[*From the* JOURNAL OF THE BOMBAY NATURAL HIST. SOC., *December* 1958.]

Remarks on Indian Cyprinid Fishes described by Jerdon (1849) under *Gonorhynchus* McClelland

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(*With a plate*)

INTRODUCTION

The fish survey of the Cauvery River and its tributary streams undertaken by me during March-April 1951, May 1953, and October 1954 has facilitated the clarification of the nomenclatorial status of many of the species described by Jerdon in his treatise on the 'Freshwater Fishes of Southern India', published in 1849. The bulk of his material came from the Cauvery watershed and he described a number of new species, the status or systematic position of many of which has hitherto remained uncertain. In the following pages, I have attempted to codify the nomenclature of three species described by Jerdon under the name *Gonorhynchus* McClelland (*nec* Gronow 1763 and Scopoli 1777). The species referred to are :

1. *Gonorhynchus gotyla* Gray
2. *Gonorhynchus McLellandi* Jerdon (New species)
3. *Gonorhynchus stenorhynchus* Jerdon (New species)

The three species are at present referable to the genus *Garra* Hamilton, of which it may be noted that the most up-to-date revision is that carried out by Hora (1921). Among the ichthyologists who have commented on Jerdon's species, mention must be made of Günther (1868), Day (1867, 1877), Annandale (1919), and Rao (1920). There has been no uniformity in the treatment accorded to Jerdon's above-mentioned species in earlier works, for some have considered all three as nominal species, while others have recognised one (*G. stenorhynchus*) as valid. This confusion seems to have been due to the few specimens that were available to them for study. My own collections and the examination of previous collections of *Garra* from the Cauvery system clearly show that three distinct species-groups can be recognised from this watershed, each exhibiting minor variations in the different tributary streams, a close study of which it is possible will eventually help in differentiating the different stream populations even into subspecies.

However, such detailed scrutiny does not come within the scope of the present paper.

Systematic Position of *Gonorhynchus Gotyla* Jerdon (nec Gray) (Plate, fig. C)

The description of *Gonorhynchus gotyla* given by Jerdon is brief; but comparison of the typical specimens of *Garra gotyla* Gray in the fish collection of the Zoological Survey of India (from north-eastern India) with the specimens from the river Cauvery, at present referable to Jerdon's description of *Gon. gotyla*, shows marked differences in the shape of the snout, the disposition of the tubercles on the snout, and certain body proportions, on which grounds it is better to consider the two as distinct, a course which was rightly adopted by Hora and others.

Günther (1868) placed *Gonorhynchus gotyla* Jerdon (*nec* Gray) in the synonymy of the composite species *Discognathus lamta* (Hamilton). Day (1877) included it in the synonymy of both *Discognathus lamta* and *D. jerdonia* (Day), with no comments. Annandale (1919), who was the next to remark on the species, placed it in the synonymy of *D. jerdonia* (Day) of which species he observed that it is 'common in the Bhavani river near the base of the Nilgiris both before and after the stream leaves its gorge . . . . Jerdon found it in the Manantoddy as well as the Bhavani and Day records it from the Wynaad.' Rao (1920) made no mention of *Gonorhynchus gotyla* Jerdon (*nec* Gray), but described *Garra lamta* and a variety of *Garra jerdonia* Day, viz. var. *brevimentalis* Rao, from the headwaters of the river Cauvery in Mysore. Of these, I consider his *G. lamta* (in part) and the variety *brevimentalis* as representing *Gonorhynchus gotyla* of Jerdon. Hora (1921) placed *Gonorhynchus gotyla* Jerdon in the synonymy of *Garra stenorhynchus* (Jerdon).

