



REDESCRIPTION AND NEW DISTRIBUTIONAL RECORDS OF *DELTA ESURIENS* (FABRICIUS) (HYMENOPTERA: VESPIDAE: EUMENINAE) FROM INDIAN STATES

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INTRODUCTION

Though relatively more taxonomic works on the potter wasps have been done on the fauna of Palearctic and Nearctic regions, our information on the fauna of Indian subcontinent is very scanty and fragmentary. Among the species reported from Indian subcontinent many need detailed taxonomic revision and redescription. One such species is *Delta esuriens* (Fabricius), originally described by Fabricius in 1787 as *Vespa esuriens* from India. Original description was very short which is inadequate for the identification at species level. Subsequently Bingham (1897) provided a redescription of it which is also very short. Hence, in this paper a detailed redescription is provided. *Delta esuriens* is a moderately large potter wasp species with 14-25 mm in length. This species is distributed in Palearctic, Oriental and Australian regions. In India, it is so far reported from Arunachal Pradesh, Delhi, Gujarat, Maharashtra, Odisha, Rajasthan, Tamil Nadu, Uttarakhand and West Bengal. In this paper, it is newly recorded from Andhra Pradesh, Chhattisgarh, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Manipur, Meghalaya and Uttar Pradesh.

MATERIAL AND METHODS

This study is based on about 140 specimens present in the Hymenoptera Section of the Zoological Survey of India, Kolkata. All the specimens were properly preserved and registered and added to the 'National Zoological Collections' of the Hymenoptera Section of the Zoological Survey of India, Kolkata (NZSI).

Abbreviations used for the Museums: BMNH = British Museum of Natural History, London, England; NZSI = National Zoological Collections, Zoological Survey of India, Kolkata, India.

Abbreviations used for the terms: H = Head; M = Mesosoma; OOL = Ocellocular length; POL = Postocellar length; T1-T2 = Gastral tergites 1 and 2.

RESULTS

Delta esuriens (Fabricius, 1787) (Images 1-5)

1787. *Vespa esuriens* Fabricius, *Mant. Ins.*, 1: 293, Syntype, Sex not mentioned, India (BMNH).
1791. *Vespa pediculata* Olivier, *Encycl. méth., Ins.*, 6: 671, "Indes orientales".
1804. *Eumenes esuriens*, Fabricius, *Syst. Piez.*: 286.
1855. *Eumenes boscii* de Saussure, *Ét. Fam. Vesp.*, 3: 132 (as a synonym of *E. esuriens*).
1918. *Eumenes caffer* var. *esuriens*: Bequaert, *Bull. Am. Mus. Nat. Hist.*, 39: 275 (cat.; in part; not p. 73).
1926. *Eumenes campaniformis* var. *esuriens*: Bequaert, *Ann. S. Afr. Mus.* 23: 541 (key), 542 (India).
1991. *Delta companiforme esuriens*: Krombein, *Smithsonian Contrib. Zool.*, 515: 6.
1992. *Delta esuriens* (Fabricius): Giordani Soika, *Lavori-Soc. Ven. Sc. Nat.*, 17: 62. Additional citation: Srinivasan and Girish Kumar, 2010, *J. Threatened Taxa*, 2 (12): 1315.
2006. *Delta esuriens esuriens* (Fabricius): Gusenleitner, *Linzer biol. Beitr.*, 38 (1): 694 (India).

Redescription : Female: Body length (H+M+T1+T2) 14-20 mm; Forewing length: 12.5 mm. Head yellow to brownish yellow with following black markings: a broad band on vertex including upper half of frons extending behind vertex to outer side of temple and to occiput, a black mark on anterior tentorial pit extending to subantennal suture to dorsal side of antennal scrobe and touches to the black band on frons and vertex (this black markings highly variable and absent in some specimens); antennae light reddish (in some specimens ventral side of scape brownish yellow; in some specimens a black mark present on scape dorsally and apical antennal segments more dark); visible part of labrum concolorous with the clypeus; mandible yellow except at margins yellowish brown; pronotum almost entirely yellow except at anterior apex of anterior face of pronotum black; mesoscutum black except a large brown area posteriorly; scutellum light red; postscutellum yellow, propleuron black or blackish brown; mesopleuron yellow to brownish yellow except mesepimeron brown to blackish brown and mesosternum black; metapleuron light red to reddish brown; propodeum light red except at basolateral apex near to lateral corner with yellow markings; legs light reddish with highly variable yellow markings (in some specimens with yellow marks on forefemur and foretibia ventrally and mid and hind tibia dorsally at apex; in some specimens fore coxa, all trochanters and mid and hind tarsal segments except basitarsus black); petiole light reddish except at base black, at subapically a black band and then a yellow band; second gastral tergite basally light reddish then a black band and remaining apical half yellow; second gastral sternite light red except at apex with a yellow band; all remaining visible part of gastral segments yellow, with their bases (when drawn out) black. Wings flavohyaline with a narrow subapical dark infumation on forewing.

