GENERAL INTRODUCTION

1. Importance and Scope of Study

During the last two decades, due to random and indiscriminate spraying of broad spectrum pesticides for control of agricultural pests in general, many of the mite pests which were either innocuous or of very little importance, have assumed the status of major pests not only in India but in many advanced countries as well. Besides, due to repeated use of organophosphoric compounds and many a times at their sublethal doses the mites have developed resistance/cross resistance making mite control a more difficult task. To avoid such situation, many advanced countries have either banned or are planning to ban many pesticids and are switching over towards developing IPM (Integrated Pest Management) utilising the natural enemies as one of the components or are developing organic farming avoiding uses of all chemical fertilizers, pesticides, etc. In either case, the natural enemies are becoming more important strategically and serious efforts are being made to explore and identify the potentially important ones, conserve those and utilise those for effective mite control programme.

Obviously, due to all these, natural enemies have received special attention and good amount of work on diverse aspects have been done globally including India. The natural enemies of agriculturally important mite pests include predatory mites (Families : Anystidae, Bdellidae, Caligonellidae, Camerobiidae, Cheyletidae, Cunaxidae, Erythraeidae, Eupodidae, Raphignathidae, Stigmaeidae, Tydeidae–all under Order Prostigmata); Ascidae, Laelapidae, Otopheidomenidae, Phytoseiidae–all under Order Mesostigmata; Acaridae–under Astigmata and some oribatid mites under Order Cryptostigmata), insects (Families : Coccinellidae, Staphylinidae–under Order Coleoptera; Anthocoridae, Lygaeidae, Miridae–under Order Hemiptera; Thripidae, Aelothripidae–under Order Thysanoptera; Cecidomyidae under Order Diptera; Chrysopidae, Hemerobiidae, Conyopterygidae–under Order Neuroptera), Spiders (Families : Theridiidae, Argiopidae, etc.), Pathogens (Virus, Bacteria, Fungi, etc.). Out of all these, the predatory mites are the most important biocontrolling agents not only because those are voraceous feeders but also because many of those are abundantly available in fields. Besides helping in control of agriculturally important mite pests, some mites have been identified belonging to oribatids (Families: Galumnidae, Mochlozetidae, Xylobatidae) which have been found in the field feeding upon insect pests, molluscan pests and plant feeding nematodes and are believed to have importance in biocontrol programme.

Though from India, a Fauna of India volume on Phytoseiidae (Gupta, 1986)—an important group of predatory mite, is available and Gupta (1985) in his Handbook. Plant mites of India, dealt with some of the predatory mite families along with the phytophagous mites, but since publication of those, over a decade has passed and during this period a good deal of explorations have been conducted through which our knowledge regarding predatory mites have further enriched. Therefore, a need has been felt for up-dating and consolidation of informations which will help the researchers immensely and the present work is an attempt aiming at that direction.

The present Monograph aims at providing a complete account of all the predatory mites of India numbering 319 species including 6 new ones, belonging to 71 genera, 19 families under 4 orders. This gives full taxonomic account of all the species, including synonymies, descriptions, illustrations, collection records, habitats, distributions, etc. but also keys to all taxonomic categories. In addition, the other informations like bioecology, food preference, predator-prey interactions, effect of pesticides, alternate food for mass culture of promising predators and field evaluation of predators by making field release, etc. are also included basing on published/ unpublished informations.

Though Chaudhri *et al.* (1974, 1979), Chaudhri & Akbar (1985) brought three documents from Pakistan dealing with different groups of predatory mites as well as phytophagous mites, but from India, this is the first document of its kind. The other consolidated documents which are available from the other parts of the world pertain to one or two families of predatory mites only and those do nto include predatory mites as a whole, as has been done here. Expectedly, this account will prove to be very useful to the acarologists and entomologists not only in India but in abroad also and will provide a baseline data for planning further research in future.

The Part I of this Monograph includes mites belonging to Orders Prostigmata, Astigmata and Cryptostigmata (Sl. Nos. of species from 1–134) while Part II will deal with mites of Order Mesostigmata (Sl. Nos. of species from 135–219). All the measurements given in text are in microns. Since majority of the phytoseiid mites have been dealt with in detail in Fauna Volume (Gupta, 1986), for those, detailed descriptions have been avoided for brevity and only diagnosis are provided.

2. Historical Review

ANYSTIDAE

These are round, reddish, soft-bodied mites with palpal thumb-claw complex. These are very fast moving and start making whirling movement or fall down from the host plant as soon as those are touched. They are efficient predators of phytophagous mites (Frazer & Nelson, 1981).

Oudemans (1936) erected this family and included two new genera, *viz. Tencateia* and *Autenriethia* to accommodate as many new species. Some of the important later works are Hirst (1931), Womersley (1942) and Grandjean (1943). Meyer & Ryke (1960) recorded species under 3 genera, *viz. Anandia, Bechsteinia* and *Chaussieria.* Smith-Meyer & Ueckermann (1987) in their detailed account on anystid mites mainly from South Africa, India and Australia, treated a total of 28 species under 8 genera of which *Namadia* and *Paranandia* were erected as new. This also included descriptions and illustrations of 7 new species, redescribed 10 known species and re-defined another 12 species. Keys to genera and species from the world were also provided. Otto & Halliday (1991) studied systematics and biology of a species of *Anystis* inroduced in Australia as biocontrolling agent. Some of the reports recording anystid mites from India are Raut & Nandi (1980). Gupta & Nahar (1981), Raut & Bhattacharya (1989), Gupta (1989) Gupta (1991, 1992, 1992a, 1995), Gupta (in press) etc. Some of the other recent references are Judson (1995), Kuznetzov (1983), Otto (1992, 1997, 1999, 1999a, 1999b, 2000), Otto & Olomski (1994).

BDELLIDAE

These are yellowish or reddish and large sized mites with long snout and hence the name "Snout mites" These mites have the proven ability in biological control as these are voraceous feeders of spider mites (Gerson & Smiley, 1990) and Collembola (Womersley, 1933, Wallace, 1954).

Duges in 1834 erected this family. Some of the initial contributions are Michael (1896), Thor (1928, 1931, 1931a, 1937), Womersley (1933, 1933a), Grandjean (1938), Baker & Balock (1944), etc. Some of the later contributions of importance are Meyer & Ryke (1959) from South Africa, Atyeo (1960, 1963) from New Zealand and Atyeo & Tuxen (1962) from Iceland. The latter work dealt with 11 species under 5 genera and provided keys to Icelandic Bdellidae. Wallace & Mahon (1973) dealt with Australian Bdellidae and included therein Subfamilies Bdellinae, Spinibdellinae and Cytinae, provided keys to genera and species and described 5 new species. Ehara (1961) from Japan, Gomezauri (1963) from Georgian SSR, Wallace (1970, 1974) from Australia, Soliman (1975) and

Soliman & Zaher (1976) from UAR, Chaudhri *et al.* (1979) Chaudhri & Akbar (1985) from Pakistan, Shiba (1976) from Malayasia, Atyeo (1977), Wainstein *et al.* (1978) from Russia, Kuznetzov & Lisvshitz (1979) from Crimea; Swift & Goff (1987, 1988) from Hawaii, etc. made further contributions. Wallace & Mahon (1976) dealt with subfamily Odontoscirinae, treated 28 species under 2 genera, of those 8 were described as new and re-descriptions were provided for another 20 species. Relevant biological informations, wherever known, were also provided. Some of the works reporting Indian Bdellids are Gupta (1985), Gupta & Ghosh (1980) from Andaman & Nicobar Island, Gupta (1989) from tea plants, Gupta & Gupta (1989) from West Bengal, Gupta (1991, 1992a) from northeast India, Gupta (1992) from West Bengal; Jagadish *et al.* (1995) from Karnataka, Gupta (1995) from Meghalaya, Gupta & Chatterjee (1997) from Delhi, Gupta & Chatterjee (1999) from Lakshadwip and Gupta (2000) from Tripura.

CALIGONELLIDAE

Grandjean (1944) erected this family, McGregor (1950) dealt with mites of the genus *Neophyllobius* from U.S.A. Baker & Wharton (1952) placed Stigmaeidae and Caligonellidae in synonymy under Raphignathidae. Summers & Schlinger (1955) dealt with this family in detail from the world. They treated 5 genera, *viz. Caligonella*, *Molothrognathus*, *Stigmagnathus* (new genus), *Coptocheles* (new genus) and *Neophyllobius* and a total of 9 species, 8 of those were described as new to science. Chaudhri *et al.* (1974) described 2 new species from Pakistan. Koc & Ayyildiz (1996, 1997) from Turkey and Swift (1996) from Hawaii are some of the other recent works in this family. Except a species of *Molothrognathus* from northeast India (Gupta, 1991, 1992) and Gupta (in press) from Tripura, nothing else in this family is known from India.

CAMEROBIIDAE

This family is little explored from the world. Some of the mites of this family are believed to be predators.

Sepasgosarian (1985) in his comprehensive account of the superfamily Raphignathoidea, provided a list of all the families including Camerobiidae from the world. Bolland (1986) reviewed the systematics of the family and dealt with the genera *Camerobia*, *Decaphyllobius*, *Tillandiobius* and *Tycherobius* and described new species. Subsequently, Bolland (1991) and Koc & Ayyildiz (1996) dealt with the genus *Neophyllobius*. Sepasgosarian (1990) provided an addendum to the world species of the superfamily Raphignathoidae in which an additional list of species of the superfamily was provided which included some species belonging to Camerobiidae. Todi *et al.* (1998) made further contribution to this family.

CHEYLETIDAE

These mites are yellowish orange coloured having well developed thumb-claw complex furnished with sickle and or comb-like setae. Many are predators of phytophagous mites and small insects (specially crawlers of scale insects).

Leach (1815) erected this family and subsequently Womersley (1941) contributed on this family from Australia while Domrow (1960) dealt with the genus *Chelonotus*. Volgin (1949–1969) Volgin & Nikolaeva (1965) through a series of papers explored the cheyletid fauna of U.S.S.R., provided new classification scheme of this family basing upon new taxonomic characters, revised many known genera published till that time and described some new species from that region. Baker (1949) also revised this family mainly basing on collection present in the United States National Museum, Washington and recorded 18 genera, 4 of those *viz. Neocheyletiella*, *Eutogenes*, *Eucheyletia* and *Chelacaropsis* were

erected as new to accommodate as many new species to serve as types of those genera. Chaetotaxy of palp, leg I, nature and number of dorsal shields, their chaetotaxy, etc. at generic level and palpal chaetotaxy, setation on dorsal surface, chaetotaxy of leg femur, tarsus, etc. were considered as key taxonomic characters. Other important contributions in this family are Lawrence (1954) from Africa, Cunliffe (1962) and Muma (1964) from U.S.A.; Waffa & Soliman (1968) from U.A.R., etc. Volgin (1969) revised the world cheyletids and recognised 102 species belonging to 54 genera under 10 tribes which included 11 genera proposed as new and re-diagnosed many species. Summers & Price (1970) in their excellent revisionary work, re-evaluated and rediagnosed all the 59 genera (including a new genus and considered 61 species.

Smiley & Williams (1972), Smiley & Moser (1970) from North America, Soliman (1973) from Egypt, Tseng (1977) from Taiwan, Qayyum & Chaudhri (1977, 1977a, 1979, 1979a), Chaudhri *et al.* (1979), Chaudhri & Akbar (1985), Aheer *et al.* (1994)–all from Pakistan, Smiley & Whitaker (1981), Volgin (1987), Lekprayoon & Siiley 1986, are some of the other important works in this family. The Indian records on cheyletid fauna are Narayanan *et al.* (1960), Narayanan & Ghai (1963), Gupta (1970), Gupta & Dhooria (1974), Gupta (1979, 1985, 1991, 1992, 1992a). Indira, Rao & Thakur (1984), Kumar & Naqvi (1990), Sharma & Bhatnagar (1992), Singh (1995), Jagadish *et al.* (1995), Gupta & Chatterjee (1997), Gupta (2000), from Tripura, etc. Some of the more recent works in this family are Aheer *et al.* (1992, 1997) from Pakistan, Corpuz-Raros (1988, 1988a, 1998) from the Philippines, Gerson (1994) and Gerson & Fain (1991) fron Australia and Thailand, respectively.

CUNAXIDAE

These are reddish/yellowish/brownish mites fairly fast moving and are known to be active predators of phytophagous mites (Ewing & Webster, 1912). Some are known to fasten their prey by threads secreted from their mouth parts.

The family Cunaxidae was erected by Thor (1902) to include those mites having 4 palpal segments, previously included under Bdellidae. *Scirus setirostris* Hermann (1804) was the first mite assigned to this family. Some of the earlier contributions towards enhancing knowledge in this family were von Heyden (1826), Duges (1834), Koch (1835), Kramer (1881), Banks (1894), Berlese (1904, 1910), Ewing (1909–1917), Oudemans (1922), Womersley (1933), etc. Thor & Willmann (1941) made the first comprehensive study of this family. They recognised 7 genera and 30 species/varieties, Baker & Hoffmann (1948) in their monographic study retained only 3 genera, *viz. Cunaxa*, *Bonzia* and *Scirula* and proposed replacement name *Cunaxoides* for *Eupalus*. Later Atyeo (1958) showed the relationship of Cunaxidae with Bdellidae and suggested its replacement in the super family Bdelloidea. Meyer & Ryke (1959) worked on some south African Cunaxidae. Muma (1960, 1961, 1961a, 1965) reported predatory behaviour of Cunaxidae. Smiley (1975) dealt with this family in detail and revised the generic classification. According to him, the taxonommic characters of importance were number of palpal segments and the nature of setae on it, location of dorsal shields and its setal pattern, presence of any tarsal flanges, etc. He recognised 9 genera, 4 of which, *viz. Parabonzia*, *Pseudobonzia*, *Neocunaxoides* and *Pseudocunaxa* were proposed as new. Den Heyer (1975–1981b) through as many as 20 papers elaborately dealt with cunaxids mostly from Afrotropical region, proposed several new taxa and revised some of the existing ones. The other important contributions in this family were Shiba (1978) from Malayasia, Chaudhri (1976–1985) and Muhammad & Chaudhri (1992) through 9 papers from Pakistan, Kuznetzov & Livshitz (1978, 1979) from Crimea, Liang (1983, 1984,

1985), Bu & Li (1987, 1987a)—all from China, Tseng (1980) from Taiwan, Michocka (1982) from Poland, etc. In an elaborate review of cunaxid fauna of the world, Sepasgosarian (1984) introduced a new taxonomic concept, discussed the past work done by authors and recognised 6 tribes, 15 genera and 124 species under this family and listed all the pertaining references. Smiley (1992) brought out a monograph on the family wherein he treated 166 species distributed over 9 subfamilies and 17 genera, 3 of which, *viz. Denheyenaxoides, Neobonzia, Paracunaxoides*, were erected as new. Besides giving full descriptions and illustrations of all the species, provided detailed synonymies and keys to all the taxa, discussed morphological characters of taxonomic importance and provided many new synonymies and new combinations. The number of palpal segments, kinds of palpal setae, kinds of setae on anterior region of hypostome (ventral side), etc. served as characters for separating subfamilies, genera and species. Lastly, by providing a dendogram, he tried to exhibit the systematic relationship of the genera within the family. Corpuz-Raros (1996) from the Philippines also contributed on this family. Indian works in this family are Gupta & Chattopadhyay (1979), Gupta & Ghosh (1980), Gupta (1981, 1985, 1991, 1992, 1992a, 1995), Gupta & Chatterjee (1997, 1999), Gupta (2000—from Tripura), Gupta (in press—from Sikkim), Gupta & Chatterjee (in press—from Mizoram), Jagadish *et al.* (1995) etc.

ERYTHRAEIDAE

These are large reddish mites, the adults and nymphs of which are mainly predators while larvae are mostly phoretic. The important works from abroad are Meyer & Ryke (1959), Tseng *et al.* (1976), van Huyssteen (1977), Treat (1980), Fain *et al.* (1987), Southcott (1961, 1965, 1984, 1988, 1989, 1989a), etc. Later Southcott (1992, 1994, 1995, 1996), reported new larval erythraeids from North America, West Africa and Spain and Australia, respectively while Southcott (1994a) dealt with erythraeids of Asia and New Guinea, describing two new species and providing keys to all the species. Wilson *et al.* (1987) reported an erythraeid mite externally parasitizing a honey bee. Gabrys (1989) described 4 new species of *Erythraeus* from Iran. The Indian records of Erythraeidae on plants are Khot (1963–1965), Ghai & Ahmed (1975), Rawat (1981), Fasih & Srivastava (1990), Sundararaju (1993), Gupta (1985, 1992), Gupta & Chatterjee (1997), Gupta (in press—from Sikkim), etc. Some of the more recent references in this family are : Fain & Jocque (1996), Fain & Repka (1998), etc.

EUPODIDAE

These mites are whitish/creamish/light brownish and are characterized by having bulging femur IV used for jumping and in many species, the dorsal setae are expanded basally and narrowing distally. In the field, as soon as they are touched, they jump. They occur on plants and their food habits are not known definitely but may have predatory nature besides fungivorous.

This family was erected by Koch in 1842. Some of the earlier works in this family are Thor & Willmann (1941), Meyer & Ryke (1960) from South Africa, Womersley & Strandtmann (1963) from Australia, Coineau (1976), Shiba (1976) from Malayasia, Livshitz & Mitrofanov (1978) from Russia, Strandtmann & Prasse (1977) from G. D. R., etc. Strandtmann (1971) dealt with these mites from Alaska and provided keys to the species of *Eupodes*. Strandtmann & Davies (1972) in their account on eupodid mites from Crozet Islands, dealt with 12 species including a new one and provided key to all the known species. Strandtmann & Goff (1978) worked out the eupodid mites from Hawaii and reported 5 species under 3 genera of which one genus and two species were new to science. Wainstein (1978) and Wainstein & Gylarov (1978) from

Russia, etc. also contributed in this family. The Indian records of eupodid mites are Gupta (1991), Gupta (1992a) from northeast India, Gupta (1992) from West Bengal, Gupta (1995) from Meghalaya, Gupta (in press—from Sikkim) and Gupta & Chatterjee (in press—from Mizoram), etc.

RAPHIGNATHIDAE

These mites occupy almost similar habitats as those of stigmaeids. Although food habits are not known definitely but some are believed to be predators.

Kramer (1931) erected this family and thereafter, for several years, the contributions which came out were meagre. Meyer & Ryke (1959) from South Africa, Atyeo (1963) from Australia, Atyeo *et al.* (1961) from U.S.A., Gerson (1968) from Israel, Kuznetzov (1976) from U.S.S.R. and Chaudhri *et al.* (1979) from Pakistan contributed in this family describing new taxa. Sepasgosarian (1985) while reviewing the superfamily Raphignathoidea, listed the species along with pertinent references in respect of this family. Ueckermann & Smith-Meyer (1987), Smith-Meyer & Ueckermann (1989) described some new species from Africa while Barilo (1989) contributed to this family from Central Asia. Sepasgosarian (1990) published an addendum to Sepasgosarian (1985) and listed the species with relevant references. Zacharda (1995, 1995a) from North America and Koc & Ayyildez (1996) from Turkey are the other relevant workers in this family. The Indian work on plant inhabiting raphignathids is rather poor and the only work of worth mentioning is Gupta (1992) from West Bengal.

STIGMAEIDAE

Like phytoseiids, these mites are important predators and have received considerable importance. Stigmaeids are yellowish mites, ovoid or elongate, very active and occupy varid habitats.

Oudemans (1931) erected this family with *Stigmaeus* Koch, 1836 as its type, genus. Grandjean (1944), Willmann (1951) made some earlier contributions. Summers (1957–1966), Summers & Price (1961), Summers & Ehara (1965), Ehara (1962, 1964), Habeeb (1966), Wood (1966–1974), Meyer (1969), Gerson (1971), Soliman (1975), Andre (1977), Kuznetzov (1977, 1977a, 1977b, 1978), Kuznetzov & Wainstein (1977) made valuable contributions to this family. Gonzalez-Rodriguez (1965) dealt with the genera *Zetzellia, Agistemus* and *Mediolata* from the world and provided description of new species, besides giving keys to all the genera and species. Chaudhri (1965), Chaudhri *et al.* (1974, 1979), Chaudhri & Akbar (1985) from Pakistan, Ehara & Omen-Kalsbeck (1983) from Indonesia, Ehara & Wongsiri (1984) from Thailand, Wang & Xu (1986), Liang & Hu (1987), Hu & Chen (1992, 1994) all from China, Ueckermann & Smith-Meyer (1987), Vandes *et al.* (1993) from Afrotropical region and Barilo (1989) from Central Asia are some of the other useful contributions in this family. Gupta (1985) in his Handbook on plant mites of India reported 3 species of Stigmaeidae known till then from India. Later, Gupta (1991, 1992, 1992a, 1995), Gupta & David (1990), Mathur et al. (1995), Gupta & Chatterjee (1997, 1999), Chatterjee & Gupta (1996) and Gupta (2000–from Tripura), Gupta (in press–from Sikkim) and Gupta & Chatterjee (in press–from Mizoram) either described new species or recorded some hitherto unknown stigmaeids from India. Yeu-Bisong & Tsai (1995) recorded *Agistemus exsertus* as a predator of citrus red mite, Gerson & Smith-Meyer (1995) dealt with Australian stigmaeids.

TYDEIDAE

These are small, soft bodied mites with needle-like chelicerae which may be fused or contiguous

at bases, Though these mites have diverse food habits, yet many are efficient predators upon nematodes (Santos *et al.* 1981) and eggs of *Eutetranychus orientalis* (Dhooria, 1982).

Kramer (1877) erected this family and this was followed by contributions by others, *viz.* Thor (1933), Baker (1944–1947), Wood (1965), etc. Baker (1965) while reviewing this family from the world, re-diagnosed this family and recognised 15 genera, 6 of those were erected as new. Besides, he described 8 new species, proposed some new combinations and provided keys to all the genera. Subsequently, Baker through a series of papers contributed on the tydeid fauna of the world under different genera, *viz. Pronematus* (Baker, 1968), *Lorryia* (Baker, 1968a), *Paralorryia* (Baker, 1968b), erected 2 new genera, *viz. Oriola* and *Meyerella* (Baker, 1968c), on *Tydeius* (Baker, 1970) and on *Naudea* (Baker & Delfinade, 1976). In all the papers, the species regonised by him were fully described, illustrated and keyed out. Other contributions in this family are Gerson (1968) from Israel, Salvijo (1969) from the Philippines, Marshall (1970) from Canada, Karg (1973), Kuznetzov (1972, 1973, 1973a, 1973b, 1974, 1975, 1975a, 1978, 1979, 1979a), Kuznetzov & Livshitz (1972, 1973, 1973a, 1973b, 1973c, 1973d, 1979), Kuznetzov & Petrova (1979, 1979a), Livshitz & Kuznetzov (1972, 1973, 1973a), Livshitz *et al.* (1973, 1973a) from Crimea and Machev & Shiovma (1978) from Bulgaria, Gupta *et al.* (1971), Sandhu *et al.* (1975), Gupta & Dhooria (1972), Gupta & Ghosh (1980), Gupta & Nahar (1981), etc. contributed on the tydeid fauna of India. Andre, through a series of papers, published during 1978–1987, revised different taxa of Tydeidae, proposed some new taxa, provided keys to known taxa, proposed general classification and discussed phaenotaxy of each leg segment. Later, the contributions of importance were Ueckermann & Smith-Meyer (1979) from Africa, Gupta (1985, 1989, 1991, 1992, 1992a, 1995), Chatterjee & Gupta (1996), Gupta & Chatterjee (1997), Gupta (2000–from Tripura), Gupta (in press–from Sikkim), Gupta & Chatterjee (in press–from Mizoram), Momen (1988, 1994, 1994a) from Ireland, El-Bagaury & Abu-Awad (1986), El-Bagaury & Momen (1989, 1990), Momen & El-Bagaury (1989, 1994–all from Egypt, Moti & Andre (1990) Momen (1995), Momen & Lundqvist (1995, 1995a, 1996, 1996a, 1996b) from Sweeden, Momen (1996) from the Himalayas, Panau & Emmanouel (1995, 1995a, 1995b, 1995c) and Panau & Kazmierski (1995) from Greece, Kizmiriski (1989, 1990) etc.

ACARIDAE

These mites are whitish, large sized, mostly fungus feeders and there are some which feed on the eggs of insects as well as of mites.

Michael (1901) and Robertson (1946) contributed to this family, Robertson (1946, 1959) revised the acarid mites. Cherian (1931) reported *Tyrophagus longior* infesting decaying orange from India. Grandjean (1939) studied chaetotazy of acarid mites. Ewing & Nesbitt (1942) published some notes on taxonomy of grain mites belonging to Acaridae. Solomon (1946), Kilpo & Pirile (1952), Hughes (1955, 1961, 1976) dealt with this family in detail. Yunker (1955) provided new classification of Acaridae. Griffiths (1964) revised the genus *Acarus* including all the species of this genus known from the world. The same author (Griffiths, 1964a, 1970) made further contributions in this genus. Zheleva & Angelkova (1961) studied the Bulgarian acarid mites. Pillai (1955), Prasad (1965) and Gupta (1970) reported species of this family occurring on plants in India. Eyndhoven (1968) described new species of this family. Wadhi *et al.* (1971) reported *Rhizoglyphus* on plant in India while Manson (1972) reported species (including new species) of *Rhizoglyphus*. Gupta (1992, 1995, Gupta & Chatterjee (1997), Gupta (2000–from Tripura), Gupta (in press–from Sikkim)

and Gupta & Chatterjee (in press–from Mizoram) are the other references reporting plant associated acarid mites from India. Recently, Rao & Prakash (1985, 1987) reported acarid mite on rice in India.

ASCIDAE

Like phytoseiids, these mites are also important predators (Tseng, 1984). Other common habitats of these mites are leaf litter, soil and stored products. Although a large number of species in this family have been published but majority of those are from habitats other that plants.

The authority of the family name has been bestowed upon Canestrini & Fanzago (1876). Some ot the initial contributions in this family are Willmann (1939), Wharton (1941), Baker & Wharton (1952), Womersley (1956), Domrow (1957), Evans & Hyatt (1960), Evans (1963), Lindquist & Evans (1965), Bernhard (1963), Athias-Henriot (1961), Wood (1966), etc. Evans (1958) revised the British Aceosejinae wherein he provided keys to all the species totalling 35 while Hurlbutt (1963) dealt with North American *Asca* treating 15 species. Chant (1963) dealt with Blattisocinae and treated 32 species (including from India), in addition to describing 25 new species. Fain *et al.* (1977) dealt with Belgian phoretic Ascids, Haienes (1979) revised *Blattisocius* and described a new species under it. Evans & Till (1979) dealt with Mesostigmata of Britain and Ireland and therein dealt with ascids of those regions. Tseng (1978, 1981, 1984) on ascids of Taiwan, Nasar & Abu-Awad (1987) from Egypt, Lindquist & Wu (1991) are some of the other important works. Walter *et al.* (1993) revised the genus *Asca* from Australia. Karg (1996) dealt with gamasid fauna from New Caledonia. So far as plant associated ascid mites from India is concerned, mention may be made of Narayanan & Ghai (1964), Menon & Ghai (1968), Gupta (1985, 1992, 1995), Gupta & Chatterjee (1997), Gupta (in press–from Sikkim), Gupta & Chatterjee (in press–from Mizoram), etc.

PHYTOSEIIDAE

Phytoseiid mites are potential predators of a number of phytophagous mites as well as of a few groups of sucking insects, like aphids, coccids, etc. and help significantly in biological control of phytophagous mites. In view of this importance, these mites have received global attention and work on taxonomy, bioecology, mass rearing, predator-prey interaction, etc. have been done extensively. Majority of those works from India have been reviewed by this author in his earlier publications (Gupta, 1986, 1987, 1989) and most of those are not included here for brevity. Some of the other important works which were not included there or appeared later from abroad are Tuttle & Muma (1973) on phytoseiids from Arizona, Kolodochka (1978) on Manual of plant inhabiting phytoseiids, El-Banhawy, (1975, 1979, 1979a, 1984) on phytoseiids of Brazil and Peru, Daneshvar & Denmark (1982) on Iranian phytoseiids, DeMoraes & Oliveira (1982) on phytoseiids of Brazil, McMurtry (1983) on phytoseiids of Guatemala, Denmark & Schicha (1983) on revision of *Phytoseiulus*, Swirski & Amitai (1984, 1985) on phytoseiids of Israel, Schicha (1983, 1984, 1987), McMurtry & Schicha (1987), Schicha & O'Dowd (1993) on phytoseiids of Australia, Schicha & Gutierrez (1985) from Papua—New Guinea, Ueckermann & Loots (1985, 1987) on South African phytoseiids, DeMoraes & McMurtry (1983, 1988, 1988a) on phytoseiids of Brazil, Columbia and Kenya, respectively; Chant & Yoshida-Shaul (1986) on world review of *ecelesiasticus* species groups, Wei-nan (1984), Wei-nan & Zhao-quan (1984, 1984a, 1984b) from China, McMurtry & DeMoraes (1985) on phytoseiids of Papua—New Guinea, Bayan (1985, 1988, 1995) on phytoseiids of Lebanon, DeMoraes *et al.* (1986) on phytoseiid catalogue, Denmark

(1988) on phytoseiids of Cambodia, DeMoraes & Mesa (1988) on phytoseiids of Columbia, Chant & Yoshida-Shaul (1989, 1991, 1992) on adult dorsal, ventral and idiosomal setal patterns of Phytoseiidae, Cobanoglu (1989) on phytoseiids of Turkey, DeMoraes *et al.* (1989, 1989a, 1989b, 1989c) on phytoseiids of Far East, Africa and Kenya, respectively, McMurtry & DeMoraes (1989) on phytoseiids of Peru, Denmark & Muma (1989) on revision of *Amblyseius*, McMurtry & Baunfour (1989) on phytoseiids of Morocco, Allawi (1991) on phytoseiids of Jordan, Ueckermann (1990, 1992) on South African Phytoseiidae, McMurtry & DeMoraes (1991) on phytoseiids of Zimbabwe, Papadoulis & Emmanouel (1991) on phytoseiids of Greece, Kolodochka & Bondarenko (1993) on phytoseiids of Black Sea region, DeMoraes *et al.* (1991) on phytoseiids of Latin America, El Banhawy & Abou-Award (1991) on phytoseiids of Tanzania, Schicha & Corpuz Raros (1992) on phytoseiids of the Philippines, Calvatti & Tsolokis (1992) on phytoseiids of Lazio, Weinan *et al.* (1992) on phytoseiids of Northeast China, Kolodochka (1991, 1993) on Russian phytoseiid fauna, Takahashi & Chant (1993, 1993a, 1993b) on phylogenetic relationships of *Phytoseiulus* groups, Denmark & Kolodochka (1993) on revision of *Indoseiulus* and Lairong & Tao (1992) on *Indoseiulus*, Touvinen (1993) on phytoseiids of Finland, Aponte & McMurtry (1993) on Venezuelian phytoseiids, Chant (1993) on adaptive radiation of the family Phytoseiidae, Denmark (1992, 1993, 1994) on revision of *Typhlodromus*, *Phytodromus* and *Paraseiulella*, respectively, Corpuz Raros (1994) on phytoseiids of the Philippines, Chant & McMurtry (1994) on review of Subfamily Phytoseiinae and Typhlodrominae (they recognised 142 and 452 species of the two subfamilies, respectively), Ragusa & Tsolakis (1994) on revision of the genus *Kampimodromus*, Lairong & Juan (1994) on phytoseiids of China, Papadoulis (1994) and Ragusa *et al.* (1995) on phytoseiids of Greece, Ryu & Lee (1992), Ryu & Ehara (1993) and Ryu (1996) on phytoseiids of Korea, Yoshida-Shaul & Chant (1995) on review of phytoseiids described by Oudemans, Kolodochka & Denmark (1996) on revision of *Okiseius*, Whitney & James (1996) on Australian phytoseiids and Weinan *et al.* (1997) on phytoseiids from China. So far as Indian phytoseiids are concerned, the relevant works have been reviewed in Gupta (1985, 1986, 1987, 1988) and in addition to those the other works are Karg (1983), Singh *et al.* (1989), Gupta (1987a, 1992, 1992a, 1995, 1995a, 1996), Mukherjee & Singh (1993), Chatterjee & Gupta (1996), Gupta & Chatterjee (1997), Singh (1994, 1995), Denmark & Rather (1984, 1996), Rishi & Rather (1983, 1984) Rather (1984, 1985, 1986, 1987, 1989, 1999), Sadana *et al.* (1990), Gupta & Gupta (1989), Dhooria (1990), Singh & Singh (1996), Jagadish *et al.* (1995), Mathur *et al.* (1995), Tagore & Putatunda (1995), Gupta & Chatterjee (1999), Gupta (2000), Gupta (in press–from Sikkim), Gupta & Chatterjee (in press–from Mizoram) etc. Some of the other recent works in this family are : Denmark & Kolodochka (1990), Yoshida-Shaul & Chant (1991, 1997), Chant & Yoshida-Shaul (1992a), Wu & Lan (1992), Denmark *et al.* (1999), Schicha & Corpuz-Raros (in press), etc.

Mites of the families Laelapidae and Otopheidomenidae reported here as predators of insect pests are not primarily plant inhabiting groups. Laelapidae is a large family known to occur in diverse habitats while Otopheidomenidae is mainly an insect associated group. Similarly, the oribatid mites belonging to families Galumnidae, Mochlozetidae and Xylobatidae dealt with here as predators of plant parasitic nematodes, are primarily soil inhabiting groups. Therefore, Historical review in respect of these five families has not been included in this monograph for brevity and also because it is out of scope of the present work.

3. CLASSIFICATION, KEYS TO ORDERS AND FAMILIES OF PREDATORY MITES KNOWN TO INHABIT PLANTS IN INDIA

CLASSIFICATION

Phylum ARTHROPODA
Sub Phylum CHELICERATA
Class ARACHNIDA
Sub Class ACARI

Key to orders of Subclass ACARI known to inhabit plants in India (After Meyer *et al.*, 1973)

1. Palpal apotele represented by a tined seta, situated near the inner basal angle of tarsus; stigmata situated dorsal to coxae II–IV and usually with elongated peritremes; tritosternum usually with lacinie, tectum present roofing gnathosama ..... Order MESOSTIGMATA

– Apotele completely absent on pedipalp, stigmata never situated dorsal to coxae II–IV 2

2. Ambulacrum of legs comprising of a median claw with a prominent pretarsus or an associated membranous pad; or a stalked sucker-like organ; chelicerae invariably chelate; trichobothria never present on idiosoma; stigma and tracheae absent ..... Order ASTIGMATA (Family : ACARIDAE)

– Ambulacra of legs not like as above, chelicerae chelate or variously modified into piercing stylets or hook-like organs; idiosoma with trichobothria, a respiratory system usually present 3

3. One pair of propodosomal trichobothria almost invariably present comprising piliform, clavate, barbed pseudostigmatid organ arising from conical depressions (pseudostigmata), chelicerae typically chelate, dentate, pedipalps simple; tibia never with distal claw, when present, the tracheal system opening externally in the acetabular cavities of legs I and II, or in the form of "brachytracheae" opening on the legs I and II or the pseudostigmata, idiosoma normal, usually well sclerotized mites ..... Order CRYPTOSTIGMATA

– Propodosomal trichobothria, when present, usually with conspicuous pseudostigmata, chelicerae rarely chelate, dentate, pedipalps of various forms, often tibia and tarsus of pedipalp form thumb-claw complex, tracheae when present open through paired stigmata situated between chelicerae or on dorsal surface of propodosoma, often sclerotized mites of normal shape or idiosoma may be vermiform with overlapping sclerites ..... Order PROSTIGMATA

Order PROSTIGMATA

Key to the families of order PROSTIGMATA known to inhabit plants in India (After Meyer *et al.* 1973)

1. Without a palpal thumb claw complex 2

– With a palpal thumb claw complex, in some cases the claw may be small or obsolete, if obsolete, it is replaced by a relatively long seta 5

2. Rod-like solenidion on tarsus I usually lying flush with tarsus in a specialised membranous depression (ragidial organ); anteriorly the propodosoma with a tubercle bearing one pair of setae .. EUPODIDAE

3. Rod-like solenidion on tarsus I erect, arising from a small, circular membranous base 3

3. Cheliceral bases fused, or if not fused, not capable of lateral scissors-like motion over gnathosoma ..... TYDEIDAE

– Chelicerae free, attached at base and free to move scissors-like laterally across gnathosoma 4

4. With 2 pairs of genital suckers, the relatively long palpi turned inward, distal segment usually claw-like; free living ..... CUNAXIDAE
- With 3 pairs of genital suckers; the relatively long palpi elbow-like with distal setae; free living..... BDELLIDAE
5. Body dorsally clothed with setae; larvae heteromorphic ..... ERYTHRAEIDAE
- Body setae relatively few, arranged in transverse rows; larvae heteromorphic ... 6
6. Chelicerae free, hinged at bases so that they are capable of scissors like movement in horizontal direction ..... ANYSTIDAE
- Cheliceral bases fused or partly fused, with needle-like movable chelae 7
7. Cheliceral bases closely fused with gnathosoma and without indication of suture; peritremes usually M-shaped, may be present on gnathosoma ..... CHEYLETIDAE
- Cheliceral bases fused with each other but not with gnathosoma, having suture conspicuous; peritremes usually present on anterior portion of propodosoma 8
8. Body ovoid or nearly circular in shape, flattened, with spiniform dorsal setae; legs disproportionately long, stilt-like tactile seta on genu of one or more legs, often ultra long ..... **CAMEROBIIDAE** (*Neophyllobius*)
- Body globular, pyriform, not noticeably flattened, longest leg not longer than length of idiosoma, usually shorter 9
9. Dorsal plating absent or feebly developed, cheliceral bases fused to form a stylophore, which dorsally may bear the sinuous, chambered peritremes or else the peritremes reaching the chelicerae, free living ..... CALIGONELLIDAE (*Molothrognathus*)
- Doral plating variable; peritremes not reaching into chelicerae; cheliceral bases independent or forming a stylophore 10
10. Chelicerae form a stylophore, coxae II and III contiguous, free living..... RAPHIGNATHIDAE
- Chelicerae generally independently movable but may be adnate or stylophore like, in a few genera coxae II and III not contiguous; legs I and II directed anteriorly, III and IV directed posteriorly ..... STIGMAEIDAE

Order CRYPTOSTIGMATA

Key to the families of order CRYPTOSTIGMATA known to be predating upon plant parasitic nematodes in India

1. Pteromorphae movable; dorsosejugal suture continuous 2
- Pteromorphae immovable; dorsosejugal suture interrupted medially ..... MOCHLOZETIDAE
2. Pteromorphae auriculate or semicircular, hinged, prodorsum with true lamellae ..... GALUMNIDAE
- Pteromorphae never auriculate, hinged, prodorsum with true lamellae ..... XYLOBATIDAE

Order MESOSTIGMATA

Key to the families of Order MESOSTIGMATA known to inhabit plants in India (After Krantz, 1978)

1. Epigynial shield truncate or weakly convex posteriorly and widely separated from anal shield, sometimes abutting a broad ventral shield (if epigynial plate rounded posteriorly, then anal shield not triangular in shape), free living, phoretic or parasitic on arthropods, or phoretically associated with birds 2

– Epigynial shield round or pointed posteriorly, usually widely separated from triangular anal shield, assuming a flattened or invaginated aspect posteriorly. Predators, nidicoles, insect associated and ecto/endo parasites of vertebrates; .... DERMANYSSOIDEA*

* Chelicerae dentate or edentate, fixed digit present, with 3 pairs of hypostomal setae in nymphs and adults. Peritreme variously produced, typically well developed and elongate, occasionally absent. A heterogeneous group comprising free living forms, and facultative/obligate parasites ... . LAELAPIDAE

2. Deutonymphs and adults with less than 20 pairs of dorsal shield setae (if more than 20 pairs present then peritremes are absent or tibia IV has 2 anterodorsal setae $2\frac{2}{1}\frac{2}{1}1$. Free living or phoretic or parasitic on insects ..... PHYTOSEOIDEA, 3

– Deutonymphs and adults with more than 20 pairs of dorsal shield setae. Free living or phoretically associated with arthropods or birds ..... ASCOIDEA*

* Endopodol and exopodal elements generally distinct (exopodal elements usually present and fused with sternal shield, exceptions in Arctoseiinae) endopodal elements usually present and fused with sternal shield; elongate dorsodistal tarsal setae present or absent, if present then accompanied by a median elongate or broadly rounded pulvillar lobe; tibia I typically with 10 setae $2\frac{1}{1}\frac{3}{1}2$. Free living or phoretically associated with insects or birds ..... ASCIDAE

3. Fixed digit of chelicera absent or reduced to less than 1/4 length of the movable digit. Tritosternum commonly absent or reduced to a broad remnant. Anal opening terminal (occasionally posteroventral in an anal shield. Parasits of insects .... OTOPHEIDOMENIDAE

– Fixed digit of chelicera normally developed, subequal in length to movable digit, tritosternum present. anal opening subterminal, in ventrianal sheld. Free living, aerial predators..... PHYTOSEIIDAE

4. SYSTEMATIC LIST OF PLANT INHABITING PREDATORY MITES OF INDIA

PART–I

Order I. PROSTIGMATA

Family 1. ANYSTIDAE Oudemans

1. *Anystis baccarum* (Linnaeus.)
2. *Anystis indica* Gupta
3. *Anystis nagalandensis* Gupta
4. *Anystis* sp.
5. *Tencateia kanthiensis* Gupta
6. *Tencateia* sp.
7. *Walzia darjeelingensis* Gupta
8. *Walzia indiana* Smith-Meyer & Ueckermann
9. *Walzia* sp.

Family 2. BDELLIDAE Duges

Subfamily 1. BDELLINAE Grandjean

10. *Bdella khasyana* Gupta
11. *Bdella maldahensis* Gupta
12. *Bdella* sp.

Subfamily 2. CYTINAE Grandjean

13. *Cyta* sp.

Subfamily 3. SPINIBDELLINAE Grandjean

14. *Biscirus* sp.
15. *Spinibdella* sp.

Subfamily 4. ODONTOSCIRINAE Grandjean

16. *Bdellodes affinis* Atyeo
17. *Bdellodes angustifolius* (Gupta)
18. *Bdellodes atro* (Gupta)
19. *Bdellodes grandiflora* Gupta
20. *Bdellodes manipurensis* Gupta

21. *Bdellodes* sp. nr. *procincta* Atyeo
22. *Bdellodes* spp.
23. *Octobdellodes guajavae* Chatterjee & Gupta sp. nov.

Family 3. CALIGONELLIDAE Grandjean

24. *Molothrognathus leptostylus* Summers & Schlinger

Family 4. CAMEROBIIDAE McGregor

25. *Neophyllobius guajavae* Chatterjee & Gupta sp. nov.

Family 5. CHEYLETIDAE Leach

26. *Chelacaropsis moorei* Baker
27. *Cheletacarus gryphus* Summers & Price
28. *Cheletogenes ornatus* (Canestrini & Fanzago)
29. *Cheletomimus* sp.
30. *Cheletonella summersi* Chatterjee & Gupta, sp. nov.
31. *Cheyletus eruditus* (Schrank)
32. *Cheyletus fortis* Oudemans
33. *Cheyletus malaccensis* Oudemans
34. *Cheyletus* spp.
35. *Eucheyletia reticulata* Cunliffe
36. *Grallacheles tulipi* Chatterjee & Gupta, sp. nov.
37. *Hemicheyletia bakeri* (Ehara)
38. *Hemicheyletia indica* Gupta
39. *Hemicheyletia* sp.
40. *Paracheyletia pyriformis* (Banks)

Family 6. CUNAXIDAE Thor

Subfamily 1. CUNAXIINAE Oudemans

41. *Armascirus taurus* (Kramer)
42. *Cunaxa anacardae* Gupta
43. *Cunaxa bambusae* Gupta & Ghosh
44. *Cunaxa capreolus* (Berlese)
45. *Cunaxa crista* Gupta
46. *Cunaxa curassavica* Gupta
47. *Cunaxa cynodonae* Gupta & Ghosh
48. *Cunaxa mangiferae* Gupta
49. *Cunaxa myabunderensis* Gupta & Ghosh
50. *Cunaxa setirostris* (Hermann)
51. *Cunaxa womersleyi* Baker & Hoffmann
52. *Cunaxa* spp.
53. *Dactyloscirus bengalensis* Gupta
54. *Dactyloscirus machairodus* (Oudemans)
55. *Dactyloscirus* sp.

Subfamily 2. CUNAXOIDINAE Den Heyden

56. *Cunaxoides croceus* (Koch)
57. *Cunaxoides nicobarensis* Gupta & Ghosh
58. *Neocunaxoides andrei* (Baker & Hoffmann)
59. *Neocunaxoides cerasoides* Gupta
60. *Neocunaxoides pradhani* Gupta & Ghosh
61. *Neocunaxoides* sp.

Family 7. ERYTHRAEIDAE Robineau-Desvoidy

Subfamily 1. BALAUSTIINAE Southcott

62. *Balaustium* sp.

Subfamily 2. CALLIDOSOMATIINAE Southcott

63. *Abrolophus delhiensis* Khot
64. *Abrolophus ripicola* Womersley
65. *Abrolophus* sp.
66. *Sphaerolophus delhiensis* Khot
67. *Sphaerolophus gigas* Khot
68. *Sphaerolophus minutus* Khot

Subfamily 3. ERYTHRAEINAE Southcott

69. *Bochartia* spp.
70. *Erythraeus plumosus* Khot
71. *Paraerythraeus delhiensis* Khot
72. *Paraerythraeus serratociliatus* Khot

Subfamily 4. LEPTINAE Southcott

73. *Leptus giganticus* Khot
74. *Leptus indicus* Khot
75. *Leptus poonaensis* Khot
76. *Leptus samsungensis* Gupta
77. *Leptus* sp.

Family 8. EUPODIDAE Koch

78. *Eupodes sigmodensis* Strandtmann & Goff
79. *Eupodes* spp.

Family 9. RAPHIGNATHIDAE Kramer

80. *Exothorhis nadiaensis* Chatterjee & Gupta, sp. nov.
81. *Raphignathus darjeelingensis* Chatterjee & Gupta, sp. nov.
82. *Raphignathus guajavae* (Gupta)

Family 10. STIGMAEIDAE Oudemens

83. *Agistemus aramatei* Gupta
84. *Agistemus edulis* Gupta
85. *Agistemus exsertus* Gonzalez-Rodriguez
86. *Agistemus flescheneri* Summers
87. *Agistemus gamblei* Gupta
88. *Agistemus garrulus* Chaudhri *et al.*
89. *Agistemus herbarius* Kuznetzov & Wainstein
90. *Agistemus heterophylla* Gupta
91. *Agistemus hystrix* Gupta
92. *Agistemus industani* Gonzalez-Rodriguez
93. *Agistemus inflatus* Meyer
94. *Agistemus javanicum* Gupta
95. *Agistemus lakoocha* Gupta
96. *Agistemus macrommatus* Gonzalez-Rodriguez
97. *Agistemus obscura* Gupta
98. *Agistemus terminalis* (Quayle)
99. *Agistemus unguiparvus* Gonzalez Rodriguez
100. *Agistemus* spp.
101. *Cheylostigmaeus* sp.
102. *Eryngiopus coimbatorensis* Gupta & David
103. *Indostigmaeus rangatensis* Gupta & Ghosh
104. *Ledermuelleria parryorum* Gupta
105. *Ledermuelleria* sp.
106. *Zetzellia languida* Gonzalez-Rodriguez
107. *Zetzellia* sp.

Family 11. TYDEIDAE Kramer

108. *Lorryia africana* Baker
109. *Lorryia stricta* Gupta
110. *Paralorryia fodderi* Gupta
111. *Parapronematus acaciae* Baker
112. *Parapronematus cameliae* Gupta
113. *Parapronematus ferox* Gupta
114. *Parapronematus murshidabadensis* Gupta
115. *Parapronematus* sp.
116. *Pronematus* sp. nr. *anconai* Baker
117. *Pronematus elongatus* Baker
118. *Pronematus fleschneri* Baker
119. *Pronematus mcgregori* Baker
120. *Pronematus sextoni* Baker
121. *Pronematus ubiquitus* (McGregor)
122. *Pronematus* spp.
123. *Tydeus cumini* Gupta
124. *Tydeus gossabaensis* Gupta
125. *Tydeus ornamentalicus* Gupta
126. *Tydeus schusteri* Andre & Naudo
127. *Tydeus wallachi* Gupta & Chatterjee sp. nov.
128. *Tydeus* spp.

Order II. ASTIGMATA

Family 12. ACARIDAE Ewing & Nesbitt

129. *Caloglyphus* sp.
130. *Sancassania* sp.
131. *Tyrophagus putrescentiae* (Schrank)

Order III. CRYPTOSTIGMATA

Family 13. GALUMNIDAE Jacot

132. *Galumna flabellifera* Hammer

Family 14. MOCHLOZETIDAE Grandjean

133. *Unguizetes clavatus* Aoki

Family 15. XYLOBATIDAE Balogh & Balogh

134. *Xylobates seminudus* Hammer

PART-II

Order IV MESOSTIGMATA

Family 16 ASCIDAE Voigts & Oudemans

135. *Blattisocius tarsalis* (Berlese)
136. *Gamasellodes blcolor* Berlese
137. *Lasioseius bengalensis* Chatterjee & Gupta, sp. nov.
138. *Lasioseius mcgregori* Chant
139. *Lasioseius quadrisetosus* Chant
140. *Lasioseius terrestris* Menon & Ghai
141. *Lasioseius* spp.
142. *Melichares (Mclichares) fici* Narayanan & Ghai
143. *Proctolaelaps pygmaeus* (Muller)

Family 17 LAELAPIDAE Berlese

144. *Hypoaspis calcuttaensis* (Bhattacharyya)
145. *Hypoaspis dubium* Costa

Family 18 OTOPHEIDOMENIDAE Treat

146. *Hemipteroseius indicus* Krantz & Khot

Family 19 PHYTOSEIIDAI Berlese

Subfamily 1 AMBLYSEIINAE Muma

147. *Amblyseius (Amblyseius) adhatodae* Muma
148. *A. (A.) aerialis* (Muma)
149. *A. (A.) channabasavannai* Gupta & Daniel
150. *A. (A.) cucurbitae* Rather
151. *A. (A.) excelsus* Chaudhri
152. *A. (A.) hapoliensis* Gupta
153. *A. (A.) herbicolus* (Chant)
154. *A. (A.) indirae* Gupta
155. *A. (A.) kulini* Gupta
156. *A. (A.) largoensis* (Muma)
157. *A. (A.) mcmurtryi* Muma
158. *A. (A.) muraleedharani* Gupta
159. *A. (A.) neorykei* Gupta
160. *A. (A.) orientalis* Ehara
161. *A. (A.) paraaerialis* Muma
162. *A. (A.) raoiellus* Denmark & Muma
163. *A. (A.) shoreae* Gupta
164. *A. (Asperoseius) heveae* (Oudemans)
165. *A. (A.) hyauliangensis* Gupta
166. *A. (A.) nucifera* (Gupta)
167. *A. (Euseius) ahaioensis* Gupta
168. *A. (E.) alstoniae* Gupta
169. *A. (E.) bambusae* Ghai & Menon
170. *A. (E.) coccineae* Gupta
171. *A. (E.) coccosocius* Ghai & Menon
172. *A. (E.) concordis* (Chant)
173. *A. (E.) delhiensis* (Narayanan & Kaur)
174. *A. (E.) eucalypti* Ghai & Menon
175. *A. (E.) finlandicus* (Oudemans)
176. *A. (E.) insanus* Khan & Chaudhri
177. *A. (E.) macrospatulatus* Gupta
178. *A. (E.) neococcineae* Gupta
179. *A. (E.) ovalis* (Evans)
180. *A. (E.) pruni* Gupta
181. *A. (E.) rhododendronis* Gupta
182. *A. (E.) sacchari* Ghai & Menon
183. *A. (E.) scutalis Athias*-Henriot
184. *A. (E.) vignus* (Rishi & Rather)
185. *A. (Neoseiulus) aceriae* Gupta
186. *A. (N.) assamensis* (Chant)
187. *A. (N.) baraki* Athias-Henriot
188. *A. (N.) cucumeris* (Oudemans)
189. *A. (N.) cynodonae* Gupta
190. *A. (N.) fallacis* (Garman)
191. *A. (N.) fraterculus* Berlese
192. *A. (N.) imbricatus* Corpuz-& Rimando
193. *A. (N.) indicus* (Narayanan & Kaur)
194. *A. (N.) longispinosus* (Evans)
195. *A. (N.) oahuensis* Prasad
196. *A. (N.) paspalivorus* (Deheon)
197. *A. (N.) rangatensis* Gupta
198. *A. (N.) reticulatus* (Oudemans)

199. *A. (Paraphytoseius) multidentatus* (Swirski & Shechter)
200. *A. (P.) scleroticus* Gupta & Ray
201. *A. (Phytoscutella) salebrosus* (Chant)
202. *A. (Proprioseiopsis) arunachalensis* Gupta
203. *A. (P.) peltatus* Van der Merwe
204. *A. (P.) synachattiensis* Gupta
205. *A. (Proprioseius) kumaonensis* Gupta
206. *A. (Typhlodromalus) chickmagalurensis* Gupta
207. *A. (T.) chitradurgae* Gupta
208. *A. (T.) eucalypticus* (Gupta)
209. *A. (T.) ficusi* Gupta
210. *A. (T.) jarooa* Gupta
211. *A. (T.) kalimpongensis* Gupta
212. *A. (T.) laaensis* Gupta
213. *A. (T.) lablabi* Ghai & Menon
214. *A. (T.) mangiferae* Chatterjee & Gupta, sp. nov.
215. *A. (T.) manipurensis* Gupta
216. *A. (T.) rosica* Gupta
217. *A. (T.) sorghumae* Gupta
218. *A. (Typhlodromips) arecae* Gupta
219. *A. (T.) bangalorensis* Karg
220. *A. (T.) crotalariae* Gupta
221. *A. (T.) eujeniae* Gupta
222. *A. (T.) guajavae* Gupta
223. *A. (T.) mangiferae* Ghai & Menon
224. *A. (T.) meghalayensis* Gupta
225. *A. (T.) neocrotalariae* (Gupta)
226. *A. (T.) neoghanii* Gupta
227. *A. (T.) officinaria* Gupta
228. *A. (T.) polyantheae* Gupta
229. *A. (T.) potentillae* (Garman)
230. *A. (T.) sapienticola* Gupta
231. *A. (T.) sijiensis* Gupta
232. *A. (T.) suknaensis* Gupta
233. *A. (T.) syzygii* Gupta
234. *A. (T.) tetranychivorus* (Gupta)
235. *Indoseiulus eharai* Gupta
236. *I. ghaiae* Denmark & Kolodochka
237. *I. ricini* (Ghai & Menon)
238. *Iphiseius (Iphiseius) andamanicus* Gupta
239. *I. (I.) hapoli* Gupta
240. *I (Trochoseius) bakeri* Gupta
241. *Paraamblyseius fragariae* Gupta
242. *P. mumai* Gupta
243. *Phytoseiulus persimilis* Athias-Henriot
244. *Platyseiella mumai* Ray & Gupta
245. *Okiseius himalayana* Gupta
246. *O. sikkimensis* Gupta
247. *O. yazuliensis* Gupta

Subfamily 2. PHYTOSEIINAE Berlese

248. *Indodromus meerutensis* Ghai & Menon
249. *Phytoseius (Pennaseius) kapuri* Gupta
250. *P. (P.) minutus* Narayanan *et. al.*
251. *P. (P.) namdaphaensis* Gupta
252. *P. (Phytoseius) bandipurensis* Gupta
253. *P. (P.) brevicrinis* Swirski & Shechter
254. *P. (P.) coheni* Swirski & Shechter
255. *P. (P.) corniger* Wainstein
256. *P. (P.) crinitus* Swirski & Shechter
257. *P. (P.) domesticus* Rather
258. *P. (P.) indicus* Bhattacharyya
259. *P. (P.) intermedius* Evans & Macfarlane
260. *P. (P.) jujuba* Gupta
261. *P. (P.) macropilis* (Banks)
262. *P. (P.) macrosetosus* Gupta
263. *P. (P.) maldahensis* Gupta
264. *P. (P.) meyerae* Gupta
265. *P. (P.) mixtus* Chaudhri
266. *P. (P.) mizoramensis* Gupta & Chatterjee, sp. nov.
267. *P. (P.) neocorniger* Gupta
268. *P. (P.) neoferox* Ehara & Bhandhufalck

269. *P. (P.) nipponicus* Enara
270. *P. (P.) punjabensis* Gupta
271. *P. (P.) rachelae* Swirski & Shechter
272. *P. (P.) roseus* Gupta
273. *P. (P.) rugosus* Denmark
274. *P. (P.) swirskii* Gupta
275. *P. (P.) wainsteini* Gupta
276. *Typhlodromus (Amblydromella) arunachalensis* Gupta
277. *T. (A.) bambusicolus* Gupta
278. *T. (A.) bakeri* (Garman)
279. *T. (A.) chrysanthemi* Gupta
280. *T. (A.) dalii* (Rather)
281. *T. (A.) darjeelingensis* Gupta
282. *T. (A.) denmarki* (Rather)
283. *T. (A.) divergentis* (Chaudhri *et. al.*)
284. *T. (A.) fleschneri* Chant
285. *T. (A.) gopali* Gupta
286. *T. (A.) himalayensis* Gupta
287. *T. (A.) homalii* Gupta
288. *T. (A.) kodaikanalensis* Gupta
289. *T. (A.) mori* Gupta
290. *T. (A.) nilgiriensis* Gupta
291. *T. (A.) persicus* Gupta
292. *T. (A.) rhenanus* (Oudemans)
293. *T. (A.) rhododendroni* Gupta
294. *T. (A.) sonprayagensis* Gupta
295. *T. (A.) tarbateijamae* (Denmark & Daneshvar)
296. *T. (A.) umbratus* (Chaudhri *et al.*)
297. *T. (A.) vinifera* (Rather)
298. *T. (A.) zafari* Chaudhri
299. *T. (Anthoseius) majumderi* Gupta
300. *T. (Brethria) confusus* Narayanan *et al.*
301. *T. (B.) roshanlali* Narayanan & Ghai
302. *T. (Clavidromus) neotransvaalensis* Gupta
303. *T. (Orientiseius) channabasavannai* Gupta
304. *T. (O.) hadii* Chaudhri
305. *T. (O.) manipurensis* Gupta
306. *T. (O.) orissaensis* Gupta
307. *T. (O.) pruni* Gupta
308. *T. (O.) rickeri* Chant
309. *T. (Paraseiulus) kuzini* Wainstein
310. *T. (P.) neosoleiger* Gupta
311. *T. (Typhloctonus) celtis* (Denmark & Rather)
312. *T. (T.) malvayai* Singh & Singh
313. *T. (T.) nesbitti* Womersley
314. *T. (T.) transitans* Gupta
315. *T. (Typhlodromus) communis* Gupta
316. *T. (T.) garhwalicus* Gupta
317. *T. (T.) neorhenanus* Gupta
318. *T. (T.) sijiensis* Gupta

Subfamily 3. GNORIMINAE Chaudhri

319. *Garhwalicus himalayensis* Gupta & Ray

SYSTEMATIC ACCOUNT OF PLANT INHABITING PREDATORY MITES OF INDIA

Order I PROSTIGMATA

1. Family ANYSTIDAE Oudemans

1936. Anystidae Oudemans, *Archiv für Naturges Chichtes N. F.*, **5** : 364.
1960. Anystidae, Meyer & Ryke, *J. Ent. Soc. S. Afr.*, **23**(1) : 178.
1970. Anystidae, Meyer, *Koedae*, **13** : 32.
1977. Anystidae, Naudo, *Annalen Reeks in-8. Zoologische Watenschappen*, **230** : 290.
1982. Anystidae, Lehman, *Trans, Ent. Soc.*, **108** : 237.
1987. Anystidae, Meyer & Ueckermann, *Ent. Mem. Dep. Agric. Wat. Suppl. Repb. S. Afr.*, **68** : 1.

Diagnosis : According to Smith-Meyer & Ueckermann (1987) these mites are long legged, fast moving, predaceous in habit having radial legs. Idiosoma short or broad or longer than broad.

Integument striated. Prodorsal shield may or may not be present. Naso with a pair of sensilla normally present on anterior margin of propodosoma. The latter also bears 1 or 2 pairs of eyes. Chelicera with hook-like chela distally and with 1 or 2 pairs of setae. Palp tibia with 2 or 3 claws. Leg tarsi end in 2 claws which may be combed or toothed and also with empodium which may be claw-like, brush-like or bell-like. Genital suckers absent.

Type genus ***Anystis*** von Heyden, 1826

Key to the genera of ANYSTIDAE known to occur on plants in India (After Meyer & Ueckermann, 1987)

1 Prodorsal shield present, 2 pairs of setae present posterolateral to the genital opening, each on small platelet ..... *Anystis*

— Prodorsal shield absent 2

2. Opisthosoma with 30-120 setae ..... *Tencateia*

— Opisthosoma with about 16 setae ..... *Walzia*

Genus 1. ***Anystis*** von Heyden

1826. *Anystis* von Heyden, *Versuch einer Systematischen Einteilung der Acariden, Isis,* **19** : 609.

1936. *Anystis,* Oudemans, *Archiv. für Naturgeschichtes N. F.,* **5** : 384.

1943. *Anystis,* Grandjean, *Memoires du mus Nat. Hist. Naturelle,* **18**(2) : 33-77.

1960. *Anystis,* Meyer & Ryke, *J. Ent. Soc. S. Afr.,* **23**(1) : 179.

1977. *Anystis,* Naudo, *Annalen in-8 Zoologische Watenschappen,* **290** : 291.

1987. *Anystis,* Meyer & Ueckermann, *Ent. Mem. Dep. Agric. Wat. Suppl. Repb. S. Afr.,* **68** : 2.

Diagnosis : Body broad and short, prodorsal shield kidney shaped, broader than long, 2 pairs of eyes, palp tibia with 3 claws. Each chelicera with 2 setae. Posterior half of genital opening flanked with 2 plates, each with a seta; 4 pairs of setae present on small platelets around anal opening.

Type ***Trombidium cornigerum*** Hermann, 1804

Key to the species of *Anystis* known to inhabit plants in India

1. Opisthosoma with 6 pairs of setae .... ***nagalandensis***

— Opisthosoma with more than 6 pairs of setae 2

2. Opisthosoma with 8 pairs of setae .... ***baccarum***

— Opisthosoma with 9 pairs of setae ..... ***indica***

1. ***Anystis baccarum*** (Linnaeus) (Figs. 1-4)

1758. *Acarus baccarum* Linnaeus, *Systema Naturae,* 10th Ed. 106.

1886-1893. *Actineda baccarum,* Stoll, *Zoologia Arachnida Acaridae* (London); 45.

1905. *Anystis baccarum,* Tragardh, *Acariden aus Agypten und dem Sudan,* Part II : 63.

1926. *Anystis baccarum,* Vitzthum, *Acari aus dem Nordichen und Ostlichen Spanien Senckenbergiana,* **8**(1) : **35.**

1933. *Anystis baccarum,* Womersley, *Proc. Roy. Soc. S. Aust.,* **57** : 111.

1960. *Anystis baccarum,* Ryke & Meyer, *Inst. Politecnico Nacional Esuela nacional de ciencias Biologicas Mexico,* 568.

1960. *Anystis baccarum,* Meyer & Ryke, *J. Ent. Soc. S. Afr.,* **23** : 179.

1970. *Anystis baccarum,* Meyer, *Koedoe,* **13** : 32.

1987. *Anystis baccarum,* Meyer & Ueckermann, *Ent, Mem. Dep. Agric. Wat. Suppl. Repb. S. Afr.,* **68** : **2-8.**

1990. *Anystis baccarum,* Rishi, *Abst. IV Nat. Symp. Acarology, Calicut,* p. 32-33.

1999. *Anystis baccarum,* Dhooria, *J. Acarology,* **14** : **88-89.**

Female : Body (including gnathosoma) 1020-1502 long, 655-1117 wide. Naso on dorsum having a sensilla. Propodosomal shield rounded anteriorly and indented posteriorly, broader than long, with 2 pairs of long setae and a pair of sensilla, 2 pairs of eyes present posterolateral to prodorsal shield. Opisthosoma with 8 pairs of pilose setae. Ventrally,

anogenital region with many short serrate setae; 1-2 pairs of agenital setae present laterally to genital opening on small platelets. Palp tibia on gnathosoma with 3 claws, 4 small solenidia present on palp tarsus. Chelicera with 2 setae. Subcapitulum with 10 pairs of ventral setae. Legs with setae present dorsally. Leg tarsus terminates in 2 claws and empodium. Leg claws with brush-like setae. Solenidia present on tibia I -II and genu I-II but tarsus II devoid of solenidia.

Male : This is known from female only (Smith-Meyer & Ueckermann, 1987).

Collection Records : In India, this species was collected in Jammu & Kashmir on abandoned orchard while in Punjab, it was recroded on ornamental plant. Smith-Meyer & Ueckermann (1987) recorded this species on over 100 plants.

Habitat : India : Abandoned orchard, ornamental plant. Elsewhere : over 100 plants (Smith-Meyer & Ueckermann, 1987).

Distribution : India (Jammu & Kashmir, Punjab). Outside India : U.S.A., Australia, Europe, Juan Fernandez Isl. (Close to Chile), St. Helena, Faeroes Isl., Mexico, Japan, North and South Africa.

Remarks : This species has been reported to be a predator of tetranychids in Jammu & Kashmir (Rishi, 1990) and also on insects (Smith-Meyer & Ueckermann, 1987). No information is available from India about its bioecological aspects. Its rearing is difficult due to its cannibalistic habit.

2. ***Anystis indica*** Gupta

(Figs. 5-10)

1992. *Anystis indica* Gupta, In : *State Fauna Ser. 3. Fauna of West Bengal,* Part 3 : pp. 144-146.

Female : Dorsum striated. Naso with a pair of sensilla. Prodorsal shield smooth, much wider than long, with 3 pairs of setae. One pair of eyes present lateral to prodorsal shield; 9 pairs of setae on rest part of dorsum, all dorsal body setae serrate. Ventrally anogenital region, covered with many setae, all almost of equal length. Setae Ps 1-4 also of equal length. No ventral setae on small platelets. Palp tibia on gnathosoma with 3 strong claws. Peritreme not discernible, chelicera as figured. All leg segments bear many setae. Tarsus of each leg terminates in 2 claws, empodium brush-like.

Male : Unknown.

Collection Records : This was described on collection made in West Bengal on *Tabernaemontana coronaria.*

Habitat : Tabernaemontana coronaria.

Distribution : India (West Bengal).

3. ***Anystis nagalandensis*** Gupta

(Figs. 11-17)

1991. *Anystis nagalandensis* Gupta, *Rec. Zool. Surv. India,* **88** : 235-236.

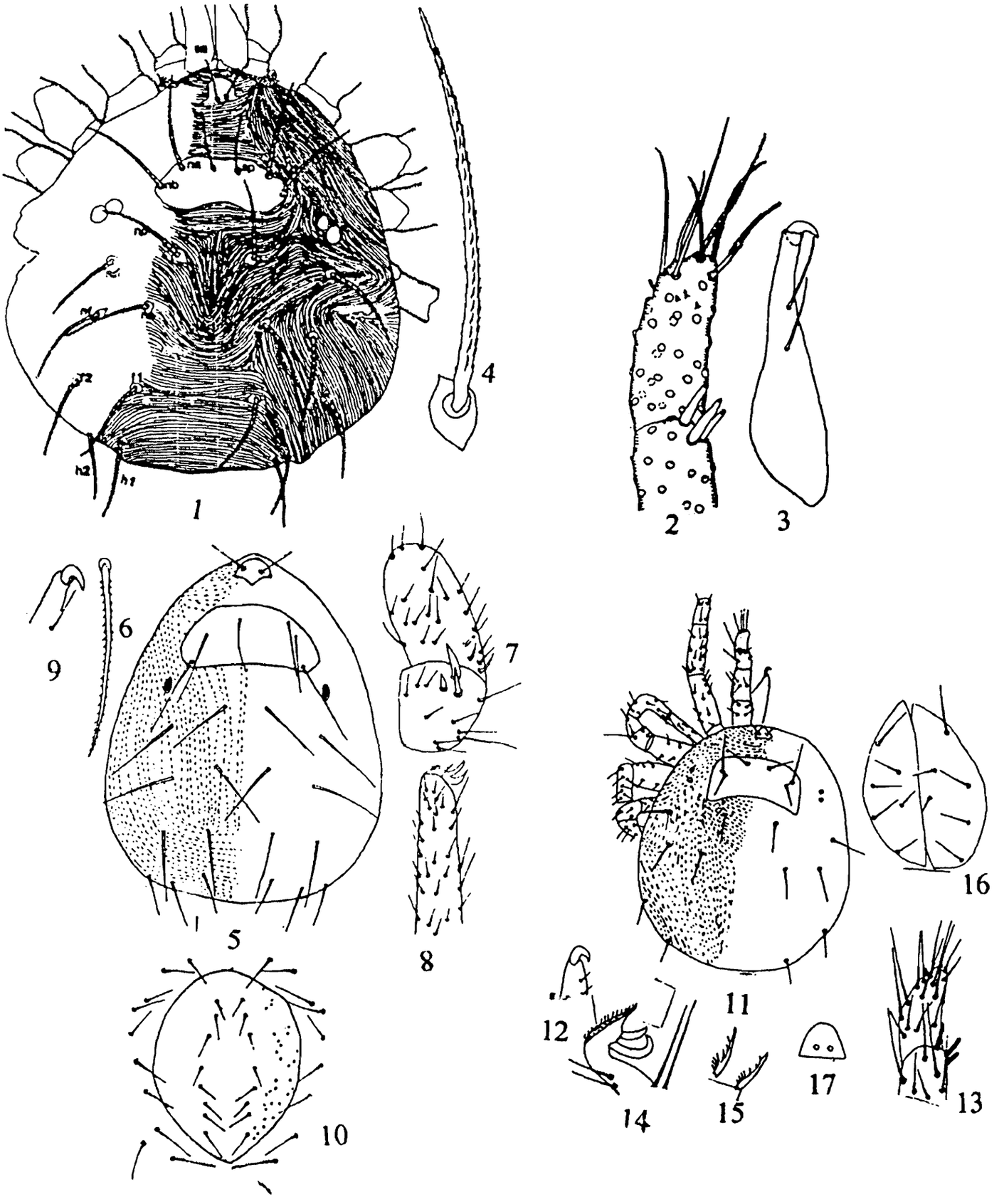
Female : Palp tibia on gnathosoma with 3 claws (2 almost of same length, other one little smaller), palp tarsus bears at least 15-16 long, thick setae and short spine. Chelicera broad basally, narrowing distally, movable chela hook-like, each chelicera with 2 setae dorsally and 6 setae ventrally. All legs profusely covered with setae, leg tarsi with combed claw. Dorsally naso on anterior margin of idiosoma bearing a pair of sensilla. Propodosomal shield trapezoidal bearing 3 pairs of setae. Two pairs of eyes placed laterally, little posterior to 3rd coxal bases. Area between naso and propodosomal plate transversely striated. Apart from 3 pairs of setae, there are 6 pairs of long setae present on dorsum. Ventrally, setae on genital plate as figured.

