

Eleven New Records and Validations of Shore Fishes from the Hawaiian Islands¹

JOHN E. RANDALL,² JOHN L. EARLE,² THERESE HAYES,² CORYDON PITTMAN,³ MIKE SEVERNS,⁴
AND R. JAN F. SMITH⁵

ABSTRACT: New records, new species, and name changes of shore fishes for the Hawaiian Islands published since 1980 are briefly reviewed. The following species of fishes are new records or recognized as valid species for Hawaii: the moray *Gymnothorax elegans* Bliss (*G. goldsboroughi* Jordan & Evermann is a junior synonym), the false moray *Xenoconger fryeri* Regan, the frogfish *Antennarius randalli* Allen, the soldierfish *Myripristis vittata* Cuvier, the snapper *Lutjanus gibbus* (Forsskål), the spadefish *Platax boersii* Bleeker, the butterflyfish *Chaetodon ulietensis* Cuvier, the damselfishes *Chromis acares* Randall and *Plectroglyphidodon phoenixensis* Schultz, the goby *Mugilogobius parvus* (Oshima), a probable unintentional introduction, and *Arothron manilensis* (Procé).

RANDALL (1976) REVIEWED the additions to the Hawaiian fish fauna and alterations in nomenclature since the publication of Gosline and Brock's *Handbook of Hawaiian Fishes* (1960). Randall (1980) continued the review and documented 15 new records of fishes for the archipelago. In this paper we first update the literature on inshore Hawaiian fishes (here defined as nonpelagic and occurring in less than 200 m) to the present, document six new records of fishes, and validate four others for Hawaii. The literature review is summarized below chronologically. We include also the changes in taxonomic nomenclature in native Hawaiian freshwater fishes (although not shore fishes, their larvae develop in the sea). Table 1 is a condensation of the nomenclatural changes in approximate phylogenetic order (using the order of Nelson 1984).

LITERATURE REVIEW

1973: **Dawson**—*Gunnellichthys curiosus* Dawson, Hawaiian Islands record. **Whitehead**—*Stolephorus buccaneeri* Strasburg, synonym of *Encrasicolina punctifer* Fowler.

1975: **Allen**—*Pomacentrus jenkinsi* Jordan & Evermann, synonym of *Eupomacentrus fasciolatus* (Ogilby).

1978: **Maciolek**—*Lentipes seminudus* Günther, male and synonym of female *L. concolor* (Gill). **Allen and Kuiter**—*Heniochus diphreutes* Jordan valid, not synonymous with *H. acuminatus* (Linnaeus) (only the former occurs in Hawaiian Islands).

1979: **Allen**—*Holacanthus arcuatus* Gray placed in genus *Apolemichthys* Fraser-Brunner, without explanation. **Hoese and Winterbottom**—*Chonophorus stamineus* (Eydoux & Souleyet) reclassified in *Awaous* Steindachner. **Akihito and Meguro**—*Sicydium stimpsoni* Gill placed in *Sicyopterus* Gill.

1980: **Emery and Allen**—*Stegastes* Jenyns, senior synonym of *Eupomacentrus* Bleeker. **Hobson**—*Oplegnathus punctatus* (Temminck & Schlegel) and *Epibulus insidiator* (Pallas) recorded from Northwestern Hawaiian Islands. **Castle**—*Ariosoma bowersi* (Jenkins)

¹ Manuscript accepted 6 July 1992.

² Bishop Museum, Box 19000-A, Honolulu, Hawaii 96817.

³ Box 23, Fairfield, Washington 99012.

⁴ Box 627, Kihei, Maui, Hawaii 96753.

⁵ Department of Biology, University of Saskatchewan, Saskatoon, Canada S7N 0W0.

TABLE 1
CHANGES IN THE CLASSIFICATION OF HAWAIIAN SHORE FISHES

FAMILY SPECIES	CHANGE	REFERENCE
Dasyatidae		
<i>Dasyatis brevis</i>	<i>D. hawaiiensis</i> a synonym	Nishida and Nakaya 1990
Albulidae		
<i>Albula glossodonta</i>	Two valid species misidentified as	Shaklee and Tamaru 1981
<i>Albula neoguinaicus</i>	<i>A. vulpes</i>	
Congridae		
<i>Ariosoma marginatus</i>	<i>A. bowersi</i> a synonym	Castle 1980
<i>Poecilcongier fasciatus</i>	New record	Randall 1986
Muraenidae		
<i>Gymnothorax nudivomer</i>	<i>G. xanthostomus</i> a synonym	Randall et al. 1981
<i>Gymnothorax ypsilon</i>	New species	Hatooka and Randall 1992
<i>Monopenchelys acutus</i>	New genus and first record	Böhlke and McCosker 1982
<i>Scuticaria bennetti</i>	<i>Uropterygius sealei</i> a synonym	McCosker et al. 1984
<i>Uropterygius macrocephalus</i>	<i>U. knighti</i> a synonym	
Clupeidae		
<i>Herklotsichthys quadrimaculatus</i>	Unintentional introduction	Williams and Clarke 1983
Engraulidae		
<i>Encrasicholina punctifer</i>	<i>Stolephorus buccaneeri</i> a synonym	Whitehead 1973
<i>Encrasicholina purpureus</i>	New combination	Nelson 1983
Synodontidae		
<i>Saurida flamma</i>	New species	Waples 1982
<i>Saurida nebulosa</i>	Valid species	
<i>Synodus ulae</i>	Valid species	Cressey 1981
<i>Synodus usitatus</i>	New species	
<i>Synodus amaranthus</i>	New species	Waples and Randall 1988
<i>Synodus falcatus</i>	New species	
<i>Synodus janus</i>	New species	
<i>Synodus lobeli</i>	New species	
<i>Synodus dermatogenys</i>	Valid species	
<i>Synodus variegatus</i>	<i>S. englemani</i> a synonym	
Moridae		
<i>Physiculus sterops</i>	New species	Paulin 1989
Carapidae		
<i>Encheliophis dubius</i>	Misidentified as <i>Carapus homei</i>	Markle and Olney 1990
<i>Onuxodon fowleri</i>	Misidentified as <i>Carapus margaritiferae</i>	
<i>Pyramodon ventralis</i>	First record	
Antennariidae		
<i>Antennarius analis</i>	New combination	Pietsch and Grobecker 1987
<i>Antennarius duescus</i>	New combination	
<i>Antennarius striatus</i>	<i>A. cunninghami</i> a synonym	
<i>Antennarius commersoni</i>	<i>A. moluccensis</i> a synonym	
<i>Antennarius pictus</i>	<i>A. chironectes</i> a synonym	
<i>Antennarius coccineus</i>	<i>A. drombus</i> a synonym	
<i>Antennatus tuberosus</i>	<i>A. bigibbus</i> a synonym	
Atherinidae		
<i>Atherinomorus lacunosus</i>	<i>Pranesus insularum</i> a synonym	Whitehead and Ivantsoff 1983
Trachichthyidae		
<i>Paratrachichthys heptalepis</i>	New species	Gon 1984
<i>Paratrachichthys prosthemi</i>	New record	
Holocentridae		
<i>Sargocentron</i>	<i>Adioryx</i> a synonym	Matsuura and Shimizu 1982
<i>Neoniphon</i>	<i>Flammeo</i> a synonym	Randall and Heemstra 1985
<i>Neoniphon aurolineatus</i>	<i>N. scythrops</i> a synonym	
<i>Sargocentron ensiferum</i>	Valid species	
<i>Sargocentron punctatissimum</i>	<i>S. lacteoguttatum</i> a synonym	
<i>Ostichthys sandix</i>	New species	Randall et al. 1982

TABLE 1 (continued)

FAMILY SPECIES	CHANGE	REFERENCE
<i>Ostichthys archiepiscopus</i> <i>Pristilepis oligolepis</i>	<i>O. pilwaxii</i> a synonym New genus; species misidentified as <i>O. japonicus</i> or <i>O. pilwaxii</i>	
Caproidae		
<i>Antigonia capros</i>	<i>A. steindachneri</i> a synonym	Parin and Borodulina 1986
Pegasidae		
<i>Eurypegaspis papilio</i>	New combination	Palsson and Pietsch 1989
Syngnathidae		
<i>Cosmocampus balli</i>	New combination	Dawson 1985
<i>Doryrhamphus excisus</i>	<i>D. melanopleura</i> a synonym	
<i>Festucalex erythraeus</i>	New combination	
<i>Halicampus edmondsoni</i>	New combination	
<i>Minyichthys brachyrhinus</i>	New combination	
Serranidae		
<i>Caprodon longimanus</i>	<i>C. unicolor</i> a synonym	Kharin and Dudarev 1983
<i>Liopropoma collettei</i>	New species	Randall and Taylor 1988
<i>Luzonichthys earlei</i>	New species	Randall 1981
<i>Pseudanthias fucinus</i>	New species	Randall and Ralston 1984
Priacanthidae		
<i>Heteropriacanthus cruentatus</i>	New combination	Fitch and Crooke 1984
<i>Cookeolus japonicus</i>	Misidentified as <i>C. boops</i>	Starnes 1988
Apogonidae		
<i>Apogon taeniopterus</i>	<i>A. menesemus</i> a synonym	Randall 1985a
<i>Apogonichthys perdix</i>	<i>A. waikiki</i> a synonym	
<i>Lachneratus phasmaticus</i>	New genus and species	Fraser and Struhsaker 1991
Lutjanidae		
<i>Pristipomoides filamentosus</i>	<i>P. microlepis</i> a synonym	Anderson 1987
Mullidae		
<i>Parupeneus cyclostomus</i>	<i>P. chryserydros</i> a synonym	Maugé and Guézé 1984
Pentacerotidae		
<i>Evistias acutirostris</i>	Misidentified as <i>Histioporus typus</i>	Hardy 1983b
<i>Pseudopentaceros wheeleri</i>	New species	
<i>Pseudopentaceros wheeleri</i>	<i>P. pectoralis</i> a synonym	Humphreys et al. 1989
Oplegnathidae		
<i>Oplegnathus punctatus</i>	New record	Hobson 1980
Pomacentridae		
<i>Chromis ovalis</i>	Valid species	Follett and Randall 1989
<i>Stegastes</i>	<i>Eupomacentrus</i> a synonym	Emery and Allen 1980
Mugilidae		
<i>Chaenomugil chaptalii</i>	New combination	Randall et al. 1985
Labridae		
<i>Cheilinus unifasciatus</i>	Misidentified as <i>C. rhodochrous</i>	Randall 1985a
<i>Epibulus insidiator</i>	New record	Hobson 1980
<i>Suezichthys notatus</i>	<i>S. tripunctatus</i> a synonym	Russell 1985
<i>Thalassoma trilobatum</i>	<i>T. fuscum</i> a homonym	Randall and Edwards 1984
<i>Thalassoma purpureum</i>	<i>T. umbrostygma</i> a synonym	
Scaridae		
<i>Calotomus</i>	<i>Scaridea</i> a synonym	Bruce and Randall 1985
<i>Calotomus carolinus</i>	<i>C. sandvicensis</i> a synonym	
Chaetodontidae		
<i>Heniochus diphreutes</i>	Valid species	Allen and Kuitert 1978
Pomacanthidae		
<i>Centropyge interruptus</i>	New record	Ralston 1981
<i>Centropyge nahackyi</i>	New species	Kosaki 1989
Tripterygiidae		
<i>Enneapterygius atriceps</i>	New combination	Matarese et al. 1984
Blenniidae		
<i>Cirripectes vanderbilti</i>	Misidentified as <i>C. variolosus</i>	Williams 1988

