

TRENDS OF EVOLUTION IN THE CYPRINOID GENERA *PSILORHYNCHUS*  
AND *PARAPSIORHYNCHUS*

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ABSTRACT

Trends of evolution in the Cyprinoid genera *Parapsilorhynchus* Hora and *Psilorhynchus* McClelland have been traced. The familial status of *Parapsilorhynchus* and specific validity of *Parapsilorhynchus discophorus* Hora as well as the composite nature of the genus *Psilorhynchus* have also been pointed out.

Hamilton Buchanan (1822) described two interesting hillstream species, *Cyprinus sucatio* and *Cyprinus balitora*, from the rivers of Northern Bengal. McClelland (1839) created the genus *Psilorhynchus* for these two species, under the family Cyprinidae. Subsequently Hora and Mukherji (1935) described another species *Psilorhynchus homaloptera* from Naga Hills. And Menon and Datta (1964) described a fourth species *Psilorhynchus pseudecheneis* from Nepal.

Hora (1925) created the family Psilorhynchidae to accommodate the genus *Psilorhynchus* and distinguished it from Cyprinidae by such basic characters like the typical air bladder which is greatly reduced and is either entirely free in the abdominal cavity or is partially covered by bone, peculiar type of mouth and lips, single row of pharyngeal teeth, completely ossified, broad plate-like basipterygium and the presence of a number of unbranched rays in the paired fins, especially pectoral fins (Hora and Mukherji, 1935).

It can be seen from the distribution of the species so far described that the family Psilorhynchidae is restricted itself in distribution to Himalayan drainage (Hamilton, 1822, Hora and Mukherji, 1935; Menon and Datta, 1964; Kaushiva, 1951; Majumdar, 1951; David, 1953).

Annandale (1919) described a species *Psilorhynchus tentaculatus* from the hillstreams of western ghats. Hora (1920) distinguished this species from the species of *Psilorhynchus* in the presence of a pair of barbels, air bladder in being normal cyprinid type and in the presence of a characteristic rudimentary disc behind the lower lip and created a new genus *Parapsilorhynchus* (obviously under the family Cyprinidae) to accommodate this species. Subsequently two more species, *Parapsilorhynchus prateri* Hora & Misra (1939) from Deolali, Nasik District and *Parapsilorhynchus discophorus* Hora (1921) from Vasishti valley, Ratnagiri District, both the species from Western ghats, were described. *Parapsilorhynchus tentaculatus* was also reported

from Satpura Hills (Hora, 1925) and Bailadila range in Bastar (Hora, 1938).

It is very interesting to note that the two most related genera should have restricted distribution each, one in Himalayan drainage and the other in Western Ghats.

The authors collected the three species of the genus *Parapsilorhynchus* from Western Ghats and specimens of the four species of the genus *Psilorhynchus* (including two type specimens) were obtained from the National Collection of Zoological Survey of India and came to the conclusion that *Parapsilorhynchus discophorus* is a good species (cf. Hora, 1925) and that the genus *Parapsilorhynchus* cannot be retained in the family Cyprinidae in view of its possessing certain basic characters like more than one undivided pectoral rays, presence of a callous thickening behind the lower lip (different from that of *Garra* where it is a regular muscular sucker-type disc), in having a typical body shape (spatulate and broad snout, back greatly arched, the under surface flattened, the paired fins horizontally placed with broader base, well spread and in level with the flattened belly etc.) nor can be kept in the family Psilorhynchidae in view of the presence of a free well developed air bladder, a pair of barbels, two rows of pharyngeal teeth, presence of a callous thickening behind the lower lip etc. Consequently, a new family Parapsilorhynchidae should be created to accommodate the genus *Parapsilorhynchus*. Further a close study of the distribution of the species of the genera *Psilorhynchus* and *Parapsilorhynchus* vis-a-vis their morphology indicates the following possible evolutionary course.

