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NEOLISSOCHILUS, A NEW GENUS OF SOUTH ASIAN CYPRINID FISHES

WALTER J. RAINBOTH

Department of Biology, University of California (UCLA), Los Angeles, California 90024, U.S.A.

ABSTRACT

The genus *Neolissochilus*, described herein, contains twenty-three nominal taxa and is most closely related to *Tor* Gray. The genus, originally containing two species, was proposed as *Lissochilus* Weber & de Beaufort, 1916, a homonym but not a synonym of *Lissochilus* Zittel, 1882. The most important character of the earlier genus, a sharply edged, horny covering of the mandible is ecophenotypically variable in these as in many other barbines, and therefore, a sharp lower jaw cannot serve as the primary distinguishing character for this lineage. Yet, the two species separated by Weber and de Beaufort (op. cit.) are contained within a distinct species assemblage. Besides a complete generic description and evaluation of diagnostic characters, the nominal taxa included in this "new *Lissochilus*" are discussed with reference to their type material and the nomenclatorial problems the complete species revision must address.

INTRODUCTION

There has been considerable difficulty with the taxonomy and systematics of the large-scaled barbels (or mahseers) of southern and southeastern Asia. Within this group there are at least two recognizable lineages. One, *Tor* Gray 1834, is an easily recognized group at the generic level. The remaining assemblage has but one applicable generic name, and that has been shown to be a homonym. Myers (1941) discussed the homonymy of the *Lissochilus* Weber & de Beaufort, 1916, with *Lissochilus* Zittel (Pethö, m.s.) 1882, a fossil genus of Neritidae (gastropods). As a replacement, Myers (op.cit.) suggested using *Acrossocheilus* Oshima, 1919, because of the shared tendency of members in that genus to develop a sharp lower jaw. Although this morphological feature was the stated reason for considering "*Lissochilus*" congeneric with *Acrossocheilus*, much of Myers' subsequent discussion in-

dicated that he knew the Chinese species of *Acrossocheilus* to be a closely related phylogenetic unit and he suspected that the southern "*Lissochilus*" species were more closely related to other southern genera. It appears that Myers' main reason for not proposing a new name was that he wished to avoid a useless proliferation of generic names. Nevertheless, the result has been that few authors have recognized the close relationship of "*Lissochilus*" to *Tor* Gray, with the result that single publications have placed representatives of *Neolissochilus* in two and sometimes more genera.

Prior to the substitution of *Acrossocheilus* for "*Lissochilus*," the latter was recognized as a subgenus of *Barbus* by Hora (1941) and Hora & Misra (1941), who discussed its relationships with various other subgenera of *Barbus* from eastern and southeastern Asia. Hora & Misra (op.cit.) distinguished "*Lissochilus*" from *Poropuntius* Smith, 1931, on the basis of dorsal

spine structure and tuberculation pattern, concluding that both groups could be recognized as subgenera of *Barbus*. Hora & Misra also recognized a distinct group of species limited to China which have subsequently been called *Acrossocheilus* by workers studying that fauna. Although Hora & Misra gave adequate means for distinguishing "*Lissochilus*," its submersion in *Acrossocheilus* caused the species belonging to the former *Lissochilus* to be spread among *Acrossocheilus*, *Tor*, and *Puntius* in Smith (1945). Subsequent investigators have had similar problems with the classification of these fishes which are found over much of southern and southeastern Asia.

It is evident that this group of fishes requires a generic name, and I propose the name *Neolissochilus*, meaning "new *Lissochilus*." With the new name, I include a generic description and a list of nominal taxa known to represent members of the genus. It is beyond the scope of this paper to attempt a species revision. Though I have detailed counts (20) and measurements (45) from more than 250 specimens spanning the geographic range of this genus, considerably more material awaits examination to determine the range of variability within each species.

GENERIC DESCRIPTION

Neolissochilus, new genus

(Type species *Barbus stracheyi* Day, 1871; Gender masculine)

Medium to large barbels of southern and southeastern Asia which may show slight dimorphism in body shape and tuberculation. Often migratory, moving upstream to clear, rocky, headwater reaches, staying in deep, slowly moving pools during wet season, and moving downstream at onset of dry season. Larger species have been reported to attain nearly a meter in length and over ten kilograms, although 60 cm and 3 kg is more common.