TABLE 1 (continued)

FAMILY SPECIES	CHANGE	REFERENCE
<i>Cirripectes quagga</i>	<i>C. lineopunctatus</i> a synonym	
<i>Parablennius thysanius</i>	New record	Springer 1991
Callionymidae		
<i>Draculo pogognathus</i>	New combination	Fricke 1983
Gobiidae		
<i>Awaous stamineus</i>	New combination	Hoese and Winterbottom 1979
<i>Bathygobius cocosensis</i>	Misidentified as <i>B. fuscus</i>	Randall et al. 1985
<i>Bryaninops</i>	<i>Tenacigobius</i> a synonym	Larson 1985
<i>Bryaninops amplus</i>	New species	
<i>Bryaninops tigris</i>	New species	
<i>Cabillus tongarevae</i>	New combination	Randall and Randall 1987
<i>Lentipes concolor</i>	<i>L. seminudus</i> a synonym	Maciolek 1978
<i>Priolepis</i>	<i>Quisquilius</i> and <i>Zonogobius</i> are synonyms	Randall et al. 1985
<i>Sicyopterus</i>	Valid genus	Akihito and Meguro 1979
<i>Stenogobius hawaiiensis</i>	New species	Watson 1991
<i>Trimma unisquama</i>	New combination	Randall et al. 1985
Microdesmidae		
<i>Gunnellichthys curiosus</i>	New record	Dawson 1973
Acanthuridae		
<i>Acanthurus blochii</i>	Misidentified as <i>A. mata</i>	Randall 1988
<i>Acanthurus nigricans</i>	Misidentified as <i>A. glaucopareius</i>	
<i>Naso caesius</i>	New species	Randall and Bell 1992
<i>Naso maculatus</i>	New species	Randall and Struhsaker 1981
Monacanthidae		
<i>Pervagor aspricaudus</i>	Misidentified as <i>P. melanocephalus</i>	Hutchins 1986
Tetraodontidae		
<i>Torquigener florealis</i>	Misidentified as <i>T. hypselogenion</i>	Hardy 1983a
<i>Torquigener randalli</i>	New species	

synonym of *A. marginatus* (Vaillant & Sauvage).

1981: **Shaklee and Tamaru**—*Albula glosodonta* (Forsskål) and *A. neoguinaica* (Valenciennes), both previously misidentified as *A. vulpes* (Linnaeus) (restricted to western Atlantic and eastern Pacific), recorded from Hawaiian Islands. **Anderson**—*Etelis marshi* placed in synonymy of *E. carbunculus* Cuvier (*carbunculus* previously misused for *E. coruscans* Valenciennes). **Randall et al.**—*Gymnothorax xanthostomus* Snyder, synonym of *G. nudivomer* (Playfair & Günther). **Randall and Struhsaker**—*Naso maculatus* described from Hawaiian Islands and Japan (misidentified as *N. lopezi* by Randall and Struhsaker 1971). **Ralston**—*Centropyge interruptus* (Tanaka) recorded from Kure, Northwestern Hawaiian Islands. **Cressey**—*Synodus usitatus* described from Hawaii and Japan; *S. ulae* Schultz valid.

Randall—*Luzonichthys earlei* described from Hawaiian Islands.

1982: **Böhlke and McCosker**—*Monopenchelys* described for *Uropterygius acutus* Parr and recorded from Hawaii. **Randall et al.**—*Ostichthys sandix* described from Hawaiian Islands; *Pristilepis*, new genus for *O. oligolepis* Whitley (previously misidentified in Hawaii as *O. japonicus* or *O. pilwaxii*, the latter a synonym of *O. archiepiscopus* [Valenciennes]); Lamber (1963) followed in placing *Holotrachys* Günther in synonymy of *Plectropops* Gill. **Waples**—*Saurida nebulosa* (Valenciennes) resurrected from synonymy of *S. gracilis* (Quoy & Gaimard); *S. flamma* described as new from Hawaiian Islands. **Matsuura and Shimizu**—*Sargocentron* Fowler, correct genus for Indo-Pacific holocentrids previously placed in *Holocentrus* Bloch and *Adioryx* Starks.

1983: **Nelson**—*Stolephorus purpureus* Fowler reclassified in genus *Encrasicholina*. **Hardy**—*Torquigener randalli* described from Hawaii; *T. florealis* (Cope), correct name for Hawaiian species previously misidentified as *T. hypselogonion*. **Hardy**—*Evistias acutirostris* (Temminck & Schlegel), correct name for pentacerotid fish previously misidentified in Hawaii as *Histioporus typus* Temminck & Schlegel; *Pseudopentaceros pectoralis* and *P. wheeleri* described as new. **Williams and Clark**—*Herklotsichthys quadrimaculatus* (Rüppell) reported from Hawaiian Islands (believed by Baldwin [1984] and Randall [1987] to be unintentional introduction). **Kharin and Dudarev**—*Caprodon unicolor* Katayama, synonym of *C. longimanus* (Günther). **Whitehead and Ivantsoff**—*Pranesus insularum* (Jordan & Evermann) reclassified in *Atherinomorus* Fowler. **Fricke**—*Pogonemus pogognathus* Gosline reclassified in *Draculo* Snyder.

1984: **Randall and Ralston**—*Anthias fucinus* described from Hawaiian Islands. **Randall and Edwards**—*Thalassoma trilobatum* (Lacepède), correct name for the homonym *T. fuscum* (Lacepède); *T. umbrostygma* (Rüppell), initial phase and synonym of *T. purpureum* (Forsskål). **Matarese et al.**—*Tripterygion atriceps* Jenkins placed in *Enneapterygius* Rüppell. **McCosker et al.**—*Uropterygius seaiei* Whitley, synonym of *U. bennettii* (Günther); *U. knighti* (Jordan & Starks) synonym of *U. macrocephalus* (Bleeker). **Maugé and Guézé**—*Parupeneus chryserydos* (Lacepède), synonym of *P. cyclostomus* (Lacepède). **Gon**—*Paratrachichthys heptalepis* described from Hawaiian Islands. **Fitch and Crook**—*Heteropriacanthus*, new genus for *Priacanthus cruentatus* (Lacepède).

1985: **Bruce and Randall**—*Scaridea* Jenkins, synonym of *Calotomus* Gilbert; *C. carolinus* (Valenciennes), correct name for scarid previously misidentified in Hawaii as *C. sandvicensis* (Valenciennes) or *C. spinidens* (Quoy & Gaimard); *C. cyclurus* (Jenkins) from Hawaii, a probable locality error and synonym of *C. japonicus* (Valenciennes) from Japan. **Randall**—*Apogonichthys waikiki* (Jordan & Evermann), synonym of *A. perdix* Bleeker; *Apogon menesemus* Jenkins, synonym

of *A. taenioperus* Bennett (contrary to classification of Fraser and Lachner 1985); *Cheilinus unifasciatus* Streets, correct name for labrid previously misidentified as *C. rhodochrous* Playfair & Günther. **Larson**—*Tenacigobius* Larson & Hoese placed in synonymy of *Bryaninops* Smith; Hawaiian Islands among localities for new gobiids *B. amplus* and *B. trigris*. **Russell**—*Suezichthys tripunctatus* Randall & Kotthaus, synonym of *S. notatus* (Kamohara). **Randall and Heemstra**—*Flammeo* Jordan & Evermann, synonym of *Neoniphon* Castelnau; *N. scythrops* (Jordan & Evermann), synonym of *N. aurolineatus* (Liénard); *Sargocentron lacteoguttatum* (Cuvier), synonym of *S. punctatissimum* (Cuvier); *S. ensiferum* (Jordan & Evermann) valid. **Randall et al.**—88 species of fishes listed as new records for Johnston Island; *Bathygobius cocosensis* (Bleeker), correct name for gobiid previously identified in Hawaiian area as *B. fuscus* (Rüppell); *Quisquilius* Jordan & Evermann and *Zonogobius* Bleeker, synonyms of *Priolepis* Valenciennes (after Hoese, pers. comm.); *Hazeus unisquamis* Gosline placed in *Trimma* Jordan & Seale (after Winterbottom, pers. comm.); *Neomyxus chaptalii* (Eydoux & Souleyet) in Hawaii, synonym of *Chaenomugil leuciscus* (Günther) (J. M. Thomson, pers. comm.). **Dawson**—*Doryrhamphus melanopleura* (Bleeker), synonym of *D. excisus* Kaup; new combinations for Hawaiian syngnathids: *Cosmocampus balli* (Fowler), *Festacalex erythraeus* Gilbert, *Halicampus edmondsoni* (Pietschmann), and *Minyichthys brachyrhinus* (Herald).

1986: **Hutchins**—*Pervagor aspricaudus* (Hollard), correct name for monacanthid previously identified in Hawaii as *P. melanocephalus* (Bleeker). **Katayama and Amaoka**—*Pseudanthias* Bleeker, preferred generic name for many Indo-Pacific anthiine fishes previously classified in *Anthias* Bloch. **Randall**—*Poecilconger fasciatus* (Günther) recorded from Hawaiian Islands. **Parin and Borodulina**—*Antigonia steindachneri* Jordan & Evermann, synonym of *A. capros* Lowe; *A. xenolepis* described from seamounts north of Midway Atoll.

