AMERICAN MUSEUM
Novitates

PUBLISHED BY
THE AMERICAN MUSEUM
OF NATURAL HISTORY
CENTRAL PARK WEST AT 79TH STREET
NEW YORK, N.Y. 10024 U.S.A.

NUMBER 2654 AUGUST 23, 1978

RICHARD P. VARI AND J. BARRY HUTCHINS

New Species of Terapon Perches (Percoidei, Teraponidae) from Australia

AMERICAN MUSEUM
Novitates

PUBLISHED BY THE AMERICAN MUSEUM OF NATURAL HISTORY
CENTRAL PARK WEST AT 79TH STREET, NEW YORK, N.Y. 10024
Number 2654, pp. 1-8, figs. 1-9 August 23, 1978

New Species of Terapon Perches (Percoidei, Teraponidae) from Australia

RICHARD P. VARI[1] AND J. BARRY HUTCHINS[2]

ABSTRACT

Two new species of freshwater teraponids, *Syncomistes rastellus* and *Hephaestus epirrhinos*, are described from the Kimberley region of northwestern Australia.

INTRODUCTION

The species of the family Teraponidae, commonly termed the terapon perches or grunters, are the third largest freshwater Australian fish group (Lake, 1971) and most diverse in the Kimberley region of northwestern Australia where eight of the 18 freshwater Australian species recognized in the most recent familial revision occur (Vari, 1978). While participating in an expedition to the Drysdale River National Park, North Kimberley, in August 1975, one of us (J.B.H.) collected specimens of two freshwater teraponid species which were subsequently found to be undescribed. One of the species is herein assigned to *Hephaestus*, a genus occurring over much of northern Australia and southern New Guinea, and the other to *Syncomistes*, a genus endemic to northwestern Australia.

METHODS: Counts and measurements were made following the procedures outlined in Vari (1978).

Syncomistes rastellus, new species

Figure 1

HOLOTYPE: Western Australian Museum (WAM) P25723-001, 100 mm. standard length (SL), obtained with rotenone by D. E. Rosen, G. J. Nelson, and W. H. Butler, April 25, 1969, in North Creek, a tributary to the Gibb River, on the road to Drysdale Crossing (approx. lat. 16°12′S, long. 126°30′E).

PARATYPES: American Museum of Natural History (AMNH) 36419, three specimens, 44-95 mm. SL, taken along with the holotype; three specimens (WAM P25402-004), 74-84 mm. SL, were collected by J. B. Hutchins, August 3, 1975, in the Drysdale River; three specimens (WAM P25404-010), 66-81 mm. SL, were collected with a seine net by J. B. Hutchins, August 4, 1975, in a pool and rapids in the Drysdale River; one specimen (WAM P25405-007), 85 mm. SL, was collected with

[1]NATO Postdoctoral Fellow, Department of Zoology, British Museum (Natural History); Division of Fishes, National Museum of Natural History, Washington, D.C.
[2]Assistant Curator of Fishes, Western Australian Museum, Perth.