Dorsal fin iv/9 (rarely iv/8), with last unbranched ray never serrated and of varied

strength, usually darkened. Interradial membranes darkened forming a broad stripe at the center of the fin. Pectoral fin i/13-17, low and pointed, the first ray longest, often darkened, with the entire fin becoming gray in large individuals. Pelvic fin i/8 (rarely i/7) also pointed, with the unbranched ray longest, melanistic coloration faint with apex slightly darker. Anal fin iii/5, pointed in mainland and western species with last unbranched ray longest, distal margin straight to slightly concave, rounded in Indonesian specimens with first or second branched ray longest, the anterior rays darkened near apex. Caudal fin vii-x, 10/9, vi-ix, deeply forked with convex distal margin on each lobe, procurrent rays and outer margins of principal rays whitish with middle of principal ray and two adjacent branched rays on each fork darkened throughout their length.

Body deep anteriorly, trunk and peduncle smoothly tapered from rather broad head to strongly compressed peduncle. Trunk slightly arched predorsally, ventral profile straight to convex.

Lateral line scales 20 to 29 on body plus 2 (occasionally 3) on base of caudal fin. Predorsal scales large, uncrowded, 6 to 10 on mid-dorsum. Transverse scales 4 or 5/4 with pelvic fin on third row below lateral line. Circumferential scales through first predorsal row and second prepelvic row from 16 to 20. Circumpeduncular scales always 12, with 5 scales above and below lateral line. Scales large and heavy, those of trunk below dorsal fin adjacent to lateral line with numerous radii in all fields, especially lateral fields. Apical (posterior field) radii converging or at least parallel posteriorly in small individuals. Lateral field radii originating along full laterobasal field margins and arching smoothly caudad. Numerous basal (anterior field) radii originating along full laterobasal margins. Anterolateral angles pronounced and anterobasal margin projecting medially, concave laterally. Circuli very fine, ranging from 25/mm to 28/mm on lateral fields. Apical field circuli broader than those of lateral fields, with accretions giving exposed part of scale a rough texture.

Head broad, snout blunt, with mouth placement varying from oblique and near-terminal, to horizontal and inferior. Species with horizontal mouths often with rostral cap overhanging the upper lip. Mouth smoothly rounded when lower jaw edge is blunt to nearly truncate when lower jaw edge is sharp. Lower lip always present medially, with post-labial groove complete or incomplete. Lips thick, but not hypertrophied. Intermandibular space usually broader than mandibles. Long maxillary and "rostral" pairs of barbels always present.

Eye in upper half of head, visible from dorsal and ventral aspects. Infraorbital bones moderately broad with branches to sensory canal pores very long, those posterior to eye longest, their lengths twice the width of infraorbitals, the pores well out on cheek and distant from main canal. Cheeks with numerous tubercles, occasionally a few tubercles immediately anterior to "rostral" barbel, but never across tip of snout.

Gill rakers long, slender, each with basal frenulum and medially directed; branches 2 to 6 rakers on epibranchial and 7 to 12 rakers on ceratobranchial segment of anterior side of first arch. Pharyngeal bones stout, with three rows (5.3.2) of hooked teeth. Grinding surfaces of teeth in outer row widest on uppermost teeth,

width progressively decreasing along row ventrally. Uppermost teeth in outer row with three or four ridges across face of grinding surface.

Living individuals are dark green on dorsum of head and body and may have a lighter area between the dorsum and the lateral line with a wide bluish lateral stripe running from eye to base of caudal fin (Figure 1). Individuals lacking lateral stripe become progressively lighter below, and tend to have dark spots at each scale base on upper part of body (Figure 2). Some non-striped juvenile individuals have a large, dark peduncle spot at center of caudal fin base. All species are silvery white below. Fins varying from yellowish to reddish brown, and through various shades of gray, usually slate-gray.

