Novaculoides, a new genus for the Indo-Pacific labrid fish
Novaculichthys macrolepidotus

John E. Randall and John L. Earle

Bishop Museum, 1525 Bernice St., Honolulu, HI 96817-2704, USA

Accepted: 19.09.2003

Keywords
Taxonomy, Labridae, Indo-Pacific, new genus

Abstract
The new genus Novaculoides is proposed for one species of labrid fish previously classified as Novaculichthys macrolepidotus (Bloch). The genus is distinct from Novaculichthys in possessing the following characters: anterior pair of canine teeth in jaws curving laterally; two or three oblique rows of small embedded scales on cheek; head short, its length 3.4-3.65 in SL; body moderately elongate, the depth 2.8-3.0 in standard length; longest dorsal and anal soft rays about equal in length; pelvic fins of males often longer than head, 3.1-4.2 in standard length. Novaculichthys is now monotypic for the species taeniourus (Lacépède).

Introduction
Norman (1957) divided the fishes of the family Labridae, popularly called wrasses, into nine subfamilies, one of which was the Hemipteronotinae in which he classified three genera, Cymolutes Günther, Hemipteronotus Lacépède, and Inistiis Gill. He included eight genera as synonyms of Hemipteronotus, among them Xyrichtys Cuvier and Novaculichthys Bleeker. Randall & Bauchot (1993) explained that Hemipteronotus was intended by Lacépède for the Pilotfish (Naucrates duxor), the generic name Hemipteronotus in reference to its short dorsal fin. The razorfish now identified as Inistiis pentadactylus (Linnaeus) was included in the synonymy of Hemipteronotus, and the genus was later restricted to it. Because both Naucrates and Xyrichtys were threatened by Hemipteronotus, Opinion 1799 of the International Commission on Zoological Nomenclature suppressed Hemiptemonotus. Xyrichtys then replaced Hemipteronotus, and the subfamily name changed to Xyrichtyinae.

The majority of authors have not accepted Norman’s placement of Novaculichthys as a synonym of what is...
now Xyrichtys. Three species have long been classified in Novaculichthys, the type species N. taeniourus (Lacepède), N. macrolepidotus (Bloch), and N. woodi Jenkins.

Schultz in Schultz & collaborators (1960) erected a new genus, Novaculops, for woodi. Some later authors, however, preferred to retain woodi in Novaculichthys.

Randall & Earle (2002) discovered that woodi belongs in the genus Xyrichtys, the type species of which, X. novacula Cuvier, is one of five Atlantic razorfishes (reviewed by Randall, 1965, then placed in Hemipteronotus). Xyrichtys is represented by three species in the eastern Pacific (Victor et al., 2001). A fourth eastern Pacific razorfish, Iniistius pavo (Valenciennes), is also wide-ranging in the Indo-Pacific region. Gill (1862) erected the genus Iniistius, based on its having the first two dorsal spines flexible, detached from the rest of the fin, and elongate (especially in juveniles). Recent authors such as Yamakawa in Masuda et al. (1984), Randall in Smith & Heemstra (1986), Masuda & Kobayashi (1994), and Okamura & Amaoka (1997) regarded Iniistius as a synonym of Xyrichtys. However, Randall & Earle (2002), following the unpublished PhD thesis on labrid osteology by Tri-thuc Nguyen (1974), provided the following characters to resurrect Iniistius as a valid genus for pavo and other Indo-Pacific species that had previously been placed in Xyrichtys: palatine bone overlaps the ectropterygoid in Iniistius, whereas it is separate in Xyrichtys; there are no dorsal pterygiophores between the second and third neural species of Iniistius, but two in Xyrichtys; the skull is notably higher in adult Iniistius than in Xyrichtys. Externally, the origin of the dorsal fin is more anterior in Iniistius, the space between the second and third dorsal spines is much broader in Iniistius, and the membrane between these two spines is strongly incised, or in the case of I. pavo and I. dea (Temminck & Schlegel), completely absent.

Randall & Carlson (1997) described Ammolabrus dicrus as a new genus and new species of the subfamily Xyrichtyiinae from the Hawaiian Islands, differing notably from the other species, which are benthic, in forming schools that feed on zooplankton well above the sandy substratum.

The fishes of the Xyrichtyiinae, many of which are called razorfishes because of their strongly compressed bodies and the firm ridge anteriorly on the head, are able to escape approaching predators by diving head-first into sand. Most live over open stretches of sand away from the shelter of coral or rocky reef or heavy plant growth because of their ability to avoid predation in this unique way. Ammolabrus dicrus generally escapes predators by swiftly swimming in elusive schools, but it will take refuge under sand as a last resort. Two species of the subfamily that do not live over open sand far from the shelter of reef or plant cover are the Rockmover Wrasse, Novaculichthys taeniourus, which occurs mostly on rubble-sand areas near reefs, and the Seagrass Wrasse, N. macrolepidotus. The former can dive into sand as needed, while the latter relies on its protective coloration (green in seagrass) and cryptic behavior in dense benthic plant growth.