ISSN 0003-0082 / Price 80 cents

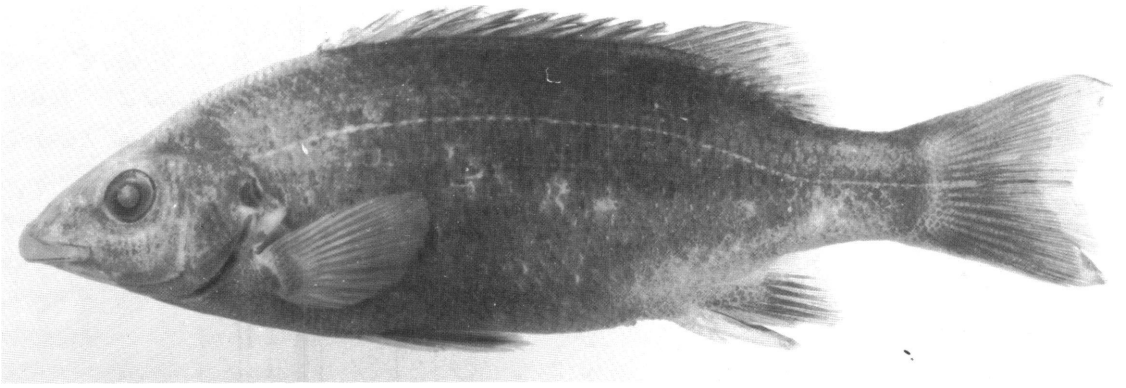

FIG. 1. *Syncomistes rastellus*, new species, holotype WAM P-25723-001, 100 mm. SL.

rotenone by J. B. Hutchins, August 5, 1975, in a small flowing pool in Mogurnda Creek, about 0.5 km. above its junction with the Drysdale River; 13 specimens (AMNH 36420 and WAM P25410-004), 72-125 mm. SL, were collected with rotenone by J. B. Hutchins, August 5, 1975, in a swift flowing pool in the Drysdale River. For further information on the 1975 collecting sites, see Hutchins (1977).

ETYMOLOGY: The trivial name, *rastellus*, from the Greek for rake, refers to the rakelike dentition of the species.

DIAGNOSIS: This species is assignable to the genus *Syncomistes* on the basis of the series of marked modifications of the jaws, dentition, axial skeleton, and internal anatomy unique to the genus among teraponids (see Vari, 1978). Within *Syncomistes*, *S. rastellus* is distinguished by having 19 to 21 gill rakers on the lower limb of the first gill arch (in contrast to 16 in *S. kimberleyensis*; 15 or 16 in *S. trigonicus*; and 15 to 18 in *S. butleri*), a reduced lower jaw having a triangular form from the ventral aspect (in contrast to the rounded jaw form in *S. butleri* and *S. kimberleyensis* [adult condition unknown for the latter]), and in the number of teeth on each side of the upper and lower jaws (see figs. 2 and 3 for comparisons with *S. butleri* and *S. trigonicus*).

DESCRIPTION: (Numbers in parentheses are the examined specimens with a given count.) dorsal-fin spines and rays XII-11(7), XII-12(13), XIII-10(1), XIII-11(3); anal-fin spines 3, rays 7(5), 8(17), 9(2); pectoral-fin rays 13 to 16; pelvic fin I-5; lateral line scales from origin at supracleithrum to hypural joint 45(4), 46(4), 47(6), 48(9), 49(1); three to six caudal scales; transverse scale series to base of dorsal sheath at median dorsal-fin spines 6+1+14(1), 6+1+15(11), 6+1+16(9), 7+1+16(2); 10 to 15 predorsal scales to occiput; cheek scales in three rows; sheath at base of spinous dorsal fin con-

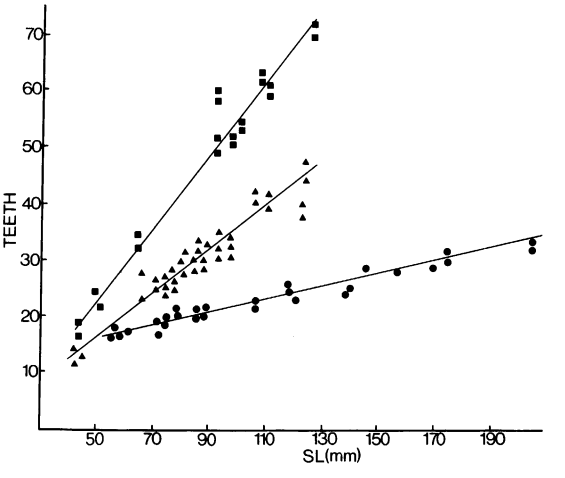

FIG. 2. Graph of number of teeth on each side of upper jaw against standard length for *Syncomistes trigonicus* (squares), *S. rastellus* (triangles), and *S. butleri* (circles) with regression lines for each species (some symbols represent more than one data point; r^2 = .95 or above, regression lines significantly different [P = .05]).

sisting of one or two irregular rows, sheath extending to fifth to seventh dorsal-fin rays; sheath at base of anal fin consisting of three to five rows of scales, sheath extending to fourth anal-fin ray; gill-rakers on first arch 8–11+-1+19–21; vertebrae 11+14.

