DESCRIPTION OF A NEW SPECIES OF HEMIRHAMPHID FISH, *DERMOGENYS BURMANICUS* FROM LOWER BURMA, WITH NOTES ON SEXUAL DIMORPHISM AND ITS TAXONOMIC SIGNIFICANCE.

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In December, 1934, three specimens of a species of *Dermogenys*, collected from a "large kutcha domestic water tank in the village Myagaing, Kyauktan township, Hanthawaddy District," Lower Burma, were received for determination by the Zoological Survey of India, from the Director, Harcourt Butler Institute of Public Health, Rangoon. Unfortunately, in these specimens, the beaks were damaged and it was, therefore, not possible to identify the fish specifically, until, on request, a further consignment of three well preserved specimens was received from the same source. At Dr. S. L. Hora's request the Director of the above named institute kindly sent some interesting ecological notes on the species; these are included at the end of the descriptive account.

There is a tendency among certain ichthyologists to attach taxonomic significance to the presence or absence of secondary sexual characters in viviparous species of Hemirhamphid fishes. It has been stated by Weber and de Beaufort[1] that in the genus *Dermogenys* van Hasselt, there is no marked sexual dimorphism. Weed[2] thinks that *Rhamphodermogenys* Fowler and Bean,[3] a subgenus of *Dermogenys* should stand as a distinct genus if it is confirmed that the type-species of the subgenus is sexually dimorphic. The new species of *Dermogenys* under consideration, shows definite secondary sexual characters in males. Opportunity is, therefore, taken to discuss below the question of sexual dimorphism in *Dermogenys* and its taxonomic significance.

I wish to express here my sincere thanks to the Director of the Harcourt Butler Institute of Public Health, Rangoon, for affording me an opportunity of studying and describing this interesting species of fish, as also for the generous gift of the material to the collection of the Indian Museum. My thanks are due also to Messrs. R. C. Bagchi and B. Bagchi who have drawn the accompanying illustrations under my supervision.

Dermogenys burmanicus, sp. nov.

D. 9-10; A. 15-16; P. 1/8; V. 1/5; C. 18; L. l. 45-46.

The body is moderately elongated and compressed. The back is broad, while the sides gradually converge below to a somewhat narrow and rounded ventral surface. Both the head and the caudal peduncle

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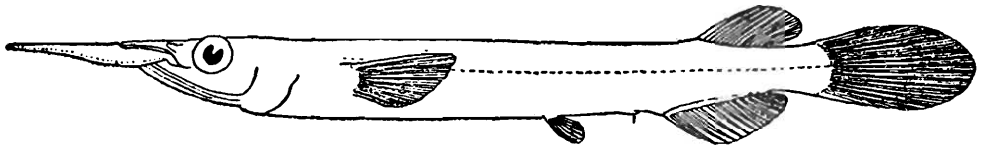
[1] Weber and de Beaufort, *Fish. Indo-Austral. Archipel.*, IV, pp. 136, 137 (1922).

[2] Weed, 'Notes on Fishes of the Family Hemirhamphidae'—*Zool. Ser. Field Mus. Nat. Hist., Chicago*, XX, pp. 49, 50 (1933).

[3] Fowler and Bean, 'Fishes of Formosa and the Philippine Islands'—*Proc. U. S. Nat. Mus.*, LXII, pp. 15, 16 (1923).

are more compressed than the body ; ventrally they are more trenchant than rounded. The dorsal profile of the body is more or less horizontal from the tip of the lower jaw to the insertion of the dorsal fin, while the ventral profile is moderately arched throughout.

