Bull. Natl. Mus. Nat. Sci., Ser. A, **36**(4), pp. 115–130, December 22, 2010

A New Species, *Acanthopagrus pacificus* from the Western Pacific (Pisces, Sparidae)

Yukio Iwatsuki[1], Masayuki Kume[2] and Tetsuo Yoshino[3]

[1] Division of Fisheries Sciences, Faculty of Agriculture, Miyazaki University,
1–1 Gakuen-Kibanadai-Nishi, Miyazaki, 889–2192 Japan
E-mail: yuk@cc.miyazaki-u.ac.jp
[2] EAC Co. Ltd., 3–34–17 Yafuso, Urasoe, Okinawa, 901–2127 Japan
E-mail: m.kume@eac-oki.co.jp
[3] Department of Marine Sciences, Faculty of Science, University of the Ryukyus,
1 Senbaru, Nishihara-cho, Okinawa, 903–0213 Japan
E-mail: b985005@sci.u-ryukyu.ac.jp

(Received 1 September 2010; accepted 21 September 2010)

Abstract A new sparid species, *Acanthopagrus pacificus*, is described on the basis of a holotype, 6 paratypes, and 47 non-type specimens (64–348 mm in standard length [SL]), widely collected from the western Pacific. *Acanthopagrus pacificus* sp. nov. is most similar to *A. berda* in overall appearance of body with $3^1/_2$; scale rows between the fifth dorsal fin base and lateral line. *Acanthopagrus berda* develops a distinct concavity of the ventral edge of the first two infraorbitals above the posterior part of upper jaw in specimens over ca. 13 cm SL, while *A. pacificus* sp. nov. has a generally straight infraorbital edge until 35 cm SL, and then, develops a moderate concavity of the ventral edge of the first two infraorbitals above the rear end of the maxilla. *Acanthopagrus pacificus* sp. nov. also differs from *A. berda* in having fewer total gill rakers (13–17, modally 15 vs. 15–19, modally 17 in *A. berda*), less deep body (mean depth 45% SL vs. mean 50% SL) and larger orbit diameter (mean 3.1 in head length vs. mean 3.7). Counts of anal-fin rays are helpful to differentiate the two species: usually III, 8 for *A. pacificus* sp. nov. and usually III, 9 for *A. berda,* respectively. Nominal species are discussed with notes on *Acanthopagrus*. A key to the currently recognized species of *Acanthopagrus*, including *A. pacificus* is provided.
Key words: Taxonomy, Sparidae, new species, *Acanthopagrus pacificus*, western Pacific.

There are provisionally 14 valid species in our present review of the genus *Acanthopagrus* Peters, 1855 (Iwatsuki *et al*., 2006; Iwatsuki and Carpenter, 2006, 2009; Kume and Yoshino, 2008; Iwatsuki and Heemstra, 2010): *A. akazakii* Iwatsuki, Kimura and Yoshino, 2006, *A. australis* (Günther, 1859), *A. berda* (Forsskål, 1775), *A. bifasciatus* (Forsskål, 1775), *A. butcheri* (Munro, 1949), *A. chinshira* Kume and Yoshino, 2008, *A. latus* (Houttuyn, 1782), *A. omanensis* Iwatsuki and Heemstra, 2010, *A. palmaris* (Whitley, 1935), *A. randalli* Iwatsuki and Carpenter, 2009, *A. schlegelii* (Bleeker, 1854), *A. sivicolus* Akazaki, 1962*, A. taiwanensis* Iwatsuki and Carpenter, 2006, and *A. vagus* Peters, 1852.

The oldest available name, *A. berda* (Forsskål, 1775), was redescribed with illustrations of the ontogenic changes of the ventral edge of the first two infraorbitals (Iwatsuki and Heemstra, 2010). *Acanthopagrus berda* has a strongly curved concavity on the ventral edge of first two infraorbitals above the rear end of maxilla, particularly obvious in specimens over 13 cm SL (Iwatsuki and Heemstra, 2010). Iwatsuki and Heemstra (2010) also reported an undescribed species as *Acanthopagrus* sp. which has been misidentified as *A. berda* from the western Pacific. This species generally has a straight ventral edge of the first two infraorbitals and it also differs from *A. berda* in some other characters.

