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FISHES OF THE SUBFAMILIES SETARCHINAE AND APISTINAE (SCORPAINIDAE) FROM INDIAN WATERS

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(With 1 Plate)

INTRODUCTION

A systematic review of the subfamilies Setarchinae and Apistinae is given in the paper. The subfamily Setarchinae is represented by two species, *Setarches longimanus* (Alcock) and *S. guentheri* Johnson and the subfamily Apistinae by a single species *Apistus carinatus* (Bloch and Schneider) from Indian seas.

Alcock (1891 : 23) described *Lioscorpius longiceps* Günther basing on a single specimen (108 mm SL) collected from Andaman sea at a depth of 182-220 fathoms and the same was figured and labelled as *Lioscorpius longiceps* var. *longimanus* (Alcock, 1894, pl. 10, fig. 3) which was later included under *Setarches guentheri* Johnson (Alcock, 1899 : 28). Alcock (1899 : 28) pointed out that Günther's *L. longiceps* figure is little different from his specimen and description of *longiceps* Günther does not correspond to its figure. Matsubara (1943 : 372) recognised *longimanus* as a valid species and supported Alcock's contention with regard to Günther's *L. longiceps* figure and description. Eschmeyer and Collette (1966 : 356) clearly stated that the specimen figured by Günther is *Setarches longimanus* and it is based on a specimen collected from Philippine Islands (Günther, 1880 : 52, pl. 17, fig. c) but the description (Günther, 1880 : 40-41) pertains to *Lioscorpius longiceps* Günther collected from Ki Islands. Eschmeyer and Collette (*op. cit.*) synonymised *Lythrichthys eulabes* Jordan and Starks known from off Ose Point, Suruga Bay and *Scorpaenella cypho* Fowler known from March Island, Mollucca passage with *longimanus.*

Eschmeyer and Collette (1966 : 359) clarified the systematic position of *Setarches guentheri* Johnson and recognised it as widely distributed species in the Indo-West Pacific and Atlantic after studying all the

nominal species, *Setarches fidjiensis* Günther (off Matuku, Fiji Islands), *Setarches parmatus* Goode (39° 57′ N., 70° 56′ W., *Bathysebastes albescens* Döderlein (off Tokyo), *Scorpaena remigera* Gilbert and Cramer (Hawaii) and *Setarches marleyi* Fowler (Natal). De Beaufort (1962 : 36) treated all Indo-Pacific *Setarches* as a subspecies of *Setarches guentheri* Johnson. The description belongs to *S. guentheri* Johnson and the figure (after Günther) belongs to *S. longimanus* (Alcock).

Day (1875 : 155), Matsubara (1943 : 396), Smith (1957 : 84) and De Beaufort (1962 : 55) recognized only one species, *Apistus carinatus* (Bloch and Schneider) from the Indo-West Pacific under the subfamily Apistinae.

Subfamily *SETARCHINAE*

Lateral line a continuous trough covered by thin membranous scales. Scales small and cycloid. Cranium thin and cavernous, bones weakly ossified. Second suborbital bone uniformly broad or gradually becoming wider posteriorly, never T-shaped and without spines in adults. Third and fourth suborbital bones absent. No fleshy appendages on head and body. Small slit present behind fourth gill arch. Vertebrae 24. Pyloric caeca 4 or 5 (Eschmeyer and Collette, 1966 : 351).

Distribution.—Indo-Pacific, Atlantic, occurring at depths of about 188–820 metres. During the capture the cranium collapses and the stomach is everted usually by the time the specimens arrive at the surface thus giving an apperance of broad head and straight predorsal profile.

Genus **Setarches** Johnson

1862. *Setarches* Johnson, *Proc. zool. Soc. Lond.*, (2) : 177 (Type--species : *Setarches guentheri* Johnson, 1862).

