

# Notes on two Homalopterid Fishes

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With 2 Text-figures

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In November, 1948, Dr. S. L. Hora requested Dr. E. Trewavas for a list of Homalopterid fishes added to the collections of the British Museum since he last studied them in 1930 for a revision of the family.\* In reply, Dr. Trewavas sent the following statement, without including in it the material received from the Indian Museum and *Homaloptera tweediei* Hora:

Registered number	Scientific name	Donor and Locality
1933—8.19.50.	<i>Homaloptera wassinki</i> .	Delacour-Lowe Expedition to Indo-China.
1933—8.9.7.	<i>Homaloptera wassinki</i> .	Oxford University Expedition to Sarawak, Borneo.
1933—8.9.8.	<i>Homaloptera</i> sp.	
1933—8.9.1-6.	<i>Gastromyzon borneensis</i> .	
1933—7.26.6-	<i>Sinohomaloptera yaotanensis</i> .	Mr. P. W. Fang, China.
1933—7.26.8.	<i>Sinogastromyzon sanhoensis</i> .	-do-
1934—12.18.34.	<i>Homaloptera smithi</i> .	Siam.
1934—12.1.127-134.	<i>Vanmanenia disparis</i> .	Hong-Kong, A. W. Herre.
1939—3.23.17.	<i>Pseudogastromyzon myersi</i> .	Hong-Kong, G. A. C. Herklots.

As no species of *Homaloptera* has so far been recorded from Indo-China, Dr. Hora enquired for further particulars regarding the specimen No. 1933. 8.19.50 and was informed that it was without any locality label, though the expedition had collected specimens from Pekh, N. Tonkin; Xien Khonang or Ching chuang, Laos and Kontum and Dak-to in Annam. Dr. Trewavas also supplied the following short description of the specimen:—

"The lateral line scales 43. D. 2/7/1; A. 1/5/1; Pelvics 2/7. Pectorals 5/10/2. A narrow dark band along the middle of the side from the head to the caudal base."

Through the kindness of Dr. Trewavas, the specimen was loaned to the Zoological Survey of India for study and as indicated below it has proved to be a form closely allied to *Homaloptera rupicola* (Prashad and Mukerji) from Upper Burma of which *Homaloptera weberi* Hora from Borneo is regarded as a close

\* Hora, S. L., *Mem. Ind. Mus.*, XII, pp. 263-330, (1932).

ally. The occurrence of similar species of *Homaloptera* in Northern Burma, Indo-China and Borneo is of considerable interest as will be shown below.

The specimen No. 1933.8.9.8. (*Homaloptera* sp.) from North Sarawak was also obtained on loan from the British Museum. It is a juvenile specimen, but its description given below leaves much in doubt about its generic position. It seems probable that several interesting Homalopterid types still remain to be discovered from Borneo.

The two specimens noted above are described below and in the end remarks are made on the phylogenetic significance of these finds.

#### *Homaloptera* sp. from Indo-China

D. 2/7/1; A. 1/5/1; P. 5/10/2; V. 2/7; C. 19.

Depth of body 8.5 in standard and 10.6 in total length; length of head 4.7 and 5.9. Head much longer than broad. Width of head contained 0.6 in its length. Eyes small, placed dorso-laterally, not visible from ventral surface. Diameter of eye contained 2.1 times in snout and 4.5 times in length of head. Inter-orbital width 1.95 in snout. Snout about as long as post-orbital part of head. Two pairs of rostral and one pair of maxillary barbels, the latter situated at corners of mouth. Outer rostral barbels longer than inner, and about as long as maxillary barbels. Mouth subterminal, lips complete and non-papillated. Gill-openings extend to ventral surface for very short distance. D. 2/7/1; origin behind pelvics; equidistant from tip of snout and base of caudal. Anal 1/5/1. Pectorals with 5 outer undivided, 10 branched and 2 inner undivided rays. Pectorals much longer than head, overlapping base of pelvics. Pelvics 2/7; extending up to vent. Caudal with 19 rays; least height of caudal peduncle contained 2.1 times in its length.

Colour in spirit pale brownish dorsally and lighter below. A narrow dark band along middle of side from posterior margin of head to base of caudal. Caudal marked with two to three zigzagging dark bands. All other fins provided with two reddish brown bands.

In the following characters *Homaloptera* sp. from Indo-China resembles *H. rupicola* of Northern Burma and *H. weberi* of Borneo:

1. Pectorals extending beyond the bases of the pelvics.
2. Origin of dorsal behind the commencement of pelvics.
3. Origin of dorsal equidistant from tip of snout and base of caudal.
4. Lateral line scales 43-44.
5. D. 2/7/1; A. 1/5/1; P. 5/10/2; V. 2/7; C. 19.