Male : Unknown.

Collection Records : This species was described from Nagaland collected on fern.

Habitat : Undet. fern.

Distribution : India (Nagaland).



Figs. 1-17 : *Anystis baccarum* (Linn.) (female) : 1. Dorsal view, 2. Palp, 3. Chelicera, 4. Dorsal seta. (after Smith-Meyer & Ueckermann, 1987); *Anystis indica* Gupta (female) : 5. Dorsal view, 6. Dorsal seta, 7. Palp, 8. Tarsus I, 9. Chelicera, 10. Anogenital region. (after Gupta, 1992); *Anystis nagalandensis* Gupta (female) : 11. Dorsal view, 12. Chelicera, 13. Palp, 14. Tarsal appendage of leg, 15. Claw, 16. Anogenital region, 17-Naso. (after Gupta, 1991).

4. *Anystis* spp.

1981. *Anystis* sp., Gupta & Nahar. In : *Contributions to Acarology in India*, p. 10.

1983. *Anystis* sp., Mathur, *Pranikee*, **4** : 229-233.

Collection Records : This undetermined species was recorded on ornamental plant in Bihar (Gupta & Nahar, 1981) and was found feeding upon *Aphis gossypii* (Mathur, 1983). infesting cotton.

Habitat : Ornamental plant, cotton.

Distribution : India (Bihar, Haryana).

Remarks : Mathur (1983) recorded this as feeding upon *Aphis gossypii* infesting cotton.

Genus 2. *Tencateia* Oudemans

1936. *Tencateia* Oudemans, *Archiv für Naturgischichte N. F.*, **5** : 422.

1987. *Tencateia*, Smith-Meyer & Ueckermann, *Ent. Mem. Dep. Agric. Wat. Suppl. Repb. S. Afr.*, **68** : 8-10.

Diagnosis : This genus resembles *Anystis* von Heyden and *Walzia* Oudemans in body shape, in preence of 3 pairs of claws on palp tibia and in having 2 pairs of eyes. The absence of propodosomal shield makes this genus different from the other two. Peritreme long, narrow and reticulated, tarsi with brush-like setae and terminates in 2 comb-like claws and empodium.

Type ***Tencateia besselingi*** Oudemans, 1936

5. *Tencateia kanthiensis* Gupta

(Figs. 18-23)

1992. *Tencateia kanthiensis* Gupta, In : *State Fauna Ser. 3, Fauna of West Bengal*, Part-3, pp. 146-148.

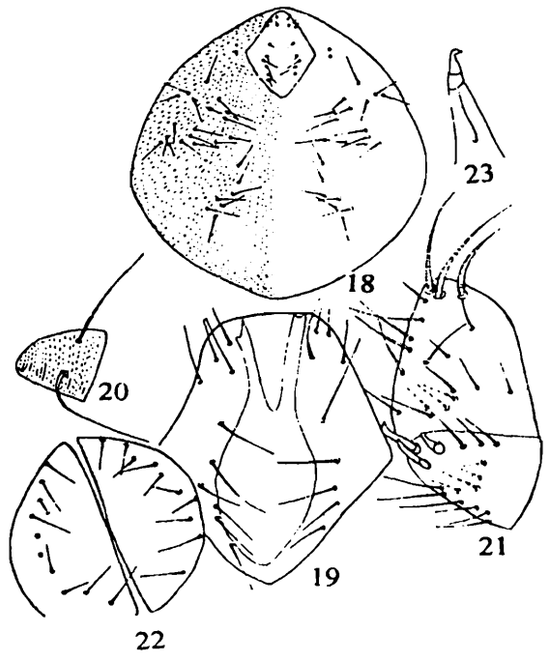
Female : Dorsum : Naso transversely striated with a pair of sensillae. Prodorsal shield with unequal pair of setae (10 pairs on one side, 9 pairs on another side). Two pairs of eyes present. Rest of the dorsum with at least 25 pairs of setae, all pointed and small. Venter : Palp tibia with 3 strong spines, setation of palp tarsus as figured, 3 solenidia present. Chelicera as figured.

Male : Unknown.

Collection Records : This mite was described from West Bengal, collected on betel vine.

Habitat : Betel vine.

Distribution : India (West Bengal).



Figs. 18-23 : *Tencateia Kanthiensis* Gupta (female) : 18. Dorsal view, 19. Prodorsal shield, 20. Naso, 21. Palp, 22. Anogenital region, 23. Chelicera. (after Gupta, 1992).

6. *Tencateia* sp.

1989. *Tencateia* sp., Raut & Bhattacharya, In : *Progress in Acarology*, **2** : 191-194.

Collection Records : An undet. species of this genus was reported on betel vine (Raut & Bhattacharya, 1989).,

Habitat : Betel vine.

Distribution : India (West Bengal).

Remarks : Raut & Bhattacharya (1989) reported this mite as effective predator of some insect pests of betelvine, *viz. Aleurocanthus rugosa, Dialeurodes pallida, Tricentrus gibbosulus, Membrothrips indicus, Zaniothrips ricini, Mymarothrips garuda* and *Aroidothrips longistylus* in West Bengal. According to the authors, population density was higher during March and lower during August. The rainfall influenced the population. This mite preyed upon eggs and developing stages of betelvine insects stated above. Experimental studies revealed that mites preferred eggs of *Membrothrips indicus* most while *A. rugosa, D. pallida, A. longistylus, Z. ricini, M. garuda* and *T. gibbosulus* were next in order of preference.

Genus 3. *Walzia* Oudemans

1936. *Walzia* Oudemans, *Archiv. für Naturgischichte, N. F.*, **5** : 419.

1987. *Walzia*, Smith-Meyer & Ueckermann, *Ent. Mem. Dep. Agric. Wat. Suppl. Repb. S. Afr.*, **68** : 14.

Diagnosis : It is similar to *Anystis* von Heyden but differs in that the prodorsal shield is absent. Setae na, nb and sp located in the area where prodorsal shield present in *Anystis*. Striae in this area finer than those present in rest of the area of dorsum.

Type ***Actineda antiguensis*** Stoll.

Key to the species of *Walzia* known to inhabit plants in India

1. Anal shield with 5 pairs of setae, naso smooth ..... *darjeelingensis*

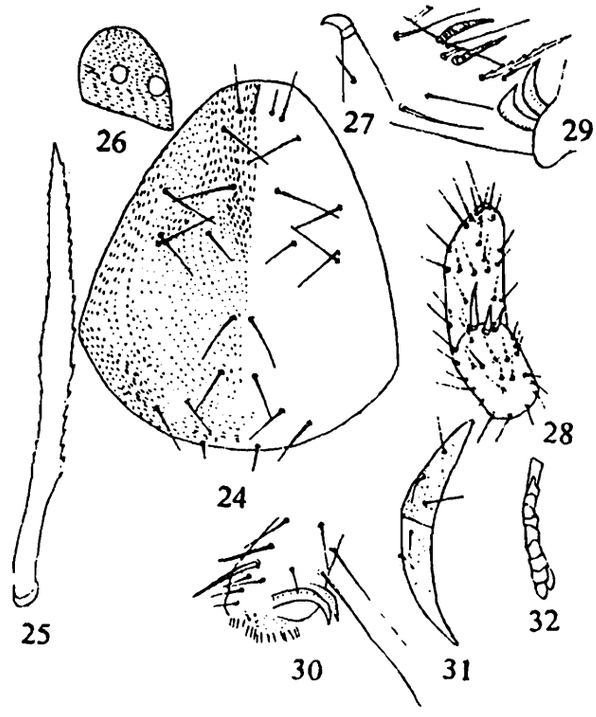
— Anal shield with 1-2 pairs of setae, naso dentate ..... *indiana*

7. *Walzia darjeelingensis* Gupta

(Figs. 24-32)

1992. *Walzia darjeelingensis* Gupta, In : *State Fauna Ser. 3, Fauna of West Bengal*, Part 3, pp. 148.

In Press. *Walzia darjeelingensis*, Gupta, In : *State Fauna Ser. 9, Fauna of Sikkim.*



Figs. 24-32 : *Walzia darjeelingensis* Gupta (female) : 24. Dorsal view, 25. Dorsal seta, 26. Naso, 27. Chelicera, 28. Palp, 29. Tarsus I, 30. Tarsus II, 31. Genital plate, 32. Peritreme. (after Gupta, 1992).

Female : Body 1718 long, 1015 wide. Dorsum without shield, striation pattern transverse posteriorly, longitudinal anteriorly, with 13 pairs of setae, all long and finely serrate, Serration of setae more prominent in the setae placed posteriorly than in the setae placed anteriorly. Naso transversely striated. Ventrally, genital plate with 5 pairs of setae, anogenital setae 1 and 2 not on plates. In gnathosoma, the palp as figured with 3 strong claws. Peritreme and chelicera as figured. All legs covered with pilose setae. Tarsus I and II each with 2 solenidia (1 long, 1 short), tibia I and II also with 1 long and 1 short solenidia. Tibia III and IV with 2 solenidia each.

Male : Unknown.

Collection Records : This species was described on collection made from Darjeeling on an undetermined plant. Later, it was also collected from Sikkim on *Dolichos lablab* as well as on an undetermined plant.

Habitat : Dolichos lablab, undet. plant.

Distribution : India (West Bengal, Sikkim).

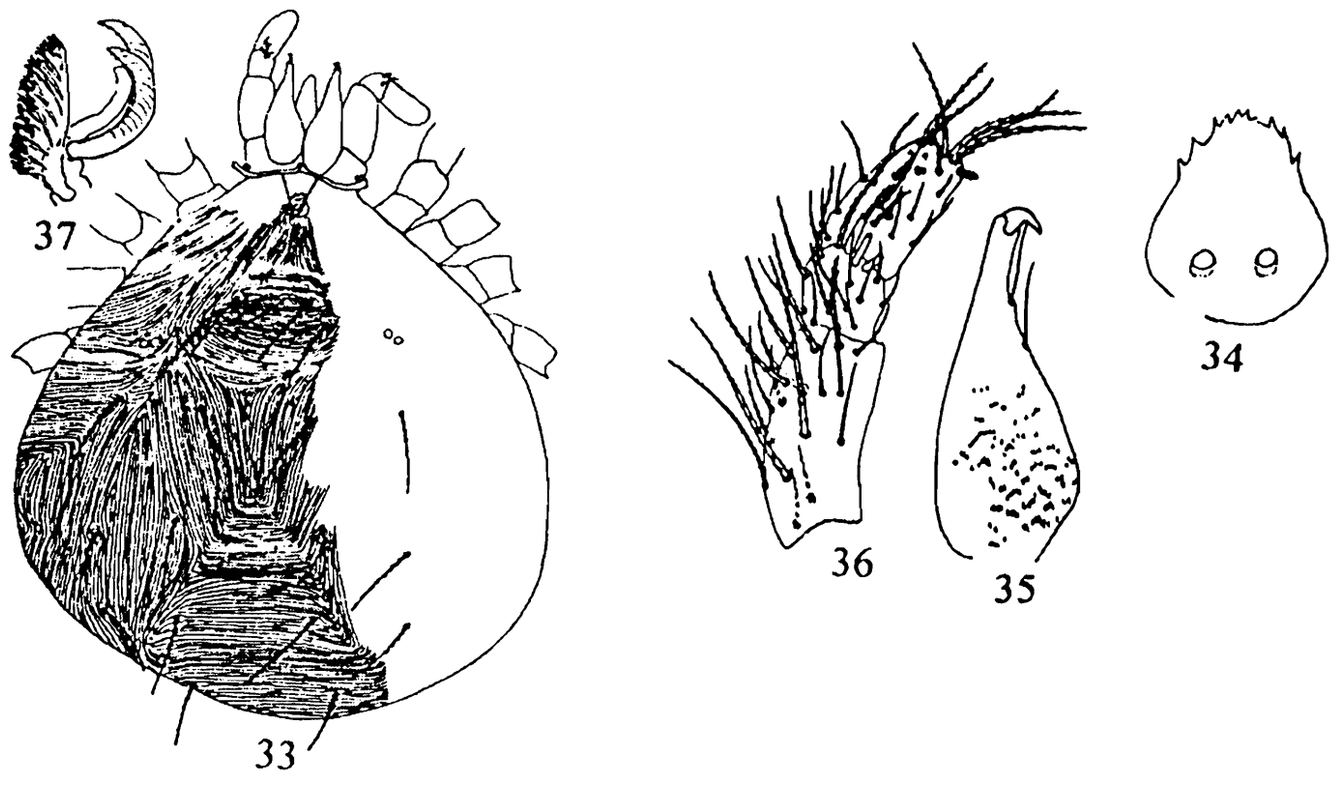
Remarks : This species was observed in the field in association with tetranychid mite (*Eotetranychus* sp.) but its feeding was not observed.

8. *Walzia indiana* Smith-Meyer & Ueckermann (Figs. 33-37)

1987. *Walzia indiana* Smith-Meyer & Ueckermann, *Ent. Mem. Dep. Agric. Wat. Suppl. Repb. S. Afr.*, **68** : 14-16.

1995. *Walzia indiana,* Gupta, In : *State Fauna Ser. 4, Fauna of Meghalaya,* Part 2, pp. 43.

Female : Body including gnathosoma 1348 long, 943 wide. Anterior margin of naso dentate. Body setae finely pilose. Opisthosomal striation with broad lobes. One pair of setae flank anal opening. Anogenital setae 1-2 on small platelets. One solenidion and 5 terminal setae present on palp tarsus, 3 solenidia present on palp tibia. Chelicera with 2 teeth and a terminal hook-like claw; 10 pairs of setae present on subcapitulum. All legs dorsally covered with pilose setae. one long and a minute



Figs. 33-37 : *Walzia indiana* Smith-Meyer & Ueckermann (female) : 33. Dorsal view, 34. Naso, 35. Chelicera, 36. Palp, 37. Tarsal appendage. (after Smith-Meyer & Ueckermann, 1987).

solenidia present each on tarsus I and II, while tibia I and II each with 3 solenidia.

Male : Body length including gnathosoma 809-1155, 597-905 wide. Palp tarsus with setae expanded distally; 2 pairs of setae flank anal opening.

Collection Records : This was described from collection made on betel vine in West Bengal and subsequently was also recorded on mulberry from Meghalaya.

Habitat : Betel vine, Mulberry.

Distribution : India (Meghalaya, West Bengal).

Remarks : This was found to be feeding upon eggs of coccids and alleurids infesting betel vine and probably this mite will be a good biocontrolling agent.

9. ***Walzia*** spp.

1979. *Walzia* sp., Raut & Nandi, *Bull. Ent., Ent. Soc. India.*

1991. *Walzia* sp., Gupta. *Rec. Zool. Surv. India,* **88** : 237.

1995. *Walzia* sp., Gupta, In : *State Fauna Ser. 4, Fauna of Meghalaya,* Part 2, pp. 43.

Collection Records : Some undetermined species of *Walzia* were recorded on betel vine in West Bengal and on palm in Meghalaya.

Habitat : Betel vine, palm.

Distribution : India (West Bengal, Meghalaya).

Remarks : In all probability, the *Walzia* sp. reported by Raut & Nandi (1980) refers to *Walzia indiana* but the latter one is a different species which could not be identified due its damaged condition.

2. Family BDELLIDAE Duges

1834. Bdellei Duges, *Ann. Sci. Nat. 8(2)* 1 *(Zool.)* : 21.

1959. Bdellidae, Meyer & Ryke, *Ann. Mag. nat. Hist.,* (13)**2** : 372.

1960. Bdellidae, Atyeo, *Univ. Kansas Sci. Bull.,* **40**(8) : 370.

1963. Bdellidae, Atyeo, *Bull. Univ. Nebraska St. Mus.,* **4(8)** : 120.

1976. Bdellidae, Wallace & Mahon, *Acarologia,* **18**(1) : 65.

1979. Bdellidae, Chaudhri *et al. Univ. Agr. Faisalabad,* p. 127.

1980. Bdellidae, Gupta & Ghosh, *Rec. Zool. Surv. India,* **77** : 201.

1985. Bdellidae, Gupta, *Handbk. Plant Mites of India,* pp. 311.

1987. Bdellidae, Swift & Goff, *Internat. J. Acarol.,* **13**(1) : 29.

1991. Bdellidae, Gupta, *Rec. Zool. Surv. India,* **88**(2) : 219.

Diagnosis : These mites are medium sized with finely striated integument. Subcutaneous shields may be present on propodosoma. Gnathosoma cone-like, formed by elongate chelate chelicerae, one or more setae present on chelicerae. Ventral hypostome with 2, 6 or 7 pairs of venterolateral setae and 2 pairs of setae on lateral lips. Palpi 5 segmented, tracheal opening near cheliceral bases. Idiosoma divided into propodosoma and hysterosoma; 4 dorsal sensillae present on pseudostigmatid organ; 2, 4 or 5 eyes present. Legs 8 segmented and rayed pad-like pulvillus. Genital tracheae, when present, well developed.

Type ***Bdella*** Linnaeus, 1758

General Morphological Characters of Taxonomic Importance

Body distinguished into Gnathosoma (having elongate chelate chelicerae), a ventral hypostome and 2 geniculate palpi (chelicerae and hypostome form cone-like structure) and propodosoma (having 2 anterior pair of legs, eyes and pseudostigmatid organs) and hysterosoma, bearing posterior pair of legs, anus and genitalia.

Gnathosoma : Palpus 6 segmented. Tibiotarsus bearing apically one or two long tactile setae. Tibiotarsus variable in length, may be expanded distally or obliquely truncated at the apex or twice as long as genu + telofemur or cylindrical or apically rounded. In Odontoscirinae, end setae

approximately equal in length, in *Monotrichobdella,* there is a single apical seta. Chelicerae elongate bearing movable chelae. Shape of chelicera, form of chelicera and number of setae on chelicera are used for generic separation. In *Cyta,* chelicerae large, thick with masive chelae; *Spinibdella* has narrow chela, needle-like. Number of setae on venter of hypostome is important character for separation of genera and their number may be 2, 6 or 7 pairs.

Propodosoma : Dorsum of propodosoma with thickened integument which is most in Odontoscirinae. Two pairs of sensillae present on pseudostigmatid organ. In all the genera, except *Thoribdella,* pseudostigmata are cup-like sockets lined with concentric rings on small ridges. A pair of median propodosomal seta is always present between the posterior sensilla. Lateral propodosomal seta may or may not be present. Integumental striation form distinctive pattern. Eyes are lateral or posterolateral to posterior sensilla, normally 2 pairs are present (In one species of *Spinibdella,* only one pair present). In addition to lateral eyes, *Cyta* has 5th eye between anterior sensilla.

Dorsal Hysterosoma : Dorsum of hysterosoma has 5 transverse rows of setae as (1) internal and external humerals, (2) internal dorsals, (3) internal lumbrals, (4) internal and external sacrals and (5) internal and external clunals. These setae vary in different genera.

Anal Region : Posterior anal cleft is surrounded by striae, the pattern may vary. Setae on anal region are shorter, thinner and nude. One pair of posterior paraanals may be present.

Genital Region : Two longitudinally striated genital plates on venter of hypostome present between anal cleft and coxae IV. Each plate bears genital setae, the number of which may vary in different species. Paragenital setae present in area surrounding genital plates. In Cytinae, unpaired seta may be present immediately anterior to genital plate. In male, penis is a thin, membranous structure surrounded by loose membranous sheath.

Setae : Two types of setae, thick walled (tactile) and thin walled (chemosensory setae- also called solenidion) present. Solenidion may be inserted into pits and those may be nude or pilose. Thin walled setae are tapering or broadly rounded distally. In *Cyta,* and in some species of *Bdella* and *Spinibdella,* the long apical setae originate in deep within the segment. Four sensillary setae are long, tapering, inserted into pseudostigmatid organs. Solid peg-like setae may be found on dorsolateral rims of coxae I and II and in dorsolateal region of hysterosomal bases.

Leg Chaetotaxy : Leg setae serve as important taxonomic characters. Legs normally have tactile setae, sensory setae and peg-like setae. Besides, duplex setae may occur on genu I-III. The number of setae and types of setae vary in different species. Pretarsal claws with laterally directed rays. Size of claw and presence/absence of minute rays are of taxonomic value.

Keys to Subfamilies of BDELLIDAE known to inhabit plants in India (After Atyeo, 1963)

1. Venter of hypostome with 6-7 pairs of strong setae and 2 pairs of small adornal setae, without well developed genital tracheae 2

— Venter of hypostome with 2 pairs of strong setae and 2 pairs of small adornal setae, with well developed genital tracheae 3

2. Trichoboth absent on tibia II, palpal tibiotarsus expanded distally ..... BDELLINAE *(Bdella)*

— Trichoboth present on tibia II, palpal tibiotarsus cylindrical or elongated .... ODONTOSCIRINAE

3. Cheliceral bases normal to inflated, chela with movable digit sickle shaped ..... CYTINAE

— Chelicerae elongated, chela with digits reduced ..... SPINIBDELLINAE

Subfamily 1. BDELLINAE Grandjean

1938. Bdellinae Grandjean, *Ann. Soc. Ent. France*, **107** : 1-24.

1963. Bdellinae, Atyeo, *Bull. Univ. Nebraska St. Mus.*, **4**(8) : 120.

1991. Bdellinae, Gupta, *Rec. Zool. Surv. India*, **88**(2) : 220.

Diagnosis : Six pairs of ventral hysterosomal setae, 4 pairs of trichoboth and undeveloped genital tracheae and expanded palpal tibiotarsus, are the characters by which this subfamily can be distinguished. This subfamily is known by a single genus *Bdella*.

Type ***Acarus longicornis*** Linnaeus, 1758 (by subsequent identification)

Genus 4. ***Bdella*** Latreille

1795. *Bdella* Latreille, *Mag. encyclopedique ouj. Letter et Arts*, **4** : 18.

1804. *Scirus* (Ciron) Hermann, *Mem. Apt. Ouverge Couronne en 1790, par la Societe de Hist nat. de Paris Hammer, Stragbourg*, p. 60.

1929. *Bdellidium* Oudemans, *Ent. Ber. Ned. Ver.*, **7** : 449.

1937. *Caenobdella* Oudemans, *Krit. Hist. Overzicht Acarologie*, **3C** : 1227.

1960. *Bdella*, Atyeo, *Univ. Kansas Sci. Bull.*, **40**(8) : 372.

1963. *Bdella*, Atyeo, *Bull. Univ. Nebraska St. Mus.*, **4**(8) : 170.

1979. *Bdella*, Chaudhri *et al.*, *Univ. Agri. Faisalabad*, p. 130.

1987. *Bdella*, Swift & Goff, *Internat. J. Acarol.*, **13**(1) : 29.

1991. *Bdella*, Gupta, *Rec. Zool. Surv. India*, **88** : 220.

1992. *Bdella*, Gupta, In : *State Fauna Ser. 3, Fauna of West Bengal, Part 3*, pp. 119.

Diagnosis : Palp tibiotarsus truncate, considerably shorter than palpal basifemur, subequal end setae as long as or longer than palp femur. normal to inflated chelicerae bearing 2 setae on proximal 3/4 of their lengths, movable digit sickle shaped on small chela; 4 pairs of eyes lateral to unmodified pseudostigmatic organ.

Type ***Acarus longicornis*** Linnaeus, 1758

Key to the species of *Bdella* inhabiting plants in India

1. Hysterosoma with 7 pairs of setae including humerals, palp tibiotarsus with 5 setae .... *maldahensis*

— Hysterosoma with 9 pairs of setae including humerals, palp tibiotarsus with 6 setae .... *khasyana*

10. ***Bdella khasyana*** Gupta (Figs. 38-41)

1991. *Bdella khasyana* Gupta, *Rec. Zool. Surv. India*, **88** : 221.

Female : Suture between propodosoma and hysterosoma absent. Two pairs of eyes present on each side of propodosoma. Propodosoma with 4 pairs of setae, lateral propodosomal setae longer than median propodosomal setae. Striation on propodosoma mostly longitudinal, that on hysterosoma mostly transverse in the region of dorsocentral setae and longitudinal laterally. Hysterosoma with 9 pairs of setae, all of characteristic shape. Chelicera with longitudinal striation, chela edentate, movable digit sickle shaped; 2 setae on chelicera. Palp with normal segmentation, tibiotarsus with 6 setae, the end seta distinct; genu with 4 setae; hypostome with 6 pairs of setae. Each leg with claws and rayed empodium. Detailed leg chaetotaxy not discernible.

Male : Unknown.

Collection Records : This species was described on material collected on. *Litsea khasyana* from Arunachal Pradesh.

Habitat : Litsea khasyana.

Distribution : India (Arunachal Pradesh).

Remarks : This mite was seen in association with *Brevipalpus* sp. but its feeding on the latter was not observed.

11. *Bdella maldahensis* Gupta

(Figs. 42-47)

1992. *Bdella maldahensis* Gupta. In : *State Fauna Ser. 3, Fauna of West Bengal,* Part 3, pp. 12.

1999. *Bdella maldahensis,* Gupta & Chatterjee, *Sci & Cult.,* **65** : 161.

Female : Body length including gnathosoma 622 long, 306 wide. Gnathosoma 183 long, palp tibiotarsus 44 long with 2 long whip-like setae, dorsal end seta 45 long, ventral end seta 100 long, with 1 erect seta and a solenidion, genu 18 long with setae, telofemur 35 long with seta, basifemur 76 long with 5 setae; chelicera non-striate, 145 long, base inflated with 2 pairs of setae. Hypostome ventrally with 6 pairs of setae, base striated. Dorsal propodosoma with 5 pairs of setae, including 2 pairs of sensory setae, anterior pair 83 long, posterior pair 100 long, the former and the latter are 90 and 100 apart. Anterior propodosomal seta 83 long, median propodosomal seta 42 (tip almost trifurcate), lateral propodosomal seta 51, first interphase- 78. Ventrally, striation longitudinal between coxae II-IV, interrupted with transverse striation. Tarsus ends in a pair of claw, each with 10 rays. Tarsus I-89 long, tibia I-49 long, tibia II-31 long, tarsus II-68 long, tibia IV-67 long, tarsus IV-89 long. Coxal setae I-IV 4, 4, 5, 2; tarsus I with 7 plumose ventral setae, 5 dorsal, 6 lateral setae, 2 blunt sensory setae; tibia I with 3 dorsal, 2 ventral, 3 lateral with 1 trichoboth; tarsus IV-5 dorsal, 2 lateral, 1 trichoboth and 1 peg-like sensory seta; tibia IV- with 3 ventral, 4 lateral and 2 dorsal setae.

Male : Unknown.

Collection Records : This species was described from West Bengal collected on mango.

Habitat : Mango.

Distribution : India (West Bengal).

Remarks : This mite was collected in association with mango bud mite, *Aceria mangiferae.* Actual feeding was not observed.

12. *Bdella* spp.

1995. *Bdella* sp., Mathur & Mathur, *Abst. IV Nat. Symp. Acarology, Calicut,* p. 14.

1996. *Bdella* sp., Chatterjee & Gupta, *J. Beng. Nat. Hist. Soc. (NS),* **15**(2) : 27.

Collection Records : Some undetermined speices of *Bdella* were collected from West Bengal and Haryana but their identities could not be established due to damaged condition.

Distribution : India (West Bengal, Haryana).

Subfamily 2. CYTINAE Grandjean

1938. Cytinae Grandjean, *Ann. Soc. Ent. France,* **107** : 1-124.

1959. Cytinae, Meyer & Ryke, *Ann. Mag. Nat. Hist.,* **13**(2) : 375.

1960. Cytinae, Atyeo. *Univ. Kansas Sci. Bull.* **40** : 416.

1963. Cytinae, Atyeo, *Bull. Univ. Nebraska St. Mus.,* **4**(8) : 121.

Diagnosis : It is characterized by massive chelae, striated integument and unpaired median eye between the anterior sensillae, presence of 2 pairs of ventral hysterosomal setae, 3 pairs of trichoboths, well developed genital treacheae; truncate palpal tibiotarsus (longer than combined lengths genu + telofemur), subequal end setae longer than palpal femur; 2 pairs of setae on chelicerae; unpaired seta present anterior to genital flap.

Type *Cyta* von Heyden, 1826

Genus 5. *Cyta* von Heyden

1826. *Cyta* von Heyden, *Isis,* **19**(6) : 608.

1836. *Amonia* Koch, *Deutschlands Crustaceen Myriapoden und.* Archniden, Fasc. 5, No. 7.

1837. *Troglobdella* Oudemans, *Kritisch Historisch Overzicht der : Acarologie,* **3** : 1228.

1842. *Ammonia* Koch, *Ubersicht des Arachnidensystems von* C. L. Koch, **3** : 75.

1959. *Cyta* Meyer & Ryke, *Ann. Mag. Nat. Hist.,* (13)**2** : 377.

1960. *Cyta*, Atyeo, *Univ. Kansas Sci. Bull.*, **40** : 416.

1963. *Cyta*, Atyeo, *Bull. Nebraska St. Mus.*, **4**(8) : 121.

1987. *Cyta*, Swift & Goff, *Internat. J. Acarol.*, **13**(1) : 36.

Diagnosis : Chelicerae thickened with massive chela, median eye present between anterior sensilla. Posterior sensilla widely separated and near lateral margins of dorsal propodosoma; trichoboth, when present, may be 1, 3 or nil.

Type ***Scirus latirostris*** Hermann, 1804
(by original designation)

13. *Cyta* SP.

1992. *Cyta* sp., Gupta In : *Contributions to Acarological Researches in India*, p. 440.

Collection Records : An undetermined species of this genus was collected on *Celtis* sp. from Arunachal Pradesh.

Habitat : Celtis sp.

Distribution : India (Arunachal Pradesh).

Subfamily 3 SPINIBDELLINAE Grandjean

1938. Spinibdellinae Grandjean, *Ann. Soc. Ent. France*, **107** : 1-24.

1959. Spinibdellinae, Meyer & Ryke, *Ann. Mag. Nat. Hist.* (13)**2** : 381.

1960. Spinibdellinae, Atyeo, *Univ. Kansas Sci. Bull.*, **40** : 423.

1963. Spinibdellinae, Atyeo, *Bull. Univ. Nebraska St. Mus.*, **4**(8) : 172.

Diagnosis : Members of this subfamily have elongated chelicerae, chela with reduced digit, needle-like unpaired median seta, presence of 2 pairs of ventral hysterosomal setae, 4 pairs of trichoboth, genital tracheae well developed, palpal tibiotarsus truncate, shorter than combined length of genu and telofemur as in *Spinibdella* or cylindrical and longer than combined segments as in *Biscirus;* dorsal propodosoma with/without lateral propodosomal setae; 2 or 4 eyes present lateral to unmodified pseudostigmatic organ.

Type ***Spinibdella*** Thor, 1930.

Key to the genera of SPINIBDELLINAE known to inhabit plants in India

1. Lateral propodosomal seta present, palpal tibiotarsus expanded distally ..... *Spinibdella*

— Lateral propodosomal seta absent, palpal tibiotarsus cylindrical, elongated with 2 long apical setae ..... *Biscirus*

Genus 6. *Biscirus* Thor

1927. *Biscirus* Thor, *Ann. Mus. Leningrad*, **27** : 135.

1959. *Biscirus*, Meyer & Ryke, *Ann. Mag. Nat. Hist.* (13)**2** : 381.

1960. *Biscirus*, Atyeo, *Univ. Kansas Sci. Bull.*, **40** : 435.

1963. *Biscirus*, Atyeo, *Bull. Univ. Nebraska St. Mus.*, **4** (8) : 171.

1979. *Biscirus*, Chaudhri *et al. Univ. Agri. Faisalabad*, p. 135.

Diagnosis : Palp tibiotarsus elongated, cylindrical, end setae 2, chelicer.al setae not extended beyond tips of chelae, latera! propodosomal setae absent, striation pattern not of specific nature.

Type ***Bdella silvatica*** Kramer, 1881
(by original designation)

14. *Biscirus* sp.

1992. *Biscirus* sp., Gupta, In : *Contributions to Acarological Researches in India*, p. 440.

Collection Records : A damaged specimen belonging to this genus was collected on *Cleidion* sp. from Arunachal Pradesh.

Habitat : Cleidion sp.

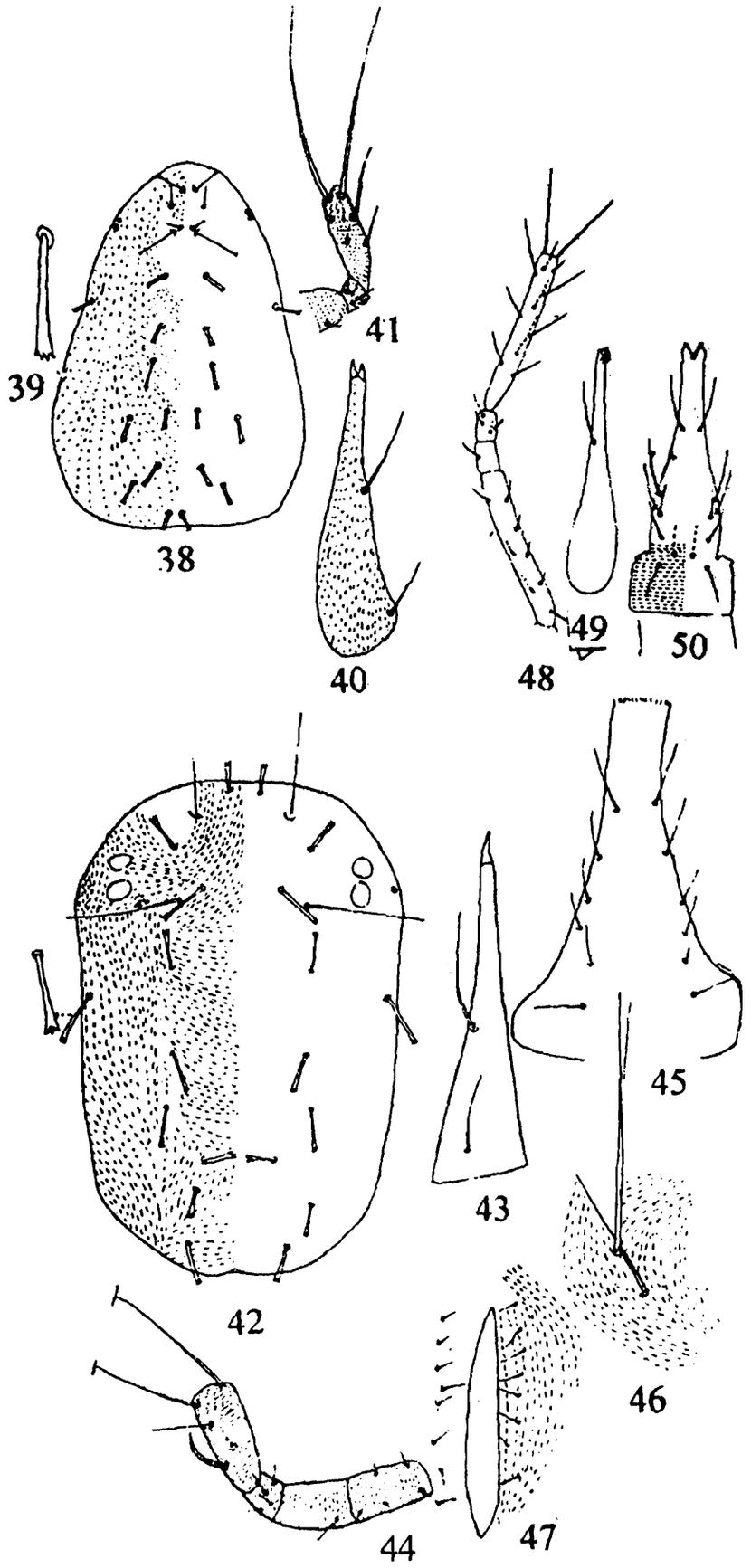
Distribution : India (Arunachal Pradesh).

Genus 7. *Spinibdella* Thor

1930. *Spinibdella* Thor. *Zool. Anz.*, **92**(1) : 22.

1960. *Spinibdella*, Atyeo, *Univ. Kansas Sci. Bull.*, **40** : **424.**

1963. *Spinibdella*, Atyeo, *Bull. Univ. Nebraska St. Mus.* **4(8)** : 173.



Figs. 38-50 : *Bdella Khasyana* Gupta (female) : 38. Dorsal view, 39. Dorsal seta, 40. Chelicera, 41. Palp. (after Gupta, 1991); *Bdella maldahensis* Gupta (female) : 42. Dorsal view, 43. Chelicera, 44. Palp, 45. Hypostome, 46. Sensillum and pseudostigmatid organ, 47. Genital region. (after Gupta,1992); *Bdellodes affinis* Atyeo (female) : 48. Palp, 49. Chelicera, 50. Ventral view of gnathosoma. (after Atyeo, 1963).

1979. *Spinibdella*, Chaudhri *et al.*, *Univ. Agr. Faisalabad*, p. 133.

1987. *Spinibdella*, Swift & Goff, *Internat. J. Acarol.*, **13**(1) : 39.

Diagnosis : According to Atyeo (1960), *Spinibdella* is related to *Biscirus* but it has a short and truncated tibiotarsus and lateral propodosomal setae present. Palp genu with 3-4 setae, basifemur with more than 2 setae; Cheliceral setae minute or of median length, distal setae not extends upto tip of chelicera. Striation pattern on dorsum specific.

Type ***Spinibdella reducta*** Thor, 1930
(by original designation)

15. ***Spinibdella*** sp.

1983. *Spinibdella* sp., Gupta & Gupta, *Abst. II All India Symp. Acarology, Pune*, p. 23.

Collection Records : An undertermined species of this genus was collected in West Bengal.

Distribution : India (West Bengal).

Subfamily 4 ODONTOSCIRINAE Grandjean

1938. Odontoscirinae Grandjean, *Ann. Soc. Ent. France*, **107** : 1-24.

1959. Odontoscirinae, Meyer & Ryke, *Ann. Mag. Nat. Hist.* **13**(2) : 378.

1960. Odontoscirinae, Atyeo, *Univ. Kansas Sci. Bull.*, **40** : 385.

1963. Odontoscirinae, Atyeo, *Bull Nebraska St. Mus.*, **4**(8) : 122.

Diagnosis : Species of this subfamily can be easily distinguished by presence of trichoboth on tibia II; ventral hypostomal setae 6-7 pairs, 5 pairs of trichoboth; genital tracheae absent; palpal tibiotarsus cylindrical, usually as long as or longer than basifemur; end seta equal or subequal, shorter than palpal tibiotarsus; chelicerae normal or inflated; movable digit sickle shaped; 4 eyes present laterally or posterolaterally to modified or unmodified posterior pseudostigmata.

Type ***Bdella virgulata*** C. & F., 1876

Key to the genera of ODONTOSCIRINAE known to inhabit plants in India

1. Lateral propodosomal seta present .... *Octobdellodes*

— Lateral propodosomal seta absent .... *Bdellodes*

Genus 8. ***Bdellodes*** Oudemans

1937. *Bdellodes* Oudemans, *Kritisch Historisch Overzicht der Acarologie* **3**(C) : 1217.

1937. *Hoploscirus* Thor, *Zool. Anz.*, **119** : 43.

1959. *Bdellodes*, Meyer & Ryke, *Ann. Mag. Nat. Hist.*, (13)**2** : 379.

1960. *Bdellodes*, Atyeo, *Univ. Kansas Sci. Bull.*, **40** : 412.

1963. *Bdellodes*, Atyeo, *Bull Nebraska St. Mus.*, **4**(8) : 124.

1976. *Bdellodes*, Wallace & Mahon, *Acarologia*, **18** : 67.

1980. *Bdellodes*, Gupta & Ghosh, *Rec. Zool. Surv. India*, **77** : 201.

1987. *Bdellodes*, Swift & Goff, *Internat. J. Acarol.*, **13**(1) : 32.

1991. *Bdellodes*, Gupta, *Rec. Zool. Surv. India*, **88** : 224.

1992. *Bdellodes*, Gupta, In : *State Fauna Ser. 3, Fauna of West Bengal, Part* 3, pp. 121.

Diagnosis : According to Atyeo (1960), *Bdellodes* is very close to *Octobdellodes* but lacks the lateral propodosomal setae. Chelicerae normal each bearing 1 or 2 setae, sickle shaped movable digit longer than fixed digit and may be smooth, flattened distally on the inner surface or with a single tooth; posterior pseudostigmatic organ unmodified, posterior sensilla longer than median propodosomal setae; leg IV shorter than leg I.

Type ***Scirus longirostris*** Hermann, 1804
(by original designation)

Key to the species of *Bdellodes* known to inhabit plants in India*

1. Anterior sensilla over 100 long 2

— Anterior sensilla less than 100 long 4

(**Bdellodes sp. nr. procincta* not included)

2. Posterior sensilla over 100 long ..... *grandiflora*

— Posterior sensilla less than 100 long 3

3. Chelicerae with 2 setae ..... *manipurensis*

— Chelicera with 1 seta, hysterosomal setae branched ..... *affinis*

4. Anterior and posterior sensilla of same length ..... *angustifolius*

— Anterior sensillum longer, little less than 1/2 times of posterior sensillum. ..... *atro*

16. ***Bdellodes affinis*** Atyeo

(Figs. 48-50)

1963. *Bdellodes (Hoploscirus) affinis* Atyeo. *Bull. Univ. Nebraska St. Mus.*, **4**(8) : 185-187.

1980. *Bdellodes (Hoploscirus) affinis*, Gupta & Ghosh, *Rec. Zool. Surv. India*, **77** : 201.

1985. *Bdellodes (Hoploscirus) affinis*, Gupta, *Handbk. Plant Mites of India*, p. 313.

2000. *Bdellodes (Hoploscirus) affinis*, Gupta. In : *State Fauna Ser. 7, Fauna of Tripura*, Part 2, p.19.

Female : As per Atyeo (1963) length including gnathosoma 1290. Gnathosoma- palp genu and telofemur approximately of same length. Measurements : II 216, III 46, IV 42, V 20, des 102, ves 96. Chelicera 345 long; anterior seta 141 long. Gnathosomal base and buccal cone striated between vh. 1 and 2; remaining area non-striated. Anterior sensilla 115 long, posterior sensilla 85 long, median propodosomal seta with fine branching, 76 long, hysterosomal setae finely branched. Internal humeral 72 long, external humeral 94 long. Genital plate with 8 setae; preanal setae 2 pairs, paragenital setae 3 pairs. Legs with each claw 5-7 lateral rays and 1 row of minute rays; tibia I 96, tarsus I 207, tibia II 99, tarsus II 208, coxal setae I-IV 4, 3, 4, 3; basifemur I-IV 14, 13, 9, 4; tibia IV 11 tactile setae; trichoboth slightly less than 1/2 length.

Male : As in female.

Collection Records : In India, this species was recorded from Andaman Isl. on *Areca catechu* and also on an unidentified plant in Tripura.

Habitat : India : *Areca catechu,* unidentified plant.

Distribution : India (Andaman & Nicobar Isl., Tripura). Outside India : Australia.

Remarks : It was found associated with *Oligonychus indicus* infesting arecanut in Andaman Isls.

17. ***Bdellodes angustifolius*** (Gupta)

(Figs. 51-53)

1991. *Bdella angustifolius* Gupta, *Rec. Zool. Surv. India*, **88** : 201.

Female : Body 1020 long, 525 wide. Palp with striation, 3rd and 4th segments equal, 5th segment cylindrical with a pair of long setae. Chelicera 51 long, a pair of setae present. Hysterosoma transversely striated. Striation indistinct with 6 pairs of setae. Dorsum of idiosoma striated, both anterior and posterior sensilla 89 long, Median propodosomal setae 85 long. Hysterosomal setae thick, pointed, both external and internal humeral 80 long. Venter of hypostome appears to be striated. Each genital plate with 4 setae in linear arrangement. Legs with claws having at least 5 rays. Coxal setal formula of legs I-IV; 2, 2, 3, 3. Length of tarsus and tibia of legs I-IV; I-82, 78; II-156, 78; III-170, 89; IV-172, 90. Tarsus III-IV with a trichoboth, tibia I, II and IV also with trichoboth; tibia I, II, IV also with sensory setae.

Male : Unknown.

Collection Records : This species was described on material collected on *Canthium angustifolium* in Manipur.

Habitat : Canthium angustifolium.

Distribution : India (Manipur).

18. *Bdellodes atro* (Gupta)

(Figs. 54-56)

1991. *Bdella atro* Gupta, *Rec. Zool. Surv. India*, **88** : 220.

Female : Body 855 long, 358 wide. Propodosoma and hysterosoma not separated by suture. Entire dorsum finely striated. Propodosomal striation transverse anteriorly and striation mostly longitudinal posterior to that. Propodosoma with 2 pairs of sensillae, anterior one 90 long, posterior one 70 long and both are 78 apart. Median propodosomal seta 67 long. Hysterosomal setae 9 pairs, almost of same length; internal humeral 76 long. Chelicerae longer than palp femur, transversely striated. Ventral idiosomal setae of moderate length, simple, pointed; 2 pairs of setae on each genital plate; preanal setae 1 pair. Each leg with 2 well developed claws and empodium, each 5-7 rayed. Tibia I-112 long. II-89 long, III-110 long, IV-112 long. Coxal setal formula : 3, 3, 3, 3. Chaetotaxy of other legs : trochanter : 5, 6, 5, ?; basifemur : 3, 3, 4, ?; telofemur : 3, 4, 3, ?; genu : 4, 3, 4, 4. Palp cylindrical with 2 long setae.

Male : Unknown.

Collection Records : This was described on material collected on *Viburum atro* in Arunachal Pradesh.

Habitat : Viburnum atro.

Distribution : India (Arunachal Pradesh).

19. *Bdellodes grandiflora* Gupta

(Figs. 57-60)

1991. *Bdellodes grandiflora* Gupta, *Rec. zool. Surv. India* **88** : 224-225.

Female : Body 750 long, 270 wide. Propodosomal striation not of superimposed type. Anterior propodosomal sensory seta 123 long, posterior sensory seta 134 long; median propodosomal seta 124 long, quite thick. No suture present between propodosoma and hysterosoma. Striation pattern on propodosomal plate mostly longitudinal and transverse anteriorly. Hysterosoma with 15 pairs of setae, all thick, appear to be weakly barbed. Chelicera with 1 seta, both digits edentate. Palp tibiotarsus long, cylindrical with 12 setae, including 2 whip like setae measuring 189 and 299, respectively; a thick seta present at tip; genu- 4 setae, telofemur- 1 seta. Hypostome ventrally with 6 pairs of setae. All legs with claws and rayed pulvillus.

Male : Unknown.

Collection Records : This species was described basing on material collected on *Thunbergia grandiflora* from Arunachal Pradesh.

Habitat : Thunbergia grandiflora.

Distribution : India (Arunachal Pradesh).

Remarks : This species was associated in field with tetranychids (*Tetranychus* sp.).

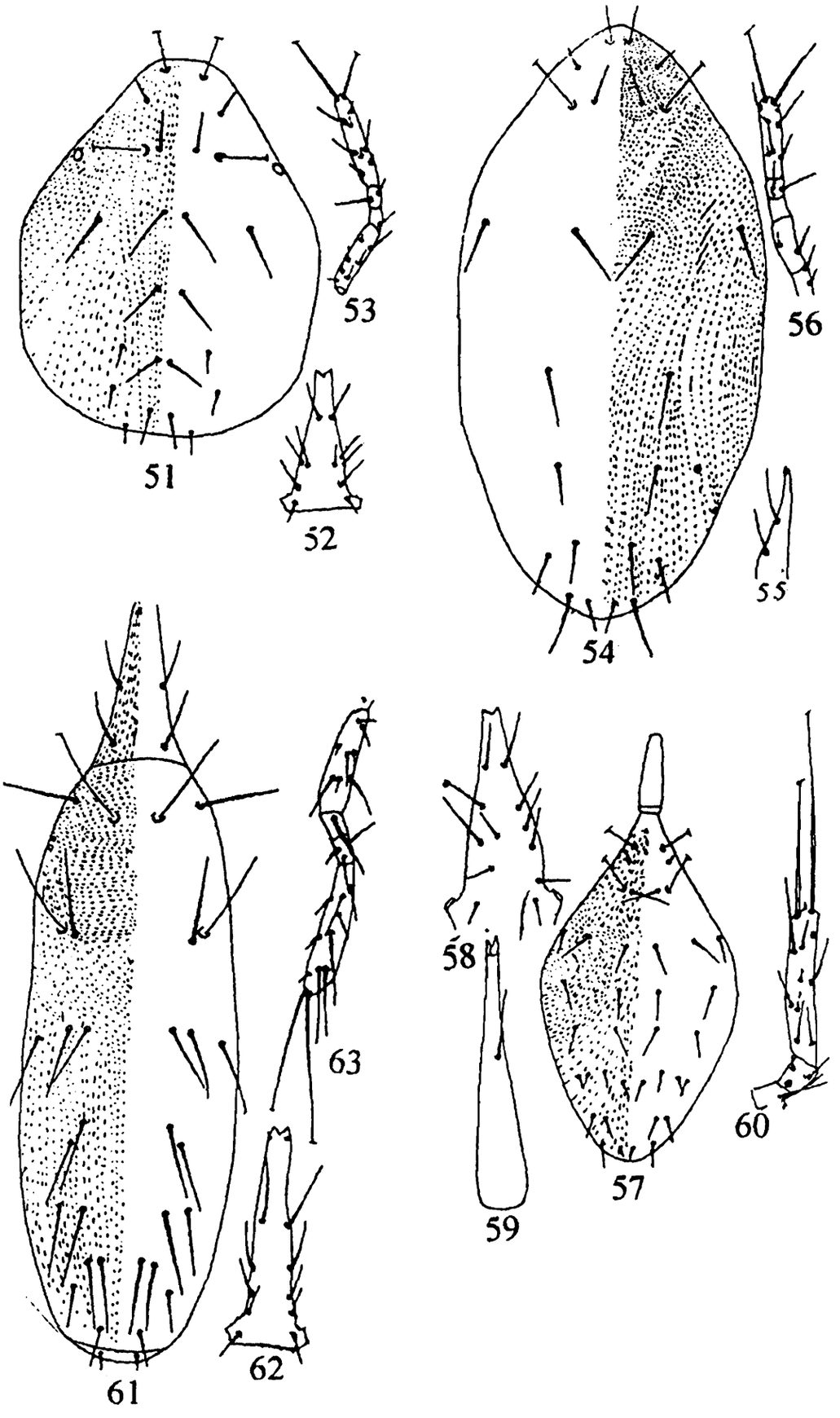
20. *Bdellodes manipurensis* Gupta

(Figs. 61-63)

1991. *Bdellodes manipurensis* Gupta, *Rec. Zool. Surv. India.*, **88** : 224.

Female : Body 663 long, 231 wide. No suture between propodosoma and Hysterosoma. Propodosomal striation transverse in mid-dorsal region and longitudinal towards margin. Propodosoma bears 4 pseudostigmata, each with a long seta, anterior one 112 long, Hysterosomal setae much longer (over 110 long). One median eye and 2 pairs of lateral eyes present on propodosoma. Hysterosoma with 11 pairs of setae, posterior setae longer than the distance between their bases. Ventrally, hysterosoma with 4 pairs of setae, measuring (from basal pair onwards) 27, 33, 45. Hysterosoma longitudinally striated all through. Chelicera little inflated at base, with 2 setae. Movable digit sickle shaped. Pedipalp basifemur with 8 setae (5 dorsal, 3 ventral), telofemur-1 seta, genu- 3 setae, tibiotarsus- 11 setae, end setae on tibiotarsus subequal. All legs with paired claws and rayed empodium.

Male : Unknown.



Figs. 51-63 : *Bdellodes angustifolius* (Gupta) (female) : 51. Dorsal view, 52. Ventral view of gnathosoma, 53. Palp. (after Gupta, 1991); *Bdellodes atro* (Gupta) (female) : 54. Dorsal view, 55. Chelicera, 56. Palp. (after Gupta, 1991); *Bdellodes grandiflora* Gupta (female) : 57. Dorsal view, 58. Ventral view of gnathosoma, 59. Chelicera, 60. Palp. (after Gupta, 1991); *Bdellodes manipurensis* Gupta (female) : 61. Dorsal view, 62, Ventral view of gnathosoma, 63. Palp. (after Gupta, 1991).

Collection Records : This mite was collected on mango in Manipur.

Habitat : Mango.

Distribution : India (Manipur).

21. ***Bdellodes*** sp. nr. *procincta* Atyeo

Collection Records : A species closely akin to *Bdellodes procincta* Atyeo, 1963, was collected on *Syzygium cumini* from Andaman Isl. Most of the legs of the specimen were broken and hence specific determination was not possible.

Distribution : India (Andaman Isl.).

22. ***Bdellodes*** spp.

1980. *Bdellodes (Bdellodes)* sp., Gupta & Ghosh, *Rec. Zool. Surv. India*, **77** : 202.

1992. *Bdellodes* sp., Gupta, In : *Contributions to Acarological Researches in India*, p. 440.

1995. *Bdellodes* sp., Jagadish *et al., Abst. V Nat. Symp. Acarology, Bangalore*, p. 17.

1997. *Bdellodes* sp., Gupta & Chatterjee, In : *State Fauna Ser. 6, Fauna of Delhi*, p. 519.

In press. *Bdellodes* sp., Gupta, In : *State Fauna Ser. 9, Fauna of Sikkim.*

Collection Records : Undermined species of *Bdellodes* were recorded from Karnataka form guava; from mango in Delhi, from Sikkim on an undetermined plant and from Arunachal Pradesh on undet. plant.

Distribution : India (Sikkim, Delhi, Karnataka, Arunachal Pradesh).

Genus 9. ***Octobdellodes*** Atyeo

1960. *Octobdellodes* Atyeo. *Univ. Kansas Sci. Bull.*, **40**(8) : 407.

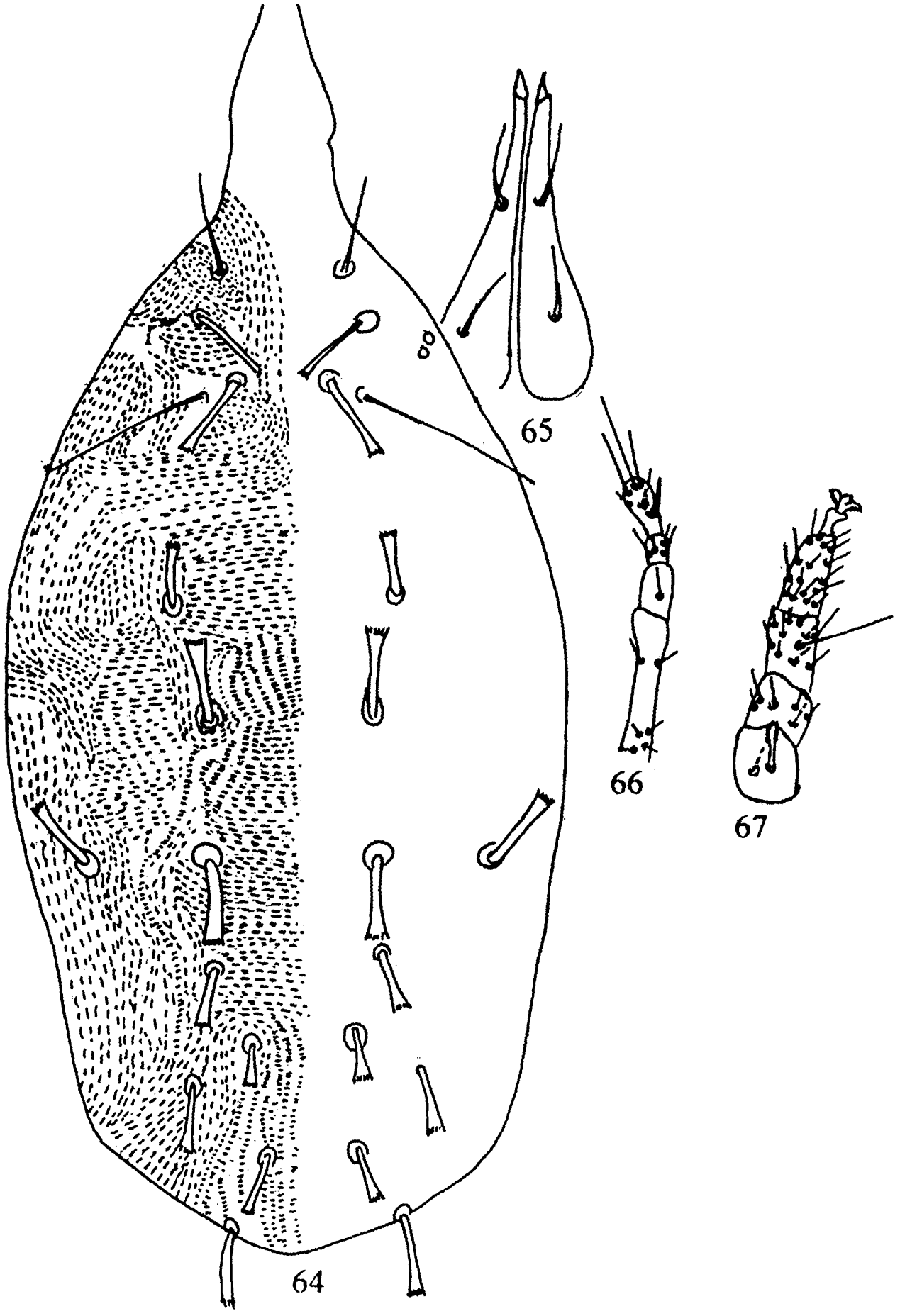
1962. *Octobdellodes*, Atyeo, *J. Kansas Ent. Soc.*, **35** : 285.

Diagnosis : According to Atyeo (1960), this genus is closely related to *Bdellodes*, but the presence of lateral propodosomal setae, presence of 6 or 7 pairs of hypostomal setae, seperate it from *Bdellodes*. Chelicera each with 2 setae, movable digits smooth, longer than fixed digit. Posterior pseudostigmatic organs unmodified; posterior sensilla longer than median propodosomal seta. Leg II shorter than leg I.

Type ***Octobdellodes hurdi*** Atyeo
(by original designation)

23. ***Octobdellodes guajavae*** Chatterjee & Gupta, sp. nov
(Figs. 64-67)

Female : Body 806 long (from posterior tip of body upto chelicera) width 379 (at the level of external humeral); Body elongated, dorsal striation as figured. Length of gnathosoma 180, palpus 185; basifemur of palpus with 6 setae, telofemur with 1 seta, genu with 4 setae, tibiotarsus with 4 setae, excluding 2 long terminal setae, des- 142 long, ves- 107 long. Measurements of palp segments : basifemur- 37, telofemur- 32, genu- 21, tibiotarsus- 40, chelicera- 178, longitudinally striated, with 2 pairs of setae, anterior one 43 long, posterior one 40 long. Cheliceral digit approximately without teeth and sickle shaped. Gnathosomal base transversely striated as figured. Dorsal propodosoma- Striations as figured. Anterior sensory seta appear to be minutely barbed, 88 long, posterior sensory seta- 95 long. Lateral propodosomal seta- 43 long, median propodosomal seta-47 long. Striation pattern between median and lateral propodosoma as figured. Region between propodosomal setae longitudinally striated, 2 pairs of eyes both of same diameter. Dorsal hysterosoma : Striation pattern as figured. Measurements of setae; external humeral- 59, internal humeral- 47, internal dorsal- 28, internal sacral- 28, external sacral- 36; all the setae on dorsal hysterosomal region are of characteristic shape as indicated in figure and each one lies on small platelets. Anal region : Anal setae- 33 long. Striation pattern in the broader region transverse and medially transverse. Each genital plate with 6 setae paragenital setae 2 pairs. Legs- claws with 4-5 lateral rays. Measurements of leg segments : tibia- I- 50, tarsus I- 71, tibia II- 54, tarsus II- 66, tibia III-



Figs. 64-67 : *Octobdellodes guajavae* Chatterjee & Gupta sp. nov. (female) : 64. Dorsal view, 65. Ventral view of gnathosoma, 66. Palp, 67. Leg I.

54, tarsus III- 83, tibia IV- 64, tarsus IV- 78. The number of tactile setae on different leg segments : leg I : trochanter- 4 setae (1 dorsal, 2 lateral, 1 ventral), basifemur- 2 setae (1 dorsal, 1 ventral), telofemur- 6 setae (2 each on dorsal, ventral, lateral), posterior lateral seta longest and slightly blunt. Genu with 1 trichoboth, 3 ventral, 5 dorsal, 2 posterior lateral setae. Tibiotarsus with 20 setae 6 dorsal, 3 posterior lateral, 2 anterior lateral, 4 anterior setae and 5 ventral setae. All the segments transversely striated. Leg II : trochanter- 3 dorsal, 3 lateral, 2 ventral setae. basifemur- 3 dorsal, 2 lateral and 2 ventral setae. Telofemur- 4 dorsal, 2 lateral, 2 ventral. Genu- 5 dorsal, 3 lateral, 3 ventral. Tibiotarsus- 2 trichoboth, 4 dorsal, 8 lateral, 3 ventral, 4 anteromost setae. Leg III : tibiotarsus with 1 trichoboth. Leg IV : genu and tibiotarsus with trichoboth each, basifemur with 1 multiforked seta, while telofemur with 2 such setae, empodial claws well developed, with leaf-like empodium having marginal rays. All leg segments transversely striated.

Male : Unknown.

Holotype : Female, India, West Bengal, Kalyani, ex *Psidium guajava,* 15.10.1995 (coll. K. Chatterjee).

Remarks : This new species differs from *Octobdellodes hurdi* (Atyeo, 1960) in having barbed lateral propodosomal seta in comparison to nude and smooth lateral propodosomal setae in this new species. Also the dorsal hysterosomal setae in the new species are with serrated tips, not met with in *O. hurdi.* Besides, genital plate of the new species has 6 setae as compared to 7 setae in *O. hurdi.*

3. Family CALIGONELLIDAE Grandjean

1944. Caligonellidae Grandjean, *Arch. Sci. Phys. Nat.*, **26**(5) : 103-113.

1955. Caligonellidae, Summers & Schlinger, *Hilgardia,* **23** : 541.

1968. Caligonellidae, Smiley & Moser, *Proc. ent. Soc. Wash.*, **70**(4) : 309.

1979. Caligonellidae, Chaudhri *et al., Univ. Agr., Faisalabad,* p. 139.

1985. Caligonellidae, Sepasagsarian, *Z. Angew. Zool.*, **72** : 439.

1990. Caligonellidae, Sepasaosarian, *Entomol. Mit. Zool. Mus. Hamburg,* Bd. **10** : 75.

Diagnosis : Relatively small mite, free living, reddish, cheliceral basal segments fused with each other in mid line forming a conical stylophore. Palp 5 segmented. Palp tarsus as long as tibial claw, slender, cylindrical, arising from distal half of palp tibia with specialised seta present apically. Idiosomal integument finely striated or with dorsal plates. Eyes 0-2 paired. Coxae I and II & III & IV forming two groups. Pretarsus with 2 claws having tenent haris.

Type ***Caligonella*** Berlese, 1910

Genus 10. ***Molothrognathus*** Summers & Schlinger

1955. *Molothrognathus* Summers & Schlinger, *Hilgardia,* **23** : 543.

1985. *Molothrognathus,* Sepasgosarian, *Z. Angew. Zool.*, **72** : 441.

2000. *Molothrognathus,* Gupta, In : *State Fauna Ser 7, Fauna of Tripura, Part-2.*

Diagnosis : Soft bodied, small mite, no dorsal plate, eyes 2 paired. Stylophore conical, deeply cleft in front, peritreme confined to stylophore. Palp genu with 1 pair of acicular setae. Palp tarsus not longer than tibial claw, with claviform sensillum on distal third, 3 acicular setae and a crown of 4 specialised setae on apex. Gnathosomal venter with 1 pair of setae.

Type ***Molothrognathus leptostylus*** Summers & Schlinger (by original designation)

24. ***Molothrognathus leptostylus*** Summers & Schlinger (Figs. 68-71)

1955. *Molothrognathus leptostylus* Summers & Schlinger, *Hilgardia,* **23**(12) : 543.

1974. *Molothrognathus leptostylus,* Chaudhri *et al., Univ. Agr. Sci. Layllpup. Pakistan,* p. 184.

1985. *Molothrognathus leptostylus*, Sepasgosarian, *Z. Angew. Zool.*, **72** : 453.

2000. *Molothrognathus leptostylus*, Gupta. In : *State Fauna Ser. 7, Fauna of Tripura*, Part 2, p. 19.

Female : Body 300 long, 180 wide. Stylophore conical with a cleft at the mid-line. Peritreme with 5 segments on each side. Palp 5 segmented, tarsal tip extends beyond rostrum, setae on femur-1 seta, genu- 1 seta, tibia- 3 seta, tibial claw longer than length of tarsus with 7 setae. Eyes 2 paired. Longitudinal striation present on idiosoma upto little beyond 4th leg and thereafter transversely striated. Dorsal setae 11 pairs (including a pair of humeral), all setae short and simple. Ventral striations longitudinal upto little beyond 4th leg and irregular caudally. Leg I- 190, II- 150, III- 150, IV- 192. Coxal setal formula : 3, 1, 1, 1, trochanter : 1, 1, 1, 1; femora : 2, 2, 2, 2; genu : 5, 4, 2, 1; tibia and tarsus I and II each with a peg-like seta.

Male : Summers & Schlinger (1955) described the male in detail.

Collection Records : This mite was described on material collected from California on almond bark as well as on pine leaf mould. From Pakistan, it was collected on *Punica granatum* while in India, it was collected from Tripura on bamboo.

Habitat : India : Bamboo. Outside India : *Punica granatum*, almond bark.

Distribution : India (Tripura), Pakistan, U.S.A.

4. Family CAMEROBIIDAE McGregor

1950. Camerobiidae McGregor, *Bull. Southern Calif. Acad. Sci.* **49** : 55.

1962. Camerobiidae, Meyer, *South Afr. J. Agr. Sci.*, **5** : 411.

1962. Camerobiidae, Richard, *N. Z. J. Agr. Res.*, **5** : 95.

1967. Camerobiidae, Soliman & Zaher, *Bull Soc. Ent. Egypt.* **51** : 27-30.

1967. Camerobiidae, DeLeon, In : *Some mites of Caribbean area, Kansas*, p. 66.

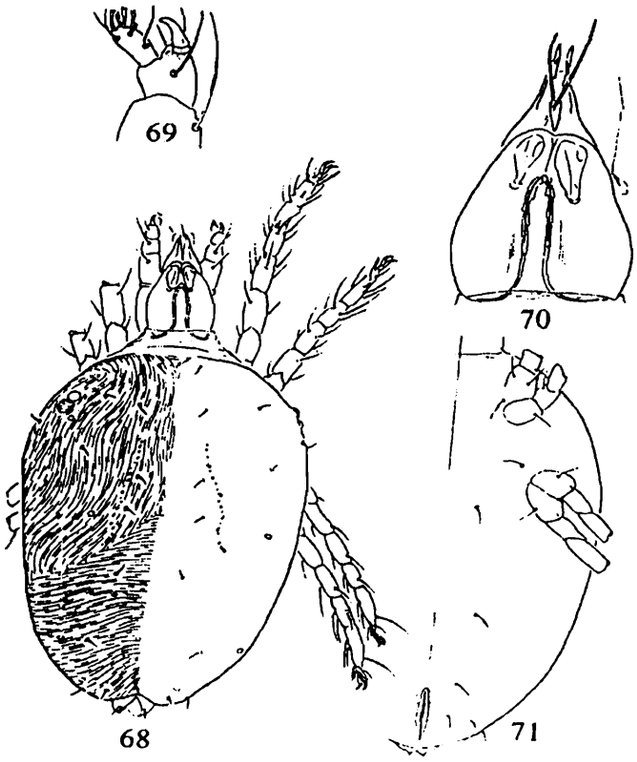
1968. Neophyllobidae Smiley & Moser, *Proc. ent. Soc. Wash.*, **70**(4) : 309.

1983. Camerobiidae, Bolland, *Ent. Ber.*, **43** : 42.

1983. Camerobiidae, Eyndhoven, *Ent. Ber.*, **43** : 25-28.

1985. Camerobiidae, Sepasgosarian, *Z. Angew. Zool.* **72** : 442.

Diagnosis : Members of this family have long stilted legs, weak palpi in ventrally directed gnathosoma having looped peritremes



Figs. 68-71 : *Molothrognathus leptostylus* Summers & Schlinger (female) : 68. Dorsal view, 69. Palp, 70. Dorsal view of stylophore, 71. Venter of idiosoma. (after Summers & Schlinger, 1955).

Genus 11. ***Neophyllobius*** Berlese

1950. *Neophyllobius* McGregor, *Bull. Southern Calif. Acad. Sci.* **49** : 55-70.

1955. *Neophyllobius*, Summers & Schlinger, *Hilgardia*, **23**(12) : 549.

Diagnosis : According to McGregor (1950), these mites are short, slender, without strong talon-like claw on penultimate segment of palp, but with 2 or more hairs, one of which may be blade-like.

Type ***Neophyllobius elegans*** Berlese

25. ***Neophyllobius guajavae***
Chatterjee & Gupta, sp. nov
(Figs. 72-77)

Female : Idiosoma 240 long, 178 wide. Leg I-261 long, leg II- 249 long, leg III- not clearly discernible, leg IV- 190 long; legs are much longer than length of body. Dorsum with 15 pairs of setae, mostly long, thick and serrate (serration not shown in figure). Striation pattern on dorsum as indicated, striation lacking at the bases of dorsal setae; most of the setae longer than distance between their bases and those of the following setae; average length being 40-54, borne on tubercles. Six pairs of setae present on dorsomedian series, 8 pairs on dorsolateral series and 1 pair on submedian series and their relative positions as indicated in the illustration. Leg chaetotaxy not adequately discernible because of position legs. Each tarsus has well developed hook-like claws and empodium, many setae on leg segments thick and minutely serrate and of diverse types; tenent haris present as usually on empodium, tarsi swollen and transversely striated. Chelicera with fine needle-like chela. Palp as illustrated.

Male : Unknown.

Holotype : Female, India : West Bengal, Kalyani, ex *Psidium guajava*, 26.4.1995.

Remarks : This is the first record of the genus from India. This species bears resemblance with *Neophyllobius natalensis* Meyer & Ryke (1959) but differs in (i) dorsum having 15 pairs of setae instead of 17 pairs as in *natalensis*, (ii) dorsum with setae bearing sclerotized area being more prominent in *natalensis* and less so in this new species, (iii) in leg and palp chaetotaxy. The live mite was bright red and was collected from the margin on the ventral surface of the leaf. In field, this mite was collected in association with *Brevipalpus phoenicis* though its feeding upon it was not observed.