Dorsal fin with 12 spines and 10–11 soft rays and deeply notched. Anal fin with 3 spines and 5–6 soft rays. Pectoral with 21–22 rays. Preorbital with three moderate spines, the anterior one as long as the posterior. Dorsal surface of the head scaleless. Swim bladder well developed.

Distribution.—Indo-West Pacific and Western Atlantic.

Key to the Indian species of the genus **Setarches**

1. Second preopercular spine reduced or absent, much shorter than first or third.

   2nd preorbital spine small, directed downward and backward. ..... *S. longimanus* (Alcock)

2. Second preopercular spine subequal to or longer than first and third. 2nd preorbital spine small, directed antero-laterally. ..... *S. guentheri* Johnson

Setarches longimanus (Alcock)
(Plate I, a)

Lioscorpius longiceps : Günther, 1880 (*nec* p. 40), *Rep. Challenger Zool.*, 1 (6) : 52, pl. 17, fig. c (Philippine islands, *Challenger* Sta. 204); Alcock, 1891. *Ann. Mag. nat. Hist.*, (6) **8** : (R. I. M. S. *Investigator* Sta. 115. Andaman sea 188-220 fathoms).

Lioscorpius longiceps var. *longimanus* Alcock, 1894, *Ill. Zool. Investig. Fish.*, Part 2, pl. 10, fig. 3 (original description by reference to Alcock, 1891, 23; *Type, locality* : Andaman Sea, 188-220 fathoms).

Setarches güntheri : Alcock, 1899, *Cat. Indian Deep Sea Fish.* : 28 (in part).

Setarches longimanus : Matsubara, 1943, *Trans. Sigen. Kenk.*, **2** : 372, figs. 129-135; Eschmeyer and Collette, 1966, *Bull. mar. Sci.*, 16 (2), : 356, figs. 1 and 2. Rama Rao, 1972, *Curr. Sci*, **41** (7) : 268.

Setarches güntheri longiceps : De Beaufort, *Fish. Indo-Australian Archipelago*, 11 : fig. 7 (in part).

Material examined.—Andaman and Nicobar Islands : F. ZSI. 13036, holotype, 108 mm SL, Andaman Sea, Sta. 115, Lat. 11° 31′ 40″ N., Long. 92° 46′ 06″ E., 188–220 fathoms, green muddy bottom, bottom temp. 13·3°C., Surface temp. 28·3°C., Agassiz trawl haul, 9·12·1890, R. I. M. S. *Investigator* Coll., F. ZSI. 154/1, one specimen, 101 mm SL., Andaman Sea, Sta. 233, Lat. 13° 17′ 15″ N., Long. 93° 10′ 25″ E., 185 fathoms, sandy bottom, bottom temp. 11·9°C., surface temperature 26·1° C, Agassiz trawl haul, 6.12. 1897, R. I. M. S. *Investigator* Coll., F. ZSI. 236/1, 243/1,eight specimens, 81–91 mm SL, Sta. 233, R. I. M. S. *Investigator* Coll.; *Sri Lanka* : F. ZSI. 1633/2, five specimens (badly mutilated condition), South of Sri Lanka Sta. 465, Lat. 5° 56′ N., Long. 81° 22′ E., 109–132 fathoms, globigerina ooze bottom, Agassiz trawl haul, 22.4. 1912, R. I. M. S., *Investigator* Coll.; *Philippine Islands* : *Lythrichthys eulabes* Jordan and Starks, F. ZSI. 4216/2 = USNM 99025, 2 specimens, 73 and 84 mm SL, Point Tagolo Light, Lat. 8° 48′ N, Long. 123° 31′ E., 200 fathoms, 9·8. 1909, *Albatross* Coll.

Meristic formula.—D. XII, 10–11; A. III, 5-6; c. 6+6; P. II, 11–14, vi-viii; V I, 5; Tub. Sc. 24-26; GR. 6-7+1+9-12.

Diagnosis.—Second preopercular spine much shorter than first or third, or absent. 2nd preorbital spine small directed downward and backwad.

