# FISHES OF THE SUBFAMILY NEMACHEILINAE REGAN (CYPRINIFORMES : BALITORIDAE) FROM MANIPUR[1]

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*(With four text-figures and three plates)*

**Key words**: Fish, Nemacheilinae, Manipur.

Subfamily Nemacheilinae of Manipur State, India, is represented by 12 species, belonging to 3 genera, namely *Acanthocobitis* Peters and *Neonoemacheilus* Zhu & Guo with 2 species each and *Schistura* McClelland with 8 species. Diagnostic characters of the species, colour patterns, updated geographical distribution, detailed morphometric data, and illustrations are given based on fresh specimens collected from the State. *N. assamensis* (Menon) and *S. nagaensis* (Menon) are treated as valid species here. Distribution map and key to identification of species are also provided.

## INTRODUCTION

Fishes of the Subfamily Nemacheilinae Regan (Cypriniformes: Balitoridae) are small sized loaches inhabiting benthic zones of fresh, well aerated hill stream waters of Asia, Ethiopia and Europe. The group is characterised by an elongate, rounded body, a subterminal mouth, presence of prepalatine, 3 pairs of barbels: 2 rostral and 1 maxillary, 1 simple ray each in pectoral and pelvic fins, and absence of spine under or before eye (Nelson 1994). Menon (1987) recognized 2 genera, namely *Triplophysa* and *Noemacheilus* under this subfamily. However, Kottelat (1990) while revising the nemacheilines of Southeast Asia, recognised as many as 31 genera.

Manipur, with its numerous hill streams, is rich in loach fauna. The western side of the State is drained by the Barak and its tributaries, which form the Brahmaputra basin. The central plain is drained by the Imphal River and its tributaries, which finally form the Manipur River, which then flows out of the State to join the Chindwin in Myanmar. The river Tizu and its tributaries, and the Chatrickong drain the northern and central part of Ukhrul district respectively, and then enter Myanmar to join the Chindwin. The Maklang and Namya Rivers draining the southern part of Ukhrul district, the Lokchao draining the Chandel district and several other streams draining the eastern part of the State join the Yu River, a tributary of the Chindwin in Myanmar. Chaudhuri (1912) described *Nemacheilus* (now *Schistura*) *manipurensis* from Ukhrul district. Hora (1921) described *N. kanjupkhulensis*, *N. prashadi* and *N. sikmaiensis* (all currently in the genus *Schistura*), while reporting on the fish and fisheries of Manipur. His report from the state also included *N. botia* (now *Acanthocobitis*), but the place of collection was Ghaspani, Nagaland. Subsequent reports on the fishes of the state by Hora (1936), Menon (1953) and Menon (1954) did not add any more nemacheilines to the list.

Menon's (1987) revision of family Homalopteridae (now Balitoridae) also reported *Noemacheilus peguensis* (now *Neonoemacheilus*) and *N. vinciguerra* (now *Schistura*) from the state.

Most of the data presented by previous workers on this group of fishes of Manipur suffers from certain drawbacks: (1) they did not have fresh specimens for examination. Many specimens were in bad shape (e.g. *Neonoemacheilus peguensis*). Types of *Schistura sikmaiensis*, in ZSI have been lost, and a neotype from Myitkyina, Myanmar had to be designated (Kottelat, 1990). Moreover, in these specimens, some characteristic colour patterns are lost due

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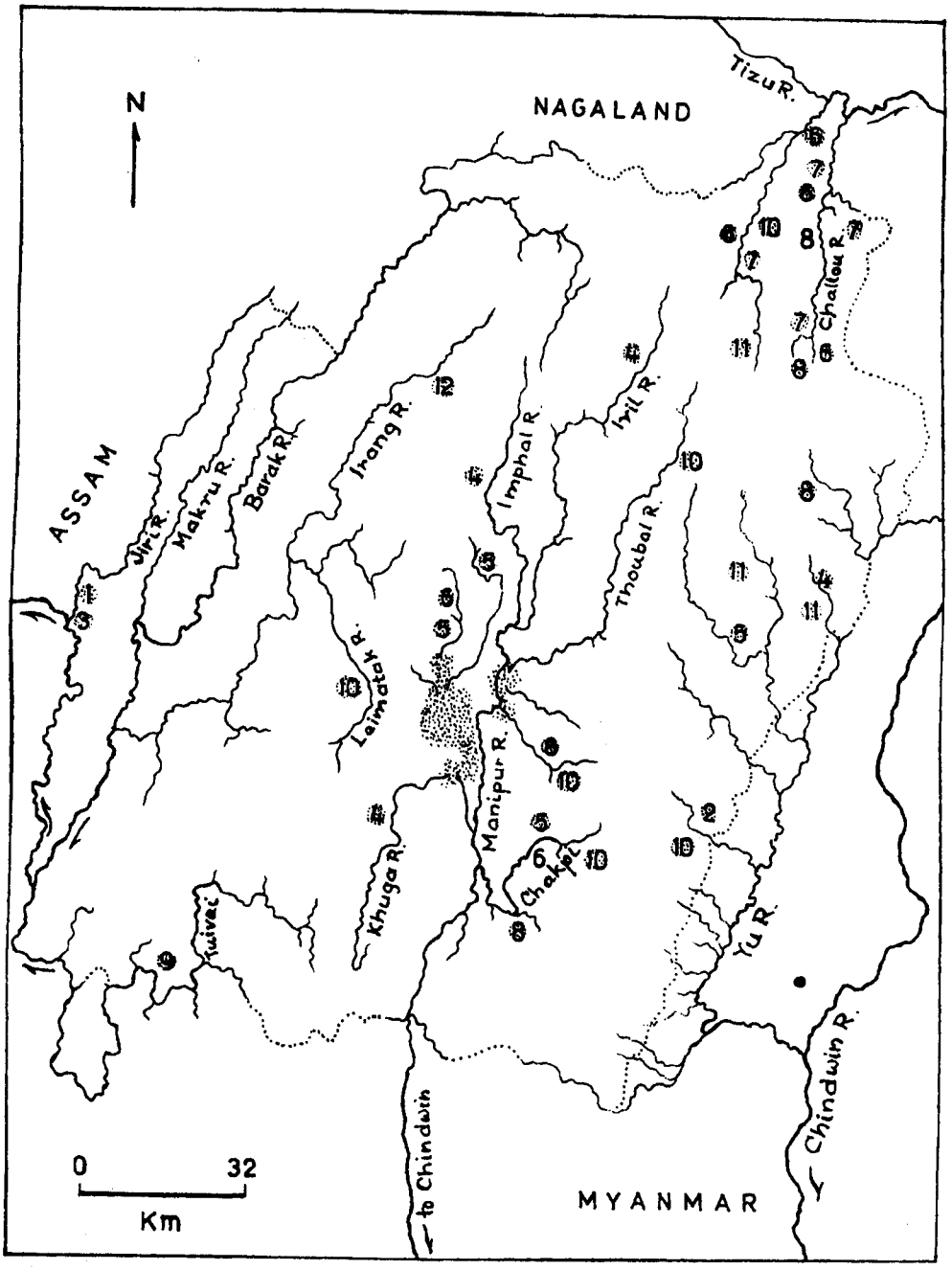



1. *Acanthocobitis botia*, 2. *A. zonalternans*. 3. *Neonoemacheilus assamensis*, 4. *N. peguensis*, 5. *Schistura kanjupkhulensis*, 6. *S. manipurensis*, 7. *S. nagaensis*, 8. *S. prashadi*, 9. *S. scaturgina*, 10. *S. sikmaiensis*, 11. *S. vinciguerra* and 12. *Schistura* sp.

Fig. 1: Map of Manipur showing distribution of nemacheiline fishes

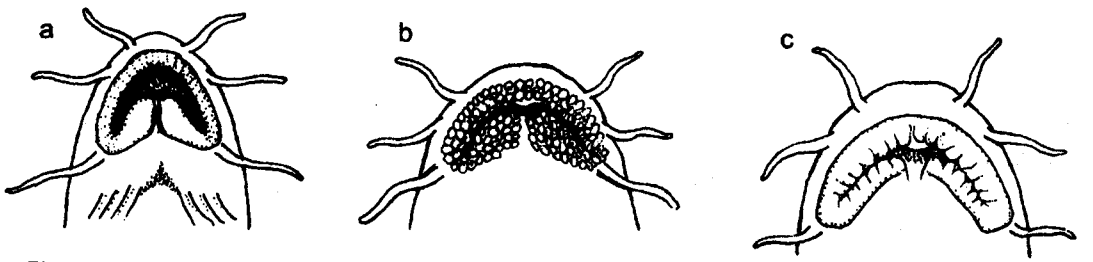



Fig. 2: Mouth and lips of nemacheiline genera: a. *Neonoemacheilus*, b. *Acanthocobitis* and c. *Schistura*.

to long preservation. (2) The descriptions were based on 1-4 specimens. e.g., 1 for *N. peguensis*, 2 each for *S. kanjupkhulensis* and *S. prashadi*, 3 for *S. sikmaiensis* etc. (3) Type localities are not clearly stated, leading to confusion in the distribution in different drainage basins. (4) The morphometric data is inadequate. (5) There is no proper illustration for some species *(N. assamensis, N. nagaensis)*.

In the present work, 164 specimens in MUMF (Manipur University Museum of Fishes, Manipur University) and a few in ZSI (Zoological Survey of India, Kolkata), collected from Manipur and its adjoining areas were examined. Morphometric measurement followed Kottelat (1990). The collections include 3 genera, namely *Acanthocobitis* Peters and *Neonoemacheilus* Zhu & Guo with 2 species each, and *Schistura* McClelland with 8 species. *N. assamensis* (Menon) and *S. nagaensis* (Menon) are treated here as valid species. *A. botia* (Hamilton) is reported from the state. Systematic accounts are presented; a key to the species and a distribution map (Fig. 1) have also been provided.