1987: **Pietsch and Grobecker**—the following antennariids recognized in Hawaii: *Anten-*

narius analis (Gosline), new combination; *A. duescus* Snyder; *A. striatus* (Shaw & Nodder), *A. cunninghami* Fowler a synonym; *A. comersoni* (Latreille), *A. moluccensis* Bleeker a synonym; *A. pictus* (Shaw & Nodder), *A. chironectes* Lacepède a synonym; *A. coccineus* (Cuvier), *A. drombus* Jordan & Evermann a synonym; *A. nummifer* (Cuvier); and *Antennatus tuberosus* (Cuvier), *Antennarius bigibbus* Lacepède, nonbinomial. **Gon**—*Paratrachichthys prosthemi* Jordan & Fowler recorded from Hawaiian Islands. **Randall and Randall**—*Ctenogobius tongarevae* Fowler reclassified in *Cabillus* Smith. **Anderson**—*Pristipomoides microlepis*, synonym of *P. filamentosus* (Valenciennes); *Rooseveltia brighami* (Seale), synonym of *P. zonatus* (Valenciennes).

1988: **Waples and Randall**—*Synodus amaranthus*, *S. falcatus*, *S. janus*, and *S. lobeli* described as new from Hawaii; *S. capricornis* Cressey & Randall and *S. doaki* Russell & Cressey, new records; *S. dermatogenys* Fowler valid; *S. englemanni* Schultz, synonym of *S. variegatus* (Lacepède). **Starnes**—*Cookeolus boops* (Bloch & Schneider), synonym of *Heteropriacanthus cruentatus* (Lacepède); *C. japonicus* (Cuvier), valid name for species misidentified by most authors as *C. boops*. **Randall and Taylor**—*Liopropoma collettei* described from Hawaiian Islands, Papua New Guinea, and Philippines. **Randall and De Bruin**—*Chaetodon modestus* Temminck & Schlegel classified in *Prognathodes* Gill. **Williams**—*Cirripectes vanderbilti* (Fowler), correct name for species misidentified in Hawaii as *C. variolosus* (Valenciennes); *C. lineopunctatus* Strasburg, synonym of *C. quagga* (Fowler & Ball). **Randall**—*Acanthurus blochii* Valenciennes and *A. nigricans* (Linnaeus), valid names for species previously misidentified as *A. mata* (Cuvier) and *A. glaucopareius* Cuvier.

1989: **Kosaki**—*Centropyge nahackyi* described from Johnston Island and Hawaii.

Paulin—*Physiculus sterops* described from Hawaiian Islands. **Böhlke et al.**—*Uropterygius bennettii* (Günther) and *U. tigrinus* (Lesson) reclassified in *Scuticaria* Jordan & Snyder; *Muraena pardalis* Temminck & Schlegel provisionally placed in *Enchelycore* Kaup. **Humphreys et al.**—*Pseudopentaceros pectoralis* Hardy placed in synonymy of *P. wheeleri*

Hardy. **Palsson and Pietsch**—*Pegasus papilio* Gilbert reclassified in *Eurypegus* Bleeker. **Follett and Randall**—proposed suppression of *Chromis velox* Jenkins to conserve *C. ovalis* (Steindachner); accepted in Opinion 1622 of International Commission on Zoological Nomenclature (1990).

1990: **Larson**—*Pleurosicya micheli* Fourmanoir reported from Hawaiian Islands. **Randall et al.**—*Apogon erythrinus* Snyder, synonym of *A. crassiceps* Garman. **Markle and Olney**—*Encheliophis dubius* (Putnam), valid name for species in Hawaii misidentified as *Carapus homei*; *Onuxodon fowleri* (Smith), valid for *C. margaritiferae* (Rendahl); *Pyramodon ventralis* Smith & Radcliffe, record for Hawaiian Islands (larvae misidentified as *P. ventralis* by Markle and Olney 1981). **Nishida and Nakaya**—*Dasyatis hawaiiensis* Jenkins, synonym of *D. brevis* Garman. **Randall et al.** (after Leis, pers. comm.)—*Chilomycterus affinis* Günther, synonym of *C. reticulatus* (Linnaeus).

1991: **Springer**—range of *Parablennius thysanius* (Jordan & Seale) extended to Hawaiian Islands. **Robins**—*Ophidion muraenolepis* (Günther) recorded from Hawaiian Islands. **Fraser and Struhsaker**—*Lachneratus phasmaticus*, new genus and species from Hawaiian Islands. **Watson**—*Stenogobius hawaiiensis*, formerly *S. genivittatus* Valenciennes, described as new. **Kosaki et al.**—36 new records of fishes for Johnston Island.

1992: **Randall and Bell**—*Naso caesius* described from islands of Pacific, including Hawaii. **Hatooka and Randall**—*Gymnothorax ypsilon* described from Japan and Hawaiian Islands.

NEW RECORDS

Family MURAENIDAE (Moray Eels)

Gymnothorax elegans Bliss

Plate IA

Gymnothorax elegans Bliss, 1883:60 (type locality, Mauritius).

Gymnothorax goldsboroughi Jordan & Evermann, 1903:167 (type locality, Honolulu); Jordan and Evermann, 1905:100, fig. 26.

Diagnosis: Body very elongate, the depth 17.3–20.3 in total length (TL); preanal length 2.2–2.4 in TL; head length 9.5–10.1 in TL; snout 4.90–5.4 in head length; orbit diameter 8.7–9.5 in head length; gape 2.0–2.1 in head length; origin of dorsal fin a short distance anterior to gill opening; teeth in jaws uniserial, acutely triangular, angling posteriorly, and serrate on about basal half of anterior and posterior edges; a single long subconical intermaxillary tooth; vertebrae 142–145 (three counts). Color in alcohol brown, becoming darker posteriorly, with numerous white spots, small and close-set anteriorly, becoming larger and more widely spaced posteriorly, most of those on tail aligned vertically; gill opening in a blackish blotch; margins of fins white. Color note made by the senior author of a specimen 622 mm TL from Oahu when fresh: purplish brown with yellow-edged white spots, most of which are round, these spots smaller on head; median fins with broad white borders; lower jaw and most of snout light reddish gray (about a dozen small white spots on snout in front of eye); gill opening in a black blotch; muscular region of inside of mouth bright yellow with brown flecks.

Remarks: The diagnosis above is based on three specimens: BPBM 3610, 510 mm TL, from Honolulu; BPBM 9027, 622 mm TL, from off Waikiki; and BPBM 24533, 408 mm TL, from Penguin Bank, off Molokai. Depth of capture available only for BPBM 9027, 50 fathoms (92 m), but the Penguin Bank specimen also probably came from less than 100 m. It was caught by hook and line at night.

Gosline and Brock (1960) placed four nominal species of moray eels in the synonymy of *Gymnothorax meleagris* (Shaw & Nodder): *G. goldsboroughi* Jordan & Evermann, *G. leucostictus* Jenkins, *G. nuttingi* Snyder, and *G. xanthostomus* Snyder. Only *G. leucostictus* is a junior synonym, the description based on juveniles. As mentioned above, Randall et al. (1981) placed *G. xanthostomus* in the synonymy of *G. nudivomer*. Randall et al. (1985:33, fig. 7) showed that *G. nuttingi* is valid.

Smith (1962) wrote that *G. goldsboroughi* is

very similar to *elegans* but lacks the brown midventral stripe on the abdomen as mentioned by Bliss and conspicuous on Smith's specimen from Inhaca Island, Mozambique. One of the three Bishop Museum specimens here identified as *elegans* has this ventral stripe, and another has it partially developed.

G. goldsboroughi was described from a single specimen (USNM 50617, 534 mm TL). This nominal species is here shifted from the synonymy of *G. meleagris* to that of *G. elegans*, and the latter is recognized as valid for the Hawaiian Islands. In addition to Mauritius and Mozambique mentioned above, this moray is otherwise known only from Samoa (Wass 1984).

Family CHLOPSIDAE (False Morays)

Xenoconger fryeri Regan

Plate IB

Xenoconger fryeri Regan, 1912:301 (type locality, Assumption Island).

Diagnosis: Body elongate, the depth 34 in TL; preanal length 2.7 in TL; head length 10.5 in TL; snout 4.85 in head length; eye diameter 13.9 in head length; gape 3.0 in head length; origin of dorsal fin about 1 head length posterior to gill opening; posterior nostril directly in front of eye; vertebrae 158. Color when fresh uniform brown, the fins pale; inside of mouth white.

Remarks: A single specimen of this species, BPBM 34625, 205 mm TL, was collected by the first three authors from an anchialine pool, 0–1.5 m depth, at Kapoho on the east coast of the island of Hawaii on 21 May 1991.

We recognized this eel as a chlopsid but were unable to identify it. We sent it on loan to Kenneth A. Tighe of the U.S. National Museum of Natural History, who is revising the family. He determined that it is *Xenoconger fryeri*, the type species of the genus *Xenoconger*. In addition to the type locality, he is aware of specimens only from Aldabra (also in the Cosmoledo Group of the Seychelles), New Caledonia, Palau, and Fiji.

Family ANTENNARIIDAE (Frogfishes)

Antennarius randalli Allen

Plate IC

Antennarius randalli Allen, 1970: 518, figs. 1, 2a (type locality, Easter Island).

Diagnosis: Dorsal rays 12, the last 2 bifurcate; anal rays 7, all bifurcate; pectoral rays 9, all simple; body depth 1.7 in standard length (SL); body compressed, the width 5.8 in depth; a short caudal peduncle present; ilicium shorter than second dorsal spine, 8.4% SL; esca globular with filaments; second dorsal spine curved; a depression at base of membrane between second and third spines into which the esca fits when laid back; third dorsal spine curved, the membrane linking it to first dorsal ray only slightly indented; paired fins small. Color in alcohol light brown, mottled with dark brown and finely flecked with whitish; a few widely scattered white spots smaller than eye; esca white; pectoral fins whitish. Color in life nearly the same, the base of the pectoral fins and thoracic region with a wash of brownish orange, the small white spots very bright.

Remarks: The above diagnosis is based on a single specimen, BPBM 32842, 31.5 mm SL, collected by the second and third authors off Makua, Oahu, on a rubble bottom at a depth of 15 m on 3 July 1989. The identification was confirmed by Theodore W. Pietsch.