5. Family CHEYLETIDAE Leach

1815. Cheyletidae Leach, *Trans. Linn. Soc. Lond.*, **11** : 399.

1949. Cheyletidae, Baker, *Proc. U.S. Nat. Mus.*, **99**(3238) : 267.

1954. Cheyletidae, Lawrence, *Ann. Nat. Mus.*, **13**(1) : 65-67.

1956. Cheyletidae, Beer, *Univ. Kansas Sci. Bull.*, **38**(5) : 395.

1960. Cheyletidae, Meyer & Ryke, *J. Ent. Soc. S. Afr.*, **23**(1) : 188.

1961. Cheyletidae, Volgin, *Parazitol. Sbornik*, 20 : 248-256.

1963. Cheyletidae, DeLeon, *Fla. Ent.*, 45(3) : 129-137.

1966. Cheyletidae, Meyer & Rodriguez, *Garcia De Orta*, **13**(2) : 24.

1969. Cheyletidae, Volgin, *Operedel. Fauna SSR*, 101 : 1-432.

1970. Cheyletidae, Smiley, *Proc. ent. Soc. Wash.*, **72(2) : 229.**

1970. Cheyletidae, Meyer, *Koedoe*, **13** : 32.

1970. Cheyletidae, Summers & Price, *Univ. Calif. Pub. Ent.*, **61** : 1-153.

1973. Cheyletidae, Meyer *et al*, *Ent. Mem. Dep. Agr. Tech. Serv.*, **29** : 13.

1977. Cheyletidae, Qayyum & Chaudhri, *Pak. J. Zool.*, **9(1)** : 71-77.

1977a. Cheyletidae, Qayyum & Chaudhri, *Pak. J. Zool.*, **9(1)** : 87-97.

1977b. Cheyletidae, Qayyum & Chaudhri, *Pak. J. Agric. Sci.*, **14**(2-3) : 110-114.

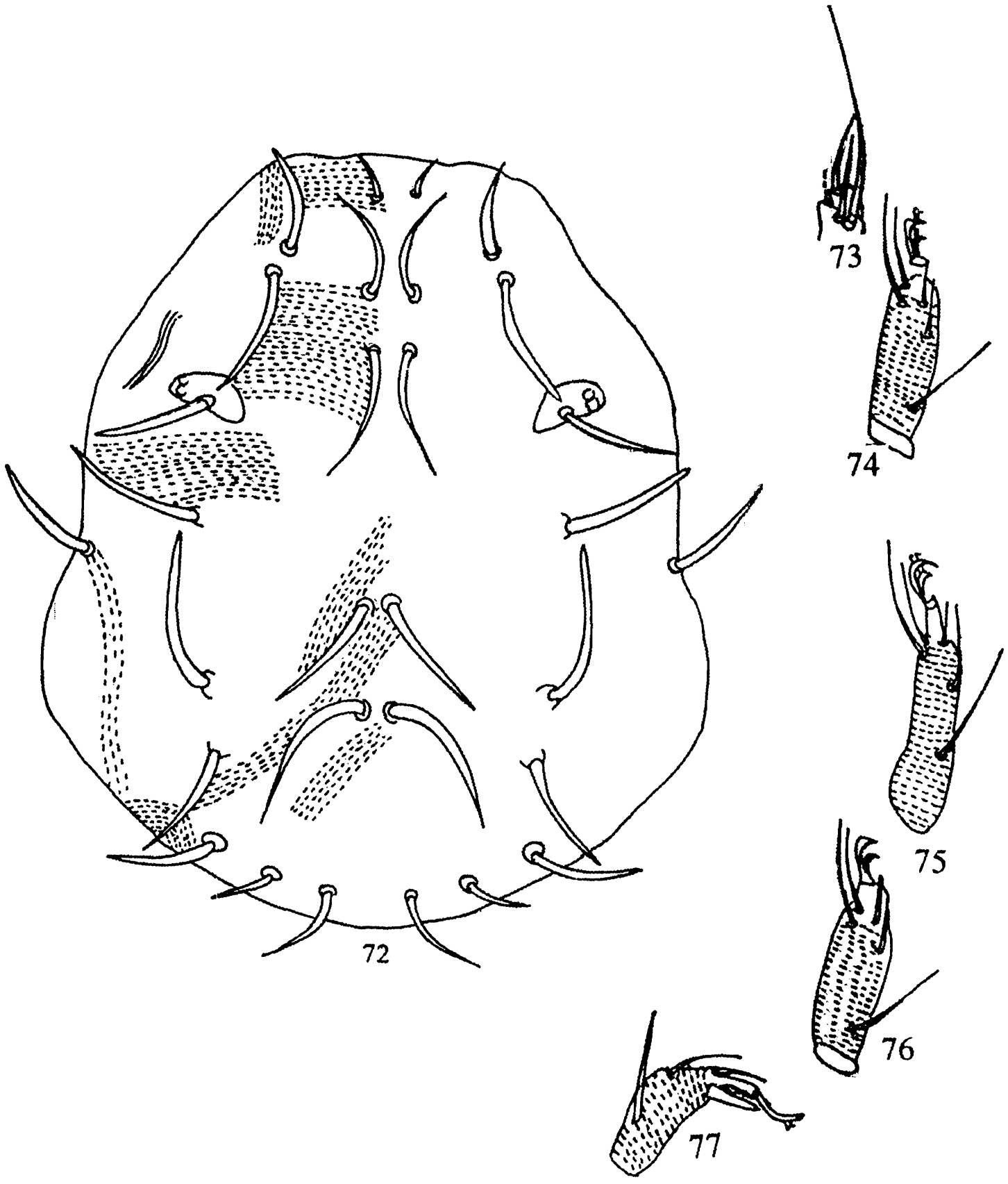
1979. Cheyletidae, Qayyum & Chaudhri, *Pak. J. Zool.*, **11(1)** : 167-172.

1979a. Cheyletidae, Qayyum & Chaudhri, *Pak. J. Ent.*, **11(1)** : 9-12.

1979b. Cheyletidae, Chaudhri *et al. Univ. Agri. Faisalabad*, p. 147.

1984. Cheyletidae, Smiley, *Internat. J. Acarol.*, **10(4) : 239.**

1985. Cheyletidae, Chaudhri & Akbar, *Univ. Agri. Faisalabad*, p. 1-313.



Figs. 72-77 : *Neophyllobius guajavae* Chatterjee & Gupta sp. nov. (female) : 72. Dorsal view, 73. Palp, 74. Tarsus of leg I, 75. Tarsus of leg II, 76. Tarsus of leg III, 77. Tarsus of leg IV.

1985. Cheyletidae, Gupta, Handbk. Plant Mites of India, p. 297.

1992. Cheyletidae, Gupta, In : *State Fauna Ser. 3, Fauna of West Bengal, Part 3*, p. 148-149.

1997. Cheyletidae, Gupta & Chatterjee, In : *State Fauna Ser. 6, Fauna of Delhi*, p. 516-517.

Diagnosis : Mostly predaceous mites. Presence of palpal thumb claw complex, presence of peritreme which is M-shaped, cheliceral bases fused with gnathosoma to form rigid gnathosomal unit, movable chela stylet like. Larva homomorphic. The forward and downward movement of the two opposed palp produces a powerful raptorial mechanism in the predatory species. Palp tarsus with 1 or 2 each of comb and sickle -like setae present only on free living forms. Body setae in different genera vary, often strong, may be simple, cloud-like, stag horn-like, palmate, pectinate, fan-like, lanceolate, etc. The number and size of dorsal plates, nature of tarsal claws, number of teeth on palp claw, nature of sensilla on palp tarsus and structure of peritreme vary in different genera and all these serve as important characters in separating genera. The extent and configuration of protegmen highly vary and are important taxonomic characters. The other characters of taxonomic value are number and size of dorsal plates, nature of tarsal claws, number of sensilla on palp tarsus and peritreme structure.

These mites feed other microarthropods such as acarid mites, collembolans, etc. They are also abundant in granaries, litter, top soil, under bark, foliage (feed upon mites/insects) and may be in nests of birds and mammals.

Type *Cheyletus* Latreille, 1796

Key to the genera of CHEYLETIDAE known to inhabit plants in India

1. All tarsi with paired claws 2
— One or more tarsi without paired claws ..... *Cheletogenes*
2. Eye not evident 3
— One pair of eyes present 5
3. With 2 well developed comb-like setae on palp tarsus ..... *Cheletonella*
— With 1 or no comb-like setae on palp tarsus 4
4. Setae on margins of dorsal plates acicular, fusiform or narrow, spatulate, comparatively barbed, no fan shaped anal setae, dorsomedian setae when present, few in numbers, tiny and simple in structure ..... *Cheyletus*
— Setae on margins of dorsal plates broadly spatulate or fan shaped, dorsomedian setae numerous, conspicuous, gently modified .... *Eucheyletia*
5. Dorsal plating on idiosoma weakly developed or absent ..... *Chelacaropsis*
— Dorsal plating represented by 1 or more well defined sclerites 6
6. Dorsal plating of hysterosoma consists of 1 pair of sclerites, partly covering metapodosoma .... *Cheletomimus*
— Dorsal plating of hysterosoma with single median plate or without plates of significant size 7
7. Marginal setae of propodosoma heteromorphic, those in front of eyes broad, flabellate, those behind eyes long, narrow, strap-like .... *Grallacheles*
— Marginal setae of propodosoma similar to each other in size and shape 8
8. Median dorsal plate absent on hysterosoma ... . *Cheletacarus*
— Median dorsal plate present on hysterosoma 9
9. Pedicel of tarsus I stubby, much shorter than setae arising on it; claws on tarsus I exceptionally small, barely perceptible, mesal paraterminal sensillum of tarsus I solenidiform, at least half as long as ad-dorsal seta of corresponding side ..... *Paracheyletia*

— Pedicel of tarsus I normal, about as long as any seta arising on it, claws on tarsus I smaller than those on tarsus II but not difficult to discern, mesal paraterminal sensillum of tarsus I setiform not appreciably overhanging tips of claws .... *Hemicheyletia*

Genus 12. ***Chelacaropsis*** Baker

1949. *Chelacaropsis* Baker. *Proc. U.S. Nat. Mus.*, **99**(3238) : 315.

1970. *Chelacaropsis*, Summers & Price, *Univ. Calif. Pub. Ent.*, **61** : 65.

1977. *Chelacaropsis*, Corpuz Raros & Sotto, *Kalikasan Philip. J. Biol.*, **6**(2) : 150.

1978. *Chelacaropsis*, Gupta & Chottapadhyay, *Indian J. Acar.*, **3** : 77-86.

1986. *Chelacaropsis*, Lekprayoon & Smiley, *Internat. J. Acarol.*, **12**(2) : 69.

Diagnosis : Baker (1949) erected this genus to accommodate a species akin to *Acaropsis* but having no dorsal plates. Palp tarsus with only one comb-like seta. Eyes present. Dorsal body setae broadly clavate, serrate.

Type ***Chelacaropsis moorei*** Baker, 1949
(by original designation)

26. ***Chelacaropsis moorei*** Baker
(Figs. 78-84)

1949. *Chelacaroosis moorei* Baker, *Proc. U. S. Nat. Mus.*, **99**(3238) : 315-316.

1980. *Chelacaropsis moorei*, Gupta & Ghosh, *Rec. zool. Surv. India*, **77** : 202.

1986. *Chelacaropsis moorei*, Lekprayoon & Smiley, *Internat. J. Acarol.*, **12**(2) : 69-73.

Female : Body 480 long, 245 wide. Distal part of gnathosoma cone shaped. Rostrum with 1 dorsal and 1 ventral setae. Tegmen and protegmen without longitudinal rod-like striae. Peritreme with 6-7 segments, 3 teeth on palp claw. Palp tarsus with 2 sickle and 1 comb-like setae with 11-13 teeth. Palp genu with 1 simple seta, 1 long spiculate seta on palp femur. Propodosomal shield subtriangular with setae subequal and capitate. No shield on hysterosoma, Ventrally simple setae on propodosoma and hysterosoma. Coxal setal formula of legs 2, 1, 2, 2; trochanter- 1, 1, 2, 1; femur- 2, 2, 2, 1; genu- 1 + 2 solenidia; 2, 2, 2; tarsi- 9 + 1 solenidion, 7 + 1 solenidion, 7, 7.

Male : Lekprayoon & Smiley (1986) described it.

Collection Records : This species was originally described on the basis of specimens collected on *Glaucomys volans querecti* from Florida and *Allium sativum* from Thailand. In India, it has been recorded from nests of *Ploceus manyar flaviceps* in West Bengal and on paddy in Andaman Isl.

Habitat : India : Paddy, nest of *P. m. flaviceps.* Elsewhere : *Glaucomys volans querecti, Allium sativum.*

Distribution : India (West Bengal, Andaman & Nicobar Isl.), Thailand, U.S.A.

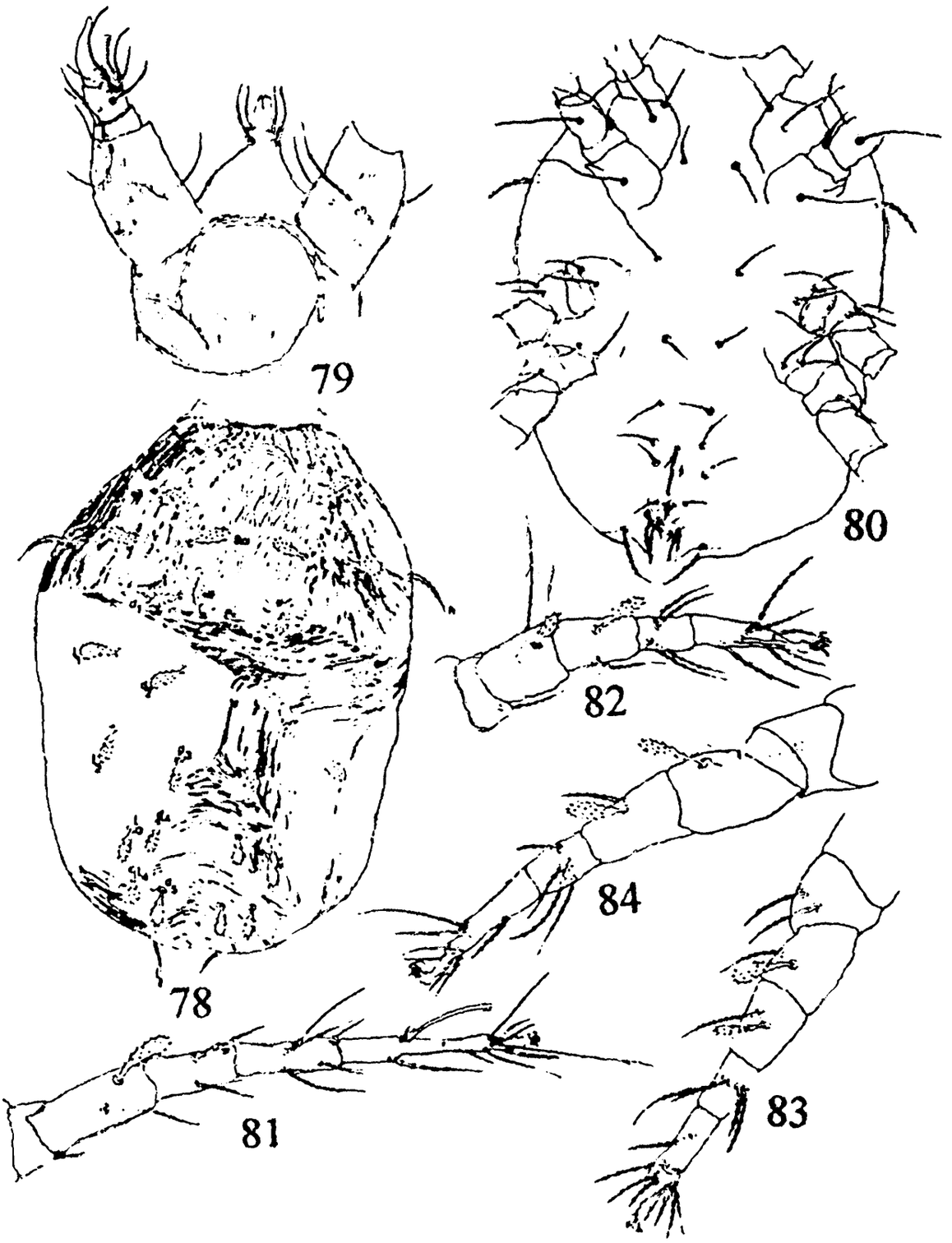
Remarks : In Thailand, this species was collected in association with *Aceria tulipae* infesting garlic. In India, it was found associated with *Schizotetranychus* sp. infesting paddy.

Genus 13. ***Cheletacarus*** Volgin

1961. *Cheletacarus* Volgin, *Akad. Nauk. SSR Zool. Inst. Parazitol Sbornik*, **20** : 248.

1970. *Cheletacarus*, Summers & Price, *Univ. Calif. Pub. Ent.*, **61** : 36.

Diagnosis : Teeth on palp claw present on greater part of mesal region. Palp tarsus with 2 comb-like and 2 sickle-like setae. Protegmen extends far in front of peritreme. Peritreme inverted U-shaped, rearwardly directed, arms comprise of 9 short overlapping lines. Dorsum covered with 1 large thin shield and several small plates, one for each seta. Eyes one paird, inconspicuous. Dorsal body setae spatulate or fan shaped, all of similar form. All tarsi with claws. Solenidion w_1 very long, no guard seta present.



Figs. 78-84 : *Chelacaropsis moorei* Baker (female) : 78. Dorsal view, 79. Gnathosoma, 80. Venter of idiosoma 81. Leg I, 82. Leg II, 83. Leg III, 84, Leg IV. (after Lekprayoon & Smiley, 1986)

Type *Cheletacarus raptor* Volgin, 1961
(by original designation)

27. *Cheletacarus gryphus* Summers & Price
(Figs. 85-88)

1970. *Cheletacarus gryphus* Summers & Price, *Univ. Calif. Pub. Ent.*, **61** : 36.

1955. *Cheletacarus gryphus*, Mathur & Mathur, *Abst. V Nat. Symp. Acarology, Bangalore*, p. 13-14.

Female : According to Summers & Price (1970) : Palp claw with 12-14 teeth, outer and inner combs with about 20 and 25 teeth, respectively. Tegmen with closely set rows of elliptical tubercles, protegmen with small tubercles. Propodosomal shield weakly sclerotized, small granules present on surface. Unplated portion of dorsum with dotted striae, ventral striae plain. Eyes present, Dorsal body setae short with truncated ends. Paragenital setae 2 pairs. Leg chaetotaxy : femora- 2, 2, 2, 1; genu- 3, 2, 2, 2; tibia- 6, 5, 4, 4; tarsi- 9, 8, 8, 7; solenidion on tarsus I about as long as tarsus.

Male : Unknown (?).

Collection Records : Originally this species was described from California collected on bark of almond tree. In India, this was recorded on fruit tree in Haryana.

Habitat : India : Fruit tree. Elsewhere : bark of almond tree.

Distribution : India (Haryana), U.S.A.

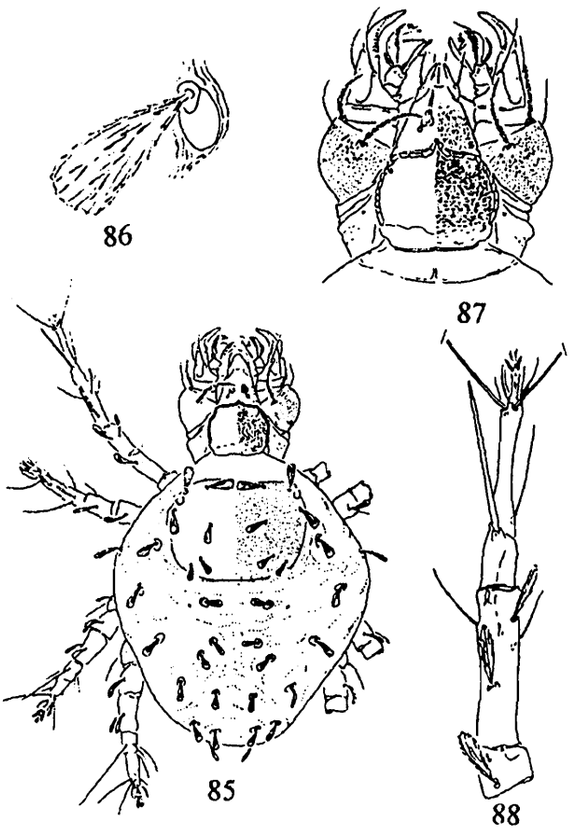
Genus 14. ***Cheletogenes*** Oudemans

1905. *Cheletogenes* Oudemans, *Ent. Ber. Ned. Ver.*, **1**(21) : 208.

1970. *Cheletogenes*, Summers & Price, *Univ. Calif. Pub. Ent.*, **61** : 53.

1973. *Cheletogenes*, Corpuz-Raros & Sotto, *Kalikasan Philip. J. Biol.*, **6**(2) : 169.

Diagnosis : Inner margin of palp claw with many minute teeth throughout inner margin, palp tarsus with 2 sickle and 2 comb-like setae. Dorsal plating papilose. Propodosomal plate covers most of propodosoma, well defined; hysterosomal plate ill defined, restricted to midportion of metapodosoma, bearing 1st and 2nd. pairs of dorsomedian setae.



Figs. 85-88 : *Cheletacarus gryphus* Summers & Price (female) : 85. Dorsal view, 86. Anterolateral hysterosomal seta, 87. Gnathosoma, 88. Tibia and tarsus of leg I. (after Summers & Price, 1970)

Dorsal setae rounded, fan-like, some of the ventral body setae flageliform, long. Anal setae acicular, smooth. Legs longer than body. Tarsus I stubby, truncate distally, no pretarsal claw, bearing 5 setiform sensillae, terminal portion with 2 long subequal setae, w_1 set on elevated nipple, no guard seta. Tarsus II-IV with pedicel, claw and empodium.

Type ***Cheletogenes ornatus***
Canestrini & Fanzago, 1876
(Monotypic)

28. *Cheletogenes ornatus*
(Canestrini & Fanzago)
(Figs. 89)

1878. *Cheyletus ornatus* Canestrini & Fanzago, *Atti. Soc. Vent. Trentena*, p. 106.

1886. *Cheyletus saccardianus* Berlese, *Acari, Myriapoda et Scorpiones huscusque in Italia reperta*, p. 32.

1904. *Cheyletus ornatus*, Oudemans, *Ent. Ber.* **1**(7) : 154.

1941. *Cheletogenes ornatus*, Womersley, *Rec. S. Aust. Mus.* **7**(1) : 85.

1944. *Cheletogenes ornatus*, McGregor, *Calif. Citrograph*, **30**(2) : 53.

1949. *Cheletogenes ornatus*, Baker. *Proc. U. S. Nat. Mus.*, **99**(3238) : 305.

1955. *Cheletogenes ornatus*, Volgin, *Akad. Nauk. SSSR. Zool. Inst. Opredel. p. Faune SSSR No.* **59** : 174.

1960 *Cheletogenes ornatus*, Narayanan *et al.*, *Proc. Nat. Inst. Sci.*, **26** : 390.

1964. *Cheletogenes ornatus*, Muma, *Fla. Ent.*, **47**(4) : 241.

1967. *Cheletogenes ornatus*, Gerson, *Acarologia*, **9**(2) : 359.

1969. *Cheletogenes ornatus*, Volgin, *Akad. Nauk. SSSR. Zool. Inst. Opredel p. Faune SSSR No.* **101** : 296.

1970. *Cheletogenes ornatus*, Meyer, *Koedoe*, **13** : 32.

1972. *Cheletogenes ornatus*, Corpuz-Raros, *Philip. Ent.*, **2**(4) : 250.

1985. *Cheletogenes ornatus*, Gupta, *Handbk. Plant Mites of India*, p. 300.

1992. *Cheletogenes ornatus*, Gupta, In : *State Fauna Ser. 3, Fauna of West Bengal, Part 3*, p. 149.

1992. *Cheletogenes ornatus*, Sharma & Bhatnagar, *Sci. & Cult.*, **58**(3-4) : 79.

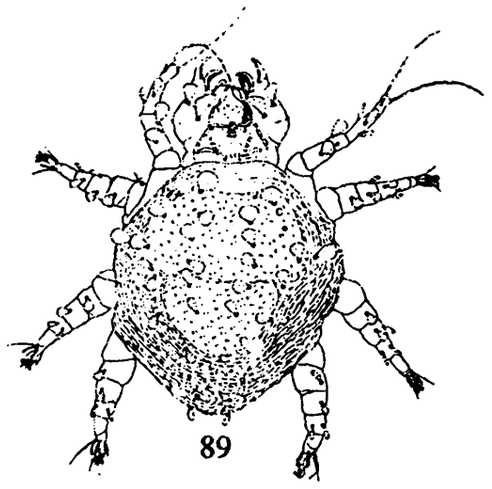
1993. *Cheletogenes ornatus*, Mukherjee & Singh, *J. Insect Sci.*, **6**(1) : 136.

1995. *Cheletogenes ornatus*, Singh, *Adv. Agri. Res. India*, **3** : 188.

1996. *Cheletogenes ornatus*, Chatterjee & Gupta, *J. Beng. Nat. Hist. Soc.* NS, **15**(2) : 27.

1997. *Cheletogenes ornatus*, Gupta & Chatterjee, In : *State Fauna Ser. 6, Fauna of Delhi*, p. 516-517.

2000. *Cheletogenes ornatus*, Gupta, In : *State Fauna Ser. 7, Fauna of Tripura*, Part 2, p. 17.



Figs. 89 : *Cheletogenes ornatus* (Canestrini & Fanzago) (female) : Dorsal view. (after Corpuz-Raros, 1972)

Female : Small rounded mite with papilose body integument and small palp-like forelegs, 15-16 teeth present along inner margin of palp claw. Outer comb-like seta with about 20 teeth; hook-like sickle shaped seta present. Palp femur broadened in front with a row of superficial microtubercles; protegmen bulbous or doomed, covering 3/4 of rostrum. Peritreme with 5-6 links, posteriormost one sharply curves inwards. Propodosomal plate with 4 lateral and 3 median setae. Hysterosomal plate ill defined, with 2 pairs of median setae and 6 lateral setae. Each seta with scale-like or cycloid blade with 10 coarsely barbed ribs.. Paragenital, genital and anal setae being 2, 2, 3 pairs, respectively. Solenidion w_1 very small. Length of legs : I- 140, II- 140.

Male : Unknown (?).

Collection Records : This mite has been recorded on a number of plants throughout the world. In India, it has been recorded in Delhi on mango in association with mango bud mite, *Aceria mangiferae;* in Rajasthan, it has been recorded on *Zizyphus* sp. in association with Ber gall mite, *Larvacarus transitans;* in Uttar Pradesh, on mango and apple; in West Bengal on mango and in Tripura on *Abutilon indicum.*

Habitat : India : Mango, *Zizyphus* sp., *Abutilon indicum*, Mango, Apple. Elsewhere : Bamboo, *Casuarina equisetifolia, Citrus madurensis, Citrus maxima, Saraca indica, Oroxylon indicum, Bixa orettana, Chrysophullam calmito Premna odorata, Bambusa glaucescens.*

Distribution : India (West Bengal), Uttar Pradesh, Delhi, Rajasthan. Cosmopolitan.

Remarks : This mite is a good predator specially of eriophyids (Narayanan *et al.*, 1960; Sharma & Kushwaha, 1983) as it has been found to be feeding upon mango bud mite and Ber gall mite, respectively. This mite is also abundantly available and therefore proper utilisation of this predatory mite may prove to be profitable in biological control of pest mites.

Sharma & Kushwaha (1983) reported that C. ornatus preyed upon *Larvacarus transitans* infesting *Zizyphus mauritiana* in Rajasthan. An individual mite devoured in average 5-60 mites during 12 hrs. Incidence of predator started from 2nd week of June (32 mites/10 galls) and attained peak in 3rd week of July (230 mites/10 galls), then the predator population declined abruptly from 2nd week of August. Temperature, RH and rainfall had no effect on population of predatory mite.

Genus 15. ***Cheletomimus*** Oudemans

1940. *Cheletomimus* Oudemans, *Ent. Ber. Ned. Ent. Ver.* **1**(18) : 163.

1949. *Cheletomimus*, Baker, *Proc. U. S. Nat. Mus.*, **99**(3238) : 293.

1964. *Cheletomimus*, Muma, *Fla. Ent.*, **47**(4) : 242-244.

1970. *Cheletomimus*, Summers & Price, *Univ. Calif. Publ. Ent.*, **61** : 8-9.

1979. *Cheletomimus*, Qayyum & Chaudhri, *Pak. J. Zool.*, **11** : 7-12.

1985. *Cheletomimus*, Chaudhri & Akbar, *Univ. Agri. Faisalabad.* p. 142.

Diagnosis : One pair of plates partially covers metapodosomal area of adult female. Palp claw with variable number of teeth on its inner margin. Palp tarsus with 2 comb and 2 sickle-like setae, with variable number of teeth on inner margin. Peritreme with variable number of links. Eyes present. Tarsus I-IV each with 2 claws. Solenidion on tarsus-I longer than guard seta.

Type ***Cheletes berlesei*** Oudemans, 1904 (Monotypic)

29. ***Cheletomimus*** sp.

2000. *Cheletomimus*, Gupta, In : *State Fauna Ser. 7, Fauna of Tripura*, Part 2, p. 17.

Collection Records : One unidentified species of this genus in damaged condition was collected on bamboo in Tripura.

Habitat : Bamboo.

Distribution : India (Tripura).

Genus 16. ***Cheletonella*** Womersley

1941. *Chelletonella* Womersley, *Rec. S. Aust. Mus.*, **7**(1) : 51-64.

1949. *Cheletonella*, Baker, *Proc. U. S. Nat. Mus.*, **99**(3238) : 267-320.

1955. *Cheletonella*, Volgin, *Akad. Nauk. SSSR., Zool. Inst. Opredel. p. Fauna SSSR, No.* **59** : 152-176.

1970. *Cheletonella*, Summers & Price, *Univ. Calif. Pub. Ent.*, **61** : 95.

Diagnosis : According to Summers & Price (1970), these mites are relatively large, soft bodied, having a pointed beak. Palp claw with few basal teeth. Palp tarsus with 2 sickle and 2 comb-like setae, stylophore approximately triangular, its protegmenal portion conical and almost entirely covering free end of rostrum. No eyes. Body plating restricted to a single shield on propodosoma, dorsal setae not inserted on the shield and are borne on trivial platelets, one for each seta. Dorsal body setae conservatively fan shaped, longer than wide. Legs shorter than idiosoma, tarsus I bears a modified long solenidion w_1 set a short distance in front of long guard seta.

Type ***Cheletonella vespertiliones***
Womersley (Monotypic)

30. ***Cheletonella summersi***
Chatterjee & Gupta, sp. nov
(Figs. 90-93)

Male : Body narrow expanded medially at the level of third pair of legs, 137 long (from posterior tip of body upto tip of rostrum). Palp as illustrated. Palp tibial claw with 5 basal teeth, tarsus with 2 comb and 2 sickle like setae, inner comb with 12-13 teeth, outer comb with 15-16 teeth. Dorsal palp tibial setae well developed and fan shaped. Setae on palp femur and genu resemble those of propodosoma. Stylophore triangular. Protegmen conical, small pores scatter on dorsal surface. Peritreme as illustrated with a number of ribs. Propodosoma covered with a shield bearing 4 pairs of fan shaped setae as illustrated. All setae almost of equal length, humeral setae present as usual, slightly longer than propodosomal setae. Hysterosoma without plate, longitudinally striated in the mid region, transversely striated at the posterior tip and irregularly striated at the lateral region with 2 pairs of setae dorsomedially and 2 pairs of setae dorsolaterally. None of the setae borne on platelets, with setae being slightly longer than propodosomal setae. Ventrally, three pairs of setae present around the anal region, one pair of setae ahead of it. Leg I- 114 long, Leg II- 95 long, Leg III- 107 long, leg IV- 88 long. Length of two terminal setae on tarsus I being 59 and 52. Tarsal solenidion 28 long, guard seta 14 long. Leg chaetotaxy; Leg I- femur- 2, tibia- 2, tarsus- 8, leg II; femur- 2, genu- 2, tibia- 4, tarsus- 7. Leg III : femur- 2, genu- 2, tibia- 4, tarsus- 7; leg IV : femur- 2, genu- nil, tibia- 4, tarsus- 6.

Female : Unknown.

Holotype : Male, India : West Bengal, Calcutta Agri-Horticultural Garden, ex Lily, 16.6.1995 (coll. K. Chatterjee).

Remarks : The only species with which it shows some resemblance is *Cheletonella vespertilionis* Womersley, 1941 but differs in having much lesser number of hysterosomal setae, in leg chaetotaxy, in ratio of length of leg I and idiosoma and in gnathosomal characters.

Genus 17. ***Cheyletus*** Latreille

1796. *Cheyletus* Latreille, *Precis des Caracteres generigues des insects An :* 179.

1949. *Cheyletus,* Baker, *Proc. U. S. Nat. Mus.,* **99**(3238) : 275-276.

1970. *Cheyletus,* Summers & Price, *Univ. Calif. Pub. Ent.,* **61** : 23-24.

1972. *Cheyleuts,* Corpuz-Raros, *Philip. Ent.,* **2**(4) : 252.

Diagnosis : Palp tarsus with 2 sickle and 2 comb-like setae. Palp claw with basal teeth, the number may vary from one to many. Protegmen well developed, accommodates cheliceral stylets. Tegmen lightly striated. Peritreme M-shaped. Propodosomal plate covers most of propodosoma, hysterosomal plate quadrangular, incompletely covering hysterosoma. Eyes absent. Dorsolateral body setae acicular, fusiform or spatulate, comparatively small, usually 10 pairs, 4 pairs on propodosomal plate, 2-5 pairs on hysterosomal plate. Tibia I-IV with 1 dorsal seta, much longer than other setae present on that segment. All tarsi with paired claws and rayed empodium.

Type ***Acarus eruditus*** Schrank, 1781

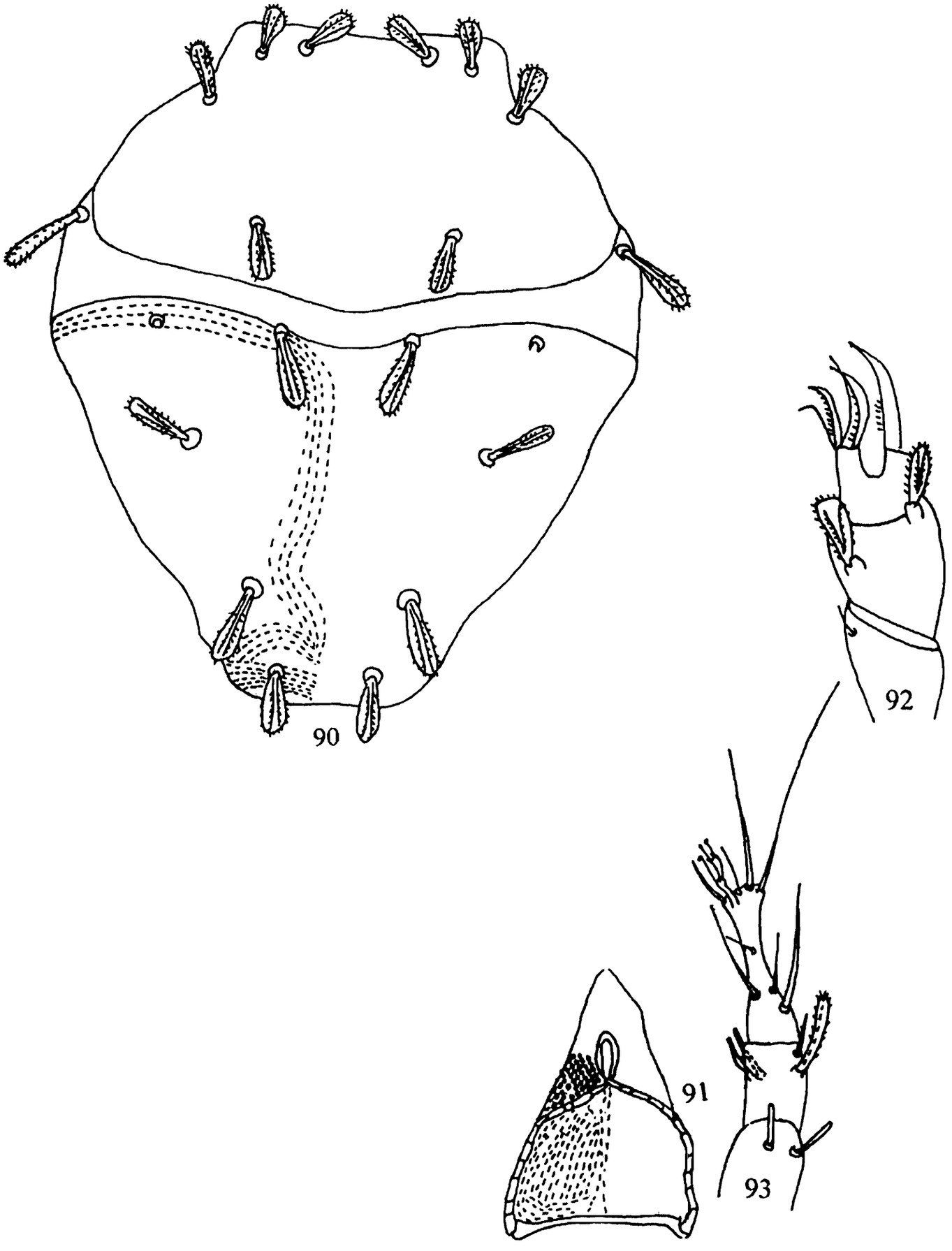
Key to the species of *Cheyletus* known to inhabit plants in India

1. Palp claw with 1 large basal tooth ..... ***fortis***
— Palp claw with 2 or more basal teeth 2
2. Femur IV with 2 setae ..... ***eruditus***
— Femur IV with 1 seta ..... ***malaccensis***

31. ***Cheyletus eruditus*** (Schrank)
(Figs. 94-98)

1781. *Acarus eruditus* Schrank, *Enumeratio insectorum Austrialindigenorum* p. 513.

1852. *Euparsus cancariformis* Hessling, *EinigeNotizen wher den Weichselzop. J. Illvatr Med. Zeit* **1**(5) : 255-259.



Figs. 90-93 : *Cheletonella summersi* Chatterjee & Gupta sp. nov. (female) : 90. Dorsal view, 91. Ventral view of gnathosoma, 92. Palp, 93. Genu, tibia and tarsus of leg I.

1903. *Cheyletus eruditus*, Oudemans, *Tijdschr. Nederl. Dierk, ver. (8 ur.)* **8** : p. xvi.

1949. *Cheyletus ferox* Baker, *Proc. U. S. Nat. Mus.*, **99**(3238) : 267.

1982. *Cheyletus eruditus*, Dhooria, *Acar. Newsl.*, **11** : 6.

1987. *Cheyletus erudirus*, Volgin, *Amerind Pub. Co. Pvt. Ltd.*, p. 532.

1989. *Cheyletus eruditus*, Barilo, *Zool. Zh.*, **68**(10) : 134-138.

1994. *Cheyletus eruditus*, Gerson, *Invert. Taxonomy*, **8**(2) : 435-437.

1995. *Cheyletus eruditus*, Shen, *Researches of Acarology in China, Chongguing Pub. House, Chongguing*, i-iii.

Female : Idiosoma 550 long, diamond shaped. Palp claw with similar basal teeth, dorsal palp tibial seta acicular, smooth, 13 teeth on outer comb, 15 teeth on inner comb. Dorsal seta on palp femur about 135 long, berbed. Tegmen ornamented with broken striae. Protegmen distinct. Peritreme M-shaped with 4-5 links. Propodosomal plate distinct, hysterosomal plate trapezoidal; area between propodosoma and hysterosoma with transverse striation. Dorsocentral setae finely barbed, acicular, 10 pairs, all similar in shape and of unequal in length; dorsomedian seta absent. Humeral seta acicular, finely barbed. Leg I/idiosoma- 0.9; femoral setae on leg I-IV- 2, 2, 2, 2; genu- 3, 2, 2, 2; tibia- 6, 4, 4, 4; tarsi- 10, 8, 7, 7.

Male : As in female.

Collection Records : In abroad, this mite has been reported on plants, in stored products and in other habitats. In India, the only record of this mite on plant is on citrus in Punjab in association with citrus brown mite, *Eutetranychus orientalis.*

Habitat : India : Citrus. Elsewhere : in diverse habitats.

Distribution : India (Punjab). Cosmopolitan.

Remarks : This mite has been reported to feed upon *Eutetranychus orientalis* infesting citrus.

32. ***Cheyletus fortis*** Oudemans

(Figs. 99-102)

1904. *Cheyletus fortis* Oudemans. *Ent. Ber. Ned. Ver.* **1** : 161.

1949. *Cheyletus fortis*, Baker, *Proc. U. S. Nat. Mus.*, **99**(3238) : 280.

1969. *Cheyletus fortis*, Volgin, *Akad. Nauk. SSR., Zool. Inst. Opredel p. Fauna SSSR No.* **101** : 87.

1970. *Cheyletus fortis*, Summers & Price, *Univ. Calif. Pub. Ent.*, **61** : 28.

1972. *Cheyletus fortis*, Corpuz-Raros, *Philip. Ent.*, **2**(4) : 252.

1985. *Cheyletus fortis*, Gupta, *Handbk. Plant Mites of India*, p. 301.

1986. *Cheyletus fortis*, Fletchmann, *Pub. Univ. Sao Paulo*, p. 75.

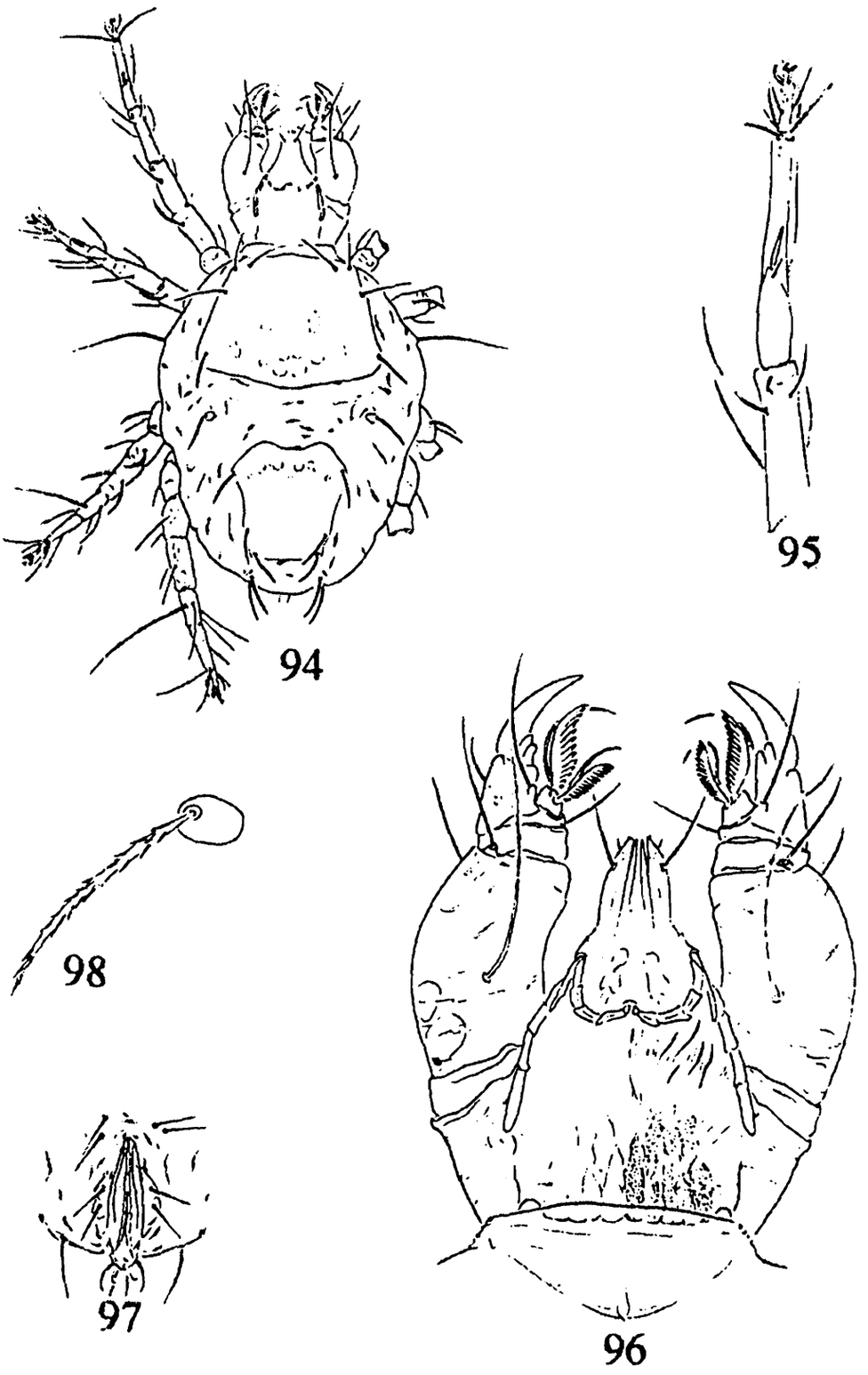
1992. *Cheyletus fortis*, Gupta, In : *State Fauna Ser. 3, Fauna of West Bengal, Part 3*, p. 149.

Diagnosis : The presence of a single basal tooth on palp tarsus is the character by which it can be easily differentiated from *C. malaccensis,* where there are 2 basal teeth. In addition, humeral setae appear to be more plumose than those of *C. malaccensis.* Males of this species also differ in number of marginal hysterosomal setae (5 pairs in *C. fortis* and 6 pairs in *C. malaccensis*). In female, inner palpal comb with about 27 teeth, outer comb with 20 teeth. Propodosomal shield does not cover whole of propodosoma with 4 pairs of lanceolate serrate setae. Hysterosomal shield squarish with 3 pairs of narrow lanceolate setae.

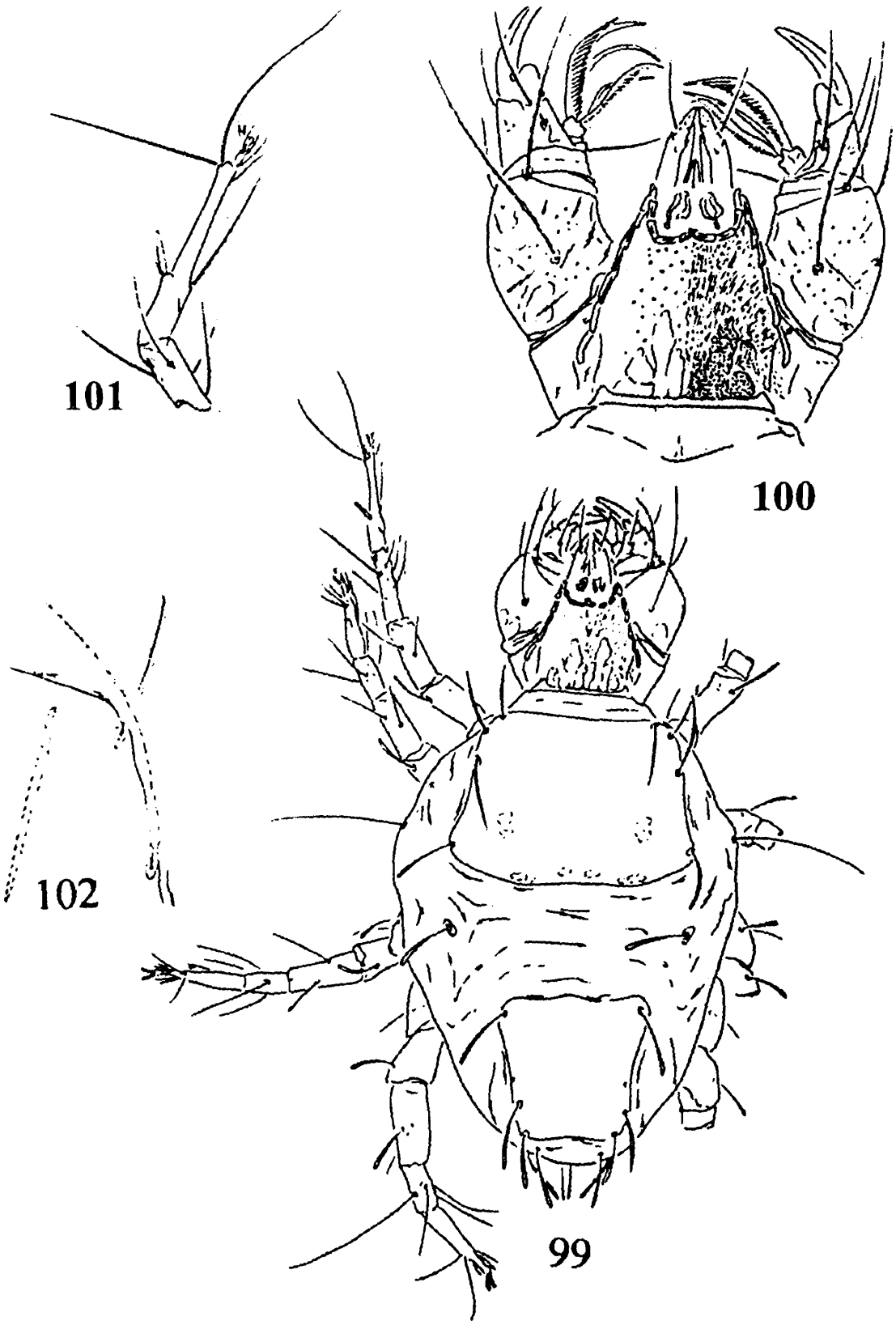
Male : ?

Collection Records : Earlier in India, this mite was reported on tree trunk. Recently, this mite has been collected on custard apple and mango in West Bengal and pomegranate in Haryana. Elsewhere : in diverse habitats.

Distribution : India (West Bengal, Tamil Nadu, Haryana, Punjab). New Guinea, Formosa, Myanmar, Philippines, Japan, Australia.



Figs. 94-98 : *Cheyletus eruditus* (Schrank) (female) : 94. Dorsal view, 95. Tibia & tarsus of leg I, 96. Gnathosoma, 97. Anogenital region, 98. Dorsolateral hysterosomal seta (first). (after Summers & Price, 1970)



Figs. 99-102 : *Cheyletus fortis* Oudemans (female) : 99. Dorsal view, 100. Gnathosoma, 101. Tarsus and tibia of leg I, 102 First three dorsolateral setae of propodosoma. (after Summers & Price, 1970)

Remarks : This is a good and abundantly available predator in stored products but on plants, it is rather rare. It was found associated with phytophagous mite on pomegranate and mango bud mite. (Gupta *et al.*, 1971; Gupta & Gupta, 1992).

33. ***Cheyletus malaccensis*** Oudemans
(Figs. 103-104)

1903. *Cheyletus malaccensis* Oudemans, *Ent. Ber.* **1**(2) : 88.

1949. *Cheyletus malaccensis*, Baker, *Proc. U. S. Nat. Mus.*, **99**(3238) : 284.

1961. *Cheyletus malaccensis*, Hughes, *The mites of stored food, London.*

1967. *Cheyletus malaccensis*, Gerson. *Acarologia*, **9**(2) : 361.

1969. *Cheyletus malaccensis*, Volgin, *Akad. Nauk. SSSR. Zool. Inst. Opredel p. Fauna SSSR. No.* **101** : 83.

1970. *Cheyletus malaccensis*, Summers & Price, *Univ. Calif. Pub. Ent.*, **61** : 25.

1972. *Cheyletus malaccensis*, Corpuz-Raros, *Philip. Ent.*, **2**(4) : 252-255.

1977. *Cheyletus malaccensis*, Corpuz-Raros & Sotto, *Kalikasan, Philip. J. Biol.*, **6**(2) : 169.

1986. *Cheyletus malaccensis*, Fletchmann, *Pub. Univ. Sao Paulo.* 75.

1990. *Cheyletus malaccensis*, Kumar & Naqvi, *Indian J. Helminth.*, **42**(1) : 21-24.

1995. *Cheyletus malaccensis*, Gupta, In : *State Fauna Ser. 4, Fauna of Meghalaya, Part 2*, p. 41.

1997. *Cheyletus malaccensis*, Gupta & Chatterjee, In : *State Fauna Ser. 6, Fauna of Delhi*, p. 517.

Female : This species is characterized as 2 smooth dorsal shields present, eyes absent, M-shaped peritreme with 13-14 pairs of segments, 2 comb-like and 2 sickle-like setae present. Tibia I with 5 tactile and 1 sensory setae, seta w_1 short. 20-26 long, dorsal setae densely plumose including humerals, those on margins 65-80 long, humerals about twice as long, dorsal setae, all marginal in position, the submedian setae being absent. *Cheyletus fortis* differs from *C. malaccensis* by presence of a single basal palp tibial tooth in the former and 2 teeth in the latter.

Male : It has 6 pairs of marginal hysterosomal setae (5 pairs present in *C. fortis*).

Collection Records : In India, it has been recorded on paddy, *Magnolia champa*, guava in Meghalaya; on guava in Delhi and also as predator on *Rhizopertha* and *Togoderma* eggs. Besides, elsewhere it has been recorded on skin of bird *Psittinus cyenrus*, on debris of Leg horn, leaf litter, bamboo litter, stored poultry feed, etc. Originally, this species was described from Malacca strait on skin of bird *Psittinus cyanurus.*

Habitat : India : Paddy, Guava, *Magnolia champa.* Elsewhere : debris of Leg horn, skin of bird *Psittinus cyanurus*, etc.

Distribution : India (Meghalaya, Delhi), U.S.A., Peru, Mexico, Europe, China, Japan, Malayasia, Philippines.

Remarks : This is a good predator on eggs of *Rhizopertna* and *Togoderma* in storage (Kumar & Naqvi, 1990) and also on eggs of *Schizotetranychus* sp. infesting paddy and *Brevipalpus* spp. infesting guava in Meghalaya.

34. ***Cheyletus*** spp.

1995. *Cheyletus* sp. Jagadish *et al. Abst. V Nat. Symp. Acarology*, p. 17.

1997. *Cheyletus* sp., Gupta & Chatterjee. In : *State Fauna Ser. 6, Fauna of Delhi*, p. 517.

Collection Records : Some undertermined species of *Cheyletus* were collected from Karnataka (feeding upon guava mite) and tetranychid mites on ornamental plants in Delhi.

Habitat : Ornamental plant, guava.

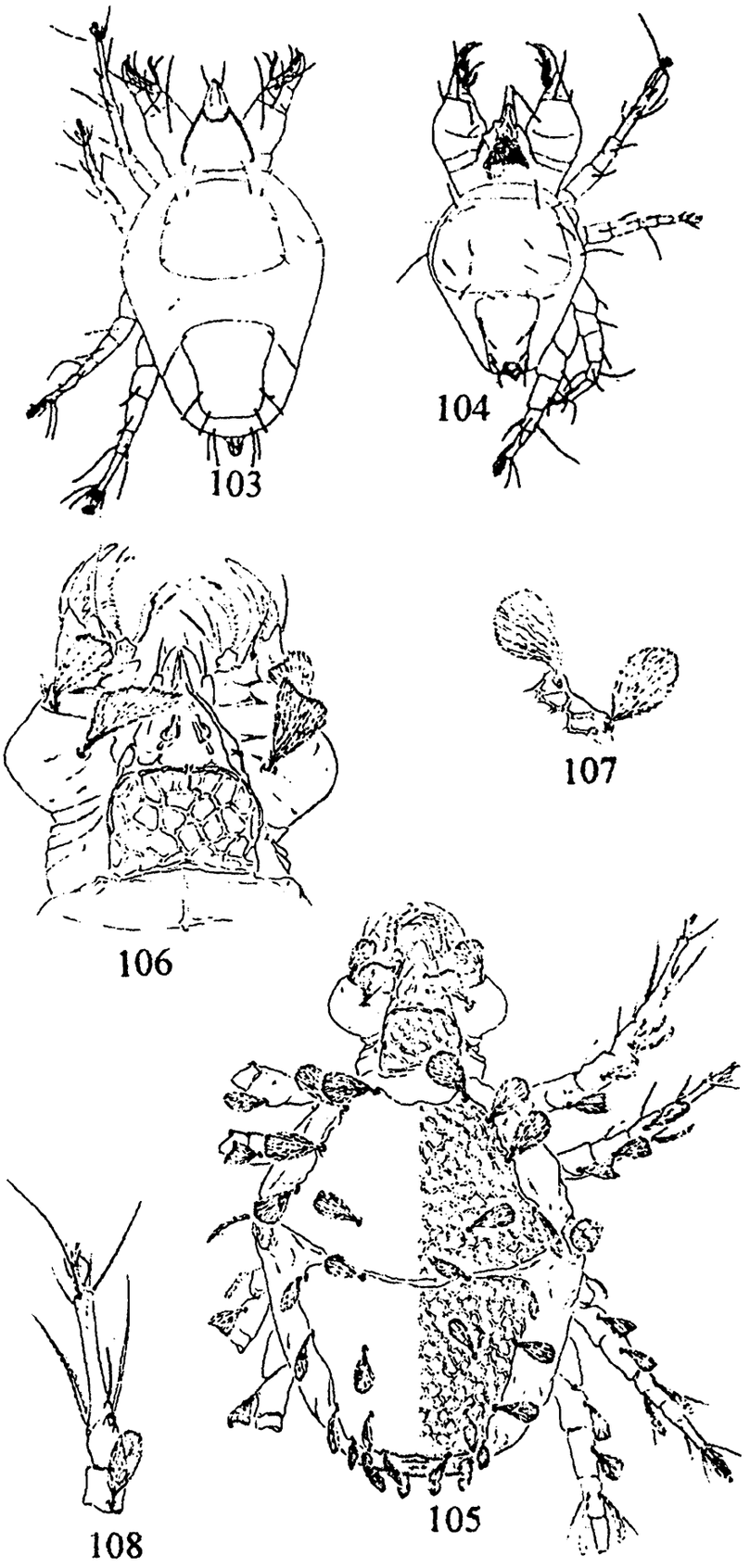
Distribution : India (Delhi, Karnataka).

Genus 18. ***Eucheyletia*** Baker

1949. *Eucheyletia* Baker, *Proc. U. S. Nat. Mus.*, **99**(3238) : 294.

1969. *Zachvatkiniola* Volgin *Akad. Nauk. SSSR. Zool. Inst., Opredel p. Faune SSSR No.* **101** : 156.

1970. *Eucheyletia*, Summers & Price, *Univ. Calif. Pub. Ent.*, **61** : 131.



Figs. 103-108 : *Cheyletus malaccensis* Oudemans (female) : 103. Dorsal view, 104. Dorsal view of male. (after Corpuz-Raros, 1972); *Eucheyletia reticulata* Cunliffe (female) : 105. Dorsal view, 106. Gnathosoma, 107. First and second dorsolateral propodosomal setae, 108. Distal segments of leg I. (after Summers & Price, 1970)

Diagnosis : Presence of 2 sickle and 2 comb-like setae on palp tarsus. Protegmen cone-like. Eyes absent; 2 large plates cover entire dorsum. Dorsolateral body setae fan-like Dorsomedian aberrent, squamate or cloud-like, 6-15 pairs; 1 pair of anal setae fan-like. Tarsus I-IV with claws and rayed empodia.

Type ***Eucheyletia bishoppia*** Baker

35. ***Eucheyletia reticulata*** Cunliffe
(Figs. 105-108)

1962. *Eucheyletia reticulata* Cunliffe, *Proc. ent. Soc. Wash.*, **64**(3) : 200-201.

1963. *Eucheyletia reticulata*, Volgin, *Akad. Nauk. SSSR., Zool. Inst. Opredel, p. No.* **101** : 157-158.

1970. *Eucheyletia reticulata*, Summers & Price, *Univ. Calif. Pub. Ent.*, **61** : 34-35.

1999. *Eucheyletia reticulata*, Gupta & Chatterjee, *Sci. & Cult.* **65**(5-6) : 161.

Female : Palp claw with short teeth. Number of teeth on outer and inner comb being 15 and 35 respectively. Ventrolateral setae on palp genu fan-like, dorsal seta on palp femur fan-shaped. Peritreme small, 4 links on each side. Posterior and anal seta spatulate. Ratio of leg/idiosoma- 0.7. Setal formula on femur 2, 2, 2, 1, genu- 3, 2, 2, 2; tarsus- 5, 4, 4, 4; solenidion w_1-27.

Male : ?

Collection Records : This mite was originally described from bumble bee *Bombus* sp. in Alaska. In India, it was collected in Lakshadwip Isl. on *Magnolia* sp.

Habitat : India : *Magnolia* sp. Elsewhere : *Bombus* sp.

Distribution : India (Lakshadwip Isl.), Alaska.

Genus ***Grallacheles*** DeLeon

1962. *Grallacheles* DeLeon, *Fla Ent.*, **45**(3) : 135.

1964. *Grallacheles*, Muma, *Fla. Ent.*, **47** : 248.

1970. *Grallacheles*, Summers & Price, *Univ. Calif. Pub. Ent.*, **61** : 73.

1977. *Grallacheles*, Corpuz-Raros & Sotto, *Kalikasan Philip. J. Biol.*, **6**(2) : 154.

Diagnosis : According to Summers & Price (1970), palp claw with 6-9 teeth. Palp tarsus with 2 sickle and 2 comb like setae. Protegmen elevated, convex in front, about 1/2 as long as tegmen. Appendages carry numerous foliate setae, some very broad and fan-like, others spatulate or lanceolate. Eyes present. Two major plates on dorsum, lateral and median dorsal body setae predominantly spatulate. Anterior lateral seta on propodosomal plate flabellate, 2nd pair transitional, 3rd and 4th pairs strap-like. Posterior setae markedly spatulate. Legs shorter than body, with noticeably short tibiae. Tarsus I bears very short inconspicuous solenidion w_1 and spatulate guard seta.

Type ***Grallacheles bakeri*** DeLeon, 1962
(by original designation)

36. ***Grallacheles tulipi***
Chatterjee & Gupta, sp. nov
(Figs. 109-112)

Female : Body 237 long (from posterior tip of body upto tip of rostrum), 118 wide (at the level of 4th leg), palp claw very well developed with 7 teeth, which are quite large. Palp tarsus with 2 comb and 2 sickle like setae, comb setae having 16-18 teeth, palp femur with fan shaped seta. Protegmen and tegmen longitudinally striated. Peritreme as in figure. Propodosoma with 5 pairs of setae, anterior pair fan-like, 59 long, 2nd. pair long, 3rd and 4th pair long and strap-like 118 and 142 long, respectively. Propodosomal shield appears to be smooth, region between propodosoma and hysterosoma transversely striated. Hysterosomal shield with 5 pairs of setae; 1st- 14 long, 2nd- 12 long, 3rd- 9 long, lateral setae strap-like, measuring 59; humeral seta strap like, 118 long. Length of leg I- 130, II-178, III-154, IV-130, all tarsi much narrower than other leg segments. tarsus ends in a pair of claws on a small stalks and 2 pairs of long whip-like setae. Solenidion and guard seta on tarsus I not well discernible. Leg I : genu- 4 setae (including 2 pairs

of dorsal fan-like setae), tibia- 4 setae (including 1 pair of dorsal fan-like seta). tarsus- 6 setae; leg II : genu- 3 setae, tibia- 3 setae, tarsus- 5 setae; chaetotaxy of other legs not discernible.

Male : Unknown.

Holotype : Female, India, West Bengal, Darjeeling, ex tulip, 4.1.1995.

Remarks : This species is related to *Grallacheles bakeri* DeLeon (1962) but differs in relative length of dorsal idiosomal setae and in leg chaetotaxy.

Genus 20. ***Hemicheyletia*** Volgin

1969. *Hemicheyletia* Volgin, *Akad. Nauk. SSSR Zool. Inst. Operedel p. Fauna SSSR. No.* **101** : 201-202.

1970. *Hemicheyletia*, Summers & Price, *Univ. Calif. Pub. Ent.*, **61** : 11.

1972. *Hemicheyletia*, Corpuz-Raros, *Philip. Ent.*, **2**(4) : 255.

1977. *Hemicheyletia*, Corpuz-Raros & Sotto, *Kalikasan Philip. J. Biol.*, **6**(2) : 154.

Diagnosis : Palp claw with 6-11 teeth, stylophore extended considerably in front of peritremes as eleveted protegmen. Peritreme horse shoe shaped, 5-6 lines per side. Eyes present, large protruding. Hysterosomal plate highly variable. Dorsolateral body setae relatively shorter, narrow, spatulated or fan shaped; 4 pairs on propodosomal plate, 0-5 pairs on median hysterosomal plate, humeral setae not acicular or flagelliform. Dorsomedian setae variable, w_1 long, tarsus I-IV with claws and rayed empodium.

Type ***Paracheyletia bakeri*** Ehara
(designated by Volgin, 1969)

Key to the species of *Hemicheyletia* known to inhabit plants in India

1. Both outer and inner comb on palptarsus with 7 setae ..... *indica*

— Outer comb with 16 teeth, inner comb with 20 teeth ..... *bakeri*

37. ***Hemicheyletia bakeri*** (Ehara)
(Figs. 113)

1962. *Paracheyletia bakeri* Ehara, *Annot. Zool. Jap.*, **35**(2) : 109-111.

1964. *Paracheyletia bakeri*, Muma, *Fla. Ent.*, **47**(4) : 245.

1967. *Paracheyletia bakeri*, Gerson. *Acarologia*, **9**(2) : 360.

1969. *Paracheyletia bakeri*, Volgin, *Akad. Nauk. SSSR., Zool. Inst. Opredel p. Fauna SSSR No.* **101** : 202-203.

1970. *Hemicheyletia bakeri*, Summers & Price, *Univ. Calif. Pub. Ent.*, **61** : 12.

1972. *Hemicheyletia bakeri*, Corpuz-Raros, *Philip. Ent.*, **2**(4) : 255-256.

1999. *Hemicheyletia bakeri*, Dhooria, *J. Acarol.*, **14**(1-2) : 88-89.

1999. *Hemicheyletia bakeri*, Dhooria, *J. Acarol.*, **14** : 87.

Female : Palp with 7 basal teeth, outer comb of palp tarsus with 16 teeth, inner comb with 20 teeth. Dorsal seta on palp femur a broad truncate fan. Six pairs of propodosomal setae present (2 submedian + 4 marginal). Tegmen with closely packed thickened segments. Rostrum spoon shaped. Eyes large protruberent. Dorsal setae 13 pairs besides 1 pair of humeral, all small broadly spatulate with 4-6 barbed ribs on covex face. Dorsomedian setae 3 pairs, 2 pairs of propodosomal and 1 pair of hysterosomal plate, w_1-30 long, guard seta present. Ventral setae smooth.

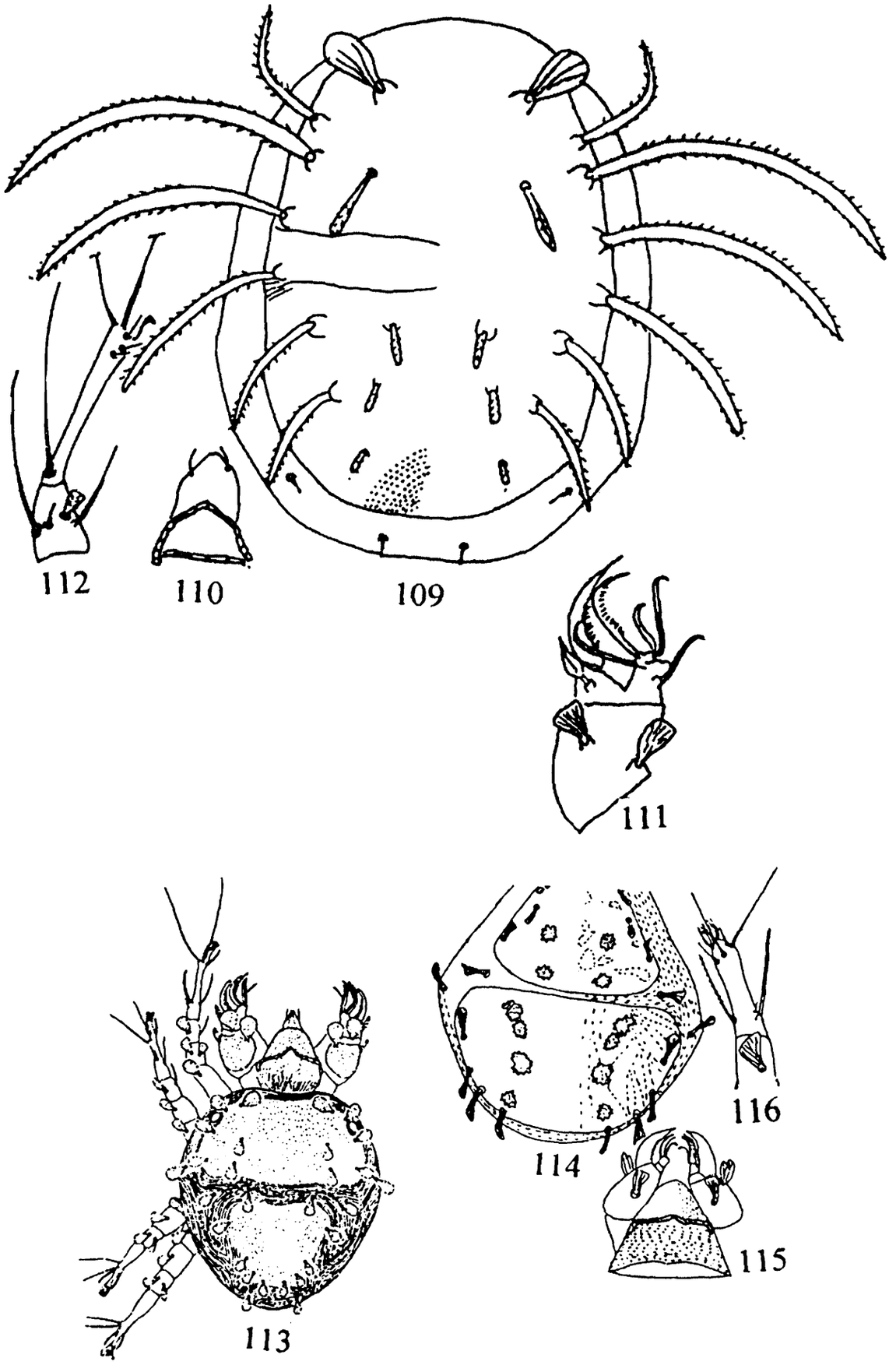
Male : Known.

Collection Records : Originally it was described from Japan on *Hibiscus rosa-sinensis* and was also recorded on Bermuda grass in California. In India, this was recorded on rose in Punjab associated with *Tetranychus urticae.*

Habitat : India : rose. Elsewhere : *Hibiscus rosa sinensis, Artocarpus odorotissima, Asparagus plumosus, Canavalia maritena* Bermuda grass.

Distribution : India (Punjab), Cosmopolitan (Southern U.S.A., Canada, Israel, Philippines, Chile).