Abbreviations used: MUMF= Manipur University Museum of Fishes; ZSI = Zoological Survey of India; WV = W. Vishwanath, WM = W. Manojkumar, HL = H. Lilabati, LK = L. Kosygin, KS = K. Selim, WJ = W. Jayadev, KN = K. Nebeshwor, SB = S. Bijoy, Unreg. = Unregistered, R = River, Str. = Stream. Under head 'Material examined' of every species, the MUMF registration number, followed by number of specimens examined, standard length of fish, site and date of collection are given.

## Systematic Account

### KEY TO THE GENERA OF NEMACHEILINAE REGAN IN MANIPUR

1a. Mouth hypertrophied, lips forming a preoral cavity; lower lip in the form of two thick pads, interrupted in the middle (Fig. 2a) ..... ..... *Neonoemacheilus*

1b. Mouth not hypertrophied, lower lip not in the form of two thick pads (Fig. 2b & 2c) ..... 2

2a. A conspicuous black spot at the upper extremity of caudal base, no transverse black bar at the base of caudal fin (Fig. 3a) ..... *Acanthocobitis*

2b. No black spot at upper extremity of caudal base, a black transverse bar at the base of caudal fin (Fig. 3b) ..... *Schistura*

### *Acanthocobitis* Peters

*Acanthocobitis* Peters, 1861: 712 (type species: *A. longipinnis* Peters). Kottelat, 1990 (revision). Banarescu & Nalbant, 1995: 432 (generic classification)

**Diagnosis**: Nemacheiline genus, recognised by a comparatively deep body which is compressed posteriorly; compressed head, nostrils close together, the anterior one without a barbel-like prolongation; large imbricate scales

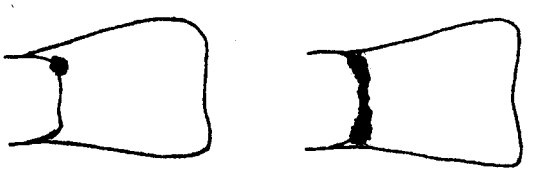


Fig. 3: Coloration on caudal base: a. *Acanthocobitis* and b. *Schistura*.

with small focus; scales absent on head and reduced on chest; upper lip usually with papillated pad, with a broad median interruption; dark transverse bands or irregular markings or regularly arranged spots on body; a conspicuous black spot at upper extremity of caudal base, lateral line complete or incomplete; males with a suborbital flap or a suborbital groove.

The counts are as: D. iv, 9½-12½, A. ii-iii, 5½, C. /9+8/ P. 11-13, V. 7-8.

KEY TO SPECIES:

1a. Lateral line complete; branched dorsal rays 12½ ..... *A. botia*

1b. Lateral line extends up to middle of dorsal fin; branched dorsal rays 9½-10½ .. *A. zonalternans*

***Acanthocobitis botia*** (Hamilton)
(Plate 1, Fig a)

*Cobitis botia* Hamilton, 1822: 350 (type locality: Ganges)

*Acanthocobitis botia*: Kottelat, 1990 (revision)

**Material examined**: MUMF, 6, 43.4-62.8 mm, Jiri R., LK and SB, January, 1998. MUMF 3015, 1, 62.8 mm, KN. 5.v.1999

**Diagnosis**: In addition to the key characters, other diagnostic characters are: dorsal profile slightly convex anteriorly and concave posteriorly, pectoral fin extends to more than half of the distance between pectoral and pelvic fin origins. Pelvic fin origin under 3rd-4th branched dorsal fin ray. Dorsal fin inserted slightly ahead of middle of body. Head rounded, eyes on dorsal half of head. Body covered with scales. Lateral line complete. Caudal fin slightly emarginate.

**Colour**: A distinct, thin, dark line above lateral line; 8-10 elongate vertical blotches on body, shapes variable. 10-11 black patches ('saddles' as mentioned by Kottelat, 1999) on back, extending towards lateral line alternate with the blotches. Dorsal fin with 5-6 horizontal series of black spots, caudal fin with 7-8 vertical series, V-shaped, pointed posteriorly.

**Distribution**: River Indus, Pakistan to Mae Khlong of Thailand, through Ganga, Brahmaputra, Chindwin, Irrawady, Sitang and Salween basins.

**Remarks**: Morphometric data given in Table 1. The species is represented only in the collections from Barak and its tributaries (Brahmaputra basin) and not from the Chindwin basin of the State. Hora (1921) included the species in the list of fishes collected from Manipur. However, collection site was Ghaspani, a village in Nagaland, in the Brahmaputra basin.

***Acanthocobitis zonalternans*** (Blyth)
(Plate 1, Fig. b)

*Cobitis zonalternans* Blyth, 1860: 172 (type locality: Tenasserim Province, Myanmar)

*Acanthocobitis zonalternans*: Kottelat, 1990: 35, figs. 11a, 17, 18 (revision); Banarescu & Nalbant, 1995: 433 (general classification and diagnostic characters).

**Material examined**: MUMF 3016, 6, 38.6-44.9 mm, Lokchao river, Moreh, WV & party, 25.iii.1999.

**Local name**: Ngatup

**Diagnosis**: In addition to key characters, diagnostic characters are: pectoral fin extends to almost 2/3rd the distance between pectoral and pelvic fin origins. Pelvic fin originates behind 4th-5th branched dorsal fin ray. Dorsal fin origin slightly ahead of middle of body. Body and belly with embedded scales. Lateral line incomplete, reaching middle of dorsal fin base. Caudal fin emarginate.

**Colour**: Body light brown with 12-13 vertical bars of variable shape, extending from back to middle of body. Dorsal black patches 10-13, extending to lateral line, alternating with vertical bars. Bars and patches thinner anteriorly.

**Distribution**: INDIA: Chindwin basin in Manipur to Mae Khlong and Tapi basins of Thailand, through Sitang and Salween basins.

TABLE 1
MORPHOMETRY OF *A. BOTIA* AND *A. ZONALTERNANS* (IN % OF SL EXCEPT SL, IN MM)

| | *A. botia* (N=7) | | | *A. zonalternans* (N=6) | | |
|---|---|---|---|---|---|---|
| | Mean | Range | S.D. | Mean | Range | S.D. |
| Standard Length | | 43.4-82.8 | | | 38.6-44.9 | |
| Depth of Body | 20.9 | 18.0-24.4 | 1.9 | 19.8 | 17.9-22.0 | 1.3 |
| Lateral Headlength | 24.5 | 22.8-25.3 | 0.9 | 24.2 | 23.2-25.6 | 0.9 |
| Dorsal headlength | 21.9 | 20.8-23.0 | 0.8 | 21.6 | 20.9-22.7 | 0.6 |
| Head depth (at nape) | 15.0 | 14.1-15.8 | 0.5 | 15.5 | 14.2-17.3 | 0.9 |
| Head depth (at eye) | 12.6 | 11.7-13.4 | 0.6 | 12.7 | 12.2-13.9 | 0.6 |
| Snout length | 9.7 | 9.0-10.9 | 0.6 | 9.1 | 8.1-10.2 | 0.7 |
| Eye Diameter | 5.8 | 5.3-6.0 | 0.2 | 5.1 | 4.4-5.8 | 0.5 |
| Interorbital width | 6.5 | 5.9-7.2 | 0.5 | 7.7 | 6.7-8.5 | 0.6 |
| Maximum head width | 15.3 | 14.5-16.6 | 0.6 | 14.8 | 13.5-15.3 | 0.7 |
| Head width (at nares) | 9.5 | 8.6-11.2 | 0.9 | 9.6 | 9.0-10.1 | 0.3 |
| Mouth gape width | 6.0 | 4.8-7.4 | 0.8 | 5.9 | 5.1-6.4 | 0.4 |
| Internarial width | 5.6 | 5.1-6.0 | 0.4 | 5.7 | 4.7-7.1 | 0.8 |
| Length of caudal ped. | 13.0 | 11.5-14.4 | 0.9 | 13.5 | 11.4-16.4 | 1.6 |
| Height of caudal ped. | 12.8 | 12.2-13.4 | 0.4 | 12.9 | 12.0-14.4 | 0.8 |
| Body width (dorsal origin) | 14.5 | 13.1-16.1 | 0.9 | 13.4 | 11.9-14.0 | 0.7 |
| Body width (anal origin) | 9.3 | 8.3-10.2 | 0.6 | 9.6 | 8.5-10.8 | 0.8 |
| Height dorsal fin base | 21.2 | 19.5-23.3 | 1.5 | 20.0 | 19.0-20.8 | 0.8 |
| Height of dorsal fin | 21.0 | 16.9-24.1 | 2.2 | 22.2 | 21.1-23.6 | 1.0 |
| Length of pectoral fin | 20.8 | 19.5-22.1 | 1.0 | 22.4 | 21.0-24.4 | 1.2 |
| Length of ventral fin | 16.5 | 15.3-17.4 | 0.7 | 18.6 | 16.8-20.5 | 1.5 |
| Length of anal fin | 8.1 | 7.5-8.8 | 0.6 | 8.7 | 7.6-10.2 | 0.9 |
| Length of upper caudal lobe | 23.8 | 22.4-25.2 | 1.0 | 25.9 | 24.4-28.2 | 1.2 |
| Length of lower caudal lobe | 22.9 | 21.4-23.9 | 0.9 | 25.9 | 24.4-28.2 | 1.2 |
| Predorsal length | 44.9 | 42.2-46.8 | 1.4 | 47.6 | 45.1-49.0 | 1.4 |
| Pre pelvic length | 52.9 | 51.9-54.7 | 0.9 | 55.1 | 53.9-57.4 | 1.3 |
| Pre anal length | 79.4 | 77.9-80.4 | 1.0 | 79.0 | 77.8-83.1 | 1.7 |
| Pre anus length | 73.9 | 72.7-75.8 | 1.0 | 73.5 | 71.5-75.7 | 1.5 |

**Remarks**: Morphometric data are given in Table 1. Hora (1921) reported the fish to be plentiful in Manipur Valley. However, now it occurs only in the streams draining into the Yu River (tributary of Chindwin). Kottelat's (1990) inclusion of Brahmaputra in the distribution of the species needs confirmation. None of the material he examined, as listed on pp. 36-38 was from the said basin.