Reaching 125 mm. SL; greatest body depth 2.7-3.35 in SL; distance from origin of spinous dorsal fin to snout 2.5-2.74 in SL; head length (HL) 3.30-3.60 in SL; length of base of dorsal fin 1.80-1.95 in SL; snout length 2.25-2.90 in HL; eye width 3.70-5.20 in HL; jaw length 2.70-3.80 in HL; length of longest dorsal-fin spine 1.70-2.60 in HL; length of longest dorsal-fin ray 1.75-2.60 in HL; length of longest anal-fin spine 1.33-2.20 in HL; length of longest anal-fin ray 1.50-2.00 in HL.

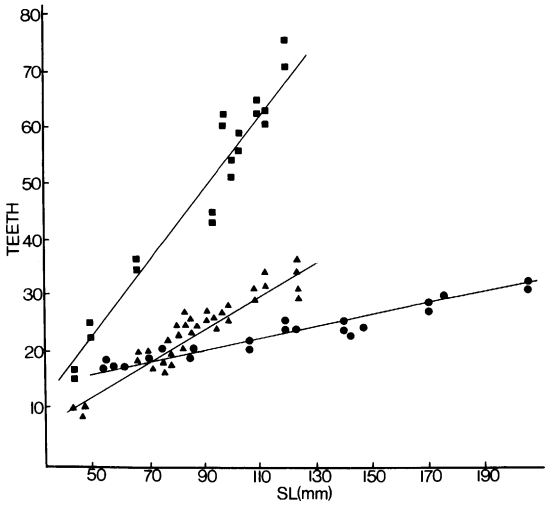

FIG. 3. Graph of number of teeth on each side of lower jaw against standard length for *Syncomistes trigonicus* (squares), *S. rastellus* (triangles), and *S. butleri* (circles) with regression lines for each species (some symbols represent more than one data point; r^2 = .95 or above, regression lines significantly different [P = .05]).

Body moderately deep, increasingly so with age. Dorsal and ventral profiles almost evenly arched. Interorbital region smooth. Snout distinctly pointed in adults. Maxillary reaching to vertical through posterior nostril. Upper jaw slightly more fleshy and longer than lower. Lower jaw triangular when viewed from ventral aspect, reduced, flattened, with teeth pointing laterally. Upper jaw with a greater number of teeth than lower. Outer row of teeth brown tipped and of irregular heights; followed internally by a narrow band of smaller similarly shaped teeth. Lower jaw with a prominent dorsally projecting median symphyseal bump; bump corresponds in shape to and inserts into a groove between premaxillaries. Both bump and depression endentulous. No teeth on vomer or palatines. Nostrils separated by a distance equal to one and one-half times diameter of posterior nostril. Both nostrils with free cutaneous edges, anterior tubelike. Lacrimal (first infraorbital) with three or four coarse serrations. Preoperculum weakly serrate, more so along vertical