Remarks : This was associated with tetrahychid mites in the field. Muma (1964) found it associated



Figs. 109-116 : *Grallacheles tulipi* Chatterjee & Gupta sp. nov. (female) : 109. Dorsal view, 110. Ventral view of gnathosoma, 111. Palp, 112. Distal segments of leg I; *Hemicheyletia bakeri* (Ehara) (female) : 113. Dorsal view. (after Corpuz-Raros, 1972); *Hemicheyletia indica* Gupta (female) : 114. Dorsal view, 115. Gnathosoma, 116. Distal segment of leg I. (after Gupta, 1991)

with citrus insects and mites, feeding upon spider mites and scale insects. According to Corpuz-Raros (1972) it is an important bio-controlling agent.

38. ***Hemicheyletia indica*** Gupta

(Figs. 114-116)

1991. *Hemicheyletia indica* Gupta, *Rec. zool. Surv. India*, **88** : 234-235.

Female : Palp claw with 7-8 teeth. Stylophore cone shaped. Both outer and inner comb with 7 teeth. Tegmen covered with microtubercles of same size. Eyes large, protruberent. Dorsal setae 15 pairs in addition to humerals, marginal setae elongate, spatulate with 5 ribs; 2 propodosomal and 1 pair of hysterosomal setae present, modified into stag horn-like. Those on hysterosoma slightly wider than those on propodosoma. The specialized setae look cluster of irregularly shaped sclerotic particles. Tarsus I solenidion much longer than guard seta.

Male : Unknown.

Collection Records : This was described on material collected on *Pavetta indica* from Arunachal Pradesh.

Habitat : Pavetta indica.

Distribution : India (Arunachal Pradesh).

39. ***Hemicheyletia*** sp.

1999. *Hemicheyletia* sp., Gupta & Chatterjee, *Sci. & Cult.* **65**(5-6) : 161.

Collection Records : One undetermined species in damaged condition was recorded from Lakshadwip on rose.

Habitat : Rose.

Distribution : India (Lakshadwip Isl.).

Genus 21. ***Paracheyletia*** Volgin

1955. *Paracheyletia* Volgin, *Akad. Nauk. SSSR., Zool. Inst. Opredel p. Fauna SSSR No.* **59** : 168-169.

1970. *Paracheyletia*, Summers & Price, *Univ. Calif. Pub. Ent.*, **61** : 18.

Diagnosis : Palp claw with 12-13 teeth, palp tarsus with 2 comb and 2 sickle like setae. Protegmen doomed. Eyes prominent. Dorsum covered by 2 plates. Dorsal body setae 2 types, dorsolateral fan shaped, dorsomedian fragmented. Tarsus I with long solenidion (w_1), guard seta absent or inconspicuous. Paired claws on tarsus I on pedicel, paraterminal setae solenidiform. Posterior anal setae acicular, smooth.

Type ***Cheyletus pyriformis*** Banks

40. ***Paracheyletia pyriformis*** (Banks)

(Figs. 117-120)

1904. *Cheyletus pyriformis* Banks, *Proc. U. S. Nat. Mus.*, **28** : 17.

1906. *Cheyletus pyriformis*, Banks, *Proc. Ent. Soc. Wash.*, **7** : 135.

1949. *Cheyletus flabellifera*, Baker, Proc. U. S. Nat. Mus., **99**(3238) : 298-299.

1949. *Cheyletus longipalpus*, Baker, *Proc. U. S. Nat. Mus.*, **99**(3238) : 298.

1955. *Paracheyletia assimilis*, Volgin, *Akad. Nauk. SSSR, Zool. Inst. Opredel p. Fauna SSSR No.* **59** : 168-169.

1970. *Paracheyletia pyriformis*, Summers & Price, *Univ. Calif. Pub. Ent.*, **61** : 19-20.

1999. *Paracheyletia pyriformis*, Rather, *J. Acarol.*, **15** : 20.

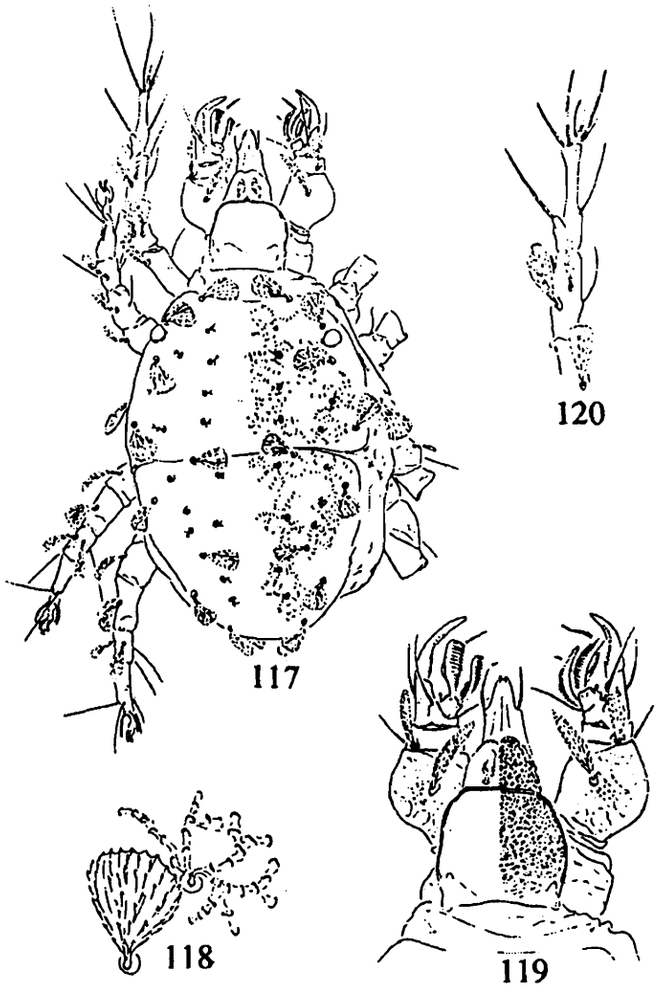
Female : Palp claw with 12-13 teeth. Palp tibia extended beyond tarsal joint to form slender distal supporting claw. Outer comb with 20 teeth, inner comb with 25 teeth. Protegmen domed. Rostrum slender, tapered to blunt point. Peritreme horse shoe shaped. Entire dorsum covered with plates of equal size. Eyes large. Dorsal setae nearly 23 pairs plus humerals. Ratio of leg I/idiosoma-0.7. Leg chaetotaxy : femoral : 2, 2, 2, 1; genu : 3, 2, 2, 2; tibia : 6, 5, 4, 4; tarsus : 8, 8, 7, 7, w_1-40 long; guard seta absent. Ventral setae smooth. Idiosoma-330 long.

Male : ?

Collection Records : This species was described on material collected from Idaho on poplar leaf. In India, the only record of this species is from Jammu & Kashmir from grape vines.

Habitat : India : Grape vines. Elsewhere : Poplar.

Distribution : India (Jammu & Kashmir), Idaho.



Figs. 117-120 : *Paracheyletia pyriformis* (Banks) (female) : 117. Dorsal view, 118. Second dorsolateral hysterosomal seta, 119. Gnathosom, 120. Distal segments of leg I. (after Summers & Price, 1970)

Remarks : Rather (1999) recorded this species feeding upon grape vine mite in Kashmir valley. However, its population was low.

6. Family CUNAXIDAE Thor

1902. Cunaxidae Thor, *Verh. Zool. Bot. Ges. Wien,* 159-164.

1931. Cunaxidae, Thor, *Gesammelt Zool. Anz.,* 97 : 62.

1948. Cunaxidae, Baker & Hoffmann, *An. Esc. Nac. Cienc. Biol. Mex.,* 5(3-4) : 229.

1960. Cunaxidae, Muma, *Ann. Ent. Soc. Amer.,* **53** : 321-326.

1975. Cunaxidae, Smiley, *Ann. Ent. Soc. Amer.,* **68** : 230.

1977. Cunaxidae, Chaudhri, Pak. *J. Agric. Sci.,* **14** : 172.

1979. Cunaxidae, Den Heyer, *Phytophylactica,* **11** : 23.

1980. Cunaxidae, Tseng, *Q. J. Taiwan Mus.,* **33** : 277.

1981. Cunaxidae, Den Heyer, *Phytophylactica,* **13** : 59.

1984. Cunaxidae, Liang, *Acta Zootaxonomica Sinica,* **9** : 49-51.

1985. Cunaxidae, Gupta, *Handbk. Plant Mites of India,* p. 313.

1985. Cunaxidae, Liang, *Entomotaxonomica,* **7**(1) : 79.

1985. Cunaxidae, Chaudhri, *Univ. Agri. Faisalabad,* p. 210.

1987. Cunaxidae, Bu & Li, *J. South Western Agri. University,* **9** : 22-26.

1992. Cunaxidae, Smiley, *Cunaxidae of the World,* p. 21.

1992. Cunaxidae, Gupta. In : *State Fauna Ser. 3, Fauna of West Bengal, Part 3,* p. 135.

1997. Cunaxidae, Gupta & Chatterjee. In : *State Fauna Ser. 6, Fauna of Delhi,* p. 519.

Diagnosis : Smiley (1992) defined this family as : Chelicera separated, hinged at base and move over gnathosoma in a scissors-like fashion. Ventrally hypostome with 4-6 pairs of setae. Genital plate in female without internal setae. Genital aperture with 2-3 pairs of acetabula. Palp segment terminates in a claw, some segments bear strong spines. Tarsal empodium claw-like with 4 raylets, claws lack

ventrolateral hairs. Body soft or strongly sclerotized with or without ventral shields. Eyes present or absent.

Type ***Cunaxa*** von Heyden, 1826

Key to the subfamilies of CUNAXIDAE known to inhabit plants in India

1. Palp with fewer than 5 segments ..... CUNAXOIDINAE
— Palp with 5 segments ..... CUNAXIINAE

Subfamily 1. CUNAXIINAE Oudemans

1902. Cunaxiinae Oudemans, 58.

1992. Cunaxiinae, Smiley, *The Predatory mite family Cunaxidae (Acari) of the World with a new classification*, p. 134.

Diagnosis : Palp 5 segmented. Inner median surface of palp tarsus with simple or rod-like or spine-like setae. Palp genu with setose, subtriangular apophysis, tibiotarsus terminates in a small claw. Chelicera broad basally, narrow distally. Propodosoma dorsally with or without shield, may be reticulated, striated or smooth. Hysterosoma with or without shield, also may be reticulated, striated or smooth. Tarsus I-IV tapering distally, may be stubby also tibia IV with a trichobothrium.

Type ***Cunaxa*** von Heyden

Key to the genera of Cunaxiinae known to inhabit plants in India

1. Palp genu without elongate apophysis, apically, tarsi I-IV long, slender, gradually tapering distally, without conspicuous lateral bilobed flanges ..... *Cunaxa*
— Palp genu apically with or without elongate apophysis, tarsi I-IV stout, short or long with lateral bilobed flanges 2
2. Tarsi I-IV short, stubby, stout, terminating in conspicuous, large, bilobed lateral flanges, with one sensory seta and having a stout elongate base ..... *Dactyloscirus*
— Tarsi I-IV slender, attenuate, terminating in small, conspicuous bilobed lateral flanges, sensory seta without stout elongate base ..... *Armascirus*

Genus 22. ***Armascirus*** Den Heyer

1978. *Armascirus* Den Heyer, *Phytophylactica*, **11**(1) : 217.

1979. *Armascirus*, Den Heyer, *Acarologia*, **20**(1) : 79.

1984. *Armascirus*, Sepasgosarian, *Zeit. Anz. Zool.*, **71** : 142.

1985. *Armascirus*, Liang, *Acta Zootaxonomica*, **7** : 49.

1992. *Armascirus*, Smiley, p. 135.

Diagnosis : Smiley (1992) defined this genus as : Body slightly sclerotized, covered with 2 or 4 reticulated shields. Median and the lateral plates found on the hysterosoma may be present or absent, or only lateral plate present on hysterosomal dorsum. Palpi 5 segmented, armed with stout spines and apophysis. Tarsi I-IV slender, attenuate, without lateral bilobed flanges.

Type ***Armascirus huyssteeni*** Den Heyer (by original designation)

41. ***Armascirus taurus*** (Kramer)

(Figs. 121-122)

1881. *Scirus taurus* Kramer, *Arch. Natura*, **81** : 17.

1894. *Scirus quadripilus* Banks, *Trans. Am. Ent. Soc.*, **20** : 220.

1902. *Cunaxa taurus*, Thor, *Verh. zool. Bot. Ges. Wien*, **52** : 160.

1929. *Cunaxa taurus*, Vitzthum, *Acari die Tierwelt Mitteleuropas*, **3**(3) : 60.

1933. *Cunaxa taurus*, Womersley, *Trans. Roy. Soc. S. Aust.*, **57** : 111.

1948. *Cunaxa taurus*, Baker & Hoffmann, *An. Esc. Nac. Cienc. Biol. Mex.*, 5(3-4) : 232.

1952. *Cunaxa taurus*, Baker & Wharton, p. 194.

1960. *Cunaxa taurus*, Muma, *Ann. Ent. Soc. Amer.*, **57**(3) : 322.

1978. *Armascirus taurus*, Den Heyer, *J. Ent. Soc. S. Afr.*, **42**(2) : 217.

1980. *Cunaxa taurus*, Tseng, *Q. J. Taiwan Mus.*, **33**(3-4) : 257.

1980. *Indocunaxa smiley* Gupta & Ghosh, *Rec. Zool. Surv. India*, **77** : 193.

1992. *Armascirus taurus*, Smiley, p. 149-151.

Female : Length 1000, width 400. Hypostome subtriangular, cone shaped. Propodosoma with reticulate subtriangular shield, extending upto anterior region of hysterosoma with setae P_1 and P_2 and 2 pairs of sensory setae. Hysterosoma with subrectangular median shield and 2 reticulate lateral shields. Setae L_1, D_1-D_3 equal, shorter than D_4, D_5. Palpi 5 segmented. Palp chaetotaxy : trochanter-nil. basifemur- 1 dorsomedian simple seta, telofemur- with apophysis ventrally and 1 spine-like seta anteriorly; genu with 1 strong spine-like seta anterodorsally, 2 spine-like seta on inner surface, one apophysis apically, tibiotarsus with a long seta on inner surface, 1 stout spine-like seta medially, terminates in simple seta and claw. Striation on idiosoma with dot-like lobes. Coxal setal formula : 3, 2, 3, 3. Leg chaetotaxy : trochanter I-IV : 1, 1, 2, 1; basifemur : 5, 5, 4, 2; telofemur : 4, 4, 4, 4; genu I with 5 setae and 4 solenidia, genu IV with 5 setae and 2 solenidia; tibia II, III-5 setae and 1 solenidia each, tibia IV-4 setae and a trichobothrium, tarsus IV-17 setae. Genital plate with 4 pairs of setae.

Male : As in female.

Collection Records : In India, it has been recorded only on *Calamus tenuis* from Andaman Isl. In abroad, it has been recorded on a number of plants.

Habitat : India : *Calamus tenuis.* Elsewhere : *Neotoma albigula,* peach, palm, orchid, *Diatraea saccharalis, Cattleya gigas,* banana, pineapple, *Anthurium scherzerianum,* wild cucurbits, *Labtia standleyana,* citrus.

Distribution : India (Andaman & Nicobar Isls.), England, France, Germany, U.S.A., Mexico, Cuba, Costa Rica, Hondurus, Panama, Philippines, Malayasia, Zaire, South Africa, China.

Remarks : Gupta & Ghosh (1980) proposed a new genus, *Indocunaxa* to accommodate a new species, *I. smileyi* from Andaman & Nicobar Isls. However, Smiley (1992) synonymised *Indocunaxa* with *Armascirus* and the species was synonymised with *taurus.*

Genus 23. *Cunaxa* von Heyden

1804. *Scirus* Hermann, *Mem. Apterologique Ouvrage Couronne en. 1790 par la Societe d Histoire Naturelle de Paris Public par F. L. Hammer, Stras bourg* 60-62.

1826. *Cunaxa* von Heyden, *ISIS of Oken,* **18**(6) : 609.

1834. *Scirus* Duges, *Ann. Sci. Natur. Zool. Biol. Anim.,* **2** : 42.

1897. *Scirus,* Berlese, *Gil Acari Agragi Revista Patologia Vegetale,* 138-139.

1941. *Cunaxa,* Thor & Willmann, *Das Tierreich,* **71** : 165.

1952. *Cunaxa,* Baker & Wharton, p. 193.

1960. *Cunaxa,* Muma, *Ann. Ent. Soc. Amer.,* **53**(3) : 322.

1975. *Cunaxa,* Smiley, *Ann. Ent. Soc. Amer.,* **68**(2) : 238.

1978. *Cunaxa,* Den Heyer, *Phytophylactica,* **11**(1) : 218.

1979. *Cunaxa,* Chaudhri *et al., Univ. Agri. Faisalabad,* p. 182.

1980. *Cunaxa,* Gupta & Ghosh, *Rec. zool. Surv. India,* **77** : 194.

1992. *Cunaxa,* Smiley, p. 153.

Diagnosis : Body strongly sclerotized, may be covered by 2 dorsal shields. Propodosomal shield may be reticulated or striated. Propodosoma and hysterosoma without or with shields, shields if present may be smooth or striated. Palpi 5 segmented with spine-like setae. Palpal genu without large subrectangular apophysis. Tarsi I-IV tapering distally without lateral bilobed flanges.

Type *Scirus setirostris* Hermann, 1804
(by original designation)

Key to the species of *Cunaxa* known to inhabit plants in India

1. Propodosomal and hysterosomal shields present 2

— Propodosomal shield only present 3

2. Palpal telofemur inner surface with an uncinate or truncate apophysis ..... *capreolus*

— Palpal telofemur inner surface with a finger like apophysis ..... *womersleyi*

3. Anterior sensillae stalky, short and thick .... *anacardae*

— Anterior sensillae not like above 4

4. Propodosomal shield smooth 7
— Propodosomal shield reticulate/striate 5
5. Palpal telofemur without apophysis or spiniform seta 6
— Palpal telofemur with apophysis or spiniform seta ..... *myabunderensis*
6. Spine-like seta on palp tibiotarsus long and slender ..... *cynodonae*
— Spine-like seta on palp tibiotarsus short and stout ..... *bambusae*
7. Telofemur inner surface with strong spine 8
— Telofemur inner surface without a spine 9
8. Telofemur inner surface with elongate apophysis and one dorsomedian simple seta .... *setirostris*
— Telofemur inner surface with blunt short apophysis and one dorsolateral simple seta .... *curassavica*
9. Seta P_2 more than 2 times of P_1 ..... *crista*
— Seta P_2 and P_1 almost of same length .... *mangiferae*

42. *Cunaxa anacardae* Gupta
(Figs. 123-124)

1992. *Cunaxa anacardae* Gupta, In : *State Fauna Ser. 3, Fauna of West Bengal, Part 3*, p. 138-139.

2000. *Cunaxa anacardae, Gupta,* In : *State Fauna Ser. 7, Fauna of Tripura, Part 2*, p. 16.

Female : Palpi 5 segmented, 78 long, almost as long as hypostome. Chaetotaxy of palp trochanter-nil, basifemur-nil, telofemur-one outer lateral, one distal midiodorsal and one medioventral setae, genu-one outer lateral, one middorsal, tibiotarsus setae not discernible. Chelicera broader at base, extending anteriorly beyond plap tibiotarsus fixed digit absent, movable digit vestigial, with a small seta at the tip of the blade. Gnathosoma subtriangular with 3 pairs of marginal, and 1 pair of ventral setae. Propodosomal plate with 2 pairs of simple setae, of which anterior pair short, stalky, thick, posterior pair-71 long, also thick at tip, other 2 pairs of setae measuring 9 and 26 long, the anterior and posterior, respectively. Hysterosoma with D_1-D_4 and D_1 seta. Genital plate with 5 pairs of setae, distal pair longer than others. Leg chaetotaxy not properly discernible.

Male : Unknown.

Collection Records : This species was described from West Bengal, collected on mango and thereafter on the same plant in Tripura.

Habitat : Mango.

Distribution : India (West Bengal, Tripura).

43. *Cunaxa bambusae* Gupta & Ghosh
(Figs. 125-127)

1980. *Cunaxa bambusae* Gupta & Ghosh, *Rec. zool. Surv. India*, **77** : 198-199.

1991. *Cunaxa bambusae,* Gupta, *Rec. zool. Surv. India,* **88** : 230.

1992. *Cunaxa bambusae,* Gupta, In : *State Fauna Ser. 3, Fauna of West Bengal, Part 3,* p. 136.

1992. *Cunaxa bambusae,* Gupta, In : *Contributions to Acarological Researches in India,* p. 440.

1992. *Cunaxa bambusae,* Smiley, p. 157-158.

2000. *Cunaxa bambusae,* Gupta, In : *State Fauna Ser. 7, Fauna of Tripura, part 2,* p. 16.

Female : Length including gnathosoma 400, width 275. Gnathosoma hypostome subrectangular, cone shaped distally. Propodosomal shield reticulate, subtriangular, extends upto anterior region of hypostome. Propodosomal seta P_1 shorter than P_2, 2 pairs of sensory setae present as usual. Striation present between propodosomal and hysterosomal plates; median shield absent. Seta D_1-D_5, L_1 present, D_1-D_3, L_1 almost of same length. Palpi 5 segmented. Palp chaetotaxy-trochanter-nil, basifemur-one dorsomedian simple seta, inner surface of telofemur without apophysis, also no spine-like seta on inner surface of genu, one seta medially, one seta on outer ventral surface, one seta dorsally, tibio-tarsus with one long simple seta

medially, one spine-like seta, one dorsolateral and one dorsomedian simple seta on outer surface. Idiosomal striation smooth. Coxal setal formula : 3, 1, 3, 2. Hypostomal venter with 5 pairs of setae. Leg chaetotaxy : trochanter I-IV : 1, 1, 2, 1; basifemur : 5, 5, 4, 2; telofemur : 4, 4, 4, 4; genu I-5 + 4 solenidion, genu II-5 + 2 attenuate solenidion, genu III-5 + 1 solenidion. genu IV : 5 + 2 solenidion, tibia I-5 + 2 solenidion, tibia II, III-5 + 1 solenidion each, tibia IV-4 + 1 trichoboth, tarsus I-20 + 5, tarsus II-20 + 1 solenidion, tarsus III-14 + 1 solenidion, tarsus IV-17 setae.

Male : Unknown.

Collection Records : This species was described on *Bambusa* sp. from Andaman & Nicobar Isl.

Habitat : Bambusa aurandinacea.

Distribution : India (Andaman & Nicobar Isl.).

Remarks : Smiley (1992) redescribed this species and the present description provided here is partly based on that.

44. *Cunaxa capreolus* (Berlese)

(Figs. 128-130)

1889. *Scirus capreolus* Berlese, *Redia*, **14** : 63, Fasc. 7, (20) : 66.

1890. *Scirus capreolus*, Berlese, *Acari, Myriapoda, et. Scorpiones hueusque in Italia Reperta*, Fasc 57 : 9.

1929. *Cunaxa capreolus*, Vitzthum, *Die Tierwelt Mitteleuropa*, **3**(3) : 60.

1941. *Cunaxa capreolus*, Thor & Willmann, *Das Tierreich* **71** : 166.

1948. *Cunaxa capreolus*, Baker & Hoffmann, *An Esc. Nac. Cienc. Biol. Mex.*, **5**(3-4) : 230.

1952. *Cunaxa capreolus*, Baker & Wharton, p. 193.

1975. *Cunaxa capreolus*, Zaher *et al.*, *Entomophaga*, **20**(2) : 209.

1977. *Cunaxa capreolus*, Chaudhri, *Pak. J. Agr. Sci.*, **14** : 42.

1979. *Cunaxa capreolus*, Den Heyer, *Phytophylactica*, **11**(1) : 39.

1984. *Cunaxa capreolus*, Sepasgosarian, *Zeit. Anz. Zool.*, **71** : 140.

1987. *Cunaxa capreolus*, Michocka, *Acarologia*, **23** : 109.

1991. *Cunaxa capreolus*, Gupta, *Rec. zool. Surv India*, **88** : 230.

1992. *Cunaxa capreolus*, Smiley, p. 162-165.

1995. *Cunaxa capreolus*, Gupta, In : *State Fauna Ser 4. Fauna of Meghalaya, Part 2*, p. 43.

Female : Length 600, width 300. Hypostome subtriangular, cone shaped distally. Propodosomal shield with P_1 and P_2 setae, along with 2 pairs of sensillae. P_1 1/2 the legth of P_2. Hysterosoma with a medin plate along with setae D_1-D_5, L_1 of which D_1, D_2-D_3 almost of same length while D_4, D_5 longer. Palpi 5 segmented. Palp chaetotaxy : trochanter-nil, basifemur-one dorsomedian, telofemur with one apophysis at the inner margin and a dorsolateral simple seta, one spine-like seta on inner surface of genu and a dorsolateral simple seta; one long and one spine-like seta on inner surface of tibiotarsus, besides one mediodorsal, one mediolateral, one apical and a small claw. Striation on idiosoma smooth. Coxal setal formula 3, 1, 3, 1; Hysterosomal venter with 6 pairs of setae. Leg chaetotaxy : trochanter I-IV : 1, 1, 2, 1; genu II-5 + 2 solenidia, genu III-5 + 1 solenidion, genu IV-5 + 1 solenidion, tarsus I-18 + 4 solenidion, tarsus II-19 + 1 solenidion, tarsus III 20 + 1 solenidion.

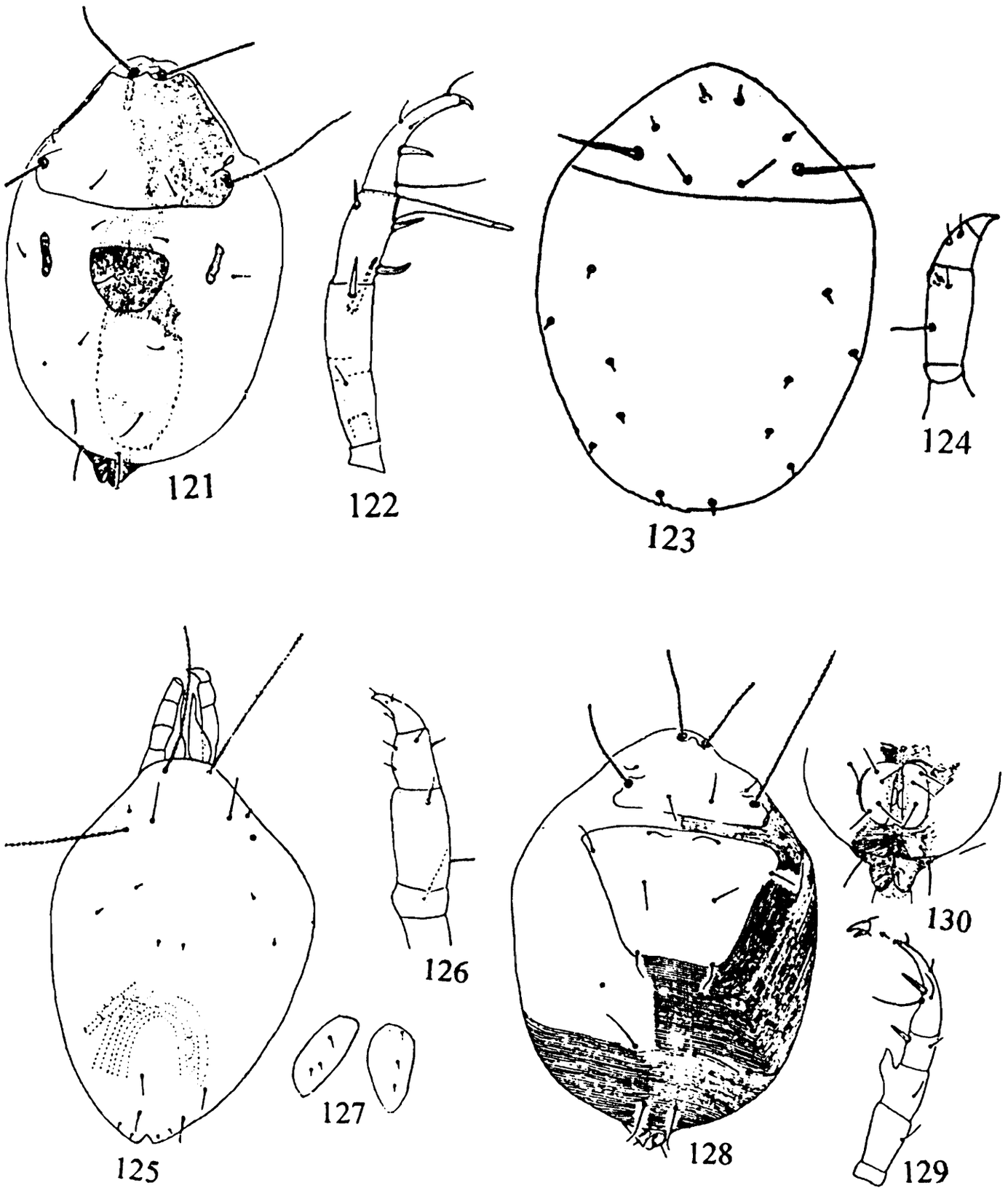
Male : As in female.

Collection Records : This species was collected on a number plants in abroad but in India, its collection was made on an undertermined plant in Meghalaya and on an another undetermined plant in association with *Tetranychus neocalendonicus* in North India.

Habitat : India : Undetermined plant. Elsewhere : *Gnaphalium wrightii, Chrysanthemum* sp., rice straw, *Allium sativum. Juglans major, Eregeron divergens.*

Distribution : India (Arunachal Pradesh, Meghalaya), cosmopolitan.

Remarks : Gupta (1992) reported this species in association with *Tetranychus neocaledonicus* and probably it fed on it.



Figs. 121-130 : *Armascirus taurus* (Kramer) (female) : 121. Dorsal view, 122. Palp. (after Smiley, 1992); *Cunaxa anacardae* Gupta (female) : 123. Dorsal view, 124. Palp. (after Gupta, 1992); *Cunaxa bambusae* Gupta & Ghosh (female) : 125. Dorsal view, 126. Palp. 127. Genital plates. (after Gupta & Ghosh, 1980); *Cunaxa capreolus* (Berlese) (female) : 128. Dorsal view, 129. Palp, 130. Ventral opisthosoma. (after Smiley, 1992)

45. *Cunaxa crista* Gupta

(Figs. 131-133)

1991. *Cunaxa crista* Gupta, *Rec. zool. Surv. India*, **88** : 228-229.

Female : Body 390 long, 160 wide. Palp 5 segmented, Palp 113 long, almost as long as hypostome. Palp chaetotaxy : trochanter-nil, basifemur-one outer lateral seta, telofemur-one outer lateral seta, genu-one inner lateral and one outer lateral, tibiotarsus-one inner lateral and one distal. Chelicera extends anteriorly upto palp tibiotarsus. Fixed digit of chelicera absent, movable digit curved. Propodosomal shield indistinct, with 2 pairs of finely branched sensory setae. Meidan shield absent on hysterosomal region, instead, striation present indistrictly, with setae D_1-D_5, L_1. Leg chaetotaxy : Basifemur I-IV : 2, 2, 1, 1; telofemur-1, 2, 2, 2; genu-4, 5, 5, 4; tibia-5, 5, 5, 3 + 1 trichoboth, tarsus-14 + 1 solenidion, 15 + 1 solenidion, 14, 7; tarsus I-IV- with 2 claws and rayed empodium.

Male : Unknown.

Collection Records : This species was described from Arunachal Pradesh, collected on *Caesalpinia crista.*

Habitat : Caesalpinia crista.

Distribution : India (Arunachal Pradesh).

46. *Cunaxa curassavica* Gupta

(Figs. 134-135)

1991. *Cunaxa curassavica* Gupta, *Rec. zool. Surv. India*, **88** : 229-230.

Female : Body 490 long, 325 wide. Palp 174 long, much longer than hypostome. Palp chaetotaxy : trochanter-nil, basifemur-one outerlateral, telofemur-one dorsal seta placed laterally, one ventrolateral spine, genu-one outer lateral, one innerlateral, one anterodorsal, one apophysis at basal inner lateral position, tibiotarsus-one medially placed inner lateral spine, one basally placed inner lateral spine, one mediodorsal, one outerlateral and one distal. Chelicera attenuate distally. Propodosoma having shield with 2 pairs of short simple setae and 2 pairs of long sensory setae. Hysterosoma striated, without shield having setae L_1, D_1-D_5. Leg chaetotaxy I-IV : basifemur : 1, 2, 3, 1; telofemur-4, 4, 4, 4, genu-7, 6, 5, 5; tibia-7 + 1 solenidion, 6, 5, 2 + 1 trichoboth, tarsus-14 + 1 trichoboth + 1 solenidion, 13 + 1 solenidion, 10, 9 + 1 trichoboth. Leg I-IV with 2 claws.

Male : Unknown.

Collection Records : This species was described from Arunachal Pradesh, collected on *Asclepias curassavica.*

Habitat : Asclepias curassavica.

Distribution : India (Arunachal Pradesh).

47. *Cunaxa cynodonae* Gupta & Ghosh

(Figs. 136–138)

1980. *Cunaxa cynodonae* Gupta & Ghosh, *Rec. zool. Surv.* **77**: 196–198.

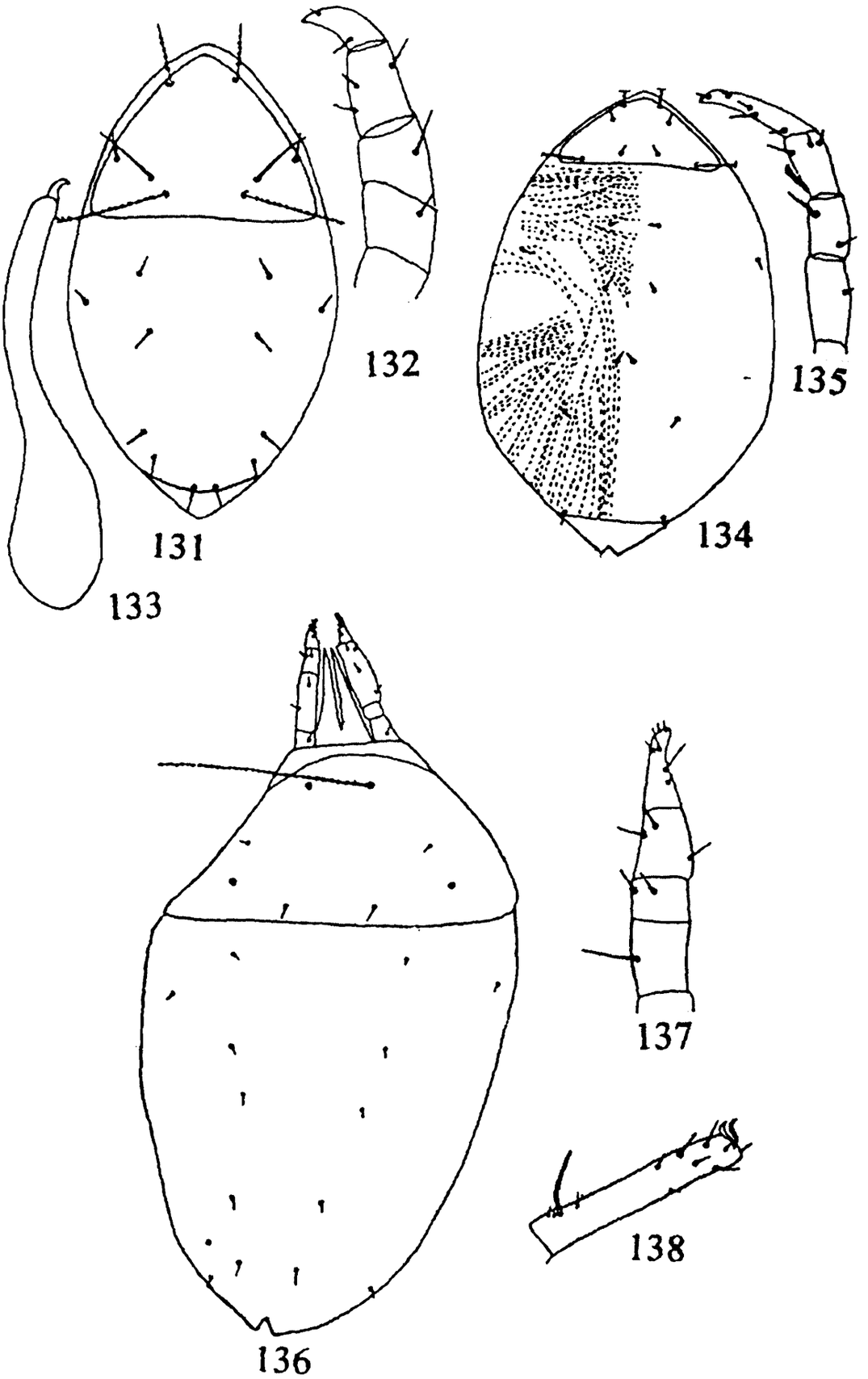
1992. *Cunaxa cynodonae*, Smiley, p. 166–167.

1992. *Cunaxa cynodonae*, Gupta, In : *State Fauna Ser. 3, Fauna of West Bengal, Part 3*, p. 136.

1996. *Cunaxa cynodonae*, Chatterjee & Gupta, *J. Beng. Nat. Hist. Soc. (NS)*, **15**(2) : 27.

2000. *Cunaxa cynodonae*, Gupta, *In : State Fauna Ser. 7, Faune of Tripura, part 2*, p. 16.

Female : Body 430 long, 300 wide. Hysterosoma subtriangular, cone shaped distally. Propodosomal shield subrectangular with 2 pairs of setae (P_1, P_2) and 2 pairs of sensory setae. Hysterosoma without shield, D_1–D_5, L_1 present as usually, D_4, D_5 longer than other hysterosomal setae. Palp 5 segmented. Palp chaetotaxy : trochanter– nil, basifemur– one dorsomedian seta, telofemur– one dorsomedian seta, genu– one slender seta medially, one simple seta on the outher surface and another seta dorsally; tibiotarsus– one long seta on outer surface, one spine– like seta medially, one dorsolateral and one ventrolateral seta on outer surface, terminally one claw and one simple seta. Coxal setal formula : 3, 1, 3, 2; Leg chaetotaxy I–IV; trochanter 1, 1, 2, 1;



Figs. 131-138 : *Cunaxa crista* Gupta (female) : 131. Dorsal view, 132. Palp, 133. Chelicera. (after Gupta, 1991); *Cunaxa curassavica* Gupta (female) : 134. Dorsal view, 135. Palp. (after Gupta, 1991); *Cunaxa cynodonae* Gupta (female) : 136. Dorsal view, 137. Palp, 138. Tarsus of Leg I. (after Gupta & Ghosh, 1980)

basifemur– 2, 3, 2, 1; telofemur– 4, 3, 3, 3; genu– 5 + 1; solenidion, 3 + 1 solenidion, 4 + 1 solenidion, 3 + 1 solenidion, tibia– 4 + 2 solenidia, 5 + 1 solenidion, 4 + 1 solenidion, 4 + 1 trichoboth; tarsus– 5 + 5 solenidia, 10 + 1 solenidion, 14 + 1 solenidion, 10 setae, Genital plate with 4 pairs of setae.

Male : Unknown.

Collection Records : This species was described from Andaman Isls. collected on *Cynodon* sp. and thereafter was recorded in West Bengal on "Akashmani plant", *Viola odorata*, and *Calotropis* sp. and on an undertermined plant in Tripura.

Habitat : Cynodon sp. *Viola odorata*, "Akashmani plant", undetermined plant, *Syzygium cumini*, *Calotropis* sp.

Distribution : India (Andaman & Nicobar Isla.).

48. *Cunaxa mangiferae* Gupta

(Figs. 139–141)

1992. *Cunaxa mangiferae* Gupta, *In : State Faune Ser. 3, Fauna of West Bengal, Part 3*, pp. 136–138.

2000. *Cunaxa mangiferae*, Gupta, *In : State Fauna Ser. 7, Fauna of Tripura, part 2*, p. 17.

Female : Palp 93 long, 5 segmented, extending beyond hypostome. Palp chaetotacy : trochanter–nil, basifemur–one inner lateral seta, telofemur–one outer lateral seta, genu–one outerlateral seta, tibiotarsus–one outer lateral basally, one outer lateral apically, one seta mid dorsally, this segment little curved inward. Fixed digit of chelicera absent, movable digit vestigial. Propodosomal shield with 2 pairs of setae (P_1, P_2), the latter longer than the former, sensory setae–S_1–156, S_2–230. Hysterosomal shield absent, area striated, with setae D_1 – D_5, L_1 – all being minute. Leg chaetotactic formula I–IV : basifemur–1, 1, 1, 2; telofemur–2, 2, 1, 1; genu–2, 2, 3 + 1 solenidion, 2 + 1 solenidion. Tibia–3 + 1 solenidion, 3 + 2 solenidia, 4, 3 + 1 solenidion, tarsus–9 + 1 trichoboth, 7 + 1 solenidion, 5 + 1 solenidion, 5 + 1 trichoboth.

Male : Unknown.

Collection Records : This species was described from West Bengal, on collection from mango. Thereafter, it has also been recorded on tea in Tripura.

Habitat : Mango, Tea.

Distribution : India (West Bengal, Tripura).

Remarks : This mite was seen associated with eggs of *Oligonychus mangiferus*, infesting mango. Since its gut content was reddish, probably it fed upon it.

49. *Cunaxa myabunderensis* Gupta & Ghosh

(Figs. 142–143)

1980. *Cunaxa myabunderensis* Gupta & Ghosh, *Rec. zool. Surv. India*, 77 : 195–196.

1992. *Cunaxa myabunderensis*, Smiley, pp. 190–192.

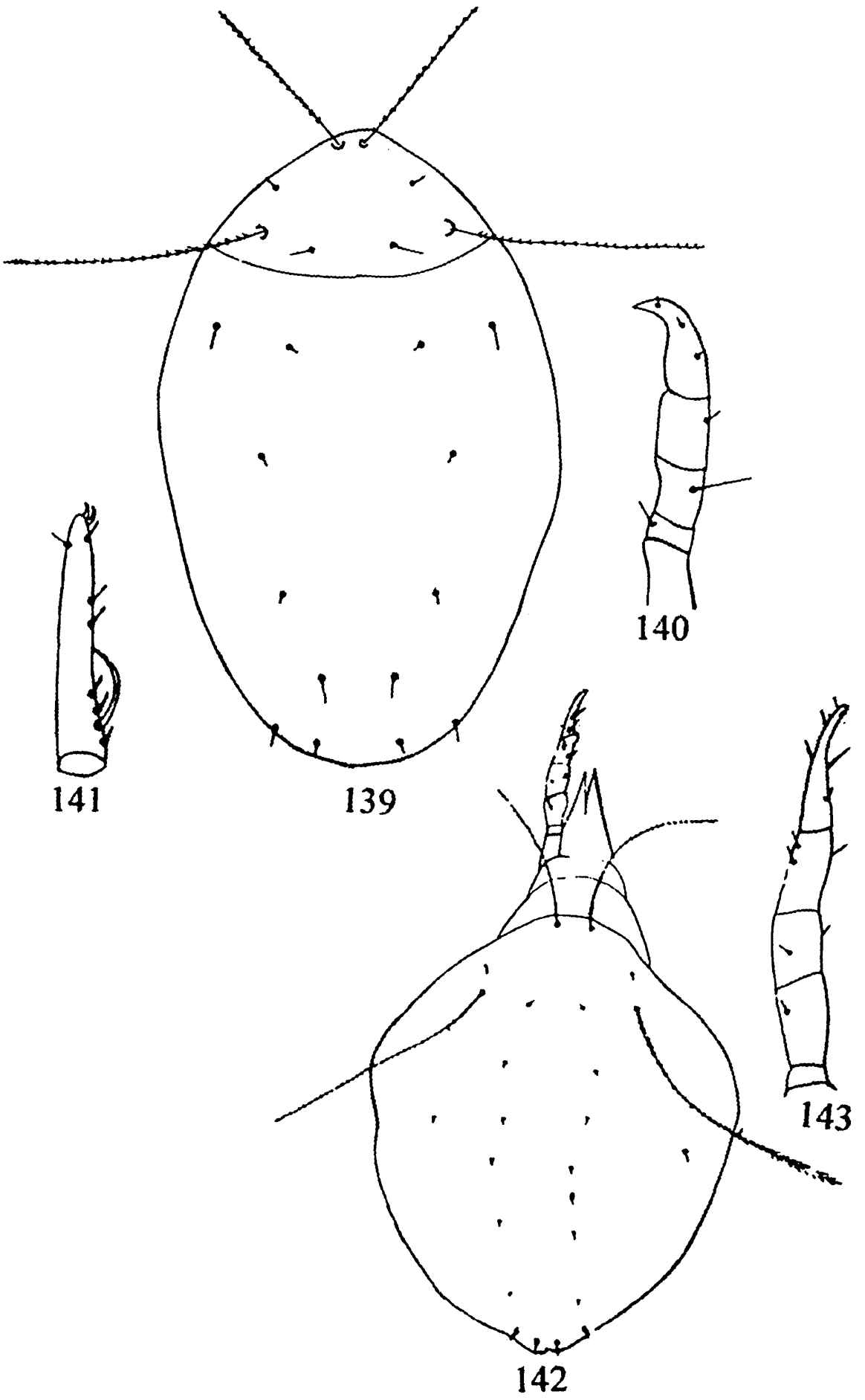
Female : Body 420 long, 380 wide. Hypostome subtriangular, cone shaped distally. Propodosomal shield bears P_1, P_2 in addition to setae S_1 and S_2. Hysterosomal shield absent, D_1–D_5, L_1 present on hysterosoma. Palp 5 segmented, Palp chaetotaxy : trochanter– nil, basifemur– one dorsomedian seta, telofemur– one spine-like apophysis on inner surface + one dorsomedian seta; genu– one seta on inner surface, 2 setae dorsolaterally on outer surface; tibiotarsus– one spine-like seta medialy on inner surface, another stout spine-like seta and without spur-like process, 2 simple setae dorsolaterally on outer surface, in addition, it terminates in a strong claw and a small seta. Chelicera broad at base, tapering distally, fixed digit absent. Leg chaetotaxy I–IV : trochanter– 1, 1, 2, 1; basifemur– 3, 3, 3, 1; telofemur– 4, 4, 4, 4; genu– 5 + 2 solenidion, 5 + 1 solenidion, 5 + 1 solenidion, 5 + 2 solenidia, tibia– 5 + 1 solenidion, 5 + 1 solenidion, 5 + 1 solenidion, 12 + 5 solenida; tarsus IV– 12 setae.

Male : 380 long, 250 wide.

Collection Records : This mite was described on *Aegle marmelos* in Andaman Isl.

Habitat : Aegle marmelos.

Distribution : India (Andaman & Nicobar Isls.).



Figs. 139-143 : *Cunaxa mangiferae* Gupta (female) : 139. Dorsal view, 140. Palp, 141. Tarsus of leg I. (after Gupta, 1992); *Cunaxa myabunderensis* Gupta (female) : 142. Dorsal view, 143. Palp. (after Gupta & Ghosh, 1980)

50. *Cunaxa setirostris* (Hermann)
(Figs. 144–145)

1804. *Scirus setirostris* Hermann, *Apterologique*, p. 60-62.

1826. *Cunaxa setirostris*, von Heyden, In : *ISIS of Oken*, **18**(6) : 608.

1834. *Scirus elaphus* Duges, *Ann. Sci. Natur. zool. Biol. Anim.*, **2** : 21.

1835. *Scirus sagax* Koch, *Deut.Crust. Myriapoden und. Arach., Fasc. 1*, **No. 20** : 64.

1838. *Scirus paludicola* Koch, *Deut. Crust. Myriapoden und. Arach.*, **21** : 23.

1841. *Scirus obisium* Gervais, *Ann. Sci. Nat. 2 zool.*, **15** : 6.

1933. *Cunaxa setirostris*, Womersley, *Trans. Roy. Soc. S. Aust.*, **57** : 3.

1937. *Cunaxa setirostris*, Oudemans, *Kritisch historisch Overzicht der Acarologie*, **111** : 1244.

1952. *Cunaca setirostris*, Baker & Wharton, p. 193.

1959. *Cunaxa setirostris*, Meyer & Ryke, *Ann. Mag. Nat. Hist.*, **11** : 370.

1960. *Cunaxa setirostris*, Muma, *Ann. Ent. Soc. Amer.*, **53**(3) : 324.

1971. *Cunaxa setirostris*, Singh & Mukherjee, *Oriental Ins.*, **5** : 488.

1975. *Cunaxa setirostris*, Smiley, *Ann. Ent. Soc. Amer.*, **68**(2) : 239.

1979. *Cunaxa setirostris*, Den Heyer, *Phylophylactica*, **11**(1) : 24.

1979. *Cunaxa setirostris*, Kuznetzov & Livshitz, *Trudy Gosud. Nik. Bot. Sad.*, **79** : 51–105.

1980. *Cunaxa setirostris*, Tseng, *Q. J. Taiwan Mus.*, **33**(3-4) : 256.

1980. *Cunaxa setirostris*, Gupta & Ghosh, *Rec. zool. Surv. India*, **77** : 194.

1982. *Cunaxa setirostris*, Dhooria, *Acar. Newsl.*, **11** : 6.

1983. *Cunaxa setirostris*, Gupta & Gupta, *Abst. II All India Symp. Acarology, Pune*, p. 23.

1985. *Cunaxa setirostris*, Gupta, *Handbk. Plant Mites of India*, p. 316.

1991. *Cunaxa setirostris*, Gupta, *Rec. zool. Surv. India*, **88** : 230.

1992. *Cunaxa setirostris*, Smiley, p. 202–204.

1992. *Cunaxa setirostris*, Gupta, In : *State Fauna Ser. 3, Fauna of West Bengal, Part 3*, pp. 140.

1992. *Cunaxa setirostris*, Gupta, In : *Contributions to Acarological Researches in India*, pp. 440.

1993. *Cunaxa setirostris*, Mukherjee & Singh, *J. Insect. Sci.*, **6**(1) : 135.

1995. *Cunaxa setirostris*, Gupta In : *State Fauna Ser. 4, Fauna of Meghalaya*, pp. 43–44.

1995. *Cunaxa setirostris*, Singh, *Adv. Agric. Res. India*, **3** : 188.

1995. *Cunaxa setirostris*, Sathiamma, *Entomon*, **20**(3-4) : 237–243.

1996. *Cunaxa setirostris*, Chatterjee & Gupta, *J. Beng. Nat. Hist. Soc. (NS)*, **15**(2) : 18–27.

1999. *Cunaxa setirostris*, Gupta & Chatterjee, *Sci. & Cult.*, **65**(5-6) : 161.

2000. *Cunaxa setirostris*, Gupta, In : *State Fauna Ser. 7, Fauna of Tripura, part 2*, p. 17.

In press. *Cunaxa setirostrix*, Gupta, In : *State Fauna Ser. 9, Fauna of Sikkim.*

Female : Body 550–600 long, 300–315 wide. Hysterosoma subrectangular. Propodosomal shield with P_1, P_2, S_1 and S_2 setae; P_1 half the length of P_2. Hysterosoma without shield, setae D_1–D_5, L_1 present; D_4 and D_5 longer than other hysterosomal setae. Palp 5 segmented, Palp chaetotaxy : trochanter– nil, besifemur– one dorsomedian seta, telofemur– one elongate apophysis on inner surface, one dorsomedian simple seta, genu– one spine-like seta on inner surface, outer surface with simple seta each on dorsally and ventrally, tibiotarsus– one long simple seta on inner surface, one spine-like seta medially, one dorsolateral seta on outer surface, terminates in simple claw and simple seta. Coxal setal formula 3, 1, 3, 2. Leg chaetotaxy : I–IV : trochanter– 1, 1, 2, 1; basifemur– 4, 4, 3, 1; telofemur– 4, 4, 4, 4; genu– 6 + 4 solenidia, 5 + 1 solenidion, 5 + 1 solenidion, 5 + 1 solenidion; tibia– 6 + 2 solenidia, 5 + 1 solenidion, 5 + 1 solenidion, 4 + 1 trichoboth; tarsus– 20 + 1 solenidion, 23 + 1 solenidion, 24 + 1 solenidion, 18 setae. Genital shield with 4 pairs of setae.

Male : Length 630, width 250.

Collection Records : This mite has been recorded in the world on a number of plants, the details of which have been given in Smiley (1992). The Indian records are from *Psidium guajava citrus* sp., Pomelo in Uttar Pradesh,

Tabernaemontana coronaria from Andaman & Nicobar Isls., on *Acanthopanax* and *Eugenia* sp. in Arunachal Pradesh, *Psidium guajava*, bitter gourd, mango, *Shorea reobusta*, mulberry, paddy, undetermined plant in West Bengal; on an undetermined plant in Meghalaya as well as in Tripura and Sikkim; on citrus in Punjab; on cocount in Kerala, on bitter gound in Lakshadwip and on bamboo in Tripura.

Habitat : India : *Psidium guajava, Citrus* sp., Pomelo, *Eugenia*, paddy, *Acanthophanax*, bitter gourd, mango, *Shorea robusta*, mulberry, paddy bamboo, coconut, undet, plants, *Tabernaemontana coronaria*, Elsewhere : on several plants (Smiley, 1992).

Distribution : India (Arunachal Pradesh, Meghalaya, Sikkim, Tripura, West Bengal, Himachal Pradesh, Punjab, Andaman & Nicobar Isls., Lakshadwip, Uttar Pradesh), Cosmopolitan.

Remarks : This is one of the most efficient predatory mites available in India and has been reported to feed upon *Eutetranychus orientalis* in Pubjab (Dhooria, 1982), on a tetranychid mite in Sikkim (Gupta, in press) and on *Oligonychus iseilemae* infesting coconut in Kerala (Sathiamma, 1995), on *Oligonychus mangiferus* infesting mango (Gupta & Gupta, 1992). In several other cases, this predatory mite was found intimately associated with phytopagous mites like tetranychids and tenuipalpids and in all probability they might be feeding upon them.

51. ***Cunaxa womersleyi*** Baker & Hoffmann (Figs. 146-147)

1948. *Cunaxa womersleyi* Baker & Hoffmann, *An. Esc. Nac. Cienc. Biol. Mexico*, **6** : 234-235.

1960. *Cunaxa womersleyi*, Muma, *Ann. Ent. Soc. Amer.*, **53** : 234.

1984. *Cunaxa womersleyi*, Sepasgosarian, *Zeit. Anz. zool.*, **71** : 144.

1992. *Cunaxa womersleyi*, Smiley, p. 213-214.

1992. *Cunaxa womersleyi*, Gupta, In : *State Fauna Ser. 3, Fauna of West Bengal, Part 3*, pp. 140.

Female : Propodosomal shield subrectangular, with setae P_1, P_2, S_1 and S_2, P_1 about 1/4 of P_2. Hysterosoma with median shield, D_2, D_3, L_1 almost equal while D_4, D_5 longer. Palpi 5 segmented, Palp chaetotaxy : trochanter-nil, basifemur-one dorsomedian simple seta, telofemur-one finger like apophysis and one dorsomedian seta; genu-one spine-like process on inner surface and one dorsolateral seta; tibiotarsus-one long simple seta on inner surface, one spine-like seta medially and one dorsolateral seta on outer surface, terminates in a claw and simple seta. Hysterosoma with 5 pairs of setae as usual. Leg chaetotaxy I–IV : trochanter– 1, 1, 2, 1; basifemur– 4, 4, 3, 1; telofemur– 4, 4, 4, 4; genu– 5 + 2, solenidion, 5 + 2 solenidia, 5 + 1 solenidion, 5 + 1 solenidion; tibia– 5 + 2 solenidia, 5 + 1 solenidion, 5 + 1 solenidion, 4 + 1 trichoboth; tarsus– 6 + 2 solenidia, 24 + 1 solinidion, 19 + 1 solenidion, 22 setae.

Male : Unknown.

Collection Records : This mite was described from Saipan and Smiley (1992) recorded it on *Sciurus niger* nest in Florida. The Indian records are from West Bengal on miscellaneous plants.

Distribution : India (West Bengal). Saipan, U.S.A.

Remarks : It was found associated with *Brevipalpus deleoni* on papaya in West Bengal.

52. ***Cunaxa*** spp.

1981. *Cunaxa* sp., Gupta & Nahar, In : *Contributions to Acarology in India*, p. 10.

1983. *Cunaxa* sp., Gupta & Gupta, *Abst. II All India Symp. Acarology, Pune*, p. 23.

1995. *Cunaxa* sp., Jagadish *et al. Abst. V Nat. Symp. Acarology*, p. 17.

1997. *Cunaxa* sp., Gupta & Chatterjee, In : *State Fauna Ser. 6. Fauna of Delhi*, p. 519.

In press. *Cunaxa* sp., Gupta, In : *State Fauna Ser. 9, Fauna of Sikkim.*

Collection Records : Some undetermined speices of *Cunaxa* are in record from Bihar on an

undetermined plant, on beans in West Bengal, on guava in Karnataka, on *Amaranthus* in Delhi, and on ornamental plant, coffee and an undetermined plant in Sikkim.

Habitat : Beans, guava, *Amaranthus*, ornamental plant, coffee, undetermined plant.

Distribution : India : Sikkim, West Bengal, Bihar, Delhi, Karnataka.

Genus 24. ***Dactyloscius*** Berlese

1916. *Scirus (Dactyloscirus)* Berlese, *Redia*, **12**(1) : 131.

1992. *Rosenhofia* Oudemans, *Ent. Ber. (Amst.)* **6**(6) : 110.

1941. *Scirus (Dactyloscirus)*, Thor & Willmann, *Das Tierrelch* **71**(1) : 173.

1952. *Scirus (Dactyloscirus)*, Baker & Hoffmann, *An. Esc. Nac. Cienc. Biol. Mexico*, **5**(3-4) : 230-241.

1975. *Dactyloscirus*, Smiley, *Ann. Ent. Soc. Amer.*, **68**(2) : 230.

1977. *Dactyloscirus*, Chaudhri, *Pak. J. Agric. Sci.*, **14** : 47.

1979. *Rosenhofia*, Den Heyer, *Phytophylactica*, **11**(2) : 87.

1980. *Dactyloscirus*, Chaudhri, *Univ. Agr. Faisalabad*, p. 43.

1982. *Dactyloscirus*, Michocka, *Acarologia*, **23** : 328.

1984. *Dactyloscirus*, Sepasgosarian, *Zeit. Anz. zool.*, **71** : 139.

1992. *Dactyloscirus*, Smiley, p. 214.

Diagnosis : Propodosomal shield reticulate or with minute striae. Hysterosoma with or without shields. Tarsi I-IV terminates into bilobed lateral flanges. Palpi 5 segmented, extends beyond apex of hypostome with strong spine like apophysis. Legs I-IV robust.

Type ***Scirus (Dactyloscirus) eupaloides*** Berlese

Key to the species of *Dactyloscirus* known to inhabit plants in India

1. Both propodosomal setae of same length .... *bengalensis*

— P_1 about one and half times as long as P_2 .... *machairodus*

53. ***Dactyloscirus bengalensis*** Gupta (Figs. 148-155)

1992. *Dactyloscirus bengalensis* Gupta, In : *State Fauna Ser. 3, Fauna of West Bengal, Part 3*, pp. 142-143.

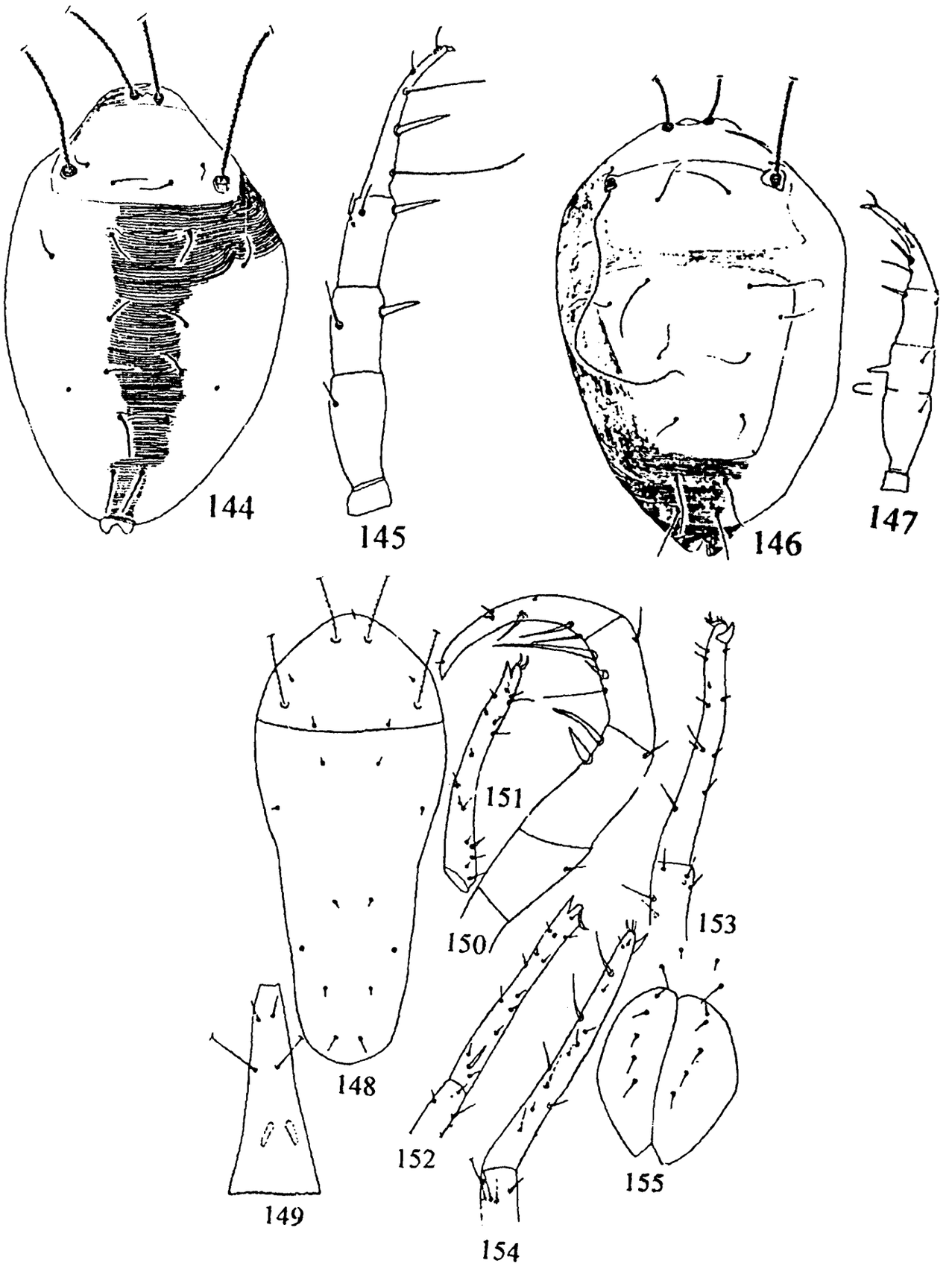
Female : Body 530 long, 340 wide, Palp 295 long, longer than hypostome. Palp chaetotaxy : trochanter-nil. basifemur-one outerlateral seta, telofemur-2 inner strong spines, distal one longer, spatulate, 31 long, proximal one almost upward curved, 18 long, one outerlateral strong, almost spine-like, genu-innerlaterally one fine seta-33 long, one innerlaterally strong spine, one distally located thick seta outerlaterally and from the apical tip of genu, a strong, long, spatulate process appears reaching upto tip of tibiotarsus; tibiotarsus with one long seta midproximidorsally, one long innerlateral seta midventrally and another a little below the tip of tibiotarsal claw; one seta ventrolaterally and one outerlaterally at middle region; tibiotarsal claw curved inward. Chelicera broad basally and narrow anteriorly. Fixed digit of chelicera absent. Propodosomal shield without granulate reticulate pattern, with 2 pairs of sensillary setae, measuring 230 and 270, respectively, both ciliated, P_1 and P_2 small. Striation pattern of hysterosoma not discernible, 6 pairs of setae present. Genital plate with 5 pairs of setae. Leg chaetotaxy I–IV : basifemur– 5, 4, 3 + 1 solenidion, 2 + 1 trichoboth; telofemur– 4, 4, 2 + 1 solenidion 4; genu– 5 + 1 solenidion, 5, 7, 5 + 2 solenidia; tibia– 5 + 1, solenidion, 4, 4 + 1 trichoboth, tarsus– 16 + 2 solenidia, 14 + 1 solenidion 4 + 1 trichoboth, 12, 12.

Male : Unknown.

Collection Records : This species was described from India (West Bengal) on *Zinia* sp.

Habitat : Zinia sp.

Distribution : India (West Bengal).



Figs. 144-155 : *Cunaxa setirostris* (Hermann) (female) : 144. Dorsal view, 145. Palp. (after Smiley, 1992); *Cunaxa womersleyi* Baker & Hoffmann (female) : 146. Dorsal view, 147. Palp. (after Smiley, 1992); *Dactyloscirus bengalensis* Gupta **(female) :** 148. Dorsal view, 149. Ventral view of hypostome, 150. Palp, 151. Tarsus of leg I, 152. Tibia and tarsus of leg II, 153. **Tibia and** tarsus of leg III. 154. Tibia and tarsus of leg IV, 155. Genital region. (after Gupta, 1992)

54. *Dactyloscirus machairodus* (Oudemans) (Figs. 156-157)

1922. *Rosenhofia machairodus* Oudemans, *Ent. Ber.*, **61** : 110.

1941. *Rosenhofia machairodus*, Thor & Willmann, *Das Tierreich*, **71** : 175.

1975. *Rosenhofia machairodus*, Smiley, *Ann. Ent. Soc. Amer.*, **68** : 235.

1975. *Dactyloscirus machairodus*, Smiley, *Ann. Ent. Soc. Amer.*, **68** : 227.

1979. *Dactyloscirus machairodus*, Den Heyer, *Phytophylactica*, **11** : 87.

1984. *Dactyloscirus machairodus*, Sepasgosarian, *Zeit. Anz. zool.*, **71** : 142.

1992. *Dactyloscirus machairodus*, Smiley, p. 237-238.

1995. *Dactyloscirus machairodus*, Gupta, In : *State Fauna Ser. 4, Fauna of Meghalaya, Part 2*, p. 44.

Female : Body 300 long, 210 wide. Hysterosoma subrectangular-Propodosomal shield with 2 pairs of sensillae and P_1 and P_2, the former about 1½ times as long as P_2. Hysterosoma with setae D_1-D_5, L_1; setae D_4, D_5 longer than other setae. Palp 5 segmented. Palp chaetotaxy; trochanter-nil, basifemur-one dorsal spine-like seta, telofemur-one peg-like seta apically at the inner surface and a dorsomedian spine-like seta; genu-one short seta medially, one apophysis anteriorly, one simple seta dorsomedially at apical region, one dorsolateral seta on outer surface; tibiotarsus with a long simple seta medially and a rod-like seta above this, one dorsolateral simple seta on outer surface. Genital plate with 4 pairs of setae.

Male : Unknown.

Collection Records : This mite was described from Sumatra on an undetermined plant and in India, its record was on palm in Meghalaya.

Habitat : Palm.

Distribution : India (Meghalaya), Indonesia.

55. *Dactyloscirus* sp.

1999. *Dactyloscirus* sp., Gupta & Chatterjee, *Sci. & Cult.*, **65**(5-6) : 161.

Collection Records : One undetermined species of *Dactyloscirus* was collected from Lakshadwip Isl. on an ornamental plant.

Habitat : Ornamental plant.

Distribution : India (Lakshadwip Isl.).

Subfamily 2. CUNAXOIDINAE Den Heyer

1979. Cunaxoidinae Den Heyer, *Acarologia*, **20**(3) : 338-350.

1992. Cunaxoidinae, Smiley, p. 246.

Diagnosis : Palp 3 segmented, tibiotarsus terminates in a claw; 2-3 knob-like apophysis on inner median surface, sometimes a spur or flange-like seta may be present. Chelicera broad basally, tapering distally. Propodosoma with or without shield, shield may be reticulate or striated. Setae P_1, P_2, L_1, D_1-D_3 may be located on shield. Coxae I and II may be fused forming pentagonal plate, may be entire or divided, coxae III and IV also may be fused, forming lateral plate, entire or divided.

Type ***Eupalus*** Koch, 1938 (?)

Key to the genera of subfamily CUNAXOIDINAE inhabiting plants in India

1. Dorsum with a single shield extending to the region of metapodosoma, L_4 seta psent or absent ..... *Neocunaxoides*

— Dorsum without shield ..... *Cunaxoides*

Genus 25. ***Cunaxoides*** Baker & Hoffmann

1834. *Eupalus* Gistl, *Ins. Doubletten Walworth*, p. 18.

1838. *Eupalus* Koch, *Deut. Crust. Myriapoda und. Arach. Fasc.* **20** : 20-21.

1894. *Eupalus*, Berlese, *Redia*, **14** : 66.

1929. *Eupalus*, Vitzthum, *Acari Die Tierwelt Mitteluropas* **3**(3) : 189.

1948. *Cunaxoides* Baker & Hoffmann, *An. Esc. Cienc. Biol. Mexico*, **5**(3-4) : 241.

1950. *Haleupalus* Radford, *Union Biol. Sci. Ser.*, **C**(1) : 87.

1952. *Cunaxoides*, Baker & Wharton, p. 192.

1960. *Cunaxoides*, Muma, *Ann. Ent. Soc. Amer.*, **53**(3) : 324.

1975. *Cunaxoides*, Smiley, *Ann. Ent. Soc. Amer.*, **68**(2) : 235.

1980. *Cunaxoides*, Gupta & Ghosh, *Rec. zool. Surv. India*, **77** : 191.

1982. *Cunaxoides*, Michocka, *Acarologia*, **23** : 327.

1984. *Cunaxoides*, Sepasgosarian, *Zeit. Anz. zool.*, **71** : 139.

1992. *Cunaxoides*, Smiley, p. 247.

Diagnosis : Smiley (1992) diagnosed this genus as : Dorsum with 1-4 shields, Dorsal shield may extend from apical propodosoma into region of metapodosoma or may be separated from propodosoma and hysterosoma. Propodosoma and hysterosoma may possess single ventral shield with coxae I-II forming a complete or divided sternal shield, never form v-shaped pentagonal shield. Palpi 3 segmented, seta L_4 absent.

Type ***Eupalus croceus*** Koch (by monotypy)

Key to the species of *Cunaxoides* known to inhabit plants in India

1. Dorsal hysterosoma without shield or striated field ..... *nicobarensis*

— Dorsal hysterosoma with shield or striated field ..... *croceus*

56. *Cunaxoides croceus* (Koch)

(Figs. 158-159)

1838. *Eupalus croceus* Koch, *Deust. Crust. Myryapoden und. Arach., Fasc.* **20** : 20-21.

1941. *Eupalus croceus*, Thor & Willmann, *Das Tierreich*, **71** : 180.

1948. *Cunaxoides croceus*, Baker & Hoffmann, *An. Esc. Cienc. Biol. Mexico*, **5**(3-4) : 241.

1975. *Cunaxoides croceus*, Smiley, *Ann. Ent. Soc. Amer.*, **68**(2) : 235.

1979. *Eupalus croceus*, Den Heyer, *Acarologia*, **20**(3) : 342.