### *Neonoemacheilus* Zhu & Guo

*Neonoemacheilus* Zhu & Guo, 1985: 321 (type species: *Nemacheilus labeosus* Kottelat). Kottelat, 1990 (revision). Banarescu & Nalbant, 1995; 436 (generic classification)

*Infundibulatus* Menon, 1987: 177 (type species: *Nemacheilus peguensis* Hora, new subgenus of *Nemacheilus* (Bleeker)

**Diagnosis**: A nemacheiline genus with hypertrophied lips forming a preoral cavity. Lips with transverse ridges, flat, lower lip in the form of two thick pads, interrupted in the middle. Scales imbricate; Lateral line complete. Body with 13-21 dark brown transverse bars; suborbital flap in males. Body slender, dorsal profile arched, ventral more or less straight, compressed moderately before dorsal fin origin, more compressed behind. Head comparatively deep. Mouth ventral, placed behind tip of snout. Lips broad, *processus dentiformes* moderately

developed. Barbels 3 pairs; inner rostral reaches corner of mouth, outer rostral and maxillary slightly longer. Anterior nostril opens obliquely in front side of a flap-like tube. Body covered with scales, absent on ventral surface. Lateral line complete.

The counts are: D. iv, 8½-9½; A. iii, 5½; C. /9+8/; P. 11-12; V. 7-9.

KEY TO SPECIES

1a. Branched dorsal fin rays 8½, head depth 12.9.(11.8-13.7)% of SL; body with 13-17 dark brown transverse bars ..... *N. assamensis*

1b. Branched dorsal fin rays 9½; head depth 14.3 (13.4-15.0)% of SL; body with 20-21 dark brown transverse bars ..... *N. peguensis*

***Neonoemacheilus assamensis*** (Menon)
(Plate 1, Fig c)

*Noemacheilus assamensis* Menon, 1987; 179 (type locality: Pagladia River, Assam)

**Material examined**: MUMF 3011, 11, 35.1-43 mm, Jiri R., tributary of Barak R., Jiribam, WV & party, December, 1997.

**Local name**: Ngatup

**Diagnosis**: Species with 8½ branched dorsal fin rays; a conspicuous pad on tip of snout overhanging mouth, width of mouth 53.4-55.6% of head width; head depth 54.1-66.7%, interorbital space 16.3-25.3% of HL; 13-17 dark brown transverse bars on body. Pectoral fin reaches midway to base of pelvic, the latter just reaches anus or a little beyond. Anus situated nearer to anal fin than to origin of pelvic fin. Mouth semicircular, situated a little behind the snout (Fig. 2a). Upper lip thin, moderately hypertrophied, a pad-like structure in the middle. Body covered with scales except head, but more sparsely between pectoral fins. Scales minute, oval-shaped with large focus (Fig. 4a). Lateral line complete with 80-85 pores.

**Sexual dimorphism**: Males with well developed suborbital flap and breeding tubercles on pectoral fin (Figs 4b, 4c)

**Colour**: Body creamish-white with 13-17 light brown transverse bars extending from back to 2/3rd of flank, not reaching ventral surface, interspace wider. Width of bar increases with size of fish. A dark bar, fainter in the middle, present on caudal base. All fins hyaline. Snout with 4 transverse stripes. Dark brown triangular spot on occiput, a small dark spot between the nares.

**Distribution**: INDIA: Pagladia R., Assam, Jiri R., Manipur (both of Brahmaputra basin).

**Remarks**: Morphometric data given in Table 2. Menon (1987) described the species based on a single specimen. Although he mentioned a paratype, he did not provide an illustration. Kottelat (1990, p. 72) distinguished the species from *N. peguensis* by its smaller number of branched dorsal fin rays and slender caudal peduncle. However, he could not describe the species due to paucity of material. Banarescu & Nalbant (1995) made no mention of the species. In the present study, 11 examples of the fish from Jiri R. of Manipur were examined. The species is redescribed here.

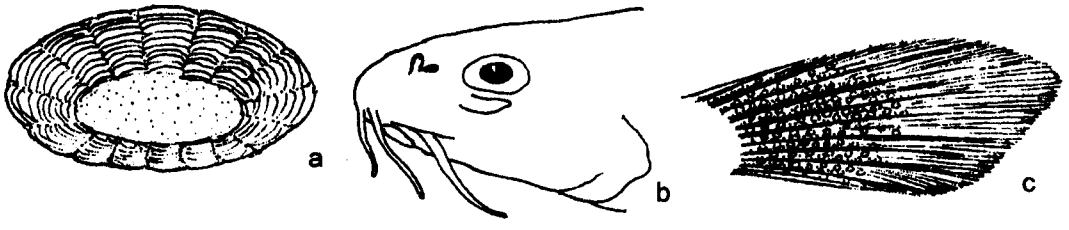



Fig. 4: Different body parts of *Neonoemacheilus assamensis*:
a. Scales from above pectoral fin, b. suborbital flap in males, c. breeding tubercles on pectoral fins of male

***Neonoemacheilus peguensis*** (Hora)
(Plate 1, Fig d)

*Nemachilus peguensis* Hora, 1929: 320, pl. 14, figs. 1, 2 (type locality: Pegu Yoma)

*Neonoemacheilus peguensis*: Kottelat, 1990: 75, fig 45 (revision, holotype examined)

**Material examined**: MUMF 3012, 1, 40.7 mm, Imphal R. WJ, 3.iii.1999; MUMF 3013, 2, 49.9-62.9 mm, Iril R., LK, March, 1999.

**Local name**: Ngatup

**Diagnosis**: A species with broad lips, mouth width 66.7-70.7% of head width; branched dorsal fin rays 9½; no pad on ventral surface of snout tip; head deeper 68.6 (67.8-69.1)% of head length; interorbital width 28.5 (24.6-31.0)% of head length; 20-21 dark brown transverse bars on body.

**Sexual dimorphism**: Males have a well developed suborbital flap.

**Colour**: Body creamish-white, 20-21 thin transverse dark brown bars extending from back to 2/3rd of flank. Fins with no markings. Occiput with dark dots.

**Distribution**: INDIA: Iril and Imphal rivers (in Manipur Valley), Namya R., a tributary of Yu river of Myanmar (all of Chindwin basin); Myanmar: Pegu Yoma (Irrawady basin).

**Remarks**: Morphometric data given in Table 2. The specimens under examination are *N. peguensis* as they agree well with the

TABLE 2
MORPHOMETRY OF *N. ASSAMENSIS* AND *N. PEGUENSIS* (IN % OF SL EXCEPT SL IN MM)

| | *N. assamensis* (N=11) | | | *N. peguensis* (N=3) | | |
|---|---|---|---|---|---|---|
| | Mean | Range | S.D. | Mean | Range | S.D. |
| Standard Length | | 35.1-43.8 | | | 40.7-62.9 | |
| Depth of Body | 17.0 | 15.5-19.5 | 1.17 | 18.2 | 17.0-20.2 | 1.4 |
| Lateral headlength | 23.7 | 22.8-24.8 | 0.58 | 23.4 | 22.9-24.1 | 0.5 |
| Dorsal headlength | 20.8 | 19.2-22.3 | 0.82 | 20.9 | 19.4-21.9 | 1.1 |
| Head depth (at nape) | 12.9 | 11.8-13.7 | 0.65 | 14.3 | 13.4-15.0 | 0.7 |
| Head depth (at eye) | 10.2 | 9.3-10.9 | 0.46 | 11.9 | 11.6-12.4 | 0.4 |
| Snout length | 8.3 | 7.4-9.0 | 0.46 | 10.1 | 9.4-10.7 | 0.5 |
| Eye Diameter | 5.8 | 5.4-6.7 | 0.27 | 5.0 | 4.6-5.4 | 0.3 |
| Interorbital width | 4.5 | 3.6-5.2 | 0.48 | 6.0 | 5.2-6.9 | 0.7 |
| Maximum head width | 12.9 | 11.8-13.7 | 0.65 | 14.0 | 13.8-14.3 | 0.2 |
| Head width (at nares) | 8.1 | 7.0-8.9 | 0.51 | 8.2 | 4.8-10.3 | 1.4 |
| Length of caud. ped. | 13.4 | 12.3-14.6 | 0.57 | 13.2 | 12.8-13.4 | 0.3 |
| Height of caud. ped. | 9.7 | 9.1-10.3 | 0.43 | 11.1 | 10.3-11.6 | 0.6 |
| Body width (dorsal origin) | 12.1 | 10.1-13.4 | 0.88 | 13.7 | 12.0-15.1 | 1.3 |
| Body width (at anal origin) | 7.9 | 6.7-9.3 | 0.86 | 8.2 | 6.8-9.2 | 1.0 |
| Height dorsal fin base | 15.7 | 13.9-16.9 | 0.70 | 17.6 | 15.8-19.1 | 1.4 |
| Height of dorsal fin | 20.4 | 19.5-23.0 | 1.19 | 19.6 | 18.0-20.6 | 1.1 |
| Length of pectoral fin | 22.1 | 21.1-23.0 | 0.63 | 19.8 | 18.1-21.6 | 1.4 |
| Length of ventral fin | 16.8 | 15.9-17.7 | 0.66 | 15.8 | 14.6-16.7 | 0.9 |
| Length of anal fin | 8.1 | 6.4-9.7 | 0.96 | 8.2 | 8.0-8.6 | 0.3 |
| Length of upper caudal lobe | 23.9 | 22.8-26.1 | 1.06 | 24.5 | 24.0-24.8 | 0.3 |
| Length of lower caudal lobe | 25.1 | 23.9-27.2 | 0.90 | 24.3 | 23.7-25.3 | 0.7 |
| Predorsal length | 44.7 | 43.6-50.4 | 1.90 | 50.0 | 49.1-50.5 | 0.7 |
| Pre pelvic length | 52.5 | 49.7-56.8 | 1.91 | 55.3 | 53.9-57.2 | 1.4 |
| Pre anal length | 78.6 | 76.4-80.8 | 1.27 | 79.0 | 78.4-79.9 | 0.6 |
| Pre anus length | 67.7 | 64.9-70.9 | 2.01 | 68.1 | 65.8-69.8 | 1.7 |
| Width of mouth in % of HW | 53.3 | 53.4-55.6 | 1.06 | 68.9 | 66.7-70.7 | 2.1 |
| Head depth as % of HL | 61.9 | 54.1-66.7 | 3.89 | 68.8 | 68.5-69.1 | 0.2 |
| Interorbital width | 21.9 | 16.3-25.3 | 2.72 | 28.7 | 24.6-31.5 | 2.9 |

