

Amphiprion leucokranos, a New Species of Pomacentrid Fish, with Notes on Other Anemonefishes of New Guinea¹

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ABSTRACT: A new species of anemonefish, *Amphiprion leucokranos*, is described from Madang, New Guinea and Fergusson Island, D'Entrecasteaux Group. The species is closely related to *A. sandaracinos* Allen, but differs in color pattern and several morphological features. Notes are included on the anemone hosts, abundance, local distribution, color pattern, and zoogeography of the eight species of *Amphiprion* at Madang.

THE FISHES of Papua New Guinea are still poorly known in spite of the recent effort by Munro (1967). He listed a total of 51 members belonging to the families Premnidae, Amphiprionidae, Pomacentridae, Abudefdufidae, and Chromidae (these families collectively included in Pomacentridae by most authors). Three months of collecting along the northeast coast of New Guinea (Madang to Samarai including the D'Entrecasteaux Islands) by Walter A. Starck II and myself yielded 97 species of pomacentrids. These collections contain several undescribed species including six specimens of a new anemonefish which is described below. It belongs to the subgenus *Amphiprion* as defined in my 1972 revision of the anemonefishes.

Measurements of the holotype and paratypes were made with a needlepoint dial caliper to the nearest one-tenth of a millimeter. The methods used for counting and measuring are described in detail in Allen (1972).

Type material has been deposited at the Australian Museum, Sydney (AMS), and the United States National Museum, Washington, D.C. (USNM).

I would like to express my appreciation to Walter A. Starck II for critically reviewing the manuscript and to my wife Connie for typing assistance.

Amphiprion leucokranos sp. nov.

Figs. 1, 2a, and 3; Table 1

Holotype

USNM 207358, 62.1 mm standard length, collected with quinaldine and dip nets on the outer reef front off the northern end of Kranket Island (lat. 5° 11' 24" S, long. 145° 50' 54" E), Madang, New Guinea, in 7 meters by G. R. Allen on 13 April 1972.

Paratypes

USNM 207359, two specimens, 11.2 and 16.8 mm standard length, same collecting data as the holotype; AMS I.16484-001, 27.9 mm standard length, collected with quinaldine and dip nets from Tab lagoon on west side of Sinub Island, 5 nautical miles north of Madang, New Guinea, in 2 meters by G. R. Allen on 14 May 1972; AMS I.16483-001, two specimens, 16.2 and 58.0 mm standard length, collected with multiprong spear and quinaldine off north side of Naura Islet, Seymour Bay, Fergusson Island, D'Entrecasteaux Group, in 2 meters by G. R. Allen on 30 May 1972.

Diagnosis

Amphiprion leucokranos displays the following combination of characters: a single broad white bar behind the eye; body depth greater than 2.1 in the standard length; pelvic and anal fins pale; soft dorsal rays 18 to 19; soft anal rays 13 or 14; teeth conical.

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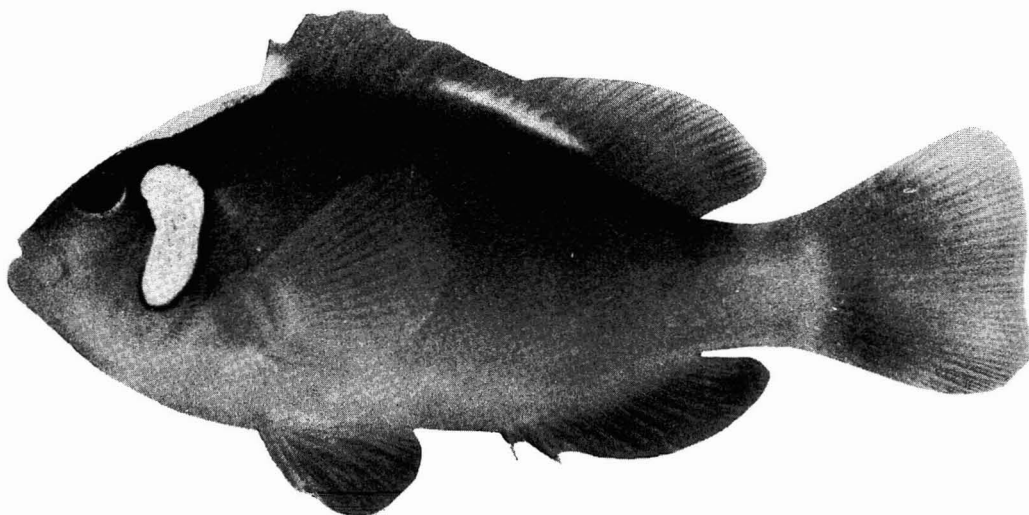