Head : Width in front view (Image 2) 1.21x as its median length; clypeus smooth, strongly convex, flattened in middle, its anterior margin transversely truncate at apex, width 0.96x its length medially; mandible long and moderately stout with four distinct teeth on inner side; labrum rounded at apex; supraclypeal area smooth; frons and ocular sinus closely and strongly punctured, interspaces less than diameter of punctures; area in front of

median ocellus smooth; vertex with scattered minute punctures; temple almost smooth; occiput with fine scattered minute punctures; cephalic fovea absent; POL 1.64x OOL; diameter of anterior ocellus slightly longer than ($=1.03x$) the distance between anterior ocellus and posterior ocelli; interocular distance slightly greater ($=1.07x$) on vertex than at clypeus; temple (Image 1) distinctly narrower ($0.49x$) than eye in profile (measured through its ocular sinus); occipital carina strong, complete and narrowed ventrally. Antenna 2.62x farther from each other than from eyes; scape length 1.75x length of F1; F1 2x as long as F2, 2.8x as long as wide, flagellar segments slightly widening towards apex; apical antennal segment slightly longer than wide ($1.13x$), $0.61x$ as long as the two penultimate segments combined.

Mesosoma : Pronotum strongly and closely punctured except anterior face almost smooth, anterolateral angle with few scattered punctures; mesoscutum, scutellum and metanotum strongly and closely punctured; propleuron smooth with minute scattered punctures; mesepisternum densely punctate; posterior margin and lower sides of mesopleuron smooth; metapleuron almost smooth; propodeal dorsum strongly punctured except at dorsolateral angle with scattered punctures; ventral area of propodeum strongly punctured except the inner concavity with scattered punctures; lateral areas of propodeum almost smooth; median groove of propodeum distinct, punctured and complete; pronotum with distinct pretegular carina; median length of mesoscutum slightly longer than its maximum width ($1.01x$); parategula exceeding tegulae posteriorly; axillary fossa not slit-like, much broader; metanotum at the same level of scutellum and propodeum, not raised. Midtibia with one spur. Forewing and hind wing as in Image 3; forewing 3.35x as long as broad; fore wing with prestigma $0.74x$ pterostigma, second submarginal cell acute basally.

Metasoma : Petiole length $0.96x$ than mesosoma in lateral view, $1.15x$ second gastral tergite (Image 1); petiole and gaster almost smooth; second gastral tergum without lamellae separated by apical thickening, slightly curved inwards medially at apex, almost straight, $1.37x$ as long as broad; posterior apices of 3rd-5th tergites and sternites distinctly curved inward at middle.

Male : Body length (H+M+T1+T2) 14-17 mm; forewing length 11.5 mm. Head width in front view (Image 4) 1.15x its length medially; median length of clypeus 1.29x its maximum width; teeth of mandible not distinct. Last antennal segment hooked apically, hook long, curved and pointed, in curved position it almost reaches the apex of ninth antennal segment; 3rd-6th gastral sternites with few large hairs; 7th with a deep median longitudinal groove; Genitalia as in Image 5; apical tip of aedeagus bulb-like; parameral spine elongate with moderately large hairs subapically. Other characters almost same as in female.

Behaviour : See Maxwell- Lefroy, 1909 and Dutt, 1912.