The head is slightly higher than broad and almost 3 times as long as broad ; its length from the tip of the upper jaw to the branchial opening is contained about 4·5 times in the length of the body from the tip of the lower jaw to the hypural joint. In the length of the trunk the head is contained nearly 3 times. The length of the lower jaw beyond the extremity of the upper jaw is contained from 6·5 to 7 times in the length of the body excluding the caudal fin, while including the caudal, it is contained from 7·5 to a little over 8 times. The eyes are large and slightly impinging in the dorsal profile. They are situated nearer the angle of the opercles than the tip of the snout. The diameter of the eye is contained almost 4·5 times in the length of the head, as measured from the tip of the snout. The interorbital space is narrow and is from flat to slightly concave. The triangular part of the upper jaw is truncate or faintly emarginate in front ; it is longer than broad. The preorbital is rounded and almost equal to half the diameter of the eye. The gape of the mouth is moderate and extends as far as or just a little beyond the nostrils. The nasal barbels are short and stumpy. The caudal peduncle is short and slightly longer than high.



TEXT-FIG. 1.—Lateral view of a type specimen (female) of *Dermogenys burmanicus*, sp. nov. × 2.

The gill opening is rather narrow and extends forwards only as far as the lower level of the orbit. The isthmus is narrow and slender. The folds of skin bordering along each side of the beak are well developed and broadest in the middle. Both the jaws are provided with rows of simple conical teeth.

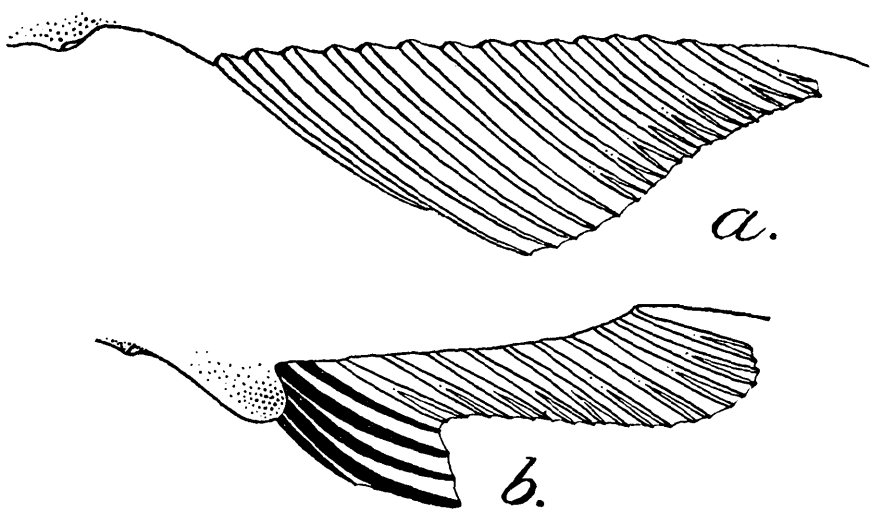
The scales are large and cycloid ; they are very thin and imbricate. Owing to the scales being thin and imbricate and the body thickly spattered with minute dark dots throughout, it is difficult to determine exactly the squamation in this species. There appear to be, however, 45 to 46 scales in a longitudinal series, counting from the angle of the opercles to the root of the caudal fin, while there are about 8 rows in a transverse series. There are 14 scales round the caudal peduncle. The head, cheeks, the opercles and the bases of the anal and the caudal are covered with scales, which are larger than those on the body.

The dorsal fin is inserted opposite the 6th ray of the anal. It is a little longer than high and has somewhat a convex distal margin. The number of rays varies from 9 to 10, of which 3 to 5 anterior ones are simple. The origin of the anal, which is nearly twice as long as high, is 6 scales in advance of that of the dorsal. The anal is longer than the dorsal. The number of rays varies from 15 to 16 of which 5 to 6 anterior

ones are spinous. Both the dorsal and the anal, when adpressed fall short of the caudal. The caudal is shorter than the length of the head, and considerably longer than high; it has an elongate-ovoid distal margin. The pectorals are inserted somewhat high on the sides; they are much shorter than the head and are separated from the origin of the ventrals by a distance almost equal to their own length. The ventral fins are small and inserted nearer the gill opening than the hypural joint. The vent is situated nearer the origin of the anal than the tip of the ventrals.