Description.—Proportional dimensions in per cent of standard length based on three specimens measuring from 81·0–108·0 mm. SL. Length of: head 43·2–47·2, snout 12·1–13·6, orbit 10·2–11 7, postorbital head 22·2–24·2, maxilla 24·2–26·0; interorbital width 11.0–11·7, height of head 28.7–35·2, width of head 22·0–24·7, depth of body 28·7–33·0, width of body 14.8–17·6, distance : predorsal 34·0–38.0,

preanal 73·6-79.6, preventral 47·2-49·4, prepectoral 46·2-47·2; Caudal peduncle: length 16·2-18·0, depth 7 7-9·3; longest : simple pectoral ray 22.2-25·3, branched pectoral ray 33·0-38.3, dorsal spine 11 1-14.8, soft dorsal ray 13·4-16.0: length of: caudal fin 22·2-24·7, dorsal fin base 49.4-51·9, anal fin base 12·0-13.6, first dorsal spine 5·6-6·2, second dorsal spine 8·3-9·9, last dorsal spine 9·9-10·2, penultimate dorsal spine 1·6-2.8, ventral fin 17.6-18·7, first anal spine 5·5-7·4, second anal spine 12·0-14·8, third anal spine 14·8-16·0.

Body broad anteriorly, tapering as well as compressed posteriorly. Predorsal profile almost straight, snout broad and blunt, interorbital space broad and flat and occiput flat. Premaxillary processes forming a low elevated triangular area over the snout, without a concavity behind, but joins with the flat interorbital space. Eyes moderate, not elevated. Mouth large and oblique, maxillary reaching the posterior border of the eye, much expanded behind, and its depth less than eye or equal to eye. Jaws subequal, tip of the lower jaw with a symphyseal knob, fitting into the toothless notch of the upper jaw and projects out slightly. Fine villiform teeth on jaws, vomer and nearly uniserial on palatines. Tongue ending in a small free spatulate tip. Nostrils are close to each other, the anterior one slightly tubular with a flap posteriorly, the posterior one rounded and not very close to eye. Gill openings wide, gill membranes free from isthamus and from each other. Pseudobranchiae present. Branchiostegals seven. Gill rakers slender, well developed at the angle, reduced to spiny knobs at the end of the arch. A slit behind the 4th gill arch. Pyloric caeca 4. A small elongated thick walled air bladder is present.

Head large, with cavernous bones and well developed muciferous cavities. Spination of head little developed. Cranial spines small and weak but sharp. Nasal spines very small. Preocular present, supra and postocular absent. Frontal and parietal ridges low and indistinct and ending in a small spine. Pterotic ending in a spinous point, cleithral and supracleithral blunt. Sphenotic, upper and lower post-temporal spines absent. Preorbital with 3 spines, anterior one antrose, the median one smaller, directed downward and backward, posterior retrose; antrose and retrose spines are of equal lengths. Suborbital close to eye; without spinous points. First preopercular spine longest, 3rd shorter than first, second spine very much reduced or absent (much shorter than first as well as third), 4th smaller than third and 5th very much reduced. No Supplemental preopercular spine. Opercle with two divergent spines, ending in a spinous point. Interopercle blunt. Interorbital and postorbital spines absent.

No other skinny appendages on the body except a flap on the posterior edge of the anterior nostril. Scales small and cycloid. Scales absent

on snout, interorbital space, occiput preorbital area, maxilla, mandible throat and interopercle and present behind eyes, on cheeks, opercle and partly on subopercle. Pectoral base, chest and belly with scales. Trunk and tail with small scales extending on to the caudal fin. Lateral line broad, with double tubules forming a continuous trough covered by thin membranous scales.

Head with well developed muciferous cavities. The interorbital space with three very characteristic mucous fossae, a very large elliptical one in the middle, two moderate and oval ones located side by side anteriorly. Two large pores on the snout and behind the eyes. Number of pores small to large along the suborbital, preopercle and lower jaw.