This small species is otherwise known from only 10 specimens: the four types from Easter Island, two from Fiji, and one specimen each from the Marshall Islands, Taiwan, Philippines, and Indonesia (Pietsch and Grobecker 1987).

Family HOLOCENTRIDAE (Squirrelfishes and Soldierfishes)

Myripristis vittata (Valenciennes)

Plate ID

Myripristis vittatus Valenciennes in Cuvier and Valenciennes 1831:492 (type locality, Mauritius).

Diagnosis: Dorsal rays X-I, 14; anal rays IV, 12; pectoral rays 15; lateral-line scales 36–37 (to caudal-fin base); gill rakers 12 + 23 (raker at angle included in lower-limb count); body depth 2.4 in SL; head length 2.9–3.0 in SL; orbit diameter 2.3–2.5 in head length; third anal spine longer than fourth, 1.65–1.75 in head length; a single pair of external symphyseal tooth patches at front of lower jaw separated by a distance about equal to diameter of a single tooth patch; no small scales in axil of pectoral fins. Color in alcohol pale with faint longitudinal yellow stripes on body following centers of scale rows; no dark markings. Color in life from underwater photographs taken by the fifth author: body orange-red, the edges of the scales more intensely colored; axil and base of pectoral fins and opercular membrane deep orange-red; first dorsal fin deep red, a little whitish basally, the membrane tips bright white; leading edges of second dorsal, anal, and pelvic fins and upper and lower edges of caudal fin white, the rest of the fins red, this color most intense distally and anteriorly; no dark markings except an incomplete slightly diagonal black bar in eye.

Remarks: We first became aware of the existence of this species when the fifth author took an underwater photograph of the anthiine fish *Holanthias fuscipinnis* (Jenkins) in a cave at a depth of 55 m at the islet of Molokini off Maui. In the same cave with this fish were three species of *Myripristis*: *M. berndti* Jordan & Evermann, *M. chryseres* Jordan & Evermann, and *M. vittata*. The fifth author later found more individuals at depths to 70 m; on 30 March 1991 he speared two, 146 and 151 mm SL, now deposited at the Bishop Museum as number BPBM 34917. These two fish are the basis for the above diagnosis.

Myripristis vittata is widely distributed in the Indo-Pacific region from the Marquesas to the Seychelles (Greenfield 1974). Although usually found at depths greater than 20 m, one specimen was collected at 3 m depth by the first author in the Solomon Islands.

Family LUTJANIDAE (Snappers)

Lutjanus gibbus (Forsskål)

Sciaena gibba Forsskål, 1775:ix, 46 (type locality, Arabia).

Diagnosis: Dorsal rays X, 13–14; anal rays III, 8; pectoral rays 16–17; lateral-line scales 47–51; scales above lateral line 7–8; gill rakers 9–10 + 15–20; body depth 2.2–2.5 in SL; head length 2.4–2.6 in SL; nape of large adults strongly arched; snout 2.4–3.0 in head length; preorbital depth 3.8–5.2 in head length; scale rows on body oblique; preopercular notch well developed with a distinct interopercular knob; vomerine teeth in a crescentic band without a median posterior extension; caudal fin forked with rounded lobes. Color in life red to gray with an orange hue on lower part of opercle and in pectoral axil; fins red to blackish, the median fins with a narrow white margin.

Remarks: The above diagnosis is from Allen and Talbot (1985).

Two shipments of live *Lutjanus gibbus* were brought to the Hawaiian Islands from French Polynesia: 40 individuals from the Marquesas in June 1958, and 137 from Moorea in the Society Islands in 1961 (Randall and Kanayama 1972). Two other snappers introduced from French Polynesia in 1956 and 1958, *Lutjanus kasmira* (Forsskål) and *L. fulvus* (Bloch & Schneider), soon became established (in the case of *L. kasmira* in such great numbers that it is believed to have caused diminution in the populations of native Hawaiian fishes more valuable than itself). As the years passed, there was no evidence that *L. gibbus* reproduced and established a resident population in the Islands.

It was therefore a surprise when a photograph of a 7-pound (3.2 kg) *Lutjanus gibbus* appeared in the February 1990 issue of *Hawaii Fishing News* with information that it was caught by hook and line at 6 p.m. on 25 November 1989 by John Camero at the Hamakua coast of the island of Hawaii. It was identified in the article as a to'au (*L. fulvus*), but the identification was tentative because of the large size of the fish. In the March issue the fish was correctly identified as *L. gibbus*

as a result of telephone calls to the editor, Chuck Johnston, from Bill Puleloa and John Naughton.

The question naturally arose whether this fish might be one of the original transplants, in which case it would have to be least 29 yr old. However, Kurt E. Kawamoto of the Honolulu Laboratory of the National Marine Fisheries Service informed us that within the last 2 or 3 yr he has seen two individuals of *L. gibbus* of about 0.9–1.35 kg in weight in the Honolulu market. He obtained the name of the fisherman who caught them, Leslie M. Cansibog. In a telephone conversation with Mr. Cansibog, we learned that he has caught about six individuals of this snapper in the last few years off Kaena Point, Oahu, at depths averaging 60 feet (18 m), always at night. Kenneth and Linda Bail (pers. comm.) observed one individual of *L. gibbus* at a depth of 15 m on the south shore of Kauai in April 1992, which they estimated weighed 2.3 kg. We can therefore conclude that the species has become established in the Hawaiian Islands, probably from the original introductions. For reasons unknown, it has not proliferated like the other two introduced snappers.

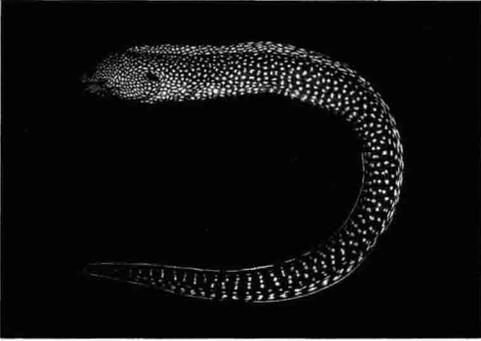
Family EPHIPPIDAE (Spadefishes)

Platax boersii Bleeker

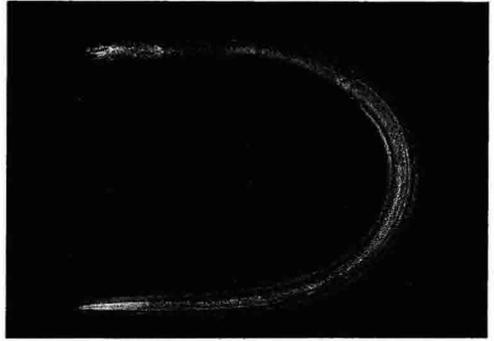
Platax Boersii Bleeker, 1852:758 (type locality, Makassar, Celebes = Ujung Pandang, Sulawesi).

Diagnosis: Dorsal rays V, 32; anal rays III, 24; pectoral rays 17; lateral-line scales 52; body orbicular, the dorsal profile smoothly convex, the depth 1.2 in SL; teeth very small, tricuspid, the cusps about equal in length. Color in alcohol light brownish gray with a dark brown bar through eye and a broader one from nape passing just behind head, across pectoral base, and broadening onto abdomen; a faint and much broader dark bar posteriorly on body; fins dark except pectorals, the pelvics darkest.

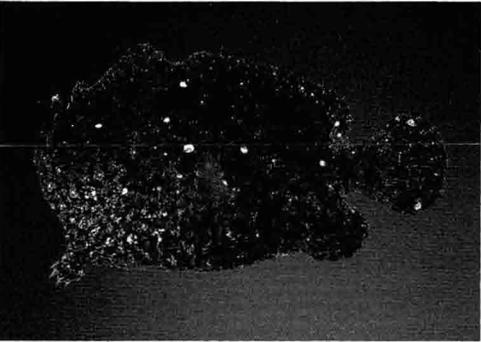
Remarks: Our single specimen, BPBM 34889, 333 mm SL, was speared under the cargo pier in the lagoon of Midway Atoll on 10 April



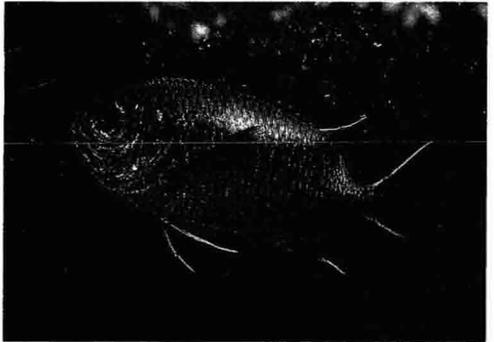
A. *Gymnothorax elegans*, BPBM 9027, 622 mm TL, Waikiki, Oahu, 92 m (J. Randall).



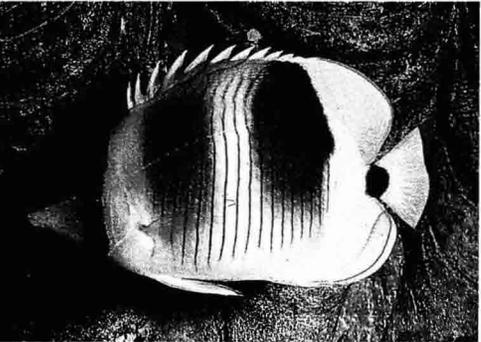
B. *Xenoconger fryeri*, BPBM 34625, 205 mm TL, anchialine pond, Hawaii (J. Randall).



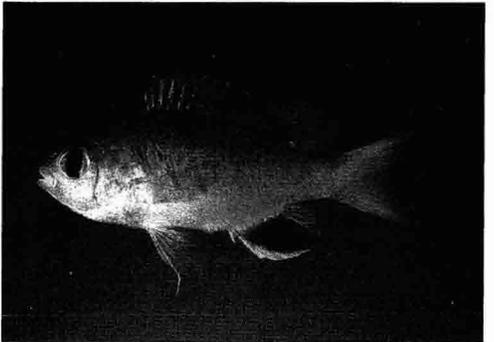
C. *Antennarius randalli*, BPBM 32842, 31.5 mm SL, Makua, Oahu (J. Randall).