The colouration of the specimens in alcohol is uniformly pale olivaceous green. Except for the ventral surface, the body is infuscated with fine dark specks and minute dots. On the back, before the insertion of the dorsal fin, there are two close-set parallel lines formed by dusky dots. The occiput and the jaws are blackish. In some specimens there is a faint indication of a dusky narrow lateral band from the shoulder to the base of the caudal fin. The fins are pale brown with minute dusky dots.

Sexual Dimorphism.—Of the six specimens of *Dermogenys burmanicus* under report, two are males and four females. The males, as measured from the tip of the upper jaw to the hypural joint, are 29 and 33 millimetres, while the females are 37, 39, 42 and 46 millimetres in length respectively. With such limited material it is not possible to be definite about the variation in the size of the males and females of the species, but it appears that the males are of a comparatively smaller size than the females. The chief secondary sexual characters of the males of *D. burmanicus*, however, lie in the modifications of the anal fin and the skin of the genital area. In female specimens the anal fin is somewhat triangular in shape and sub-angulate posteriorly; the rays are normal and more or less subequal. The genital papilla, situated well in advance of the insertion of the anal fin, is represented by a slightly elevated small rounded area (Text-fig. 2, *a*). In the male individuals, on the contrary,



TEXT-FIG. 2.—Enlarged views of anal fin of specimens of *Dermogenys burmanicus*, sp. nov. × *ca.* 9.

(*a*) Female; (*b*) Male, showing secondary sexual characters.

the anal fin has a deep notch behind the last simple ray; posteriorly it is more rounded than angulate. The undivided rays, 5 or 6 in number,

as the case may be, are decidedly shorter than those in the females. They are considerably thickened, strong and quite spinous, and have rather blunt tips. Among these modified rays, the second is the longest and thickest. All the spinous rays are recurved and closely adherent. Anteriorly and to some extent laterally, they are partially enveloped by an elongated swollen fold of skin which " seems to be an outgrowth of the genital papilla" This swollen fold of skin is like a pocket and is capable of being everted. (Text-fig. 2, *b*.)

In regard to the structure of the anal fin in *Dermogenys*, Weber and de Beaufort (*op. cit.*, p. 137) have remarked: " None of the rays thickened, but in males the anterior part of the anal is sometimes enveloped by a swollen fold of skin, which seems to be an outgrowth of the genital papilla." Weed (*op. cit.*, p. 50) in his revision of the genera of the Hemirhamphid fishes has adopted the above account for *Dermogenys*. In view of the presence of well defined secondary sexual characters in males of *D. burmanicus*, it is, however, necessary to emend the definition of the genus.

In 1923, Fowler and Bean (*op. cit.*, pp. 15, 16) described a species of *Dermogenys*, *D. bakeri*, from Zamboanga, Philippine Islands, and created a new subgenus, *Rhamphodermogenys* for its reception. Unfortunately, the authors had a single specimen before them, and they did not describe the characteristics of the anal fin. From the figure of the fish published by them (p. 16, fig. 3), however, it appears that the specimen represents a male. The form of the anal fin is more or less identical with that of a male of *D. burmanicus*. In this connection Weed remarks; " If the form of anal fin as shown by Fowler and Bean is a sexual character and there are no intergradations with the conditions mentioned for *Dermogenys* by Weber and de Beaufort (1922, p. 137) this form [*Dermogenys* (*Rhamphodermogenys*) *bakeri*] probably should stand as a distinct genus"

It will thus be seen that sexual dimorphism may be well-defined in some species of *Dermogenys* and ill-defined or absent in others and no taxonomic value can, therefore, be attached to it.

The subgenus *Rhamphodermogenys* is distinguished " from the subgenus *Dermogenys* Van Hasselt by its long upper jaw and advanced ventrals" But so far as can be judged from the description and the figure of the type-species, *D.* (*Rhamphodermogenys*) *bakeri*, the upper jaw does not appear to be much longer than in most species of *Dermogenys* (its " width $1\frac{3}{5}$ in its length "). The ventrals in *Rhamphodermogenys* are inserted nearer the gill opening than the hypural joint. But it may be pointed out that in *Dermogenys* itself the ventral fins may be " inserted about midway between gill opening and hypural joint or a little nearer to either" (Weed, *op. cit.*, p. 49). Division of the genus *Dermogenys* into subgenera on such characters, therefore, appears to be too artificial.