Nominal taxa belonging to this genus have been recognized by examination of type material (all but two instances) or original descriptions and figures. Nominal species of *Neolissochilus* are discussed here in chronological order of their original descriptions. They are: *Barbus hexastichus* M'Clelland, 1839:269, 333 (type locality: great rivers in the plains of India). One individual, SMF 547, labelled syntype is the only alcohol specimen of this species from M'Clelland's collection found thus far. Several specimens, mounted and non-mounted skins, which came to the

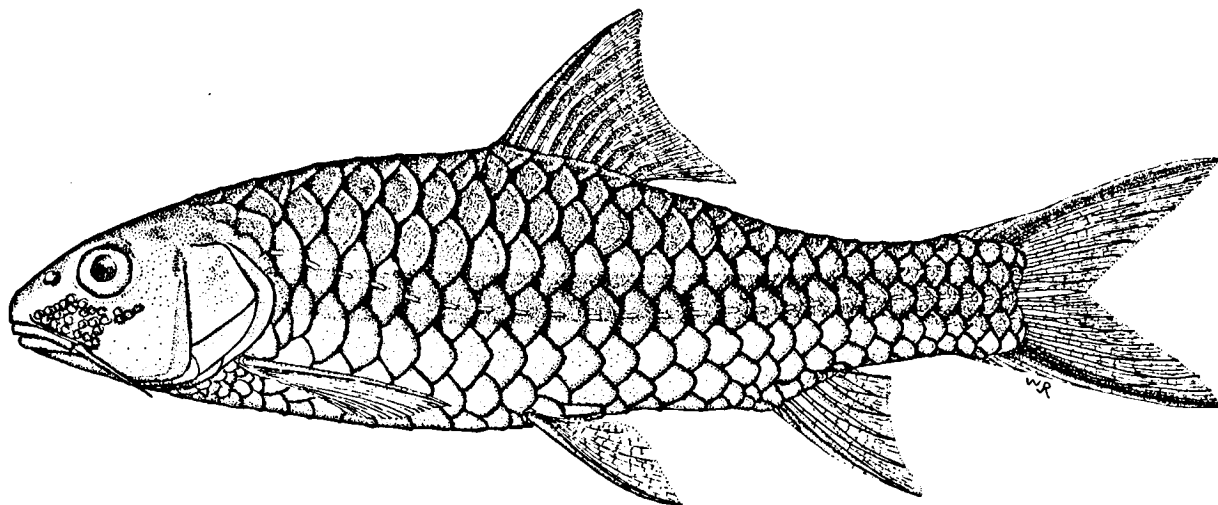


Fig. 1. A specimen of *Neolissochilus stracheyi* (Day), 124 mm SL, from the Mae Yuam, 4 km from its confluence with the Salween River, Mae Hong Sorn Province, Thailand.