The authors have long been aware that Novaculichthys macrolepidotus seems too divergent from the type species and the only other species of the genus, N. taeniourus, to remain in the genus. The present study confirms that it warrants placement in a new genus. A brief diagnosis of the Xyrichtyiinae is given below, followed by a key to the genera of the subfamily, a diagnosis of the new genus, and a species account of the one species of the genus.

Materials and Methods

Specimens were examined at the Bernice P. Bishop Museum, Honolulu (BPBM); California Academy of Sciences, San Francisco (CAS, SU), and the U.S. National Museum of Natural History, Washington, D.C. (USNM).

Novaculoides macrolepidotus material examined

Red Sea: Sinai Peninsula, Ras Muhammad, mangrove channel, USNM 221762, 85 mm.
Seychelles: La Digue, BPBM 21651, 74.5 mm. Amritanes, Alphonse, BPBM 35604, 2: 60-60.3 mm. Aldabra, USNM 289765, 3: 39-68 mm. Indonesia: Lombok, BPBM 29800, 121.6 mm. Papua New Guinea: Admiralty Islands, USNM 114807, 82 mm. Santa Cruz Islands: Taumako Island (9°51'S, 167°9.5'E), USNM 357184, 24 mm. Philippines: Negros, Dumague, SU 38765, 2: 84-90 mm. Cebu, Cebu City market, BPBM 22094, 3: 118-126 mm. Luzon, Sorsogon Province, Gubal, USNM 327866, 5: 52-101 mm. Cagayan Province, Santa Ana, USNM 309339, 4: 53-104 mm. San Vicente, USNM 309377, 45 mm. Batanes, USNM 332196, 47 mm. Palau: CAS 73622, 3: 68-102 mm. Lord Howe Island: BPBM 35031, 125 mm. Fiji: Viti Levu, AMS I.222-32-014, 71 mm. Tonga: Tongatapu, BPBM 37916, 128 mm.

Subfamily Xyrichtyiinae

Diagnosis

Dorsal rays IX,12-15, the first one or more spines flexible; anal rays III (rarely II),12-13; branched caudal rays 10-12; pectoral rays 12-13, the uppermost rudimentary; pelvic rays I,5; longitudinal scale series 72-93 (Cymolutes) or 26 (all other genera); lateral line interrupted; cheek naked or with a few rows of small scales; opercle naked except for 1-4 scales dorsally; gill rakers short, fewer than 26; branchiostegal rays 5-6; vertebrae 25; a single pair of large canine teeth anteriorly in jaws, the lower pair fitting inside upper when mouth closed (if a second pair of canines are present, they are about half length of anterior pair); no
canine at corner of mouth; pharyngeal teeth bluntly conical, nodular, or as very small molars; preopercular edge free and without serration; body depth variable, but body always compressed, the width varying from 2-3.5 in depth; no scales basally on dorsal or anal fins; caudal fin usually slightly rounded (slightly forked in Ammolabrus).

Future study may result in the removal of the genus Cymolutes, represented by three fine-scaled Indo-Pacific species, from the Xyrichtyinae.

Key to the genera of Xyrichtyinae

1a. Scales small, the lateral line scales 48-68 + 15-22; branched caudal rays 10; head naked ............. Ammolabrus

1b. Scales not small, the lateral line scales 19-22 + 4-6; branched caudal rays 12 (rarely 11); some scales present on head (may be only one or two dorsally on opercle) ......................... Cymolutes

2a. Caudal fin slightly forked; all dorsal spines flexible; body elongate, the depth 4.2-4.45 in standard length; upper jaw strongly protrusible, the median process of premaxilla extending to above anterior edge of pupil ................................................. Ammolabrus

2b. Caudal fin truncate to slightly rounded; only the first one or two dorsal spines flexible; body not elongate, the depth 2.3-3.9 in standard length; upper jaw not protrusible ..............................................

3a. Pair of canine teeth anteriorly in jaws not curving laterally; anal soft rays not nearly as long as dorsal soft rays .................................................. Novaculichthys

3b. Pair of laterally and inwardly curving canine teeth anteriorly in jaws, the tips of lower pair overlapping base of upper pair when mouth closed; anal soft rays about equal in length to dorsal soft rays .............................................

4a. A second pair of canine teeth in jaws half as long as first pair; no scales on cheek; head short, 3.4-3.65 in SL; body moderately elongate, the depth 3.5-3.95 in SL; dorsal and anal soft rays 13; longest dorsal soft ray about twice as long as longest dorsal spine ...... Novaculoides

4b. No second pair of canine teeth anteriorly in jaws; small scales present on cheek; head not short, 3.1-3.4 in SL; body not elongate, the depth 2.3-3.4 in SL (except the Atlantic Xyrichtys martiniensis with depth 3.2-3.8 in SL); dorsal and anal soft rays 12; longest dorsal soft ray at most 1.5 times longer than longest dorsal spine ................................