Fig. 1. Holotype of *Acanthopagrus pacificus* sp. nov., NSMT-P 93818, 348 mm SL, Iriomote Island, Yaeyama Group, Ryukyu Islands, Japan.

We examined many specimens of this western Pacific fish and have concluded that it represents an undescribed sparid species that is here described as a new species, *Acanthopagrus pacificus* sp. nov. Synonyms of *A. berda* are also discussed, with notes on congeners of *Acanthopagrus*. A key to the 15 species now recognized, including *A. pacificus,* is provided.

Methods

Counts and measurements generally followed Hubbs and Lagler (1964) and some modifications followed Iwatsuki and Carpenter (2006) and Iwatsuki and Heemstra (2010). Sex was determined by making incisions on the right side of the specimens. Institutional codes follow Leviton *et al*. (1985), Matsuura (1997), and Skelton (2003), with the following additions: Raffles Museum of Biodiversity Research, Zoological Reference Collection, Department of Biological Sciences, National University of Singapore, Singapore (ZRC).

Acanthopagrus pacificus sp. nov.

[New English name: Pacific Seabream;
Japanese name: Nan'yo-chinu]

(Figs. 1, 2A, 3A-D, 4A, 5A-B, 6; Table 1)

Sparus berda (not of Forsskål); Fowler, 1933: 157, fig. 8 (in part, Indo-West Pacific); Weber and de Beaufort, 1936: 466, 470, fig. 93 (in part, Indo-Pacific); Yu and Zhou, 1986: 242 (China); Ye, 1991: 403 (China).

Acanthopagrus berda (not of Forsskål); Roberts, 1978: 59 (Fly River, Papua New Guinea); Akazaki, 1984: 173, pl. 167-D (Iriomote Island, Ryukyu Islands, Japan); Kottelat *et al.*, 1993: 116 (Indonesia); Hayashi, 1993: 747 (in part, Ryukyu Islands, Japan); Mohsin and Ambak, 1996; 360 (Malaysia); Larson and Williams, 1997: 361 (Darwin, Northern Territory, Australia); Kuiter, 1997: 178 (Australia); Sadovy and Cornish, 2000: 135 (Hong Kong, China); Hayashi, 2002: 857 (in part, Ryukyu Islands, Japan); Allen *et al.*, 2002: 343 (Australia); Bray *et al.*, 2006: 1226 (Australia); Carpenter, 2001: 2996 (in part; color photograph is *A. berda;* widespread Indo-West Pacific from South Africa to India, extending to western Pacific, Japan and northern Australia); Iwatsuki and Carpenter, 2006: 5, fig. 1B (Taiwan).

Acanthopagrus sp.: Iwatsuki and Heemstra, 2010: 129 (western Pacific).