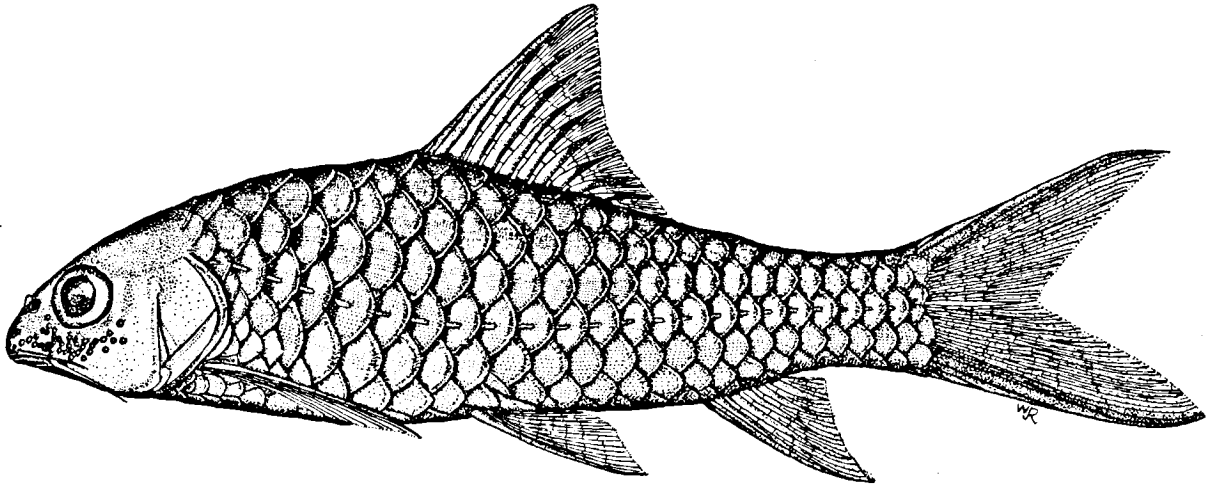


Fig. 2. A specimen of *Neolissochilus soroides* (Duncker), 88 mm. SL, from Huay Yong, Prachuap Kiri Khan Province Thailand.

BMNH from the East India Company and India Museum represent material of M'Clelland's. The earliest received at the BMNH were registered approximately two and a half months after M'Clelland's shipment arrived in London. Much of M'Clelland's material was listed by Günther (1868) as having been collected by Griffith, and the itemized list of M'Clelland's specimens was bound in the "Griffith" chapter in the India Museum books (for further information on these books, see Whitehead & Talwar, 1976). M'Clelland's collection arrived on the same ship with a large shipment of Griffith non-fish specimens, and, except for a few instances, M'Clelland's name has not been associated with specimens which may have been used in original descriptions. The problem is probably soluble, but only in part, and constitutes a curatorial nightmare. Specimens labelled as *Barbus hexastichus* BMNH represent at least two and possibly three species, one of which is the same as the species represented by SMF 547. However, SMF 547 seems to have definite origin with M'Clelland, and is regarded here as a "provisional" lectotype.

Barbus hexagonolepis M'Clelland, 1839:270, 340 (type locality: upper Assam). None of M'Clelland's material has been found with the name *hexagonolepis*. M'Clelland's shipment to the India Museum in London contained none of this species by name. However, this could merely indicate that in the three years between the presentation of his paper and the shipment of his specimens he had decided that *hexagonolepis* was not valid. One of the stuffed specimens of this genus at the British Museum (BMNH 1860.3.19.640) has the hexagon-shaped scales figured by M'Clelland, and was likely a member of his shipment, but even this involves conjecture.

Barbus spinulosus M'Clelland 1845:280 (type locality: Sikkim). Two specimens, SMF 953, labelled syntypes from the "Ganges" donated by M'Clelland in 1847. However, the type designation of these specimens is doubtful, because M'Clelland based his description on one specimen from Sikkim. Yet, if no obvious type is found, these specimens, identified by M'Clelland at a time very near the date of description may yield the best information as to the identity of this species.

Barbus blythi Day, 1869:555 (type locality: Tenasserim). Type specimen, ZSI A787, examined in Calcutta. The specimen has most of the body between the pelvic and pectoral fin cut away, so that only a narrow strip of flesh in the predorsum holds the specimen together. However, it does allow identification of some of the additional Tenasserim material available.

Barbus compressus Day, 1869:555 (type locality: unknown). Type specimen, ZSI 5513/1, examined in Calcutta. Mukerji (1934) thought the type to be indistinguishable from a specimen from the upper Irrawaddy basin. Having examined about a dozen specimens from the upper Irrawaddy and Chindwin, I agree that the type of *B. compressus* is extremely similar to these.

Barbus innominatus Day, 1869:556 (type locality: Ceylon). Syntypes, ZSI cat. 792, examined in Calcutta. These specimens are young and small (35 and 36 mm SL), with the smaller one slightly more intact. This species has not been collected for over one hundred years, and is extremely rare or, regrettably, extinct. These specimens have 29 to 30 scales in the lateral line, rather than 24 as published (Day, 1869, 1878).

Barbus stevensoni Day, 1870:100 (type locality: Akyab). The type and only known specimen, ZSI 2597, has been lost or destroyed, as previously mentioned by Whitehead & Talwar (1976). The original specimen was a juvenile, later figured at life-size by Day (1878).