FIG. 1. *Amphiprion leucokranos*, holotype, standard length 62.1 mm.

TABLE 1

MEASUREMENTS (IN THOUSANDTHS OF THE STANDARD LENGTH) OF THE HOLOTYPE AND LARGEST PARATYPE OF *Amphiprion leucokranos*

CHARACTERS	HOLOTYPE USNM 207358	PARATYPE AMS I.16483-001
Standard Length (mm)	62.1	58.0
Greatest Body Depth	463	486
Head Length	290	313
Snout Length	81	92
Eye Diameter	71	90
Interorbital Width	81	86
Least Depth of Caudal Peduncle	168	176
Length of Caudal Peduncle	148	141
Snout to Origin of Dorsal Fin	360	376
Snout to Origin of Anal Fin	624	649
Snout to Origin of Pelvic Fin	377	380
Length of Dorsal Fin Base	580	555
Length of Anal Fin Base	263	259
Length of Pectoral Fin	263	270
Length of Pelvic Fin	218	242
Length of Pelvic Spine	143	155
Length of First Dorsal Spine	71	79
Length of Second Dorsal Spine	100	104
Length of Third Dorsal Spine	113	111
Length of Last Dorsal Spine	68	73
Length of Longest Soft Dorsal Ray	161	152
Length of First Anal Spine	35	47
Length of Second Anal Spine	82	83
Length of Longest Anal Ray	134	133
Length of Caudal Fin	284	276

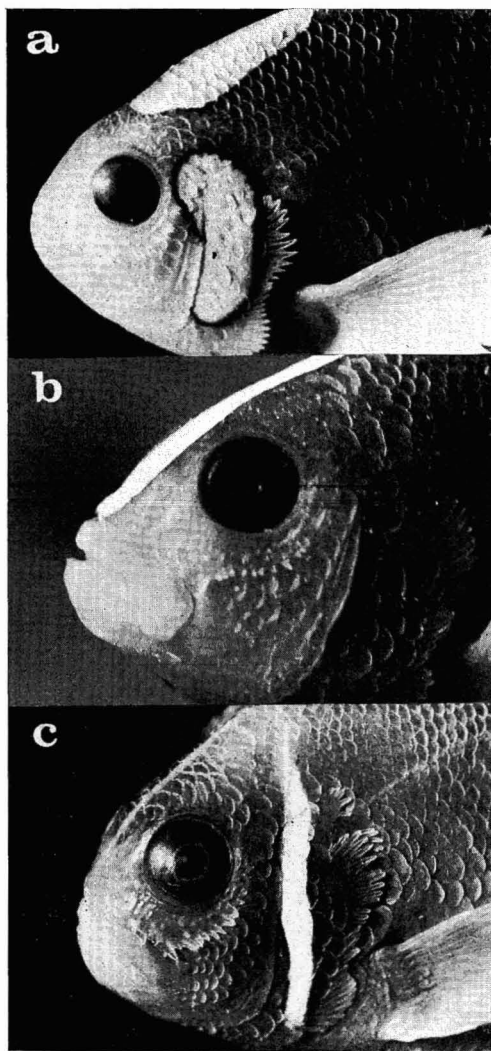


FIG. 2. Head markings of certain *Amphiprion*: a, *A. leucokeranos* (holotype); b, *A. sandaracinos*; c, *A. perideraion*.