Relationship and Remarks.—Dermogenys burmanicus is closely allied to *D. pusillus* van Hasselt found in the rivers of Malay Peninsula, Siam, Philippines, etc., but can be readily distinguished from it by the position of the ventral fins. In *D. pusillus*, the base of the ventrals is nearer

the caudal than the head, while in *D. burmanicus*, it is nearer the head than the caudal. Besides, there are differences in colouration between the two species. *D. orientalis* M. Weber,[1] known from Borneo and Celebes, is another near ally of *D. burmanicus*, but the latter differs from the former in having a proportionately shorter beak and an entirely different colour pattern.

Hemirhamphus brachynopterus Bleeker[2], which should also be referred to the genus *Dermogenys*, was obtained from the River Hooghly. Since its discovery it has not been rediscovered so far and Day,[3] while giving a very short account of the species in his *Fishes of India*, remarked: "Dr. Bleeker received a single small specimen, which unfortunately is now in such a bad state that I cannot add anything to the above description" It is, however, clear that *D. burmanicus* differs from *D. brachynopterus* in having a much longer upper jaw. In Bleeker's species the upper jaw is "rather wider than long, its length not equalling one diameter of orbit", while in *D. burmanicus* the upper jaw is longer than wide, its length being nearly twice the orbital width.

Distribution.—*D. burmanicus* is found generally in the fresh water rivers throughout the Delta Districts in Burma. It is interesting to note that since Bleeker's discovery in 1853, the genus *Dermogenys* is being reported from the Indo-Burmese waters for the first time. It has so far been known to be widely distributed in the fresh waters of Siam, Malay Peninsula, Sumatra, Borneo, Java, Celebes and the Philippines.

Ecological notes.—The Director of the Harcourt Butler Institute of Public Health, Rangoon, has kindly supplied the following ecological notes on *D. burmanicus*, which is locally known as "*Pseudo Ngapaung-Yo*":

"1. It is found generally in fresh water river, throughout the Delta Districts in Burma.

"2. It breeds throughout the year, as the young ones can be captured throughout all seasons.

"3. It attains not more than 4 inches in length.

"4. It always swims against the tide along the banks of the river.

"5. It is very delicate and it does not stand long journey, specially in buses, boats carts and trains.

"6. It feeds on insects, larvae and pupae.

"7. It is not used as food."

Type-specimens.—No. F 11778/1 (male); No. F 11780/1 (female), preserved in the collection of the *Zoological Survey of India, Indian Museum, Calcutta.*

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[1] Weber & de Beaufort, *Fish. Indo-Austral. Archipel*, IV, pp. 137, 138 (1922).

[2] Bleeker, *Verh. Batav. Genoot*, XXV, p. 146 (1853).

[3] Day, *Fish. India*, p. 517 (1878).

Measurements in millimetres :

	Types.		
	♀	♂	♀
Length of body from tip of lower jaw to hypural joint	42·0	33·0	39·0
Length of trunk from branchial opening to hypural joint	27·0	23·5	25·0
Height of body	4·0	3·5	3·5
Length of head from tip of upper jaw to branchial opening	9·0	9·0	9·0
Breadth of head	3·0	2·75	3·0
Height of body	3·5	3·0	3·5
Length of snout	4·0	3·5	4·0
Diameter of eye	2·0	2·0	2·0
Interorbital width	0·75	0·75	0·75
Length of base of dorsal	3·0	3·0	3·0
Height of dorsal	2·5	2·3	2·5
Length of base of anal	5·0	4·0	4·5
Height of anal	2·5	2·5	2·5
Length of pectoral	6·5	5·8	6·0
Length of ventral	2·5	2·5	2·5
Length of caudal	7·0	6·2	6·5
Length of caudal peduncle	3·0	2·3	2·5
Least height of caudal peduncle	2·0	2·0	2·0
Length of lower jaw beyond extremity of upper	6·0	5·8	6·0