description of the holotype by Kottelat (1990), who described the species partially from the specimen which was in very bad shape (as his photograph shows). Menon (1987) noted that the species had a cup-shaped (labial structure) with a greatly hypertrophied upper lip. Kottelat (1990), on the other hand, wrote that the lips are thick. Both the authors showed a cup-shaped mouth with greatly hypertrophied lips (Menon's pl. 6, fig. 8; Kottelat's fig. 45), which were the reproductions of Hora's (1929) drawings. The present specimens (Fig. 2a) do not have such a structure.

*Schistura* McClelland

Schistura McClelland, 1838: 944, 947 (type species: *S. rupecula* McClelland); Kottelat, 1990: 90 (revision): Banarescu & Nalbant, 1995: 438 (generic classification).

**Diagnosis**: Mouth wider than long, lower lip medially interrupted, but not forming two lateral triangular pads; a black bar (sometimes dissociated) on caudal fin base; 2 black marks along the base of dorsal fin; body with black transverse bars, split in many. Posterior nostril prolonged into a tube in some. Sexual dimorphism not seen in most species; pectoral fin rays may be ossified and covered with breeding tubercles in males. Body covered with embedded scales.

The counts are: D. ii-iii, 7½-9½, A. ii-iii, 5½, C/8-9+7-8/, P. 9-12, V. 6-8.

In all the species found in Manipur, the following observations were made. Branched dorsal fin number is an important specific character. Dorsal fins are inserted midway between tip of snout and caudal fin base, except in *S. prashadi* where they are inserted slightly ahead. Anterior nostrils are pierced obliquely in the front side of a flap-like nasal tube. There are 3 pairs of barbels, inner and outer rostrals and a maxillary. Processus dentiformes are developed in all the species except in *S. prashadi* in which it is reduced. A black spot is present at the base of first few dorsal rays, except in *S. scaturigina*.

**Local name**: Commonly called Ngatup in Manipur; Moremlei, Khirilei or Hankorkhai in Tangkhul dialect.

KEY TO SPECIES

1. Branched dorsal rays 9½ ..... *S. prashadi*
   Branched dorsal fin rays 7½-8½ ..... 2
2. Branched dorsal rays 7½, lateral line incomplete ..... 3
   Branched dorsal rays 8½, lateral line complete or incomplete ..... 4
3. Body with 8-11 broad transverse bars with narrow interspace ..... *S. kanjupkhulensis*
   Body with 17-21 narrow irregular bars, often breaking up into mottles, sometimes plain and dusky ..... *S. manipurensis*
4. Lateral line incomplete. 11-12 broad transverse bars with narrow interspace ..... *S. nagaensis*
5. Transverse bars in two rows, one extending from back to lateral line, alternating with another from lateral line towards belly, no black spot at base of first few dorsal fin rays ..... *S. scaturigina*
   Transverse bars regularly arranged, black spot present at base of first few dorsal fin rays ..... 6
6. Transverse bars 9, depth of body 14.6% of SL ..... *Schistura* sp.
   Transverse bars more than 9, depth of body 15.7-18.2% of SL ..... 7
7. 17-20 transverse bars extending from back to belly, interspace of similar width ..... *S. sikmaiensis*
   Transverse bars wide in caudal peduncle, gradually narrowing anteriorwards, bars broken up into characteristic reticular network in front of dorsal fin origin ..... *S. vinciguerra*

***Schistura kanjupkhulensis*** (Hora)

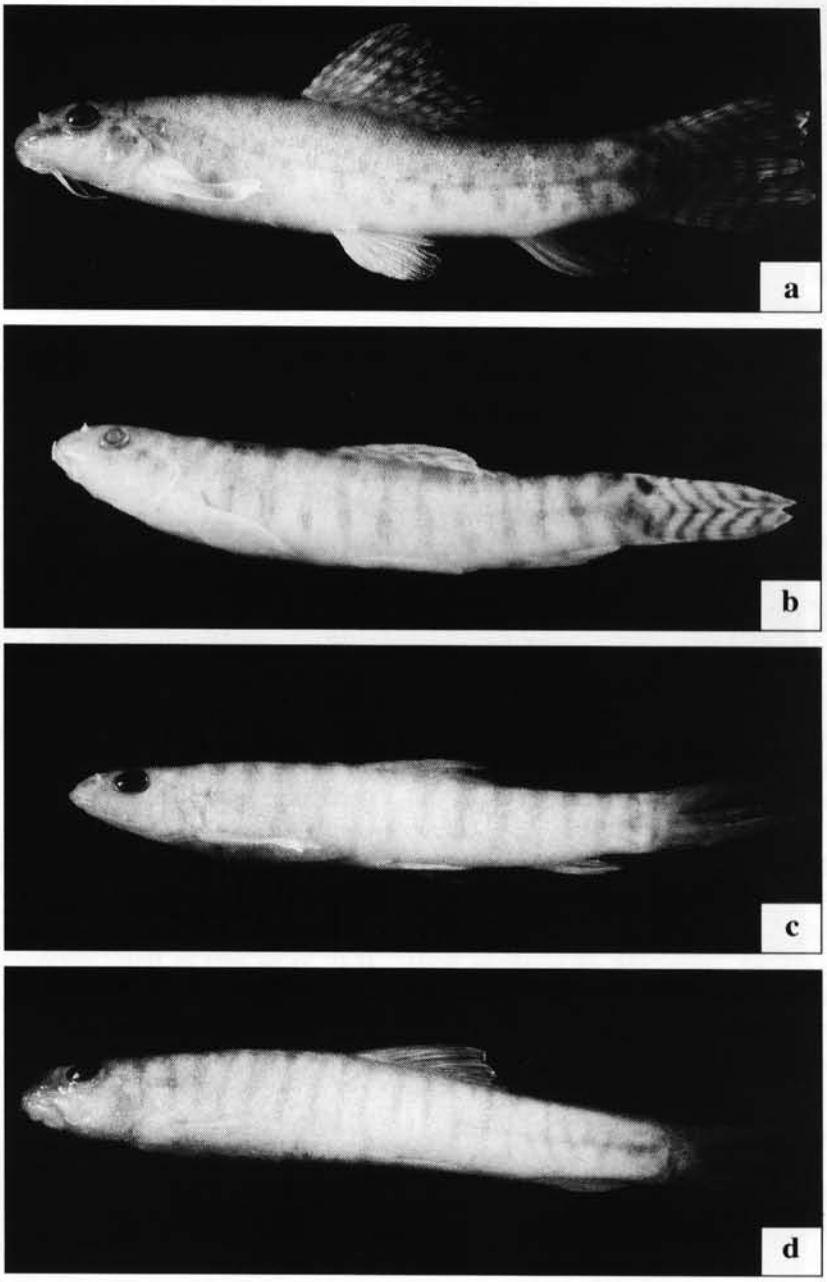
(Plate 2, Fig. a)

*Nemacheilus kanjupkhulensis* Hora, 1921: 202, pl. 10, figs. 4, 4a (type locality: Yairibuk, Manipur).