Description

The proportions which appear below apply to the holotype and largest paratype only; however, the counts include all of the type material. Counts and proportions appearing in parentheses refer to the paratypes when these data differ from those of the holotype. Proportional measurements for the holotype and largest paratype are expressed in thousandths of the standard length in Table 1.

Dorsal rays IX,18 (IX,18 to 19); anal rays II,14 (II,13 to 14); pectoral rays 19 (19 to 20); gill rakers on first arch 20 (18 to 20); vertical scale rows 52 (50 to 52); horizontal scale rows from base of dorsal fin to lateral line 4 (not including small dorsal base sheath scales); from lateral line to origin of anal fin 19 (18 to 19); tubed lateral line scales 40 (35 to 39); predorsal scales about 19 to 20 (19 to 22), extending to anterior portion of interorbital; teeth conical, 32 in each jaw of the holotype.

The following description of the head spination applies only to the holotype. Spinules on posterior margin of interopercle, subopercle, and opercle well developed; interopercle spinules 10; subopercle spinules 15; opercle spinules 12; preopercle relatively smooth; suborbital spinules (including preorbital) 18; suprascapular spinules 4, in two small patches of two spinules each, above and below the lateral line origin.

Depth of body 2.2 (2.1), head 3.5 (3.2), both in the standard length. Snout 3.6 (3.4), eye 4.1 (3.5), interorbital 3.6, least depth of caudal peduncle 1.7 (1.8), length of caudal peduncle 2.0 (2.2), of pectoral fin 1.1 (1.2), of pelvic fin 1.3, of middle caudal rays 1.0 (1.1), all in the head length.

Single nasal opening on each side of snout; mouth oblique, nearly terminal; lateral line gently arched beneath dorsal fin, terminating three to four scale rows below base of posterior dorsal rays; snout, lips, and chin naked, remainder of head scaled; head and body scales finely ctenoid; small sheath scales covering about one-third to one-half of basal portion of pectoral, dorsal, anal, and caudal fins.

Origin of dorsal fin at level of pectoral fin base; spines of dorsal fin increasing in length to third or fourth spine, then gradually decreasing in length to last spine; length of first dorsal spine 4.1 (3.9), of second dorsal spine 2.9 (3.0), of third dorsal spine 2.7 (2.8), of ninth dorsal spine 4.3, of longest soft dorsal ray 1.8 (2.1), of first anal spine 8.2 (6.7), of second anal spine 3.5 (3.8), of longest soft anal ray 2.2 (2.4), all in the head length.

Color in alcohol: Head and body of holotype tannish, slightly darker dorsally; broad whitish bar on side of head, behind eye, extending from the dorsalmost level of the eye to the sub-