Holotype. NSMT-P 93818, 348 mm SL, fe-

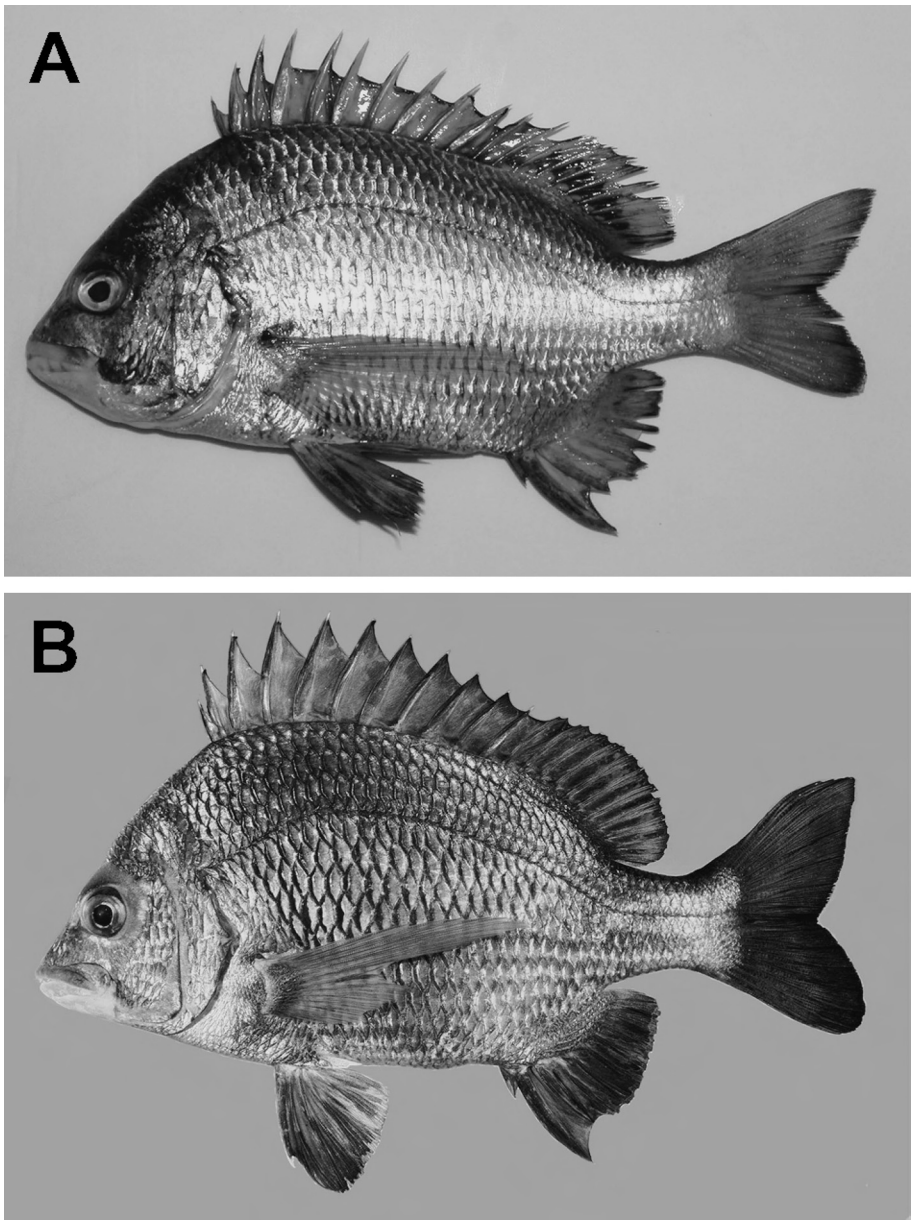

Fig. 2. *Acanthopagrus pacificus* sp. nov. (A) and *A. berda* (B). A, MUFS 22938, 183 mm SL, Tung-kang, Taiwan, photographed by Y. Iwatsuki; B, BPBM 19055, 194 mm SL, Negombo Reef, Sri Lanka, photographed by J. E. Randall.

male, Iriomote Island (24°21′32.4″N, 123°44′ 52.4″E, Iriomote Island according to fish buyer), Yaeyama Group, Ryukyu Islands, Japan (purchased in Okinawa Central Fish Market by M. Kume), speared, 16 May, 1989.

Paratypes. 6 specimens, 127–273 mm SL. FRLM 13420–13421, 2 specimens, 127–131 mm SL, Funauki Bay (24°20′33.8″N, 123°44′33.8″E), Iriomote Island, Okinawa, Japan; MUFS 23438–23439, 2 specimens, 158–160 mm SL, Shirahama, Iriomote Island (24°21′32.4″N, 123°44′ 52.4″E), Ryukyu Islands, Japan, 3 Oct., 2004;