*Nemacheilus kanjupkhulensis*: Menon, 1987: 115 (diagnosis and description)

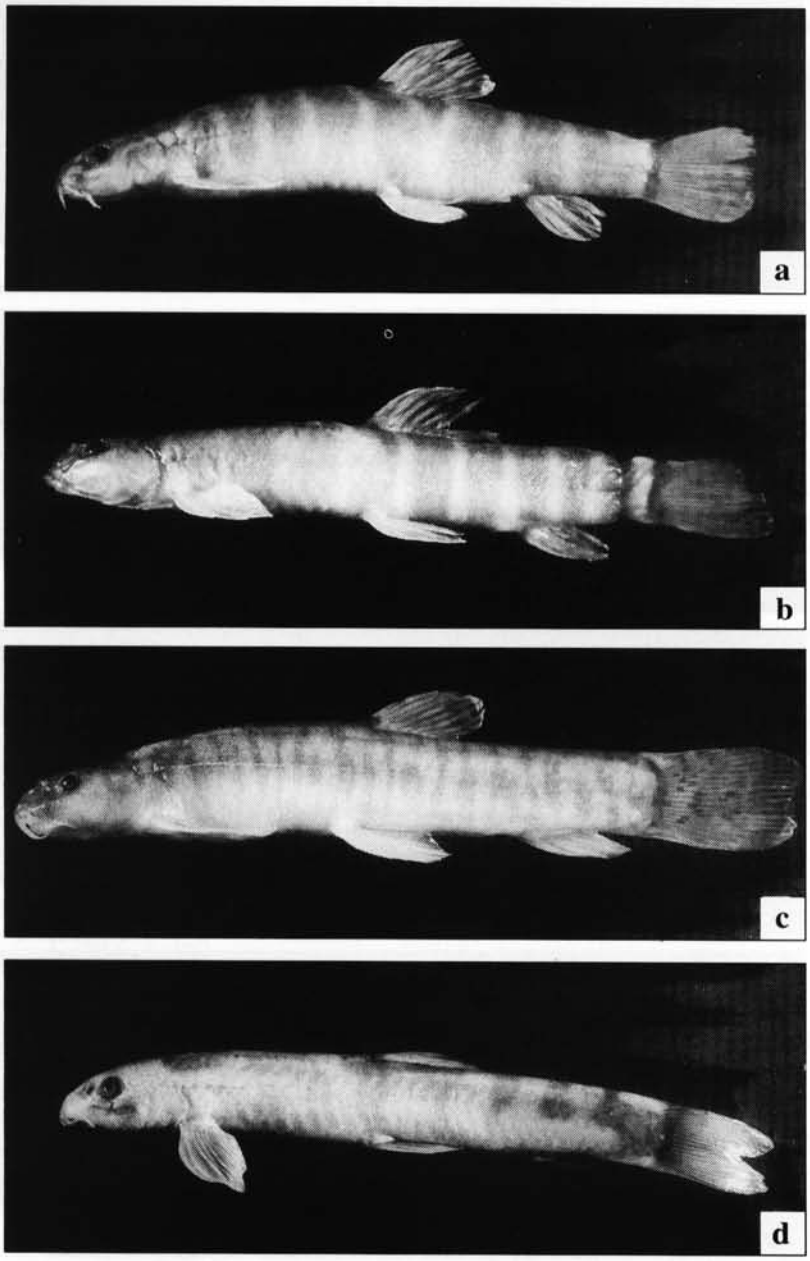
*Schistura kanjupkhulensis*: Kottelat, 1990: 131 (revision); Banarescu & Nalbant, 1995: 439, fig. 10 (generic classification and illustration)

W. Vishwanath *et al.*: *Acanthocobitis* sp. and *Neonoemacheilus* sp. PLATE 1




Figs a-d: a. *Acanthocobitis botia* (MUMF 3015), 62.8 mm SL;
b. *A. zonalternans* (uncatalogued), 42.1 mm SL;
c. *Neonoemacheilus assamensis* (MUMF 3011), 38.8 mm SL; d. *N. peguensis* (MUMF 3012), 41.7 mm SL

W. Vishwanath *et al.*: *Schistura* sp. PLATE 2




Figs a-d: a. *Schistura kanjupkhulensis* (MUMF 2040), 45.0 mm SL;
b. *S. nagaensis* (MUMF 2074), 41.4 mm SL; c. *S. manipurensis* (uncatalogued) 54.0 mm SL;
d. *Schistura* sp. (MUMF 3009), 54.0 mm SL

**Material examined**: Unreg. 5, 30.3-49.8 mm, Chakpi stream, WM, 12.xi.1992; unreg. 1, 36.0 mm, Maklang R., KS, 25.iv.1995; 3007, 3, 42.5-46.3 mm, Khujairok, WV & party, March, 1998.

**Diagnosis**: *Schistura* with 7½ branched dorsal fin rays, 8-11 broad black bars on body alternating with narrower and pale yellow interspace; body depth 17.1 (15.0-19.3)% of SL. Caudal fin truncate.

**Sexual dimorphism**: Not known.

**Colour**: Body yellowish with 8-11 broad brown transverse bars, alternating with narrow interspace. Bands usually not broken up. Caudal base with a continuous darker bar. A dark spot at base of first few dorsal rays. Distinct series of longitudinal dark spots in upper 2/3rd of dorsal fin, another fainter one near outer border. Caudal fin with 2-3 irregular vertical bands. Fins and some parts of body orange in live condition.

**Distribution**: INDIA: Chindwin basin of Manipur.

**Remarks**: Morphometric data given in Table 3. Distributed in the streams of the Manipur central valley and of those draining into the Yu R. of Myanmar. Menon (1987) described *Noemacheilus* (now *Schistura*) *nagaensis* from Tizu R., Nagaland. Kottelat (1990) doubted its validity and recorded it as synonymous with *S. kanjupkhulensis* with a question mark. The species is considered valid in this work, it is discussed in detail and described.

***Schistura manipurensis*** (Chaudhuri)
(Plate 2, Fig c)

*Nemachilus manipurensis* Chaudhuri, 1912: 443, pl. 40 fig. 4, pl. 41 fig. 1 (type locality: Manipur)

*Noemacheilus manipurensis*: Menon, 1987: 121, pl. 12 fig. 4 (diagnosis and description)

*Schistura manipurensis*: Kottelat, 1990: 156, fig. 114, 115 (revision)

**Material examined**: Unreg., 3, 29.3-40.3 mm, Chapki Str., WM, 16.ix.1992; MUMF 2079, 1, 56.5 mm, Challou R., Thetsi, LK, 2.vi.1994; MUMF 2155-59, 5, 38.0-56.0 mm, Tizu R., 15.viii.1994, MUMF 2201, 9, 35.0-55.0 mm, Tizu R., 17.vi.1997, MUMF 2272, 1, 54.3 mm, Str. Near Tolloi, 12.xi.1997; Unreg., 7, 30.2-59.2 mm, Challou R., Chingal, 30.iv.1995; Unreg., 6, 35.0-51.2 mm, Wanze Str., Khamsom, 8.i.1996; all LK, Unreg., 1, 56.4 mm, Chatrickong R., KS, 6.vi.1996; MUMF 3001, 6, 35.4-59.8 mm; Khujailok, WV & party, March, 1998.

**Diagnosis**: *Schistura* with 7½ branched dorsal rays, males with suborbital flap, *processus dentiformes* reduced, lateral line incomplete, extending up to pelvic origin, a dark spot at base of first few dorsal fin rays, body with dark thin bars, usually broken up, may be plain dusky, caudal fin slightly emarginate to truncate.

**Sexual dimorphism**: Males with a large suborbital flap.

**Colour**: Body pale yellowish, with 17-21 thin transverse bars, irregular, extending from back to caudal base, a black spot at base of first few dorsal rays. Dorsal fin with 2 horizontal bars, one in the middle and another near outer border, caudal with irregular transverse bars.

**Distribution**: INDIA: Chindwin basins of Nagaland and Manipur.

**Remarks**: Chaudhuri (1912) reported the type locality as Manipur, Assam, without mentioning the drainage. Manipur was a part of Assam in British India. Now it is a State of the Indian Union. Hora (1921) obtained the information from Dr. Annandale and reported that the fish was collected by Rev. Pettigrew from Ukhrul district. All the streams and rivers in the district belong to the Chindwin basin. Specimens examined by Menon (1987) and Kottelat (1990) were also from the same basin. Thus, distribution of the species in Brahmaputra basin as reported by them is not valid. Morphometric data given in Table 4.

***Schistura nagaensis*** (Menon)

(Plate 2, Fig b)

*Noemacheilus nagaensis* Menon, 1987; 117 (type locality: Phodung R., tributary of Tizu R., Nagaland).

**Material examined**: MUMF 2074-78, 5, 31.5-41-0 mm, Challou R, Thetsi, 2.vi.1994; MUMF 2218-32, 15, 31.5-50.0 mm, Wanze stream, Khamsom, 2.i.1995; MUMF 2270-71, 2, 50.0-54.0 mm, Str. Near Tolloi, 12.xi.1997; Unreg., 3, 47.8-48.0 mm, Momo stream, Tusom CV, 2.iii.1998 (all Coll. LK); ZSIF 10061, 2, Zu zeti Str. (Larur), Nagaland, JH Hutton, 1927.

**Diagnosis**: *Schistura* with 7½ branched dorsal fin rays, 9-11 broad, dark, transverse bars on body, alternating with narrower white/pale yellow interspace; body depth 14.6 (13.9-15.3)% of SL. Caudal fin truncate, lateral line incomplete.

**Sexual dimorphism**: Not known.

**Colour**: Body yellowish-white with 9-11 broad, dark brown, transverse bands alternating with narrow interspace. Caudal base with a dark continuous bar. Black spot at the base of first few dorsal rays, horizontal dark bar near outer border of dorsal fin.