5a. Origin of dorsal fin more than an eye diameter behind eye; space between second and third dorsal spines much greater than spaces between other spines; membrane between second and third dorsal spines deeply incised (or in the case of two species, the first two spines completely separate) .............................................. Iniistius

5b. Origin of dorsal fin over eye or less than half an eye diameter behind eye; space between second and third dorsal spines much greater than spaces between other spines; membrane between second and third dorsal spines deeply incised (or in the case of two species, the first two spines completely separate) .............................................. Iniistius

Novaculoides, new genus

Type species: Labrus macrolepidotus Bloch, 1791

Diagnosis

Dorsal and anal rays IX,13; lateral line interrupted, the pored scales 20 + 5-6; a pair of inwardly and laterally curving canine teeth anteriorly in jaws; no canine tooth at corner of mouth; pharyngeal teeth small and bluntly conical to nodular; two or three oblique rows of small embedded scales from behind corner of mouth to behind lower part of eye; body moderately elongate, the depth 3.5-3.65 in SL, and compressed, the width 2.8-3.1 in depth; head short, 3.4-3.65 in SL; dorsal profile of head about 45°; no acute ridge anteriorly on head; origin of dorsal fin nearly reaching to above upper end of preopercular margin; first two dorsal spines flexible, the tips curving posteriorly; no broad gap between base of second and third dorsal spines; dorsal spines short (except prolonged first two of juveniles), the longest soft rays nearly twice as long as longest spine; anal soft rays about equal in length to dorsal soft rays.

Remarks

Novaculichthys is differentiated from Novaculoides by the following characters: anterior pair of canine teeth in jaws not curved laterally; a single near-vertical row of small embedded scales behind and slightly below eye; body depth 2.8-3.0 in standard length; head length 2.8-3.0 in standard length; longest anal soft rays about 1.2 times longer than longest dorsal soft rays; pelvic fins of adults shorter than pectoral fins, about 7 in standard length.

Xyrichtys differs from Novaculoides in lacking a second pair of canine teeth anteriorly in the jaws, half as long as the anterior canines; not having any scales on the cheek or behind the eye; head not short, its length 3.1-3.4 in standard length; dorsal and anal soft rays 12; longest dorsal soft ray at most 1.5 times longer than longest dorsal spine.

Although sharing some characters with Novaculichthys and Xyrichtys, Novaculoides does not fit well in either genus.
**Novaculoides macrolepidotus** (Bloch, 1791)

Figs. 1-4

*Labrus macrolepidotus* Bloch, 1791: 135, pl. 284, fig. 2 (type locality unknown).

*Labrus arago* Quoy & Gaimard, 1824: 263, pl. 65, fig. 2 (type locality, Iles des Papous).

*Labrus taenianotus* Cuvier in Quoy & Gaimard, 1824: 271 (type locality, Waigeo, Indonesia).

*Julis trimaculata* Valenciennes, 1839 (no locality; preoccupied by *Julis trimaculata* Quoy & Gaimard, 1834 = *Halichoeres trimaculatus*).

*Novacula julioïdes* Bleeker, 1851: 354 (type locality, Banda Islands, Indonesia).

**Description**

Dorsal rays IX,13; anal rays III,13; pectoral rays 12; pelvic rays, I,5; principal caudal rays 12; upper and lower procurent caudal rays 5; longitudinal scale series 26; lateral line interrupted, the pored scales 20 + 5 or 6 (plus one pored scale on caudal fin base); scale rows above lateral line 1.5; scale rows below lateral line to origin of anal fin 7.5; circumpeduncular scales 16; gill rakers 17-20; branchiostegal rays 5; vertebrae 9 + 16; tip of second neural spine ending below ventral end of second dorsal pterygiophore; third neural spine extending between second and third dorsal pterygiophores.

Mouth terminal to slightly ventral, the gape a little oblique; upper jaw not protrusible; one pair of slender, laterally and posteriorly curved canine teeth at front of jaws, not fully covered by lips when mouth closed, the lower pair fitting inside upper pair when mouth closed, their tips overlapping base of upper pair; second pair of teeth in jaws as small curved canines about half length of anterior pair, each followed by a series of up to 12 progressively smaller conical teeth; no canine tooth posteriorly on upper jaw (at corner of mouth); a pavement-like band of small, close-set, discoid teeth medial to conical teeth in each jaw in a maximum of three longitudinal rows; paired upper pharyngeal plates triangular, each with about 20 small teeth in five or six anterior to posterior rows, the anterior teeth longest and bluntly conical, the remainder nodular and progressively smaller posteriorly; narrow median limb of T-shaped lower pharyngeal plate with two to three transverse rows of conical teeth, all but the first few blunt; posterior limb broadly triangular with about 50 nodular teeth in irregular transverse rows, the largest teeth in posterior row.