In my opinion, the species of *Garra* commonest throughout the river Cauvery is the one which agrees in most of the characters with the description of *Gonorhynchus gotyla* Jerdon. In this form the lateral-line scales are almost always 34 or less than that (32 to 34 and exceptionally 35). In the scalation, fin ray counts, and body proportions it closely resembles *Chondrostoma mullya* Sykes from the Krishna watershed further north, which in turn seems to be closely related to the genotype *Garra lamta* Hamilton. Until more detailed comparisons are carried out these may be considered conspecific. Adult specimens of the typical *G. lamta* that I have examined (from Chota Nagpur, Gangetic watershed) are of a maximum size of 75 mm. in standard length, while the Cauvery specimens appear to be much larger attaining a maximum standard length of about 130 mm. or more and possessing a broader adhesive disc with a narrower velum. Thus we find that the *G. lamta* species-group has a more or less continuous distribution from north-eastern India through

peninsular India to even Ceylon, where it is represented by another closely allied form *G. ceylonensis* Bleeker. The Cauvery specimens that I have compared with the specimens of *G. mullya* in my collection from the Poona area (type locality of *G. mullya*) do not show any noteworthy difference except that in the former the snout is more profusely covered with open mucous pores and horny tubercles. Until its consistency and significance are studied from considerably larger samples (for both males and females have pores and tubercles on the snout as in *G. stenorhynchus*, *G. gotyla*, *G. mcclellandi*, etc.), it will be possible to assign *Gonorhynchus gotyla* Jerdon (*nec* Gray) only to the synonymy of *Garra lamta* Hamilton. If the differences in the above-noted character or other meristic details prove significant enough for the recognition of distinct species or subspecies in the two watersheds, the availability of an already proposed name, *brevimentalis*, is indicated here to denote the specimens from the river Cauvery. No doubt, *G. lamta* in the Cauvery itself exhibits a certain diversity of characters, especially in the nature of the snout and the arrangement of the pores and tubercles, often showing intergradation with allied species and thus leading one to suspect interspecific hybridization in nature between the species of *Garra* occurring there. During field collections I have obtained *G. lamta* along with either or both the species *G. stenorhynchus* and *G. mcclellandi*, and the specimens of the three species collected from the Cauvery River in April-June and October-November showed that the mature females were mostly gravid, which suggests that their breeding seasons probably coincide. This, in addition to the similar habits of life exhibited by these species makes possible the more common occurrence of interspecific hybrids between these species. It will be interesting if more detailed studies are made in the light of these observations.

A brief re-description of *G. lamta* from the Cauvery River is given here based on specimens collected from the Manantoddy River (Wynaad), the Cauvery River (Mysore), and the Bhavani and the Moyar Rivers (Nilgiris), all tributaries of the main Cauvery River :

D. ii-iii, 8 ; P. i, 12-13 ; V. i, 8 ; A. ii, 5 ; C. i, 17, i ; L- 1. 32-35 ; L. tr. 4-4½/1/2½-3 predorsal scales 10-11; circumpeduncular scales 16 ; scales between vent and anal origin 4-5 (The frequency distribution of the fin rays and scale counts are given on p. 530) ; anal fin when addressed reaching base of caudal fin ; snout without a proboscis ; mucous pores and horny tubercles present or absent on snout; tubercles when present arranged in more or less bilaterally symmetrical patches as follows: (1) antero-rostral patch at the tip of snout often in a continuous band, separated from the rest of the snout by a narrow deep furrow, (ii) postero-rostral patches, being two small laterally arranged patches in the middle of the snout behind the antero-rostral patch; (iii) antero-lateral

patches, being lateral to the postero-rostral patches; (iv) inter-nasal patches, being two patches of tubercles situated behind the postero-rostral patches between the anterior nostrils; and (v) inter-naso-orbital patch, being situated between the posterior margin of the posterior nasal opening and the anterior margin of the orbit on either side. All or a few of these patches may be present. Colour : a distinct black shoulder spot behind upper angle of gill-opening; a mid-lateral dark band commencing from behind opercle, often very faint and diffuse and ending in a precaudal spot; latter generally indistinct in larger examples ; two or three dark longitudinal incomplete narrow bands above and below dark mid-lateral band separated by lighter interspaces, all being well-defined on the sides of the caudal peduncle ; abdomen and ventral side of body yellowish white; fins hyaline, the pectoral and lower caudal finrays being generally darker.

Garra malabarica Day (1865) and *Garra alta* Day (1867) from the Cauvery River are synonyms of *Garra lamta* as designated here.