*H. wassinkii*, to which this species had been referred, is distinguished from

*Homaloptera* sp., by the origin of the dorsal being nearer the base of the caudal than the tip of the snout; the larger number of lateral line scales (47); and the comparatively shorter paired fins, pectorals just reaching but not overlapping the pelvics.

*H. ocellata*, which also resembles *Homaloptera* sp., differs from the latter primarily in the large number of lateral line scales (63-71 versus 43-44); and the pectorals being separated from the pelvics by a considerable distance (versus pectorals overlapping base of pelvics).

I have compared *Homaloptera* sp., with the type and co-type of *H. rupicola* from Northern Burma and a single specimen of *H. weberi* from Borneo present in the collection of the Zoological Survey of India (Indian Museum). The specimens of *H. rupicola* are all small in size. Due to the paucity of material of *Homaloptera* sp., and *H. weberi*, each of which is represented by a single specimen, it has not been possible to institute a detailed comparison between these three forms. The following table, however, shows the resemblances and differences between them.

<i>H. rupicola</i> (Prashad and Mukerji): UPPER BURMA.	<i>Homaloptera</i> sp.: INDO-CHINA.	<i>H. weberi</i> Hora: BORNEO.
1. Standard length 23 mm.	Standard length 42 mm.	Standard length 46 mm.
2. Head contained 4 in standard and 5 in total length.	Head contained 4.7 in standard and 5.9 in total length.	Head contained 4.3 in standard and 5.5 in total length.
3. Width of head 1.5 in its length.	Width of head 1.3 in its length.	Width of head 1.3 in its length.
4. Diameter of eye 4 in head and 1.8 in snout.	Diameter of eye 4.5 in head and 2.1 in snout.	Diameter of eye 3.8 in head and 1.8 in snout.
5. Inter-orbital width slightly more than diameter of eye.	Inter-orbital width equal diameter of eye.	Inter-orbital width slightly less than diameter of eye.
6. Least height of caudal peduncle contained about 2 times in its length.	Least height of caudal peduncle contained 2.1 times in its length.	Least height of caudal peduncle contained 2.1 times in its length.
7. Pelvics separated from anal opening by short distance.	Pelvics extend to anal opening.	Pelvics extend to anal opening.
8. D. 2/7; A. 2/5; P. 5/11; V. 2/6; L. 1.42-45.	D. 2/7/1; A. 1/5/1; P. 5/10/2; V. 2/7; L. 1.43-44.	D. 2/7; A. 2/5; P. 5/10/1; V. 2/7-8; L. 1.44-45.
9. <i>Colour in spirit</i> .—Ground colour light yellow, with a large number of minute dots of a chocolate black colour arranged in the form of five vertical bands along the sides. All fins with 1-2 vertical bands. In some specimens the bands run into one another in the mid-dorsal line, where light and dark bands alternate.	<i>Colour in spirit</i> .—Light brownish on the sides, the ventral surface being paler. A dark narrow brownish streak along the lateral line from behind the gill-openings to the centre of base of caudal. Caudal with 3 zigzagging dark bands. All fins with 2 dark bands.	<i>Colour in spirit</i> .—Olivaceous with a series of brownish spots along the dorsal surface, the posterior, spots of the series descend on the sides and form saddle-shaped bands. Snout marked with 4 short longitudinal streaks. Pectorals and pelvics with 2 black bands; 1-2 zigzagging bands across caudal.

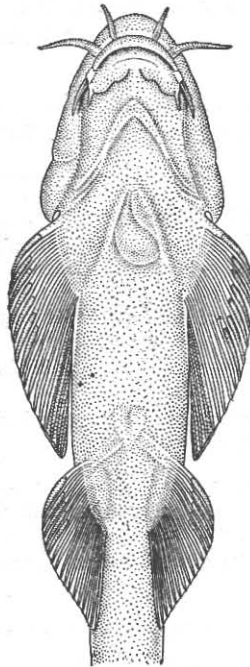
The isolation of these three forms from one another indicates the possibility of convergent evolution rather than any genetic affinities between them. Owing to the absence of enough material, it is not possible to give any specific name to the Indo-Chinese form.