The fact that both the genera are very closely related to each other (consequently *Parapsilorhynchus tentaculatus*, the type species of the genus *Parapsilorhynchus* was originally described under the genus *Psilorhynchus*

(Annandale, 1919) and their present day distribution, i.e., one genus in the Himalayan drainage and another genus in Western Ghats, suggest that both genera has a common origin somewhere in the north of Eastern Himalayas (i.e., Southern China from where the present day freshwater fishes were considered to have been evolved (Menon, 1973) and subsequently migrated towards southwest via Eastern Himalayas, Garo Hills—Rajmahal Hills, Satpura Range to Western Ghats, during the pleistocene glacial period when the gap between Garo and Rajmahal hills was elevated and hence connected due to the general lowering of the sea level in view of the glaciation (Hora, 1944, 1949). The forms left back at Eastern Himalayas have evolved into the genus *Psilorhynchus* and must be primitive in view of the higher number of unbranched pectoral rays and developed their own specializations like reduced air bladder, single row of pharyngeal teeth, broad spatulate mouth, broad based and horizontally placed paired fins etc. The early Psilorhynchid species must have had relatively large number of undivided pectoral rays and lateral line scales, smaller eyes etc., something like the present day species viz, *P. pseudocheneis* and *P. homaloptera*. Out of this stock must have evolved somewhat recent group with fewer unbranched pectoral fin rays and lateral line scales, bigger eyes etc., like the present day species *P. sucario* and *P. balitora* and spread out westward in the Himalayan drainage.

These two groups of species of the genus *Psilorhynchus* (*pseudocheneis* and *homaloptera* on the one hand and *sucario* and *balitora* on the other) also differ from each other in other morphological characters like body shape (dorso-ventrally compressed anteriorly and laterally compressed posteriorly in the first group and spindle-shaped in the second group), base of the paired fins (broad in the first groups and narrow in the second group),