Systematic Position of *Gonorhynchus McLellandi* Jerdon
(Plate, fig. D)

The second species, namely *Gonorhynchus McLellandi* Jerdon, has for long been considered a nominal species and some ichthyologists have completely ignored it. Jerdon's description of it is cited in full below :

> ' Snout covered with numerous pores ; profile rising to the dorsal, slightly concave from that to the tail—head is to the whole body as 1 to $4\frac{1}{2}$, height is $3\frac{2}{3}$ in its total length ; two longish cirri, head depressed in front, dorsal fin rather high. D. 10. A. 7, &c.—Colour dusky green above, golden on sides and greenish white beneath ; caudal fin green in centre, reddish above and below; other fins yellow, edged with red ; cheeks golden, 36 scales along the body in 9 rows. Length 10 inches.' (Jerdon, 1849, p. 310.)

The species was noted as occurring in the ' Bowany River ' at the foot of the Neilgherries and also in the ' Manantoddy River', both tributaries of the river Cauvery. I have collected the typical form of *Gonorhynchus mcclellandi*[1] from the Manantoddy River at Manantoddy (Wynaad) and find that Jerdon was wrong in characterising his species as having only two ' longish cirri ', for my specimens show two pairs of barbels—the long rostral pair which Jerdon seems to have noted and a very short and rudimentary pair of maxillary barbels which are situated in the labial groove at the place where the rostral fold joins the ' adhesive disc ' and is generally overlapped by the velum of the disc, thereby hiding it from view. *G. mcclellandi* is distinct from the

[1] The name *McLellandi* is correctly spelt here as *mcclellandi*.

remaining species of *Garra* occurring in the Cauvery River in a combination of characters, the most important being the comparatively more elongate and flattened body form, the distinctly conical or pointed snout, the characteristic number of about 36 lateral line scales (general range 35 to 37), and the position of the vent which is greatly removed from the origin of the anal fin. The frequency distribution of the fin rays and scale counts are given in the tables on p. 530. Mucous pores on the snout are present even in young specimens measuring about 2 inches, but one noteworthy feature is the almost complete absence of the large horny tubercles which are so characteristic of *G. stenorhynchus* and even *G. lamta* (from Cauvery River). My collections show that the combination of the specific characters given above is true of specimens of *G. mcclellandi* found throughout the Cauvery River. The only noteworthy difference in specimens from the different localities is the greater or lesser number of mucous pores present on the snout, but as this may be attributable to age and sex its taxonomic utility in this particular instance seems to be dubious. As for the colour of the species, the shoulder spot is present behind the upper angle of the gill-opening as in *G. lamta* and the dark mid-lateral band is well-defined in smaller specimens, while in larger examples it merges with the dark greyish colour of the upper half of the body. Incomplete dark narrow lateral bands above and below the mid-lateral band in the posterior half of the body (characteristic of *G. lamta* and *G. stenorhynchus*) are conspicuous by their absence. Almost the entire ventral half of the body is yellowish white (Plate, fig. D).

Thus with the re-discovery of *G. mcclellandi*, the following species described from the Cauvery River in Madras (*Garra platycephala* Rao) and those from the Bhavani River (*Garra jerdonia* Day and *Discognathus elegans* Annandale) do not seem tenable. None of these are specifically distinct, although Rao (op. cit.) gave the lateral line scale count in *G. platycephala* as 37 to 39, which seems to be an exceptionally high count. I have not come across such high counts in specimens from Mysore. Hora (1921) was right in considering *G. jerdoni* Day and *D. elegans* Annandale as conspecific, and both are considered here synonyms of *G. mcclellandi*. Thus, the following, it is felt, is the correct rendering of the synonymy *Garra mclellandi* (Jerdon):

Garra mcclellandi (Jerdon)

Gonorhynchus McLellandi Jerdon, *Madras J. Lit. and Sci.* **15,** p. 310 (1849). Type locality : Manantoddy River and the Bowany River, both tributaries of the Cauvery River.

Discognathus lamta Günther, (in part), Cat. Fish. Brit. Mus. **7,** p. 69 (1868).