Barbus stracheyi Day, 1871:307 (type locality: Akyab and Moulemein). Type and subsequently illustrated specimen, ZSI 2175, from Moulemein, examined in Calcutta. Day (1869) first called this species *Barbus malabaricus* after Jerdon (1849), and later described it as new, with the name *B. stracheyi*. Day (1869) indicated his *B. malabaricus* grew to eleven inches, and ZSI 2175 is eleven inches long without the caudal fin. Another specimen in the Zoological Survey of India, ZSI F5509/1, from Akyab, still bears the original identification of *Barbus*

malabaricus and appears to be of similar antiquity. This specimen is larger, with a twelve inch long body, but is incomplete because all gill arches are gone. Day (1869) mentioned that he saw a single specimen from each locality in the Calcutta museum, and I have found no other individual which could be the Akyab specimen used by Day. I believe it likely, given the identification, that ZSI F5509/1 is the specimen which Day referred to, making it a probable syntype. Considering the facts that the Moulemein specimen was subsequently illustrated by Day (1878), and that it is in better shape, ZSI 2175 from Moulemein, is designated here as lectotype.

Barbus wynaadensis Day, 1873:528 (type locality: Vithry in the Wynaad). Syntypes, ZSI 2320, 2382, 2379, BMNH 1889.2.1.571-573, MCZ 4291, and questionable syntype RMNH 2587 examined. Of these specimens, two were subsequently figured by Day (1878), and one of the two figured specimens (ZSI 2379) represents another species not in this genus. All other material examined represents a single species. The finest of these specimens is RMNH 2587, which lacks Day's original label and bears only the locality of Wynaad on the replacement label. All other lots retain Day's original hand-written tags. Of the BMNH material received from Day, one of the three lots (the one listed above) is from Vithry, Wynaad. The remaining two lots are from the Wynaad only, and from Malabar, making it doubtful that they are type material. Another lot, FMNH 2318 (2 examples), bears only the locality of Wynaad, and must also be considered doubtful as type material. For designation of lectotypes, preference must be given to figured specimens, and ZSI 2382 is the single individual of this species figured by Day (1878, pl. 138, fig. 3). The remaining syntypes become paralectotypes.

Barbus dukai Day, 1878:564 (type locality: Teesta River near Darjeeling). Syntypes, ZSI 2388, RMNH 2681, BMNH 1889.2.1.518-519, examined. All locality labels indicate Darjeeling only. Day's label is

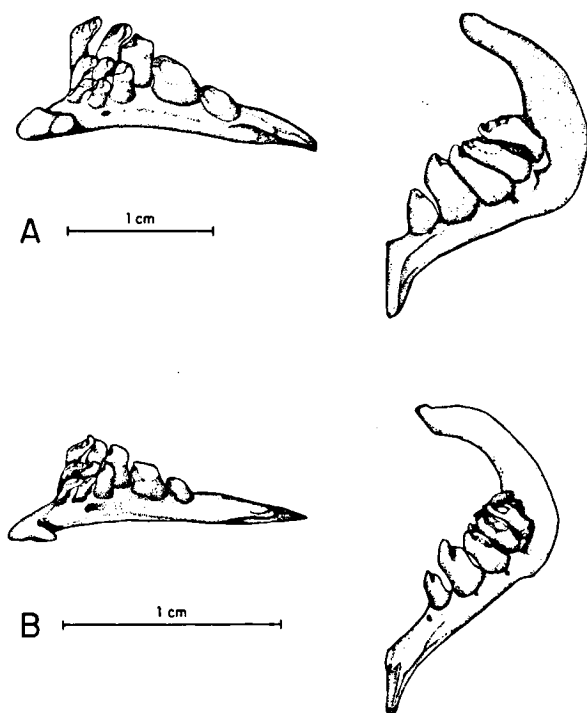


Fig. 3. Right pharyngeal arches of two Gangetic torins, (A) *Neolissochilus dukai* (Day) from the Borelli River, Assam, India and (B) *Tor mosal* (Hamilton) from Dehra Dun, India.

missing from RMNH 2681. Not all known material has been examined, and it is not yet possible to state with certainty which specimen is closest to Day's figure. Therefore, a lectotype will be named at a later date.