**Distribution**: INDIA: Tizu River and its tributaries in Nagaland and Manipur (Chindwin basin).

**Remarks**: Morphometric data given in Table 3. Menon (1987) described the fish based on 14 specimens from Phodung River, a tributary

TABLE 3

MORPHOMETRY OF *S. KANJUPKHULENSIS* AND *S. NAGAENS* IS (IN % OF SL EXCEPT SL IN MM)

| | *S. kanjupkhulensis* (N=11) | | | *S. nagaensis* (N=25) | | |
|---|---|---|---|---|---|---|
| | Mean | Range | S.D. | Mean | Range | S.D. |
| Standard Length | | 42.6-46.3 | | | 33.4-44.6 | |
| Depth of Body | 17.1 | 15.0-19.3 | 1.8 | 14.6 | 13.9-15.3 | 1.1 |
| Lateral headlength | 22.0 | 21.2-22.5 | 0.6 | 22.7 | 20.9-24.3 | 1.3 |
| Dorsal headlength | 19.5 | 19.0-19.8 | 0.4 | 20.3 | 19.2-21.6 | 0.9 |
| Head depth (at nape) | 14.8 | 11.9-20.2 | 0.2 | 11.6 | 9.4-12.9 | 0.7 |
| Head depth (at eye) | 10.0 | 9.3-10.8 | 0.6 | 10.2 | 9.6-10.8 | 0.6 |
| Snout length | 8.8 | 8.2-9.2 | 0.4 | 8.7 | 8.1-9.0 | 0.4 |
| Eye Diameter | 3.1 | 2.8-3.3 | 0.2 | 4.2 | 3.4-5.1 | 0.3 |
| Interorbital width | 5.5 | 5.2-5.8 | 0.2 | 5.1 | 4.9-5.2 | 0.3 |
| Maximum head width | 14.6 | 14.4-14.8 | 0.2 | 13.7 | 12.8-14.4 | 0.7 |
| Head width (at nares) | 10.0 | 9.3-10.6 | 0.5 | 9.0 | 8.1-9.9 | 0.7 |
| Mouth gape width | 7.7 | 7.4-8.0 | 0.2 | 6.1 | 5.4-6.6 | 0.5 |
| Internarial width | 3.8 | 3.8-3.9 | 0.0 | 4.1 | 3.4-4.5 | 0.5 |
| Length of caudal peduncle | 14.5 | 13.8-15.1 | 0.5 | 14.3 | 14.1-14.4 | 0.1 |
| Height of caudal peduncle | 12.2 | 11.7-12.6 | 0.4 | 11.1 | 10.8-11.4 | 0.2 |
| Body width(at dorsal origin) | 13.3 | 11.3-14.8 | 1.5 | 11.8 | 11.3-12.1 | 0.4 |
| Body width (at anal origin) | 9.0 | 8.2-9.5 | 0.6 | 8.7 | 8.4-8.9 | 0.2 |
| Predorsal length | 52.0 | 51.2-52.8 | 0.5 | 51.7 | 50.6-52.9 | 0.9 |
| Prepelvic length | 53.2 | 51.6-54.9 | 1.4 | 53.2 | 52.7-53.9 | 0.5 |
| Pre anal length | 76.5 | 74.6-78.0 | 1.4 | 77.2 | 76.5-78.6 | 1.0 |
| Pre anus length | 75.3 | 74.5-77.7 | 1.4 | 74.1 | 72.5-75.9 | 1.4 |
| Length of upper caudal lobe | 18.7 | 17.7-19.3 | 0.7 | 18.4 | 15.9-20.7 | 1.2 |
| Length of lower caudal lobe | 19.6 | 19.0-20.0 | 0.4 | 19.2 | 17.7-20.7 | 1.2 |
| Length of pectoral fin | 18 .0 | 17.1-19.0 | 0.8 | 18.4 | 17.5-19.8 | 1.0 |
| Length of ventral fin | 15.5 | 14.5-16.2 | 0.7 | 16.8 | 16.5-17.4 | 0.4 |
| Length of anal fin | 11.3 | 10.6-11.9 | 0.5 | 12.9 | 12.6-13.1 | 0.2 |
| Length of dorsal fin base | 13.7 | 13.2-14.3 | 0.7 | 16.2 | 15.7-16.8 | 0.5 |
| Height of dorsal fin | 13.9 | 11.4-15.5 | 0.5 | 16.1 | 15.0-18.3 | 1.6 |

TABLE 4
MORPHOMETRIC DATA OF *S. MANIPURENSIS* AND *SCHISTURA* SP. (IN % OF SL EXCEPT SL IN MM. )

| | *S. manipurensis* (N=39) | | | *Schistura* sp. (N=1) |
|---|---|---|---|---|
| | Mean | Range | S.D. | |
| Standard Length | | 35.4-59.8 | | 54.0 |
| Depth of Body | 15.9 | 14.2-17.7 | 1.1 | 14.6 |
| Caudal length | 21.4 | 19.5-22.5 | 1.0 | — |
| Lateral headlength | 20.2 | 11.6-22.9 | 0.9 | 20.7 |
| Dorsal headlength | 19.3 | 18.4-20.1 | 0.6 | 20.6 |
| Head depth (at nape) | 12.5 | 12.3-12.7 | 0.1 | 11.9 |
| Head depth (at eye) | 10.2 | 9.8-10.9 | 0.4 | 9.8 |
| Snout length | 8.7 | 8.4-9.0 | 0.2 | 8.5 |
| Eye Diameter | 3.1 | 2.2-3.7 | 0.5 | 3.3 |
| Interorbital width | 7.8 | 7.0-8.5 | 0.5 | 5.7 |
| Maximum head width | 16.0 | 13.8-18.4 | 1.5 | 13.0 |
| Head width (at nares) | 11.2 | 10.5-11.7 | 0.4 | 9.1 |
| Mouth gape width | 6.9 | 6.5-7.4 | 0.3 | 7.0 |
| Internarial width | 5.7 | 4.5-6.1 | 0.5 | 2.8 |
| Length of caudal peduncle | 12.1 | 11.6-13.4 | 0.6 | 15.4 |
| Height of caudal peduncle | 11.7 | 11.0-12.3 | 0.5 | 11.5 |
| Body width (at dorsal origin) | 11.7 | 9.9-13.1 | 1.1 | 11.3 |
| Body width (at anal origin) | 7.7 | 7.1-8.4 | 0.4 | 7.6 |
| Predorsal length | 52.8 | 50.6-54.5 | 1.3 | 50.2 |
| Prepelvic length | 49.7 | 48.3-50.3 | 0.7 | 51.7 |
| Pre anal length | 78.2 | 77.5-78.8 | 0.5 | 75.6 |
| Pre anus length | 74.4 | 72.5-76.0 | 1.3 | 71. 1 |
| Length of upper caudal lobe | 21.4 | 19.5-22.7 | 1.0 | 19.4 |
| Length of lower caudal lobe | 20.9 | 19.1-22.6 | 1.1 | 19.6 |
| Length of pectoral fin | 19.0 | 17.9-20.4 | 0.8 | 17.6 |
| Length of ventral f in | 18.3 | 16.9-19.5 | 0.7 | 15.9 |
| Length of anal fin | 10.4 | 8.4-12.6 | 1.4 | 13.5 |
| Length of dorsal fin base | 11.0 | 10.2-12.1 | 0.6 | 11.7 |
| Height of dorsal fin | 13.4 | 11.5-15.0 | 1.6 | 13.1 |

of Tizu River, Nagaland, collected by J.H. Hutton in March, 1927. He separated the species from *S. kanjupkhulensis* (Hora) as having 8 vs 7 branched dorsal rays. Two of Hutton's specimens (ZSIF 10061) collected from Zu Zeti Str., (tributary of Tizu R., near Myanmar border) in 1927 were examined and found to have 8½ branched dorsal rays. We observed certain differences between *S. kanjupkhulensis* and *S. nagaensis* (mean ±S.D.) in respect of depth of body (19.1 ±1.8 vs. 14.6 ±0.6); depth of head (14.8 ±0.2 vs. 11.6 ±1.6) and mouth width (7.7 ±0.2 vs. 6.1 ±0.5)% of SL. These differences were not noticed by Menon (1987) because of the wide range in his data, probably because he also examined small (juvenile), old and badly preserved specimens.

Menon's (1987) statement that *S. nagaensis* replaces *N. kanjupkhulensis* in Nagaland drainage into the Brahmaputra system needs reconsideration. In fact, Tizu River (type locality of *S. nagaensis*) originates in the Tuensang District of Nagaland. It then forms the interstate boundary between Nagaland and Manipur and finally flows into the Chindwin in Myamar. Thus, the species under description is a Chindwin form and not Brahmaputra form as reported by Menon (op. cit.), which confused Kottelat (1990).

***Schistura prashadi*** (Hora)
(Plate 3, Fig a)

*Nemachilus prashadi* Hora, 1921: 203, Pl. 10 fig. 2 (type locality: Thonagpal tank, Thoubal and Sikmai streams, Manipur).

*Noemacheilus prashadi*: Menon, 1987: 127 (diagnosis and description).

*Schistura prashadi*: Kottelet, 1990: 191 (revision); Banarescu & Nalbant, 1995: 440 (generic classification). Kosygin & Vishwanath, 1998: 243 (report from Nagaland)

**Material examined**: MUMF 296, 6, 48.7-53.1 mm, Chakpi stream at Mombi, WM, 12.xi.1992, MUMF 2070-73, 4, 34.0-36.5 mm, Challou R. Thetsi, 2.vi.1994, MUMF 2268, 1, 49.0 mm, Wanje Str., Khamsom, 5.ii.1997, Unreg., 3, 48.6-59.5 mm, Momo stream, Tusom CV, 2.iii.1998, all by LK; Unreg., 2, 43.2-52.3 mm, Chatrickong R., KS, 2.ii.1997.

**Diagnosis**: *Schistura* with 9½ branched dorsal rays, complete lateral line, a distinct black

spot at base of first few dorsal rays, complete or slightly broken black caudal bar, colour pattern consisting of transverse bars laterally, reticulated spots dorso-laterally, and 1-2 V-shaped dark transverse bars on caudal fin, the tips pointing towards body. Caudal fin forked, lateral line complete.

**Sexual dimorphism**: Males with suborbital flap, its edge with tubercles, pectoral rays with tubercles on dorsal surface.