Garra jerdonia Day, *Proc. Zool. Soc. London,* p. 288 (1867). Type locality : Bhavani River at foot of Neilgherries and also Wynaad.

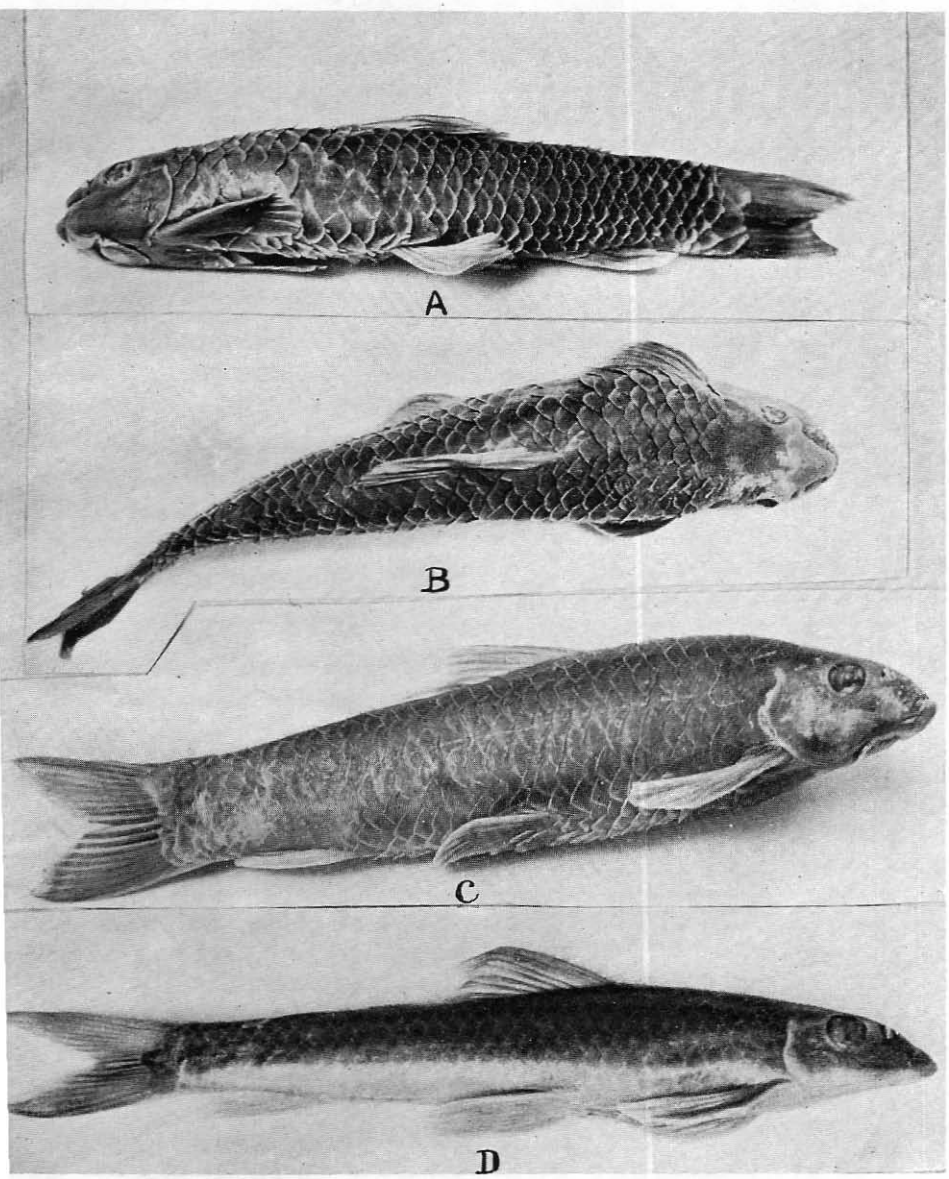
Discognathus jerdonia Day, (in part), Fish. India **2**, p. 528, pl. cxxii, fig. 6 (1877).
Discognathus jerdonia Day, (in part), Fauna Brit. India. Fish **1**, p. 247 (1889).
Discognathus lamta Jenkins, (in part), *Rec. Ind. Mus.* **3**, pp. 291-293 (1909).
Discognathus jerdoni Annandale, (in part), *Rec. Ind. Mus.* **18**, p. 73 (1919).
[Pl. ix, fig. 2 ; pl. xi, fig. 3 and not pl. ix fig. 1, which probably represents a specimen of *Garra lamta* subsp. *mullya* (Sykes,)]
Discognathus elegans Annandale, *Rec. Ind. Mus.* **18**, p. 76, pl. ix, fig. 4 ; pl. xi, fig. 5 (1919). Type locality : Bhavani River at base of Neilgherries.
Garra jerdonia Rao, *Ann. Mag. Nat. Hist.* (9), 4, p. 53 (1920).
Garra platycephala Rao, *Ann. Mag. Nat. Hist.* (9), 4, p. 56, pl. i, figs. 2, 2*a*, 2*b*, (1920). Type locality : Cauvery River at Seringapatam, Mysore.
Garra stenorhynchus Hora, (in part), *Rec. Ind. Mus.* **22**, p. 653 (1921).
Garra jerdoni Hora, *Rec. Ind. Mus.* **22**, p. 657 (1921).
Garra lamta Rao and Seshachar, (in part), *Half-yearly J. Mysore Univ.* **1**, (2), p. 126 (1927).