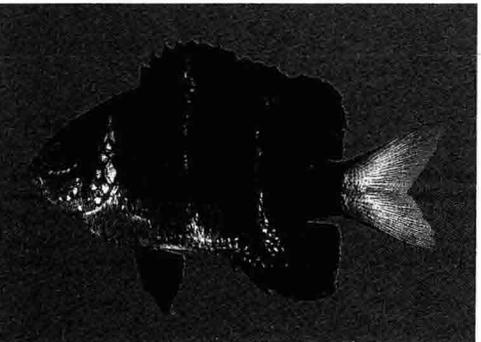
D. *Myripristis vittata*, underwater photograph, about 160 mm TL, Molokini, Maui (M. Severns).



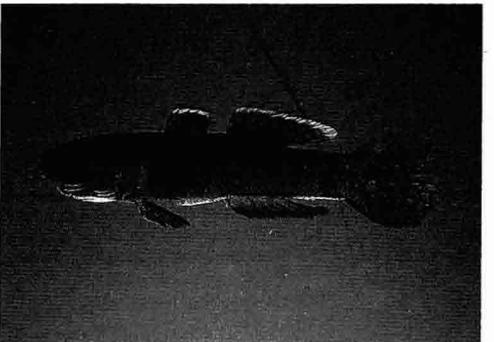
E. *Chaetodon ulietensis*, aquarium photograph, about 120 mm TL, Kaneohe Bay, Oahu (J. Randall).



F. *Chromis acares*, BPBM 34918, 35 mm SL, Makena, Maui (J. Randall).



G. *Plectroglyphidodon phoenixensis*, BPBM 34916, 54 mm SL, Opunaha Gulch, Maui (J. Randall).



H. *Mugilogobius parvus*, BPBM 32749, 24.5 mm SL, Kaneohe Bay, Oahu (J. Randall).

1980 by Alan K. Tomita. Several were seen under the pier 4 days earlier (Thomas F. Hourigan, pers. comm.). Although species of *Platax* enter the aquarium trade when small (their common name in the Pacific is batfish, which conflicts with the same, and official, common name of the Ogcocephalidae), there is little likelihood that the Midway fish were released by an aquarist. The data for the diagnosis above were taken from the Midway specimen. We follow Kishimoto et al. (1988) in identifying this specimen as *Platax boersii*.

The fourth author, Richard Pratt, and Don and Juhree Noviello observed a fish they believed to be a species of *Platax* at Mala Wharf, West Maui, in 1987. In view of the location, it could have been an aquarium release.

Family CHAETODONTIDAE (Butterflyfishes)

Chaetodon ulietensis Cuvier

Plate IE

Chaetodon ulietensis Cuvier in Cuvier and Valenciennes 1831: 39 (type locality, Ulietea).

Diagnosis: Dorsal rays XII,24; anal rays III,20; pectoral rays 16; lateral-line scales 23, ending beneath base of 13th dorsal soft ray; gill rakers 17; body depth 1.9 in SL; head length 2.75 in SL; snout moderately produced, its length 2.3 in head length. Color in alcohol whitish with a black bar from nape through eye to lower edge of subopercle, two broad blackish bars on upper two-thirds of body that extend into dorsal fin, vertical blackish lines following scale rows on body, and a black bar posteriorly on lower three-fourths of caudal peduncle. In life the body and fins posterior to a line at hind edge of second dark body bar bright yellow except for a broad hyaline posterior border and blackish submarginal line in caudal fin; tips of dorsal spines yellow.

Remarks: The diagnosis above was based on our one specimen of this species, BPBM 30216, 207 mm SL, collected by H. Chapman off the old airport on the Kona coast of Hawaii at 12 m depth on 29 May 1984. It was maintained in the Waikiki Aquarium

until its death on 14 August 1984, when it was given to the Bishop Museum by Bruce A. Carlson.

Another individual caught in Kaneohe Bay, Oahu, in 1989 is still alive at the Waikiki Aquarium (Plate IE). It was reported in a short anonymous article in the November/December 1989 issue of *Kilo i'a*, the newsletter of the Waikiki Aquarium, along with a photograph of the fish by Marjorie Awai.

The possibility exists that these two fish were aquarium releases; however, this species has not been observed to enter the aquarium trade in Hawaii (B. A. Carlson, pers. comm.).

Family POMACENTRIDAE (Damsel-fishes)

Chromis acares Randall & Swerdloff

Plate IF

Chromis acares Randall & Swerdloff, 1973: 331, figs. 2, 3 (type locality, Rarotonga).

Diagnosis: Dorsal rays XII,11; anal rays II,11; upper and lower spiniform caudal rays 2; pectoral rays 17; lateral-line scales 16; gill rakers 5 + 17; body depth 2.5 in SL; caudal fin forked, the second and twelfth branched rays filamentous, the caudal concavity 5.1 in SL; pectoral fins 3.5 in SL. Color in alcohol brownish gray, paler on lower head and thorax; a small whitish spot at rear base of dorsal fin; caudal fin pale except filaments, which are dusky; a large black area covering nearly all of anal fin between second and seventh soft rays. Color when fresh bluish gray, paler ventrally, the side of head, including mouth and snout, mainly yellow; a small bright orange-yellow spot at rear base of dorsal fin; caudal fin orange-yellow except for a broad centroposterior region, which is pale translucent yellowish, and the filaments, which are blackish; anal fin black in large central part, the leading edge pale blue, the posterior part translucent yellowish.

Remarks: Randall and Swerdloff (1973) recorded *Chromis acares* from many islands of Oceania, including Johnston Island. They had no material from the Hawaiian Islands, but they reported the species from Kahe Point, Oahu, from a sight record made by

James M. Peck, Jr., and John C. McCain, then of the Hawaiian Electric Company. During the ensuing years the first author has been alert for this species in Hawaiian waters, finding only countless individuals of the related *C. vanderbilti* (Fowler). He was beginning to doubt the veracity of the Peck-McCain observation until he observed a solitary individual of *C. acares* on 7 April 1991 on an isolated reef off Makena, Maui, at 16.5 m depth. The fish was speared and photographed (BPBM 34918, 35 mm SL). This specimen was used for the above diagnosis.

Plectroglyphidodon phoenixensis Schultz
Plate IG

Abudefduf phoenixensis Schultz, 1943:190, fig. 15 (type locality, Enderbury Island, Phoenix Islands).

Diagnosis: Dorsal rays XII,17; anal rays II,14; pectoral rays 21; tubed lateral-line scales 21; gill rakers short, 5 + 12; body depth 2.05 in SL; teeth uniserial, relatively long, close-set, with rounded tips; margin of preopercle and subopercle smooth; suborbital scaled; scales dorsally on head extending slightly anterior to nostrils. Color in alcohol dark brown, paler over lower head and thorax, with a broad black bar encircling caudal peduncle and four narrow pale bars: one posteriorly on head, two in middle of body extending into dorsal fin, and one marginal at front of black peduncular bar; caudal fin pale. In life the pale bars were pink, the caudal fin whitish.

Remarks: This damselfish was first sighted in the Hawaiian Islands by the fourth author and Richard Pratt in the surge zone at Hekili Point on the south coast of West Maui in September 1988. In 1989, three additional individuals were observed by the fourth author in water less than 1 m in depth in a zone of heavy surf; each fish spent most of the time within an area of about 1–2 m²; these areas included large colonies of *Palythoa tuberculosa* (Esper), plus colonies of *Porites lobata* Dana and *Pocillopora meandrina* Dana. The fifth author was brought to the site, where he took an underwater photograph of one of the fish. Later, five individuals of this species were seen along 200 m of shoreline at Opunaha

Gulch and Papawai Point (20° 47' 24" N, 156° 33' 30" E), two of which were clearly a pair. The first, fourth, and fifth authors went to this site on 12 October 1990, armed with a multi-prong spear; one specimen was speared by the fifth author (BPBM 34916, 54 mm SL). Data from this specimen are the basis for the above diagnosis.

It seems odd that this species was not discovered in the Hawaiian Islands until 1988, and it is still known only from West Maui. That it might be an unintentional introduction from the release of fish from an aquarium is most unlikely, because it is unknown in the aquarium fish trade. It could be a recent natural arrival to the archipelago, but it seems more probable that it is widespread in the Islands and has been overlooked because of its not being common and because of its habitat. It lives more inshore on exposed rocky coasts, in general, than the abundant *Plectroglyphidodon imparipennis* (Sauvage). It is sometimes seen in the same area as the common *P. sindonis* (Jordan & Evermann), but tends to occur in slightly deeper water than the latter species, usually where there is some coral or zoanthid on the substratum. We were able to see it only on very calm days, and even then, observation was difficult because of the surge.

Although not described until 1943, *Plectroglyphidodon phoenixensis* is now known throughout most of the Indo-Pacific region from East Africa to French Polynesia (Allen 1991).

The fourth author has observed a total of 13 individuals of *P. phoenixensis* at Maui. These fish occupied feeding territories of about 1–10 m² (smaller individuals in smaller territories, in general), which they defended vigorously. They were observed to feed on turf algae, the above-mentioned corals, and *Palythoa tuberculosa*. The feeding on these different food organisms seemed to be in approximate proportion to their abundance within the territories.

Family GOBIIDAE (Gobies)

Mugilogobius parvus (Oshima)
Plate IH

Glossogobius parvus Oshima, 1919:305, pl. 53, fig. 3 (type locality, Kizanto Island, Taiwan).

Diagnosis: Dorsal rays VI-I,9; anal rays I,9; pectoral rays 15–16; longitudinal scale series 39–43; scales ctenoid, except anteriorly; scales progressively larger posteriorly on body; opercle scaled but the scales largely embedded; small scales dorsally on head nearly reaching interorbital space; gill rakers short, 2–3 + 6–7; body depth 4.6–5.4 in SL; body width 1.4–1.7 in depth; head length 3.4–3.5 in SL; snout length 3.8–3.9 in head length; eye diameter 3.4–3.5 in head length; interorbital space 4.4–4.7 in head length; gill opening extending well below lower edge of pectoral-fin base but not reaching anteriorly to posterior edge of preopercle; caudal fin rounded, its length 3.7–3.9 in SL; pelvic fins about 1.4 in head length, with a distinct frenum having a small fleshy lobe at each end. Color in alcohol light brown, the edges of the scales darker, with about 11 indistinct narrow dark bars on upper two-thirds of body, the two on nape diagonal; indistinct dark brown bands radiating from eye; a prominent dark brown spot at base of opercle; a large curved dark brown spot in first dorsal fin covering about one-third of fin; a vertically elongate brown spot in middle of each membrane of second dorsal fin; irregular narrow vertical dark brown bars in caudal fin. In life the dark brown spots in the dorsal fins were black; a white submarginal band bordered the top of the black spot in the first dorsal fin, and a white submarginal band was evident in the second dorsal fin.