Dorsal spines subequal or equal or shorter than soft dorsal rays. The first two close to each other, 3rd, 4th and 5th isolated. The spines increase gradually from 1st to 3rd, 4th, 5th and 6th longest and subequal, remaining decrease gradually upto 11th, which is smallest and 12th abruptly longer, longer than the first two spines, sometimes equal or subequal to second spine. Dorsal deeply notched before 12th spine. Dorsal membrane between the spines deeply notched. Soft dorsal elongately rounded. First anal spine small, third anal spine longest, soft anal broadly rounded. Vertical fins not elongate, pectoral broad and rounded, the rays increase gradually to the middle and decrease gradually to the lower and reaching on to the soft anal. Ventral short and not reaching to anal. Caudal emerginate.

Colour in alcohol.—Uniform light yellowish colour. Inside the mouth largely dusky, pyloric caeca, hind part of the intestine greyish to black. Fins mostly pale, the membrane between the dorsal spines with grey edges and distal parts of pectoral blackish.

Habitat.—It occurs on the sandy and muddy bottom, at depths ranging from 109–220 fathoms in Indian waters.

Distribution.—Known from Arbian Sea, Andaman Sea, Indonesia, Philippine Islands, South-Eastern coast of Japan, from deeper waters ranging from 180–704 metres. It is likely to occur in many localities in the Indo-Pacific.

Relationships.—It is closely related to *S. guentheri* Johnson but differs from it mainly in the nature of second preopercular spine.

Remarks.—Matsubara (1943, pp. 372–73), while listing the synonymy of *longimanus* Alcock wrongly attached Arafura locality to Alcock's references (1891, p. 23; 1894, pl. 10, fig. 3) instead of Andaman Sea. *Lioscoroius longiceps* Günther was collected from Arafura sea by *Challenger* at Sta. No. 192 and *longimanus* Alcock was collected

from Andaman sea by *Investigator* at Sta. No. 115. Matsubara's mistake is probably due to oversight. Eschmeyer and Collette (1966, pp. 356 and 359), instead of including *Lythrichthys eulabes* under material examined data of *longimanus* (p. 356), included it under *guentheri* due to oversight.

Setaraches guentheri Johnson
(Plate I, b)

Setarches güntheri Johnson, 1862, *Proc. zool. Soc. Lond.*, 2 : 177, pl. 23 (*Type-locality* : Madeira); Alcock, 1899, *Cat. Indian Deep Sea Fish.* : 28 (in part); Herre, 1951, *Philipp. J. Sci.*, 80 (4) : 441 (in part); Smith, 1957, *Ichthyol. Bull. Rhodes Univ.*, 5 : 85, fig. 9; Eschmeyer and Collette, 1966, *Bull. mar. Sci.*, 16 (2) : 357, figs. 1 and 2; Eschmeyer, 1969, *Occ. Pap. Calif. Acad. Sci.*, 79 : 102.

Setarches güntheri longiceps : Beaufort, 1962, *Fish. Indo-Australian Archipelago*, 11 : 36, fig. 7 (in part).

Material examined.—*Sri Lanka* : F. ZSI. 14131-14133, three specimens, 80-96 mm SL, off Trincomalee, Sta. 201, Lat. 8° 44′ 40″ N., Long. 81° 20′ 15″ E., 296-320 fathoms, green muddy bottom, bottom temp. 9·4-9·8° C., Surface temp. 29·1° C., Agassiz trawl haul, 16·4 1895, R. I. M. S. *Investigator* Colls.

Meristic formula.—D. XII, 11; A. III, 6; C. 6+6 ; P. ii-iii, 10-12, vii-ix; V I, 5; Tub. Sc. 23-25; GR. 5-6+1+9-10.

Diagnosis.—Second preopercular spine well developed, subequal to or longer than first and third. 2nd preorbital spine small, directed anterolaterally.