**A juvenile Homalopterid specimen from Borneo**

D. 3/7 ; A. 1/4 ; P. 7/14 ; V. 5/11 ; C. 17.

A single juvenile specimen from Northern Sarawak, Borneo, has the following characters:—

Head and anterior part of body greatly depressed and ventrally flattened. Snout broadly rounded ; eyes superior with free orbital margins ; not visible from



TEXT-FIG. 1.—Ventral view of juvenile Homalopterid from Borneo  $\times 8$ .

ventral surface ; mouth inferior, transverse, slightly arched ; lips thin and non-papillated ; lower jaw naked anteriorly and provided with a sharp cutting edge. Lower jaw fits into a cavity of upper jaw. Lips continuous at angles of mouth. Labial fold interrupted in centre. Four pairs of barbels ; outer rostral barbels longer than inner ; a pair of barbels at each corner of mouth. Gill-openings extend to opposite base of pectoral fin.

Dorsal 3/7 ; commencement in advance of origin of pelvics, and placed nearer base of caudal than tip of snout. Anal 1/4, small, situated considerably behind free extremity of pelvics. Paired fins broad and horizontally placed.

Pectorals vertical in inner 1/3 and horizontal in outer 2/3 ; provided with 21 rays and pelvics with 16 rays. Pelvics free from each other and not uniting to form a disc like structure. Caudal with 17 rays.

This specimen is characterized by the following diagnostic features:—

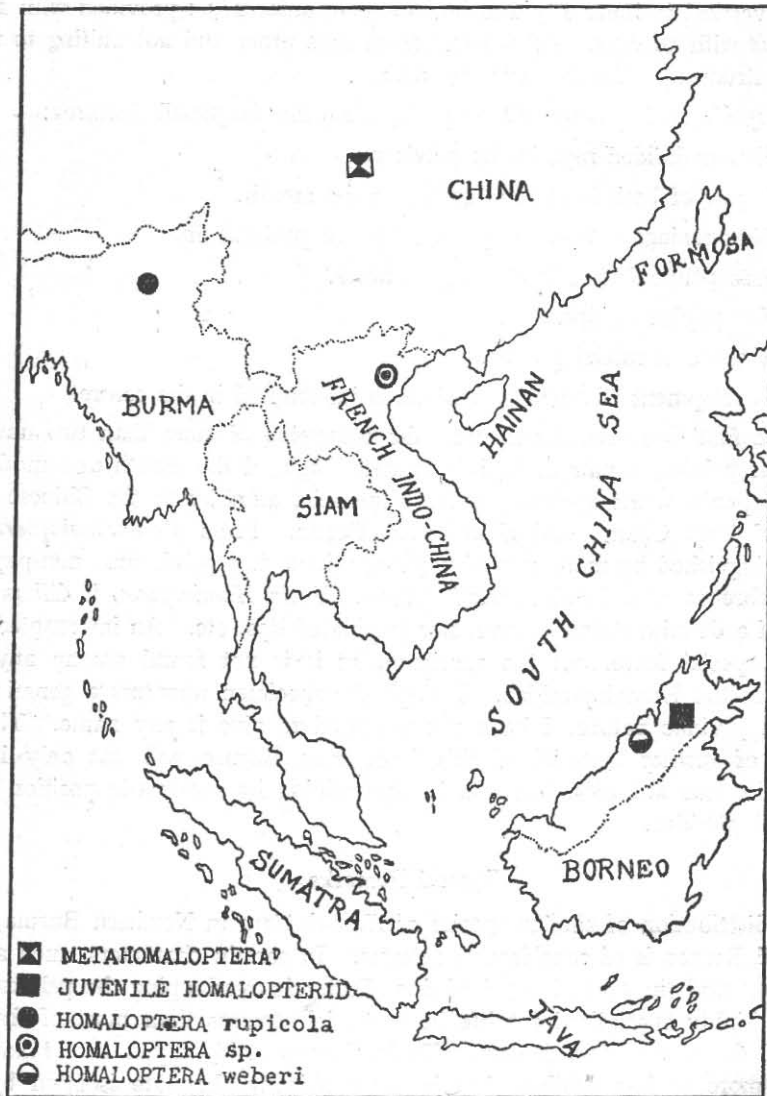
1. Five undivided rays in the pelvic fin.
2. A pair of barbels at each corner of the mouth.
3. Gill-openings extend to opposite base of pectoral fin.
4. Free pelvic fins with convergent bases.
5. Non-papillated lips.
6. Absence of rostral groove.
7. Development of labial fold which is interrupted in the centre.

In the first three characters, *viz.*, the possession of more than two undivided rays in the pelvics, a pair of barbels at each angle of the mouth and moderately small gill-openings, the specimen shows superficial affinities to the Chinese genera *Metahomaloptera* Chang, and *Hemimyzon* Regan. From *Metahomaloptera*, it is easily distinguished by more extensive gill-openings, free pelvic fins, non-papillated lips and absence of a definite rostral groove. From *Hemimyzon*, it differs in the absence of a definite rostral groove, non-papillated lips, etc. An interrupted labial fold is a special feature of the specimen, as it is not found among any other members of the Homalopteridae. Though the specimen warrants a generic rank, due to its juvenile nature, I have not ventured to give it any name. The procurement of further material of this form from Borneo will not only help to elucidate its true affinities, but also in determining its systematic position among the Homalopteridae.