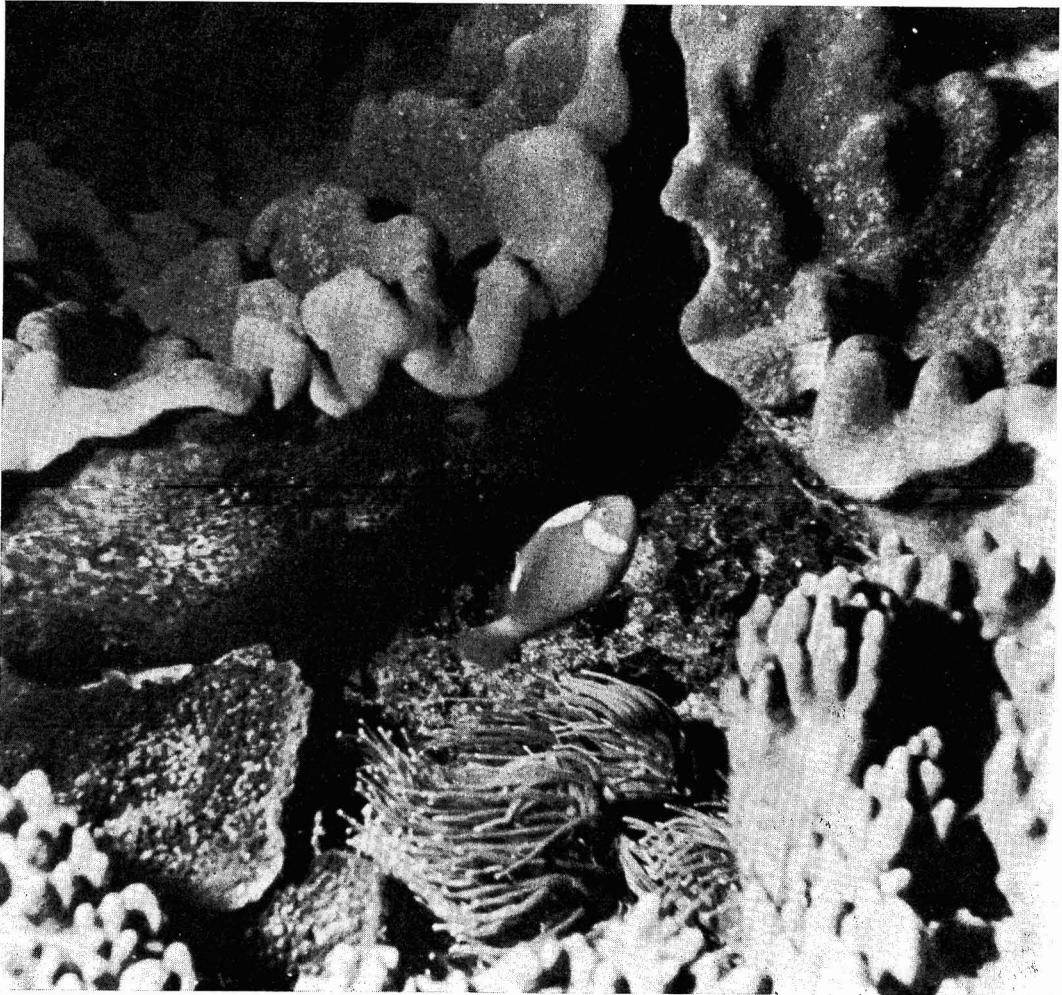


FIG. 3. Underwater flash photograph of the holotype of *Amphiprion leucokranos* with its anemone host, *Radianthus malu*. The photograph was taken at the type locality.

opercle-interopercle junction; broad teardrop-shaped stripe on forehead, rounded anteriorly and tapering to a point posteriorly, extending from the dorsal fin origin to the posterior portion of the interorbital region (see Fig. 2a); both the head bar and stripe with narrow black margins; whitish narrow stripe, about one-third eye diameter on dorsal base sheath, extending posteriorly from seventh dorsal spine to seventh soft dorsal ray; fins pale, slightly yellowish.

Color in life: Head and body dusky orange dorsally, yellow-orange ventrally; head bar, forehead stripe, and dorsal base stripe white; fins yellow-orange.

The color patterns of the paratypes are essentially similar to that of the holotype, except that the two largest paratypes are slightly darker, the head bar of each side on the 16.2-mm paratype is confluent with the forehead stripe, and the bar of one side is confluent with the stripe on the 16.8-mm specimen.