Material examined : **INDIA: Andhra Pradesh**: Krishna district, Machilipatnam, 1♀, 5.vi.1908, Coll. C. Paiva, NZSI Regd. No. 12971/H3; Vishakhapatnam district, Aganampudi, 1♂, 6.ii.2004 & Gopalapatnam, 1♀, 8.ii.2004, Coll. D.R. Maulik & Party, 12972/H3 & 12973/H3. **Arunachal Pradesh**: East Siang district, Hill Top, 1♀, 23.ix.2002, Mebo, 1♀, 25.ix.2002 & Pasighat, 1♀, 26.ix.2002, Coll. M. Sil & Party, 12974/H3 to 12976/H3. **Chhattisgarh**: Dhamtari district, Kukrel, 1♀, 22.iv.1975, Coll. S.K. Gupta & Party, 13005/H3; Bastar district, Sonpur, 1♀, 1.i.1981 & Chitrakoot, 1♀, 14.xii.1981, Coll. M.S. Shishodia & Party, 13006/H3 & 13007/H3; **Delhi**: exact locality not known, 1♀, 14.iii.1922, Coll. S. Basil Edwards, 423/H3; Delhi University Campus, Lajpat Nagar & S.J. Flyover, 13♀ & 12♂, 2.x.1961-23.x.1978, Coll. V.K. Gupta & Party, 12977/H3 to 13001/H3. **Gujarat**: Banaskantha district, Deesa, 1♂, 10.iii.1901, Collector Unknown, 13002/H3; Mehsana district, Modhera, 2♂, 24.xi.1974, Coll. B. Dutta & Party, 13003/H3 & 13004/H3. **Himachal Pradesh**: Kangra Valley, 1♀ & 3♂, June, 1899, Coll. Dudgeon, 13008/H3 to 13011/H3; Chamba district, Sarol Garden, 6♀, 20.v.1927, Coll. S.L. Hora, 13012/H3 to 13017/H3; Chamba district, Khajjiar, 1♂, 24.vi.1965, Coll. Tikar, 13018/H3; Solan district, Saproon, 1♂, 17.vi.1979, Coll. V.K. Gupta, 13019/H3. **Jharkhand**: Ranchi, 1♀ & 1♂, date of collection Unknown, Coll. Irvine, 13020/H3 & 13021/H3; Dumka district, Kusumbi, 1♀ & 1♂, 12.xi.2009, Coll. R. Babu & Party, 13022/H3 & 13023/H3; Palamau district, Daltonganj, Nawatoli, 1♀, 14.xii.2010, Coll. R. Babu & Party, 13024/H3.

Karnataka: Bengaluru, 5♀ & 3♂, date of collection and name of collector Unknown, 3215/H3, 13025/H3 to 13031/H3; Bengaluru, 2♀ & 1♂, date of collection Unknown, Coll. Cameron, 3196/H3, 3212/H3 & 3207/H3. **Kerala**: Thiruvananthapuram, 1♂ & 1♀, March-April, 1888, name of collector Unknown, 13032/H3 & 13033/H3. **Maharashtra**: Ratnagiri district, Chiplun, 1♀, 5.v.1912, Coll. F.H. Gravely, 13034/H3; Pune district, Paud, 1♀, 6.iv.1965, Coll. B.S. Lamba, 13035/H3; Nashik district, Deolali, 2♀, 23.iii.1971, Coll. D. Ram, 13036/H3 & 13037/H3; Dhule district, Chaugaan, 1♀, 14.xii.2003, Coll. B.C. Das & Party, 13038/H3; Nagpur district, Borgaon, 2♀, 26.iii.2004, Coll. S.K. Mandal & Party, 13039/H3 & 13040/H3. **Manipur**: Imphal West district, Kangchup, 1♀, 9.x.1976, Coll. Tyagi, 13041/H3. **Meghalaya**: East Garo Hills district, Dainadubi, 1♀ & 1♂, 13.v.1979, Coll. J.K. Jonathan & Party, 13042/H3 & 13043/H3. **Odisha**: Ganjam, 2♂, date of collection and name of collector Unknown, 3205/H3 & 13044/H3; Khordha district, Bhubaneswar, 1♂, date of collection Unknown, Coll. Tusharendu Ray, 13045/H3; Mayurbhanj district, Bangriposi, 2♀ & 1♂, 3.v.1972, Coll. A.R. Bhaumik & Party, 13046/H3 to 13048/H3; Koenjhar district, Keonjhat, 1♀ & 2♂, 23.v.1972, Coll. A.R. Bhaumik & Party, 13049/H3 to 13051/H3; Dhenkanal district, Nimidha, 1♂, 26.iii.1983, Coll. P. Parui, NZSI Regd. No. 13052/H3. **Rajasthan**: Jhunjhunu district, Gudha, 1♀ & 1♂, 11.iv.1958 & 27.v.1958, Coll. T.G. Vazirani, 3123/H3 & 3032/H3; Jodhpur district, Bisalpur, 1♂, 8.vi.1960 & Mandore, 1♀, 21.ix.1963, Coll. R.K. Bhatnagar, 3838/H3 & 3604/H3. **Tamil Nadu**: Coimbatore, 2♀ & 3♂, 9.ix.1963-10.xi.1964, Coll. P.S. Nathan, 13053/H3 to 13057/H3; Coimbatore Rural district, Mettupalayam, 1♂, 12.xii.1975, Coll. A.N.T. Joseph & Party, 13058/H3. **Uttarakhand**: Nainital district, Kaladhungi, 1♀, 6.v.1913, Coll. R. Hodgart, 13059/H3; Chamoli district, Ghangaria, 1♀, 1.vi.1965, Coll. V.K. Gupta, 13060/H3. **Uttar Pradesh**: Sonbhadra district, Rihand, 1♀, 2.iv.1979, Coll. R.L. Choudhury, 13061/H3; Gautam Buddha Nagar district, Solarpur Kalan, 1♀, 6.vi.1989 & Noida, 1♀, 8.vi.1989, Coll. M.S. Shishodia & Party, 13062/H3 & 13063/H3; Aligarh district, Pilkhana, 1♂, 15.xi.2005, Coll. S.I. Kazmi & Party, 13064/H3; Meerut district, Meerut town, 1♀, 22.xi.2005 & Kashi,