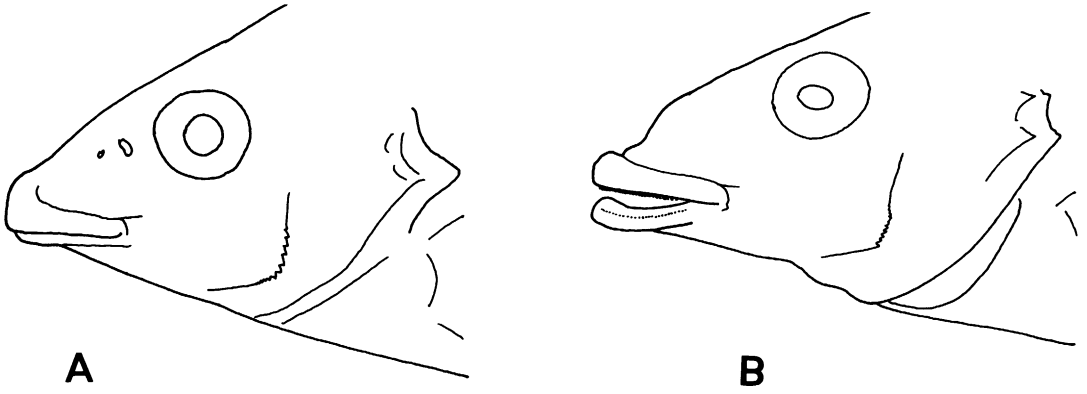

FIG. 4. Heads of *Syncomistes rastellus* (A) and *S. trigonicus* (WAM P-25026-002, 112 mm. SL) (B) showing differences in head form.

edge. Lower opercular spine longer and stronger, not extending beyond edge of opercular lobe. Cleithrum exposed, weakly serrate in some individuals; with scales on side. Supracleithrum exposed. Posttemporal exposed; serrate along posterior edge. Extrinsic swimbladder muscle arising from rear of skull and ventral process of posttemporal. Swimbladder transversely constricted; incompletely divided into two chambers. Intestinal pattern highly convoluted; large amount of looping to left of stomach.

Spinous dorsal fin low, arched, first spine short; fifth to seventh spines longest, those following decreasing gradually in length to penultimate which is slightly shorter than ultimate. Soft dorsal fin with a straight posterior border. Second anal-fin spine longest, twice length of first; stronger and slightly longer than third. Soft anal fin angular, with straight or slightly concave border. Pelvic fins pointed; first ray longest, reaching two-thirds distance to anus in juveniles, one-half distance in adults. Pectoral fins asymmetrically pointed, fifth ray longest. Caudal fin emarginate.

COLORATION: In preservative juveniles have a light brown head and body coloration with a longitudinal stripe running from supracleithrum to caudal fin base. Anal fin in juveniles with a blotch on anterior rays. All other fins clear. Adult body and head coloration darker. Body dark brown or grey dorsally and slightly lighter ventrally (fig. 1). Head darker interorbitally from tip of snout to rear of skull. Opercle dark. Head light ventrally. Fins dusky; anal fin in some individuals with a basal blotch.

COLOR IN LIFE: Head, body, and fins blackish gray to greenish gray with scale centers paler. After death this coloration usually fades to a yellowish green or yellow with the ventral surface of head and body white.

DISTRIBUTION: *Syncomistes rastellus* is presently known only from the Drysdale River drainage system (fig. 5).

ECOLOGY: Observed swimming in schools with *Syncomistes trigonicus* and grazing on algae-covered rocks. It favors large rivers rather than small tributaries, particularly in areas of flowing waters and occurs in clear to murky waters over a variety of bottoms.

REMARKS: Within the genus *Syncomistes*, *S. rastellus* is hypothesized to be the sister species of *S. trigonicus*, with which it shares the apomorphic characters of the reduced triangular form of the lower jaw and a marked increase in the number of teeth in each jaw with age (see figs. 2 and 3). However, it is distinguishable from that species both in the absolute number of teeth and in general head form (fig. 4). The question of the exact relationship of this species to *S. kimberleyensis* is not presently resolvable due to a lack of adult material of the latter species.

Hephaestus epirrhinos, new species
Figure 6

HOLOTYPE: WAM P25724-001, 99 mm. SL, was obtained with rotenone by J. B. Hutchins, August 7, 1975, in a swift flowing pool in the Drysdale River (approx. lat. 15°01′S, long. 126°54′E).