Pillay (1929), Hora and Law (1941), and Silas (1951) have recorded *G. jerdoni* as occurring in the rivers draining the Travancore hills. The single specimen that I collected from the Peermed Hills (Periyar watershed) is different from the typical *G. mcclellandi* in many details. In view of its uncertain position, references to *G. jerdoni* fom Travancore are not included in the above list of synonyms. *Garra mcclellandi* appears to be restricted to the Cauvery watershed.

Systematic Position of *Gonorhynchus stenorhynchus* Jerdon

(Plate, figs. A, B.)

Of the three species of *Gonorhynchus* described by Jerdon, this is the only species that has been recognised as valid by most of the earlier ichthyologists, although Günther (1868) placed it as a doubtful species under the genus *Discognathus* Heckel, and Day (1877) relegated it to the synonymy of the composite species *Discognathus lamta* (Hamilton). The single well-defined median proboscis of the snout is a sufficiently distinct character to separate *G. stenorhynchus* from other species of *Garra* occurring in peninsular India. Besides this, the following characters are equally important, and by them it can be distinguished from *Garra gotyla* Gray of northern India, which species is also characterised by the presence of a median proboscis on the snout. The characters referred to are (i) the more anterior position of the ' shoulder spot ' which does not extend behind the upper angle of the gill-opening. Annandale (1919) has correctly depicted its position in the drawing of *G. stenorhynchus* (Pl. ix, fig. 3), although its significance has never been commented upon. I consider this as an additional character of specific importance ; and (ii) the presence of a row of well-defined dark spots at the base of the branched dorsal fin rays, more clear from the third to the last branched rays. Many species of *Garra* lack this character, although it also occurs in species widely separated ; for instance in *Platycara notata* Blyth



Species of *Garra* Hamilton of the Cauvery Watershed

stenorhynchus (Jerdon): (A) Lateral, (B) Dorsal views of a specimen, 112 mm.; (C) *G. lamta* Hamilton, 106 mm.; (D) *G. mcclellandi* (Jerdon), 87 mm. (The measurements in millimeters denote the standard lengths.)

Photos : E. G. Silas

(= *Garra notata*) of Burma, *G. tibanica* Trewavas and *G. brittoni* Trewavas from south-west Arabia, etc.

The frequency distribution of the fin rays and scale counts are given in the tables on p. 530.