1984. *Eupalus croceus*, Sepasgosarian, *Zeit Anz. zool.*, **71** : 141.

1987. *Cunaxoides croceus*, Michocka, *Acarologia*, **23** : 101.

1992. *Cunaxoides croceus*, Smiley, p. 251-254.

In press. *Cunaxoides croceus*, Gupta, In : *State Fauna Ser., 9, Fauna of Sikkim.*

Female : Propodosoma with dash-like striae. Propodosomal shield with P_1, P_2, S_1 and S_2. Idiosomal shield with D_1–D_5, L_1; D_4 and D_5 much shorter than L_1, Setae D_1–D_3, L_5 almost of same length. Palpi 3 segmented. Palp chaetotaxy : trochanter-nil, femur-5 setae, genu-5 setae, tibiotarsus-6 setae, tooth-like process present on inner surface, tibiotarsus ends in a claw. Hypostome without subtriangular reticulation. Ventrally sternal plate poorly demarcated with coxae I and II, coxae III and IV poorly demarcated but form two separate elongate lateral striated fields; anterior plate each with 5 pairs of simple setae, striated fields each with 3 pairs of setae. Leg chaetotaxy I–IV : trochanter– 1, 1, 2, 1; basifemur– 4, 4, 5, 1; telofemur– 4, 4, 3, 2; genu– 5 + 4 solenidia, 5 + 2 solenidia, 5 + 1 solenidion, 5 + 2 solenidia; tibia– 5 + 1 solenidion, 5 + 1 solenidion, 5 + 1 solenidion, 4 + 1 trichoboth; tarsus– 19 + 1 solenidion, 17 + 3 solenidia, 13 + 1 solenidion, 13. Genital plate with 4 pairs of setae.

Male : Similar to female.

Collection Records : The Neotype was collected from Germany on *Caledonia lichens* and the Indian record was from Sikkim on ornamental plant and coffee.

Habitat : India : Ornamental plant, coffee. Elsewhere : *Caledonia lichens*.

Distribution : India (Sikkim), Germany.

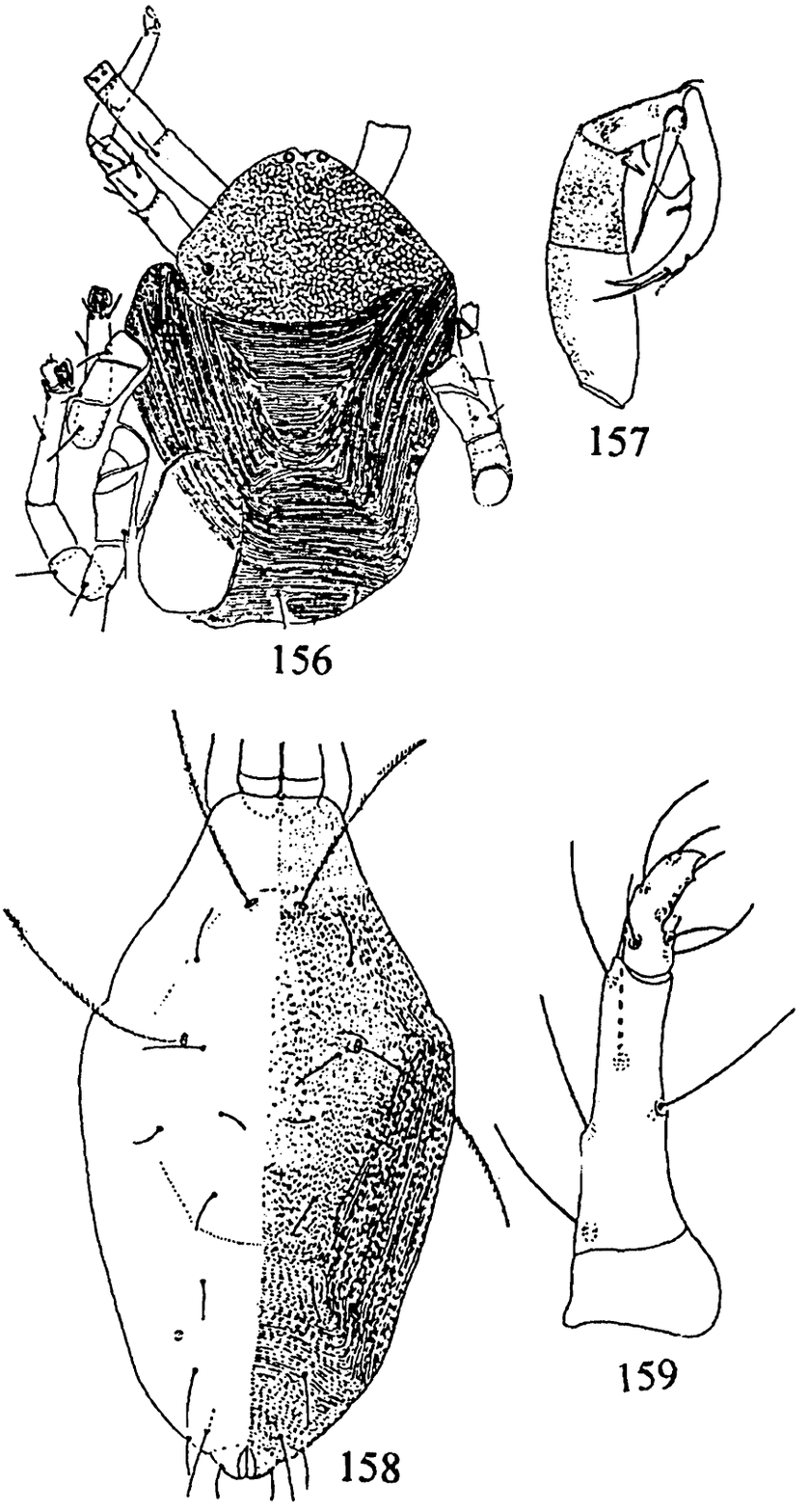
57. *Cunaxoides nicobarensis* Gupta & Ghosh

(Figs. 160–161)

1980. *Cunaxoides nicobarensis* Gupta & Ghosh, *Rec. zool. Surv. India*, **77** : 191-193.

1992. *Cunaxoides nicobarensis*, Smiley, p. 261.

Female : Body 450 long, 280 wide. Propodosoma with each striae forming subrectangular shield, with setae P_1, P_2, S_1 and S_2. Hysterosoma separated from propodosoma, with dot-like striae; hysterosomal setae broaken. Palpi 3 segmented. Palp chaetotaxy : trochanter-nil, femoragenu-with 2 outerlateral setae, one distally and one medially,



Figs. 156-159 : *Dactyloscirus machairodus* (Oudemans) (female) : 156. Dorsal view, 157. Palp. (after Smiley, 1992); *Cunaxoides croceus* (Koch) (female) : 158. Dorsal view, 159. Palp. (after Smiley, 1992)

2 apophysis on the inner surface, terminates in a small claw. Idiosomal ventral anterior portion divided medially not forming two distinct plates with coxae I and II. Leg chaetotaxy : I–IV : trochanter– 1, 1, 2, 1; basifemur– 2, 3, 3, 1; telofemur– 4, 3, 3, 3; genu– 8 + 4 solenidion, 5 + 1 solenidion, 5 + 1 solenidion, 5 + 1 solenidion, tibia– 4 + 1 solenidion, 5 + 1 solenidion 5 + 1 solenidion 4 + 1 trichoboth, tarsus– 9 + 1 solenidion, 9 + 1 solenidion, 6 + 1 solenidion, 6 setae. Genital plate with 4 pairs of setae.

Male : Similar to female.

Collection Records : This species was originally described from Car Nicobar Isls. on undetermined plant.

Habitat : Undetermined plant.

Distribution : India (Andaman & Nicobar Isl.).

Genus 26. *Neocunaxoides* Smiley

1975. *Neocunaxoides* Smiley, *Ann. Ent. Soc. Amer.*, **68**(2) : 237.
1977. *Neocunaxoides*, Chaudhri, *Pak. J. Agric. Sci.*, **14** : 50.
1979. *Neocunaxoides*, Den Heyer, *Acarologia*, **23**(3) : 338.
1980. *Neocunaxoides*, Chaudhri, *Univ. Agr. Faisalabad*, p. 37.
1980. *Neocunaxoides*, Tseng, *Q. J. Taiwan Mus.*, **33** : 265.
1980. *Scutopalus* Den Heyer, *Acarologia*, **21**(2) : 187.
1980. *Neocunaxoides*, Gupta & Ghosh, *Rec. zool. Surv. India*, **17** : 190.
1982. *Neocunaxoides*, Michocka, *Acarologia*, **23** : 334.
1984. *Neocunaxoides*, Sepasgosarian, *Zeit. Anz. Zool.*, **71** : 139.
1992. *Neocunaxoides*, Smiley, p. 274.

Diagnosis : Dorsum covered by a single shield extending from apical propodosoma upto hysterosomal region, above or below coxa IV. Setae L_4 absent. Idiosomal venter with 4-7 plates. Coxae I, II may be fused forming pentagonal plate, which may be completely or divided medially, Coxae III and IV also fused forming lateral plate on each side. Palp 3 segmented, distal segment usually with 2-3 knob-like apophysis or a spur or a flange-like seta.

Type ***Cunaxoides andrei*** Baker & Hoffmann (by original designation and monotypy)

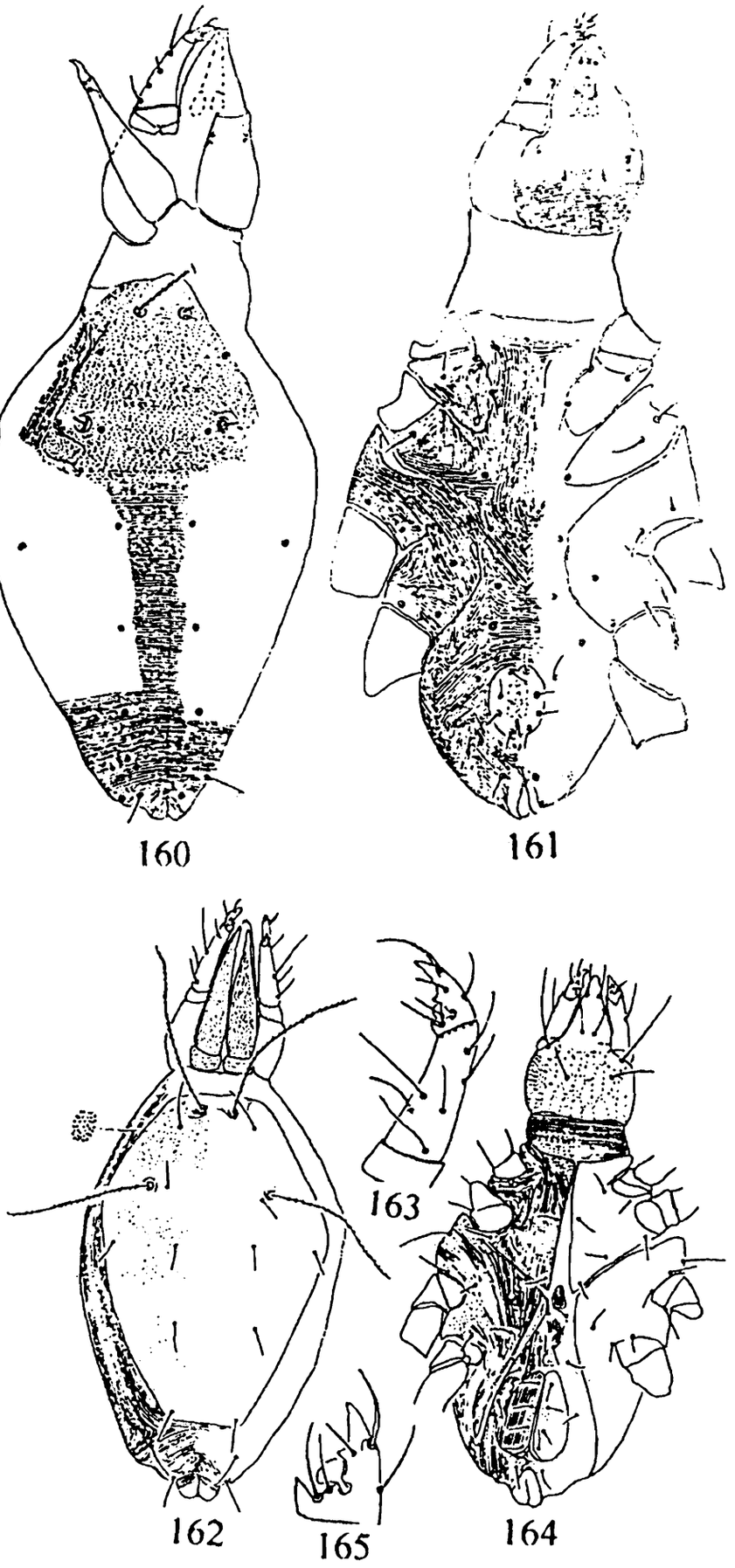
Key to the species of *Neocunaxoides* known to inhabit plants in India

1. Dorsal setae D_1–D_5 rod-like ..... *pradhani*
— Dorsal setae D_1–D_5 simple or setose 2
2. Palp tibiotarsus with mushroom shaped seta .. .. *andrei*
— Palp tibiotarsus without such seta ....*cerasoides*

58. *Neocunaxoides andrei* (Baker & Hoffmann) (Figs. 162-165)

1948. *Cunaxoides andrei* Baker & Hoffmann, *An. Esc. Nac. Cicnc. Biol. Mexico*, **5** : 249-250.
1975. *Neocunaxoides andrei*, Smiley, *Ann. Ent. Soc. Amer.*, **68**(2) : 237.
1978. *Neocunaxoides andrei*, Gupta & Chattopadhyay, *Indian J. Acar.*, **3** : 83.
1979. *Neocunaxoides andrei*, Kuznetzov & Livshitz, *Trudy Gosud, Nik. Bot. Sad.*, **79** : 59.
1980. *Neocunaxoides andrei*, Den Heyer, *Pub. Univ. North. Ser. A.* **23** : 7.
1980. *Neocunaxoides andrei*, Den Heyer, *Phytophylactica*, **12** : 129.
1980. *Neocunaxoides andrei*, Tseng, *Q. J. Taiwan Mus.*, **33** : 267.
1981. *Neocunaxoides andrei*, Gupta, *Proc. Soil. Biol. Ecol. India*, p. 93.
1984. *Neocunaxoides andrei*, Sepasgosarien, *Zeit Anz. zool.*, **71** : 140.
1987. *Neocunaxoides andrei*, Michocka, *Acarologia*, **23** : 102-104.
1992. *Neocunaxoides andrei*, Smiley, p. 275-277.
2000. *Neocunaxoides andrei*, Gupta, In : *State Fauna Ser. 7, Fauna of Tripura, Part 2*, p. 17.

Female : Body 500 long, 260 wide. Dot-like punctations present on propodosomal shield, with setae P_1, D_2, D_1–D_3, L_1, S_1, S_2, setae D_4 and D_5 longer than others. Palpi 3 segmented. Palp chaetotaxy : trochanter-nil, femerogenu-2 anterior



Figs. 160-165 : *Cunaxoides nicobarensis* Gupta (female) : 160. Dorsal view, 161. Ventral view. (after Smiley, 1992); *Neocunaxoides andrei* (Baker & Hoffmann) (female) : 162. Dorsal view, 163. Palp, 164. Ventral view, 165. Palp tibiotarsus. (after Smiley, 1992)

outerlateral setae, 2 innerlateral simple setae posteriorly and 2 simple setae dorsally, tibiotarsus with 2 outerlateral setae, a basal tooth on inner surface, 2 setae above it and a mushroom shaped seta medially, a claw at the terminal end of the segment. Idiosomal venter divided medially forming 2 distinct plates with coxae I and II, each plate bearing 6 setae. Coxae III and IV also fused forming 2 separate lateral plates, each with 6 setae. Leg chaetotaxy : I–IV : trochanter– 1, 1, 2, 1, basifemur– 3, 5, 2, 0; telofemur– 5, 6, 4, 3; genu– 8 + 1 solenidion, 5 + 1 solenidion, 5 + 1 solenidion, 4 + 2 solenidia; tibia– 5 + 1 solenidion, 5 + 1 solenidion, 5 + 1 solenidion, 4 + 1 trichoboth; tarsus– 3 + 4 solenidia, 2 + 1 solenidion, 14, 16. Genital plate with 4 pairs of setae.

Male : Unknown.

Collection Records : This was described from India collected on an undetermined leaf. Thereafter, it has been recorded on soil, cotton, pine cone, Graminaceous plant, etc. Smiley (1992). In India, it has been recorded on citrus in Tripura.

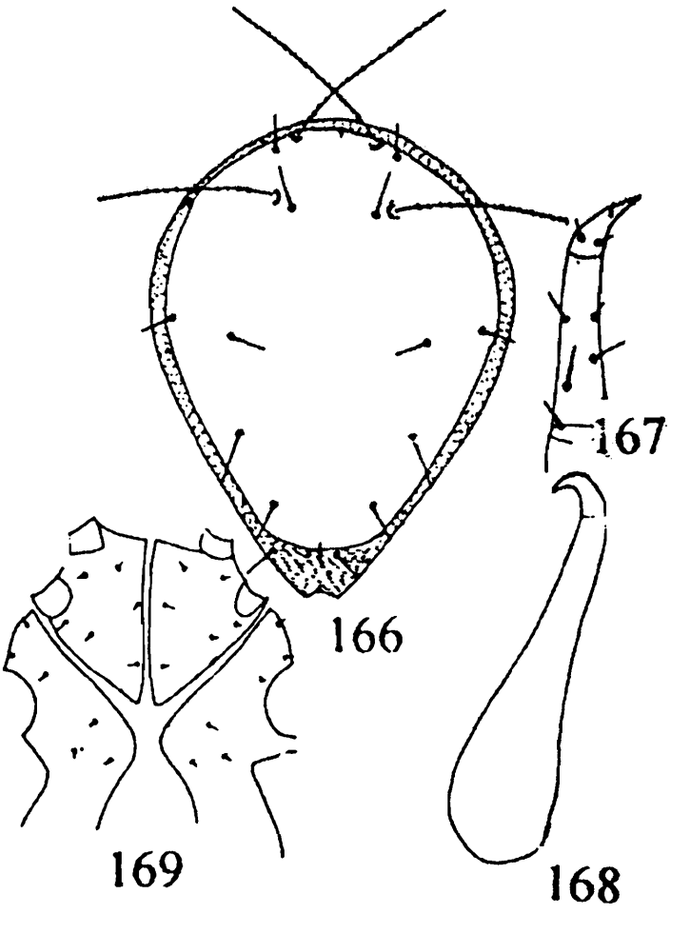
Habitat : India : Citrus. Elsewhere : Undetermined plant, soil, cotton, pine cone, Graminaceous plant.

Distribution : India (Tripura), U.S.A.

59. *Neocunaxoides cerasoides* Gupta
(Figs. 166-169)

1991. *Neocunaxoides cerasoides* Gupta, *Rec. zool. Surv. India*, **88** : 225-228.

Female : Body 320 long, 220 wide. Palp 3 segmented, 85 long, almost as long as hypostome. Palp chaetotaxy : trochanter-nil, femerogenu-one anterodorsal, two outerlateral, two innerlateral, tibiotarsus-one outerlateral, one inner lateral, one distal. Chelicera elongate, broadened at base, extending anteriorly upto tibiotarsus, striated dorsally, fixed digit absent, movable digit pointed, curved. Gnathosoma broad at base with 1 pair of marginal setae. Dorsum covered with a single shield, sensory setae finely ciliated, placed anteriorly. Posteriorly, setae D_1–D_3, L_1 present. Ventrally, anterior portion divided into two distinct plates fusing with coxae I and II, each plate bears 6 setae; coxae III and IV also form two elongate plates-each with 6 setae. Chaetotaxy of legs I–IV : basifemur– 2, 3, 3, 1; telofemur– 4, 3, 3, 2; genu– 6, 7, 6, 7; tibia– 9, 7, 5, 5; tarsus– 15, 18, 14, 10 + 1 trichoboth. Tarsi I–IV with 2 claws and empodium.



Figs. 166-169 : *Neocunaxoides cerasoides* Gupta (female) : 166. Dorsal view, 167. Palp, 168. Chelicera, 169. Anteroventral aspect. (after Gupta, 1991)

Male : Unknown.

Collection Records : This species was described from Assam collected on *Polyalthia cerasoides.*

Habitat : Polyathia cerasoides.

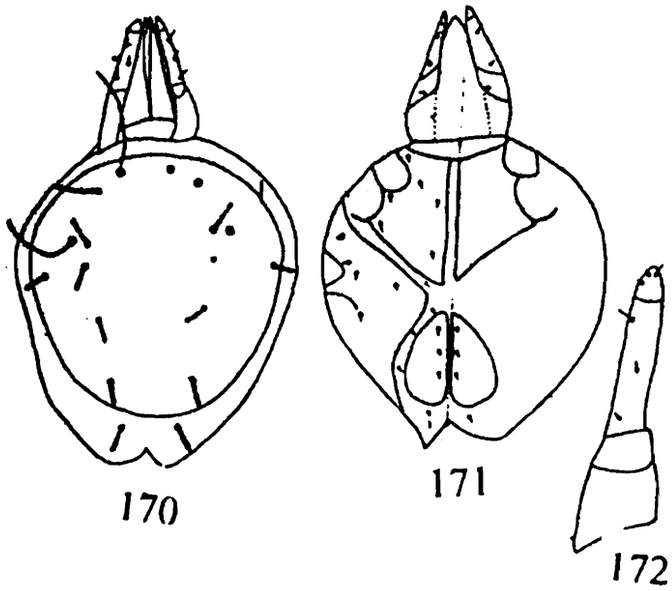
Distribution : India (Assam).

60. *Neocunaxoides pradhani* Gupta & Ghosh (Figs. 170-172)

1980. *Neocunaxoides pradhani* Gupta & Ghosh, *Rec. zool. Surv. India*, 77 : 190-191.

1992. *Neocunaxoides pradhani*, Smiley, p. 293.

Female : Body 300 long, 225 wide. Propodosomal plate with setae P_1, P_2, D_1–D_5, L_1, besides the anterior and posterior sensillae. Palp 3 segmented. Palp chaetotaxy : trochanter-nil, femerogenu-2 outerlateral setae, two setae posterolaterally, 1 ventrally, tibiotarsus-2 outer anterolateral, 1 seta basally, 2 knob-like apophysis on inner surface, 2 setae basally, the segment terminates in a claw. Ventrally two distinct plates anteriorly formed by fusion of coxae I and II, each with 6 setae; coxae III and IV also form two elongate plates each with 6 setae. Coxal setal formula : 3, 2, 3, 3; chaetotaxy of legs I–IV : trochanter– 1, 1, 2, 1; basifemur– 4, 5, 3, 2; telofemur– 4, 4, 3, 4; genu– 5 + 4 solenidia, 5 + 2 solenidia, 5 + 1 solenidion, 5 + 2 solenidia; tibia– 5 + 1 solenidion, 5 + 1 solenidion, 5 + 1 solenidion, 4 + 1 solenidion; tarsus– 11 + 2 solenidia, 12 + 1 solenidion, 10, 10. Genital plate with 4 pairs of setae.



Figs. 170-172 : *Neocunaxoides pradhani* Gupta (female) : 170. Dorsal view, 171. Ventral view, 172. Palp. (after Gupta & Ghosh, 1980)

Male : Unknown.

Collection Records : This species was described from Andaman & Nicobar Isl., collected on jackfruit.

Habitat : Jackfruit.

Distribution : India (Andaman & Nicobar Island).

Remarks : Smiley (1992) re-described this species and the description given here is to some extent based on that.

61. *Neocunaxoides* sp.

1992. *Neocunaxoides* sp., Gupta, In : *State Fauna Ser. 3, Fauna of West Bengal, Part 3*, p. 140

Collection Records : One specimen in damaged condition was collected in West Bengal on beans.

Habitat : Beans.

Distribution : India (West Bengal).

7. Family ERYTHRAEIDAE Robineau-Desvoidy

1828. Erythraeidae Robineau-Desvoidy, *K.H.O.A., IIID* : 144.

1966. Erythraeidae, Smiley, *Proc. Ent. Soc. Wash.*, 66(2) : 25.

1970. Erythraeidae, Meyer, *Koedoe*, 13 : 32.

Diagnosis : Reddish mite, larva heteromorphic, lack urstigma and parasitic on arthropods. A shallow furrow separates the propodosoma from hysterosoma. Propodosoma having a median longitudinal "crista metopica", may reach posteriorly to middle of dorsum. Crista metopica with 2 sensillary areas, anterior one placed forward, posterior one at posterior end of crista. Sensillary area each has a pair of sensory setae. One or two pairs of eyes prersent. Coxae I and II and III and IV form two different groups. Strong claws present on palp tibia. Chelicera unsegmented, stylet-like, toothed distally. Genital suckers absent. Adults are free living, normally predators, found on plants and litter; larvae are parasitic to insects.

Type ***Erythraeus*** Latreille, 1806

Key to the subfamilies of ERYTHRAEIDAE known to inhabit plants in India (Based on Southcott, 1961)

1. Two eyes on each side .....ERYTHRAEINAE
— One eye on each side 2
2. Dorsum of idiosoma with sensory pits (urnulae), either 2 or 4 in number, if only 2, then those are placed anteriorly and not far from eyes .... BALAUSTIINAE
— Dorsum of idiosoma without sensory pits 3
3. Eyes anterior to middle of crista .... LEPTINAE
— Eyes behind middle of crista .... CALLIDOSOMATINAE

Subfamily 1 BALAUSTIINAE Southcott

1947. Balaustiidae Grandjean, *Arch. zool. Exp. Gen.* **85**(1) : 12, 13.

1957. Balaustiinae Southcott, *Rec. S. Aust. Mus.*, **13**(1) : 98 (in part).

1961. Balaustiinae, Southcott, *Aust. J. Zool.*, **9** : 540.

Diagnosis : Southcott (1961) defined this subfamily as : Adults and nymphs possess one eye on each side, placed well behind middle of crista or behind midpoint between anterior and posterior dorsal idiosomal sensillae. Dorsum with 2 or 4 specialised sensory pits. Dorsal idiosomal setae ciliate.

Type ***Balaustium*** von Heyden

Genus 27. ***Balaustium*** von Heyden

1826. *Balaustium* von Heyden, *K. H. O. A. IIID* : 309.

1893. *Rhyncholophus* Berlese, p. 81.

1958. *Balaustium*, Sellnick, *Med. Vaxtxkyddanst Stockh.* **II** (71-72) : 42 (in part).

1961. Balaustium, Southcott, *Aust. J. Zool.*, **9** : 543.

1968. *Balaustium*, Smiley, *Proc. ent. Soc. Wash.*, **70**(1) : 13.

Diagnosis : Adults and nymphs with one eye on each side, crista present but tends to be obsolete. Dorsum of idiosoma carries two sensory pits, placed anteriorly behind the eyes. Palpal genu not elongated distally, palpal tibia conical, normal.

Type ***Balaustium murorum*** (Hermann, 1804)

62. ***Balaustium*** sp.

1981. *Balaustium* sp., Mukherjee & Somchoudhury, In : *Contributions to Acarology in India*, p. 186.

1990. *Balaustium* sp., Senrayan *et al.*, *Hexapoda*, **2** : 81-90.

In press. *Balaustium* sp., Gupta, In : *State Fauna Ser. 9, Fauna of Sikkim.*

Collection Records : Two undetermined spp. of *Balaustium* were reported from India, one on litter ecosystem in Tamil Nadu and the other one on undetermined plant from Sikkim, as well as on brinjal in West Bengal.

Habitat : Undetermined plant, soil., Brinjal.

Distribution : India (Sikkim, Tamil Nadu). West Bengal.

Remarks : Though species of this genus are known to be important predators but from India, its predatory habit has not been reported-. However, one undetermined species of *Balaustium* was found to feed upon *Tetranychus* sp. on brinjal in West Bengal.

Subfamily 2. CALLIDOSOMATINAE Southcott

1957. Callidosomatinae Southcott, *Rec. S. Aust. Mus.*, **13**(1) : 97.

1957. Balustiinae, Southcott, *Rec. S. Aust. Mus.*, **13**(1) : **98** (in part).

1961. Callidosomatinae, Southcott, *Aust. J. zool.*, **9** : 521.

Diagnosis : Southcott (1961) defined this subfamily as : Adults and nymphs with one eye on each side. Crista metopica present, eyes behind middle of crista, which may extend behind posterior sensillary area. Idiosoma of adults and nymphs without sensory pits. Pedal tibiae of adults and nymphs may have prominent distal tubercles.

Type *Callidosoma* Womersley, 1936

Key to the genera of CALLIDOSOMATINAE known to inhabit plants in India

1. Palp tarsus greatly enlarged, globular or pyriform and extend beyond palpal tibial claw .... *Sphaerolophus*

— Palp tarsus not greatly enlarged or normal or nearly normal structure, not overhanging palp tibial claw or only slightly overhanging palpal tibial daw ..... *Abrolophus*

Genus 28. ***Abrolophus*** Berlese

1872. *Trombidium* Thorell, *Of Versk. Sevenska vetensk Akad. Handl.*, p. 162.

1877. *Rhyncholophus* Brady, *Proc. Zool. Soc.* : 25.

1891. *Abrolophus* (sic.) *Berlese, AMS* **59**(1) : 2.

1903. *Erythraeus* Oudemans, *Tij. Ent.*, **45**(3-4) : 142 (in part).

1906. *Balaustium* (sic.) Oudemans, *Ent. Ber. Amst.*, **2**(25) : 82.

1916. *Abrolophus*, Berlese, *Redia*, **12**(1) : 126.

1961. *Abrolophus*, Southcott, *Aust. J. Zool.*, **9** : 533.

Diagnosis : Southcott (1961) defined this genus as : adults and nymphs with one eye on each side, behind middle of crista. Crista normal, no specialised sensory seta (urnulae) present on dorsum of idiosoma. No tubercles on tibia of legs. Palpi normal, without any unusually enlarged segment. Palp tarsus normal, rather small, not or only slightly overreaching palp tibial claw.

Type ***Abrolophus quisquillarum*** (Hermann) Berlese, 1891

Key to the species of *Abrolophus* known to inhabit plants in India

1. Front tarsi 3-3½ times as long as wide .... *ripicola*

— Front tarsi 2½ times as long as wide .... *delhiensis*

63 ***Abrolophus delhiensis*** Khot

(Figs. 173-176)

1965. *Abrolophus delhiensis* Khot, *Acarologia*, **7** : 71.

1985. *Abrolophus delhiensis*, Gupta, *Handbk. Plant Mites of India*, 322-323.

1997. *Abrolophus delhiensis*, Gupta & Chatterjee, In : *State Fauna Ser. 6, Fauna of Delhi*, p. 520.

Female : Khot (1965) described this species as : Bright red with red eye spots, Body eliptical, 1000 long, 360 wide. Crista 156 long, anterior sensillary area with rounded tip forming a nasus with cristal plate. Sensillary seta 70 long. Crista extending posteriorly into an irregular projection. Dorsal setae setose, length ranging from 21-80. Eyes on either side, situated lateral to posterior sensillary area. Palp with slightly bent tibial claw and palp tarsus bullet shaped.

Male : ?

Collection Records : This mite was described from Delhi, collected on orchard.

Habitat : Orchid.

Distribution : India (Delhi).

64. ***Abrolophus ripicola*** Womersley

(Figs. 177-180)

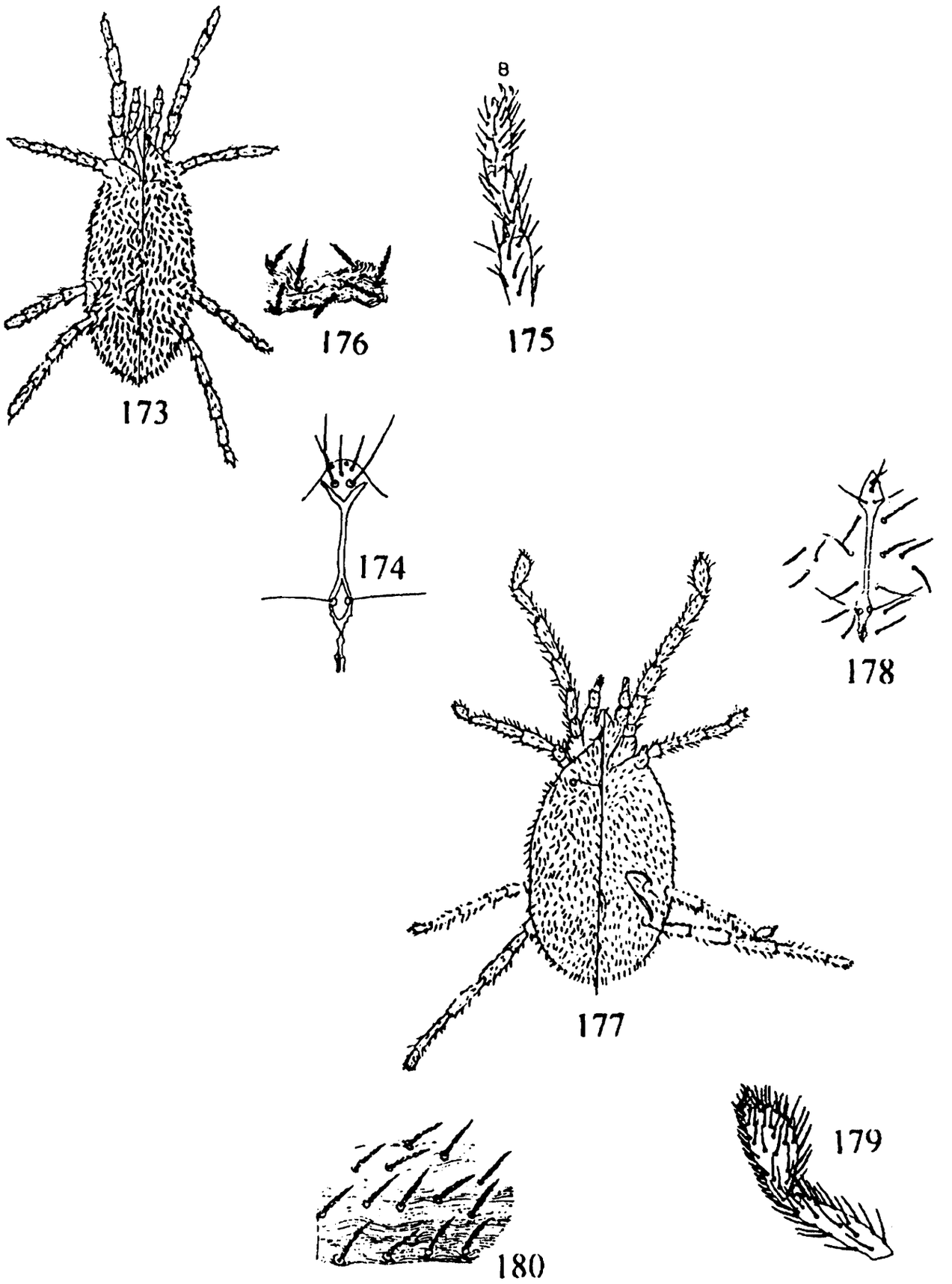
1934. *Abrolophus ripicola* Womersley, *Rec. S. Aust. Mus.*, **7** : 228.

1965. *Abrolophus ripicola*, Khot, *Acarologia*, **7** : 71.

1985. *Abrolophus ripicola*, Gupta, *Handbk. Plant Mites of India*, p. 324.

1997. *Abrolophus ripicola*, Gupta & Chatterjee, In : *State Fauna Ser. 6, Fauna of Delhi*, p. 520.

Female : Khot (1965) described this species as : Deep orange, body oval, 1000 long, 520 wide. Dorsum dense spur of highly setose setae. Crista 180 long, extending posteriorly upto base of coxae II. Anterior sensillary area triangular with transverse lines. Sensory setae smooth, pointed, linear, situated on the posterior part of the area,



Figs. 173-180 : *Abrolophus delhiensis* Khot (female) : 173. Left half-dorsal view, right half-ventral view, 174. Crista, 175. Palp, 176. Body setae. (after Khot, 1965); *Abrolophus ripicola* Womersley (female) : 177. Left half-dorsal view, right half-ventral view, 178. Crista, 179. Palp, 180. Body setae. (after Khot, 1965)

a pair of non-sensillary setae situated anterior to sensillary setae. Eye situated posterior lateral to middle of crista. Leg I-819, II-635, III-650, IV-820, leg setae simple.

Male : Unknown.

Collection Records : This species was described from Delhi, collected on orchard.

Habitat : Orchard.

Distribution : India (Delhi).

65. *Abrolophus* sp.

1978. *Abrolophus* sp., Seshu Reddy & Davies, *Acar. Newsl.*, **6** : 9.

Collection Records : This undetermined species of *Abrolophus* was recorded in Andhra Pradesh, feeding on sorghum shoot fly, *Athirigona soccata.*

Habitat : Sorghum.

Distribution : India (Andhra Pradesh).

Remarks : This mite appears to be an important predator of Dipteran species, *Athirigona soccata.* A single mite consumed 31 eggs. It also consumed newly hatched young ones.

Genus 29. *Sphaerolophus* Berlese

1885. *Rhyncholophus* Berlese, *AMS* **18** : 7.

1914. *Sphaerolophus* (sic.) Oudemans, *Arc. Naturgesch,* **79A** : 1.

1961. *Balaustium* (sic.), Southcott, *Aust. J. zool.*, 9 : 530.

1968. *Sphaerolophus,* Smiley, *Proc. ent. Soc. Wash.*, **70**(1) : 15.

Diagnosis : Adults and nymphs-one eye on each side, behind middle of crista. Crista normal. No specialised sensory pits (urnulae) present on dorsum of idiosoma. No tubercle on tibiae of legs and palpi normal, no enlarged leg segment. Palp tarsus small not or slightly overreaching palp tibial claw.

Type *Abrolophus quisquillarum* (Hermann), Berlese, 1891

Key to the subgenera and species of *Sphaerolophus* known to inhabit plants in India

1. Palp tarsus elongated and pyriform .... *Sphaerolophus (Cavannea) gigas*

— Palp tarsus enlarged and globular .... *Sphaerolophus (Sphaerolophus),* 2

2. Palp tarsus 4 times longer than wide .... *S. (S.) delhiensis*

— Palp tarsus longer than wide .... *S. (S.) minutus*

66. *Sphaerolophus delhiensis* Khot (Figs. 181-184)

1965. *Sphaerolophus (Sphaerolophus) delhiensis* Khot, *Acarologia,* **7** : 66.

1985. *Sphaerolophus delhiensis,* Gupta, *Handbk. Plant Mites of India,* p. 322.

1997. *Sphaerolophus delhiensis,* Gupta & Chatterjee, *State Fauna Ser. 6, Fauna of Delhi,* p. 520.

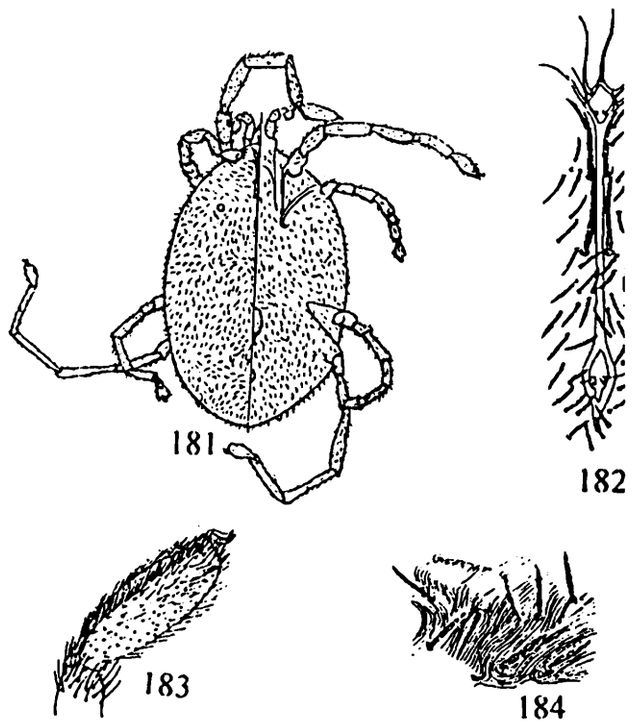
Female : Khot (1965) described this as : Bright red mite. Body oval, 1430 long, 1120 wide. Dorsum densely covered with minute, ciliated, curved setae. Crista 940 long, anterior sensillary area rectangular, with smooth, pointed sensillary setae. Two pairs of long setae, double the size of normal dorsal setae present, situated on either side of the base of anterior sensillary area and another pair little below it. Eyes on either side of crista. Tarsus I with spur of setae along inner margin. Leg I-1170, II-1100, III-1230, IV-2030. Palp tarsus spherical.

Male : Unknown.

Collection Records : This species was described from Delhi, collected on cotton.

Habitat : Cotton.

Distribution : India (Delhi).



Figs. 181-184 : *Sphaerolophus delhiensis* Khot (female) : 181. Left half-dorsal view, right half-ventral view, 182. Crista, 183. Palp, 184. Body setae. (after Khot, 1965)

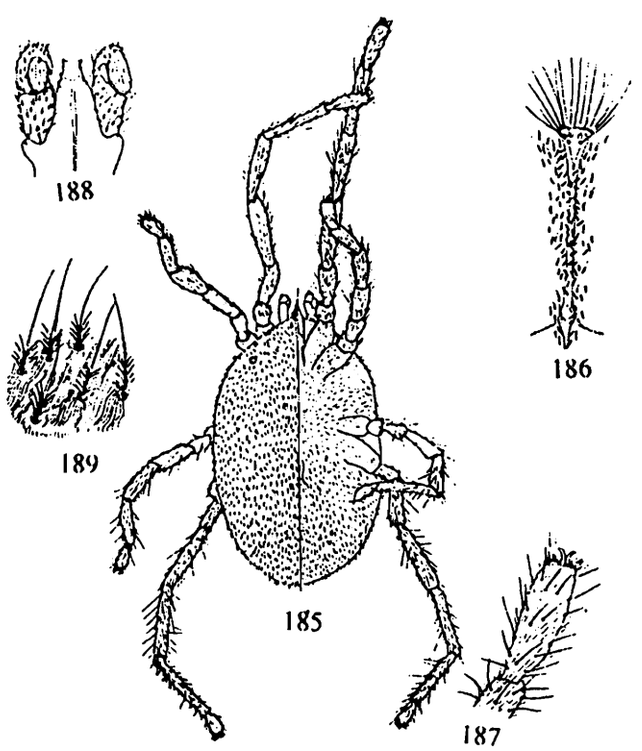
67. ***Sphaerolophus gigas*** Khot

(Figs. 185-189)

1965. *Sphaerolophus (Cavannea) gigas* Khot, *Acarologia*, 7 : 64.

1997. *Sphaerolophus gigas*, Gupta & Chatterjee, In : *State Fauna Ser. 6, Fauna of Delhi*, p. 520.

Female : Khot (1965) described as : Bright red mite, 3900 long, 2300 wide. Body covered with numerous setae, each with spiny ciliation upto middle and then ends pointedly. Crista stout, 1340 long, anterior sensillary area triangularly situated on anterior dorsal margin, with 8 non-sensillary setae,



Figs. 185-189 : *Sphaerolophus gigas* Khot (female) : 185. Left half-dorsal view, right half-ventral view, 186. Crista, 187. 188. Palp, 189. Body setae. (after Khot, 1965)

situated along its anterior margin and 2 other such pairs on either side of sensillary setae. Posterior sensillary area on middle of dorsum with a pair of sensillary setae, 180 long. Eyes on either side, situated behind crista. Length of Legs : I-6180, II-3800, III-3930, IV-? Tarsi with dense spur of setae at the base of claw, Palp tarsus pyriform claw bullet shaped.

Male : Unknown.

Collection Records : The description of this species is based on material collected on sugarcane in Delhi.

Habitat : Sugarcane.

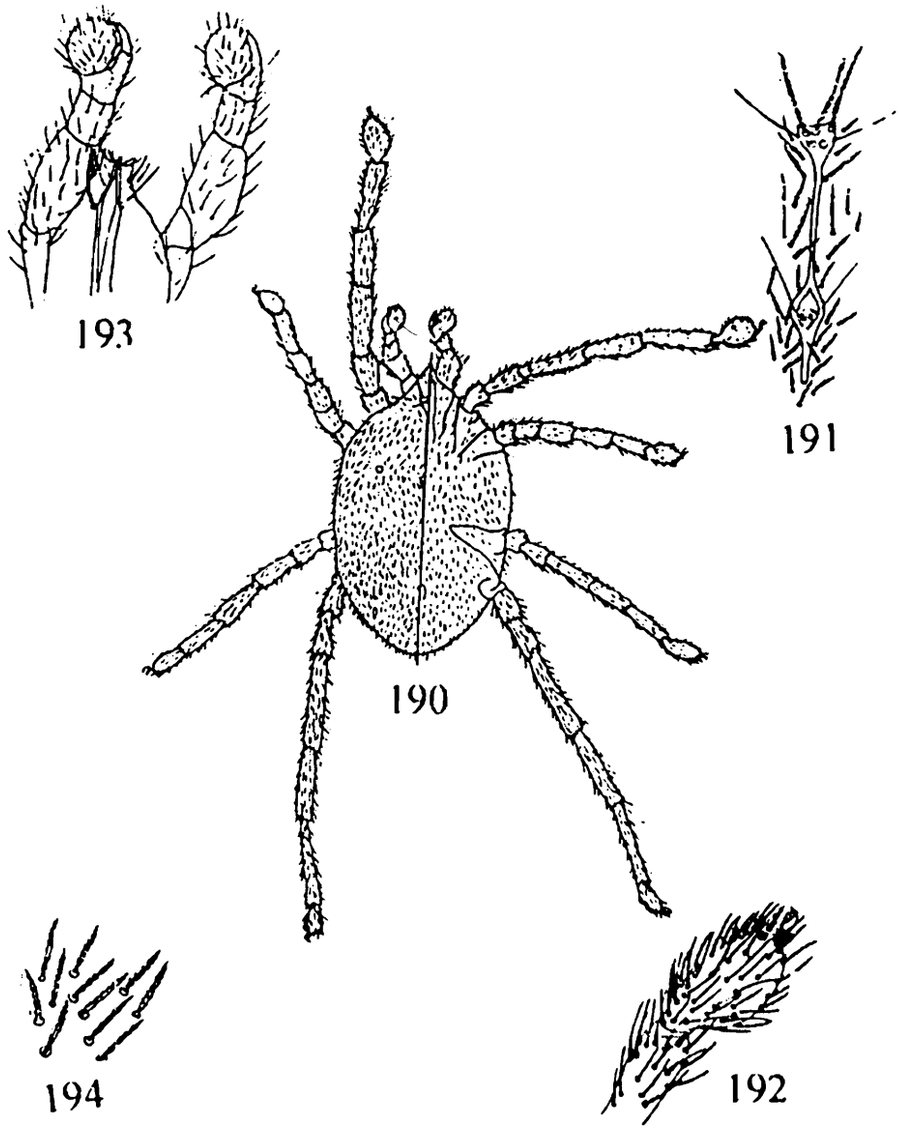
Distribution : India (Delhi).

68. ***Sphaerolophus minutus*** Khot (Figs. 190-194)

1965. *Sphaerolophus (Sphaerolophus) minutes* Khot, *Acarologia*, 7 : 66.

Female : Khot (1965) described this as : Body 1014 long, 460 wide. Bright orange red. Crista 230 long, extending posteriorly upto middle of dorsum. Anterior sensillary area triangular, with 3 plumose non-sensillary setae situated along anterior margin of area with a sensillary setae, 220 long. Eyes situated on either side lateral to posterior sensillary area. Dorsal setae small, pointed. Leg I-1090 long, II-730 long, III-825 long, IV-1300 long.

Male : Unknown.



Figs. 190-194 : *Sphaerolophus minutus* Khot (female) : 190. Left half-dorsal view, right half-ventral view, 191. Crista, 192, 193. Palp, 194. Body setae. (after Khot, 1965)

Collection Records : This species was collected from Delhi on orchard.

Habitat : Orchard.

Distribution : India (Delhi).

Subfamily 3. ERYTHRAEINAE Southcott

1957. Erythraeinae Southcott, *Rec. S. Aust. Mus.*, **19**(1) : 97.

1961. Erythraeinae, Southcott, *Aust. J. zool.*, **9** : 462.

Diagnosis : Southcott (1961) diagnosed this subfamily as : Erythraeids with 2 eyes on each side. Adults and nymphs normally with a crista. Anterior sensillary area of crista placed dorsally at the anterior pole of propodosoma. Larva also with 2 eyes on each side. Dorsum scutum rounded or squarish with 2 or 3 pairs of scutalae.

Type ***Erythraeus*** Latreille, 1806

Key to the genera of ERYTHRAEINAE* known to inhabit plants in India

1. Legs with finely modified serrate setae .... *Paraerythraeus*

— Legs without serrate setae ..... *Erythraeus*

Genus 30. ***Bochartia*** Oudemans

1910. *Bochartia* Oudemans, *Acarologische Aanteekenungen XXXI. Ent. Ber., Amst.*, **3**(52) : 49.

1934. *Bochartia*, Womersley, *Rec. S. Aust. Mus.*, **5**(2) : 251. (in part).

1937. *Erythraeus*, Oudemans, *K. H. O. A. IIID*, p. 1959.

1961. *Erythraeus*, Southcott, *Aust. J. zool.* **9** : 491.

Diagnosis : Larval erythraeid mite with 2 eyes on each side. Dorsal scutum rounded, somewhat flattend anteriorly. Dorsal scutum with 2 pairs of scutalae. Posterior originates somewhat anterior to posterior margin of scutum. Ciliated claw of palpatarsus bifurcate.

Type ***Bochartia kuyperi*** Oudemans, 1910

69. ***Bochartia*** spp.

1975. *Bochartia* sp., Ghai & Ahmed, *Entomologists' Newsl., I. A. R. I.*, **5**(5) : 28-29.

1981. *Bochartia* sp., Rawat, In : *Contributions to Acarology in India*, p. 104-106.

1990. *Bochartia* sp., Fasih & Srivastava, *Pest Control*, **32**(2) : 39-41.

1993. *Bochartia* sp., Sundaraju, *J. Biol. Control*, **7**(1) : 6-8.

Collection Records : Some undetermined species of *Bochartia* were reported to feed upon cotton jassid, *Amrasca biguttula biguttula* in Delhi (Ghai & Ahmed, 1975), on cabbage painted bug, *Bagrada cruciferum* and pigeon pea pod borer, *Clavigralla gibbosa* in M. P. (Rawat, 1981); *Drosicha mangiferae* on citrus (Saxena & Rawat, 1968); *Amritodus atkinsoni* and *Indioscopus* (Fasih & Srivastava, 1990) and preying upon *Helopeltes antonii* in Tamil Nadu (Sundaraju, 1993).

Distribution : India (Madhya Pradesh, Tamil Nadu, Delhi).

Genus 31. ***Erythraeus*** Latreille

1778. *Acarus* de Geer, *K. H. O. A. II*, p. 134 (in part).

1804. *Trombidium* Hermann, *Memoire apterologique* p. 33.

1806. *Erythraeus* Latreille, *K. H. O. A. IIID*, p. 1954-5.

1834. *Rhyncholophus* Duges, *K. H. O. A. IIID*, p. 15.

1897. *Balaustium* (sic.) Oudemans, *Tij. Ent.*, **40**(2) : 120.

1937. *Erythraeus*, Oudemans, *K. H. O. A. IIID*, p. 1954.

1961. *Erythraeus*, Southcott, *Aust. J. zool.*, **9** : 484.

Diagnosis : Moderately large erythraeid mites with 2 eyes on each side. Crista present. Stout conical spine present ventrally along flexor edges of palp genu and tibia. Palp tarsus pear or club shaped, overreaching the palp tibial claw. Legs without modified serrate setae.

*According to Vitzthum (1925) (Acarologische Beobachtungen Achte Nat 90A(10) : (1-86). *Bochartia* is the larval form of *Erythraeus*. He referred adults to *Erythraeus* and larvae to *Bochartia*. According to him. *Bochartia Kuypuri* is the larva of *Erythraeusd regalis*.

Type *Acarus phalangoides* de Geer, 1778

70. *Erythraeus plumosus* Khot

(Figs. 195-200)

1963. *Erythraeus plumosus* Khot, *Acarologia*, **5** : 240.

1985. *Erythraeus* plumosus, Gupta, *Handbk. Plant Mites of India*, p. 325.

1987. *Erythraeus plumosus*, Gupta & Chatterjee, In : *State Fauna Ser. 6, Fauna of Delhi*, p. 521.

Female : Khot (1963) described this as : yellowish oval, 1890 long, 715 wide, crista 520 long, extending dorsally upto middle of coxae. Anterior sensillary area with a long, tapering sensillary setae situated in the middle of the area in addition to the 7 non-sensillary setae around the sensillary setae. Posterior sensillary area with a pair of sensillary setae, 140 long; 2 pairs of eyes on either side of crista. Dorsal setae pigmented, clavate, 26 long. Ventral setae length vary between 15-39. Palp with conical spines along ventral flexor edge of palp tibiae, 3 such spurs present on palp genu. Leg I-3240, II-2700, III-3250, IV-5320. Legs covered with dense serrate setae.

Male : Unknown.

Collection Records : This mite was described on the basis of collection made in orchard and grass in Delhi.

Habitat : Orchard, grass.

Distribution : India (Delhi).

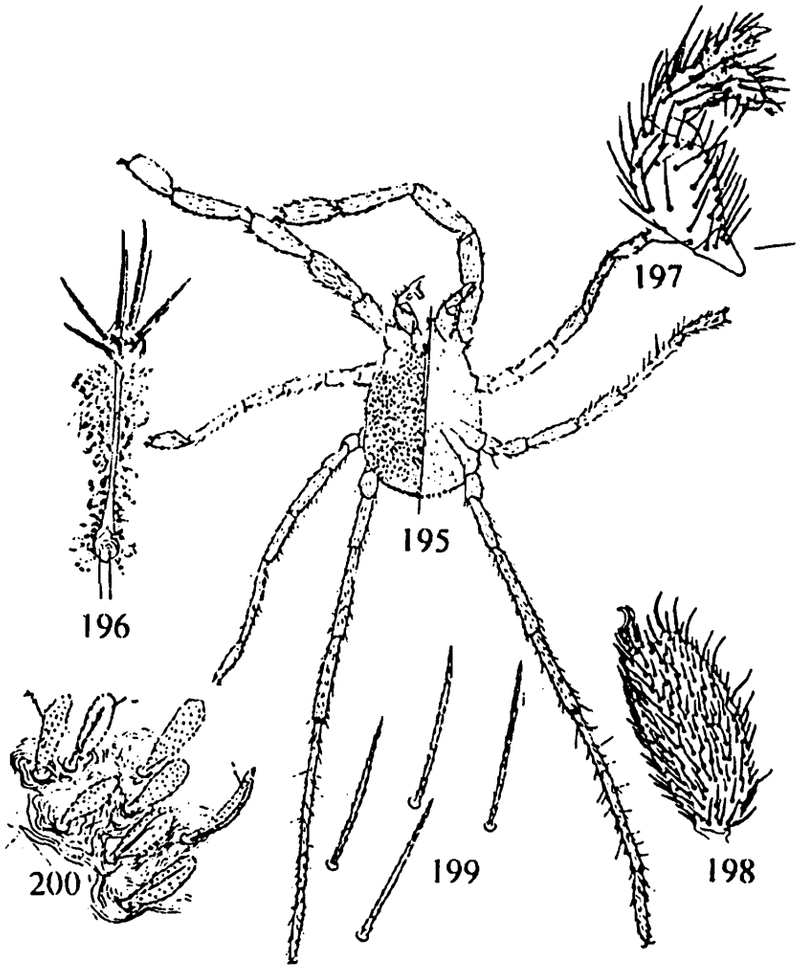
Genus 32. *Paraerythraeus* Southcott

1904. *Erythraeus* Tragardh, In : *Results of Swidish Expedition to Egypt and White Nile, 1901, Vol. I, No. 20*, p. 1-124.

1946. *Paraerythraeus* Southcott, *Proc. Linn. Soc. NSW.*, **71**(1-2) : 11.

1961. *Paraerythraeus*, Southcott, *Aust. J. zool.*, **9** : 511.

1963. *Paraerythraeus*, Khot, *Acarologia*, **5**(2) : 233.



Figs. 195-200 : *Erythraeus plumosus* Khot (female) : 195. Left half-dorsal view, right half-ventral view, 196. Crista, 197, 198. Palp, 199. Leg setae, 200. Body setae. (after Khot, 1963)

Diagnosis : Adults and nymphs with 2 eyes on each side, highly modified asymmetrically serrate setae present on legs, rows of conical spines on ventral flexor side of palp tibia distally and similarly placed on palp genu. Palp claw with single basal palp blunt tooth.

Type ***Paraerythraeus gregoryi*** Southcott, 1946

Key to the species of *Paraerythraeus* known to inhabit plants in India

1. Anterior sensillary area with 10-12 non-sensillary setae ..... *delhiensis*
— Anterior sensillary area with 3-5 nonsensillary setae ..... *serratociliatus*

71. ***Paraerythraeus delhiensis*** Khot (Figs. 201-205)

1963. *Paraerythraeus delhiensis* Khot, *Acarologia*, **5** : 234-236.

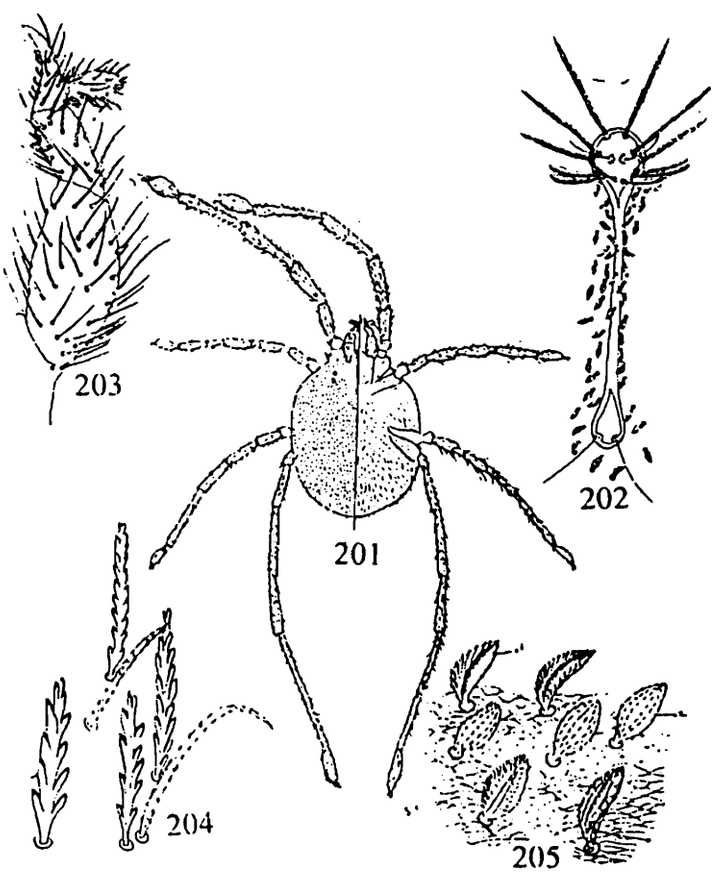
Female : Khot (1963) described this species as : Blackish mite, 3250 long, 2130 wide. Crista 910 long. Round anterior sensillary area almost on the gnathosoma, with 12 non-sensillary blunt ciliated setae, marginally placed; another pointed sensillary setae 91 long, located on middle of sensillary area. Posterior sensillary area having smooth, delicate sensorry setae, 117 long. Dorsal setae 39-52 long, with prominent black keel and small black projecting ciliations. Dorsum with reticulate striations. Eyes paired, bright red on either side. Ventral setae needle-like. Palp with 7, small, pigmented conical spines on ventral flexor edge of tibia, 6-7 conical spines present on palp genu. Palpal claw triangular with small projection at ventral base. Leg I-5380, II-4160, III-4870, IV-7570. Leg setae of two types, specialised asymmetrical serrate setae and highly setose setae. Tarsus I densely covered with setae.

Male : Unknown.

Collection Records : This mite was described basing on collection made on orchard and debris in Delhi.

Habitat : Orchard, debris.

Distribution : India (Delhi).



Figs. 201-205 : *Paraerythraeus delhiensis* Khot (female) : 201. Left half-dorsal view, right half-ventral view, 202. Crista, 203. Palp, 204. Leg setae, 205. Body setae. (after Khot, 1963)

72. *Paraerythraeus serratociliatus* Khot

1963. *Paraerythraeus serratociliatus* Khot, *Acarologia*, **5** : 236.

1985. *Paraerythraeus serratociliatus*, Gupta, *Handbk. Plant mites of India*, p. 326.

1997. *Paraerythraeus serratociliatus*, Gupta & Chatterjee, In : *State Fauna Ser. 6, Fauna of Delhi*, p. 521.

Female : Khot (1963) described this species as : Body round, deep orange coloured, 1050 long, 550 wide. Dorsal setae clavate, 190 long. Crista 870 long, anterior sensillary area roundish, situated on anterior edge of dorsum, with a pair fine sensorry setae, 105 long, in addition 3 non-sensillary setose setae, about 150 long also present. Eyes paired on either side. Palp with strong tibial claw and 3 conical spines on ventral flexor edge of palp tibia. Palp tarsus leaf shaped with pointed smooth setae. Leg I-960 long, II-930, III-770, IV-270. Specialised setae on legs blunt with rounded cup-like setations.

Male : Unknown.

Collection Records : The description of this species was made from Delhi on collection from orchard and grass.

Habitat : Orchard, grass.

Distribution : India (Delhi).

Subfamily 4 LEPTINAE Southcott

1957. Leptinae Southcott, *Rec. S. Aust. Mus.*, **13**(1) : 98.

1961. Leptinae, Southcott, *Aust. J. zool.*, **9** : 514.

1964. Leptinae, Khot, *Acarologia*, **6**(4) : 681.

Diagnosis : Erythraeid mite with 1 eye on each side alongside anterior half of crista in adult and nymph. Crista with 2 sensillary areas, anterior at the apex of the propodosoma and posterior at the posterior e..d of crista.

Type ***Leptus*** Latreille, 1796

Genus 33. ***Leptus*** Latreille

1763. *Pediculeus* (sic.) Scapoli, *K. H. O. A. II :* 386.

1976. *Leptus* Latreille, *K. H. O. A. II :* 1929.

1961. *Leptus*, Southcott, *Aust. J. zool.*, **9** : 514.

1964. *Leptus*, Khot, *Acarologia*, **6**(4) : 681.

1991. *Leptus*, Greenwood, *Entomologie*, **61** : 193.

Diagnosis : Same as given for the subfamily.

Type *Acarus phalangii* De Geer, 1778

Key to the species of *Leptus* known to inhabit plants in India

1. Crista short, extending only upto level of coxae II, eyes situated little above on midpoint on either side of crista 2

— Crista long, extending posteriorly almost upto middle of dorsum, eyes placed anteriorly just behind the anterior sensillary area 3

2. Dorsum with only a few setae .... *samsungensis*

— Dorsum with numerous setae .... *poonaensis*

3. Metatarsus longer than tarsus .... *giganticus*

— Metatarsus shorter than tarsus ....*indicus*

73. ***Leptus giganticus*** Khot

(Figs. 206-209)

1964. *Leptus giganticus* Khot, *Acarologia*, **6** : 682.

1985. *Leptus giganticus*, Gupta, *Handbk. Plant Mites of India*, p. 325.

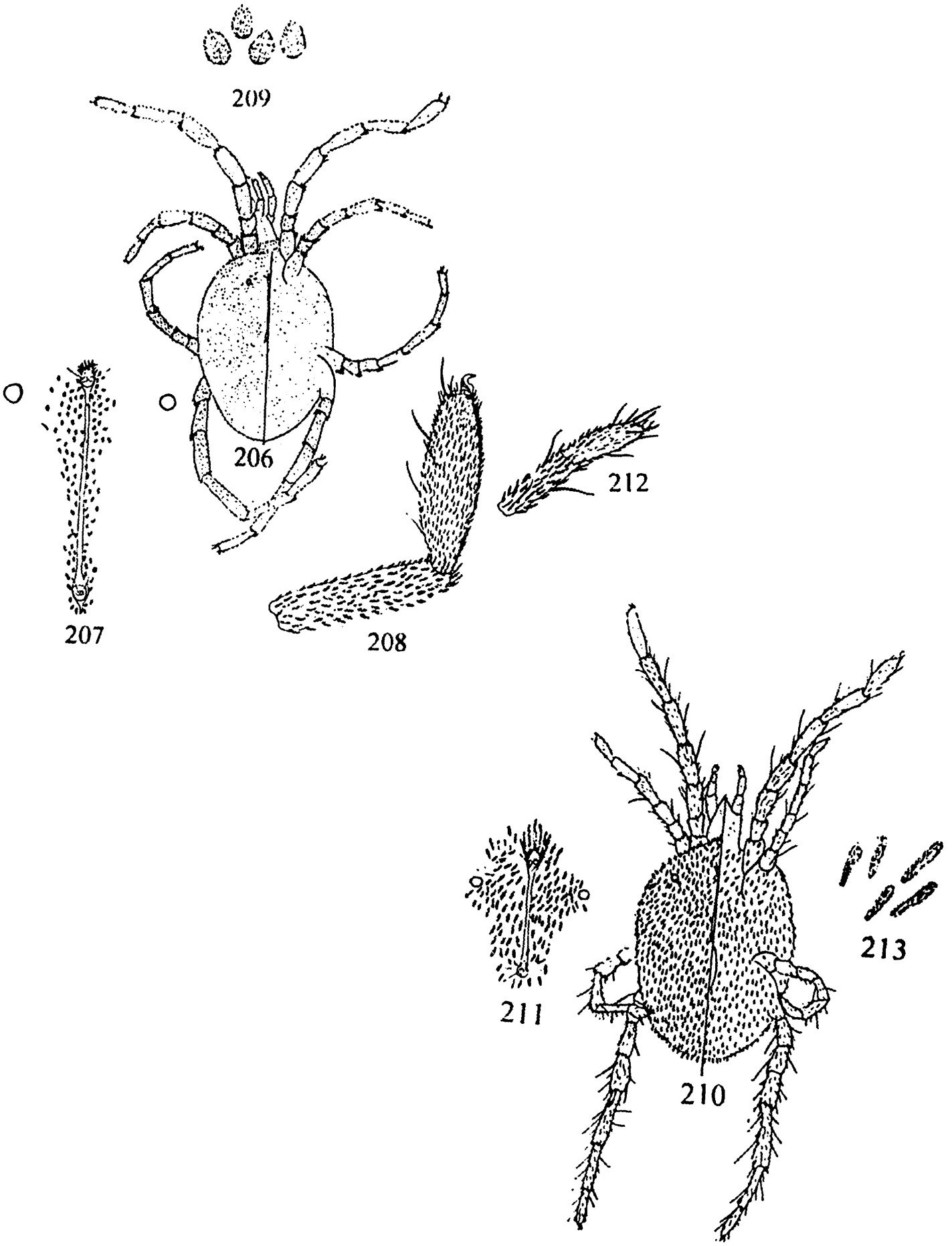
Female : Khot (1964) described this as : Blackish red mite, body oval, 3270 long, 2000 wide. Dorsal setae small, 15 long, heavily pigmented and showing 2 lid-like halves.Crista about 1000, extends beyond anterior sensillary area. Leg I-4212, II-2950, III-390, IV-300. Leg setae similar as body setae. Leg I metatarsus longer than tarsus.

Male : Unknown.

Collection Records : This mite was collected in Uttar Pradesh on citrus leaves.

Habitat : Citrus.

Distribution : India (Uttar Pradesh).



Figs. 206-213 : *Leptus giganticus* Khot (female) : 206. Left half-dorsal view, right half-ventral view, 207. Crista, 208. Palp, 209. Body setae. (after Khot, 1964); *Leptus indicus* Khot (female) : 210-Left half-dorsal view, right half-ventral view, 211. Crista, 212. Palp, 213. Body setae. (after Khot, 1964)

74. *Leptus indicus* Khot
(Figs. 210-213)

1964. *Leptus indicus* Khot, *Acarologia*, **6** : 682.

Female : Khot (1964) described this as : Body orange oval. Dorsal setae plumose, pointed. Crista 533 long, anterior sensillary area pyriform, sensory setae, 72 long, along with a few non-sensillary setae (66). Leg I-1833, II-1390, III-1340, IV-2208. Tarsus I 3 times as long as wide.

Male : Unknown.

Collection Records : This mite was collected on orchard in Delhi.

Distribution : India (Delhi).

75. *Leptus poonaensis* Khot
(Figs. 214-217)

1964. *Leptus poonaensis* Khot, *Acarologia*, **6** : 682.

1985. *Leptus poonaensis*, Gupta, *Handbk. Plant Mites of India*, p. 324-325.

Female : Khot (1964) described this species as : Orange oval mite, 1235 long, 780 wide. Dorsal setae setose, pointed, 24 long. Crista 222 long, anterior sensillary area pyriform having a pair of finely setose sensory setae and 4 densely setose non-sensillary setae. Posterior sensillary area with a pair of finely setose sensillary setae, 54 long. Eyes on either side, situated laterally midpoint of crista. Leg I-1385, II-1007, III-1104, IV-1339.

Male : Unknown.

Collection Records : This species was described from Maharashtra on collection made on fig plant.

Habitat : Fig plant.

Distribution : India (Maharashtra).

76. *Leptus samsungensis* Gupta
(Figs. 218-222)

1992. *Leptus samsungensis* Gupta, In : *State Fauna Ser. 3, Fauna of West Bengal, Part 3*, p. 122.

Female (nymph) : Body 550 blong, 270 wide. Dorsal setae 27-30 long, tapering at the tip. Crista 47 long, 22 wide, pointed posteriorly. Anterior sensory seta pyriform, serrate, 38 long, placed little above posterior tip of crista. Eyes one paired, placed at the level of leg II. Striation pattern on dorsum transverse in the region anterior to crista, longitudinal in the area lateral to crista and transverse towards posterior tip. Legs very long, transversely striated, tarsus-I-53 long with 3 claws and 3 solenidia, tarsus II-67 long, III-78 long. Length of Leg I-710, II-672, III-627.

Male : Unknown.

Collection Records : This mite was described from West Bengal collected on tea.

Habitat : Tea.

Distribution : India (West Bengal).

77. *Leptus* sp.

1995. *Leptus* sp., Dhiman & Sharma, *Annals Forestry*, 3(1) : 81-86.

Female : This undetermined species was reported preying upon a hemipteran species, *Physopelta schlanbuschi* in Uttar Pradesh, as well as on an ornamental plant in West Bengal.

Habitat : Ornamental plant.

Distribution : India (West Bengal, Uttar Pradesh).