PARATYPES: Three specimens (WAM P25410-001), 66-113 mm. SL, taken with the holotype; one specimen (WAM P25403-002), 253 mm. SL, collected with a seine net by J. B. Hutchins, August 3, 1975, in the Drysdale River; six specimens (WAM P25404-003 and AMNH 36418), 40-179 mm. SL, obtained with rotenone by J. B. Hutchins, August 4, 1975, in a small pool and rapids in the Drysdale River; one specimen (WAM P25407-003), 72 mm. SL, obtained with rotenone by J. B. Hutchins, August 6, 1975, in a side channel to the Drysdale River; two specimens (WAM P25421-001), 195-310 mm. SL, obtained with rotenone by J. B. Hutchins, August 8, 1975, in a small flowing pool in Palmoondoora Creek. For further information on the collecting sites see Hutchins (1977).

ETYMOLOGY: The trivial name, *epirrhinos*, from the Greek for long-nosed, refers to the elongate snout of this species.

DIAGNOSIS: This species is assignable to the genus *Hephaestus* on the basis of its exposed, serrate posttemporal, the presence of two spines on the first proximal dorsal pterygiophore, the longest dorsal spines in adults being shorter than the longest dorsal rays, the insertion of two proximal dorsal pterygiophores between successive neural spines, and a posterior insertion of the dorsal fin relative to the neural

spines. Within the genus, *H. epirrhinos* is distinguishable in having 25 vertebrae, 14 to 17 gill rakers on the lower limb of the first gill arch (in contrast to 27 vertebrae and 9 to 12 gill-rakers for *H. trimaculatus, H. adamsoni, H. suavis, H. raymondi, H. transmontanous, H. obtusifrons,* and *H. carbo*), an interrupted lip fold on the lower lip (in contrast to a continuous fold in *H. jenkinsi*), and 8 or 9 scales above the lateral line (in contrast to 5 to 7 in *H. roemeri*). It is distinguishable from the remaining species in the genus, *H. fuliginosus* (and all other members of the genus), in its elongate snout and the elongate shallow head (see figs. 7 and 8 for plots of the relative proportions of the head length, head depth, and snout length for *H. epirrhinos* and *H. fuliginosus*). Finally, whereas in *H. fuliginosus* the lacrimal (first infraorbital) is of approximately equal proportions vertically and horizontally, in *H. epirrhinos* it is distinctly elongate horizontally with the median sensory canal distally divided (fig. 9), a condition not found in any *H. fuliginosus* examined.

DESCRIPTION: (Numbers in parentheses are the examined specimens with a given count.) dorsal-fin spines and rays XI-12(3), XII-11(5), XII-12(4), XII-13(1), XIII-11(1); anal-fin spines 3, rays 7(2), 8(9), 9(3); pectoral-fin rays 14 to 16; pelvic fin I-5; lateral line scales from origin