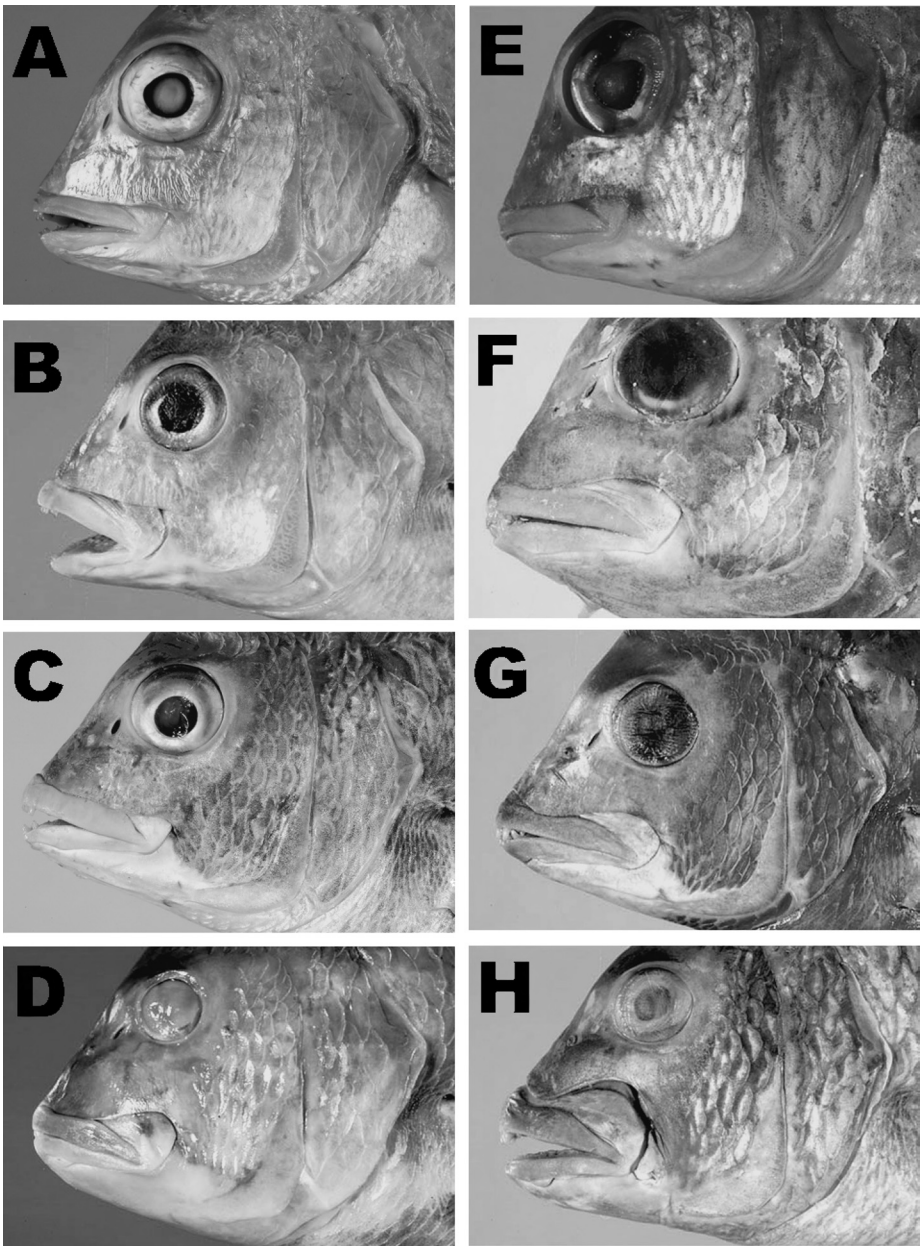

Fig. 3. Ventral edge of first two infraorbitals above posterior part of upper jaw and anal-fin rays of *A. pacificus* sp. nov. (A–D) and *A. berda* (E–H). A, SU 27048 at CAS, 115 mm SL, Philippines; B, BPBM 29979, 168 mm SL, Vali, Indonesia; **C**, MUFS 17881, 198 mm SL, Darwin, Australia; D, NSMT-P 93818 (formerly URM-P 23518), 348 mm SL, highly collected from Iriomote Island (24°21′32.4″N, 123°44′52.4″E), Yaeyama Group, Ryukyu Islands, Japan; E, RUSI 56461, 108 n mm SL, Mozambique; F, MUFS 19734, 164 mm SL, India; **G**, BPBM 19055, 194 mm SL, Sri Lanka; H, RMNH 15683, 241 mm SL, southern Red Sea.

URM-P 1062-1063, 2 specimens, 272–283 mm SL, Siira River (24°19′28.8″N, 123°54′27.6″E), Iriomote Island, Ryukyu Islands, Japan.