8. Family EUPODIDAE Koch

1842. Eupodidae Koch, *Heft*, 1-40.

1934. Eupodidae,Thor, *Das Tierreich*, **71** : 541.

1960. Eupodidae, Meyer & Ryke, *S. Afr. J. Agric. Sci.*, **3** : 481.

1968. Eupodidae, Strandtmann & Tilbrook, *Br. Antarct. Sur. Bull.*, No. **17**: 15-57.

1971. Eupodidae, Strandtmann, *Pacific Insects*, **13** : 75.

1972. Eupodidae, Strandtmann & Davies, *Pacific Insects*, **14** : 50.

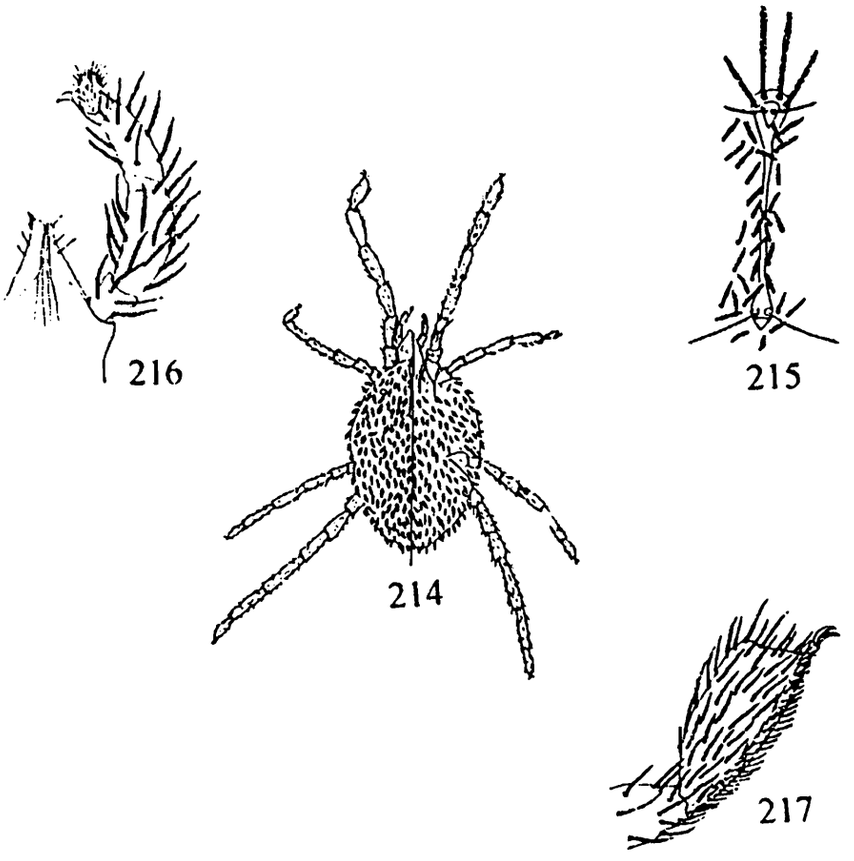
1976. Eupodidae, Coineau, *Acarologia*, **18**: 50-54.

1977. Eupodidae, Strandtmann & Prasse, *Abh. Ber. Naturkundemus Gorlitz*, **50** : 1-33.

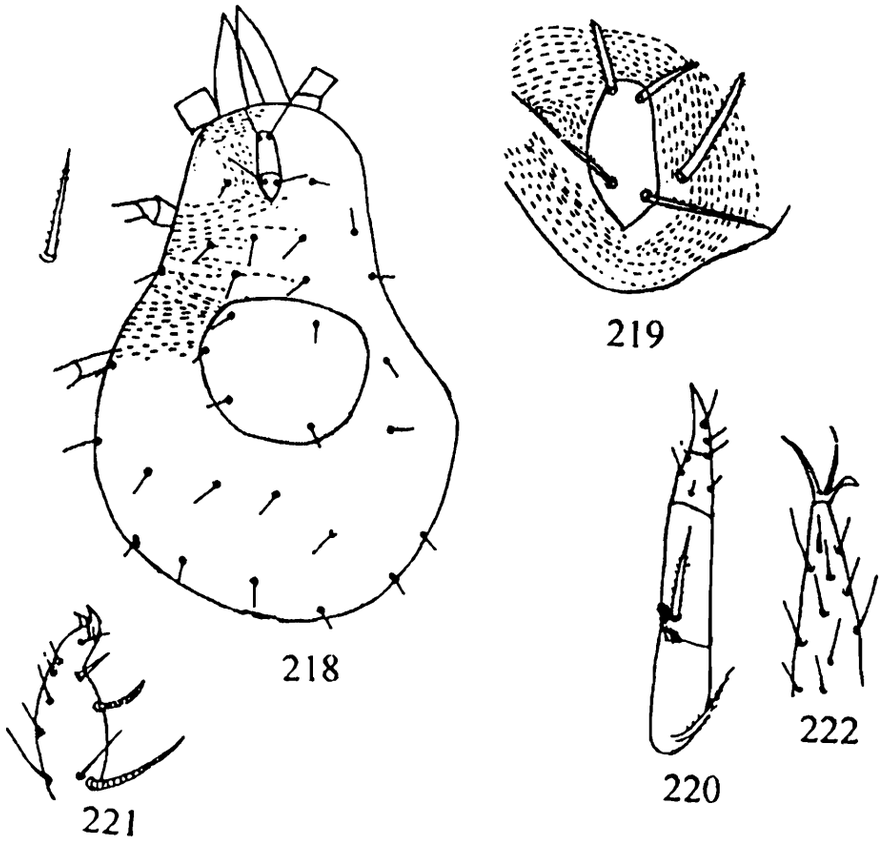
1978. Eupodidae, Strandtmann & Goff, *Pacific Insects*, **19** : 121.

1991. Eupodidae, Gupta, *Rec. zool. Surv. India*, **88** : 237.

1992. Eupodidae, Gupta, In : *State Funa Ser. 3, Fauna of West Bengal, Part 3*, p. 144.



Figs. 214-217 : *Leptus poonaensis* Khot (female) : 214. Left half-dorsal view, right half-ventral view, 215. Crista, 216., 217. Palp. (after Khot, 1964)



Figs. 218-222 : *Leptus samsungensis* Gupta (female) : 218. Dorsal view, 219. Crista, 220. Palp, 221. Tarsus of leg I, 222. Tarsus of leg III. (after Gupta, 1992)

Diagnosis : White yellow medium sized mite, pear shaped, fast moving, highly fragile. Propodosoma and hysterosoma may be separated by a suture, skin soft, finely striated, weakly haired. Eye spot present on each side of propodosoma. Pseudostigmata present with weakly differentiated sensory seta. Leg IV of *Eupodes* thicker than other legs with very thick femora. Tarsi with 2 claws and paired empodia. Palpi with 4 movable segments. Chelicera with modified chela.

Genus 34. ***Eupodes*** Koch

1842. *Eupodes* Koch, *Heft*, 1-40.
1934. *Eupodes*, Thor, *Das Tierreich*, **71** : 541.
1941. *Eupodes*, Thor & Willmann, Birlin, 1-541.
1960. *Eupodes*, Meyer & Ryke, *S. Afr. J. Agric. Sci.*, **3** : 484.
1972. *Eupodes*, Strandtmann & Davies, *Pacific Insects*, **14** : 49.
1976. *Eupodes*, Coineau, *Acarologia*, **18** : 56-64.
1978. *Eupodes*, Strandtmann & Goff, *Pacific Insects*, **19** : 123.
1991. *Eupodes*, Gupta, *Rec. zool. Surv. India*, **88** : 207-239.
1992. *Eupodes*, Gupta, In : *State Fauna Ser. 3, Fauna of West Bengal, Part 3*, p. 144.

Diagnosis : White, yellowish, reddish or black mites. Body delicate and soft. Some dorsal setae inflated basally and tapering distally. Leg IV thicker than other legs with very thick femora.

Type ***Eupodes*** Koch, 1836

78. ***Eupodes sigmoidensis*** Strandtmann & Goff (Figs. 223-228)

1978. *Eupodes sigmoidensis* Strandtmann & Goff, *Pacific Insects*, **19** : 123-124.
1992. *Eupodes sp. nr. sigmoidensis*, Gupta, In : *State Fauna Ser. 3, Fauna of West Bengal, Part 3*, p. 144.
1999. *Eupodes sigmoidensis*, Gupta & Chatterjee, *Sci. & Cult.* **65**(5-6) : 161.
In press. *Eupodes sp. nr. sigmoidensis*, Gupta, In : *State Fauna Ser. 9, Fauna of Sikkim.*
In press. *Eupodes sigmoidensis*, Gupta & Chatterjee, In : *State Fauna Ser. 11, Fauna of Mizoram.*

Female : Body 400 long, elongate, body as long as leg I. All dorsal body setae except interanl verticals, trichoboth and internal lumbers, swollen basally. Lumbers, scacrals and anals clustered at posterior margin. Seta Le-110, suture present between coxae II and III. Coxal setal formula 3, 1, 4, 3; coxal setae long, swollen basally. Two pairs of genital knobs and 2 genital flaps cover genital opening, each flap with 5 setae. Hypostome with 2 pairs of small setae, one pair mediolateral, the other apical. Cheliceral seta nude. Pedipalp with 2nd and 3rd long, fusiform; femur I and II undivided, femur IV swollen. Dorsal setae fusiform. Tarsi I and II with ragidial organ.

Male : Sperm sac reticulated.

Collection Records : In abroad, this mite was recorded on different habitats but in India, it has been recorded on mango, undetermined plant, banana, sapota in West Bengal, *Nerium*, sweet gourd, weeds, *Bougainvillea*, rubber plant in Lakshadwip island, *Bougainvillea* in Sikkim and rose in Mizoram.

Habitat : Mango, *Bougainvillea*, sapota, coconut, rubber plant, rose, banana, *Nerium*, sweet gourd, etc. Elsewhere : exposed grass, Koa forest, Metrosideros forest, Savana, volcanic desert, moss, etc.

Distribution : India (West Bengal, Mizoram, Lakshadwip Island, Sikkim).

Remarks : The food habit of this species is unknown but yet it has been included here for its frequent association with phytophagous mites. Further investigations as regards its role in phytophagous mite colonies may throw some new light.

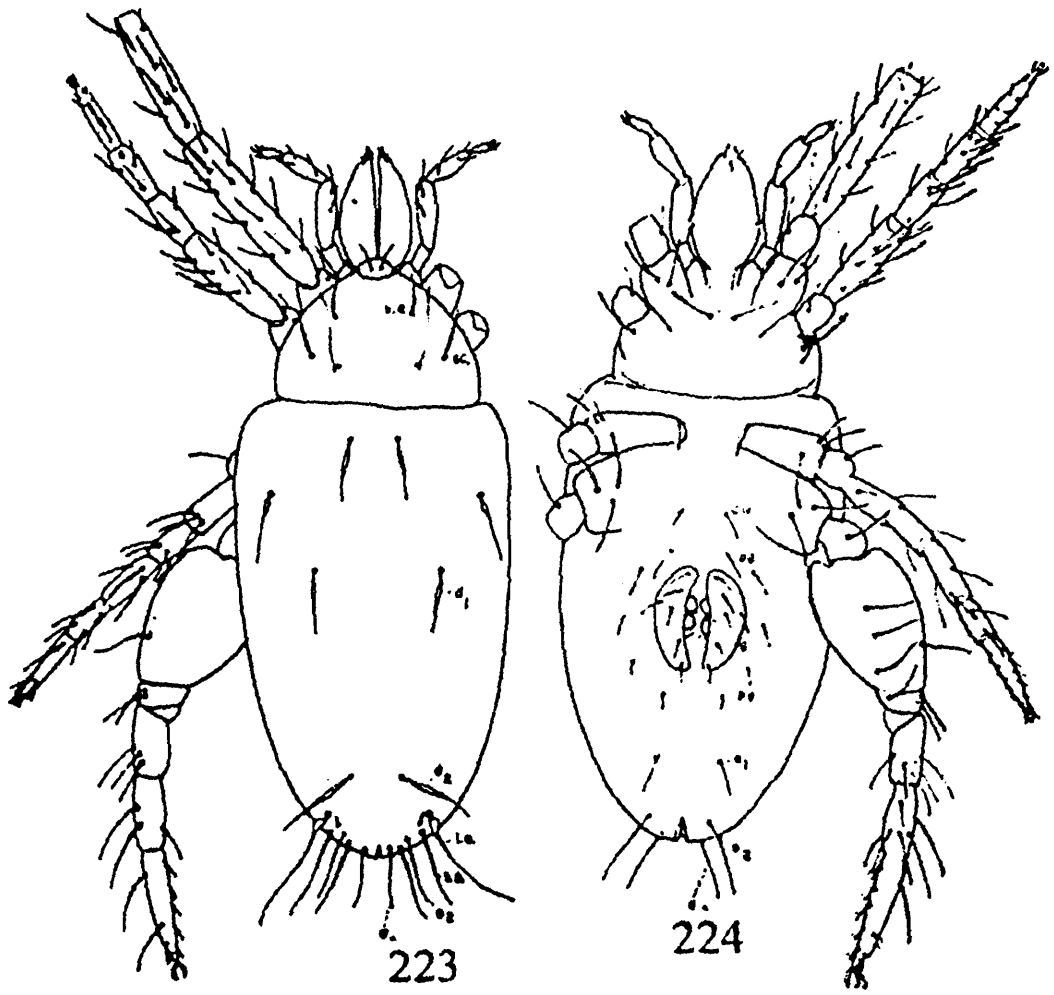
79. ***Eupodes*** spp.

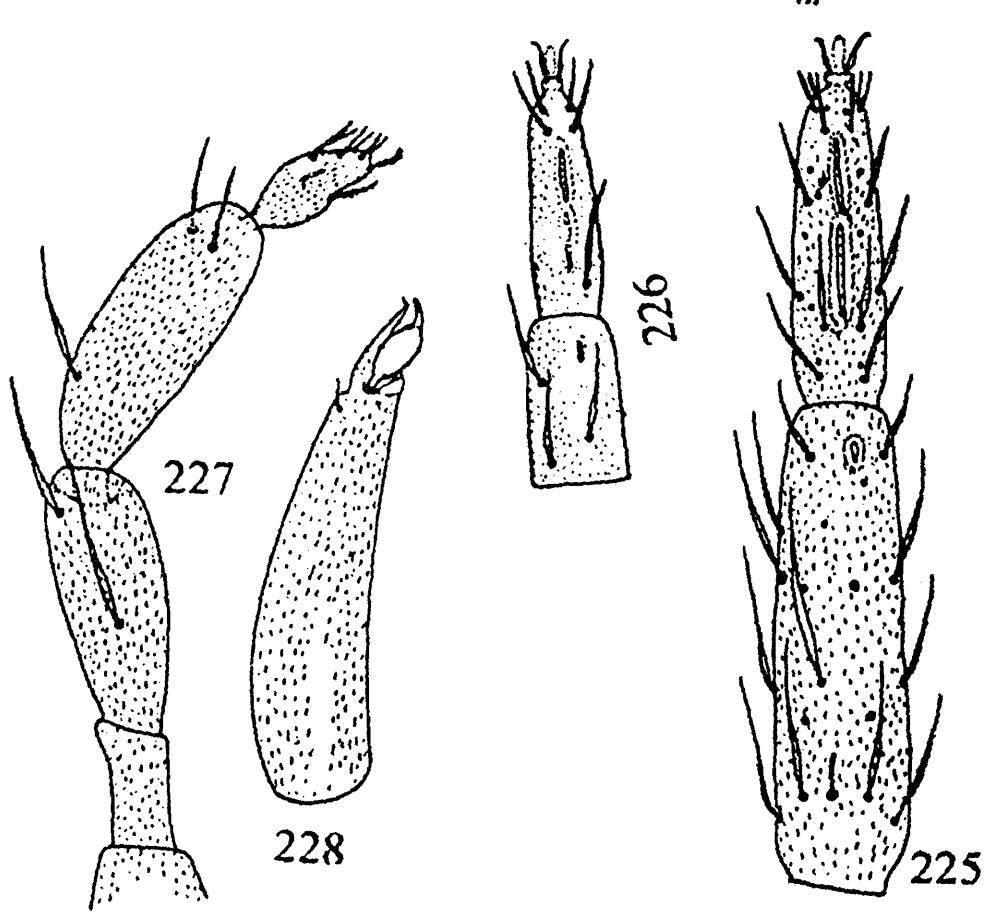
1991. *Eupodes* sp., Gupta, *Rec. zool. Surv. India*, **88** : 237.
1992. *Eupodes* sp., Gupta, In : *Contributions to Acarological Researches in India*, p. 441.
1995. *Eupodes* sp., Gupta, In : *State Fauna Ser. 4, Fauna of Meghalaya, Part 2*, p. 41.

Collection Records : Some undetermined spp. of *Eupodes* were reported by this author from Arunachal Pradesh on *Antedesma* as well as from Meghalaya on an undetermined plant.

Habitat : Antedesma, undetermined plant.

Distribution : India (Arunachal Pradesh, Meghalaya).





Figs. 223-228 : *Eupodes sigmoidensis* Strandtmann & Goff (female) : 223. Dorsal view, 224. Ventral view, 225. Tarsus and tibia of leg I, 226. Tarsus and tibia of leg II, 227. Palp, 228. Chelicera. (after Stranatmann & Goff, 1978)

9. Family RAPHIGNATHIDAE Kramer

1879. Raphignathidae Kramer, *Arch. Naturg,* **45**(Bd. 1) : 142-157.

1952. Raphignathidae, Baker & Wharton, p. 9.

1955. Raphignathidae, Cunliffe, *Proc. ent. Soc. Wash.,* **57** :209.

1957. Raphignathidae, Summers, *Proc. ent. Soc. Wash.,* **61** :85.

1959. Raphignathidae, Meyer & Ryke, *Ann. Mag. Nat. Hist.,* **2**(13):209.

1961. Raphignathidae, Athias-Henriot, *Ecole National D'Agriculture D'Alger,* **3**(1): 1.

1961. Raphignathidae, Atyeo, *et al., Acarologia,* **3**: 12-20.

1973. Raphignathidae, Meyer *et al., Ent. Mem. Dept. Agri & Tech. Serv. S. Afr.,* **29**: 14.

1979. Raphignathidae, Chaudhri *et al., Univ. Agr. Faisalabad,* p. 191.

1988. Raphignathidae, Bolland, *Ent. Ber.,* **48**: 23.

1989. Raphignathidae, Barilo, *Zool. Zh.,* **68**: 134-138.

1989. Raphignathidae, Smith-Meyer & Ueckermann, *Ent. Mem. Dept. Agriic. & Water Suppl. Repub. S. Afr.,* **74**: 50.

1990. Raphignathidae, Sepasgosarian, *Entomol. Mitt. zool. Mus. Hamburg, Bd.* **10**: 76.

1992. Raphignathidae, Gupta, *State Fauna Ser. 3, Fauna of West Bengal, Part 3,* p. 134.

1997. Raphignathidae, Gupta & Chatterjee, *State Fauna Ser. 6, Fauna of Delhi,* p. 518.

Diagnosis : Small, reddish mites, round, no suture present between propodosoma and hysterosoma. Number of shields varies. Area between shields striated. Eye 1-2 pairs. Propodosoma without sensory setae. Peritreme may enter into basal portion of chelicerae. Palp tarsus moderately long, located ventrally, each tarsus with 2 claws. and rayed pulvillus. Chela stylet-like for piercing purpose, tarsi I and II with single sensory organ. Coxae either contiguous or separated into groups. Genital suckers absent. Anal opening posterior or posterodorsal. Majority are predators, feed on eggs.

Type ***Raphignathus*** Koch, 1838

Key to the genera of RAPHIGNATHIDAE known to occur on plants in India

1. Dorsal propodosoma with median plate bearing setae ae, be, a and a pair of lateral plates bearing setae ce, de, he, dorsal hysterosoma with 4 pairs of dorsomedian setae (b, c, d, e), mostly simple, not borne of tubercles and 2 pairs of posterolateral setae ..... *Raphignathus*

— Dorsal idiosoma entirely covered by a thin skeletal sheath, not clearly subdivided into discrete plates, dorsal body setae mostly long, thick and borne on tubercles, humeral setae displaced upward ..... *Exothorhis*

Genus 35. ***Exothorhis*** Summers

1960. *Exothorhis* Summers, *Fla. Ent.,* **43**: 131.

1985. *Exothorhis,* Sepasgosarian, *Z. Angew. zool.,* **72**: 441.

Diagnosis : Dorsal idiosoma entirely covered by a thin skeletal sheath not subdivided into discrete plates. Dorsal body setae and dorsals of proximal leg segments stout, closely denticulate, all originate on tubercles. Setae he displaced upward from pleural position. Tibial claw of palp reduced.

Type ***Exothorhis caudata*** Summers, 1960

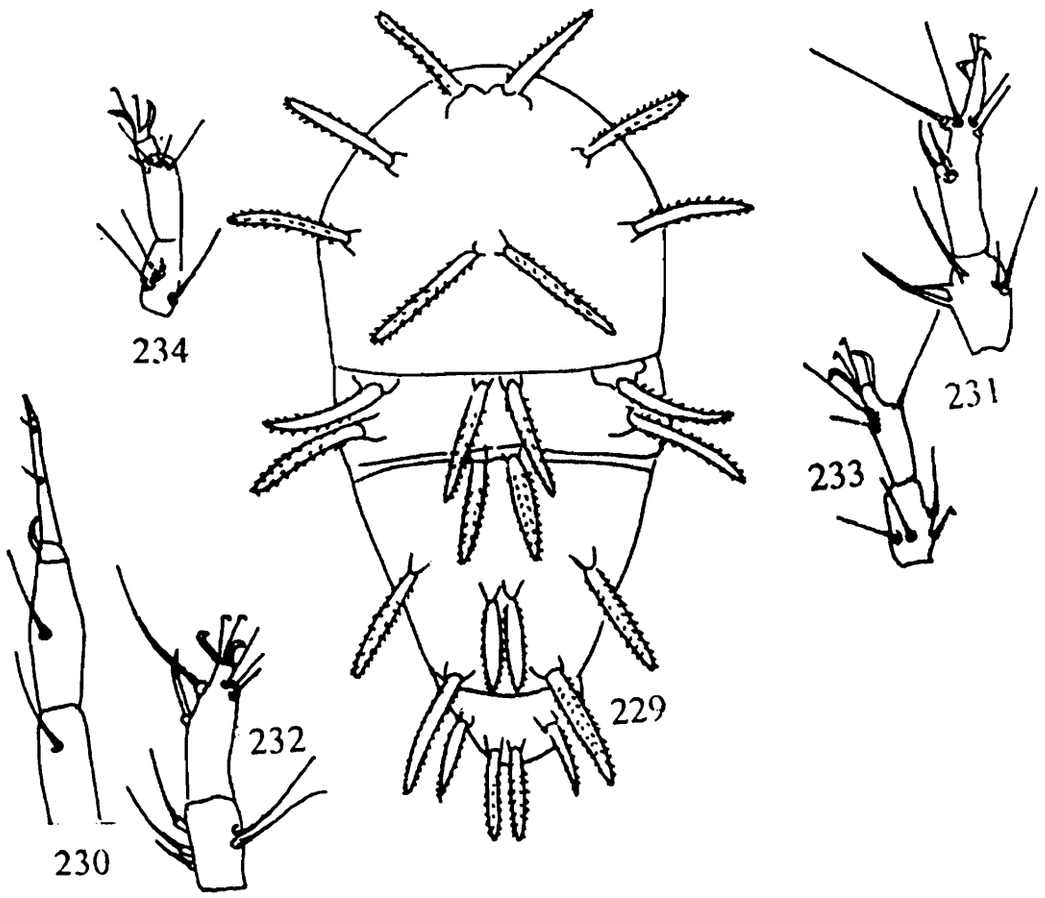
80. ***Exothorhis nadiaensis*** Chatterjee & Gupta, sp. nov.

(Figs. 229-234)

Male : Dorsum : body length including chelicera 434, width 166. Palp 118 long. Palp chaetotaxy : femur–1, genu–1, tibia-strong claw. Chelicera with needle-like stylets. Peritreme hooked. Most body setae long, thick, plumose. Chaetotaxy of propodosomal shield : ae–42, be–56, de–57, ce–47, transverse striation present between propodosoma and hysterosoma; 7 pairs of setae present on metapodosoma, a–50, b–52, lm–52, c–47, d-broken, e–64, le–33. Region beyond metapodosomal shield transversely striated. Ocular body round. Genital plate with 5 pairs of setae; paragenital setae 2 pairs, anal setae 2 pairs. Legs 4 pairs, 2 pairs directed anteriorly, 2 pairs directed posteriorly. Measurements of legs : I–232, II–190, III–142, IV–142. Measurements of tibia I–IV : 59, 59, 33, 35, respectively.

Female : Unknown.

Holotype : Male, India : West Bengal, Nadia Dist., Kalyani, ex *Psidium guajava,* 19.8.1995.



Figs. 229-234 : *Exothorhis nadiaensis* Chatterjee & Gupta sp. nov. (female) : 229. Dorsal view, 230. Palp, 231. Distal segments of leg I, 232. Distal segments of leg II, 233. Distal segments of leg III, 234. Distal segments of leg IV.

Remarks : This new species is close to *Exothorhis costatus* (Chaudhri *et al.*, 1979) but differs in relative length of dorsal setae, in chaetotactic pattern of leg segments in striation pattern of stylophore as well as of dorsum.

Genus 36. ***Raphignathus*** Duges

1834. *Raphignathus* Duges, *Ann. des. Science nat. 29 serie zool.* **2** : 42.

1842. *Raphignathus* Koch, *Heft*, 1-40.

1887. *Raphignathus*, Berlese, In : *Italian Reperta Ordoprostigmata Patavii.*

1906. *Raphignathus*, Oudemans, *Ent. Ber. No. 27 : Deel* **II** : 41.

1922. *Raphignathus*, Oudemans, *Ent. Ber. Ned. Ent. Ver.* **127** : 110.

1926. *Raphignathus*, Hirst., *J. Med. Res.*, **13** : 1023.

1959. *Raphignathus*, Meyer, Ryke, *Ann. Mag. Nat. Hist.*, **13**(2) : 209.

1963. *Raphignathus*, Atyeo, *J. Kasas Ent. Soc.*, **36** : 172.

1979. *Raphignathus*, Chaudhri *et al.*, *Univ. Agri. Faisalabad*, 193.

1985. *Raphignathus*, Sepasgosarian, *Z. Anz. zool.*, **72** : 442.

1988. *Raphignathus*, Bolland, *Ent. Ber.*, **48** : 23-26.

1989. *Raphignathus*, Barilo, *Zool. Zh.*, **68** : 134-138.

1989. *Raphignathus*, Smith-Meyer & Ueckermann, *Ent. Mem. Dept. Agri. & Water Suppl. Repub. S. Afr.*, **74** : 1-58.

1993. *Raphignathus*, Qinghai & Longshu, *Jour. Fujian Agri. Univ. (NS)* **22**(3) : 321.

Type ***Raphignathus ruberrimus*** Duges, 1834

Diagnosis : Chaudhri *et al.*, (1979) diagnosed this genus as : Stylophore with striation. Palp 5 segmented, with ventrally directed tarsus. Palp chaetotaxy : trochanter nil, femur-3 tactile setae, genu-2 tactile setae, tibia-3 tactile setae, dorsomedian claw present, tarsus-4 tactile setae arranged in irregular whorl, dorsomedian eupathid, 4 terminal eupathids. Doral propodosoma with one pair of eyes and 6 pairs of setae, median plate with ae, be, a and lateral plate with ce, de, he. Dorsal hysterosoma with 4 pairs of dorsomedian setae (b, c, d, e) and 2 pairs of postlateral setae.

Anus terminal, anal plate bears 3 pairs of setae. Legs 7 segmented, pretarsus with 2 small, unadorned claws with paired tenent hairs.

Key to the species of *Raphignathus* known to inhabit plants in India

1. Tarsus I-IV with spurs, median plate truncated ..... *guajavae*
— Tarsus III and IV lack spurs, median plate tapering ..... *darjeelingensis*

81. ***Raphignathus darjeelingensis*** Chatterjee & Gupta sp. nov. (Figs. 235-241)

Female : Idlosoma 284 long (upto gnathosoma) 159 wide, propodosoma covered with 3 plates, shaped as figured, median plate elongated, 48 long, posterior tip tapering, bearing 3 pairs of setae, anteriormost-29 long, median one-36 long, posterior one 36 long, lateral plates 53 long, each with 3 setae. Striation pattern longitudinal in between median and lateral plates. Hysterosoma appears to be without any plate, finely reticulated, 4 pairs of mediodorsal setae borne on rounded plates, which are round or oval, 1st hysterosomal-28 long, 2nd-35 long, 3rd-36 long, 4th-32; 3 pairs of post hysterosomal setae of unequal length present. One pair of setae present on either side of anal plate and a pair of paragenital setae present. Leg I-296 long, II-235, III-237, IV-270. Chaetotaxy of tibia and tarsus of legs I-IV as illustrated. Tarsus of legs I and II with strong spurs. Tarsus of III and IV without such spurs. Genu-3 setae, tibia-3 setae, tarsus-6 setae.

Male : Unknown.

Holotype : Female, India : West Bengal, Darjeeling, ex *Croton* sp., 28.9.1996.

Remarks : This new species can be differented from *Raphignathus guajavae* Gupta (1992) due to absence of spurs on tarsus III and IV and from *Raphignathus ethiopica* (Meyer & Ryke, 1959) in shape of median propodosomal plate, in striation pattern of hysterosoma, in leg chaetotaxy and in having only 2 pairs of setae around anal region.

82. ***Raphignathus guajavae*** (Gupta) (Figs. 242-247)

1992. *Acheles guajavae* Gupta, In : *State Fauna Ser. 3, Fauna of West Bengal, Part 3,* p. 134-135.

Female : Idiosoma 347 long (upto rostrum), 190 wide. Propodosoma covered with 3 plates. The median plate rounded posteriorly, having 3 pairs of setae, anteriormost being the longest, 29 long and the posteriormost being the shortest, 13 long. Median plate lightly striated longitudinally. Each lateral plate with 3 setae, almost of same length. Striation pattern oblique in between the plates. Hysterosome with 9 pairs of setae of which anterior 6 pairs on small plates, setae of diverse length, of which last 2 being longest, measuring 31 and 24, respectively. Anterior dorsal seta do not touch the base of setae next in line. Leg chaetotaxy in respect of tarsus and tibia I-IV as illustrated. Each tarsus with a thick solenidion dorsally and a pair of claws.

Male : Unknown.

Collection Records : This species was described from West Bengal, collected on guava.

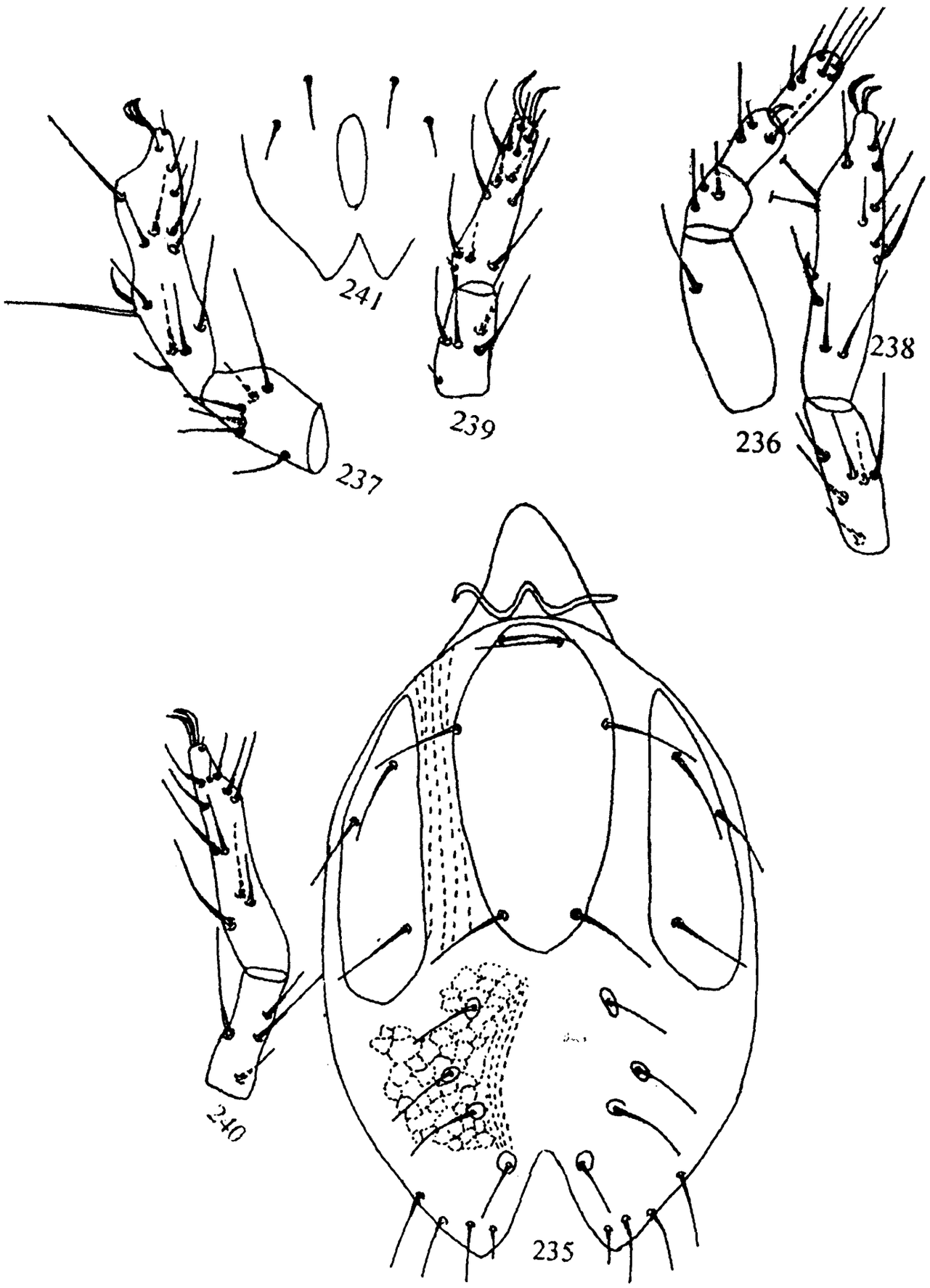
Habitat : Guava.

Distribution : India (West Bengal).

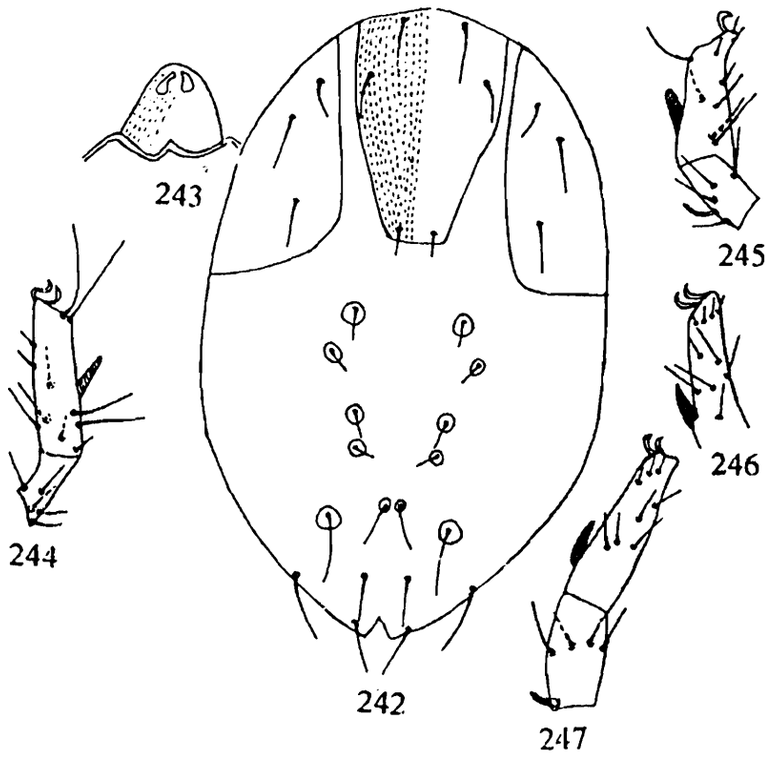
Remarks : Originally this species was put under *Acheles* but now it is being transferred to *Raphignathus,* which is more appropriate.

10. Family STIGMAEIDAE Oudemans

1931. Stigmaeidae Oudemans, *Ent. Ber.,* 7(158) : 252.
1962. Stigmaeidae, Summers, *Hilgardia,* **33** : 491.
1964. Stigmaeidae, Wood, *N. Z. J. Sci.,* **7** : 579.
1965. Stigmaeidae, Gonzalez-Rodriguez, *Univ. Calif. Pub. Ent.,* **41** : 1.
1965. Stigmaeidae, Chaudhri, *Acarologia,* **7** : 467.
1966. Stigmaeidae, Summers, *Acarologia,* **8** : 230.
1968. Stigmaeidae, Wood, *N. Z. J. Sci.,* **11** : 277-279.
1969. Stigmaeidae, Meyer, *Acarologia,* **11** : 207.
1972. Stigmaeidae, Wood, *Acarologia,* **13** : 301.
1974. Stigmaeidae, Wood, *Acarologia,* **16** : 62.
1978. Stigmaeidae, Wainstein, *Akad. Nauk. SSSR., Ins. Evol. Morph. Eko Zhiv. Im. A. N. Serv. zool. Inst.,* **7485** : 1.



Figs. 235-241 : *Raphignathus darjeelingensis* Chatterjee & Gupta sp. nov. (female) : 235. Dorsal view, 236. Palp, 237. Distal segments of leg I, 238. Distal segments of leg II, 239. Distal segments of leg III, 240. Distal segments of leg IV, 241. Venter.



Figs. 242-247 : *Raphignathus guajavae* (Gupta) (female) : 242. Dorsal view, 243. Gnathosoma, 244. Distal segments of leg I, 245. Distal segments of leg II, 246. Distal segments of leg III, 247. Distal segments of leg IV. (after Gupta, 1992)

1985. Stigmaeidae, Gupta, *Handbk. Plant Plant Mites of India,* p. 301.

1985. Stigmaeidae, Sepasgosarian, *Z. Angew. zool.*, **72** : 440.

1987. Stigmaeidae, Ueckermann & Smith-Meyer, *Phytophylactica,* **19** : 371.

1989. Stigmaeidae, Barilo, *zool. Zh.*, **68** : 134-138.

1990. Stigmaeidae, Cheng-ye & Lairong, *Acta Entomologica Sinica,* **15** : 461-462.

1990. Stigmaeidae, Lairong & Cheng-ye, *Entomotaxonomica,* **9** : 307-311.

1990. Stigmaeidae, Sepasgosarian, *Ent. Mtt. zool. Mus. Hamburg,* **10 NR. 139/140** : 75.

1992. Stigmaeidae, Hu-siquin-Chen-Xiwen, *Jour. Jiangxi Univ.,* **16** : 108-110.

1992. Stigmaeidae, Gupta, In : *State Fauna Ser. 3, Fauna of West Bengal, Part 3,* p. 117.

1994. Stigmaeidae, Hu Siquen *et al., Acta Arachnologica Sinica,* **3** : 91-93.

1994. Stigmaeidae, Hu Siquin & Chen Xiwen, *Acta Arachnologica Sinica,* **3** : 1-4.

1997. Stigmaeidae, Gupta & Chatterjee, In : *State Fauna Ser. 6, Fauna of Delhi,* p. 517.

Type ***Stigmaeus*** Koch, 1836

Diagnosis : According to Ueckermann & Smith-Meyer (1987), the members of this family can be distinguished by absence of peritreme, podocephalic canal may lead from base of gnathosoma to coxae II; dorsum of idiosoma nude or completely covered by 2 shields or partly covered by 2 or more shields; dorsal body setae vary from 13-14 pairs. Chelicerae free, may be partly fused in some genera; palpal thumb claw complex present and consisting of tibial claw, with a seta like or claw like accessory claw at the base and a palp tarsus; terminal eupathidium on palp tarsus may be in the form of simple spine or bidentate. Single pair of anogenital plate covering the genital and anal vestibule.

Type ***Stigmaeus*** Koch, 1836

Key to the genera of STIGMAEIDAE known to occur on palnts in India

1. Idiosoma fusiform, propodosomal plate restricted to a small area carrying 2 pairs of setae, terminal sensillum a spikelet ..... *Eryngiopus*

— Idiosoma broadly oval, propodosomal plate covers most of the dorsal region, carries 3 or 4 pairs of setae, terminal sensillum of palp tarsus usually a single trifid process 2

2. Propodosomal plate carries 3 pairs of setae, dorsum of hysterosoma partly covered by one or more plates at least two of which are paired sclerites, chelicerae not fused 3

— Propodosomal plate carries 4 pairs of setae, hysterosoma covered by one or more unpaired plates, if 3 pairs of setae occur on propodosomal plate, then he seta borne on small paired plates and a single pair of subcapitular seta present, chelicerae sometimes fused 4

3. Dorsal setae ba borne on median plate proper, this plate also carries a, b, c, lm .... *Agistemus*

— Dorsal seta la borne on small independent plates median plate carries 4 pairs of setae .... *Zetzellia*

4. Chelicera adnate, with septum persisting, dorsal plate do not overlap into venter .... *Cheylostigmaeus*

— Chelicera not fused, dorsal plates may overlap into venter into intercoxal region 5

5. Hysterosoma with one extensive plate carrying 6 pairs of setae, palp tarsus with a bifid process ..... *Ledermuelleria*

— Entire dorsum covered by a single plate carrying 11 pairs of setae, palp tarsus with a bifid process ..... *Indostigmaeus*

Genus 37. *Agistemus* Summers

1927. *Zetzellia* Oudemans, Ent. *Ber. Amst.*, 7(158) : 263 (in part).

1960. *Agistemus* Summers, *Proc. ent. Soc. Wash.*, **62** : 234.

1965. *Agistemus*, Gonzalez-Rodriguez, *Univ. Calif. Pub. Ent.*, **41** : 24.

1966. *Agistemus*, Summers, *Acarologia*, **8**(2) : 240 (in part).

1967. *Zetzellia*, Wood, *Trans. Roy. Soc. N. Z.*, **9**(9) : 125.

1969. *Agistemus*, Meyer, *Acarologia*, **11**(2) : 256.

1982. *Zetzellia*, Tseng, *Phytopathologist & Entomologist of National Taiwan University*, **9** : 5 (in part).

1984. *Agistemus*, Bolland & Ueckermann, *Phytophylactica*, **16** : 201.

1985. *Agistemus*, Sepasgosarian, *Z. Angew. zool.*, **72** : 440.

1985. *Agistemus*, Chaudhri & Akbar, *Univ. Agri. Faisalabad*, p. 262.

1987. *Agistemus*, Ueckermann & Smith-Meyer, *Phytophylactica*, **19** : 381.

1992. *Agistemus*, Gupta, In : *State Fauna Ser. 3, Fauna of West Bengal, Part 3*, p. 117.

1994. *Agistemus*, Siqin & Xiwen, *Acta Arachnologica Sinica*, **3**(1) : 1.

1997. *Agistemus*, Gupta & Chatterjee, In : *State Fauna Ser. 6, Fauna of Delhi*, p. 517.

Diagnosis : Gonzalez-Rodriguez, (1965) defined this genus as : 3 unpaired plates present, *viz.* propodosomal, median and suranal, cover most of dorsum. Two paires of paired plates, *viz.* humerals and intercalaries. Main plates plain or reticulate, propodosomal plate carries setae, ae, be, ce. Median plate usually entire with 5 pairs of setae a, b, c, la, lm. Two pairs of setae on suranal plate, a central e and lateral le. Humeral and intercalary with one seta each. One pair of eyes, one pair of ocular bodies, situated between eyes and setae ce. Palp tibia with long primary claw, longer than half of palp tarsus, accessory claw about 1/2 of palp tarsus. Terminal sensillum a trifid process. Subcapitular setae 2 pairs, m and n; 4 pairs of setae present on anogenital plate; 2 pairs of paragenital setae on independent platelets., Palp chaetotaxy : coxa-1, femur-3, genu-1, tibia-2, tarsus-6.

Type ***Caligonus terminalis*** Quayle, 1912

Key to the speices of *Agistemus* known to occur on plants in India*

1. Propodosomal plate reticulate 2

— Propodosomal plate not reticulate 5

2. Ratio of setae ae/ae-ae more than 2 3

— Ratio of setae ae/ae-ae less than 2 .... ***heterophylla***

3. Ratio of setae ae/ae-ae more than 3.... ***gamblei***

— Ratio of setae ae/ae-ae less than 3 4

(**herbarius* and *inflatus* not included for want of material literature)

4. Reticulation pattern of hysterosomal plate 2-14 cells in median longitudinal row ..... *fleschneri*
— Reticulation not as above ..... *lakoocha*
5. Ratio of setae ae/ae-ae is 1.5 or more 9
— Ratio of setae ae/ae-ae less than 1.5 6
6. Ratio of setae ae/ae-ae less than 1 ..... *hystrix*
— Ratio of setae ae/ae-ae 1 or more than 1 7
7. Seta la and a almost equal 8
— Seta la considerably longer than a ..... *edulis*
8. Seta lm around 37 long ..... *terminalis*
— Seta lm about 2 times of 37 ..... *javanicum*
9. All dorsal setae longitudinally barbed 10
— Dorsal setae not barbed 13
10. Seta le longer than e ..... *obscura*
— Seta le shorter than e 11
11. Seta le only slightly shorter than e .... *unguiparvus*
— Seta le reasonably shorter than e 12
12. Seta a/a-a less than 1 ..... *simplex*
— Seta a/a-a more than 1 ..... *industani*
13. Postocular body very large, almost touching be and ce ..... *macrommatus*
— Postocular body never so large 14
14. Setae ae and be almost of same length .... *exsertus*
— Seta ae shorter than be 15
15. Setae c and la almost of same length .... *aramatai*
— Seta c longer than la ..... *garrulus*

83. *Agistemus aramatai* Gupta
(Figs. 248-250)

1991. *Agistemus aramatai* Gupta, *Rec. zool. Surv. India*, **88** : 210.

Female : Body 408 long, 256 wide. Propodosomal and hysterosomal plates smooth with 3 pairs of setae on the former and 5 pairs on the latter, all setae weakly barbed. Seta ae > ae-be, be ≥ be-be, ae/ae-ae = 1.5, a-la-67, ae-44, be-67, ce-49, c-53, lm-44, seta la nearer to la than to lm. Palp tibial claw of same length as that of palp tarsus. $P_{g_1} > P_{g_2}$, $g_1 = g_3$, $g_2 = g_4$. Chaetotaxy of legs in respect of femur, genu, tibia, tarsus are : I-5, 3, 6, 12; II-4, 1, 6, 10; III-2, ?, 6, ?, IV-2, 0, 6, ? Post ocular body distinct.

Male : Unknown.

Collection Records : This species was described from Arunachal Pradesh collected on *Castanopsis armata.*

Habitat : Castanopsis aramata.

Distribution : India (Arunachal Pradesh).

84. *Agistemus edulis* Gupta
(Figs. 251)

1991. *Agistemus edulis* Gupta, *Rec. zool. Surv. India*, **88** : 218.

Male : Propodosomal and hysterosomal plates distinct, with 3 pairs of setae on the former and 5 pairs of setae on the latter. Measurements of setae : ae-44, be-78, ce-62, a-56, b-62, c-67, la-67, ae-ae-31, ae-be-26, a-b-67, width of postocular body much less than distance between be-ce. Striation transverse between anterior propodosomal and posterior hysterosomal shields. Leg chaetotaxy not discernible.

Female : Unknown.

Collection Records : This mite was described from Arunachal Pradesh collected on *Macheles edules.*

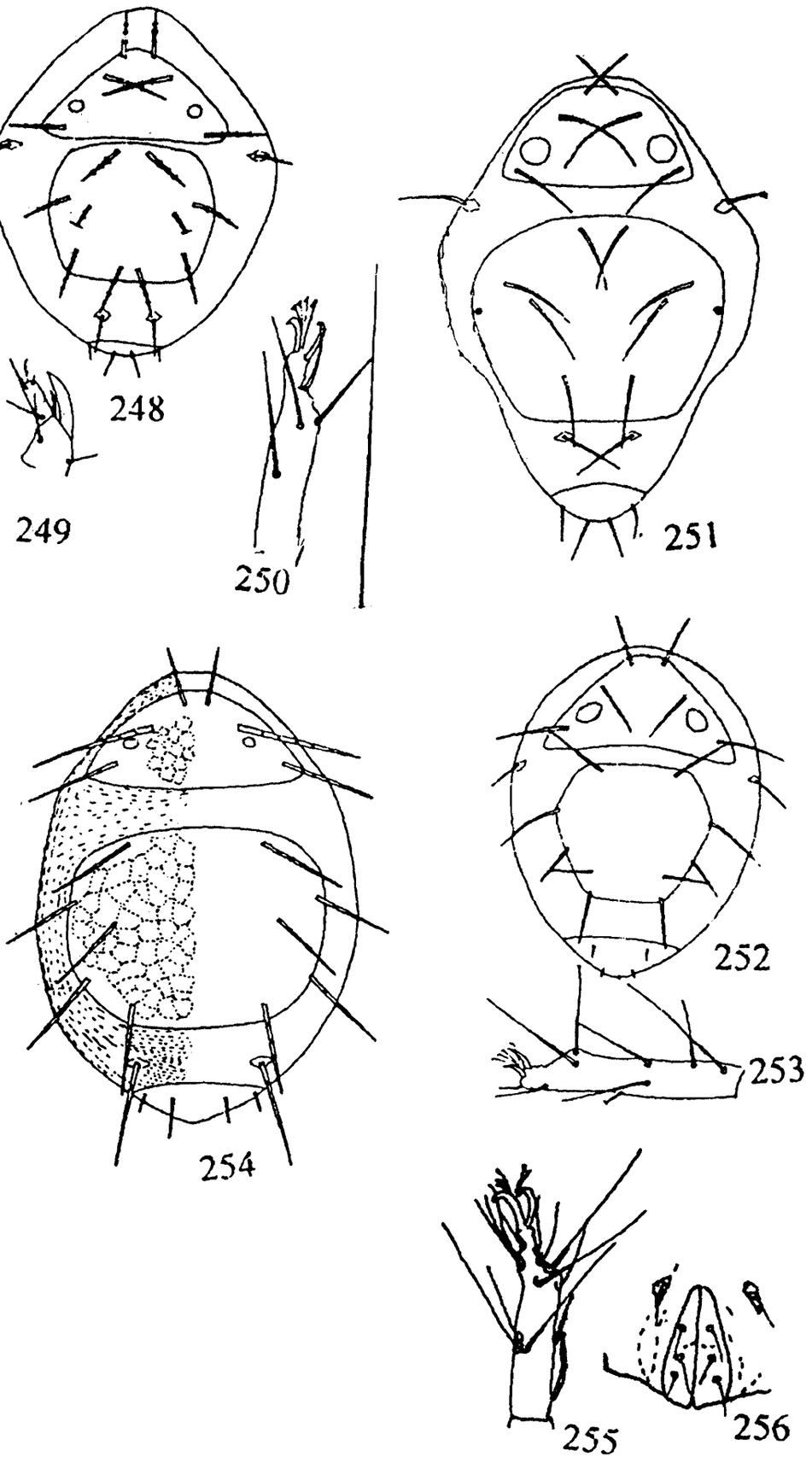
Habitat : Macheles edules.

Distribution : India (Arunachal Pradesh).

85. *Agistemus exsertus* Gonzalez-Rodriguez
(Figs. 252-253)

1963. *Agistemus exsertus* Gonzalez-Rodriguez, *Acarologia*, **2** : 343-344.

1965. *Agistemus exsertus*, Gonzalez-Rodriguez, *Univ. Calif. Pub. Ent.*, **41** : 38.



Figs. 248-256 : *Agistemus aramatai* Gupta (female) : 248. Dorsal view, 249. Distal segments of palp, 250. Distal segments of leg I. (after Gupta, 1991); *Agistemus edulis* Gupta (male) : Dorsal view. (after Gupta, 1991); *Agistemus exsertus* Gonzalez-Rodriguez (female) : 252. Dorsal view, 253. Distal segments of leg I. (after Gupta, 1991); *Agistemus fleschneri* Summers : 254. Dorsal view of female, 255. Tarsus I of female, 256. Opisthosomal region of male. (after Gonzalez-Rodriguez, 1965)

1990. *Agistemus exsertus*, Sepasgosarian, *Ent. Mitt. Zool. Mus., Hamburg*, Bd. **10** : 81.

1991. *Agistemus exsertus*, Gupta, *Rec. zool. Surv. India*, **88** : 214-215.

1992. *Agistemus exsertus*, Gupta, In : *Contributions to Acarological Researches in India*, p. 439.

1999. *Agistemus exsertus*, Gupta & Chatterjee, *Sci. & Cult.*, **65**(5-6) : 161.

In press. *Agistemus exsertus*, Gupta & Chatterjee, In : *State Fauna Ser. 11, Fauna of Mizoram.*

Female : Body 465 long, 360 wide. Propodosomal and median plate with 3 and 5 pairs of setae, respectively. Dorsal setae nude, on tubercles, setae measure : ae-49, be-47, ce-53, ae-ae-31, ae-be-26, be-ce-40, a-53, b-34, c-51, la-56, lm-34, a-a-53, he-38, a/a-a = 1.5, c/c-c = 2.1. Postocular body distinct, P_{g_1}. shorter than $P_{g_1}-P_{g_2}$. Tip of palp tarsus extends to genu-tibial joint of leg I; tibia II with dorsolateral setae barbed; dorsalmost seta of tarsus I approximately 1.5 times as long as mesal one.

Male : As in female. Setal ratios differ.

Collection Records : This species was described from Japan on citrus feeding upon *Panonychus citri.* In India, it has been recorded on *Butea almoides* in Arunachal Pradesh; on undetermined weed in Assam, on brinjal and sword bean in Lakshadwip and on *Schema edulis* in Mizoram.

Habitat : India : *Butea almoides,* undetermined weed, brinjal, sword beans, *Schema edulis.* Elsewhere : Citrus.

Distribution : India (Arunachal Pradesh, Assam, Mizoram, Lakshadwip) Japan.

Remarks : In Japan, this has been reported to feed upon *Panonychus citri* on Citrus.

86. ***Agistemus fleschneri*** Summers
(Figs. 254-256)

1960. *Agistemus fleschneri* Summers, *Proc. ent. Soc. Wash.*, **62** : 237-240.

1965. *Agistemus fleschneri*, Gonzalez-Rodriguez, *Univ. Calif. Pub. Ent.*, **41** : 30-31.

1980. *Agistemus fleschneri*, Gupta & Ghosh, *Rec. zool. Surv. India*, **77** : 204.

1991. *Agistemus fleschneri*, Gupta, *Rec. zool. Surv. India*, **88** : 209-210.

1992. *Agistemus fleschneri*, Gupta, In : *Contributions to Acarological Researches in India*, p. 439.

1992. *Agistemus fleschneri*, Gupta, In : *State Fauna Ser. 3, Fauna of West Bengal, Part 3*, p. 117-118.

1995. *Agistemus fleschneri*, Gupta, In : *State Fauna Ser. 4, Fauna of Meghalaya, Part 2*, p. 42.

1995. *Agistemus fleschneri*, Mathur & Mathur, *Abst. V Nat. Symp. Acarology*, p. 14.

1996. *Agistemus fleschneri*, Chatterjee & Gupta, *J. Beng. Nat. Hist. Soc., NS* **15**(2) : 26.

1997. *Agistemus fleschneri*, Gupta & Chatterjee, In : *State Fauna Ser. 6, Fauna of Delhi*, p. 517.

2000. *Agistemus fleschneri*, Gupta, In : *State Fauna Ser. 7, Fauna of Tripura, part 2*, p. 18.

In press. *Agistemus fleschneri*, Gupta, In : *State Fauna Ser. 9, Fauna of Sikkim.*

Female : Body 365 long, 170 wide. Dorsal propodosomal plate with polygonal reticulations, reticulation on median plate with not less than 12 cells between successive dorsocentral setae,the plate covers 2/3 of hysterosoma. Measurements of setae : ae-44, ae/ae-ae-2.5, be-69, be/be-be-2.00, ce-60, ce-ce-61, a-50, a/a-a-0.73, la-47, b-46, lm-52, c-52, li-56, e-33, le-13. Palp extends upto genu-tibial joints of leg I. Leg moderately long with smooth setae, dorsal setae weakly barbed. Postocular body inconspicuously outlined, its diameter not twice greater than the eyes. Palp tibial claw 2/3 of palp tarsus, accessory claw stout, 1/2 of tibial claw, g_1-17 long, extends beyond g_2.

Male : As in female, differs in setal ratios.

Collection Records : This mite has been reported on a number of plants (Gonzalez-Rodriguez, 1965). In India, its records are from *Psidium guajava* and an undetermined plant in Andaman & Nicobar Isl., on litchi in Assam, on mango in Manipur, on *Lantana* and wood apple in Tripura, on citrus in Meghalaya, on guava in Delhi, on citrus in Sikkim and *Cephalotaxus griffithei* in Arunachal Pradesh.

Habitat : India : *Psidium guajava,* undet. plant, *Cephalotaxus griffithei,* litchi, mango, *Lantana, Shorea robusta,* brinjal, ornamental plant, paddy, citrus, wood apple.

Distribution : India (Arunachal Pradesh, Assam, Manipur, Meghalaya, Sikkim, Tripura, West Bengal, Delhi, Haryana, Punjab, Andaman & Nicobar Isl.), U.S.A., Chile, Mexico.

Remarks : Predatory behaviour of this mite has been reported in India in several cases as Mathur *et al.,* (1995) from Haryana, Chatterjee & Gupta (1996) feeding upon *Brevipalpus obovatus* infesting guava in West Bengal, Gupta & Chatterjee (1997) feeding upon tetraychids in Delhi, on *Aceria mangiferae* infesting mango in Manipur and *Tetranychus urticae* on okra in Assam (Gupta & Gupta, 1992).

87. ***Agistemus gamblei*** Gupta

(Figs. 257-258)

1991. *Agistemus gamblei* Gupta, *Rec. zool. Surv. India,* **88** : 218-219.

Female : Propodosomal and median plates distinct, reticulate, the former with 3 pairs of setae, latter with 5 pairs of setae. Measurements of setae : ae-44, ae/ae-ae-3.6, be-76, be/be-be-1.4, ce-67, ce/ce-ce-0.6, a-44, la-47, lm-58, c-56, he-39, li-53, le-26, e-33, a/a-a-0.5, ae > ae-be, a-la = little less than half of a, b nearer to la than to lm. Postocular body not demarcated. Body 408 long, 204 wide.

Male : Unknown.

Collection Records : This was described from Arunachal Pradesh collected on *Machilis gamblei.*

Habitat : Machilis gamblei.

Distribution : India (Arunachal Pradesh).

88. ***Agistemus garrulus*** Chaudhri, Akbar & Rasool

(Figs. 259-261)

1974. *Agistemus garrulus* Chaudhri, Akbar & Rasool, *Univ. Agri. Lyallpur,* p. 197-200.

1985. *Agistemus garrulus,* Sepasgosarian, *Z. Angew. zool.,* **72** : 450.

1991. *Agistemus garrulus,* Gupta, *Rec. zool. Surv. India,* **88** : 219.

1995. *Agistemus garrulus,* Gupta, In : *State Fauna Ser. 4, Fauna of Meghalaya, Part 2,* p. 42.

Female : Body 274 long, 199 wide. Palp tibial claw well developed, accessory claw present. Palp tarsus sensillum trifid. Chelicera 90 long, stylet-30 long. Dorsal propodosomal shield non-reticulated, integument striated. Eyes one pair, postocular body large. Dorsal setae barbed along entire length and located on tubercles. ae/ae-ae-1.8, be-1.3 times of be-ce, a/a-a-1.3, setae be little longer than be-ce, le-shorter than e, e/le-1.7. Ventrally with triangular platelets at opisthosomal region, ae-44, be-79, ce-53, he-49, a-62, b-65, c-72, la-56, lm-67, li-67, e-43, le-26. Paragenital setae one paired. P longer than $P_{g_1} - P_{g_2}$. Anogenital setae 4 pairs; g_1 longest. Setal formula : coxae 2, 1, 2, 2; trochanter : 1, 1, 1, 1; femora : 5, 4, 2, 2; genu-4, 1, 0, 0; tibia-6, 6, 6, 6; tarsus : 11, 10, 8, 7.

Male : Unknown.

Collection Records : This mite was described from Pakistan collected on *Hibiscus esculentus.* From India, its record is from Meghalaya on mulberry.

Habitat : India : mulberry. Elsewhere : *Hibiscus esculentus.*

Distribution : India (Meghalaya), Pakistan.

89. ***Agistemus herbarius*** Kuznetzov & Wainstein

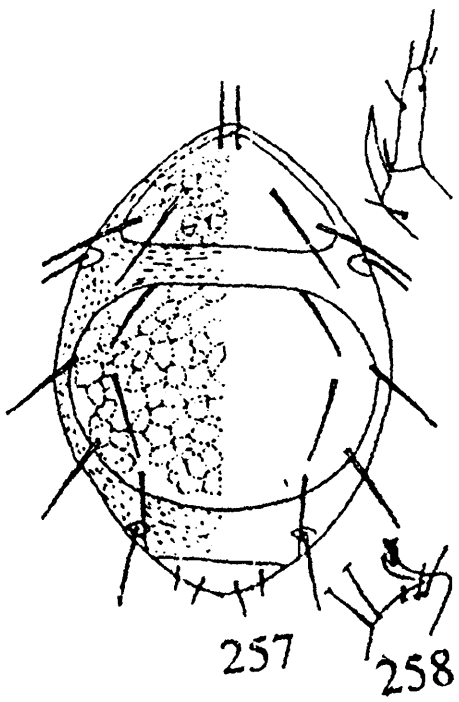
1977. *Agistemus herbarius* Kuznetzov & Wainstein, *zool. Zh.,* **56** : 476-479.

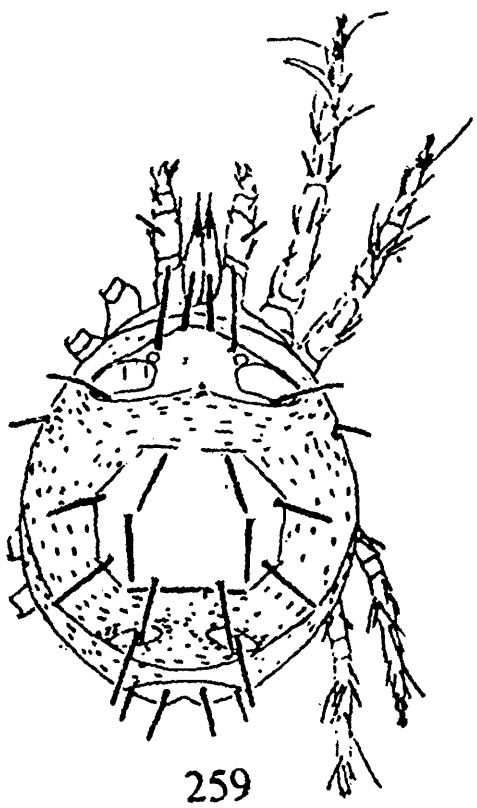
1985. *Agistemus herbarius,* Sepasgosarian, *Z. Angew. zool.,* **72** : 451.

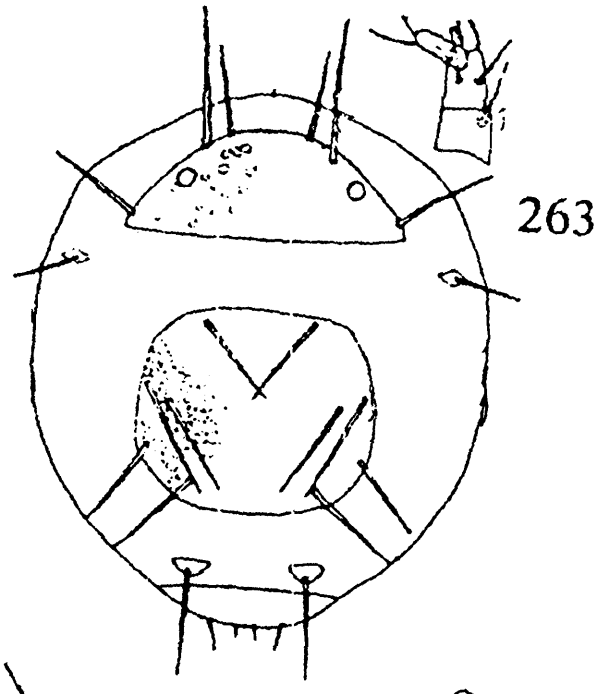
1999. *Agistemus herbarius,* Rather, *J. Acar.,* **15** : 20.

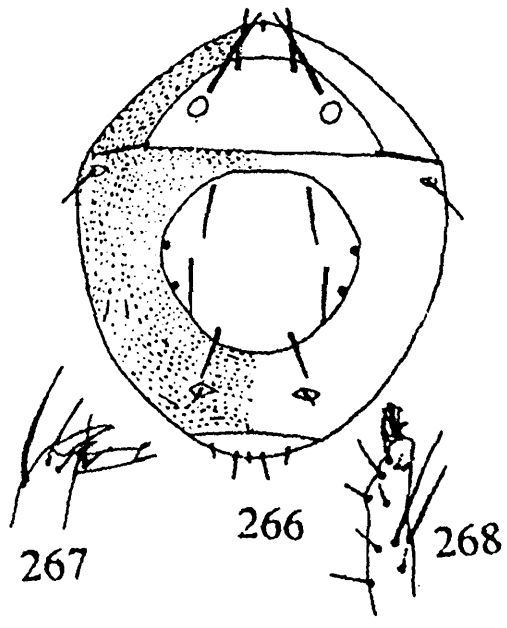
Collection Records : Rather (1999) recorded this species from Jammu & Kashmir, on grape vines feeding upon grape vine mite.

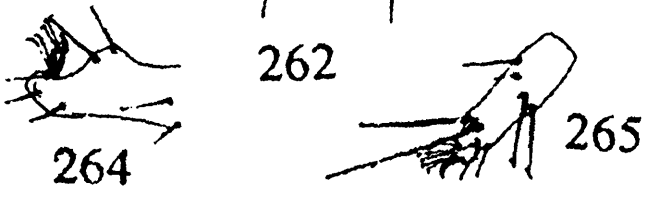
Habitat : India : Grape vines.











Figs. 257-268 : *Agistemus gamblei* Gupta (female) : 257. Dorsal view, 258. Tarsus of leg I. (after Gupta, 1991); *Agistemus garrulus* Chaudhri *et al.* (female) : 259. Dorsal view, 260. Distal segments of palp, 261. Anogenital region. (after Chaudhri *et al.*, 1974); *Agistemus heterophylla* Gupta (female) : 262. Dorsal view, 263. Distal segments of Palp, 264. Tarsus of leg II, 265. Tarsus of leg I. (after Gupta, 1991); *Agistemus hystrix* Gupta (female) : 266. Dorsal view, 267. Distal segments of palp, 268. Tarsus of leg I. (after Gupta, 1991)

Distribution : India (Jammu & Kashmir).

Remarks : Rather (1999) reported this mite on grape vines feeding upon eggs and nymphs of spider mites, *Oligonychus mangiferus* and *Tetranychus urticae.*

90. ***Agiseemus heterophylla*** Gupta
(Figs. 262-265)

1991. *Agistemus heterophylla* Gupta, *Rec. zool. Surv. India,* **88** : 211-214.

1996. *Agistemus heterophylla,* Chatterjee & Gupta, *J. Beng. Nat. Hist. Soc. (NS)* **15**(2) : 27.

Female : Propodosomal plate with 3 pairs of setae, median plate with 5 pairs of setae, both with reticulations. All setae broad, unbarbed, measuring : ae-40, be-78, ce-58, ae/ae-ae-1.2, be/be-be-1.1, ce/ce-ce 0.31, he-45, a-58, la-71, b-56, lm-64, c-64, li-56, le-31, e-20. Palp tarsus almost as long as palp tibial claw. Tarsus I-IV with 2 claws, tarsus I with 1 long seta,tarsus II with 1 long seta, tarsus III-IV without long setae. Barbed seta on genu I shorter than segment. Paragenital setae 2 pairs, subequal, anogenital setae g_1 almost reaches upto g_3. Chaetotaxy of legs I-IV : tarsus-5, 4, 2, 2; genu-3, 1, 0, 0; tibia-6, 6, 6, 6.

Male : Unknown.

Collection Records : This species was described from Arunachal Pradesh, collected on *Girardinia heterophylla* and thereafter, it was collected from West Bengal on *Psidium guajava.*

Habitat : Girardinia heterophylla, Psidium guajava.

Distribution : India (Arunachal Pradesh, West Bengal).

91. ***Agistemus hystrix*** Gupta
(Figs. 266-268)

1991. *Agistemus hystrix* Gupta, *Rec. zool. Surv. India,* **88** : 214.

In press. *Agistemus hystrix,* Gupta & Chatterjee, In : *State Fauna Ser. 11, Fauna of Mizoram.*

Female : Propodosomal and median plates well demarcated, the former having 3 pairs of setae and the latter with 5 pairs of setae, most of the dorsal setae being thick and minutely barbed. Integument transversely striated between propodosomal and median plates. Measurements of setae. ae/ae-ae-1.4, be-73, ce-51, he-44, a-56, a/a-a-0.67, b-56, la-broken, lm-broken, le-20, e-26. Diameter of postocular body-28. Paragenital setae 2 pairs, extending upto tip of g_2. Body 458 long, 295 wide. Dorsalmost seta of femur I-44 long, Chaetotaxy of femur and genu of legs I-IV : I-5, 4; II-4, 1; III-2, 0; IV-2, 0. Apical sensillum of palp tarsus trifid. Setation of tibia I-IV-nude.

Male : Unknown.

Collection Records : Description of this species is based upon material collected from Manipur on *Castanopsis hystrix.*

Habitat : Castanopsis hystrix.

Distribution : India (Manipur).

92. ***Agistemus industani*** Gonzalez-Rodriguez
(Figs. 269)

1965. *Agistemus industani* Gonzalez-Rodriguez, *Univ. Calif. Pub. Ent.,* **41** : 40.

1967. *Zetzellia industani,* Wood, *Trans. Roy. Soc. N. Z. zool.,* **9** : 93-139.

1985. *Agistemus industani,* Sepasgosarian, *Z. Angew. zool.,* **72** : 452.

1991. *Agistemus industani,* Gupta, *Rec. zool. Surv. India,* **88** : 215.

1992. *Agistemus industani,* Gupta, In : *Contributions to Acarological Researches in India,* p. 439.

1995. *Agistemus industani,* Singh, *Adv. Agr. Research India,* p. 188.

1995. *Agistemus industani,* Jagadish *et al., Abst. V Nat. Symp. Acarology,* p. 17.

1999. *Agistemus industani,* Dhooria, *J. Acar.,* **14**: 88-89.