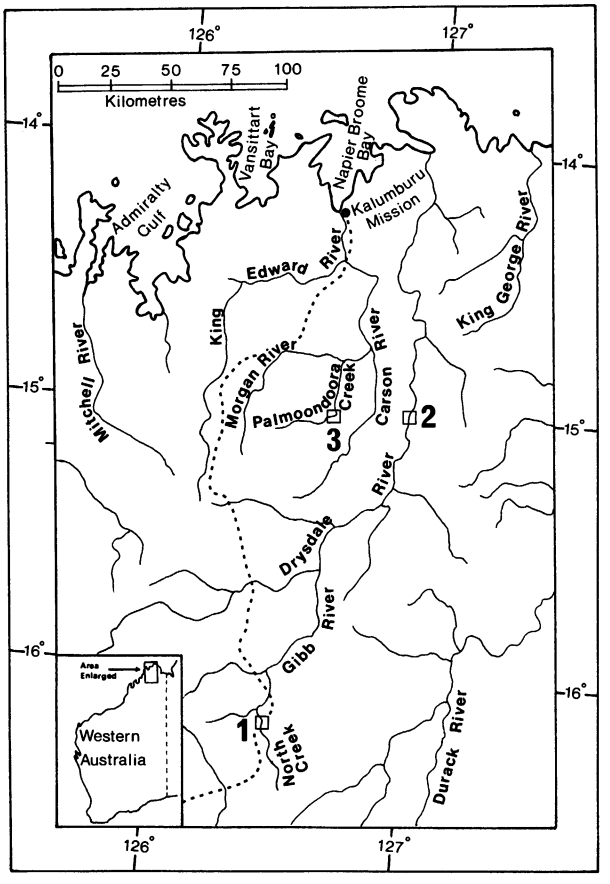

FIG. 5. Map of the Drysdale River area, northern Western Australia, showing the collection localities for the following specimens (dotted line depicts the road to Kalumburu Mission); 1, collection locality of holotype and three paratypes of *Syncomistes rastellus*; 2. region of collection of 20 paratypes of *S. rastellus* and holotype and 11 paratypes of *Hephaestus epirrhinos*; 3, collection locality of two paratypes of *H. epirrhinos*.

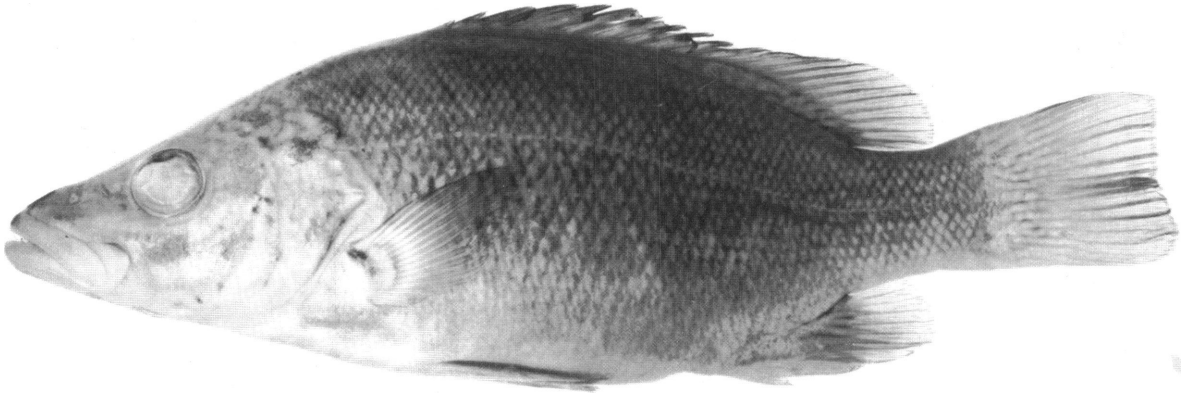

FIG. 6. *Hephaestus epirrhinos*, new species, holotype WAM P-25724-001, 99 mm. SL.

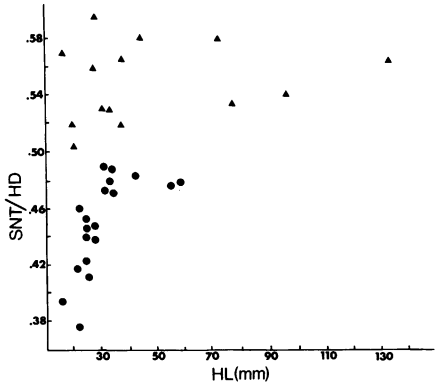

FIG. 7. Plot of snout length/head depth against head length for *Hephaestus fuliginosus* (circles) (AMNH 32438, 18540, 35656, 35660) and *H. epirrhinos* (triangles) (see list of type material).

at supracleithrum to hypural joint 48(1), 49(3), 50(3), 51(3), 52(1), 53(1), 54(2); five to nine caudal scales; transverse scale series to base of dorsal sheath at median dorsal-fin spines 8+1+15(8), 8+1+16(3), 8+1+17(1), 9+1+16(1), 9+1+17(1); 10 to 14 predorsal scales to occiput; cheek scales in six or seven rows; two to four rows of scales in sheath at base of spinous dorsal fin, sheath extending to seventh to last dorsal ray; four or five rows of scales in sheath at base of anal fin, sheath extending to fifth to last anal ray; gill-rakers on first arch 6–9+1+14–17; vertebrae 10+15.