Description.—Proportional dimensions in percent of standard length based on two specimens measuring from 83·0 and 96·0 mm SL. Length of : head 44. 8-46·4, snout 13·0-13·7, orbit 11·5-11·9, postorbital head 22·6-23·0, maxilla 22·6-23·0; interorbital width 9·9-10·7, height of head 34·5, width of head 20·8-21·4, depth of body 32·1-33·3, width body 15·5-15·6, distance : predorsal 37·5-39·6, preanal 77·4-80·0, preventral 56·0-56·2, prepectoral 44·8-48·8; caudal peduncle : length 15·6-17·9, depth 9·9-10·7; longest : simple pectoral ray 23·8-24·0, branched pectoral ray 32·1-33·3, dorsal spine 16·6-20·8, soft dorsal ray 16·6; length of : caudal fin 25·0, dorsal fin base 47·6-49·0, anal fin base 12·3-13·0, first dorsal spine 7 1-7·3, second dorsal spine 13·0, last dorsal spine 10·4-11·3, penultimate dorsal spine 4·2-6·3, ventral fin 19·0-23·0, first anal spine 7·3, second anal spine 11·5-11·9, third anal spine 14·6-15·5.

Body oblong and moderately compressed, head large with cavernous bones and with well developed muciferous cavities. Predorsal profile almost straight in preserved specimens. Interorbital broad and flat or gently convex. Occiput flat. Premaxillary process slightly elevated, the elevation being in a line with flat interorbital space. Eyes moderate, mouth large, oblique, maxillary reaching the posterior end of the eye,

much expanded behind, depth less than eye. Jaws subequal, tip of the lower jaw with a small symphyseal knob which fits into the toothless notch of the upper jaw. Fine villiform teeth on jaws, vomer and nearly uniserial on palatines. Tongue small with a spatulate tip. Nostril close to each other, anterior nostril slightly tubular without a flap. Posterior one entire, rounded and not very close to eye. Gill opening wide, gill membranes free from isthamus and from each other. Pseudobranchiae present. Branchiostegals seven. Gill rakers slender, well developed at the angle, gradullay reduced to spiny knobs at the end. A slit behind the fourth gill arch. No study was made on the pyloric caeca and air bladder as they were removed from the preserved specimens under study.

Spination of the head little developed, small and weak but sharp. Nasal spines very small, preocular present, supraocular and postoculars absent. Frontal and parietal ridges indistinct and the later ending in a minute spinous point. Pterotic ending in spinous point. Sphenotic, lower and upper post-temporal absent. Supracleithral and cleithral blunt. Preorbital with three spines, anterior and posterior ones antrose and retrose respectively and both are of equal length, the median one small, with anterolateral direction. Suborbital ridge oblique, close to eye, without spinous points. First, second and third preopercular spines well developed and second one subequal to, or longer than first and third. Fourth and fifth blunt and very much reduced. No supplemental preopercular spine. Opercle with two well developed divergent spines, ending in sharp spinous points. Interopercle blunt and no interorbital and postorbital spines.

No other skinny appendages on the body. Scales small and cycloid. Scales absent on snout, interorbital space, occiput, preorbital area, maxilla, mandible, throat and interopercle and present on cheeks, postorbital area, opercle and partly on subopercle. Pectoral base, chest and belly with small scales. Trunk and tail with small scales extending onto the caudal fin. Lateral line broad, with double tubules, forming a continuous trough covered by thin membranous scales. Median and vertical fin pattern is similar to *longimanus*.

Colour in alcohol.— Pinkish in colour, inside the mouth slightly dusky, intestine blackish, fins hyaline and the membrane between the dorsal spines with greyish edge.

Habitat.— It occurs on the green muddy bottom at depths ranging from 296-320 fathoms in the Indian region (Sri Lanka).