Remarks: The diagnosis above is based on two specimens collected at Coconut Island, Kaneohe Bay, Oahu, the first (BPBM 32749, 24.5 mm SL) by the sixth author in a mangrove area at 0.3 m depth in March 1988, and the second (BPBM 33492, 21.5 mm SL) by the first author on 2 August 1988 at the same location. In December 1989 Bronson Nagareda and Ryland Kam collected specimens from the Ala Moana drainage canal (BPBM 33930, 25: 23–46 mm). Mr. Nagareda remembered seeing the goby in a drainage area in Neal Blaisdell Park leading to Pearl Harbor in 1987. In June 1991 Arnold Y. Suzumoto went to the area where Nagareda had ob-

served the fish, collected it (BPBM 34997, 5: 14–50 mm), and observed it in other seepage and drainage areas in the vicinity.

We were unable to identify this goby when it was first collected, so we sent specimens to Helen K. Larson of the Northern Territory Museum, Darwin, who is revising the genus. She confirmed that the genus is *Mugilogobius* but was uncertain of the species. Later, after examining type specimens of species of the genus, she identified our material as *M. parvus* (Oshima), known from Taiwan and the Philippines.

Mugilogobius parvus has been found in the aquaculture pools of the Mariculture Research Training Center at the north end of Kaneohe Bay (BPBM 33931, 4: 30–40 mm, collected by Mike Yamamoto on 8 February 1990). All of these localities are brackish water areas at least part of the time, and all are characterized by mud substrata. The aquaculture ponds vary from fresh to brackish; the goby is much more common in the brackish ponds. If 10 individuals of this goby are placed in a freshwater aquarium, about two will survive and live well in the tank (Benjamin B. Alexander, MRTC, pers. comm.).

We believe *Mugilogobius parvus* has been inadvertently introduced to Hawaii, probably via ballast water of a ship. The same mode of transport is suspected for the introduction of two native Japanese estuarine gobiids, *Acanthogobius flavimanus* (Temminck & Schlegel) and *Tridentiger trignocephalus* (Gill), to San Francisco Bay, California, and Sydney Harbor, New South Wales (Hoese 1973). *M. parvus* has become a common fish in its habitat on Oahu, but it is not yet known from the other Hawaiian Islands.

Family TETRAODONTIDAE (Puffers)

Arothron manilensis (Procé)

Figure 1

Tetrodon manilensis Procé, 1822:130 (type locality, Bay of Manila).

Diagnosis: Dorsal rays 9; anal rays 9; pectoral rays 16; nasal organ anterior and medial to eye, consisting of two fleshy tentacles that branch from a common base (no openings

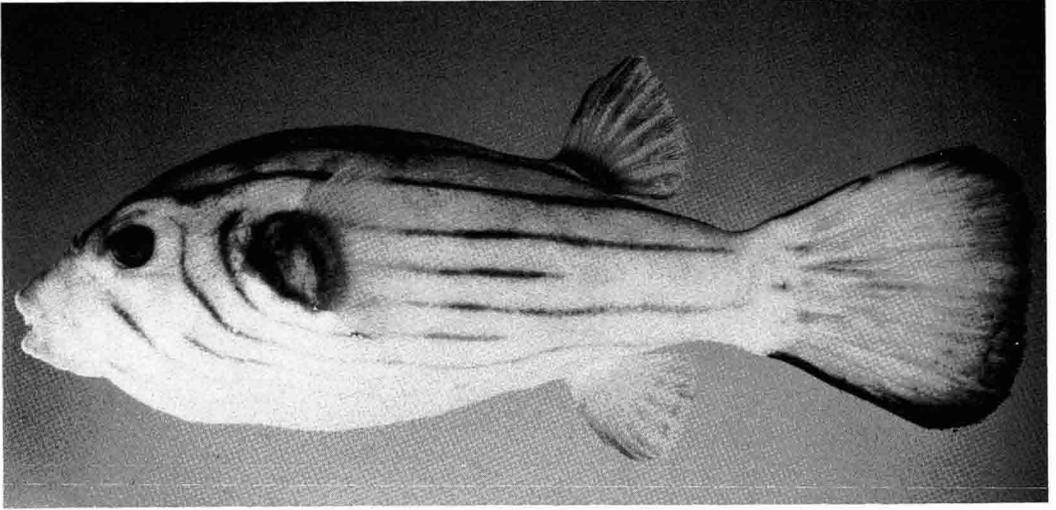


FIGURE 1. *Arothron manilensis*, BPBM 35400, 120 mm SL, Oahu (photo by J. Randall).

visible); head and body covered with barely perceptible small slender spinules except posteriorly on caudal peduncle, and region around mouth, eye, and gill opening; head length 2.55 in SL; snout short, 2.0 in head length; fleshy orbit diameter 5.9 in head length; interorbital space 2.05 in head length; longest dorsal ray 2.1 in head length; longest anal ray 2.15 in head length; caudal fin truncate with broadly rounded corners, and long, its length 2.6 in SL. Color when fresh: olivaceous, shading to white ventrally, with 10 black lines (about 1 mm wide) on body, the first middorsal, the seventh to tenth curving upward onto head; dorsal and anal fins with dusky rays and clear membranes; caudal fin with a diffuse black margin.

Remarks: A single individual of this distinctive puffer was caught by hand net by Clint T. Fujimoto at 1.5 m depth off Diamond Head, Oahu, on 29 October 1992. The bottom was sand and reef with a heavy growth of *Sargassum*. The fish, which was not recognized by Fujimoto as one seen by him previously, was brought to Saltwater Fish Hawaii, where it was also realized as unusual for Hawaiian waters. The specimen (BPBM 35400, 120 mm SL) was given to the Bishop Museum and identified as *Arothron manilensis*.

Arothron manilensis has long been regarded as a synonym of *A. immaculatus* Bloch & Schneider. Randall (1985b), however, showed that it is distinct from *immaculatus* in having a longer caudal fin and dark stripes. *A. immaculatus* is an Indian Ocean species, and *A. manilensis* is primarily a western Pacific one, but the two occur together in Indonesia, the Philippines, and the Ryukyu Islands. *A. manilensis* ranges east in Oceania to Samoa in the Southern Hemisphere, and before this record in Hawaii, to the Marshall Islands and Gilbert Islands (Kiribati) in the Northern Hemisphere.

The usual habitat was described by Randall (1985b) as "shallow protected waters, generally where the sea is somewhat turbid and the substratum silty sand or mud, with or without heavy plant growth; it readily penetrates brackish habitats." The Oahu locality off Diamond Head is a little unusual for the species except for the heavy growth of *Sargassum*. It would be expected more from an area such as Pearl Harbor or Honolulu Harbor. The possibility that this fish is an aquarium release cannot be completely discounted, but it seems unlikely, because we have never seen it in the aquarium trade. It is probably a waif that drifted in as a larva from a distant locality.

ACKNOWLEDGMENTS

We thank the following persons for assistance in this study: Benjamin B. Alexander, Kenneth and Linda Bail, Bruce A. Carlson, Hattie Chapman, William S. Devick, Clint T. Fujimoto, Douglass F. Hoese, Thomas F. Hourigan, Kurt E. Kawamoto, Helen K. Larson, Philip A. McGillivray, Bruce C. Mundy, Loreen R. O'Hara, James D. Parrish, Theodore W. Pietsch, Richard L. Pyle, Helen A. Randall, Frank G. Stanton, Kenneth A. Tighe, Alan K. Tomita, and Arnold Y. Suzumoto. Bruce A. Carlson, David W. Greenfield, Bruce C. Mundy, and Helen A. Randall reviewed the manuscript. Mundy kindly provided us with some references to Hawaiian fishes unavailable at the Bishop Museum. He also pointed out some references pertinent to the classification of Hawaiian fishes overlooked by Randall (1980).

LITERATURE CITED

- AKIHITO and K. MEGURO. 1979. On the difference between the genera *Sicydium* and *Sicyopterus* (Gobiidae). *Jpn. J. Ichthyol.* 26(2): 192–202.
- ALLEN, G. R. 1970. Two new species of frogfishes (Antennariidae) from Easter Island. *Pac. Sci.* 24(4): 517–522.
- . 1975. *Damselfishes of the South Seas*. T.F.H. Publications, Neptune City, New Jersey.
- . 1979. *Butterfly and angelfishes of the world*, vol. 2. Mergus Publishers, Melle, Germany and John Wiley and Sons, New York and Toronto.
- . 1991. *Damselfishes of the world*. Mergus Publishers, Melle, Germany.
- ALLEN, G. R., and R. H. KUITER. 1978. *Heniochus diphreutes* Jordan, a valid species of butterflyfish (Chaetodontidae) from the Indo-west Pacific. *J. R. Soc. West. Aust.* 61(1): 11–18.
- ALLEN, G. R., and F. H. TALBOT. 1985. Review of the snappers of the genus *Lutjanus* (Pisces: Lutjanidae) from the Indo-Pacific, with the description of a new species. *Indo-Pacific Fishes*. No. 11.
- ANDERSON, W. D., JR. 1981. A new species of Indo-west Pacific *Etelis* (Pisces: Lutjanidae), with comments on other species of the genus. *Copeia* 1981(4): 820–825.
- . 1987. Systematics of the fishes of the family Lutjanidae (Perciformes: Percoidae), the snappers. Pages 1–87 in J. J. Polovina and S. Ralston, eds. *Tropical snappers and groupers: Biology and fisheries management*. Westview Press, Boulder, Colorado.
- BALDWIN, W. J. 1984. A note on the occurrence of the gold spot herring, *Herklotsichthys quadrimaculatus* (Rüppell) in Hawaii. *Pac. Sci.* 38(2): 123–126.
- BLEEKER, P. 1852. Derde bijdrage tot de kennis der ichthyologische fauna van Celebes. *Nat. Tijdschr. Neder.-Indië* 3: 739–782.
- BLISS, R. 1883. Descriptions of new species of Mauritian fishes. *Trans. R. Soc. Mauritius* 13: 45–63.
- BÖHLKE, E. B., and J. E. MCCOSKER. 1982. *Monopenchelys*, a new eel genus, and re-description of the type species, *Uropterygius acutus* Parr (Pisces: Muraenidae). *Proc. Acad. Nat. Sci. Phila.* 134: 127–134.
- BÖHLKE, E. B., J. E. MCCOSKER, and J. E. BÖHLKE. 1989. Family Muraenidae. Pages 104–205 in E. B. Böhlke, ed. *Fishes of the western North Atlantic*, part 9, vol. I, Orders Anguilliformes and Saccopharyngiformes. *Mem. Sears Found. Mar. Res.* 1.
- BRUCE, R. W., and J. E. RANDALL. 1985. Revision of the Indo-Pacific parrotfish genera *Calotomus* and *Leptoscarus*. *Indo-Pacific Fishes*. No. 5.
- CASTLE, P. H. J. 1980. Identification of *Congrogadus marginatus* from Hawaii with the eel genus *Ariosoma* (Pisces: Congridae). *Copeia* 1980(1): 159–160.
- CRESSEY, R. 1981. Revision of Indo-West Pacific lizardfishes of the genus *Synodus* (Pisces: Synodontidae). *Smithson. Contrib. Zool.* 342: 1–51.
- CUVIER, G., and A. VALENCIENNES. 1831. *Histoire naturelle des poissons*, vol. 7. F. G. Levrault, Paris.
- DAWSON, C. E. 1973. Indo-Pacific distribution of microdesmid fishes (Gobioidea). *J. Mar. Biol. Assoc. India* 15(1): 318–322.
- . 1985. Indo-Pacific pipefishes (Red Sea to the Americas). *The Gulf Coast Re-*