Reaching 310 mm. SL; greatest body depth 2.60-3.25 in SL; distance from origin of spinous dorsal fin to snout 2.10-2.35 in SL; head length 2.30-2.70 in SL; length of base of dorsal fin 2.07-2.33 in SL; snout length 2.60-3.05 in HL; eye width 3.95-7.4 in HL; length of longest dorsal-fin spine 2.80-4.90 in HL; length of longest dorsal-fin ray 2.10-2.95 in HL; length of longest anal-fin spine 2.30-3.75 in HL; length of longest anal-fin ray 2.15-3.10 in HL.

Body relatively shallow, compressed. Dorsal profile more pronounced than ventral. Dorsal profile nearly straight from snout to dorsal origin. Ventral profile only slightly curved from tip of lower jaw to pelvic insertion. In juveniles profile straight from pelvic fin insertion to anus, slightly curved in adults. Interorbital region smooth. Lower jaw slightly longer than upper. Gape oblique. Maxillary reaching to vertical through posterior nostril. Teeth relatively small, in bands, outer row enlarged, brown tipped. Internal to this there are several series of colorless teeth embedded in flesh of mouth. No teeth on vomer or palatines. Nostrils distant, separated by a distance equal to one-half eye diameter. Lacrimal (first infraorbital) elongate (see fig. 9) with three or four serrations along posterior edge. Preoperculum serrate; serrations largest on vertical edge. Lower opercular spine longer and stronger, not extending beyond edge of opercular lobe. Posttemporal exposed, serrate posteri-

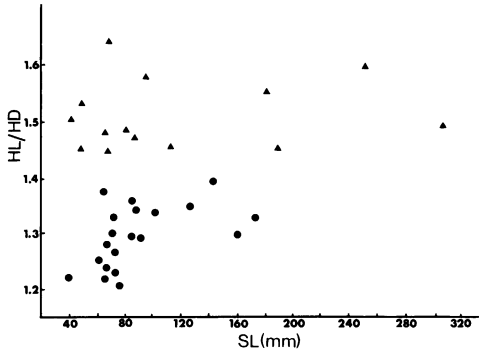

FIG. 8. Plot of head length/head depth against standard length for *Hephaestus fuliginosus* (circles) and *H. epirrhinos* (triangles) (see figure 7 for specimen information).

orly, not covered with scales. Cleithrum exposed, weakly serrate posteriorly, with few or no scales on side. Supracleithrum exposed. Extrinsic swimbladder muscle attaching to rear of skull and ventral process of posttemporal. Swimbladder divided into two subchambers by a transverse constriction.

Spinous dorsal fin arched, fifth spine longest, those following decreasing in length gradually to penultimate which is subequal to ultimate. Soft dorsal fin obtusely rounded. Second anal-fin spine longest, twice length of first, slightly longer than, but much stronger than third, shorter than longest anal ray. Soft anal-fin margin rounded. Pectoral fin asymmetrically pointed, fourth to sixth rays longest. Pelvic fins pointed; first ray longest in juveniles, subequal to second ray in adults, reaching two-thirds of distance to anus. Caudal fin emarginate.

COLORATION: In preservative the juveniles are light grayish brown with specimens up to 50 mm. SL having traces of longitudinal vermiculations on rear of body and caudal peduncle. Spinous and soft dorsal fins and soft anal fin dark, other fins clear. Overall head and body coloration darker with age. Individuals over 150 mm. SL very dark, lighter ventrally. All fins except pelvics and pectorals very dark. Pectoral fins with a dark spot at base. Specimens of 300 mm. SL nearly black overall.

COLOR IN LIFE: Head, body, and fins of adults black, blackish brown, or blackish green with scale centers paler. Juveniles green with dark green longitudinal vermiculations on upper portions of head and body and along caudal peduncle; vermiculations continue basally onto dorsal and caudal fins. After death, coloration may fade to yellowish green or yellow.