**Colour**: Body yellowish-white with 10-12 dark brown bars extending from slightly above the lateral line towards the level of paired fin origins. Irregular or reticulated spots present from back to lateral line. Caudal bar darker, complete or slightly interrupted. Dorsal fin with black spot at base of first few rays, two horizontal dark bars in the middle. Two V-shaped vertical dark bars on caudal fin, one in the middle and another near posterior margin, apex of both pointing towards body.

**Distribution**: INDIA: Chindwin basin of Manipur.

**Remarks**: Morphometric data given in Table 5. All the specimens examined had 9½ branched dorsal rays as observed by Kottelat (1990). Hora (1921) and Menon (1987) reported only 8, which needs examination. The species is not represented in our collections from Brahmaputra basin so far.

***Schistura scaturigina*** (McClelland)
(Plate 3, Fig b)

*Cobitis scaturgina* McClelland, 1839: 308, 443, pl. 53, fig. 6 (type locality: Ganga ?)

*Noemacheilus scaturigina*: Menon, 1987: 86, pl. 3, figs. 2, 3; pl. 13, figs. 8, 9 (diagnosis and description)

**Material examined**: MUMF 3008, 1, 41.00 mm, Tuivai R., HL. March 1997.

**Diagnosis**: *Schistura* with 8½ branched dorsal rays, elongated head, snout and pectoral fin, no black spot at base of first few dorsal fin rays, caudal fin forked.

**Sexual dimorphism**: Unknown.

**Colour**: Body yellowish-white with 12 transverse triangular bars extending from lateral line downward. Bars tend to break up anteriorly. Back and dorsolateral sides with irregular spots and bands. Black bar at base of caudal fin interrupted. Dorsal fin dusky, caudal fin with 2-3 irregular transverse dark bands.

**Distribution**: INDIA: Ganga and Brahmaputra basins.

**Remarks**: Morphometric data given in Table 5. The present specimens agree with the description by Menon (1987) except for the missing black spot at base of dorsal fin rays. Although Menon's (1987) drawing of the species (Pl. III Fig. 20) shows the spot, his photograph in pl. XIII Figs. 8, 9 do not show clear dark spots. The specimen examined was from Tuivai R., a tributary of the Barak (Brahmaputra basin). The fish is very similar to *S. prashadi* in its general body shape and coloration. We agree with Banarescu and Nalbant (1995) in including both the species in the *Scaturigina* group.

***Schistura sikmaiensis*** (Hora)
(Plate 3, Fig c)

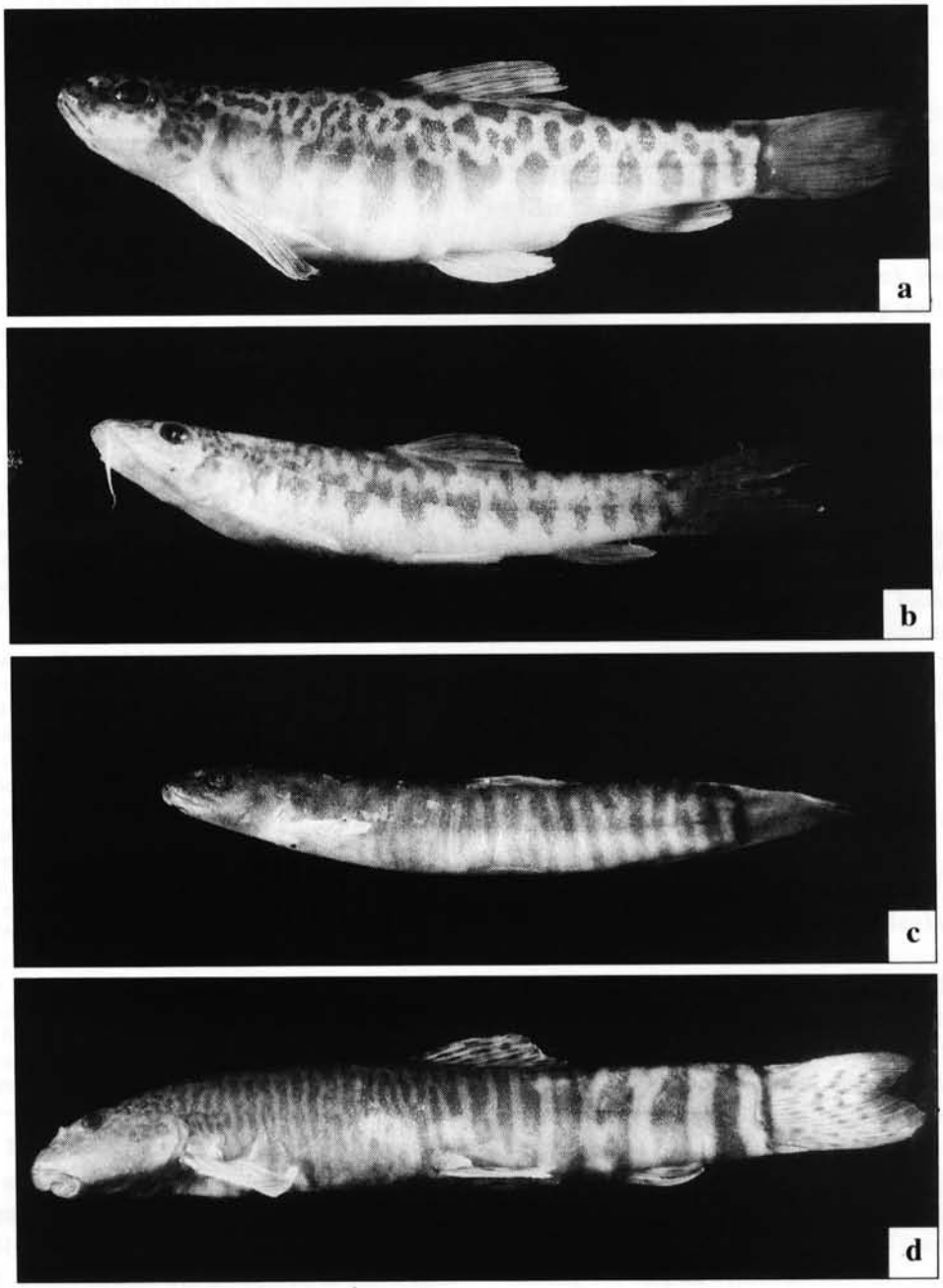
*Nemacheilus sikmaiensis* Hora, 1921: 201, Pl. 9 fig. 4, Pl. 10 fig. 1 (type locality: Sikmai stream near Pallel, Manipur)

*Noemacheilus sikmaiensis*: Menon, 1987: 125, Pl. 3 figs. 4, 5 (diagnosis and description)

*Schistura sikmaiensis*: Kottelat, 1990 (revision).

**Material examined**: Unreg., 16, 31.2-69.0 mm, Chakpi stream, Mombi (tributary of Manipur R, WM, 16.ix.1992; MUMF 2150-2154, 5, 43.0-56.0 mm, Challou R., Thetsi, LK, 15.viii.1994; MUMF 3003, 1, 92.3 mm, Leimatak R., WJ & SB, 17.v.1999; MUMF 3004, 1, 56.8 mm, Moreh, WV & party, 24.iii.1999; MUMF 3005, 1, 74.1 mm, Litan Str., KS, 25.iii.1999.

W. Vishwanath *et al.*: *Schistura* sp. PLATE 3




Figs a-d: a. *Schistura prashadi* (uncatalogued), 59.2 mm SL; b. *S. scaturigina* (MUMF 3008), 41.0 mm SL; c. *S. sikamaiensis* (uncatalogued), 42.1 mm SL; d. *S. vinciguerrae* (uncatalogued), 68.2 mm SL

TABLE 5
MORPHOMETRIC DATA OF *S. PRASHADI* AND *S. SCATURIGINA* (IN % OF SL EXCEPT SL IN MM.)

| | *Schistura prashadi* (N=16) | | | *S. scaturgina* (N=1) |
|---|---|---|---|---|
| | Mean | Range | S.D. | |
| Standard Length | | 34.0-59.5 | 41.0 | |
| Depth of Body | 20.7 | 19.2-24.1 | 1.8 | 19.0 |
| Lateral headlength | 22.9 | 22.2-24.3 | 0.6 | 24.7 |
| Dorsal headlength | 20.2 | 19.3-20.9 | 0.6 | 22.2 |
| Head depth (at nape) | 14.9 | 12.6-17.2 | 1.2 | 13.9 |
| Head depth (at eye) | 12.3 | 11.5-14.2 | 1.0 | 10.6 |
| Snout length | 8.7 | 7.6-9.5 | 0.7 | 10.1 |
| Eye Diameter | 4.8 | 4.2-5.2 | 0.3 | 4.6 |
| Interorbital width | 6.2 | 5.6-7.0 | 0.5 | 5.6 |
| Maximum head width | 14.4 | 13.3-15.9 | 0.9 | 15.2 |
| Head width (at nares) | 9.5 | 9.3-10.0 | 0.2 | 8.4 |
| Internarial width | 5.2 | 5.1-5.4 | 0.1 | 5.4 |
| Length of caudal peduncle | 14.8 | 13.6-17.1 | 1.3 | 12.0 |
| Height of caudal peduncle | 11.0 | 10.1-11.7 | 0.5 | 11.2 |
| Body width (at dorsal origin) | 14.5 | 13.8-15.2 | 0.6 | 15.9 |
| Body width (at anal origin) | 9.2 | 8.7-10.2 | 0.5 | 8.8 |
| Predorsal length | 46.4 | 44.7-47.6 | 1.1 | 50.7 |
| Prepelvic length | 53.6 | 52.6-55.6 | 1.0 | 54.4 |
| Pre anal length | 76.2 | 74.2-77.4 | 1.1 | 79.8 |
| Pre anus length | 71.3 | 69.2-76.6 | 1.6 | 71.2 |
| Length of upper caudal lobe | 23.2 | 22.6-23.8 | 0.5 | - |
| Length of lower caudal lobe | 23.1 | 22.3-23.8 | 0.5 | - |
| Length of pectoral fin | 22.4 | 21.6-23.1 | 0.6 | 22.7 |
| Length of ventral fin | 18.0 | 16.9-18.7 | 0.7 | 19.0 |
| Length of anal fin | 14.1 | 13.5-14.6 | 0.5 | 18.8 |
| Length of dorsal fin base | 19.0 | 17.7-20.2 | 0.9 | 15.9 |
| Height of dorsal fin | 18.9 | 16.4-20.6 | 1.4 | 20.5 |

**Diagnosis**: *Schistura* with blunt, rounded head and snout, no *processus dentiformes*, 17-20 transverse bars on body extending from back to belly, interspace of similar or slightly smaller width, black caudal bar complete, a black spot on the base of first few dorsal rays. Body elongate, tubular in front of dorsal fin, compressed behind, head slightly depressed. Caudal fin deeply emarginated or forked, lateral line complete.