Non-type specimens. 47 specimens, 64–283 mm SL. BPBM 29979, 2 specimens, 89–170 mm SL, Lembar Harbor, Lombok Island, Indonesia;

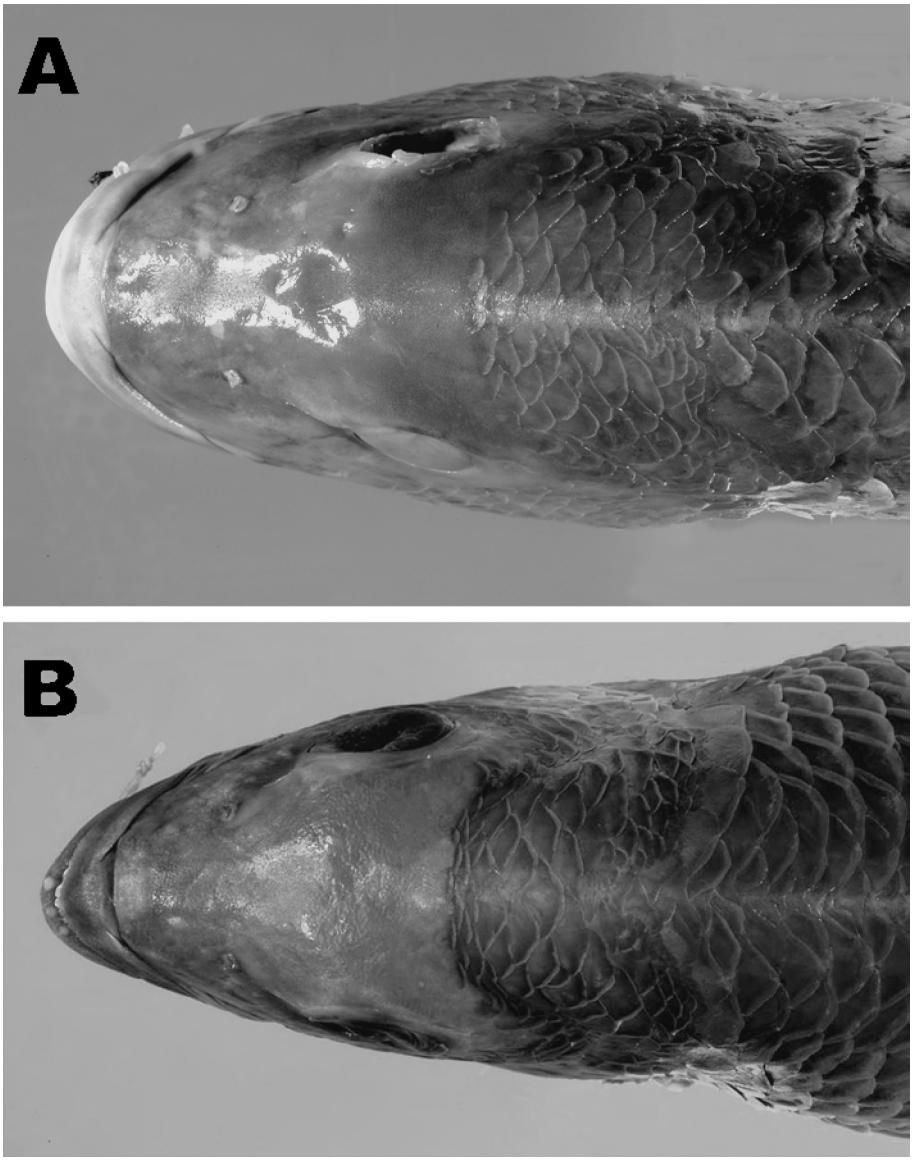

Fig. 4. Posteriormost head squamation type of *A. pacificus* sp. nov. (A) and *A. berda* (B). A**,** URM-P 23518, 348 mm SL, Ryukyu Islands, Japan; B, ZRC 38094, 249 mm SL, Langkawi Island, Kisap River, Malaysia.

CSIRO C957, C966, 2 specimens, 157–159 mm SL, Daru Harbor, Daru Island, Papua New Guinea; CSIRO H4968-02, 67 mm SL, Irian Jaya; FRLM 17386–17387, 2 specimens, 125–128 mm SL, Middle of Kuira River, Iriomote Island, Okinawa, Japan; FRLM 17390, 125 mm SL, Middle of Kuira River, Iriomote Island., Okinawa, Japan; FRLM 18933, 106 mm SL, Middle of Mizuoti River, Iriomote Island, Okinawa, Japan; MUFS 17799–17881, 3 specimens, 129–198 mm SL, Fannie Bay Beach, Fannie Bay, Darwin, Northern Territory, Australia (12°24′ 55.54″S, 130°49′37.57″E), coll. by H. Motomura and S. Gregg, June 1999; MUFS 22938, 174 mm SL, Kaoshung (22°26′56.4″N, 120°27′15.4″E), Taiwan; RMNH D420 (designated as the paralec-