The striking resemblance of *G. stenorhynchus* to *G. arabica* Hora from Arabia is noteworthy and, as Trewavas (1941) has suggested, further collections of *G. arabica* from the Wadi Tiban basin will help to confirm the locality of the latter and also redefine the species. As it stands at present, but for the disjunct distribution I do not find any difference between *G. stenorhynchus* and *G. arabica* to consider them as specifically distinct. Even the shoulder spot in *G. arabica* seems to occupy a position identical with that seen in *stenorhynchus*, for Hora (1921, p. 679) notes the presence of 'an indistinct black dot on the operculum near its angle', which is unlike that seen in *G. lamta*, where the shoulder spot is behind the upper angle of the gill-opening, often entirely covering the first perforated scale of the line. Therefore, until fresh material of *arabica* is worked upon, it will be better to consider it as a geographical race of the earlier proposed species, *G. stenorhynchus*. Hora (1951) has given a complete list of synonyms of *Garra stenorhynchus* (Jerdon), which is to be accepted with one other minor change. *Gonorhynchus gotyla* Jerdon (*nec* Gray) does not belong to the synonymy of *G. stenorhynchus* but as pointed out earlier (p. 524.) is considered a synonymy of *Garra lamta* Hamilton.

Conclusion

The three species of *Gonorhynchus* described by Jerdon (1849) from the Cauvery River are re-designated here as follows :

1. *Gonorhynchus gotyla* Jerdon (*nec* Gray) = *Garra lamta* Hamilton.
2. *Gonorhynchus McLellandi* Jerdon = *Garra mcclellandi* (Jerdon).
3. *Gonorhynchus stenorhynchus* Jerdon = *Garra stenorhynchus* (Jerdon).

The study of the species of *Garra* from the Cauvery drainage once again emphasises the view expressed earlier (Silas, 1954) that the 'maze of species that are known at present to constitute the genus *Garra* seems definitely separable into different species-groups including polytypic species with infra-specific levels of differentiation . . . .'. The *G. lamta*-group has a range covering a greater extent of the distribution of the genus and is represented in the different drainages of the different geographical areas by species and subspecies. *G. mcclellandi*, with a higher scale count, more anteriorly situated vent, etc., seems to fall under a separate species-group which has representatives in north-eastern India and probably also as far east as Yunnan, south China, and Indo-China. The third species, *G. stenorhynchus*, belongs to the *Garra gotyla*-group

which probably also extends westward as far as Arabia. It is hoped that, when the genus is fully worked upon, the points raised here and the questions left unanswered will be clarified.

SUMMARY

The nomenclature of three species of Indian cyprinid fishes described by Jerdon in 1849 under the genus *Gonorhynchus* McClelland have been clarified and the species redefined as *Garra lamta* Hamilton, *Garra mcclellandi* (Jerdon), and *Garra stenorhynchus* (Jerdon). Attention is drawn to the variations in certain features, especially the horny tubercles on the snout, scalation, etc. The studies also point to the possibility of inter-specific hybrids of species of *Garra* occurring in the Cauvery watershed. The above three species of *Garra* appear to belong to three distinct species groups.

TABLES SHOWING THE FREQUENCY DISTRIBUTION OF THE FIN RAY AND SCALE COUNTS IN SPECIES OF *Garra* FROM THE CAUVERY WATERSHED

Species	No. of lateral line scales						No. of predorsal scales			
	32	33	34	35	36	37	9	10	11	12
Garra lamta Hamilton ..	2	2	3	2	—	—	—	5	4	—
Garra stenorhynchus (Jerdon) ..	6	27	26	—	—	—	—	38	18	—
Garra mcclellandi (Jerdon) ..	—	—	—	14	15	1	—	26	2	—

Species	Scales around caudal peduncle				Scales between vent and origin of anal fin					
	14	15	16	17	4	5	6	6½	7	8
1. *Garra lamta* Hamilton ..	—	—	9	—	4	5	—	—	—	—
2. *Garra stenorhynchus* Jerdon ..	—	—	59	—	22	36	—	—	—	—
3. *Garra mcclellandi* (Jerdon) ..	—	2	28	—	—	—	—	1	20	9

Species	Scales between lateral line and origin of dorsal fin					Scales between lateral line and origin of pelvic fin				
	3	3½	4	4½	5	2	2½	3	3½	4
1. *Garra lamta* Hamilton ..	—	—	6	2	—	—	1	7	—	—
2. *Garra stenorhynchus* (Jerdon)..	—	1	50	6	—	—	1	53	3	—
3. *Garra mcclellandi* (Jerdon) ..	—	—	4	26	—	—	1	22	7	—

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