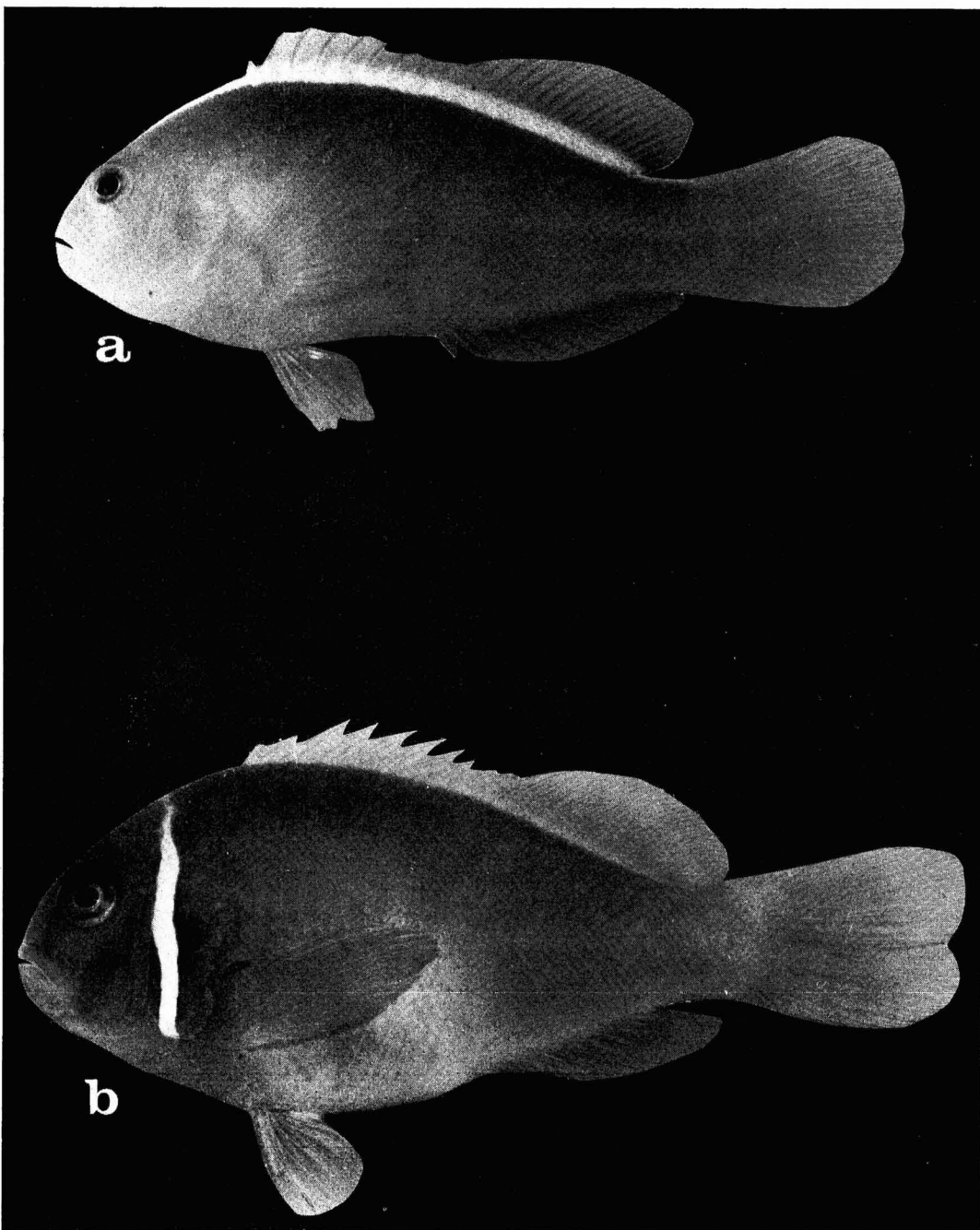


FIG. 4. *Amphiprion* which bear a resemblance to *A. leucokranos*: a, *A. sandaracinos*; b, *A. perideraion*.

Comparisons

The general morphology of this species aligns it closely with *A. sandaracinos* Allen, 1972 (Figs. 2*b* and 4*a*). Both are members of the low-bodied "akallopis complex" as defined in my revision. The collection of both species at Madang and Fergusson Island facilitated detailed comparisons. They differ distinctly in color pattern. *A. sandaracinos* also differs in number of soft anal rays (usually 12, compared to 13 or 14 for *leucokranos*), pectoral rays (16 to 18, compared to 19 or 20 for *leucokranos*), and gill rakers on the first arch (16 to 18, compared to 18 to 20 for *leucokranos*). The greater dorsal spine length of *leucokranos* is the only proportional character of value for separating the two species. The longest dorsal spine of *sandaracinos* fits 3.1 to 3.8 in the head length as opposed to 2.7 to 2.8 for *leucokranos*.