Distribution.— It is known from Atlantic, Indian and West Pacific Oceans at greater depths ranging from 200-760 metres but it prefers a depth of about 400 metres. It has been reported from tip of South

Africa, Durban, Natal, Zanzibar, along the east coast of Africa, Ceylon, Indo-Australian Archipelago, Philippines, Japan, Fiji and Hawaii in the Indo-West Pacific regions.

Relationships.—*S. longimanus* (Alcock) is the only known relative of *guentheri*, a world-wide known scorpaenid.

Subfamily *APISTINAE*

Small stingfishes occurring at moderate depths and they are easily distinguishable by their long pectorals with the last ray free. Body oblong and moderately compressed, head bony with few spines, mostly naked, trunk and tail covered with small to medium jagged imbricate ctenoid scales. Mouth small to moderate, oblique, with narrow bands of villiform teeth in jaws, on vomer and palatines. Lateral line normal. Gill membrane free from isthamus and from each other. Branchiostegals seven. A cleft benind the fourth gill arch. Three chin barbels. Air bladder thick with a median tranverse constriction.

Distribution.— Indo-Pacific.

Genus **Apistus** Cuvier

1829. *Apistus* Cuvier, *Regne Animal*, Ed. 2, **2** : 167 (Type-species : *Apistus alatus* Cuvier and Valenciennes, 1829 = *Scorpaena carinata* Bloch and Schneider, 1801).

1839. *Pterichthys* Swainson, *Nat. Hist. Fishes*, **2** : 265 (Type-species : *Scorpaena carinata* Bloch and Schneider, 1801)

1849. *Prosopodasys* Cantor, *J. Roy. asiat. Soc. Beng.*, **18** : 44 (Type-species : *Apistus alatus* Cuvier and Valenciennes, 1829).

1858. *Polemius* Kaup, *Arch. Naturg.*, **24** (1) : 333 (Type-species : *Apistus alatus* Cuvier and Valenciennes, 1829).

Dorsal with 15 spines and 9–10 soft rays. Anal with 3 spines and 7–8 soft rays. Pectoral long with 10–11 rays, the lowest ray free from the remaining. Ventral with a strong spine and 5 rays.

Distribution.—Indo-West Pacific.

Apistus carinatus (Bloch and Schneider) (Plate I, c)

1801. *Scorpaena carinata* Bloch and Schneider, *Syst. Ichth.* : 193 (*Type-locality* : Tranquebar, India).

1803. *Trigla woorah-minoo* Russell, *Fish. Coromandel*, **2** : 45, pl. 160, fig. B (Visakhapatnam, India).

1829. *Apistus alatus* Cuvier (in Cuvier and Valenciennes), *Hist. nat. Poiss.*, 4 : 392 (*Type-locality* : Pondicherry, India); Günther, 1860, *Cat. Brit. Mus. Fish.*, **2** : 131; Herre, 1951, *Phillip. J. Sci.*, **80** (4) : 422.

1829. *Apistus carinatus* Cuvier (in Cuvier and Valenciennes), *Hist. nat. Poiss.*, **4** : 395 (*Type-locolity* : Tranquebar, India); Day, 1875, *Fish. India*, : 155, pl. 37, fig. 4; Day, 1889, *Fauna Brit. India Fish.*, **2** : 64, fig. 24; Pillay, 1929, *J. Bombay nat. Hist. Soc.*, **33** (1) : 375; Matsubara, 1943, *Trans. Sigen. Kenk.*, **2** : 396; Smith, 1957, *Ichthyol. Bull. Rhodes Univ.*, **5** : 84, pl. 6, fig. E.; De Beaufort, 1962, *Fish. Indo-Australian Archipelago*, **11** : 55, fig. 11.

1829. *Apistus israelitarum* Cuvier (in Cuvier and Valenciennes), *Hist. nat. Poiss.* **4** : 396 (*Type-locality* : Red Sea).

1904. *Apistus evolans* Jordan and Starks, *Prac. U. S. Nat. Mus.*, **27** : 146, fig. 12 (*Type-locality* : Tokyo).