Barbus nigrovittatus Boulenger, 1893:201 (type locality: Fort Stedman). Syntypes, BMNH 1893.6.30.41-42, examined, and in good shape.

Barbus soroides Duncker, 1904:178 (type locality: Pahang River, Malay Peninsula). Syntypes, BMNH 1905.5.6 8-9, ZIM 368 (8441 in old catalogue), ZIM 370 (8440 in old catalogue), examined. Ladiges, et al., (1958) listed ZIM 8441 as "lectotype," and ZIM 8440 and 7735 as "paratypes." However, in Duncker's original description, ZIM 7735 was listed as another species, "*Barbus soro*" and therefore cannot become type material for *Barbus soroides*.

Labeobarbus longipinnis Weber & de Beaufort, 1916:149 (type localities: Lake Kawai, Deli, Sumatra; Pangus R. on Mt. Ungarang, Java). Syntypes, ZMA 113008 and ZMA 113009 (2 spec.), examined, the specimens representing all material used for original description. Although two specimens are from Java and a single specimen is from Sumatra, the Sumatra specimen (ZMA 113008) is in better shape and is here designated as lectotype.

Lissochilus sumatranus Weber & de Beaufort, 1916:169 (type locality: Bandar Baru, Sumatra). Syntypes, ZMA 112606 and ZMA 119012 (6) examined. These represent all material used for the original description. The specimen illustrated by Weber & de Beaufort (1916, fig. 68) is the largest individual of the series and is designated as lectotype (ZMA 112606). The dark coloration at the tips of the caudal lobes appears to be some sort of stain, possibly from a shipping container, and is not melanin. The stain is present on the single illustrated individual out of the original seven.

Lissochilus thienemanni Ahl, 1933:515 (type locality: Toba See, Sumatra). The single individual of 211 mm. total length, not seen. However, the description indicates that it is a *Neolissochilus*.

Lissochilus hutchinsoni Fowler, 1934:120 (type locality: Nakon Sritamarat). Holotype, ANSP 58076, examined. In Fowler's figure (p. 118, fig. 76), the anal fin and dorsal fin have discrete black blotches which exaggerate the dusky coloration found on the fish and mentioned in Fowler's description. Smith (1945) also noted the disparity between Fowler's description and figure, but did not examine the type specimen to confirm that the error was in the figure rather than in the description.

Crossochilus benasi Pellegrin & Chevey, 1936:226 type localities; Rivière Ngoi Pho Tao at Muong Hum, Lao Kay Prov., Tonkin and Rivière de Chapa at Pont des Lianes, Lao Kay Prov., Tonkin). Syntypes MNHN

35-338 and MNHN 35-339, examined, and in good shape.

Lissochilus tweediei Herre & Myers, 1937:61 (type locality: Yum River, trib. to Plus River, Perak). Holotype and paratypes, SU30969, in same bottle and examined. The largest specimen is holotype according to original publication. Another paratype at USNM, not yet seen.

Barbus (Labeobarbus) blanci Pellegrin & Fang, 1940:115 (type locality: Ban Nam Khueng, Laos). Syntypes, MNHN 39-203, 39-204, 39-205, examined, and in fair shape.

Lissochilus hendersoni Herre, 1940:10 (type locality: Penang Island). Holotype and one paratype (holotype the larger of the two), SU 32632, and paratypes, SU 32633 (19), ZSI 13631/1 (2) and BMNH 1938.12.1.103-4 (2), examined.

Puntius paucisquamatus Smith, 1945:178 (type locality: Kao Luang, Nakon Sritamarat Prov., Thailand). Holotype, USNM 119713, and paratypes, USNM 119501 and 119502, examined.

Acrossocheilus vittatus Smith, 1945:198 (type locality: Huey Mekong Kha, trib. to Salween River). Holotype, USNM 117479, examined, not in good shape. Smith's description and figure suffice, but the key to species (p. 197) is erroneous, as this species should key to couplet 6, rather than couplet 3.