1♀, 23.xi.2005, Coll. S.I. Kazmi & Party, 13065/H3 & 13066/H3; Saharanpur, 1♀, 24.ii.2006, Coll. B. Biswas & Party, 13067/H3; Faizabad district, Bikapur, 1♀, 4.iv.2006 & Mumtaznagar, 1♂, 5.iv.2006, Coll. S.I. Kazmi & Party, 13068/H3 & 13069/H3; Sant Ravidas Nagar district, Gopiganj, 1♂, 14.iv.2006, Coll. S.I. Kazmi & Party, 13070/H3; Gautam Buddha Nagar district, Dadri, 1♂, 20.v.2006, Coll. S.I. Kazmi & Party, 13071/H3; Bahraich district, gadadharpur, 1♂, 9.ix.2006, Coll. S.I. Kazmi & Party, 13072/H3; Banda district, Khurhand, 1♂, 31.x.2007, Coll. S.I. Kazmi & Party, 13073/H3; Jalaon district, Orai, Garithan, 1♀, 5.xi.2007, Coll. S.I. Kazmi & Party, 13074/H3; Agra district, Azizpur, 1♀, 11.xi.2007, Coll. S.I. Kazmi & Party, 13075/H3; Aligarh district, Aligarh Muslim University Campus, 1♀ & 1♂, 13.xi.2007, Coll. S.I. Kazmi & Party, 13076/H3 & 13077/H3; Gautam Buddha Nagar district, Chaprola, 1♀, 16.xi.2007, Coll. S.I. Kazmi & Party, 13078/H3. **West Bengal:** Kolkata, 1♀ & 1♂, date of collection and name of collector Unknown, 3192/H3 & 424/H3; Kolkata, 5♀ & 1♂, date of collection and name of collector Unknown, 13079/H3 to 13084/H3; Kolkata, 1♀, date of collection Unknown, Coll. J.B. Richardson, 3209/H3; Kolkata, 1♀ & 2♂, 11.x.1906-24.x.1907, name of collector Unknown, 13085/H3 to 13087/H3; N-24 Parganas district, Salt Lake, 1♂, 10.v.1926, Coll. B.N. Chopra, 13088/H3; Kolkata, 1♀, 1930, date of collection and name of collector Unknown, 13089/H3; Howrah district, Shibpur, Acharya Jagadish Chandra Bose Indian Botanical Garden, 1♀, 28.vi.1965, Coll. P. Parui, 5179/H3; S-24 Parganas district, Matla, Gorosthan Ghor, 1♂, 18.x.1965, Coll. A.N.T. Joseph & Party, 5178/H3; S-24 Parganas district, Agarhati, 1♀, 3.vi.1978, Coll. M. Prasad & Party, 13090/H3; N-24 Parganas district, Salt Lake, Nalban, 1♂, 11.vii.1984, Coll. B. Biswas & Party, 13091/H3; Bankura district,

Bhogpur, 1♂, 14.x.1986, Coll. K.P. Mukherjee & Party, 13092/H3; Jalpaiguri district, Nagrakata, 1♂, 20.vi.1987, Coll. K.P. Mukherjee & Party, 13093/H3; Malda district, Parbati Danga, 1♂, 27.vi.1987, Coll. K.P. Mukherjee & Party, 13094/H3; Howrah district, Chandrapur, 1♂, 25.v.1994, Coll. S.K. Gupta & Party, 13095/H3.

Distribution : India: Andhra Pradesh (new record), Arunachal Pradesh, Chhattisgarh (new record), Delhi, Gujarat, Himachal Pradesh (new record), Jharkhand (new record), Karnataka (new record), Kerala (new record), Maharashtra, Manipur (new record), Meghalaya (new record), Odisha, Rajasthan, Tamil Nadu, Uttarakhand, Uttar Pradesh (new record) and West Bengal.

Elsewhere : Arabia, Australia, Indonesia (Borneo, Java), Iran, Iraq, Laos, Mauritius, Myanmar, Pakistan, Philippines, Sri Lanka, Thailand, Timor.

SUMMARY

The potter wasp species *Delta esuriens* (Fabricius, 1787) is redescribed and newly recorded from the Indian states Andhra Pradesh, Chhattisgarh, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Manipur, Meghalaya and Uttar Pradesh.

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PLATE I

Delta esuriens (Fabricius)

Female 1. Body profile.



Female 2. Head front view.



Female 3. Forewing and Hindwing.



Male 4. Head front view. 5. Genitalia.



Male 5. Genitalia.