Body moderately elongate, the depth 3.5-3.95 in SL, and compressed, the width 2.8-3.1 in body depth; head short, 3.4-3.65 in standard length; dorsal profile of head slightly convex, forming an angle of about 45° to horizontal axis of body; no acute median edge on front of head; snout length 2.80-3.2 in head length; eye diameter varying from 4.55 in head length in 60-mm specimen to 6.3 in 128-mm specimen; fleshy interorbital width 4.2-4.9 in head length.

Preopercular margin smooth and membranous, the posterior margin reaching above mouth but not to level of lower edge of eye, the ventral margin nearly reaching a vertical at corner of mouth.

Nostrils small, in front of centre of eye, the anterior in a small short tubule, the posterior an oblique slit; suborbital pores 7.

Scales thin, cycloid, and adherent; largest scale on side of chest about half height of largest scale on side of body; no median predorsal scales; only two or three embedded scales on side of nape anterior to origin of dorsal fin; two small partially embedded scales dorsally on opercle; two or three oblique rows of small

---

**Fig. 1.** Mature female *Novaculoides macrolepidotus*, 60 mm SL, Alphonse Atoll, Seychelles. Photo by J. Randall
Fig. 2. Mature female *Novaculoides macrolepidotus*, 74.5 mm SL, La Digue, Seychelles. Photo by J. Randall

Fig. 3. Two male *Novaculoides macrolepidotus*, 120 and 126 mm SL, Cebu, Philippines. Photo by J. Randall
embedded scales on cheek from just above corner of mouth to behind lower edge of eye; no scales on fins except basally on caudal fin; tubule of lateral line scales median and straight, the anterior series often with a short, oblique, upper branch.

Origin of dorsal fin nearly reaching a vertical at upper end of preopercular margin; first two dorsal spines flexible, their tips curving posteriorly; space between base of second and third dorsal spines only a little broader than that between the first two spines or between third and fourth spines; dorsal spines short, only slightly longer posteriorly, the ninth 3.6-3.85 in head length (except juveniles with prolonged first two dorsal spines); seventh to ninth dorsal soft rays longest, 2.1-2.2 in head length; origin of anal fin below base of first dorsal soft ray; third anal spine 3.3-3.8 in head length; seventh to ninth anal soft rays longest, 2.0-2.3 in head length; caudal fin slightly to moderately rounded, 1.25-1.45 in head length; pectoral fins short and broadly rounded, 1.8-2.0 in head length; pelvic fins of females 4.7-5.3 in SL; pelvic fins of males often longer than head, 3.1-4.2 in SL.

Adults green to brownish yellow, the body of females with an irregular, midlateral, dark brown stripe or row of spots; body of males with small dark spots only posteriorly; large females and males with two curved black bands from eye across upper part of operculum and a hemispherical black spot on opercular flap, all three dark markings with a submarginal orange line, the uppermost in large males may be replaced by two black lines, one of which continues dorsally on body; a dark band or double line often present from eye to front of snout; a narrow dark band extending obliquely behind upper part of eye; a black spot on first membrane of dorsal fin, edged anteriorly in white or pale blue; a large black spot usually present medially on chest; median fins often with pink markings. A juvenile 5 cm in total length illustrated by Masuda & Kobayashi (1994: 288, fig. 8) is brown with a few small black blotches midlaterally and anteriorly on lateral line, three longitudinal rows of white blotches on body; head with brown, red, and white bands extending from eye except ventrally; elevated anterior part of dorsal fin mainly red.

**Distribution**

Red Sea and east coast of Africa to the Mariana Islands, Palau, Fiji, and Tonga; in the western Pacific from the Ryukyu Islands to the Great Barrier Reef and Lord Howe Island.

**Remarks**

Bloch’s description of *Labrus macrolepidotus* was based on a single specimen. Paepke (1999: 90) listed the holotype in the Museum für Naturkunde der Humboldt Universität zu Berlin as ZMB 2633 and the stan-

---

**Fig. 4.** Underwater photograph of a large male *Novaculoides macrolepidotus* in seagrass, Cebu, Philippines. Photo by J. Randall.
standard length as 71 mm. Although Bloch stated that the locality of his specimen was not known, Paepke apparently had reason to list it as the Indian Ocean. *Novaculaoides macrolepidotus* has been collected mainly from shallow seagrass beds and algal flats; Bishop Museum specimens were collected from 1-2 m. In the seagrass this species is the same colour of green as the surrounding plants. In addition to being difficult to see because of its protective coloration, it is difficult to approach underwater.a

References