Tor (Tor) qiaojiensis Wu, 1977:326 (type locality: Qiaojie, Yunnan). Description in Chinese. Type material not yet seen. Figure fits *Neolissochilus*.

RELATIONSHIPS

Neolissochilus is closely related to *Tor* Gray and occurs over much of the same range. There are few single external characters which distinguish these genera throughout the range, though several are useful within defined regions. The development of the lower lip into a fleshy lobe below the mandibular symphysis in *Tor* seems to be the most useful character throughout the full geographic range, from the Indus River

basin to Borneo. In *Tor*, notches in the lower lip, marking the extent of the median lobe always appear at the medial edge of each mandible. However, the median lobe may be no thicker than the lateral lobes of the lower lip. Therefore, the median lobe of *Tor* can always be seen, even though there may be no hypertrophy of the lip. Only in Java and Sumatra may *Neolissochilus* display these notches.

Gill raker counts can distinguish *Tor* from *Neolissochilus*, though there is slight overlap in certain geographical regions. In the Ganges River and its tributaries, the number of gill rakers on the lower arm of the first arch distinguishes all *Neolissochilus*, which have 6 to 9 gill rakers, from all *Tor* except *T. progeneius* (M'Clelland) which have 10 to 16 rakers in the five remaining species. *Tor progeneius* has 8 to 10 rakers on the lower arm of the first arch and appears to be an intermediate between *Tor* and *Neolissochilus* in other ways. *Tor progeneius* is the only Gangetic *Tor* with cheek tubercles and the only *Tor* anywhere which may occasionally lack completely a median lobe on the lower lip. It is not possible to state with certainty which genus *progeneius* belongs to without making a detailed study of both genera. However, it is possible to state that it is not a hybrid, because it possesses traits beyond the combined ranges of variation of any putative parental species known from the same area. At this time, I assign it to *Tor* following Hora (1941). Further, the application of the name *progeneius* is that of common usage, following Hora (1941), which may not be the same as M'Clelland (1839), if the stuffed skins at the British Museum are used as reference. The problems that the use of those skins entails have been mentioned earlier and are well beyond the scope of this paper.

Specimens of *Neolissochilus* from peninsular India and Sri Lanka have 6 to 9 gill rakers on the lower arm of the first arch whereas *Tor* from the same region have 10 to 14 (10 found on a single individual of 50 examined). Burmese specimens of *Neolissochilus* (44 examined) have from 7 to 11 lower-arm gill rakers in contrast to counts of 12 to 16 for *Tor* from the same area. *Neolissochilus* specimens from Thailand and

Malaya have 7 to 12 lower-arm gill rakers and *Tor* from there have 12 to 17 gill rakers.

Individuals of the *Tor-Neolissochilus* group from Java and Sumatra may not be distinguishable by the use of a single character, but can be recognized with additional criteria. In this region, some, but not all, species of *Tor* have high gill raker counts, which will separate them from *Neolissochilus* in a manner similar to that just mentioned for the nearby mainland. However, more than one species of *Tor* from the islands have low gill raker counts and may fail to develop the median lobe of the lower lip. These *Tor* seem to be similar to each other and may form another related group. Although no external counts suffice, head and body shape are useful indicators. Of course, development of the sharp, keratinous, lower jaw indicates an obvious *Neolissochilus*. Individuals of *Neolissochilus* with an unmodified lower jaw have a much broader, blunter, and longer snout than these particular *Tor* which have a sharply tapering, short snout. Further, the intermandibular space in *Neolissochilus* is broader than either mandible, in contrast to these *Tor* where it is narrower than the mandible. Also, *Neolissochilus* specimens have a more shallow and terete trunk than *Tor* which tend to be laterally compressed and deeper bodied.