DISTRIBUTION: Known only from the Drysdale River and nearby Palmoondoora Creek, a tributary of the Morgan River (fig. 5).

ECOLOGY: In areas where *Hephaestus epirrhinos* was collected it was the dominant carnivore among the fish species present. It favors large rivers, although numerous large specimens (to 320 mm. SL) were found in the large pool at the base of Morgan Falls on Palmoondoora Creek.

REMARKS: On the basis of the characters noted in the diagnosis this species is assignable to the genus *Hephaestus*. However, *H. epirrhinos* lacks a series of apomorphic states of the extrinsic swimbladder muscle, vertebral counts, and posttemporal and tabular osteology uniting *H. adamsoni, H. raymondi, H. transmontanous, H. obtusifrons, H. trimaculatus, H.*

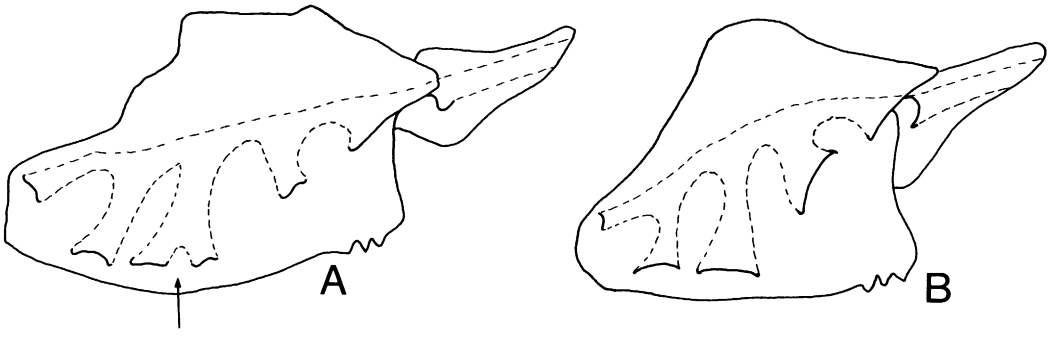

FIG. 9. Lacrimals of *Hephaestus epirrhinos* (A) and *H. fuliginosus* (B).

carbo, and *H. suavis* into a monophyletic subgroup within the genus (see discussion of the subunits of *Hephaestus* in Vari [1978]). Among the remaining species in the genus, it would appear to be most similar, although not necessarily most closely related to *H. fuliginosus*.

ACKNOWLEDGMENTS

The American Museum-Australian expedition to Western Australia which collected part of the type series of *Syncomistes rastellus* was made possible by the generous financial support provided by Mr. James Greenway, Jr. of the Department of Ornithology of the American Museum. The remaining material was collected by one of us (J.B.H.) on the expedition to the Drysdale River National Park, North Kimberley, of the Department of Fisheries and Wildlife, Perth, Western Australia. Research associated with this project was carried out at the American Museum of Natural History, Western Australian Museum, and British Museum (Natural History) partially supported by a NATO-NSF Postdoctoral Fellowship to the senior author. Dr. D. E. Rosen of the American Museum and Mr. G. J. Howes of the British Museum offered helpful suggestions on earlier drafts of the manuscript. The assistance of the above individuals and institutions is gratefully acknowledged.

LITERATURE CITED

Hutchins, J. Barry
1977. The freshwater fish fauna of the Drysdale River National Park, North Kimberley, Western Australia. *In* Kabay, E. D., and A. A. Burbridge (eds.), A biological survey of the Drysdale River National Park, North Kimberley, Western Australia in August, 1975. Wildlife Res. Bull. West. Australia, no. 6, pp. 102-109.

Lake, John S.
1971. Freshwater fishes and rivers of Australia. Sydney, Thomas Nelson Ltd., 61 pp.

Vari, Richard P.
1978. The *Terapon* perches (Percoidei; Teraponidae). A cladistic analysis and taxonomic revision. Bull. Amer. Mus. Nat. Hist., vol. 159, pp. 175-340.