- search Laboratory, Ocean Springs, Mississippi.
- EMERY, A. R., and G. R. ALLEN. 1980. *Stegastes*; a senior synonym for the damselfish genus *Eupomacentrus*; osteological and other evidence, with comments on other genera. *Rec. West. Aust. Mus.* 8(2): 199–206.
- FITCH, J. E., and S. J. CROOKE. 1984. Revision of eastern Pacific catalufas (Pisces: Pristigasteridae) with description of a new genus and discussion of the fossil record. *Proc. Calif. Acad. Sci.* 43(19): 301–315.
- FOLLETT, W. I., and J. E. RANDALL. 1989. *Heliastes ovalis* F. Steindachner, 1900 (currently *Chromis ovalis*; Osteichthyes, Perciformes): proposed conservation of the specific name. *Bull. Zool. Nomencl.* 46(1): 35–37.
- FORSSKÅL, P. 1775. *Descriptiones animalium . . . piscium . . . in itinere orientali observavit.* Mölleri, Copenhagen.
- FOWLER, H. W. 1938. The fishes of the George Vanderbilt South Pacific Expedition, 1937. *Monogr. Acad. Nat. Sci. Phila.* 2.
- FRASER, T. H., and E. A. LACHNER. 1985. A revision of the cardinalfish subgenera *Pristiapogon* and *Zoramia* (genus *Apogon*) of the Indo-Pacific region (Teleostei: Apogonidae). *Smithson. Contrib. Zool.* 412.
- FRASER, T. H., and P. J. STRUHSACKER. 1991. A new genus and species of cardinalfish (Apogonidae) from the Indo-West Pacific, with a key to apogonine genera. *Copeia* 1991(3): 718–722.
- FRICKE, R. 1983. Revision of the Indo-Pacific genera and species of the dragonet family Callionymidae. J. Cramer, Germany.
- GON, O. 1984. *Paratrachichthys heptalepis*, a new roughie (Pisces, Trachichthyidae) from the Hawaiian Islands. *Pac. Sci.* (1983) 37(3): 293–299.
- . 1987. New records of three fish species from Hawaii. *Jpn. J. Ichthyol.* 34(1): 100–104.
- GOSLINE, W. A., and V. E. BROCK. 1960. *Handbook of Hawaiian fishes.* University of Hawaii Press, Honolulu.
- GREENFIELD, D. W. 1974. A revision of the squirrelfish genus *Myripristis* Cuvier (Pisces: Holocentridae). *Nat. Hist. Mus. Los Angeles Cty. Sci. Bull.* 19.
- HARDY, G. S. 1983a. The status of *Torquigener hypselogeneion* (Bleeker) (Tetraodontiformes: Tetraodontidae) and some related species, including a new species from Hawaii. *Pac. Sci.* 37(1): 65–74.
- . 1983b. A revision of the fishes of the family Pentacerotidae (Perciformes). *N.Z. J. Zool.* 10: 177–220.
- HATOOKA, K., and J. E. RANDALL. 1992. A new moray eel (*Gymnothorax*: Muraenidae) from Japan and Hawaii. *Jpn. J. Ichthyol.* 39(3): 183–190.
- HEEMSTRA, P. C. 1984. *Apolemichthys kingi*, a new species of angelfish (Pomacanthidae) from South Africa, with comments on the classification of angelfishes and a checklist of the pomacanthids of the western Indian Ocean. *J. L. B. Smith Inst. Ichthyol. Spec. Publ.* 35.
- HOBSON, E. S. 1980. The structure of reef fish communities in the Hawaiian Archipelago: Interim status report. Pages 57–70 in R. W. Grigg and R. R. Pfund, eds. *Proceedings of the Symposium on Status of Resource Investigations in the Northwestern Hawaiian Islands.* Univ. Hawaii Sea Grant Misc. Rep. 80-4.
- HOESE, D. F. 1973. The introduction of the gobiid fishes *Acanthogobius flavimanus* and *Tridentiger trigonocephalus* into Australia. *Koolewong* 2(3): 3–5.
- HOESE, D. F., and R. WINTERBOTTOM. 1979. A new species of *Liateres* (Pisces, Gobiidae) from Kwazulu, with a revised checklist of South African gobies and comments on the generic relationships and endemism of western Indian Ocean gobioids. *R. Ont. Mus. Life Sci. Occas. Pap.* 31.
- HUMPHREYS, R. L., JR., G. A. WINANS, and D. T. TAGAMI. 1989. Synonymy and life history of the North Pacific pelagic armorhead, *Pseudopentaceros wheeleri* Hardy (Pisces: Pentacerotidae). *Copeia* 1989(1): 142–153.
- HUTCHINS, J. B. 1986. Review of the monacanthid fish genus *Pervagor*, with descriptions of two new species. *Indo-Pacific Fishes.* No. 12.

- INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE. 1990. Opinion 1622. *Helicostes ovalis* Steindachner, 1900 (currently *Chromis ovalis*; Osteichthys, Perciformes): Specific name conserved. Bull. Zool. Nomencl. 47(4): 300.
- JORDAN, D. S., and B. W. EVERMANN. 1903. Descriptions of new genera and species of fishes from the Hawaiian Islands. Bull. U.S. Fish Comm. 22 (1902): 161–208.
- . 1905. The aquatic resources of the Hawaiian Islands. Part I. The shore fishes. Bull. U.S. Fish Comm. 23 (1903): xxviii + 574.
- KATAYAMA, M., and K. AMAOKA. 1986. Two new anthiine fishes from the eastern tropical Atlantic. Jpn. J. Ichthyol. 33(3): 213–222.
- KHARIN, V. E., and V. A. DUDAREV. 1983. A new species of the genus *Caprodon* Temminck et Schlegel, 1843 (Serranidae) and some remarks on the composition of the genus. Vopr. Ikhtiol. (J. Ichthyol.) 23(1): 20–25.
- KISHIMOTO, H., M. HAYASHI, H. KOHNO, and O. MORIYAMA. 1988. Revision of Japanese batfishes, genus *Platax*. Sci. Rep. Yokosuka City Mus. 36: 19–38.
- KOSAKI, R. K. 1989. *Centropyge nahackyi*, a new species of angelfish from Johnston Atoll (Teleostei: Pomacanthidae). Copeia 1989(4): 880–886.
- KOSAKI, R. K., R. L. PYLE, J. E. RANDALL, and D. K. IRONS. 1991. New records of fishes from Johnston Atoll, with notes on biogeography. Pac. Sci. 45(2): 186–203.
- LAMBER, C. K. 1963. Fossil and recent beryciform otoliths; an adjunct to ichthyological classification. M.S. thesis, University of Missouri, Rolla.
- LARSON, H. K. 1985. A revision of the gobiid genus *Bryaninops* (Pisces), with a description of six new species. Beagle 2(1): 57–93.
- . 1990. A revision of the commensal gobiid fish genera *Pleurosicya* and *Luposicya* (Gobiidae), with descriptions of eight new species of *Pleurosicya* and discussion of related genera. Beagle 7(1): 1–53.
- MACIOLEK, J. A. 1978. Taxonomic status, biology, and distribution of Hawaiian *Leptipes*, a diadromous goby. Pac. Sci. (1977) 31(4): 355–362.
- MARKLE, D. F., and J. E. OLNEY. 1981. A description of the vexillifer larvae of *Pyramodon ventralis* and *Snyderidia canina* (Pisces, Carapidae) with comments on classification. Pac. Sci. (1980) 34(2): 173–180.
- . 1990. Systematics of the pearlfishes (Pisces: Carapidae). Bull. Mar. Sci. 47(2): 269–410.
- MATARESE, A. C., W. WATSON, and E. G. STEVENS. 1984. Blennioidea: Development and relationships. In H. G. Moser, W. J. Richards, D. M. Cohen, M. P. Fahay, A. W. Kendall, Jr., and S. L. Richardson, eds. Ontogeny and systematics of fishes. Am. Soc. Ichthyol. Herpetol. Spec. Publ. 1.
- MATSUURA, K., and T. SHIMIZU. 1982. The squirrelfish genus *Adioryx*, a junior synonym of *Sargocentron*. Jpn. J. Ichthyol. 29(1): 93–94.
- MAUGÉ, A. L., and P. GUÉZÉ. 1984. Remarques sur les Mullés décrits par Lacepède et statut des deux espèces de *Parupeneus*: *P. cyclostomus* et *P. rubescens* (Pisces, Teleostei, Mullidae). Bull. Mus. Natl. Hist. Nat., sér. 4, 6(2): 487–503.
- MCCOSKER, J. E., K. HATOOKA, K. SASAKI, and J. T. MOYER. 1984. Japanese moray eels of the genus *Uropterygius*. Jpn. J. Ichthyol. 31(3): 261–267.
- NELSON, G. 1983. *Anchoa argentivittata*, with notes on other eastern Pacific anchovies and the Indo-Pacific genus *Encrasicolina*. Copeia 1983(1): 48–54.
- NELSON, J. S. 1984. Fishes of the world, 2d ed. John Wiley and Sons, New York.
- NISHIDA, K., and K. NAKAYA. 1990. Taxonomy of the genus *Dasyatis* (Elasmobranchii, Dasyatidae) from the north Pacific. Pages 327–345 in H. L. Pratt, Jr., S. H. Gruber, and T. Taniuchi, eds. Elasmobranchs as living resources: Advances in the biology, ecology, systematics, and the status of the fisheries. NOAA Tech. Rep. 90.
- OSHIMA, M. 1919. Contributions to the study of the freshwater fishes of Formosa. Ann. Carnegie Mus. 12: 169–328.
- PALSSON, W. A., and T. W. PIETSCH. 1989.