1904. *Apistus venenans* Jordan and Starks, *Proc. U. S. Nat. Mus.*, **27** : 148, fig. 13 (*Type-locality* : Nagasaki).

1908. *Apistus faurei* Gilchrist and Thompson, *Ann. S. Afr. Mus.*, **6** : 176 (*Type-locality* : Natal coast, 15-30 fathoms).

1910. *Apistus macrolepidotus* Ogilby, *New Fish. Old. Coast* : 108 (*Type-locality* Queensland; India).

Material examined.—Bay of Bengal : F. ZSI. 12581, 12582 and 12585, three specimens, 81·0–85·0 mm SL, off Ganjam coast, fine sandy and muddy bottom, 1889—90, 10 fathoms, Agassiz trawl haul, R. I. M. S. *Investigator* Coll., F. 400/2, one specimen, 78·0 mm SL, off Orissa coast, near the black Pagoda, Lat. 20° 30′ N., Long. 87° E., 27·11. 1909, *Golden Crown* Coll., Two specimens, 58·0 and 77·0 mm SL, off Visakhapatnam, Lat. 17° 40′ N., Long. 83° 20′ E., 10·7. 1963, Otter trawl haul, M. D. *Pratap* Coll., F. ZSI. 1730–32 and 1744 (original of plate 37, fig. 4, *Fish. India*, Day, 1875), four specimens, 67·0–76·0 mm SL, Lat. 13° N., Long. 80° 24′ E., date of collection nil, *F. Day* Coll., F. ZSI. 2346/2, two specimens, 57·0 and 58·0 mm SL, Marina Beach, Lat. 13° N., Long. 80° 24′ E., 11·8. 1961, ZSI, *Southern Regional Station, Madras* Coll., Three Specimens, 57·0–79·0 mm SL, Kovelong Beach (Madras), Lat. 13° N., Long. 80° 24′ E., 5·7. 1966, *T E. Sivaprakasam* Coll.

Meristic formula.—D. XV, i, 7–9, i–ii (one specimen with XVI); A. III, 6–7, i–ii, C. 5+5; P. i, 8–9, i–ii; V I, 5; VSR. 55–56; TRS. 8/15–18; Tub. Sc. 28–30; Gr. 6+1+10–12 (Scale count of Day, 1875, p. 155 is a lateral scale row count).

Diagnosis.—Pectoral fin elongate, its lowermost ray detached; imbricate, leafy shaped ctenoid scales; a deep blotch between 8th and 13th dorsal spines.

Description.—Proportional dimensions in percent of standard length based on four specimens measuring from 58.0–85·0 mm SL. Length of : head 36·5-39·6, snout 10·0–11·3, orbit 9·0–11·3, post-orbital head 17·7–20·7, maxilla 16·9–17·7; interorbital width 3·2–3·5, height of head, 23·4–24·2, width of head 19·5–21·8, depth of body 27·6-30·6, width of body 18·2-22·4, distance : predorsal 28·2–32·3, preanal 63·8-67 1, preventral 37·0–38·7, prepectoral 33·9–35 1; Caudal peduncle : length 15·3–19·4, depth 9·0–12·1; longest : simple pectoral ray 54·1–69.4, branched pectoral ray 29·9–32·8, dorsal spine 16·5–19·0, soft dorsal ray 18·8–24·2; length of : caudal fin 31·8–34·5, dorsal fin base 60·3–64·5, anal fin base 22·4–24·2, first dorsal spine

10·2–17·2, second dorsal spine 11·8–15·6, last dorsal spine 11·8-15·5, penultimate dorsal spine 8·8–12·1, ventral fin 23·5–30·1, first anal spine 8·0-12 1, second anal spine 9·4-13·8, third anal spine 13·0–17·2.