In press. *Agistemus industani,* Gupta & Chatterjee, *State Fauna Ser. 11, Fauna of Mizoram.*

Female : Body 490, long, 300 wide. Propodosomal shield smooth covering broad area of dorsal surface, 2½ times as wide as long. Median plate

smooth. Measurements of setae : ae-56, ae-ae-26, ae/ae-ae-2.1, be-78, be-ce-71, ce-60, a-56, a-a-49, b-67, a-b-67, c-69, la-67, lm-67, e-38, le-24, li-67, he-51. Dorsal setae robust, not tapered towards ends, set on strong tubercles. Paragenital setae 2 pairs, anogenital setae 4 pairs; g_1 longest. Dorsalmost seta of genu I little over 1.3 times as long as lateral seta.

Male : Unknown.

Collection Records : This species was described from Tamil Nadu collected on *Cyperus rotundus*. Subsequently, it has been recorded from Uttar Pradesh on *Momordica charantia, Cucurbita moschata,* from Karnataka on guava, from Nagaland on *Maoulla puya,* from Mizoram on citrus and marigold, from Arunachal Pradesh on *Cestanopsis* sp. and from Punjab on an ornamental plant.

Habitat : India : *Cyperus rotundus, Momordica charantia, Cucurbita moschata, Maoulla puya, Cestanopsis* sp. ornamental plant, marigold, citrus, guava.

Distribution : India (Arunachal Pradesh, Mizoram, Nagaland, Uttar Pradesh, Punjab, Tamil Nadu, Karnataka).

Remarks : Among the stigmaeid mites those species found to be abundantly available and have potential importance as biocontrol agent, *Agistemus industani* is certainly one of those. Because of this, Rai *et al.*, (1999) studied the predatory behaviour of this species using *Tetranychus ludeni* as its prey on mulberry plant at Varanasi. They reported that the predator fed voraceously on the eggs of the prey in the field. Under laboratory condition, they found that the fertilized eggs gave progeny of both sexes at 3 : 1 ratio (female : male). Longevity of adult female was found to be 23-46 days and that of male was 23-48 days. Feeding potentiality of female was 3 times higher than that of male. The average oviposition was 3 eggs/day and prey consumption rate was 15 eggs/day. According to the authors, this species appeared to be effective predator of mite pests on vegetable crops.

93. *Agistemus inflatus* Meyer

1969. *Agistemus inflatus, Acarologia,* **11**(2) : 261.

1987. *Agistemus inflatus,* Ueckermann & Smith-Meyer, *Phytophylactia,* **19** : 381.

1999. *Agistemus inflatus,* Dhooria, *J. Acar.,* **14**(1-2) : 88-89.

Collection Records : Dhooria (1999) reported this species from Punjab on an ornamental plant. Originally, it was described from South Africa, collected on grass.

Habitat : Ornamental plant, elsewhere : grass.

Distribution : India (Punjab), South Africa.

94. *Agistemus javanicum* Gupta

(Figs. 270-272)

1991. *Agistemus javanicum* Gupta, *Rec. zool. Surv. India,* **88** : 218.

In press. *Agistemus javanicum,* Gupta & Chatterjee, In : *State Fauna Ser. 11, Fauna of Mizoram.*

Female : Body 450 long, 290 wide. Propodosomal and median plates well demarcated, the former with 3 pairs of setae and the latter with 5 pairs of setae. Measurements of setae : ae-49, ae-ae-35, ae/ae-ae-1.4, be-71, a-56, a-a-56, b-51, a/a-a-1, a-60, lm-71, c-51, li-62, le-24, e-33, he-56. Integument between propodosomal and median plates transversely striated, lateral area of median plate transversely striated. Palp tarsus with 3 tined seta. Chaetotaxy of femur, genu and tibia of legs I-IV : I-5, 4, 6; II-4, 1, 6; III-2, 0, 6; IV-2, 0. 6. Seta g_1 longer than Pg_1. All setae on tibia I and II nude. Palp tibial claw greater than palp tarsus; pg_1, pg_2 almost of same length. Postocular body as long as broad.

Male : Unknown.

Collection Records : Description of this species was from Manipur, collected on *Cleidion javanicum.*

Habitat : Cleidion javanicum.

Distribution : India (Manipur).

95. *Agistemus lakoocha* Gupta
(Figs. 273-275)

1991. *Agistemus lakoocha* Gupta, *Rec. zool. Surv. India*, **88** : 211.

Female : Body 331 long, 204 wide. Palp tibial claw slightly shorter than palp tarsus; 4 stout setae present at the base of tibial claw. Palp tarsus with trifid seta. Propodosomal and median plates reticulate, the former with 3 pairs of setae measuring ae-38, ae/ae-ae-2.5, be-71, be/be-be-1.4, ce-58, ce/ce-ce-0.6. Area immediately posterior to propodosomal plate with transverse striation, laterally obliquely striated, all setae thick, not serrate. Propodosomal plate gently reticulated. Median plate with 5 pairs of setae, a-47, la-44, b-47, lm-53,c-53, he-35. Area lateral to median plate longitudinally and area posterior to median plate transversely striated. Seta li-54, le-33, e-17. Paragenital setae 2 pairs, anogenital setae 4 pairs. Genu-I and II each with 1 lateral seta, tarsus I with 2 long setae terminally, tarsus II with 1 long seta and such setae absent on tarsus III and IV. Postocular body well demarcated.

Male : Unknown.

Collection Records : This species was described from Arunachal Pradesh collected on *Artocarpus lakoocha.*

Habitat : Artocarpus lakoocha.

Distribution : India (Arunachal Pradesh).

96. *Agistemus macrommatus* Gonzalez-Rodriguez
(Figs. 276-278)

1965. *Agistemus macrommatus* Gonzalez-Rodriguez, *Univ. Calif. Pub. Ent.* **41** : 38-39.

1982. *Zetzellia macrommatus*, Tseng, *A Catalogue and Bibliography of Acari of Taiwan*, p. 1-164.

1985. *Agistemus macrommatus*, Sepasgosarian, *Z. Angew. zool.*, **72** : 454.

1990. *Agistemus macrommatus*, Arbabi & Singh, *Abst. IV. Nat. Symp. Acarology, Calicut*, p. 8.

1991. *Agistemus macrommatus*, Gupta, *Rec. zool. Surv. India*, **88** : 215.

1992. *Agistemus macrommatus*, Gupta, In : *State Fauna Ser. 3, Fauna of West Bengal, Part 3*, p. 118.

1992. *Agistemus macrommatus*, Gupta, In : *Contributions to Acarologica Researches in India*, p. 439.

1993. *Agistemus macrommatus*, Mukherjee & Singh, *J. Insect Sci.*, **6**(1) : 135.

1995. *Agistemus macrommatus*, Singh, *Adv. Agric. Res., Inda*, **3** : 188.

1999. *Agistemus macrommatus*, Gupta & Chatterjee, *Sci. & Cult.*, **65**(5-6) : 161.

Female : Body 560 long, 250 wide. Propodosomal and median plates smooth. Drosal setae thick, indistinctly barbed, integument transversely striated between propodosomal and median plates, integument posterior to it transversely striated. Measurement of setae : ae-51, ae-ae-33, ae/ae-ae-1.5, be-78, be-be-72, ce-56, be > be-ce, a-58, a-a-53, b-60, c-67, la-56, lm-67, he-56, e-35, le-15. Diameter of postocular body 35. Two pairs of paragenital setae present, anogenital setae 4 pairs, g_1 extends upto middle of g_2. Palp tarsus and tibial claw of the same length. Dorsalmost seta of femur I as long as or slightly shorter than lateral setae.

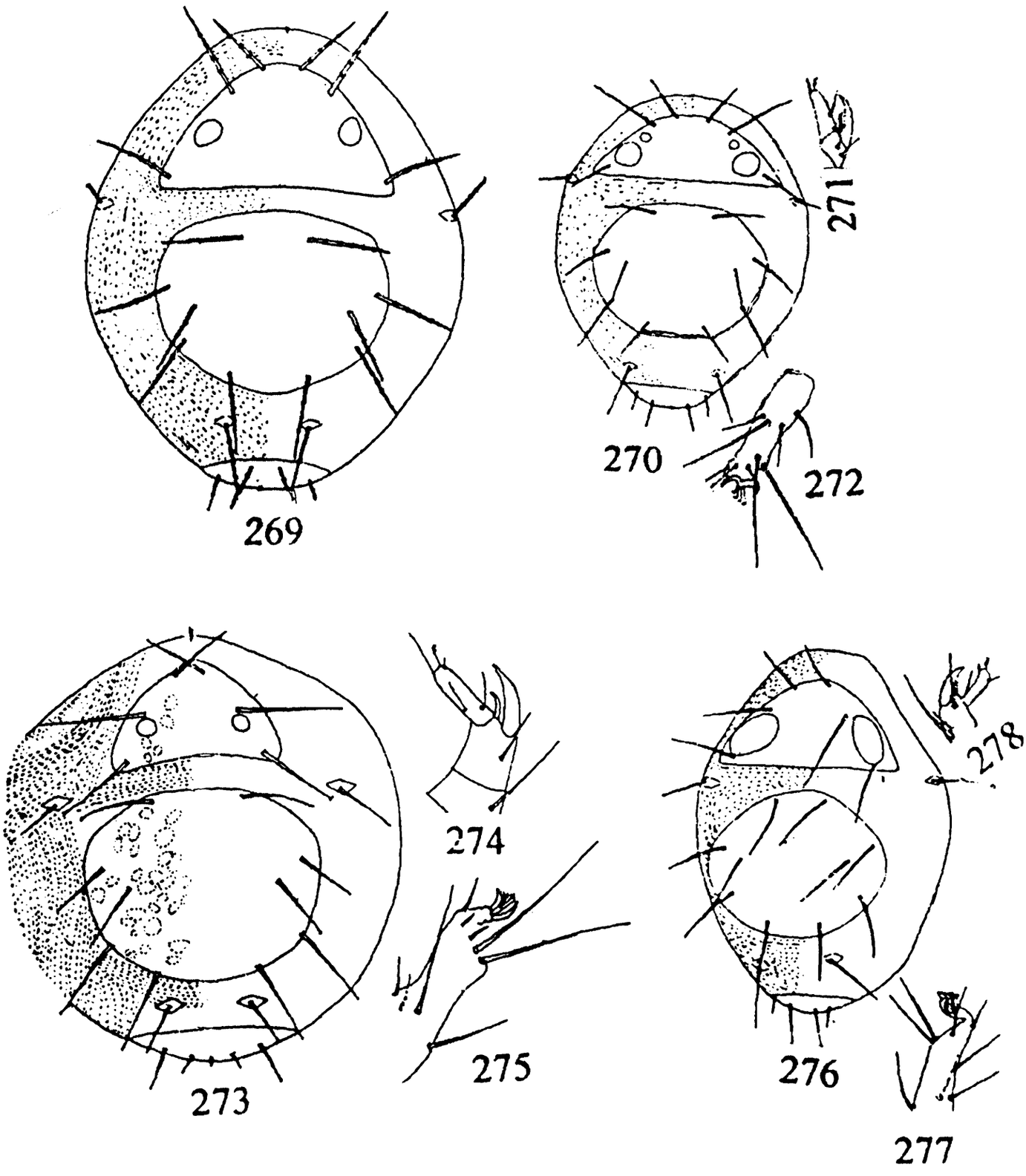
Male : As in female, ratios of setae vary.

Collection Records : This species was described from material collected on *Erianthus* sp. in Tamil Nadu, India and was subsequently reported to occur on *Carica papaya* in Uttar Pradesh and Arunachal Pradesh, on coriander in West Bengal, on *Calotropis* in Lakshadwip and on cowpea in Uttar Pradesh.

Distribution : India (Arunachal Pradesh, West Bengal, Uttar Pradesh, Tamil Nadu, Lakshadwip).

Habitat : Erianthus sp., *Carica papaya,* cowpea, *coriander, Calotropis* sp.

Remarks : This was found feeding upon *Tetranychus ludeni* infesting cowpea in Uttar Pradesh (Arbabi & Singh, 1990) and also *Tetranychus neocaledonicus* infesting *Calotropis* in Lakshadwip. This mite appears to be effective predator.



Figs. 269-278 : *Agistemus industani* Gonzalez-Rodriguez (female) : Dorsal view. (after Gupta, 1991); *Agistemus javanicum* Gupta (female) : 270. Dorsal view, 271. Distal segments of Palp, 272. Tarsus of leg I. (after Gupta, 1991); *Agistemus lakoocha* Gupta (female) : 273. Dorsal view, 274. Distal segments of palp, 275. Tarsus of leg I. (after Gupta, 1991); *Agistemus macrommatus* Gonzalez-Rodriguez (female) : 276. Dorsal view, 277. Distal segments of palp, 278. Tarsus of leg I. (after Gupta, 1991)

97. *Agistemus obscura* Gupta
(Figs. 279-281)

1991. *Agistemus obscura* Gupta, *Rec. zool. Surv. India*, **88** : 210-211.

1999. *Agistemus obscura*, Gupta & Chatterjee, *Sci. & Cult.*, **65**(5-6) : 161.

In press. *Agistemus obscura*, Gupta & Chatterjee, In : *State Fauna Ser. 11, Fauna of Mizoram.*

Female : Body 443 long, 112 wide. Propodosomal plate with 3 pairs of setae, barbed, measuring, ae-47, ae/ae-ae-1.5, be/be-be-1.1, ce-60, ce/ce-ce-0.4. Postocular body distinct, diameter-33. Median plate ornamented. Setae be longer than distnace between be-ce. All setae gently barbed. Median plate ornamented, setae measure : a-51, b-62, la-64, lm-67, c-67, li-60, le-40, e-22, he-53. Posterior part of hysterosoma striated. Tibial claw longer than tarsus. $Pg_1 = Pg_2$-18 long, g_1-g_3-16-18 long, g_4-12. Leg I-IV with claws, genu I with 1 long barbed seta, tarsus I with 2 long setae, tarsus II with 1 long seta, tarsi III and IV lack barbed setae. Intercalary plates close to median plates.

Male : Unknown.

Collection Records : This species was described from Manipur, collected on *Ficus obscura.*

Habitat : Ficus obscura.

Distribution : India (Manipur).

98. *Agistemus terminalis* (Quayle)
(Figs. 282-283)

1912. *Caligonus terminalis* Quayle, *Univ. Calif. Agri. Exp. Sta. Bull. No.* **234** : 499.

1914. *Caligonus terminalis*, Banks, *J. Ent. zool.*, **6** : 57.

1946. *Mediolata terminalis*, Nesbitt, *Can. Ent.*, **78** : 15.

1960. *Agistemus terminalis*, Summers, *Proc. Ent. Soc. Wash.*, **62** : 234.

1965. *Agistemus terminalis*, Gonzalez-Rodriguez, *Univ. Calif. Pub. Ent.*, **41** : 29.

1967. *Zetzellia terminalis*, Wood, *Trans. Roy. Soc. N. Z. zool.* **9** : 93-139.

1984. *Agistemus terminalis*, Ehara & Wongsiri, *Kyotyo*, **52**(1) : 117.

1985. *Agistemus terminalis*, Sepasgosarian, *Z. Angew. zool.* **72** : 461.

1992. *Agistemus terminalis*, Gupta, In : *State Fauna Ser. 3, Fauna of West Bengal, Part 3*, p. 118.

1996. *Agistemus terminalis*, Chatterjee & Gupta, *J. Beng. Nat. Hist. Soc. (NS)* **15**(2) : 27.

2000. *Agistemus terminalis*, Gupta, In : *State Fauna Ser. 7, Fauna of Tripura, Part 2*, p. 18.

In press. *Agistemus terminalis*, Gupta, In : *State Fauna Ser. 9. Fauna of Sikkim.*

In press. *Agistemus terminalis*, Gupta & Chatterjee, *State Fauna Ser. 11, Fauna of Mizoram.*

Female : Body yellowish. Propodosomal and median plates not ornamented. Dorsal setae minutely barbed, not set on tubercles. Measurements of setae : ae-35, be-48, ce-35, he-40, a-34, b-31, c-36, lm-37, li-37, e-35, le-20, ae/ae-ae-1.0, be rarely extends upto ce, ce shorter than he, a/a-a-0.6. Setae li and e longer than a and b. Paragenital setae 2 pairs, anogenital setae g_1 very long, about 2 times of other paragenital setae. Chaetotaxy of legs I-IV : femora-5, 4, 2, 2; genu-4, 1, 0, 0; tibia-6, 6, 6, 6; setae on tibia I and II nude.

Male : Unknown.

Collection Records : The description of this species was based upon collection from California on citrus. The Indian records are from West Bengal on *Dahlia* and beans, from Mizoram on an undet. Plant, from Sikkim on sugarcane and papaya and from Tripura on betel vine.

Habitat : India : Dahlia, beans, undet. plant, betel vine, sugarcane, papaya. Elsewhere : citrus, avocado, juniperus, camphor tree, *Malus* sp., *Cryptomerya.*

Distribution : India (Mizoram, Sikkim, Tripura, West Bengal), U.S.A., Mexico, Guatemala, Japan.

Remarks : This has been seen feeding upon *Brevipalpus* sp. infesting papaya in Sikkim (Gupta-in press-Sikkim) as well as it was found associated with *Acaphylla theae* infesting tea in northeast India (Gupta & Gupta, 1992).

99. *Agistemus unguiparvus* Gonzalez-Rodriguez (Figs. 284-287)

1965. *Agistemus unguiparvus* Gonzalez-Rodriguez, *Univ. Calif. Pub. Ent.*, **41** : 43.

1985. *Agistemus unguiparvus*, Sepasgosarian, *Z. Angew. Zool.*, **72** : 462.

1987. *Agistemus unguiparvus*, Ueckermann & Smith-Meyer, *Phytophylactica*, **19** : 383.

1995. *Agistemus unguiparvus*, Singh, *Adv. Agri. Res. India*, **2** : 189.

2000. *Agistemus unguiparvus*, Gupta, *State Fauna Ser. 7, Fauna of Tripura, Part 2*, p. 18.

Female : Body 410 long, propodosomal and median plates not ornamented. Postocular body small. Dorsal setae on weak tubercles, ae shorter than be, ce, ae/ae-ae-2.00, a/a-a-1.5. Setae a and b short than the distance between its bases and that of the following setae. Paragenital setae 2 pairs, Pg_2 longer than Pg_1. Anogenital setae 4 pairs, g_1 much longer than others. Dorsalmost seta on genu I longer than the segment, tibia I-IV each with a barbed seta. Solenidion on tarsus I long. Measurements of setae : ae-25, be-46, ce-42, he-37, a, b-41 each, c-47, la-36, lm-45, li-38, e-36, le-29.

Male : Gonzalez-Rodriguez (1965) described it.

Collection Records : This species was described from Mozambique collected on cotton. The Indian records are on *Pyrus malus* from Uttar Pradesh and on citrus from Tripura.

Habitat : India : Citrus, *Pyrus malus*. Elsewhere : Cotton.

Distribution : India (Tripura, Uttar Pradesh), Mozambique.

100. *Agistemus* spp.

1971. *Agistemus* sp., Sadana & Kanta, *Sci. & Cult.*, **37**(11) : 530.

1983. *Agistemus* sp., Gupta & Gupta, *Abst. II All India Symp. Acarology, Pune*, p. 23.

1986. *Agistemus* sp., Dhooria, *Acar. Newsl.*, **16** : 5.

1987. *Agistemus* sp., Borthakur & Das, *Two & Bud*, **34**(1-2) : 21-24.

1989. *Agistemus* sp. Singh, Somchoudhury & Mukherjee, In : *Progress in Acarology*, **2** : 361-367.

1992. *Agistemus* sp. nr. *simplex*, Gupta, In : *State Fauna Ser. 3, Fauna of West Bengal, Part 3*, p. 119.

1995. *Agistemus* sp., Gupta, In : *State Fauna Ser. 4, Fauna of Meghalaya, Part 2*, p. 42.

1996. *Agistemus* sp., Chatterjee & Gupta, *J. Beng. Nat. Hist. Soc. (NS)* **15**(2) : 27.

1999. *Agistemus* sp., Dhooria, *J. Acarology*, **14** : 87.

2000. *Agistemus* sp., Gupta, In : *State Fauna Ser. 7, Fauna of Tripura, Part 2*, p. 18.

In press. *Agistemus* sp., Gupta, In : *State Fauna Ser. 9, Fauna of Sikkim.*

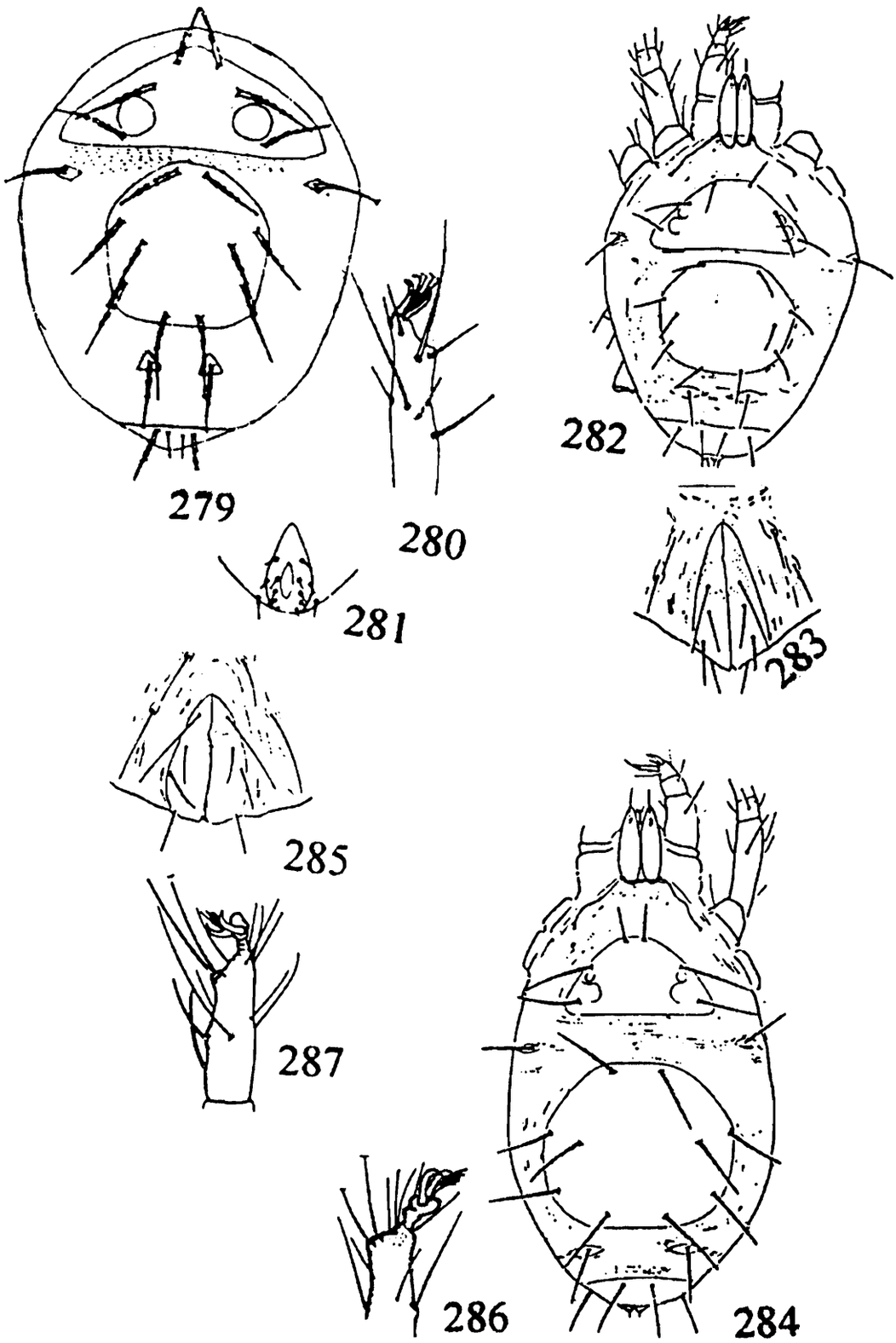
In press. *Agistemus* sp., Gupta & Chatterjee, *State Fauna Ser. 11, Fauna of Mizoram.*

Collection Records : Some undetermined species of *Agistemus* were recorded by various workers on different plants like on tea from Assam, on citrus, rose, brinjal in Punjab, on mango and guava from West Bengal, on undetermined plants from Meghalaya, Sikkim, on *Aporusa dioca* from Mizoram and on Jackfruit from Tripura.

Habitat : Tea, citrus, rose, brinjal, mango, guava, jackfruit, *Aporusa dioca*, undetermined plant.

Distribution : Assam, Meghalaya, Sikkim, Mizoram, West Bengal, Tripura.

Remarks : Dhooria (1986) reported predation capacity of different mobile stages of an undetermined species of *Agistemus*. It was found that deutonymphs and adults of prey mite were never attacked by any stage of the predatory mite probably due to sluggish movement of the predator as compared to active movement of prey mite. Adult predator consumed 3-22 eggs/day and 2-10 larvae/day. The time taken to suck completely an egg and a larve was 15-20 minutes and 45 minutes, respectively. The deutonymph of predator consumed 2-12 eggs/day. The larva and protonymph of



Figs. 279-287 : *Agistemus obscura* Gupta (female) : 279. Dorsal view, 280. Tarsus of leg I, 281. Venter of opisthosoma. (after Gupta, 1991); *Agistemus terminalis* (Quayle) (female) : 282. Dorsal view, 283. Venter of opisthosoma. (after Gonzalez-Rodriguez, 1965); *Agistemus unguiparvus* Gonzalez-Rodriguez (female) : 284. Dorsal view, 285. Opisthosoma, 286. Tarsus I of female, 287. Tarsus I of male. (after Gonzalea-Rodriguez, 1965)

predator had very low feeding rate. Since this predator had very poor prey consumption rate and had slower developmental rate than that of its prey, this did not appear to be efficient predator of spider mite. The same author (Dhooria, 1986a) also reported that binapacryl, malathion and dicofol were least effective to this predator and hence, suggested that these chemicals may be used for control of *T. ludeni* on brinjal when *Agistemus* sp. is present in the field.

Genus 38. *Cheylostigmaeus* Willmann

1952. *Cheylostigmaeus* Willmann, Veroffel. *Inst. Meeresforschung Klasse Abt.* **1** : 162 : 160.

1965. *Cheylostigmaeus,* Summers & Ehara, *Acarologia,* **7**(1) : 49.

1966. *Cheylostigmaeus,* Summers, *Acarologia,* **8**(2) : 236.

1967. *Cheylostigmaeus,* Wood, *Trans. roy. Soc. N. Z. (Zool.),* **9**(9) : 133.

1968. *Cheylostigmaeus,* Wood, *N. Z. J. Sci.,* **11**(2) : 276.

1969. *Cheylostigmaeus,* Meyer, *Acarologia,* **11**(2) : 252.

1978. *Cheylostigmaeus,* Wainstein, *Evoliutsionnoi Morfologii Ekologii Zhivotnykh in, A. N. Severlova Zoologicheskii Institut,* **7485**, p. 158.

1979. *Cheylostigmaeus,* Chaudhri *et al., Univ. Agri. Faisalabad* p. 214.

1985. *Cheylostigmaeus,* Sepasgosarian, *Z. Angew. Zool.,* **72** : 441.

1987. *Cheylostigmaeus,* Ueckermann & Smith-Meyer, *Phytophylactica,* **19** : 372.

Diagnosis : According to Ueckermann & Smith-Meyer (1987) this genus is closely related to *Eustigmaeus* Berlese but differs mainly in having partly fused chelicerae. The members of this genus possess strongly developed mouth parts, a prodorsal and opisthodorsal shield covering the dorsum without overlapping the side walls of the body, location of humeral shield on dorsolateral position; suranal shield on posterior-ventral position; dorsal body setae 13 pairs; palp tarsus with tridentate eupathidium.

Type ***Cheylostigmaeus grandiceps*** Willmann, 1951

101. *Cheylostigmaeus* sp.

1980. *Cheylostigmaeus* sp., Gupta & Ghosh, *Rec. zool. Surv. India,* **77** : 204.

Collection Records : an undetermined species of this genus was reported on *Ficus* sp. in Little Andaman Isl. The damaged condition of this specimen made it difficult to identify upto species level.

Habitat : Ficus sp.

Distribution : India (Andaman & Nicobar Isl.).

39. *Eryngiopus* Summers

1964. *Eryngiopus* Summers, *Proc. Ent. Soc. Wash.,* **66**(3) : 186.

1966. *Eryngiopus,* Summers, *Acarologia,* **8**(2) : 244.

1967. *Eryngiopus,* Wood, *Trans. roy. Soc. N. Z. (Zool),* **9**(3) : 111.

1969. *Eryngiopus,* Meyer, *Acarologia,* **11**(2) : 231.

1971. *Eryngiopus,* Wood, *N. Z. J. Sci.,* **14**(2) : 412.

1978. *Eryngiopus,* Wainstein, *Evoliutsionnoi Morfologii Ekologii Zhivotnykh in A. N. Severlova Zoologicheskii Institut,* **7485** : 166.

1984. *Eryngiopus,* Ehara & Wongsiri, *Kontyo,* **52** : 110.

1985. *Eryngiopus,* Sepasgosarian, *Z. Angew. Zool.,* **72** : 441.

1987. *Eryngiopus,* Ueckermann & Smith-Meyer, *Phytophylactica,* **19** : 294.

1992. *Eryngiopus,* Siquin & Xiwen, *J. Nanchang Univ. (NS)* **16**(2) : 110.

1994. *Eryngiopus,* Siquin & Xiwen, *J. Nanchang Univ. (NS)* **18**(1) : 93.

Diagnosis : According to Ueckermann & Smith-Meyer (1987), this genus can be diagnosed as : idiosoma elongate with dorsal plating almost obsolete, shield restricted medially as raised small area in propodosoma and suranal shield present posteriorly. Dorsal setae 13 pairs, prodorsal shield with setae ae, be and a pair of eyes, suranal shield

with setae e, le. Some ventral setae and posteior subcapitular setae very long; terminal eupathidium bidentate or a single spikelet. Intercoxal and paragenital plates absent.

Type ***Eryngiopus gracilis*** Summers, 1964

102. ***Eryngiopus coimbatorensis*** Gupta & David (Figs. 288-291)

1990. *Eryngiopus coimbatorensis* Gupta & David, *Entomon*, **15**(3 & 4) : 281-282.

Female : Propodosomal plate confined to a small area as figured, separated by longitudinal striation but contiguous at the tip, bearing setae ae (9 long), be (13 long) and a pair of eyes. Other two pairs of propodosomal setae ce and de measure 18 and 22, respectively, all propodosomal setae being short, narrow and simple. Propodosomal integument posterior to plate longitudinally striated; he-17 long. Hysterosoma longitudinally striated with setae a, b, c, la, lm, li placed on integument and measure 20, 14, 14, 18, 14, 27, respectively. Suranal plate single, ill defined, bearing setae e and le and measure 26 and 27, respectively, a-a-85, b-b-42, c-c-40, e/le-1 1, ae/ae-ae-0.18, a/a-a-0.23, c/c-c-0.35. Paragenital setae 3 pairs, anogenital setae 4 pairs. Palp terminal sensillum rod-like without fork. Leg chaetotaxy : I-IV : femora-3, 3, 2, 2; genu-1, 1, 1, 1; tibia-5, 5, 4, 4; tarsus 8, 8, 4, 6.

Male : Unknown.

Collection Records : This species was described from Tamil Nadu collected on sugarcane in association with scale insect, *Melanopsis glomerata.*

Habitat : Sugarcane.

Distribution : India (Tamil Nadu).

Remarks : This mite was found to feed actively on sugarcane scale insect, *Melanopsis glomerata* and could effectively control it.

Genus 40. ***Indostigmaeus*** Gupta & Ghosh

1980. *Indostigmaeus* Gupta & Ghosh, *Rec. zool. Surv. India*, **37** : 204-205.

Diagnosis : Body broadly rounded, dorsum covered by single shield, reticulated with polygonal cells. Palp tarsus with bifid terminal sensillum. Dorsal shield with 13 pairs of setae borne on weak tubercles. Subcapitular setae 2 pairs.

Type ***Indostigmaeus rangatensis*** Gupta & Ghosh, 1980

103. ***Indostigmaeus rangatensis*** Gupta & Ghosh (Figs. 292-297)

1980. *Indostigmaeus rangatensis* Gupta & Ghosh, *Rec. zool. Surv. India*, **77** : 205-206.

Female : Body almost round, 323 long, 275 wide. A single dorsal plate covers propodosoma and hysterosoma. Dorsum reticulated with polygonal cells except towards margin, polygonal cells longer medially and smaller at anterior and posterior ends as well as towards the margin. Dorsal setae long, somewhat corrugated at the margin and borne on tubercles. Dorsal setae shorter than bases of sucessive setae. Paragenital setae 2 pairs, unequal; anogenital setae 3 pairs. Ventrally striations longitudinal between coxae I and II as well as between coxae III and IV. Striation pattern transverse centrally. One pair of setae present between coxae I and another pair slightly above coxae III. Measurements of setae : ae-34, be-38, ce-34, he-10, a-38, b-34, c-20, la-24, lm-22, ln-20, li-14, le-17, e-17, leg I-153 long.

Male : Unknown.

Collection Records : The description of this species was based upon collection made from Andaman & Nicobar Isl. on *Citrus medica.*

Habitat : Citrus medica.

Distribution : India (Andaman-Nicobar Isl.).

Genus 41. *Ledermuelleria* Oudemans

1923. *Ledermuelleria* Oudemans, *Ent. Ber. Amst.*, 6(130) : 150.

1966. *Ledermuelleria*, Wood, *N. Z. J. Sci.*, 9(1) : 86.

1967. *Ledermuelleria*, Wood, *Trans. Roy. Soc. N. Z.*, 9(9) : 133.

1971. *Ledermuelleria*, Wood, *Acarologia*, **13** : 76.

1972. *Ledermuelleria*, Wood, *Acarologia*, **13** : 301.

Diagnosis : Wood (1967) defined this genus as chelicerae completely separated and arising from beneath on overlapping propodosoma. Dorsal plate consisting of propodosomal having 4 pairs of setae and a pair of eyes. Hysterosomal shield with 6 pairs of setae and suranal having 2 pairs of setae. Humeral plate large, triangular with apex protruding between coxae II and III with one seta each. Plates cover entire dorsum and may overlap laterally.

Type ***Caligonus segnis*** Koch, 1836

104. *Ledermuelleria parryorum* Gupta (Figs. 298-299)

1991. *Ledermuelleria parryorum* Gupta, *Rec. zool. Surv. India*, **88** : 219.

In press. *Ledermuelleria parryorum*, Gupta & Chatterjee, In : *State Fauna Ser. 11, Fauna of Mizoram.*

Female : Length of body excluding gnathosoma 257, width 235, body oval. Dorsum entire, no suture between propodosomal and hysterosomal regions; dorsum reticulate, walls of network thin and indistinct. Dorsum with 8 pairs of setae, all being spine-like and barbed. Length of seta : anteriormost 72, 4 laterals measure respectively 89, 78, 82, 78. Posteriormost-seta-56; 2 setae present mediodorsal -ly, each 74 long. A pair of eyes present between second pair of propodosomal setae. Palp tarsus extends upto tibia-I; palp tibial claw well developed. Chelicera fine, needle-like. Legs short; tarsi with a pair of claws. Anogenital setae 3 pairs.

Male : Unknown.

Collection Records : Description of this species was on material collected on *Mussandra parryorum* from Arunachal Pradesh.

Habitat : Mussandra parryorum.

Distribution : India (Arunachal Pradesh).

105. *Ledermuelleria* sp.

1995. *Ledermuelleria* sp., Gupta, *State Fauna Ser. 4, Fauna of Meghalaya, Part 2*, p. 42.

Collection Records : An undetermined species of *Ledermuelleria* was recorded from Meghalaya on an undet. plant.

Habitat : Undet. plant.

Distribution : India (Meghalaya).

Genus 42. *Zetzellia* Oudemans

1927. *Zetzellia* Oudemans, *Ent. Ber.*, 7(158) : 263.

1952. *Mediolata* Baker & Wharton, p. 205.

1952. *Zetzellia* (sic.), Baker & Wharton, p. 205.

1965. *Zetzellia*, Gonzalez-Rodriguez, *Univ. Calif. Pub. Ent.*, **41** : 15.

1967. *Zetzellia*, Wood, *Trans. Roy. Soc. N. Z.*, 9(9) : 125. (in part).

1978. *Zetzellia*, Wainstein, *Akad. Nauk. SSSR. Inst. Evoliutsionnoi Morfologii Ekologii Zh*, In : *Severlova Zoologicheskii Institut* A. N., **7485** : 161.

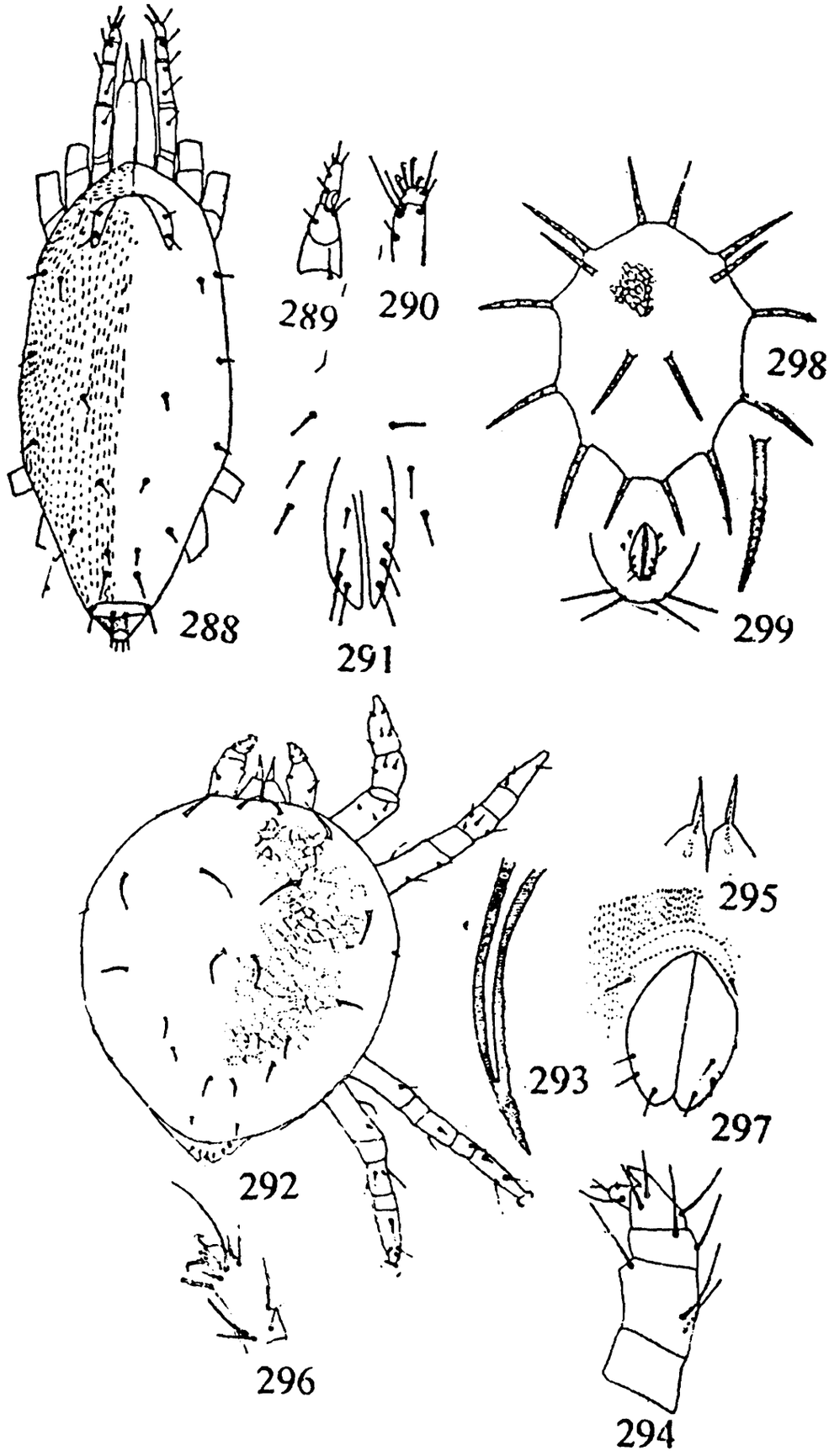
1983. *Zetzellia*, Ehara & Oomen-Kalsbeek, *Internat. J. Acarol.*, 9(1) : 19.

1986. *Zetzellia*, Yuan-min & Juan, *Acta Entomotaxonomica Sinica*, **11**(3) : 274.

1987. *Zetzellia*, Ueckermann & Smith-Meyer, *Phytophylactica*, **19** : 372.

1992. *Zetzellia*, Siqin & Xiwen, *Acta Arachnologica Sinica*, 1(1) : 39.

Diagnosis : Gonzalez-Rodriguez (1965) defined this genus as : idiosoma having paired and unpaired plates as (i) a triangular propodosomal plate carrying setae ae, be, ce, the latter pair sometimes borne on platelets, (ii) ovoid humeral platelets each with one seta. (iii) a median plate longitudinally divided into two or more sections bearing setae a, b, c, lm, (iv) a pair of independent mediolateral platelets with seta la located towards sides of idiosoma, (v) one pair of intercallary platelets bearing seta li and (vi) a suranal plate carrying seta le and e. Propodosomal



Figs. 288-299 : *Eryngiopus coimbatorensis* Gupta & David (female) : 288. Dorsal view, 289. Palp tibia and tarsus, 290. Tarsus I, 291. Venter of opisthosoma. (after Gupta & David, 1990); *Indostigmaeus rangatensis* Gupta & Ghosh (female) : 292. Dorsal view, 293. Dorsocentral seta, 294. Palp, 295. Chelicera, 296. Tarsus I, 297. Opisthosomal region. (after Gupta & Ghosh, 1980); *Ledermuelleria parryorum* Gupta (female) : 298. Dorsal view, 299. Opisthosoma. (after Gupta, 1991)

and median plates often reticulated. Postocular body small. A total of 12 pairs of dorsal setae. Two pairs of dissimilar setae on ventral capitulum. Paragenital setae one or two pairs. Tibial claw may be as long as palp tarsus, accessory claw may be like main claw or a slender setiform process. Terminal sensillum of palp-tarsus trifid. Empodium an erect rod with 3 pairs of raylets diverging beyond claw tips.

Type ***Zetzellia methalagli*** Oudemans, 1927 (by original designation)

106. ***Zetzellia languida*** Gonzalez-Rodriguez (Figs. 300-304)

1965. *Zetzellia languida* Gonzalez-Rodriguez, *Univ. Calif. Pub. Ent.*, **41** : 21.

1985. *Zetzellia languida*, Sepasgosarian, *Z. Angew. Zool.*, **72** : 452.

1992. *Zetzellia languida*, Gupta, *State Fauna Ser. 3, Fauna of West Bengal, Part 3*, p. 119.

Female : Dorsal plates not reticulated. Median plate rectangular. Dorsal setae short, barbed, setae e and le longer than other dorsal setae. Measurements of setae : ae-15, be-23, ce-21, he-21, a-13, b-12, c-14, la-16, lm-18, li-20, e-25, le-25, ae/ae-ae-0.7, be/be-be-0.7, a/a-a-0.4. Paragenital setae-2 pairs, g_1-1/3 of paragenital. Postocular body round. Chaetotaxy of legs I-IV : femora-5, 4, 2, 2, genu-4, 1, 0, 0; tibia-6, 6, 6, 6; tarsus-13, 10, 8, 6.

Male : Gonzalez-Rodriguez (1965) described it.

Collection Records : This species was collected in Congo on an undetermined plant. The Indian record is from West Bengal on mango.

Habitat : India : Mango. Elsewhere : undetermined plant.

Distribution : India (West Bengal), Africa.

107. ***Zetzellia*** sp.

1999. *Zetzellia* sp., Kumar, Dokras & Kumar, *J. Acar.*, **14**(1-2) : 32-33.

1999. *Zetzellia* sp., Kumar, *J. Acar.*, **14** : 33-34.

Collection Records : Two records of undetermined species of *Zetzellia* sp. were made from Himachal Pradesh on apple and other orchards feeding upon *Panonychus ulmi.*

Habitat : Apple, orchard.

Distribution : India (Himachal Pradesh).

Remarks : Kumar (1999) reported that orchards receiving chemical treatments had more population of pest mites and less of *Zetzellia* sp.

11. Family TYDEIDAE Kramer

1877. Tydeidae Kramer, *Naturg.* **43** : 232, 246.

1993. Tydeidae, Thor, *Das Tierreich*, **60** : 1.

1965. Tydeidae, Baker, *Adv. Acar.*, p. 96.

1966. Tydeidae, Meyer & Rodriguez, *Garcia de Orta* **13** : 19.

1968. Tydeidae, Baker, *Ann. Ent. Soc. Amer.*, **61** : 968.

1968a. Tydeidae, Baker, *Ann. Ent. Soc. Amer.*, **61** : 1091.

1968b. Tydeidae, Baker, *Ann. Ent. Soc. Amer.*, **61** : 1097.

1970. Tydeidae, Baker, *Ann. Ent. Soc. Amer.*, **63** : 164.

1970. Tydeidae, Meyer, *Koedoe*, **13** : 31.

1970. Tydeidae, Carmona, *Agronomia Lusitina*, **31** : 137-183.

1976. Tydeidae, Baker & Delfinado, *Internat. J. Acarol.*, **2**(1) : 35.

1979. Tydeidae, Andre, *Annales Soc. r. Zool. Belg.*, p. 108.

1979. Tydeidae, Ueckermann & Meyer, *Phytophylactica*, **11** : 117.

1980. Tydeidae, Andre, *Bull. Ann. Soc. r. Belg. Ent.*, **116** : 103.

1980. Tydeidae, Rasmy & El-Bagoury, *Acarologia*, **21** : 194-196.

1981. Tydeidae, Andre, *Acarologia*, **22** : 165.

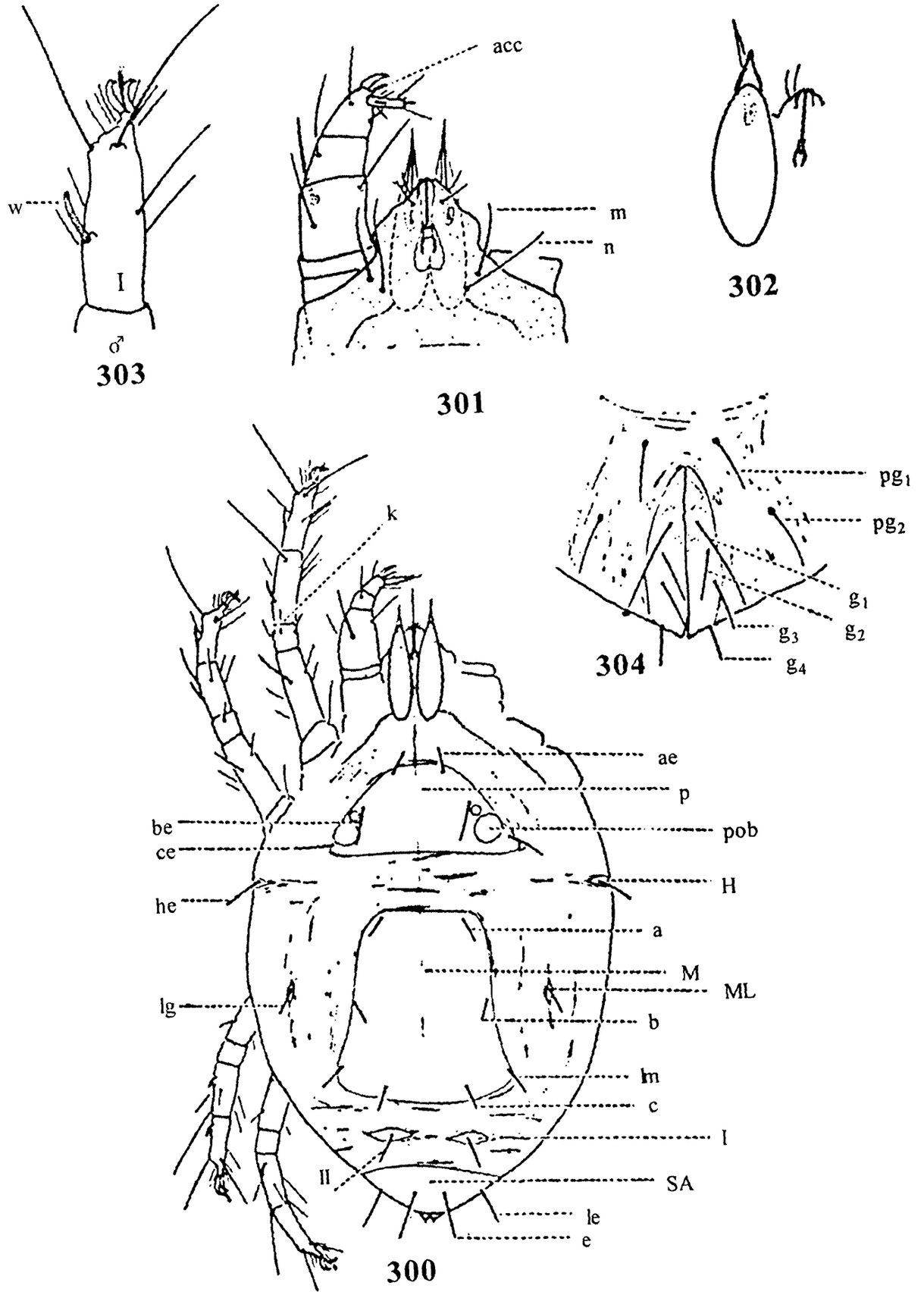
1981. Tydeidae, Zaher & el-Bagoury, *Acarologia*, **22** : 179-180.

1984. Tydeidae, Andre, *Bull. Annals. Soc. r. Belg. e Ent.*, **120** : 119-120.

1985. Tydeidae, Andre, *Bull. Annls. Soc. r. belge. Ent.*, **121** : 243-246.

1985. Tydeidae, Gupta, *Handbk. Plant Mites of India*, p. 305.

1987. Tydeidae, Andre *Acarologia*, **29** : 355.



Figs. 300-304 : *Zetzellia languida* Gonzalez-Rodriguez (female) : 300. Dorsal view, 301. Palp, 302. Chelicera, 303. Tarsuss of male, 304. Venter of female. opithosomal region. (after Gonzalez-Rodriguez, 1965)

1989. Tydeidae, Kazmierski, *Mitt. Ham. Zool. Mus. Inst.* **86** : 289-314.

1991. Tydeidae, Gupta, *Rec. zool. Surv. India,* **88** : 207-239.

1992. Tydeidae, Gupta, In : *State Fauna Ser. 3, Fauna of West Bengal, Part 3,* p. 123.

1994. Tydeidae, Kulczyck, *Vestn. Zool.,* **8** : 50-56.

1994. Tydeidae, Momen & El-Bagoury, *Entomol. Mitt. aus. dem. Zool. Mus., Hamburg,* **11** : 127-131.

1995. Tydeidae, Momen & Lundqvist, *Acarologia,* **36** : 41.

1996. Tydeidae, Gupta & Chatterjee, In : *State Fauna Ser. 6, Fauna of Delhi,* p. 518.

Diagnosis : Small or tiny mites measuring 150-500 long, weak or nonsclerotized body. Palp 4 segmented and typically shaped Normally, palp tarsus with 5 setae and a solenidion may also be present ventrally or terminally, palp with 1 or 2 simple setae. Palp femur with 2 setae, no seta on palp trochanter. Chelicera with needle-like unopposed chela. Dorsal setae 3 pairs P_1, P_2, P_3 along with a pair of sensillary setae on the propodosoma, sensory setae present on pseudostigmata. Hysterosomal setae in 5 transverse rows of 4 setae each or in 4½ rows, when posterior lateral pair lacking, setae D_1–D_5 form dorsal series and L_1–L_5 form lateral series. Sometimes D_4 and L_4 and D_5, L_5 may be very long. Dorsal setae may be of diverse shape simple, serrate, club shaped, lanceolate, etc. In *Pronematus*, L_2 shifted in line with dorsal setae. Ventrally, genital, paragenital and anal setae vary in number and these form important taxonomic characters. Striation pattern of dorsum is also important taxonomic character for determining genera and species.

Type *Tydeus* Koch

Key to the genera of TYDEIDAE known to inhabit plants in India

1. Hysterosomal seta L2 in normal lateral position, striation longitudinal between second pair of hysterosomal dorsocentral setae 2
– Hysterosomal seta L2 shifted to lie in the line of D series, striation pattern of varying types 4
2. Striation transverse or reticulate between second pair of hysterosomal dorsocentral setae 3
– Striation longitudinal between second pair of hysterosomal dorsocentral setae ..... *Paralorryia*
3. Dorsal striation not forming reticulate pattern. ..... *Tydeus*
– Dorsal striation forming reticulate pattern ..... *Lorryia*
4. Without anal setae, femur III and IV each with a prominent forked seta ..... *Parapronematus*
– With a single pair of anal setae, setae normal on femora III and IV ..... *Pronematus*

Genus 43. ***Lorryia*** Oudemans

1925. *Lorryia* Oudemane, *Ent. Ber. Ned.*, **7** : 32.

1931. *Retetydeus* Thor, *Zool. Anz.*, **94** : 89.

1933. *Lorryia* Thor, *Das Tierreich*, **60** : 33.

1952. *Lorryia*, Baker & Wharton, p.192.

1968. *Lorryia*, Baker, *Ann. Ent. Soc. Amer.*, **61** : 686-1008.

1970. *Lorryia*, Carmona, *Acarologia*, **12**(2) : 310.

1979. *Lorryia*, Ueckermann & Smith-Meyer, *Phytophylactica*, **11** : 45.

Diagnosis : Seta L_2 in normal lateral position. Dorsal hysterosomal setae in 4½ rows (L_5 missing). Dorsal body surface covered with reticulate pattern having spine-like lobes. Genital setae 6 pairs. Paragenital setae 4 pairs, anal setae 1 pair, ventral setae 3 pairs. Palp setae 5, 2, 2. Coxae IV may be with 1 or 2 setae.

Type *Lorryia superba* Oudemans

Key to the species of *Lorryia* known to inhabit plants in India

1. Genital setae 6 pairs, leg chaetotactic tormula : I– 8, 3, 2, 3, 0, 2; II– 6, 1, 1, 2, 0, 1; III– 5, 1, 1, 1, 1, 3; IV– 5, 1, 1, 1, 0, 1 ..... *africana*
– Genital setae 5 pairs, leg chaetotactic formula I– 8, 3, 3, 2, 1, ?, II– 6, 2, 2, 3, 0, ?; III– 5, 2, 1, 2, 1, ?, IV– 5, 2, 1, 1, 0, ? ..... *stricta*

108. *Lorryia africana* Baker
(Figs. 305–308)

1965. *Lorryia africana* Baker, In : *Advances in Acarology*, **2** : 107.

1968. *Lorryia africana*, Baker, *Ann. Ent. Soc. Amer.*, **61** : 1002.

1979. *Lorryia africana*, Ueckermann & Smith-Meyer, *Phytophylactica*, **11** : 49.

1980. *Lorryia africana*, Gupta & Ghosh, *Rec. zool. Surv. India*, **77** : 203.

Female : Palpal setal formula 5, 1, 2. Distal segment of palp long, slender, terminal, sensillum with broad tip. Body elongate, reticulation strong. Propodosomal sensory seta long, whip-like, dorsal body setae long, lanceolate, subequal. Genital setae 6 pairs, paragenital setae 4 pairs, anal setae 1 pair, ventral setae 3 pairs. Chaetotaxy of legs I–IV : I–8, 3, 2, 3, 0, 2; II–6, 1, 1, 2, 0, 1; III–5, 1, 1, 1, 1, 3; IV–5, 1, 1, 1, 0, 1. Empodium hooked. Solenidion on tarsus I long and slender.

Male : Unknown.

Collection Records : This species was described from Belgian Congo collected on *Podocarpus usamburensis*. The Indian record is from Andaman Isl. on *Anacardium occidentale*.

Habitat : India : *Anacardium occidentale*. Elsewhere : *Podocarpus usamburensis*.

Distribution : India (Andaman & Nicobar Isls.), Africa.

109. *Lorryia stricta* Gupta
(Figs. 309–312)

1991. *Lorryia stricta* Gupta, *Rec. zool. Surv. India*, **80** : 231-234.

Female : Ghathosoma distinct. Distal palpal segment longer than broad. Body outline irregular, indented all along but more prominent anteriorly and posteriorly. Propodosomal sensory seta almost touches D_1 seta. Propodosomal setae measure : P_1–26, P_2–27, P_3–44, S–45. Hysterosomal setae measure D_1–31, D_2–26, D_3–26, D_4–24, L_1–26, L_2–29, L_3–27, L_4–24, L_5–20. Hysterosomal reticulations as indicated. All empodia with strong claws. Tarsus I with rod-like solenidion. Genital setae 5 pairs, paragenital setae 4 pairs, anal setae 1 pair. Leg setae of I–IV : I– 8, 3, 3, 2, 1, ?; II– 6, 2, 2, 3, 0, ?; III– 5, 2, 1, 2, 1, ?; IV– 5, 2, 1, 1, 0, ?.

Male : Unknown.

Collection Records : This species was described from Nagaland on *Erythrina stricta*.

Habitat : Erythrina stricta.

Distribution : India (Nagaland).

Genus 44. *Paralorryia* Baker

1965. *Paralorryia* Baker, In : *Advances in Acarology*, **2** : **104.**

1968. *Paralorryia*, Baker, *Ann. Ent. Soc. Amer.*, **61** : **1097-**1106.

Diagnosis : Body shape similar to *Lorryia*, seta L_2 in normal lateral position, hysterosomal setae in 4½ rows (L_5 missing). Body covered with striations or partly reticulated, striation longitudinal between D_2, lobes rounded. Genital setae 6 pairs, paragenital setae 4 pairs, anal setae 1 pair, ventral setae 3 pairs. Palp chaetotaxy : 5, 2, 2; palp tarsus long and slender. Chaetotaxy in legs I–IV : I– 8, 3, 3, 3, 1, 2; II– 6, 2, 2, 3, 0, 1; III– 6, 2, 1, 2, 1, 3; IV– 5, 2, 1, 1, 0, 1.

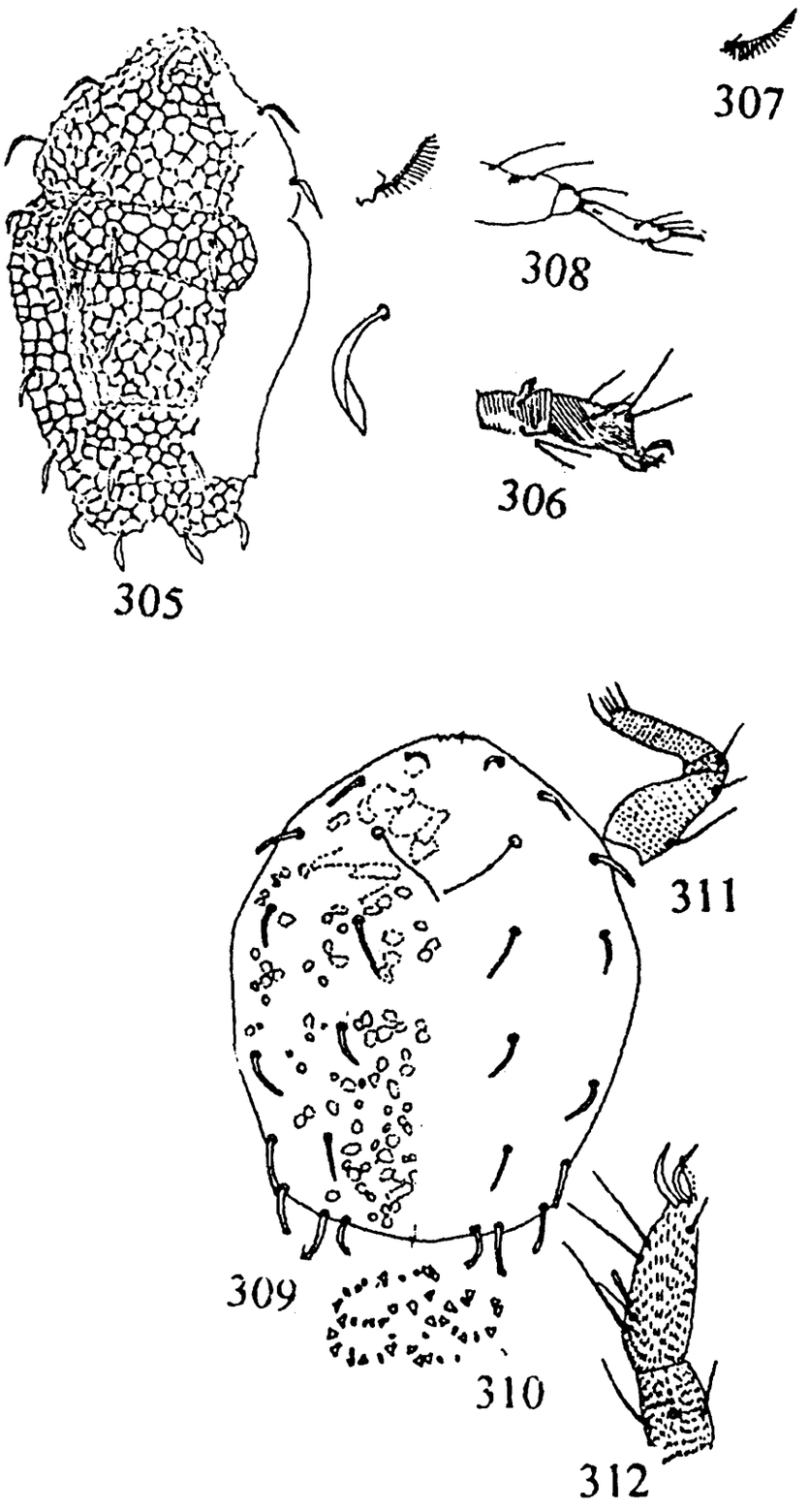
Type ***Lorryia crumbensis*** Baker

110. *Paralorryia fodderi* Gupta
(Figs. 313–315)

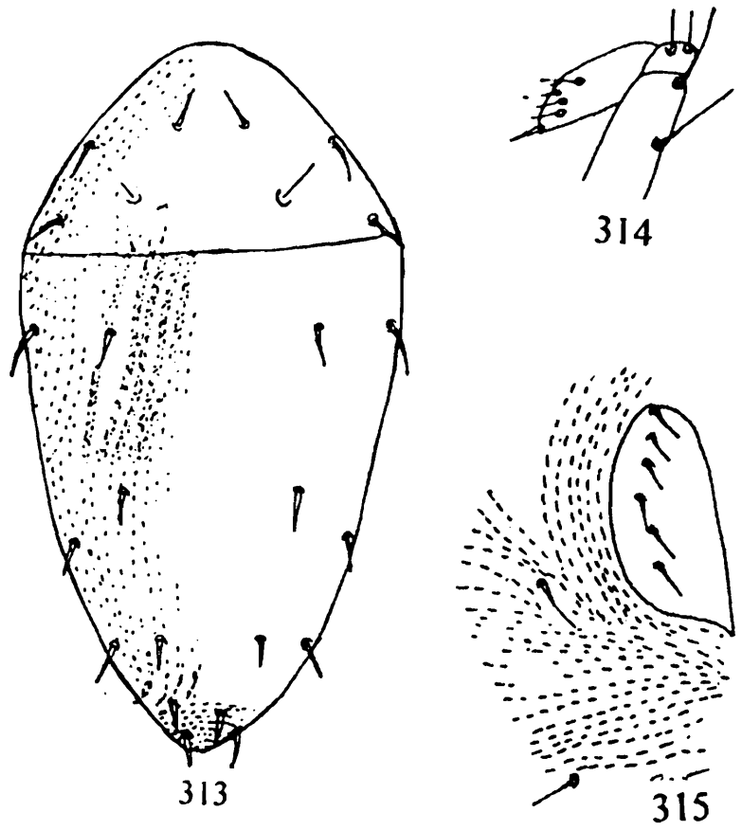
1992. *Paralorryia fodderi* Gupta, In : *State Fauna Ser. 3, Fauna of West Bengal, Part 3*, p.128.

2000. *Paralorryia fodderi*, Gupta, In : *State Fauna Ser. 7, Fauna of Tripura, Part 2*, p. 19.

Female : Dorsum 382 long (from posterior tip of body upto rostrum), 265 wide (maximum width) with 12 pairs of setae, 4 pairs on propodosoma and 8 pairs on hysterosoma. Propodosomal setae P_1–P_3, S almost of same length, measuring 21, 22, 23, 23, respectively. Setae on hysterosoma almost of similar length having slightly broadened tip and



Figs. 305-312 : *Lorryia africana* Baker (female) : 305. Dorsal view, 306. Tibia and tarsus of leg I, 307. Hooked empodium, 308. Palp. (after Baker, 1965); *Lorryia stricta* Gupta (female) : 309. Dorsal view, 310. Ornamentation pattern of dorsum, 311. Palp, 312. Tibia and tarsus of leg I. (after Gupta, 1991)



Figs. 313-315 : *Paralorryia fodderi* Gupta (female) : 313. Dorsal view, 314. Palp, 315. Genitoanal region. (after Gupta, 1992)

measure : D_1–28, D_2–29, D_3–29, D_4–31, L_1–29, L_2–28, L_3–32, L_4–31 Propodosoma and hysterosoma with longitudinal striation excepting at posterior region where it is semicircular. Genital setae 6 pairs, anal setae 1 pair. Empodium with ventral claw.

Male : Unknown.

Collection Records : This species was described from West Bengal, collected on fodder grass.

Habitat : Fodder grass.

Distribution : India (West Bengal).

Genus 45. ***Parapronematus*** Baker

1965. *Parapronematus* Baker, In : *Advances in Acarology*, 2 : 115-116.

Diagnosis : Seta L_2 in dorsal position. Hysterosomal setae in 4½ rows (L_5 missing). Leg I lacks claws and empodium, tarsus ends bluntly in 4 long or short terminal setae. Genital setae 3 pairs, anal setae absent, ventral setae 3 pairs. Chaetotaxy of legs I–IV : I– 6, 2, 2, 3, 1, 2; II– 6, 2, 2, 3, 0, 1; III– 6, 2, 2, 3, 1, 3; IV– 5, 2, 1, 1, 0, 1. Dorsal setae on femur III and IV with forked seta.

Type ***Pronematus acaciae*** Baker

Key to the species of *Parapronematus* known to inhabit plants in India.

1. Solenidion on tarsus I on middle of the segment ..... *murshidabadensis*
– Solenidion on tarsus I not on middle of segment 2
2. Solenidion on tarsus I situated posterior to middle of segment ..... *cameliae*
– Solenidion on tarsus I situated ahead of middle of segment 3
3. Forked seta 1½ times as long as width of segment ..... *ferox*
– Forked seta as long as width of segment ..... *acaciae*

111. ***Parapronematus acaciae*** Baker

(Figs. 316–324)

1965. *Parapronematus acaciae* Baker, *Advances in Acarology*, **2** : 116-117.

1980. *Parapronematus acaciae*, Gupta & Ghosh, *Rec. zool. Surv. India*, **77** : 203.

Female : Body 280 long, 160 wide. Stylophore cleft anteriorly. Palp chaetotaxy; 5, 1, 2, distal segment of palp long and slender. Propodosoma with longitudinal striation. Seta P_1 shifted posteriorly between sensory setae. Body setae stout, serrate and lanceolate; sensory setae longer than body setae. Hysterosoma with longitudinal striation. First and second rows of hysterosomal setae similar to those on propodosoma; third and fourth rows longer. Tibia and tarsus I subequal in length, solenidion slender on tibia and circular on tarsus. Leg setae pilose. Femore III and IV with Y-like dorsal setae.

Male : Body 175 long, 100 wide.

Collection Records : This was described on collection from Belgian Congo on *Acacia* sp. The Indian record is from Car Nicobar Isl. on bamboo.

Habitat : India : Bamboo. Elsewhere : *Acacia* sp.

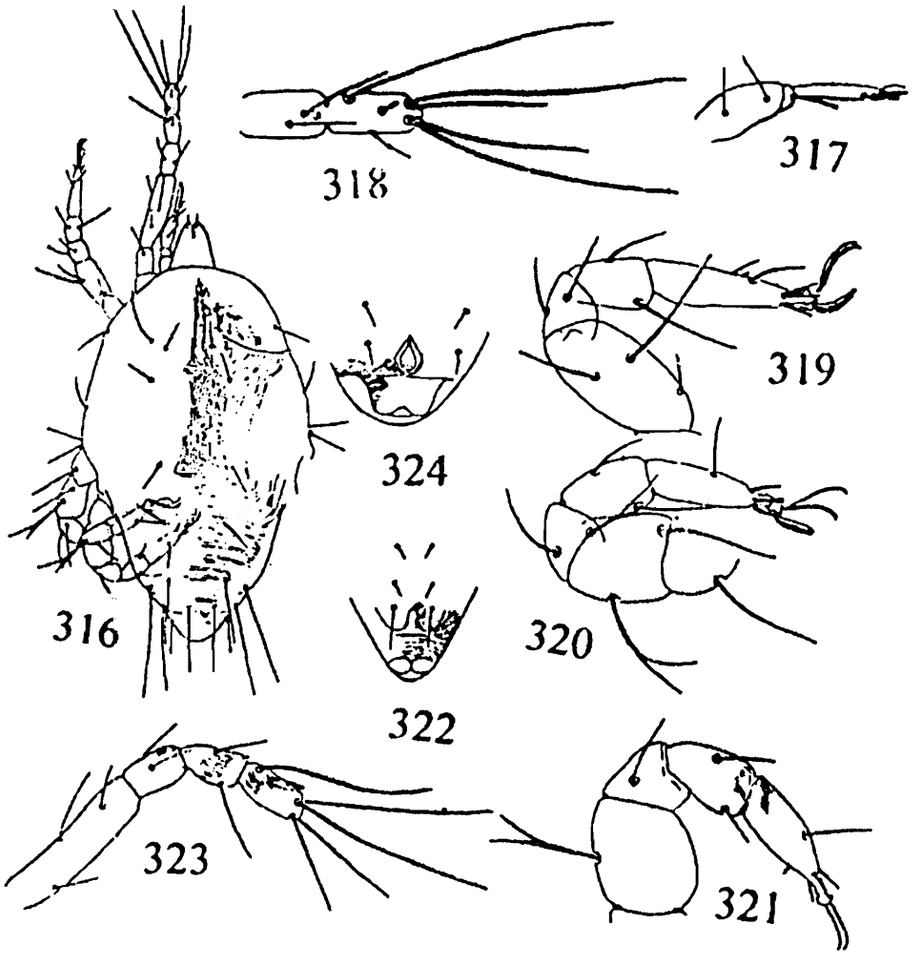
Distribution : India (Andaman & Nicobar Isl.), Africa, Hong Kong, Trinidad, Florida.