- Revision of the acanthopterygian fish family Pegasidae (Order Gasterosteiformes Indo-Pacific Fishes. No. 18.
- PARIN, N. V., and P. D. BORODULINA. 1986. Preliminary review of the benthopelagic fish genus *Antigonia* Lowe (Zeiformes, Caproidae). Trans. P. P. Shirshov Inst. Oceanol., Moscow 121A: 141–172.
- PAULIN, C. D. 1989. Review of the morid genera *Gadella*, *Physiculus*, and *Salilota* (Teleostei: Gadiformes) with descriptions of seven new species. N. Z. J. Zool. 16:93–133.
- PIETSCH, T. W., and D. B. GROBECKER. 1987. Frogfishes of the world. Stanford University Press, Stanford, California.
- PROCÉ, M. MARION DE. 1822. Sur plusieurs espèces nouvelles de poissons et de crustacés observées par M. Marion de Procé. Bull. Sci. Soc. Philom., Paris. 129–134.
- RALSTON, S. 1981. A new record of the pomacanthid fish *Centropyge interruptus* from the Hawaiian Islands. Jpn. J. Ichthyol. 27(4): 327–329.
- RANDALL, J. E. 1976. The endemic shore fishes of the Hawaiian Islands, Lord Howe Island and Easter Island. Trav. Doc. O.R.S.T.O.M. 47:49–73.
- . 1980. New records of fishes from the Hawaiian Islands. Pac. Sci. 34(3): 211–232.
- . 1981. *Luzonichthys earlei*: a new species of anthiine fish from the Hawaiian Islands. Freshwater Mar. Aquarium 4(9): 13–18.
- . 1985a. Guide to Hawaiian reef fishes. Harwood Books, Newtown Square, Pennsylvania, and Treasures of Nature, Kaneohe, Hawaii.
- . 1985b. On the validity of the tetraodontid fish *Arothron manilensis* (Procé). Jpn. J. Ichthyol. 32(3): 347–354.
- . 1986. 106 new records of fishes from the Marshall Islands. Bull. Mar. Sci. 38(1): 170–252.
- . 1987. Introductions of marine fishes to the Hawaiian Islands. Bull. Mar. Sci. 41(2): 490–502.
- . 1988. Three nomenclatorial changes in Indo-Pacific surgeonfishes (Acanthurinae). Pac. Sci. (1987) 41(1–4): 54–61.
- RANDALL, J. E., and L. J. BELL. 1992. *Naso caesius*, a new acanthurid fish from the Central Pacific. Pac. Sci. 46(3): 344–352.
- RANDALL, J. E., and G. H. P. DE BRUIN. 1988. The butterflyfish *Prognathodes quoyotensis* from the Maldive Islands, a first record for the Indian Ocean. Cybium 12(2): 145–149.
- RANDALL, J. E., and A. EDWARDS. 1984. A new labrid fish of the genus *Thalassoma* from the Pitcairn Group, with a review of related Indo-Pacific species. J. Aquaric. Aquat. Sci. 4(2): 13–32.
- RANDALL, J. E., and P. C. HEEMSTRA. 1985. A review of the squirrelfishes of the subfamily Holocentrinae from the western Indian Ocean and Red Sea. Ichthyol. Bull. J. L. B. Smith Inst. Ichthyol. 49: 1–29.
- RANDALL, J. E., and R. K. KANAYAMA. 1972. Hawaiian fish immigrants. Sea Front. 18(3): 144–153.
- RANDALL, J. E., and S. RALSTON. 1984. A new species of serranid fish of the genus *Anthias* from the Hawaiian Islands and Johnston Island. Pac. Sci. 38(3): 220–227.
- RANDALL, J. E., and H. A. RANDALL. 1987. Annotated checklist of the fishes of Enewetak Atoll and other Marshall Islands. Pages 289–324 in D. M. Devaney, E. S. Reese, B. L. Burch, and P. Helfrich, eds. The natural history of Enewetak Atoll, Vol. II, Biogeography and systematics. U.S. Department of Energy, Office of Scientific and Technical Information, Oak Ridge, Tennessee.
- RANDALL, J. E., and P. STRUHSAKER. 1971. The acanthurid fish *Naso lopezi* Herre from the Hawaiian Islands. Copeia 1971(2): 320–332.
- . 1981. *Naso maculatus*, a new species of acanthurid fish from the Hawaiian Islands and Japan. Copeia 1981(3): 553–558.
- RANDALL, J. E., and S. N. SWERDLOFF. 1973. A review of the damselfish genus *Chromis* from the Hawaiian Islands, with descriptions of three new species. Pac. Sci. 27(4): 327–349.
- RANDALL, J. E., and L. TAYLOR. 1988. Review of the Indo-Pacific fishes of the serranid genus *Liopropoma*, with descriptions of seven new species. Indo-Pacific Fishes. No. 16.
- RANDALL, J. E., K. AIDA, Y. OSHIMA, K.

- HORI, and Y. HASHIMOTO. 1981. Occurrence of a crinotoxin and hemagglutinin in the skin mucus of the moray eel *Lycodontis nudivomer*. *Mar. Biol. (Berl.)* 62: 179–184.
- RANDALL, J. E., G. R. ALLEN, and R. C. STEENE. 1990a. Fishes of the Great Barrier Reef and Coral Sea. Crawford House Press, Bathurst, New South Wales.
- RANDALL, J. E., P. S. LOBEL, and E. H. CHAVE. 1985. Annotated checklist of the fishes of Johnston Island. *Pac. Sci.* 39(1): 24–80.
- RANDALL, J. E., T. SHIMIZU, and T. YAMAKAWA. 1982. A revision of the holocentrid fish genus *Ostichthys*, with descriptions of four new species and a related new genus. *Jpn. J. Ichthyol.* 29(1): 1–26.
- RANDALL, J. E., C. L. SMITH, and M. N. FEINBERG. 1990b. Report on fish collections from Rapa, French Polynesia. *Am. Mus. Novit.* 2966.
- REGAN, C. T. 1912. New fishes from Aldabra and Assumption, collected by Mr. J. C. F. Fryer. *Trans. Linn. Soc. London (Zool.)* 15(2): 301–302.
- ROBINS, C. R. 1991. Two new species of *Ophidion* (Pisces: Ophidiidae) from remote islands of the eastern Pacific. *Nat. Hist. Mus. Los Angeles Cty. Contrib. Sci.* 427.
- RUSSELL, B. C. 1985. Revision of the Indo-Pacific labrid fish genus *Suezichthys*, with descriptions of four new species. *Indo-Pacific Fishes*. No. 2.
- SCHULTZ, L. P. 1943. Fishes of the Phoenix and Samoan islands collected in 1939 during the expedition of the U.S.S. "Bushnell." *Bull. U.S. Natl. Mus.* 180.
- SHAKLEE, J. B., and C. S. TAMARU. 1981. Biochemical and morphological evolution of Hawaiian bonefishes (*Albula*). *Syst. Zool.* 30(2): 125–146.
- SMITH, J. L. B. 1962. The moray eels of the western Indian Ocean and the Red Sea. Rhodes Univ., Dep. Ichthyol. Bull. 23: 421–444.
- SPRINGER, V. G. 1991. Documentation of the blennioid fish *Parablennius thysanius* from the Hawaiian Islands. *Pac. Sci.* 45(1): 72–75.
- STARNES, W. C. 1988. Revision, phylogeny and biogeographic comments on the circumtropical marine percoid fish family Priacanthidae. *Bull. Mar. Sci.* 43(2): 117–203.
- TINKER, S. W. 1978. Fishes of Hawaii. Hawaiian Service, Inc., Honolulu.
- WAPLES, R. S. 1982. A biochemical and morphological review of the lizardfish genus *Saurida* in Hawaii, with the description of a new species. *Pac. Sci.* 35(3): 217–235.
- WAPLES, R. S., and J. E. RANDALL. 1988. A revision of the Hawaiian lizardfishes of the genus *Synodus*, with descriptions of four new species. *Pac. Sci.* 42(3–4): 178–213.
- WASS, R. C. 1984. An annotated checklist of the fishes of Samoa. NOAA Tech. Rep. NMFS SSRF-781.
- WATSON, R. E. 1991. A provisional review of the genus *Stenogobius* with descriptions of a new subgenus and thirteen new species (Pisces: Teleostei: Gobiidae). *Rec. West. Aust. Mus.* 15(3): 627–710.
- WHITEHEAD, P. J. P. 1973. A synopsis of the clupeoid fishes of India. *J. Mar. Biol. Assoc. India* 14(1): 160–256.
- WHITEHEAD, P. J. P., and W. IVANTSOFF. 1983. *Atherina lacunosa* and the fishes described by J. R. Forster. *Jpn. J. Ichthyol.* 29(4): 355–364.
- WILLIAMS, J. T. 1988. Revision and phylogenetic relationships of the blennioid fish genus *Cirripectes*. *Indo-Pacific Fishes*. No. 17.
- WILLIAMS, V. R., and T. A. CLARKE. 1983. Reproduction, growth, and other aspects of the biology of the gold spot herring, *Herklotsichthys quadrimaculatus* (Clupeidae), a recent introduction to Hawaii. *Fish. Bull.* 81(3): 587–597.