Body oblong, moderately compressed, predorsal profile with a gentle slope from nape to snout. Premaxillary processes not elevated. Interorbital space narrow with a median groove, the ridges diverging posteriorly and terminating in blunt spines on the flat occiput. Eyes small, directed slightly upward and outward, the upper margin of the pupil on a level with the interorbital ridge. Mouth small and oblique, maxilla narrow anteriorly and broad posteriorly, reaching to the middle of the eye, its depth less than eye. Jaws subequal, lower jaw with a well developed knob at symphysis, fitting into the toothless notch of the upper jaw. Narrow band of villiform teeth in jaws, on vomer and palatines. Tongue free and spatulate. Nostrils close to each other, posterior slit-like, anterior in middle of snout and tubular. Gill opening wide, gill membranes free from isthamus and from each other. Pseudobranchiae present. Branchiostegals seven. Gill rakers long and slender, well developed on the lower arch, reduced to knobs at the end of upper arch. A slit behind the fourth gill arch. Lateral line straight.

Head bony with low ridges and less spiny. Nasal spines minute. Supraorbital rim smooth, preocular region with low bony ridges, and postocular finely ridged. Fronto-parietal ridge slightly elevated ending in a blunt spine. Sphenotic, pterotic and upper post-temporal low ridged, the last one ending in a feeble spine. Supracleithral blunt and cleithral insignificant. Preorbital with two small spines over maxilla and one long retrose spine, almost reaching the posterior border of the maxilla. Suborbital ridge smooth with no spines. First preopercular spine longest and the remaining with blunt projections and some are concealed. No supplemental preopercular spine. Opercle with 2 diverging spines. Interopercle present but concealed. No postorbital and interorbital spines.

Scales characteristic, small, imbricate, ctenoid with irregular jagged hind margin and somewhat leafy in shape. Head naked except a patch of few series of scales at the posterior end of maxilla and below the suborbital ridge. Trunk, tail, chest and belly scaled. Fins naked except the pectoral and caudal base.

No flaps or cirri on the body except the chin with 3 barbels, one long, below mandibular symphysis and 2 lateral. Skin of lower jaw and lower part of preopercle thickly covered with very small pores.

Dorsal spines moderately strong, shorter than soft dorsal rays. The first two spines are close to each other, the first slightly shorter than second. Spines increasing in length to 7th, 8th to 12th subequal, 13th

and 14th shorter and 15th longer; membrane deeply notched. Dorsal rays branched. Anal spines increasing in length from first to third and anal rays branched. Ventrals with a strong spine, short in females and long in males reaching the anal origin, all rays branched. Pectoral long, the first ray reaching the caudal peduncle, the free, rod-like, flexible pectoral ray reaching to the anal, rays branched except the upper and lowermost rays, all the rays well connected by a membrane except the last. Caudal rounded and middle rays branched.

Colour in alcohol.—Body reddish brownish to light brownish or yellowish, belly whitish, pectoral greyish to blackish, upper and lowermost rays whitish, upper half of the spiny dorsal fin membrane greyish, a dark blotch between 8th and 13th dorsal spines. Soft dorsal, anal, ventral and caudal pale (in long preserved specimens) but with 3-4 greyish to blackish cross bands on soft dorsal and caudal, anal greyish and ventrals pale to dusky (in freshly preserved specimens).

Habitat.—It occurs off the coast and generally collected from trawl catches made on muddy, sandy and rocky bottoms.

Distribution.—Bay of Bengal and Arabian Sea (Trivandrum) — a wide spread species in the Indo-West Pacific.

Remarks.—Only one specimen (F. ZSI. 1744) among the present collection shows sixteen dorsal spines and probably this may be an abnormal character. A careful comparision of Day's drawing and his specimens revealed that instead of showing the blotch between 8th and 13th dorsal spines clearly the whole upper half of the spiny dorsal fin membrane was shown with a deep black band.

SUMMARY

A key to the Indian species of the genus *Setarches* Johnson is given. *Setarches longimanus* (Alcock), *S. guentheri* Johnson and *Apistus carinatus* (Bloch and Schneider) are described in detail.

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