The specimens of *sandaracinos* which were observed at Madang and the D'Entrecasteaux Islands were associated with the giant anemone, *Stoichactis giganteum* Forskål, whereas the types of *leucokranos* were residing with *Radianthus malu* (Haddon & Shackleton). The live holotype is illustrated at the type locality in Fig. 3.

Amphiprion perideraion (Figs. 2*c* and 4*b*) is another member of the "akallopis complex" inhabiting the reefs of northeastern New Guinea. Its color pattern is similar to that of *leucokranos*, but it differs in several respects including number of dorsal fin rays (usually X, 16), pectoral rays (usually 17), and dentition (incisiform as opposed to the conical structure of *leucokranos* and *sandaracinos*).

Remarks

The characters indicated in the diagnosis would place *leucokranos* in subsection 23a of the key to the species of *Amphiprion* which appears in my 1972 revision. If added to the key, this species would appear as subsection 24c with the following key characters: pelvic and anal fins pale; soft dorsal rays 18; soft anal rays 13 or 14; pectoral rays 19; teeth conical.

The name *leucokranos* is of Greek derivation and means "white cap" or "white helmet" and refers to the characteristic color mark on the forehead.

NOTES ON THE *Amphiprion* OF MADANG, NEW GUINEA

Eight species of *Amphiprion* were collected at Madang and also at Goodenough and Fergusson islands in the D'Entrecasteaux Group. This is the greatest number of anemonefishes recorded for a given locality and surpasses the previous high of seven species recorded from the Philippines (Allen 1972). The following section is intended as a supplement to my recent revision of the anemonefishes and includes notes on anemone hosts, relative abundance, local distribution, color pattern, and zoogeography.

Anemonefishes were observed on a daily basis at Madang from 2 April to 20 May 1972. They were most common on the outer fringing reef of Tab Lagoon (lat. 5° 11' 00" S, long. 145° 50' 30" E) which parallels the mainland coast 1.5 to 2 nautical miles from shore, and in sheltered coves on the lagoon side of small islets lying along the fringing reef. I counted approximately 206 *Amphiprion* while swimming a 200-meter-long, zigzag transect, parallel to shore, at depths ranging from 6 to 10 meters, on the outer fringing reef (near the type locality of *A. leucokranos*). The count included approximately 150 *A. melanopus*, 32 *A. clarkii*, 16 *A. perideraion*, seven *A. chrysopterus*, and one *A. sandaracinos*. A similar transect along the shore of a sheltered cove on Kranket Island (lat. 5° 11' 34" S, long. 145° 50' 48" E) in 2 to 7 meters yielded a count of 30 *A. percula* and six *A. biaculeatus*. An average of three to four *Amphiprion* was associated with each anemone—usually a single adult pair and one or two small juveniles.

Amphiprion biaculeatus (Bloch) was observed on the outer fringing reef and along the leeward shore of fringing reef islands at depths ranging from 2 to 6 meters. It was always associated with *Radianthus gelam* Haddon & Shackleton. Generally there were two fish per anemone, and these fish displayed a great disparity in size, the larger fish usually being two to three times longer than the smaller. Gonad examination of several pairs indicated that both fish were mature adults. The smaller fish were invariably males, which frequently mature at a standard length of only 40 to 50 mm. Juvenile

fish and adult males were generally bright red with three white bars; the adult females were usually a drab red-brown with inconspicuous grayish bars. However, if the adults were harassed by a diver or if they assumed an aggressive role in order to rid their territory of intruders, their bodies became more reddish and the bars a brilliant white. The change required only seconds and could be elicited repeatedly by waving a hand several inches from the anemone.