**Sexual dimorphism**: Males with suborbital flap.

**Colour**: Body light brown with 17-20 dark olivaceous transverse bars extending from back to belly, interspace with similar or slightly smaller width. A dark, complete bar on caudal base. A black spot at base of first few dorsal fin rays. Dorsal fin with 2 horizontal dark lines in the middle. Other fins dusky. Body and fins orange in live fish.

**Distribution**: INDIA: Brahmaputra basin in Assam, Meghalaya, Tripura, Nagaland, Manipur; Chindwin basin in Manipur; Southwest Yunnan and Myanmar in the vicinity of Myitkyina and Putao.

**Remarks**: Morphometric data are given in Table 6. The species is very widely distributed, i.e., both in the Barak and Chindwin basins of Manipur. Kottelat (1990) doubted the identity of specimen reported by Menon (1987) from Brahmaputra basin. The present description is based on both Barak (Brahmaputra) and Chindwin basins of these States.

***Schistura vinciguerrae*** (Hora)
(Plate 3, Fig d)

*Nemachilus multifasciatus* (non Day, 1978): Vincigerra, 1890: 337 (Meekalan, Thagata Juva).

*Nemachilus vinciguerrae* Hora, 1935: 62, pl 2 fig. 12 (type locality: Meekalan, Burma).

*Noemacheilus vinciguerrae*: Menon, 1987: 134, pl. 4 fig. 3 (diagnosis and description).

*Schistura vinciguerrae*: Kottelat, 1990: 218, pl. 5. figs.164, 165 (revision).

**Material examined**: MUMF 2180-2189, 10, 65.0-79.5 mm; Wanze stream, Khamsom, LK, 2.i.1995; Unreg., 10, 43.3-57.4 mm; Maklang R., KS, 25.viii.1995.

**Diagnosis**: *Schistura* with 8½ branched dorsal fin rays, distinctive colour pattern: dark,

TABLE 6
MORPHOMETRIC DATA OF *SCHISTURA SIKMAIENSIS* AND *S. VINCIGUERRA* (IN % OF SL EXCEPT SL IN MM)

| | *S. sikmaiensis* (N=24) | | | *S. vinciguerra* (N=20) | | |
|---|---|---|---|---|---|---|
| | Mean | Range | S.D. | Mean | Range | S.D. |
| Standard length | | 31.2-92.3 | | | 43.3-79.5 | |
| Depth of body | 16.6 | 15.7-17.4 | 0.5 | 17.6 | 16.9-18.2 | 0.5 |
| Lateral headlength | 24.0 | 23.4-24.6 | 0.5 | 22.8 | 21.3-24.2 | 1.2 |
| Dorsal headlength | 22.0 | 21.7-22.3 | 0.3 | 19.1 | 18.2-19.9 | 0.7 |
| Head depth (at nape) | 13.9 | 12.6-14.9 | 0.2 | 12.8 | 11.9-13.8 | 0. 8 |
| Head depth (at eye) | 12.0 | 11.2-12.4 | 1.1 | 10.5 | 8.7-12.0 | 1. 6 |
| Snout length | 10.8 | 10.0-11.6 | 1.8 | 8.0 | 7.5-8.4 | 0.4 |
| Eye Diameter | 3.5 | 3.0-3.9 | 0.4 | 3.8 | 3.0-4.6 | 0.7 |
| Interorbital width | 6.0 | 5.2-6.6 | 0.2 | 5.8 | 5.7-6.0 | 0.1 |
| Maximum head width | 16.4 | 14.8-18.0 | 1.3 | 13.5 | 12.9-14.5 | 1.1 |
| Head width (at nares) | 12.3 | 10.2-14.3 | 1.8 | 9.7 | 9.6-10.0 | 0.2 |
| Mouth gape width | 8.7 | 7.6-9.8 | 0.9 | 6.4 | 5.9-6.7 | 0.4 |
| Internarial width | 4.8 | 4.2-5.8 | 0.5 | 4.2 | 3.8-4.8 | 0.4 |
| Length of caudal peduncle | 11.9 | 11.2-12.5 | 0.8 | 14.5 | 13.9-14.8 | 0.4 |
| Height of caudal peduncle | 13.8 | 12.8-14.0 | 0.5 | 13.7 | 12.6-14.7 | 0.9 |
| Body width (at dorsal origin) | 15.1 | 13.7-16.5 | 1.2 | 13.4 | 11.7-14.5 | 1.2 |
| Body width (at anal origin) | 9.8 | 8.3-11.2 | 1.2 | 9.0 | 7.9-9.6 | 0.8 |
| Predorsal length | 51.6 | 50.7-52.5 | 0.8 | 50.0 | 48.3-51.8 | 1.4 |
| Prepelvic length | 55.4 | 54.9-55.8 | 1.4 | 54.3 | 52.4-55.5 | 1.4 |
| Pre anal length | 79.5 | 77.9-81.0 | 1.4 | 80.3 | 80.0-80.7 | 1.3 |
| Pre anus length | 73.2 | 71.8-74.6 | 1.2 | 74.0 | 73.5-74.4 | 0.4 |
| Length of upper caudal lobe | 19.9 | 18.6-21.1 | 1.3 | 21.7 | 20.3-23.3 | 1.2 |
| Length of lower caudal lobe | 19.3 | 18.2-20.4 | 1.2 | 22.6 | 21.7-23.1 | 1.3 |
| Length of pectoral fin | 16.0 | 14.5-17.4 | 1.2 | 19.5 | 18.4-20.1 | 0.8 |
| Length of ventral fin | 14.1 | 13.8-14.4 | 0.5 | 17.0 | 16.4-17.7 | 0.5 |
| Length of anal fin | 11.8 | 10.7-12.6 | 0.8 | 14.1 | 12.7-15.5 | 1.1 |
| Length of dorsal fin base | 16.1 | 15.5-16.6 | 1.3 | 16.0 | 14.8-16.7 | 0.9 |
| Height of dorsal fin | 16.7 | 14.6-18.7 | 2.0 | 15.5 | 12.9-16.9 | 1.9 |

wide transverse bars with wide interspaces behind, gradually narrower in front; 2-3 bars united dorsally in front of doral fin, usually forming reticulations. Caudal fin forked, lateral line complete.

**Sexual Dimorphism**: Not known.

**Colour**: Body yellowish, with 10-16 dark transverse bars, as wide as interspace in caudal peduncle, gradually narrow anteriorly. Bars unite dorsally in front of dorsal fin origin, usually reticular. A black spot at base of first few dorsal rays; one horizontal dark band across dorsal fin and 2 V-shaped bars across the caudal fin.

**Distribution**: INDIA: Origin of Challou River (near Sirohi Hills), a tributary of Tizu River; Maklang and Namya Rivers all Chindwin headwaters in Manipur; Irrawady and Salween basins in Myanmar and Irrawady basin in China.

**Remarks**: Menon (1987) examined 6 specimens from Manipur, which were probably obtained by a field worker (who came to Manipur in 1985) from M. Gonchandra Sharma, who was collecting fish from Tarest stream, which drains the Ukhrul and Chandel Districts and joins the Yu river (tributary of Chindwin in Myankar). Kongan thana is a small village in the eastern part of Ukhrul District. Namya River, like Taret stream flows into Yu river. Thus, Menon's (1987) and Hora's (1937) references of the locality in Myanmar are wrong.

***Schistura*** sp.

(Plate 2, Fig d)

**Material examined**: MUMF 3009, 1 male, 54.0 mm, tributary of Irang R. at Langkha, MG, 1989.

**Diagnosis**: An elongated form of *Schistura*, its body depth at dorsal origin 14.6% of SL, ventral profile flat and straight, short fins, 8½ branched dorsal ray, male with suborbital flap, complete lateral line, 9 broad transverse dark bands extending from back towards belly, broader dorsally, tapering gradually, a black spot at base of first few dorsal rays, caudal fin forked.

**Sexual dimorphism**: Only one specimen, probably male, was available for examination. It has a prominent suborbital flap.

**Colour**: As in diagnosis. In addition, body dark brown from back to lateral line, pale yellowish ventrally. Caudal fin with irregular horizontal dark bands.

**Distribution**: Manipur: Lankha stream, tributary of Irang (Tamenglong District).

**Remarks**: The specimen does not match any known species of *Schistura*. It is elongated, its fins short and with a characteristic colour pattern. Pending collection and observation of more specimens, new specific status cannot be given. Morphometric data given in Table 4.

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