#### General Remarks

The distribution of similar species of *Homaloptera* in Northern Burma, Indo-China and Borneo is of considerable interest. In certain characters, such as (i) a broad snout and (ii) extensive paired fins (Pectorals overlapping the pelvics), they are more highly specialized for life in torrential streams than most of the other species of the genus *Homaloptera*. Their diagnosis also shows that taxonomically they are more or less similar, though geographically they are isolated by wide distances. From the distribution of the genus *Homaloptera* and its rate of speciation, it is evident that the genus is throwing out adaptive radiations at a rapid rate. Further proof of this is seen in the high percentage of endemic species met with in the Malay Peninsular and in the Islands of the Archipelago. In Malay Peninsula 2 out of 4 species, in Sumatra 6 out of 11 species and in Borneo 3 out of 7 species of *Homaloptera* are at present known to be endemic. This indicates that in each minor geographical division, species of *Homaloptera* have evolved in a relatively shorter time.

The following possible explanations may be advanced to account for the occurrence of the three closely allied forms of *Homaloptera* in Burma, Indo-China



TEXT-FIG. 2.—Map showing the distribution of identical species of *Homaloptera*; the juvenile Homalopterid and the genus *Metahomaloptera*.

and Borneo. It is now known that to the *Homaloptera*, which reached the islands of the Malay Archipelago, the Indo-Malayan trend of mountains facilitated their southward dispersal from their ancestral home in Southern China, viz., Yunnan. The possibility of similar species of *Homaloptera* occurring as the result of an early movement to Burma, Indo-China and Borneo, from Yunnan as the centre has to be ruled out, for the fast rate of speciation of the genus would not favour such a view, as specific differentiations would have set in before it could reach Borneo.

An alternative explanation would be that this specialized *Homaloptera* which differentiated from more primitive stock of *Homaloptera* from Yunnan would at some later date have migrated to Northern Burma, Indo-China and Borneo. Being already highly specialized for life in torrential streams, further speciation would not have taken place. The existing river-systems in South Eastern Asia would permit their dispersal from the neighbourhood of Yunnan to Indo-China. But the time factor would stand in the way of accounting for its occurrence in such a widely separated place like Borneo.

The most plausible explanation that can be adduced to account for their present day distribution is that they have independently originated in Northern Burma, Indo-China and Borneo, from less specialized stock of *Homaloptera*. Their highly adaptive features for life in the torrential waters and the rapid rate of speciation of the genus lend support to such a view.

In addition, the occurrence of a peculiar Homalopterid in Borneo is also of interest in that it throws more light as to the independent origin of certain forms of fishes there. *Metahomaloptera* and *Hemimyzon*, to which genera the form shows superficial resemblance, are confined to the mainland of China and to Formosa. Zoogeographical evidences do not show that there ever was a migration of torrential fauna directly from China and Formosa to Borneo in the south after the Pliocene. The volcanic activities in Borneo and the exacting conditions of the torrential medium may be attributed as factors facilitating rapid adaptive changes in the torrential fauna, especially in fishes like the Homalopteridae. Recently Hora (1951) has shown that there has been parallel evolution in the *Gastromyzonid* fishes on the Chinese mainland and in the island of Borneo. It is also known that some of the Homalopterid genera, such as, *Bhavana* Hora, *Travancoria* Hora, *Balitoropsis* Smith, *Metahomaloptera* Chang etc., have evolved independently from less specialized Homalopterid stocks. Hence it would seem probable that the specimen from Borneo is also one such independent offshoot from some evolving Homalopterid stock, and as stated above, the procurement of further material of this form would help in unravelling many facts concerning its systematics and zoogeography.

#### Acknowledgement

My grateful thanks are due to Dr. S. L. Hora, Director, Zoological Survey of India, for placing this valuable material at my disposal for study, and for his helpful suggestions and guidance in the preparation of this note.

#### References

- HORA, S. L. 1951. Parallel Evolution of the *Gastromyzonid* Fishes of the Mainland of Asia and in the Island of Borneo. *Evolution* (in press).
- PRASHAD, B. and MUKERJEE, D. D. 1929. The Fish of the Indawgyi Lake, and the streams of the Myitryina District (Upper Burma). *Rec. Ind. Mus.*, XXXI, pp. 188-190.