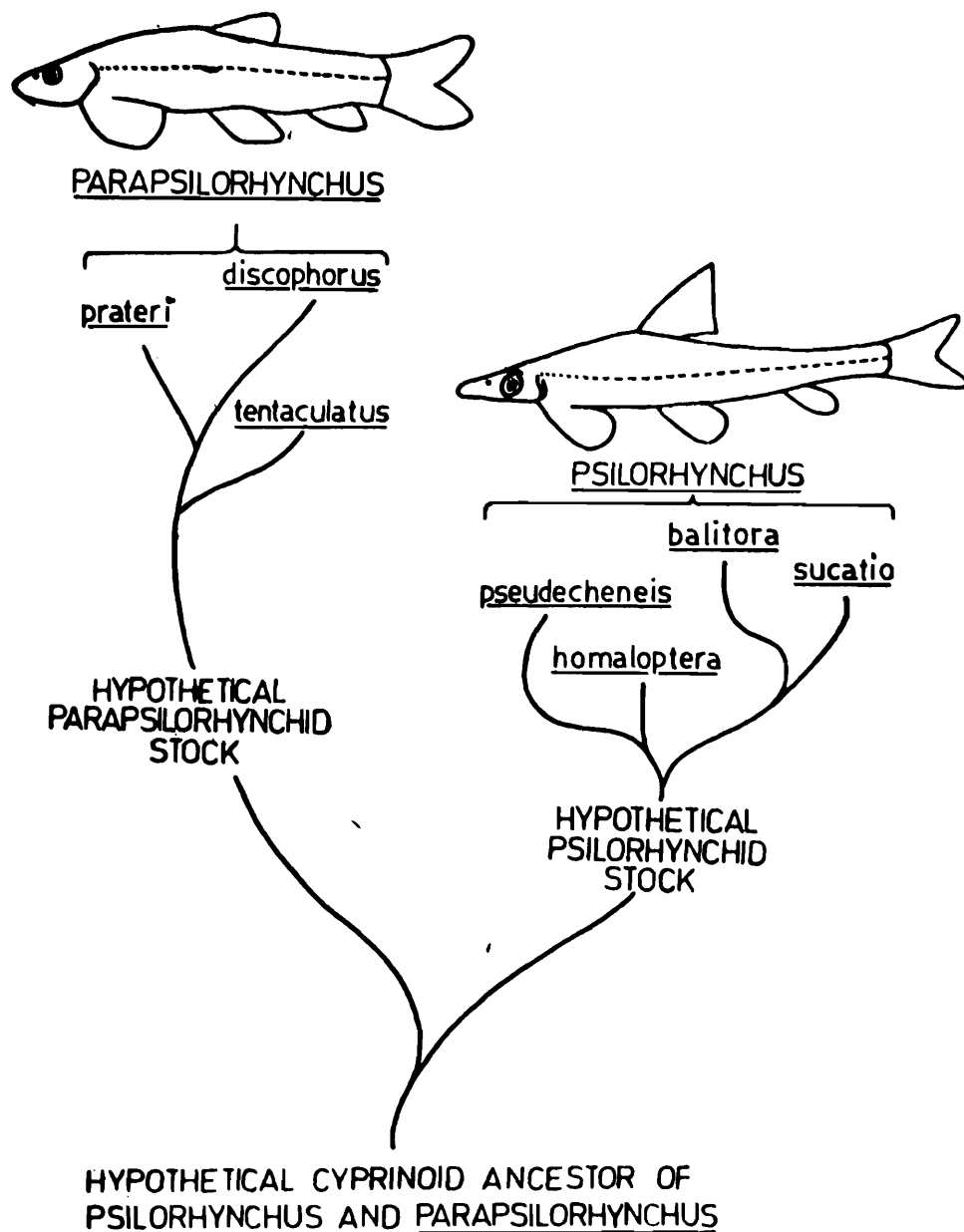


Fig. 1. Trends of evolution in the cyprinoid genera *Psilorhynchus* and *Parapsilorhynchus*.

presence (second group) or absence (first group) of scales on the chest and presence (first group) or absence (second group) of lateral foramina in the basipterygium. In view of this marked grouping of species it is felt that the original *Psilorhynchus* genus actually comprises of two genera, one *Psilorhynchus* proper consisting of the species *sucatio* and *balitora* (since *P. sucatio* is the type species of the genus *Psilorhynchus* (Mukherji,

1933) and the species *pseudecheneis* and *homaloptera* might represent another genus.

The forms that migrated westward during the pleistocene glaciation must have been something like the present day *Parapsilorhynchus tentaculatus* (with a lower number of unbranched pectoral rays than *Psilorhynchus*, but higher than those of the present day species of *Parapsilorhynchus*, with a rudimen-

tary thickening in the posterior part of lower lip etc.). The fact that *Parapsilorhynchus tentaculatus* is reported from places along the course of migration (Satpura Hills etc.) besides Western Ghats shows that not only it was once a well distributed species but also indicates its migratory route. *Parapsilorhynchus tentaculatus* is obviously primitive form compared to *P. discophorus* and *P. prateri* in view of the fact that while in *P. tentaculatus* the unbranched pectoral rays are three, in *prateri* and *discophorus* they are two. The thickening of the disc behind the lower lip is rudimentary (i.e. in formative stage) in *P. tentaculatus* whereas both in *prateri* and *discophorus* the thickening is complete and prominent. In fact it is not difficult to imagine *tentaculatus* or its ancestral form as a sort of a connecting link in the evolution from the genus *Psilorhynchus* (where there are many unbranched pectoral rays and no thickening, or disc behind the lower lip) to the genus *Parapsilorhynchus* (where the maximum number of unbranched pectoral rays are 3 and with a thickening or disc behind the lower lip). Those populations restricted in the Nasik region of the Godavari River must have specialized and developed the disc-like thickening behind the lower lip as well as small scales on the body and have evolved into the species *prateri* though remaining small in size as in *tentaculatus*. The latter species is mainly restricted to the tributaries of the Krishna River in the Western Ghats (Poona and Mahabaleswar), although it has a wider distribution than the other two species. The population that has gone west and southwest (Koyna River and Vasishti Valley) has evolved into the species *discophorus* growing to larger size and with fuller body, scales largest in the genus and smaller eyes.

The evolution and relationships of the species of the two genera *Psilorhynchus* and *Parapsilorhynchus* can be diagrammatically

shown as in the accompanying figure (Fig. 1).

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