Amphiprion chrysopterus Cuvier was encountered only on the outer slope of the barrier reef at depths ranging from 4 to 10 meters. It was usually associated with *Stoichactis giganteum*, but on two occasions it was observed with *Radianthus malu*. Examples from northeastern New Guinea differ in color from 87 specimens from the western Pacific islands (mainly Micronesia) examined by me previously (Allen 1972). In contrast to the pale coloration (yellow-orange in life) of the pelvic and anal fins in specimens from the latter area, the color of these fins on New Guinea individuals was invariably black. The species was previously unrecorded from New Guinea.

Amphiprion clarkii (Bennett) was abundant in both outer reef and protected lagoon environments at depths between 2 and 40 meters. It was most often associated with *Radianthus malu* and, to a lesser extent, with *Stoichactis giganteum* and with two sand-dwelling *Radianthus*, *R. simplex* (Haddon & Shackleton) and an unidentified species. Individuals living with *Radianthus* were largely yellow-orange with two or three white bars (see fig. 49A in Allen 1972), whereas the inhabitants of *Stoichactis giganteum* were mostly black with white bars and yellow pelvic, anal, and caudal fins. I have described similar color forms for *Amphiprion tricinctus*. Experiments conducted at Eniwetok Atoll (Allen 1972) showed that the anemone influences the coloration of the fish and the orange form can be induced to change to the black form and vice versa by switching anemone hosts.

The types of *Amphiprion leucokranos* Allen were collected in 2 to 7 meters depth and were associated with *Radianthus malu* (Fig. 3). The holotype was collected on the edge of a surge channel on the fringing reef off Kranket Island,

a low fringing reef islet about 1 nautical mile north of Madang.

Amphiprion melanopus Bleeker was abundant in shallow water (2 to 7 meters) along the outer fringing reef and in channels between the islets of the fringing reef. It is host-specific for the small cluster-dwelling anemone *Physobranchia douglasi* Kent. The approximately 150 individuals counted during the transect which was discussed earlier were associated with a large (approximately 3 × 12 meters) continuous patch of anemones.

Amphiprion percula (Lacépède) was commonly observed in the lagoon and occasionally on the outer reef. Individuals in the lagoon were usually associated with *Stoichactis kenti* Haddon & Shackleton at depths ranging from 2 to 5 meters. It was found slightly deeper on the outer reef slope (5 to 10 meters) in association with *Radianthus ritteri*. *Amphiprion percula* is another species whose coloration apparently is influenced by the host anemone species. Adult individuals living with *Stoichactis kenti* were basically bright orange with three black-edged white bars, the midbody bar having a prominent anteriorly directed projection. Nearly all of these individuals had the orange ground color between the bars broadly invaded with black (see fig. 14 in Allen 1972). Fish which were associated with *Radianthus ritteri* lacked these blackish areas, being predominately orange. A specimen collected from *Stoichactis kenti* was kept in an aquarium with *Radianthus ritteri*. The blackish color gradually faded over a period of 3 weeks, but was regained 2 weeks after the fish was released at the same anemone from which it had been captured.

Amphiprion perideraion Bleeker (Figs. 2c and 4b) was occasionally sighted on the outer slope of the fringing reef and in the lagoon at depths ranging from 6 to 18 meters. The anemone host was always *Radianthus ritteri*.

Amphiprion sandaracinos Allen (Figs. 2b and 4a) was rare at Madang. Only two specimens were observed, both in association with *Stoichactis giganteum* (cohabited by *Amphiprion chrysopterus*) at a depth of 10 meters. The specimens collected at Madang and the D'Entrecasteaux Islands represent a range extension for this recently described species. The only previous reliable records were from various

localities in the Philippine Islands. However, I mentioned in my 1972 revision (p. 83) that the Australian Museum, Sydney, has two specimens which were received from Taronga Aquarium, Sydney, with the questionable collection locality of Bougainville, Solomon Islands. The validity of this record is more plausible in light of the Madang collections.

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