The pharyngeal arches of *Neolissochilus* differ from *Tor* in several ways (Figure 3). Hora (1940, 1941) demonstrated that pharyngeal arches in the new genus are relatively shorter and more massive than those of *Tor*. Hora's (1940) figured arch of *Neolissochilus hexagonolepis* has teeth with uniformly less wear (sharper hooks) than those I have seen, but other characteristics of that figure, though not discussed, are similar to *Neolissochilus* I have examined. Besides the different relative sizes of the teeth in both genera, the arch itself in *Neolissochilus* is more massive. The articular margin in *Neolissochilus* forms an angle of about 75° with the tooth-bearing arm, as compared to a 45° angle in *Tor*. In *Neolissochilus*, the tooth-bearing area of the anterior arm commences much closer to the articular margin than the toothed section in *Tor*. In *Neolissochilus* the thickest part of the curved

dorsal arm is at the center instead of being displaced toward the inner margin in *Tor*. In Indonesia, the pharyngeal arches of the genera are more similar in size, although the difference in articular angle seems reliable.

Though *Neolissochilus* is closely related to *Tor*, the next nearest relatives are difficult to ascertain. *Neolissochilus* and *Tor* seem to be only distantly related to any of the various genera of barbels in eastern and southeastern Asia. However, in more western areas of tropical Asia, faunal elements bearing greater resemblance to *Tor* and *Neolissochilus* begin to appear. Proceeding westward across southern Asia, the first group of species resembling *Tor* and the new genus is found in peninsular India. The relationships of the peninsular Indian genus have never been studied, described, nor has that genus been defined, and doing such would not be practical here. To the west of peninsular India other groups appear, with *Barbus chelynooides* M'Clelland of the Indus, and *Barbus grypus* Heckel of the Mesopotamian drainages (themselves probable congeners), resembling *Tor* and *Neolissochilus* the most closely. Some of the African large *Barbus* (Banister, 1973) are very similar to *Tor*, and may be fairly close relatives.

Recently, members of both *Tor* (Khuda-Bukhsh, 1980), and *Neolissochilus* (*Acrossocheilus sumatranus* in Suzuki & Taki, 1981) have been shown to possess tetraploid genomes. Other tetraploid barbels and carps are *Barbus barbus* (Wolf, et al., 1969), *Barbus plebejus* and *Barbus meridionalis* (Cataudella, et al., 1977), *Barbus meridionalis petenyi* = *B. peloponnesius* in Karaman, 1971 (Sofradzija & Berberovic, 1973), *Aulopyge hugeli* (Berberovic, et al., 1973), *Cyprinus carpio* and *Carassius auratus* (Ohno, et al., 1967). From the occurrence of polyploidy in these species, it appears that polyploidization has happened in at least two lineages other than the line leading to *Tor* and *Neolissochilus*. Members of other closely related genera discussed in the previous paragraph have not been karyotyped, and it would be interesting to determine just where the polyploidization event occurred in the evolutionary history of these species.

SUMMARY

The genera *Tor* and *Neolissochilus* constitute the most important group of indigenous game fishes of southern Asia (Jhingran, 1977:216) with one or both genera found in nearly every tropical upland river east of the Indus. Both genera have had voluminous literature in scientific and popular publications, but regardless the amount of work published regarding them, their taxonomy and systematics are still confusing. Much of the problem stems from the variability these fishes express in their soft tissues (especially lips) and patterns of squamation. The degree of difficulty in understanding patterns of variability in *Neolissochilus* was discussed by Hora (1940), and Hora & Misra (1941) who synonymized every described species (for which they could locate information) with *hexagonolepis* M'Clelland. The hypothesis that there is but a single species is rendered untenable by the fact that throughout the eastern part of the range of *Neolissochilus*, there are two species per drainage. The species pairs are recognizable by head and body shape differences in concert with differences in squamation. Both species illustrated are found in the Chao Phrya drainage and the northern coastal drainages of the Gulf of Thailand. The present status of the genus *Neolissochilus*, which has had all taxa synonymized, will require extensive study, and will face sampling problems of geography and problems of size—allometry. Another likely problem with our understanding of both *Tor* and *Neolissochilus* is the degree of ecophenotypic variability within species and populations. This variability could be similar to that described for the Lake Nyasa barbels (Banister & Clarke, 1980), although the African situation appears extreme in comparison to all present indications from southern and south-eastern Asia.

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