112. ***Parapronematus cameliae*** Gupta

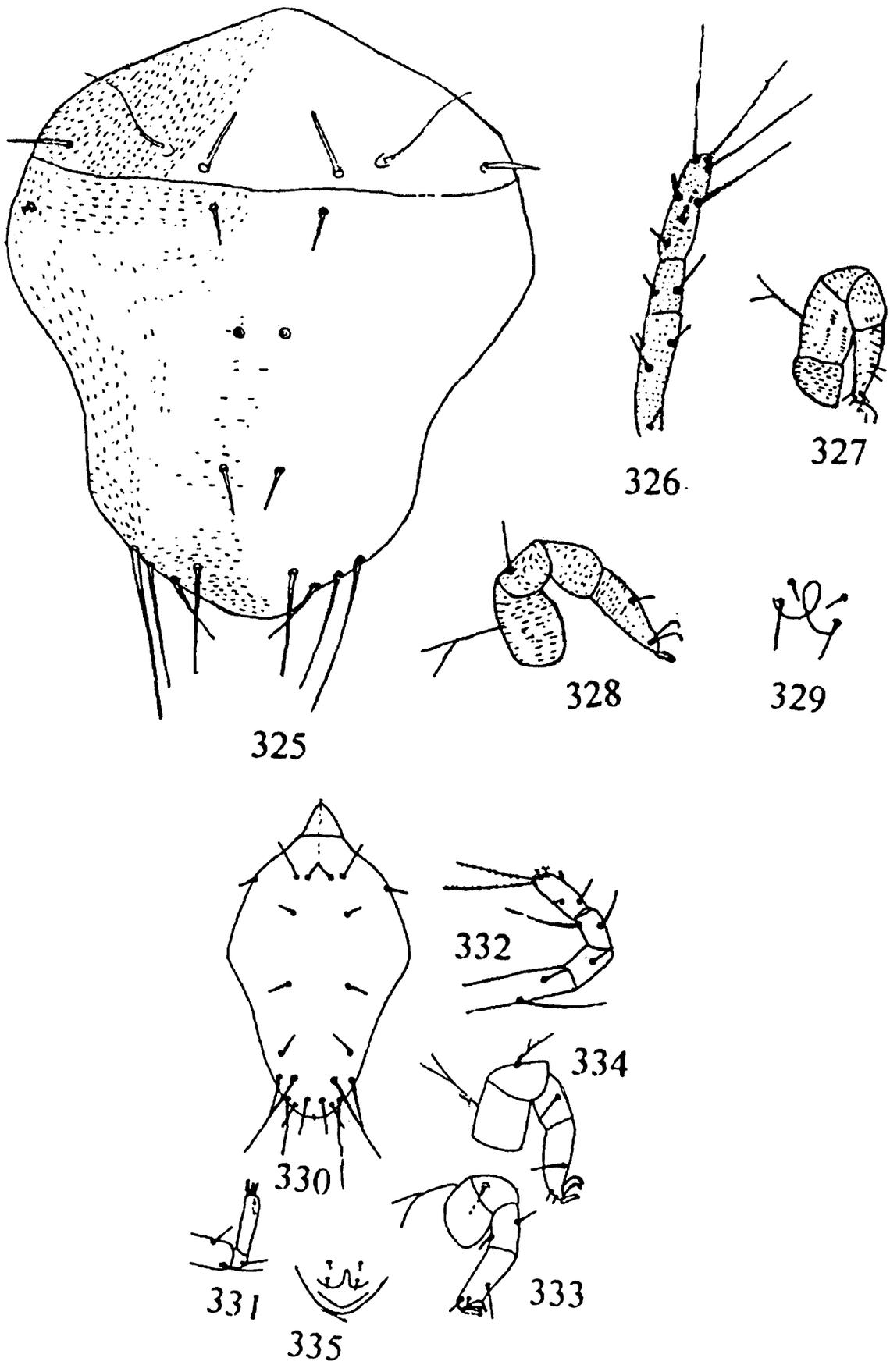
(Figs. 325–329)

1992. *Parapronematus cameliae* Gupta, In : *State Fauna Ser. 3, Fauna of West Bengal, Part 3*, p.126.

Female : Body 224 long, 145 wide. Stylophore cleft present anteriorly. Palp setal formula 4, 1, 2. Striation pattern on propodosoma longitudinal, that



Figs. 316-324 : *Parapronematus acaciae* Baker (female) : 316. Dorsal view, 317. Palp, 318. Tarsus and tibia of leg I, 319. Leg II, 320. Leg III, 321. Leg IV, 322. Genitoanal region, 323. Tarsus and tibia of leg I (male), 324. Genitoanal region (male). (after Baker, 1965)



Figs. 325-335 : *Parapronematus cameliae* Gupta (female) : 325. Dorsal view, 326. Palp, 327. Tibia and tarsus of leg III, 328. Tibia and tarsus of leg IV, 329. Anal region. (after Gupta, 1992); *Parapronematus ferox* Gupta (female) : 330. Dorsal view, 331. Palp, 332. Leg I, 333. Leg III, 334. Leg IV, 335. Genital region. (after Gupta, 1991)

on hysterosoma not clearly visible. P_2 seta absent. P_1 placed posteriorly. Measurements of setae : P_1–25, P_3–22, S–31, D_1–22, D_2– broken, D_3–22, D_4–31, D_5–36, L_1–22, L_2–56, L_3–23, setae P_3, P_1, D_1, D_3, D_1– thick and lanceolate, other setae long, thin and pointed. Solenidion on tarsus I thick, that on tibia I extremely small. Femora III and IV with Y-shaped setae. Leg chaetotaxy as figured.

Male : Unknown.

Collection Records : This species was described from West Bengal, collected on tea.

Habitat : Tea.

Distribution : India (West Bengal).

113. ***Parapronematus ferox*** Gupta

(Figs. 330–335)

1991. *Parapronematus ferox* Gupta, *Rec. zool. Surv. India*, **88** : 231.

Female : Body 266 long, 156 wide. Palp setal formula 5, 1, 2. Distal segment long, slender with thick barbed setae, placed anteriorly, other 2 setae placed below that level. Propodosomal striation indistinct, P_2 missing, P_1 placed posteriorly between sensory setae; S–49, P_1–24; Striation pattern on hysterosoma indistinct. First and second rows of hysterosomal setae similar to propodosomal setae, while third and fourth rows much longer, weakly barbed. Leg chaetotaxy as for the genus. Tibia and tarsus I subequal, solenidion on tarsus I placed little ahead of mid point of segment, tibia with 2 pairs of setae, and a short solenidion, placed anteriorly, other leg setae pilose. Femur III and IV with Y-shaped setae.

Male : Unknown.

Collection Records : The description of this species is based upon collection on *Rubus ferox* from Arunachal Pradesh.

Habitat : Rubus ferox.

Distribution : India (Arunachal Pradesh).

114. ***Parapronematus murshidabadensis*** Gupta

(Figs. 336–341)

1992. *Parapronematus murshidabadensis* Gupta, In : *State Fauna Ser. 3, Fauna of West Bengal, Part 3*, pp. 126.

1999. *Parapronematus murshidabadensis*, Gupta & Chatterjee, *Sci. & Cult.*, **65**(5–6) : 161.

In press. *Parapronematus murshidabadensis*, Gupta, In : *State Fauna Ser. 9, Fauna of Sikkim*.

Female : Body 278 long, 168 wide, Stylophore cleft anteriorly. Palpal setal formula 4, 1, 2, distal palpal segment long and slender. Propodosoma with longitudinal striation. P_2 absent. P_1 shifted posteriorly between sensory setae. Measurements of setae : P_1–22, P_3–24, S–47, all propodosomal setae thick and lanceolate. Hysterosoma with longitudinal striation upto D_3 and transverse thereafter. D_1–22, $D_2 = D_3$–21, D_4–44, D_5–40, L_1–24, L_2–78, L_3–56. Solenidion on tarsus I thick and that on tibia I blunt.

Male : Unknown.

Collection Records : The description of this species is from West Bengal, collected on Banyan tree.

Habitat : Banyan (*Ficus religiosa*).

Distribution : India (West Bengal).

115. ***Parapronematus*** sp.

1980. *Parapronematus* sp., Gupta & Ghosh, *Rec. zool. Surv. India*, **77** : 203.

Collection Records : An undetermined species of this genus was collected from Car Nicobar Isl. collected on *Mangifera indica*.

Habitat : Mangifera indica.

Distribution : India (Andaman & Nicobar Isls.).

Genus 46. ***Pronematus*** Canestrini

1886. *Pronematus* Canestrini, *Att. Ist Veneto Ser. 6*, **4** : 698.

1933. *Pronematus*, Thor, *Das Tierreich*, **60** : 45.

1952. *Pronematus*, Baker & Wharton, *An introduction to Acarology*, p.192.

1965. *Pronematus*, Baker, *Advances in Acarology*, **2** : 114.

1966. *Pronematus*, Meyer & Rodriguez, *Garcia de Orta*, **13**(2) : 19.

1968. *Pronematus*, Baker, *Ann. Ent. Soc. Amer.*, **61** : 1091.

Diagnosis : L_2 seta on dorsal position, tarsus I lacks claws and empodium and it ends in 4 long terminal setae. Hysterosomal setae in 4½ rows, L_5 missing. Propodosoma with setae P_1, P_2, P_3, S. Anal setae 1 pair, 4 pairs of setae anterior to latered from genitalia, ventral setae 3 pairs. Leg chaetotaxy : I–6, 3, 3, 3, 0, 2; II–6, 2, 3, 2, 0, 1; III–5, 2, 2, 2, 1, 3; IV–5, 2, 1, 2, 0, 1. Femur IV not divided. Palpal setal formula 5, 1, 2.

Type ***Pronematus bonatii*** Canestrini

Key to the species of *Pronematus* known to inhabit plants in India.

1. Tarsus I as long as or longer than tibia I 2
– Tarsus I shorter than tibia I ..... *mcgregori*
2. Distal setae of tersus I serrate along entire length 3
– Distal setae on tarsus I not serrate along entire length 5
3. Solenidion on tarsus I medial ..... *fleschneri*
– Solenidion on tarsus I distal 4
4. Ventral body setae 1/2 as long as distance between bases ..... *ubiquitus*
– Ventral body setae short, not 1/3 as long as distance between bases ..... *sextoni*
5. Dorsal body setae short, not 1/2 as long distance between bases, distal segment of palp short ..... *elongatus*
– Dorsal body setae longer, 1/2 as long as distance between bases, distal segment of palp normal ..... *anconai*

116. ***Pronematus*** sp. nr. ***anconai*** Baker

1943. *Pronematus anconai* Baker, *Rev. Soc. Mex. Hist. Natur.* **4**(3-4) : 188-189.

1968. *Pronematus anconai*, Baker, *Ann. Ent. Soc. Amer.*, **61**: 1094-1095.

1979. *Pronematus* sp. nr. *anconai*, Pandey *et al. Indian J. Ent.*, **40** : 197-200.

Collection Records : Pandey *et al.*, (1979) reported this species from Rajasthan on *Clerodendron inerme*.

Habitat : Clerodendron inerme.

Distribution : India (Rajasthan).

117. ***Pronematus elongatus*** Baker

(Figs. 342–346)

1968. *Pronematus elongatus* Baker, *Ann. Ent. Soc. Amer.*, **61** : 1093-1094.

1993. *Pronematus elongatus*, Rather, *J. Acar.*, **15** : 20.

Female : According to Baker (1968), rostrum elongated, not strongly cleft; movable chela strong and of medium length; distal segment of palp slightly longer than penultimate segment. Propodosoma with fine longitudinal striation. Sensory setae whip like, Serrate, about 3 times the length of other propodosomal setae. Seta P_1 far posterior of sensory setae. Hysterosoma with transverse striation over dorsocentral area, except V-like pattern between D_1–D_2. Setae D_1, D_2, L_1, L_2 subequal in length, D_3 longer, D_4, L_3, L_4 subequal in length. Tarsus I longer than tibia I. Distal setae of tarsus I almost as long as segment; solenidion on tarsus I short and rounded and that on tibia I shorter.

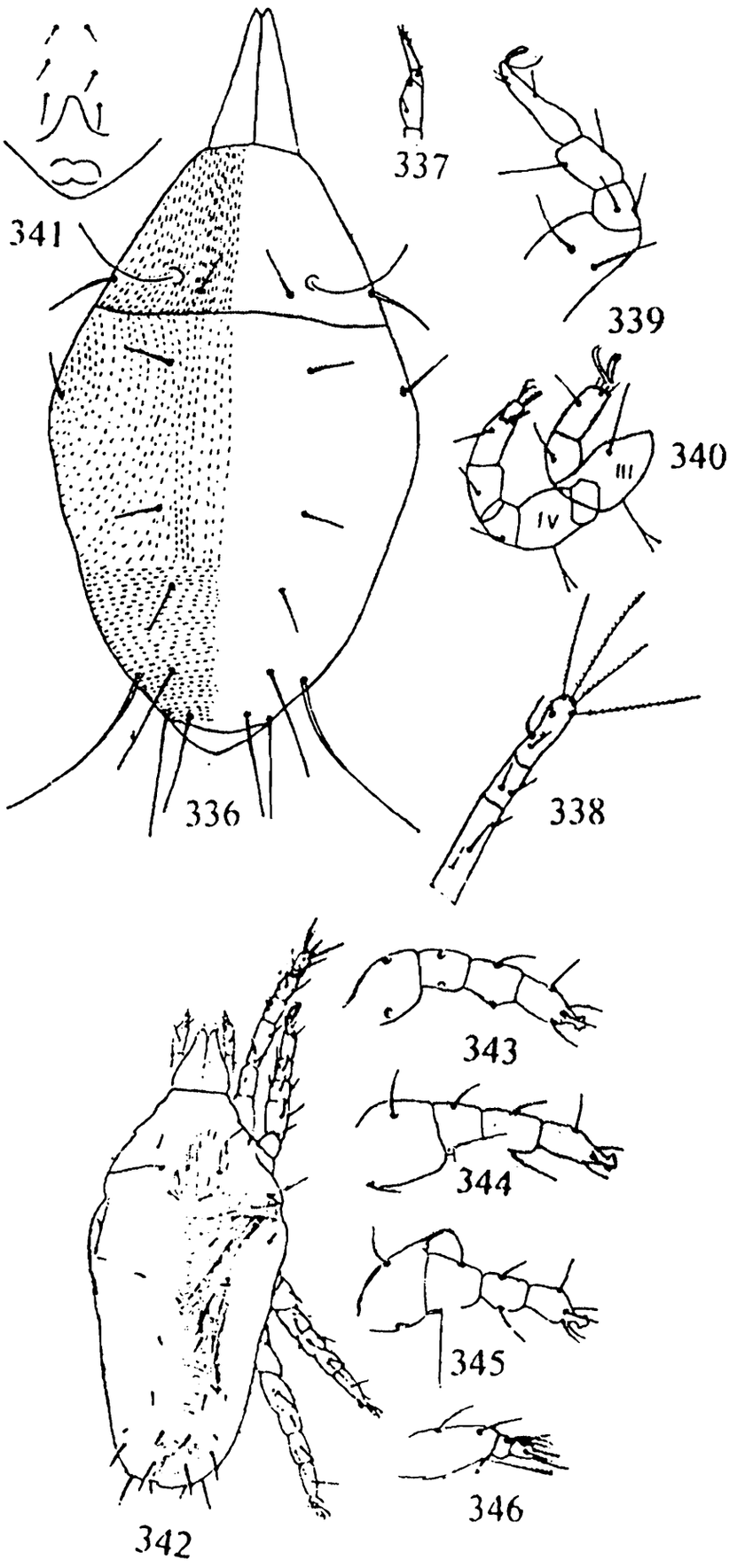
Male : Baker (1968) described it.

Collection Records : The description of this species is based on collection on *Bouteloua barbata* from Arizona, U.S.A. Its Indian record is from Jammu & Kashmir on grape vine feeding upon grape vine mite.

Habitat : India : Grape vine. Elsewhere : *Bouteloua barbata*.

Distribution : India (Jammu & Kashmir), U.S.A.

Remarks : This mite is reported to be feeding upon grape mite in Jammu & Kashmir (Rather, 1999).



Figs. 336-346 : *Parapronematus murshidabadensis* Gupta (female) : 336. Dorsal view, 337. Palp, 338. Leg I, 339. Leg III, 340. Leg IV, 341. Genital region. (after Gupta, 1992); *Pronematus elongatus* Baker (female) : 342. Dorsal view, 343. Leg III, 344. Leg IV, 345. Leg IV (male). 346. Palp (male). (after Baker, 1968)

118. ***Pronematus fleschneri*** Baker

(Figs. 347–348)

1968. *Pronematus fleschneri* Baker, *Ann. Ent. Soc. Amer.*, **61**(5) : 1092-1093.

1973. *Pronematus fleschneri*, Singh & Putatunda, *Punjab Hort. J.*, **13**(2 & 3).

1974. *Pronematus fleschneri*, Gupta & Dhooria, *Proc. Indian Sci. Congr.*, **61** : 69.

1980. *Pronematus fleschneri*, Gupta & Ghosh, *Rec. zool. Surv. India*, **77** : 202.

1981. *Pronematus fleschneri*, Gupta & Nahar, In : *Contributions to Acarology in India*, pp. 10.

1993. *Pronematus fleschneri*, Mukherjee & Singh, *J. Insect Sci.*, **6**(1) : 135.

1995. *Pronematus fleschneri*, Singh, *Adv. Agri. Res. India*, **3** : 187.

1995. *Pronematus fleschneri*, Rai *et al.*, *Abst. V Nat. Symp. Acarology*, p. 76.

1996. *Pronematus flechneri*, Chatterjee & Gupta, *J. Beng. Nat. Hist. Soc. (NS)*, **15**(2) : 27.

1997. *Pronematus flechneri*, Gupta & Chatterjee, In : *State Fauna Ser. 6, Fauna of Delhi*, pp. 512.

2000. *Pronematus fleschneri*, Gupta, In : *State Fauna Ser. 7, Fauna of Tripura, Part 2*, p. 18-19.

In press. *Pronematus fleschneri*, Gupta, In : *State Fauna Ser. 9, Fauna of Sikkim.*

Female Body 220 long, 125 wide. Rostrum elongate, distal segment of palp 2 times as long as penultimate segment. Propodosomal striation longitudinal with minute lobes. Setae P_1–P_3 subequal in length, strong, serrate, sensory setae longer than other propodosomal setae. Hysterosomal striation fine. Setae D_1–D_3, L_1 subequal in length. Tibia I shorter than tarsus I, the latter with one pair of setae, longer than segment, another pair of shorter setae, all setae serrate. Solenidion on tarsus I extends beyond tip of segment, that on tibia I shorter.

Male : Unknown.

Collection Records : The description of this species is based upon collection on citrus in Delhi. Subsequently, it has been recorded on a number of plants, *viz.* citrus in U.P. associated with *Oligonychus mangiferus* and *Eutetranychus orientalis*; on *Psidium guajava*, *Punica granatum*, *Syzygium cumini* in U.P., on *Oryza sativa* and *Bambusa aurandinacea* in Andaman Isl.; *Solanum melongena*, *Luffa acutangula*, *Capsicum* sp. in West Bengal; on citrus in Tripura and Punjab; on rose in Sikkim and on paddy in Bihar.

Habitat : Psidium guajava, *Syzygium cumini*, *Punica granatum*, *Oryza sativa*, *Bambusa aurandinacea*, *Abelmoschus esculentus*, *Solanum melongena*, *Luffa acutangula*, *Capsicum* sp., rose.

Distribution : India (Tripura, Sikkim, West Bengal, Bihar, Delhi, Punjab, Uttar Pradesh, Andaman & Nocobar Isls.).

Remarks : This species appears to be a good predator and has been observed to feed upon *Tetranychus neocaledonicus* infesting brinjal (Chatterjee & Gupta, 1996), on spider mites in Gujarat (Rai *et al.*, 1995). Its association with spider mites like *Oligonychus mangiferus* and *Eutetranychus orientalis* has also been reported from U.P. (Singh & Putatunda, 1975). May be, more thorough investigation on feeding habit of this species will prove to be profitable.

119. ***Pronematus mcgregori*** Baker

(Figs. 349–350)

1968. *Pronematus mcgregori* Baker, *Ann. Ent. Soc. Amer.*, **61** : 1095.

1979. *Pronematus mcgregori*, Pandey *et al.*, *Indian J. Ent.*, **40** : 197-200.

Female : Body 280 long, 130 wide. Distal segment of palp elongated. Propodosomal striation longitudinal upto D_2 setae, P_1, P_3 subequal and longer than P_2. Sensory setae long, slender and serrate. D_1–D_4, L_1–L_2 subequal and shorter than L_3 and L_4; all setae gently serrate. Ventral body setae short. Distal setae on tarsus I longer than segment, solenidion on tarsus I slender about as long as segment, that on tarsus II long and slender.

Male : Unknown.

Collection Records : The description of this species is based upon material colected on ornamental plant in Belgian Congo and the Indian record is from Rajasthan on *Clerodendron inerme*.

Habitat : India : *Clerodendron inerme*, Elsewhere : Ornamentals.

Distribution : India (Rajasthan), Africa.

120. ***Pronematus sextoni*** Baker
(Figs. 351–352)

1968. *Pronematus sextoni* Baker, *Ann. Ent. Soc. Amer.*, **61** : 1092-1093.

1982. *Pronematus sextoni*, Dhooria, *Acar. Newsl.*, **11** : 6.

1993. *Pronematus sextoni*, Mukherjee & Singh, *J. Insect. Sci.*, **6** : 135.

1995. *Pronematus sextoni*, Jagadish *et al.*, *Abst. V Nat. Symp. Acar., Bangalore*, p. 17.

1995. *Pronematus sextoni*, Singh, *Adv. Agr. Res. India*, **3** : 188.

1996. *Pronematus sextoni*, Chatterjee & Gupta, *J. Beng. Nat. Hist. Soc., (NS)*, **15**(2) : 27.

1997. *Pronematus sextoni*, Gupta & Chatterjee, *State Fauna Ser. 6, Fauna of Delhi*, p. 518.

Female : Rostrum not much longer than broad at base. Chelicera and palp normal. Propodosoma with fine longitudinal striation without lobes. P_1, P_2 long, serrate, subequal, sensory setae similar to other propodosomal setae. Hysterosomal setae of moderate length. Ventral body setae less than 1/3 than the distance between their bases. Tarsus I longer than tibia I, distal setae longer than segment, serrate along eitire length, solenidion on tarsus I bent.

Male : Unknown.

Collection Records : This species was described from Belgian Congo collected on *Ficus* sp. The Indian records are on *Psidium guajava*, *Artocarpus heterophylla*, *Zizyphus jujuba* in U.P.; on guava and mango from Karnataka, on *Psidium guajava* and *Allium* sp. from West Bengal and on citrus in Delhi.

Habitat : India : *Psidium guajava*, *Artocarpus heterophylla*, *Zizyphus jujuba*, mango, *Allium* sp., citrus. Elsewhere : *Ficus* sp., *Acacia* sp., *Hibiscus* sp.

Distribution : India (West Bengal, Delhi, Uttar Pradesh, Karnataka), Africa.

Remarks : Its predatory habit has been recorded in Karnataka on guava as well as on mango mite (Jagadish *et al.*, 1995) on citrus mite *Eutetranychus orientalis* in Delhi (Dhooria, 1982).

121. ***Pronematus ubiquitus*** (McGregor)
(Figs. 353–361)

1932. *Tydeus ubiquitus* McGregor, *Proc. Ent. Soc. Wash.*, **34** : 62.

1933. *Pronematus ubiquitus*, Thor, *Das Tierreich*, **60** : 46.

1946. *Pronematus ubiquitus*, Baker, *Ann. de la. Esc. de Ciencias Biol.*, **4**(2-3) : 255.

1965. *Pronematus ubiquitus*, Baker, *Advances in Acarology*, **2** : 115.

1966. *Pronematus ubiquitus*, Meyer & Rodriguez, *Garcia orta*, **13**(2) : 19.

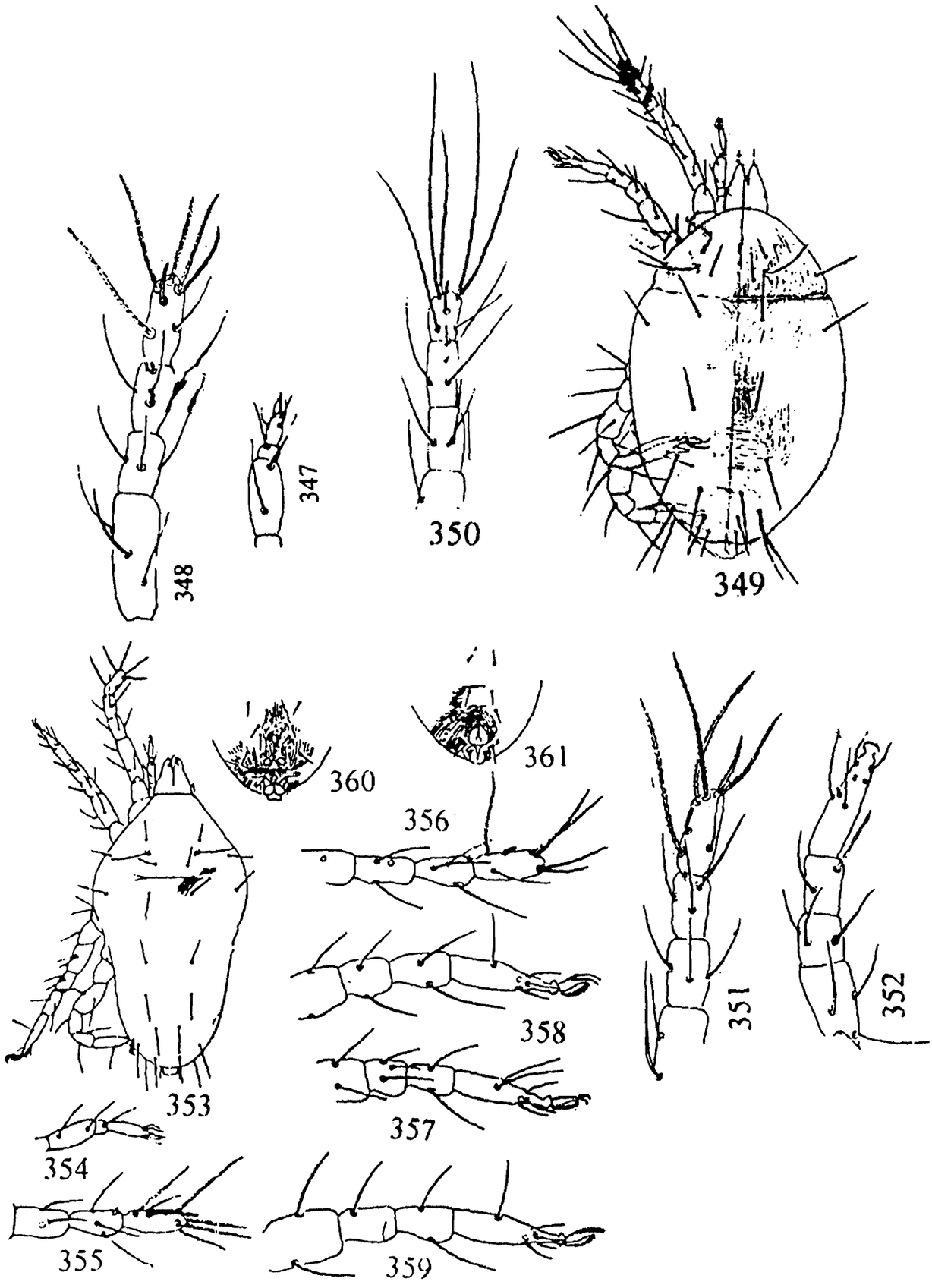
1968. *Pronematus ubiquitus*, Baker, *Ann. Ent. Soc. Amer.*, **61** : 1003.

1993. *Pronematus ubiquitus*, Mukherjee & Singh, *J. Insect Sci.*, **6**(1) : 135.

1995. *Pronematus ubiquitus*, Singh, *Adv. Agri. Res. India*, **3** : 188.

1996. *Pronematus ubiquitus*, Chatterjee & Gupta, *J. Beng. Nat. Hist. Soc., (NS)*, **15**(2) : 27.

Female : Rostrum elongate, distal palpal segment broadish. at mid point. Propodosomal striation longitudinal with minute lobes. P_1–P_3 strong, serrate, subequal. Hysterosomal striation longitudinal to D_3; dorsal setae longer than propodosomals, D_5 very short, L_3 longest. Ventral body setae 1/2 as long as distance between their bases. Tarsus I longer than tibia II; distal setae of tarsus I serrate at tips; longest pair longer than segment, other two setae as long as segment; solenidion stout, bent at base, that on tibia I short and straight, that on tibia II as long as that on tibia I.



Figs. 347-361 : *Pronematus fleschneri* Baker (female) : 347. Palp, 348. Leg I. (after Baker, 1968); *Pronematus mcgregori* Baker (female) : 349. Dorsal view, 350. Leg I. (after Baker, 1968); *Pronematus sextoni* Baker (female) : 351. Leg I, 352. Leg II. (after Baker, 1968); *Pronematus ubiquitus* (McGregor) (female) : 353. Dorsal view, 354. Palp, 355. Leg I of male, 356. Leg I (female), 357. Leg II (female), 358. Leg III (female), 359. Leg IV (female), 360. Genitoanal region (female), 361. Genitoanal region (male). (after Baker, 1965)

Male : Body setae shorter, solenidion on tarsus I longer.

Collection Records : The description of this species is based upon collection from Arizona. The Indian records are from *Ficus carica* and *Pyrus communis* in U.P. and on *Psidium quajava* in West Bengal.

Habitat : India : *Ficus carica, Pyrus communis, Psidium guajava.* Elsewhere : on variety of plants.

Distribution : India (West Bengal, Uttar Pradesh), U.S.A. Mexico, Egypt, South Africa.

122. ***Pronematus*** spp.

1917. *Pronematus* sp., Sadana & Kanta, *Sci. & Cult.*, **37**(11) : 530.

1979. *Pronematus* sp., Pandey *et al.*, *Indian J. Ent.*, **40** : 197-200.

Collection Records : Some undetermined *Pronematus* species were reported on citrus in Punjab.

Habitat : Citrus.

Distribution : India (Punjab).

Remarks : Sadana & Kanta (1971) reported this mite feeding upon *Eutetranychus orientalis* in Punjab.

Genus 47. ***Tydeus*** Koch

1835. *Tydeus* Koch, *CMA Fasc*, **4** : 12.

1931. *Brachytydeus* Thor, *Zool. Anz.*, **44** : 102-104.

1933. *Stylotydeus* Thor, *Das Tierreich*, **60** : 50.

1937. *Calotydeus* Oudemans, *Kritich Historisch Overzicht der Acarologische*, 922.

1952. *Brachytydeus*, Baker & Wharton, *An introduction to Acarology*, p. 191

1966. *Tydeus*, Meyer & Rodriguez, *Garcia de Orta*, **13**(2) : 22.

Diagnosis : L_2 seta on normal lateral podition, slightly benind and latered to D_2. Propodosoma with fine longitudinal striation and hysterosoma with transverse striation on dorsomedian region. Hysterosomal setae in 4½ rows (L_5 missing). Genital setae 5 or 6 pairs, paragenital setae 4 pairs. Anal setae 1 pair. Ventral setae 3 pairs. Palp setal formula 5, 2, 2, palp tarsus long and slender. All tarsi possess claws and empodium. Chaetotaxy of legs : I– 8, 3, 3, 3, 1, 2; II– 6, 2, 2, 2, 0, 1; III– 5, 2, 1, 1, 1, 3; IV– 5, 2, 1, 1, 0, 1. Femur IV undivided.

Type ***Tydeus kochi*** Oudemans

Key to the species of *Tydeus known to inhabit plants in India.**

1. D_3 and D_4 of same length 2
– D_3 much longer (slightly less than double) than D_4 ..... *ornamentalicus*
2. L_2 and L_1 of same length 3
– L_2 longer than L_1 ..... *cumini*
3. D_4 less than 10 microns ..... *wallachi*
– D_4 over 20 microns ..... *gossabaensis*

123. ***Tydeus cumini*** Gupta
(Figs. 362–367)

1992. *Tydeus cumini* Gupta, In : *State Fauna Ser. 3, Fauna of West Bengal, Part 3*, p. 134.

2000. *Tydeus cumini*, Gupta, In : *State Fauna Ser. 7, Fauna of Tripura, p. 19.*

Female : Body 380 long, 280 wide. Propodosomal striation longitudinal including in the region between sensory setae, striation pattern oblique and irregular in lateral propodosomal area. Striation pattern in hysterosomal area between D_1–D_2 longitudinal, V-shaped in the region between D_2 and longitudinal between L_1–L_2 and transverse in posterior tip of body. P_1–22, P_2–18, P_3–25, S–22, all propodosomal setae thick. Hysterosomal setae : D_1–20, D_2–22, D_3–27, D_4–26, D_5–20, L_1–20, L_2–26, L_3–29, L_4–22. Chaetotaxy of legs as illustrated.

Male : Unknown.

**schusteri* not included in this key for want of required information & details.

Collection Records : The description of this species is based upon collection on black berry in West Bengal.

Habitat : Black berry.

Distribution : India (West Bengal).

124. ***Tydeus gossabaensis*** Gupta

(Figs. 368–373)

1992. *Tydeus gossabaensis* Gupta, In : *State Fauna Ser. 3, Fauna of West Bengal, Part 3*, pp. 131.

In press. *Tydeus gossabaensis*, Gupta & Chatterjee, *State Fauna Ser. 11, Fauna of Mizoram.*

In press. *Tydeus gossabaensis*, Gupta, In : *State Fauna Ser. 9, Fauna of Sikkim.*

Female : Dorsum 350 long (from posterior tip of body upto tip of rostrum), 269 wide. Propodosoma with longitudinal striation medially and also between sensory setae, transverse striation between D_1 setae, v-shaped postriorly, transverse anterior to D_3 and beyond that region, and rounded at the extreme posterior tip. All dorsal setae mostly thick with pointed tip. Setae D_3, D_4, D_5, L_3, L_4 with spatulate tip. Measurements of setae : P_1–22, P_2–22, P_3–26, S–24, D_1–20, D_2–24, D_3–26, D_4–26, D_5–22, L_1–29, L_2–29, L_3–21, L_4–21.

Male : Unknown.

Collection Records : The description of this species is based upon material from West Bengal, collected on an unidentified plant.

Habitat : Unidentified plant.

Distribution : India (West Bengal).

125. ***Tydeus ornamentalicus*** Gupta

(Figs. 374–379)

1992. *Tydeus ornamentalicus* Gupta, In : *State Fauna Ser. 3, Fauna of West Bengal, Part 3*, pp. 131.

1996. *Tydeus ornamentalicus*, Gupta & Chatterjee, *J. Beng. Nat. Hist. Soc. (NS)*, **15** : 37.

Female : Dorsal body setae simple and thick. Striation transverse between D_3. Propodosoma with 3 pairs of setae in addition to sensory setae. P_1–21, P_2–24, P_3–31, S–33. Striation on propodosoma longitudinal in the region anterior to P_3 but transverse between those seta, V-shaped between D_2 and D_3 and transverse posterior to D_3. Hysterosomal setae measure : D_1–29, D_2–33, D_3–38, D_4–20, D_5–22, L_1–35, L_2–35, L_3–40, L_4–19. Genital setae 6 pairs. Palp setal formula 5, 2, 2. Anal setae 1 pair, paragenital setae–4 pairs. Chelicera long and needle like, stylophore rounded.

Male : Unknown.

Collection Records : This species was described from Darjeeling, West Bengal, collected on ornamental plant. Subsequently, it was also collected from Darjeeling on tulip.

Habitat : Undet, ornamental plant, tulip.

Distribution : India (West Bengal).

126. ***Tydeus schusteri*** Andre & Naudo

1965. *Tydeus schusteri* Andre & Naudo, *Acarologia*, **7(4)** : 673.

1970. *Tydeus (Paratydeus) schusteri*, Baker, *Ann. Ent. Soc. Amer.*, **63** : 166.

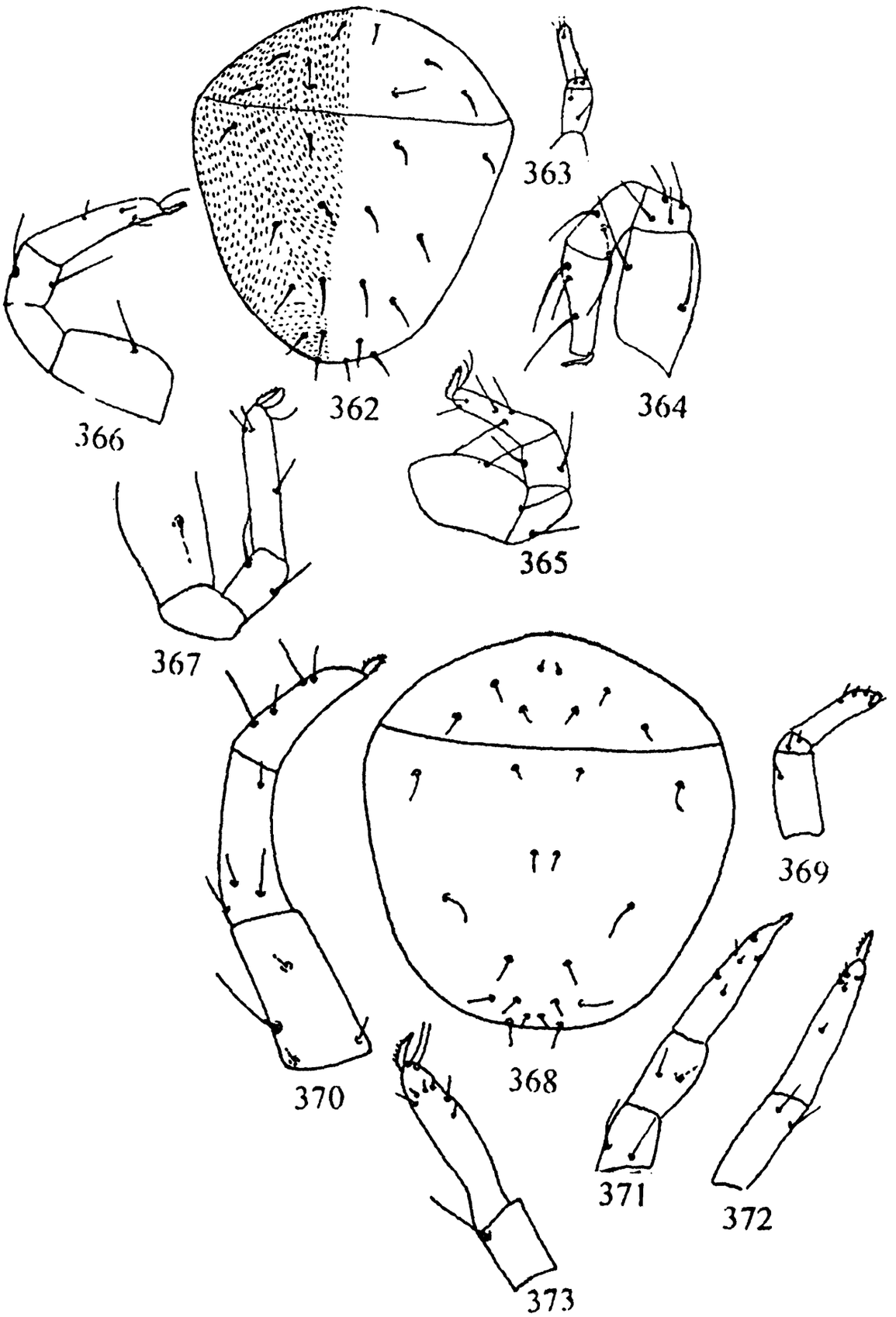
1995. *Tydeus (Paratydeus) schusteri*, Singh, *Adv. Agri. Res. India*, **3** : 188.

Diagnosis : Body setae short, slender, nude.

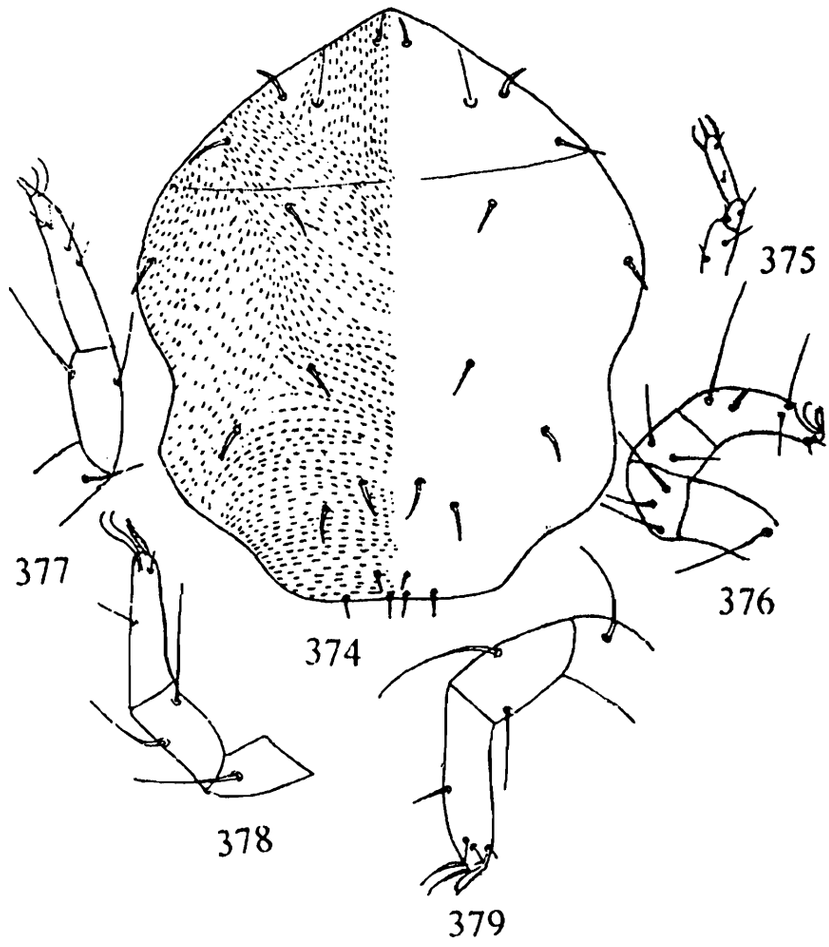
Collection Records : In abroad, this species was collected from Brazil on sea shore. In India, it has been recorded on *Pyrus malus*, *Prunus americana*, *Prunus* sp. in U.P.

Habitat : Pyrus malus, Prunus americana, Prunus sp.

Distribution : India (Uttar Pradesh), Brazil.



Figs. 362-373 : *Tydeus cumini* Gupta (female) : 362. Dorsal view, 363. Palp, 364. Leg I, 365. Leg II, 366. Leg III, 367. Leg IV. (after Gupta, 1992); *Tydeus gossabaensis* Gupta (female) : 368. Dorsal view, 369. Palp, 370. Leg I, 371. Leg II, 372. Leg III, 373. Tibia and tarsus of leg IV. (after Gupta, 1992)



Figs. 374-379 : *Tydeus ornamentalicus* Gupta (female) : 374. Dorsal view, 375. Palp, 376. Tibia and tarsus of leg I, 377. Tibia and tarsus of leg II, 378. Leg III, 379. Leg IV. (after Gupta, 1992)

127. ***Tydeus wallachi*** sp. nov. Gupta & Chatterjee

(Figs. 380–385)

Female : Dorsum 201 long, 159 wide, propodosoma with longitudinal striation except in the region of propodosoma where it is irregular. The second pair of seta on propodosoma smaller in comparison to other two pairs of setae. Sensory setae fine, pointed, almost 1½ times as long as other propodosomal setae. Striation in the middle of region of hysterosoma transverse, longitudinal near the margin. Striation at the posteriormost region roundish. Measurements of setae : P_1–17, P_2–14, P_3–17, S–24, D_1–9, D_2–11, D_3–9, D_4–9, D_5–7, L_1–9, L_2–9, L_3–9, L_4–9. Palp 3 segmented. Palp femur with 1 long seta, genu–2 setae, tibia–2 setae, all three terminal setae of palp of same length. Leg chaetotaxy of tibia and tarsus I–IV as illustrated.

Male : Unknown.

Collection Records : Holotype Female, India : Mizoram, Lunglei, Longtalai, Sairep, on *Schima wallachi*, 17.12.1994.

Habitat : Schima wallachi.

Distribution : India (Mizoram).

Remarks : This new species is very close to *Tydeus gossabaensis* Gupta (1992) but differs from it in having D_4 seta less than 10 microns while it is more than 20 microns in case of *gossabaensis*.

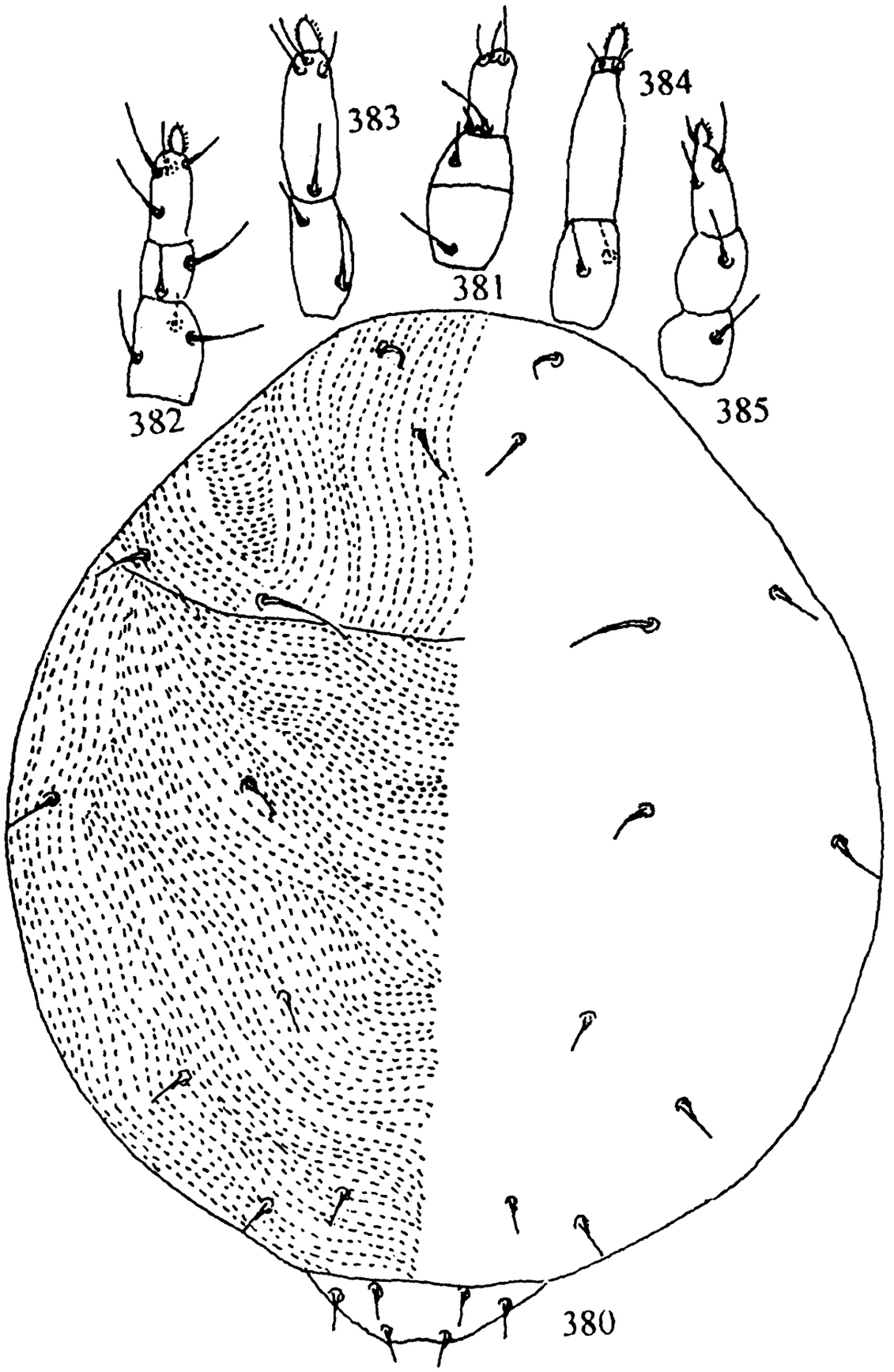
128. ***Tydeus*** spp.

1989. *Tydeus* sp., Somchoudhury & Mukherjee, In : *Progress in Acarology*, **2** : 361-367.

1991. *Tydeus* sp., Gupta, *Rec. zool. Surv. India*, **88** : 234.

1995. *Tydeus* sp., Gupta, In : *State Fauna Ser. 4, Fauna of Meghalaya, Part 2*, pp. 41.

1996. *Tydeus* sp., Chatterjee & Gupta, *J. Beng. Nat. Hist. Soc. (NS)*, **15** : 27.



Figs. 380-385 : *Tydeus wallachi* Gupta & Chatterjee sp. nov. (female) : 380. Dorsal view, 381. Palp, 382. Distal segments of leg I, 383. Distal segments of leg II, 384. Distal segments of leg III, 385. Distal segments of leg IV.

2000. *Tydeus* sp., In : *State Fauna Ser. 7, Fauna of Tripura, Part 2*, p. 19.

In press. *Tydeus* sp., Gupta, In : *State Fauna Ser. 9, Fauna of Sikkim.*

Collection Records : Several undetermined species of *Tydeus* were recorded as on litchi in West Bengal, on *Magnolia champa* as well as an undet, plant in Meghalaya, *Rosa centrifolia* in West Bengal, *Mallotus philippensis* in Tripura and orchid in Sikkim.

Habitat : Litchi, *Magnolia champa*, undet. plant, *Rosa centrifolia*, *Mallotus philippensis*. Further identifications wer not possible due to their damaged conditions.

Distribution : India (Meghalaya, Sikkim, Tripura, West Bengal).

Order II ASTIGMATA

12. Family ACARIDAE Ewing & Nesbitt

1959. Acaridae, Robertson, *Aust. J. Zool.*, 7 : 146-181.

1964. Acaridae, Griffiths, *Bull. Brit. Mus. Nat. Hist. (Zool.)*, 11(6) : 413-464.

1966. Acaridae, Meyer & Rodriguez, *Garcia de Orta*, 13(2) : 25.

1970. Acaridae, Griffiths, *Bull. Brit. Mus. Nat. Hist.*, **19** : 89-120.

1972. Acaridae, Manson, *Acarologia*, 13(4) : 621-650.

1973. Acaridae, Meyer *et al.*, *Ent. Mem. Dept. Agr. Tech. Ser. Repub. S. Afr.*, **29** : 31.

1976. Acaridae, Hughes, *The mites of stored food and houses, Tech. Bull.*, **9** : 28.

1985. Acaridae, Gupta, *Handbk. Plant mites of India*, pp. 407.

1990. Acaridae, Fain & Collof, *J. Nat. Hist.*, **24** : 667.

1990. Acaridae, Fain & Gerson, *Acarologia*, 31(4) : 381.

1990. Acaridae, Fain & Mahunka, *Entomologia*, **60** : 109.

1992. Acaridae, Gupta, In : *State Fauna Ser. 3, Fauna of West Bengal, Part 3*, pp. 186.

1995. Acaridae, Gupta, In : *State Fauna Ser. 4, Fauna of Meghalaya, Part 2*, pp. 44.

1996. Acaridae, Chatterjee & Gupta, *J. Beng. Nat. Hist. Soc. (NS)*, **15** : 27.

1997. Acaridae, Gupta & Chatterjee, In : *State Fauna Ser. 6, Fauna of Delhi*, pp. 528.

Diagnosis : Body distinguishable into 2 regions by a transverse line into propodosoma and hysterosoma. Body stout, white. Chelicera chelate. Five pairs of setae present on propodosoma : (i) rostral setae, (ii) Grandjean's organ, (iii) cervical setae, (iv) outer propodosomal and (v) inner propodosomal setae. A pair of pseudostigmatic organ also present on propodosoma. Male and female genitalia opening present between coxae III and IV. Two copulatory suckers on sides of male anus. Epimera I fused with sternum, all others are free. Tarsus I bears characteristic setae.

Type ***Acarus*** Linnaeus, 1758

Key to the genera of ACARIDAE known to inhabit plants in India (after Hughes, 1976)

1. External vertical setae ve arising near the anterior angles of the dorsal propodosomal shield at the same level as vi or slightly posterior*.

* Setae on the dorsal apex of tarsus I, short and needle shaped; 5 ventral terminal spines at the end of tarsi, of which the 3 central ones thickened ..... *Tyrophagus*

— Setae ve rudimentary or absent, or when present arising near the middle of the lateral edge of propodosomal shield**.

** A complete set of setae present on the dorsal and lateral surface of the idiosoma, the posterior edge of the hysterosoma is not produced into projecting shield in the male .... *Caloglyphus*

Genus 48. ***Caloglyphus*** Berlese

1961. *Caloglyphus* Hughes. *The mites of Stored food, Tech. Bull. Ministry of Agric., London, No.* **9** : 1-287.

1976. *Caloglyphus*, Hughes, *The mites of stored food and houses. Ministry of Agric. Fisheries & Food, Tech. Bull.* **9** : 88.

Diagnosis : Setae ve represented either by short fine setae arising near the middle of the lateral edge of the propodosomal shield or are absent. Setae Sc e

longer than Sc i. Sc i always present and well developed. Complete set of setae present on the dorsal and lateral surfaces of hysterosoma, longer setae may be expanded at the base, on leg I and II, ba not thickened to form conical spine and always well separated from omega$_1$. Five ventral terminal setae present. Heteromorphic males and hypopial stages commonly available (Hughes, 1976).

Type ***Sancassania cheloni*** Oudemans

Remarks : Although Samsinak (1960) synonymised *Caloglyphus* with *Sancassania* Oudemans but Hughes (1976) did not accept this view and retained *Caloglyphus.*

129. ***Caloglyphus*** sp.

1981. *Caloglyphus* sp., Chandra & Mital. In : *Contributions to Acarology in India,* pp. 107.

Collection Records : Chandra & Mital (1981) recorded it in Uttar Pradesh on *Chrotogonus tetrachypterus.*

Habitat : Chrotogonus tetrachypterus.

Distribution : India (Uttar Pradesh).

Remarks : This mite was reported to infest egg pods of and early inster nymphs of this locust and could effectively control it.

Genus 49. ***Sancassania***

130. ***Sancassania*** sp.

1986. *Sancassania* sp., David & Nandagopal, *Abst. VII Internat. Congr. Acar., Bangalore,* p. 58.

Collection Records : David & Nandagopal (1986) recorded this species on sugarcane white grub, *Holotricha serrata* in Tamil Nadu.

Habitat : Holotricha serrata on sugarcane.

Distribution : India (Tamil Nadu).

Remarks : This mite was reported to feed upon eggs of sugarcane white grub, in Tamil Nadu.

Genus 50. ***Tyrophagus*** Oudemans

1924. *Tyrophagus* Oudemans, *Acarologische Aanteekenengen LXXVII 77, Ent. Ber.*, **6** : 250.

1959. *Tyrophagus*, Robertson, *Aust. J. zool.*, **7** : 146-181.

1976. *Tyrophagus*, Hughes, pp. 49-50.

1985. *Tyrophagus*, Gupta, *Handbk. Plant mites of India*, pp. 409.

1992. *Tyrophagus*, Gupta, In : *State Fauna Ser. 3, Fauna of West Bengal, Part 3*, pp. 186.

1995. *Tyrophagus*, Gupta, In : *State Fauna Ser. 4, Fauna of Meghalaya, Part 2*, pp. 44.

1996. *Tyrophagus*, Chatterjee & Gupta, *J. Beng. Nat. Hist. Soc. (NS)*, **15** : 27.

1997. *Tyrophagus*, Gupta & Chatterjee, In : *State Fauna Ser. 6, Fauna of Delhi*, pp. 528.

Diagnosis : Hughes (1976) diagnosed this genus as Setae ve longer than length of genu and pertireme. they arise at same level as vi. Setae sc i longer than sc e, seta d_1 and 1a almost equal in length and shorter than d_3 and d_4. Dorsal terminal tarsal setae needle shaped. Ventral tarsal setae 5, of which, 3 central ones thickened. Sigma$_1$ less than 3 times of Sigma$_2$. Leg I of male not enlarged. Ventral apophysis absent on tarsus I.

Type ***Acarus putrescentiae*** Schrank, 1781

131. ***Tyrophagus putrescentiae*** (Schrank) (Figs. 386–391)

1781. *Acarus putrescentiae* Schrank, *Enum. Ins. Aust. Indig.*, 521.

1924. *Tyrophagus putrescentiae*, Oudemans, *Ent. Ber.*, **6** : 136, 250

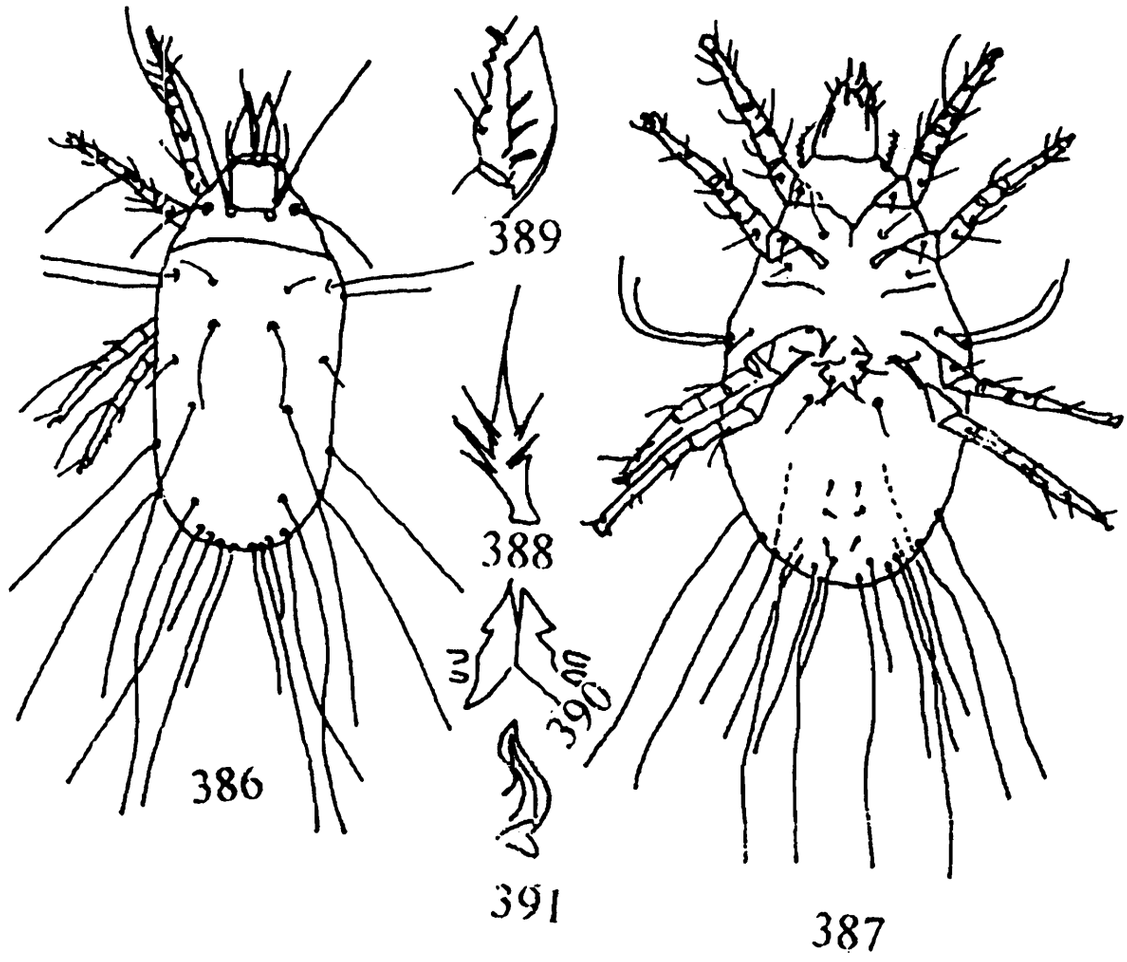
1955. *Tyrophagus putrescentiae*, Pillai, *J. Zool. Soc.*, **7** : 141-144.

1965. *Tyrophagus putrescentiae*, Banerjee, *Two & Bud.*, **12** : 4-7.

1973. *Tyrophagus putrescentiae*, Lal & Mukherjee, *Bull. Grain Tech.*, **11**(1) : 68-69.

1983. *Tyrophagus putrescentiae*, Gupta & Gupta, *Abst. II All India Symp. Acarology, Pune*, p. 23.

1985. *Tyrophagus putrescentiae*, Gupta, p. 409.



Figs. 386-391 : *Tyrophagus putrescentiae* (Schrank) : 386. Dorsal view, 387. Ventral view, 388. Supracoxal seta, 389. Tarsus I, 390. Female genital opening, 391. Penis. (after Gupta, 1985)

1992. *Tyrophagus putrescentiae*, In : *State Fauna Ser. 3, Fauna of West Bengal, Part 3*, pp. 186.

1994. *Tyrophagus putrescentiae*, Walia & Mathur, *Indian J. Nematology*, **24** : 243-245.

1995. *Tyrophagus puterscentiae*, Walia & Mathur, *Nematologia Meditetrranea*, **23**(2) : 255-261.

1996. *Tyrophagus puterscentiae*, Chatterjee & Gupta, *J. Beng. Nat. Hist. Soc. (NS)*, **15** : 27.

1997. *Tyrophagus puterscentiae*, Gupta & Çhatterjee, In : *State Fauna Ser. 6, Fauna of Delhi*, pp. 528.

Diagnosis : In dorsoventral view of male, arms of penis support towards outwards; pseudostigmatid organ large with long pectinations at its enlarge base. Seta lp approximately of same length as remaining posterior setae. Seta d_2 2–3 times as long as la. Distal half of penis shaft curved. Sc e shorter than sc i. Ratio $d_2/l_4 = 2.03$,, ratio x/y (distance between 1st and 3rd pairs of postanal setae) = 2.75. solenidion w_1 on first tarsus enlarged at tip. Distance from base of 4th tarsus to distal margin of 2nd sucker = 1.70 and as long as distance from latter (distance from latter point to tip of tarsus).

Male : As in female.

Collection Records : In India, it has been recorded on *Saraca indica*, rose, *Luffa acutangula* in West Bengal; on mango in Delhi, on ornamental plant in Meghalaya.

Habitat : Saraca indica, mango, ornamental plant, rose, *Luffa acutangula*. Elsewhere on diverse habitats.

Distribution : India (Meghalaya, West Bengal, Uttar Pradesh, Haryana), cosmopolitan.

Remarks : Wallia & Mathur (1995) reported that this mite fed upon *Meloidogyne javanica* and *Aphelinchoides compositicola*, two serious nematode plant pests in Haryana.

Order III. CRYPTOSTIGMATA

13. Family GALUMNIDAE Jacot

1925. *Galumnidae* Jacot, *Phylogeny in Oribatoidea Am. Nat.*, **59** : 372-379.

1986. *Galumnidae*, Sanyal & Bhaduri, *Records zool. Surv. India Occ. Pap.*, **83** : 46.

Diagnosis : Pteromorphae auriculate or semicircular, hinged prodorsum with true lamellae.

Type ***Galumna*** von Heyden, 1826.

Genus 51. ***Galumna*** von Heyden

1826. *Galumna* von Heyden, *ISIS, Oken*, **18** : 611.

1986. *Galumna*, Sanyal & Bhaduri, *Rec. zool. Surv. India, Occ. Pap.*, **83** : 46

Diagnosis : Aciculiform and normal chelicerae not attenuated distally; lamellae and sublamellae reduced to line "L" and "S", respectively; area porosae mostly present; lamellar setae originally between "L" and "S" lines. Pteromorphae with fissures, notogastral setae or alveoli 10 pairs, genital setae 6 pairs.

Type ***Notaspis alatus*** Hermann, 1804

132. ***Galumna flabellifera*** Hammer

1958. *Galumna flabellifera* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **10**(1) : 93.

1986. *Galumna flabellifera*, Sanyal & Bhaduri, *Rec. zool. Surv. India, Occ. Pap.*, **83** : 46.

1993. *Galumna flabellifera*, Raveendran & Haq, *Abst. IV Nat. Symp. Soil. Biol. & Ecol., Bangalore*, p. 68.

Diagnosis : Rostral and interlamellar setae thin, short, not longer than their hair pore, lamellar hair still shorter; sensilla directed outwards in a big curve, with long, broad head and set with bristles, ia placed obliquely to the longitudinal axis of the body; area porosae large. Genital setae 1–3 place on the anterior broder plate.

Collection Records : It was collected in Kerala as predator of plant parasitic nematode.

Distribution : India (Kerala, Rajasthan), Argentina.

Remarks : Raveendran & Haq (1993) reported that this mite cut the nematodes into pieces before devouring. This species preferred nematodes to fungi.

14. Family MOCHLOZETIDAE Grandjean

1960. Mochlozetidae Grandjean, *Acarologia*, **2** : 101-148.

1992. Mochlozetidae, Balogh & Balogh, *Hungarian Nat. Hist. Mus. Budapest*, pp. 1–375.

Diagnosis : Pteromorphae immovable. Dorsosejugal suture interrupted medially.

Genus 52. ***Unguizetes*** Sellnick

1925. *Unguizetes* Sellnick, *Treubia*, **6** : 473.

1992. *Unguizetes*, Sanyal, In : *State Fauna Ser. 3, Fauna of West Bengal, Part 3*, pp. 328.

Diagnosis : Lamellae connected by linear translamella; no chitinous bridge between pteromorphae. Notogastral setae entirely reduced, represented by 10 pairs of minute alveoli; area porosae 4 pairs; legs tridactylus.

Type ***Unguizetes triplicatulus*** Sellnick

133. ***Unguizetes clavatus*** Aoki

1967. *Unguizetes clavatus* Aoki, *Nat. Life Southeast Asia*, **5** : 195.

1977. *Unguizetes clavatus*, Chakrabarti *et al.*, *Sci. & Cult.*, **43**(4) : 180.

1990. *Unguizetes clavatus*, Raut & Bhattacharya, *Abst. IV Nat. Symp. Acarology, Calicut*, p. 31–33.

1992. *Unguizetus clavatua*, Sanyal, In : *State Fauna Ser. 3, Fauna of West Bengal, Part 3*, pp. 329.

Diagnosis : Lateral side of rostrum with crest, translamellar carries a projection on the middle and one crest behind. Prodorsal setae rough, sensillus clavate, shaped with few fine bristles on the head; 4 pairs of area porosae, Aa, A_1, A_2, A_3, A_2 placed in the middle of A_1 and A_3. Notogastral setae represented by 7 pairs of alveoli. Genital setae 6 pairs.

Collection Records Raut & Bhattacharya (1989) collected this species in West Bengal on betel vine leaves in association with various insect pests of betel vine.

Habitat Betel vine in association with insect pests.

Distribution : India (West Bengal), Japan, Thailand.

Remarks : Raut & Bhattacharya (1989) reported this mite feeding upon eggs of different insect pests like : *Aleurocanthus rugosa, Dialeurodes pallida, Tricentrus gibbosulus, Membrothrips indicus, Zaniothrips ricini* and *Mymarothrips garruda.*

15. Family XYLOBATIDAE Balogh & Balogh

1984. Xylobatidae Balogh & Balogh, *Acta. Zool. Hung.*, **30**(3 & 4) : 257-313.

1992. Xylobatidae, Balogh & Balogh, *Hung. Nat. Hist. Mus. Budapest*, p. 1-375

Diagnosis : Pteromorphae never auriculate, hinge, prodorsum with true lamellae.

Genus 53. ***Xylobates*** Jacot

1929. *Xylobates* Jacot, *Trans. Amer. Micr. Soc. Menasha*, **48** : 429.

1992. *Xylobates*, Sanyal, In : *State Fauna Ser. 3, Fauna of West Bengal, Part 3*, pp. 324.

Diagnosis Interlamellar setae long; complete dorsosejugal suture; 4 pairs of area porosae in notogaster; 10 pairs of short notogastral setae; 5 pairs of genital setae, 1 pair of agenital setae. Legs monodactylus.

Type ***Oribates lophotrichus*** Berlese, 1904

134. ***Xylobates seminudus*** Hammer

1971. *Xylobates seminudus* Hammer, *Biol. Skr. Dan. Vid. Selsk.*, **16**(6) : 38.

1992. *Xylobates seminudus*, Sanyal, In : *State Fauna Ser. 3, Fauna of West Bengal, Part 3*, pp. 325.

1993. *Xylobates seminudus*, Raveendra & Haq, *Abst. IV Nat. Symp. Soil. Biol. & Ecol.*, p. 68.

Diagnosis : Rostral setae unilaterally barbed; lamellar and interlamellar setae also barbed; sensillus with long stalk and lanceolate head; both of which beset with long bristles on outer border; notogastral setae 10 pairs represented by pores on the dorsum; ventral setae present; genital setae 5 pairs (Sanyal, 1992).

Collection Records : Raveendran & Haq (1993) collected this species as predator on plant parasitic nematodes.

Distribution : India (West Bengal, Kerala), Fiji, Tahiti Isl., Tonga Tapu Isl.

Remarks : Raveendran & Haq (1993) reported this mite as completely devouring upon nematodes. The cutting was done either singly or in groups. An individual mite would require an average of 35–45 minutes for completion of feeding activity. It was also mentioned that this mite had more preference for nematodes than for fungi and probably it could be a good biocontrolling agent for plant parasitic nematodes.

SUMMARY

The present Monograph aims at providing a comprehensive account of the plant inhabiting predatory mites of Orders Prostigmata (Families : Anystidae, Bdellidae, Caligonellidae, Camerobiidae, Cheyletidae, Cunaxidae, Erythraeidae, Eupodidae, Raphignathidae, Stigmaeidae, Tydeidae), Astigmata (Family : Acaridae) and Mesostigmata (Families : Ascidae, Laelapidae, Otopheidomenidae, Phytoseiidae). In addition, some oribatid mites (Order : Cryptostigmata) reported to be feeding upon important insect/nematode pests in agriculture are also included.

The Part-I of this Monograph deals with 134 species (including descriptions of six new species) of which Prostigmata includes 128 species (11 families, 46 genera), Astigmata includes 3 species (1 family, 3 genera) and Cryptostigmata includes 3 species (3 families, 3 genera). Besides giving full synonymies, descriptions, illustrations, collection

records, habitats, distributions, etc., keys to Orders, families, genera and species are also provided. A detailed taxonomic review, complete list of all the plant inhabiting predatory mites (319 spp, 71 genera, 19 families) so far known from India and biological notes, wherever possible, are also given.

The Part-II of this Monograph will deal with the remaining 185 species of the Order Mesostigmata belonging to Ascidae (9 spp, 5 genera), Laelapidae (2 spp, 1 genus), Otopheidomenidae (1 sp., 1 genus) and Phytoseiidae (173 spp, 11 genera). It will also include chapter on bio-ecology and predatory behaviour of the potentially important predatory species and State-wise list of predatory mites known so far from India.

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