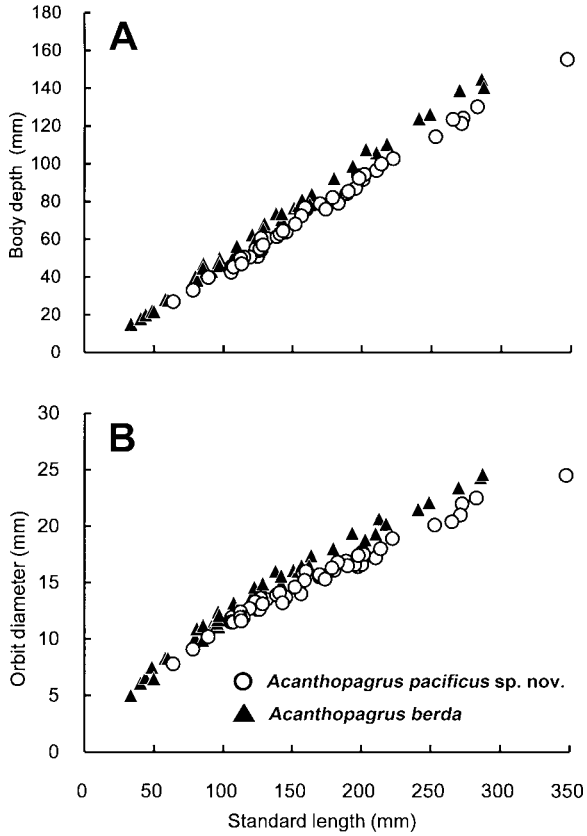

Fig. 5. Body depth and orbit diameter of *Acanthopagrus pacificus* sp. nov. and *A. berda* in relation to standard length.

totype of *C. calamara*), 211 mm SL, Java, Indonesia, collected by Kuhl and van Hasselt; SMF 3021, 146 mm SL, Java, Indonesia, collected by Kuhl and van Hasselt; URM-P 1093, 214 mm SL, Sirahama, Iriomote Island, Okinawa, Japan; URM-P 1095, 198 mm SL, Sirahama, Iriomote Island, Okinawa, Japan; URM-P 4828, 189 mm SL, Nakama River, Iriomote Island, Okinawa, Japan; URM-P 23512–23516, 5 specimens, 201–253 mm SL, Yaeyama Group, Ryukyu Islands, Japan; URM-P 23522, 265 mm SL, Yaeyama Group, Ryukyu Islands, Japan; URM-P 28483, 64 mm SL, Urauchi River, Iriomote Island, Yaeyama Group, Ryukyu Islands, Japan; URM-P 29626–29627, 2 specimens, 106–112 mm SL, Nozaki River, Iriomote Island, Yaeyama Group, Ryukyu Islands, Japan; URM-P 29629, 78 mm SL, Nozaki River, Iriomote Island, Yaeyama Group, Ryukyu Islands, Japan; URM-P 32648, 181 mm SL, Urauchi River, Iriomote Island, Yaeyama Group, Ryukyu Islands, Japan; URM-P 41027, 127 mm SL, Yaeyama Group, Ryukyu Islands, Japan; URM-P 41046, 196 mm SL, Yaeyama Group, Ryukyu Islsandsa, Japan; URM-P 41048, 190 mm SL, Yaeyama Group, Ryukyu Islands, Japan; URM-P 41050–41051, 170–183 mm SL, Yaeyama Group, Ryukyu Islands, Japan; URM-P 41070–41071, 123–139 mm SL, Yaeyama Group, Ryukyu Islands, Japan; URM-P 41075, 141 mm SL, Yaeyama Group, Ryukyu Islands, Japan; URM-P 41078, 126 mm SL, Yaeyama Group, Ryukyu Islands, Japan; MUFS 2915, 283 mm SL, Penan, Malaysia; NSMT-P 67822, 113 mm SL, Hainan Island, China; NSMT 67822, 113 mm SL, Hi Phong, Vietnam; SU 27048 at CAS, 115 mm SL, Palawan Island, Philippines; SU 61150 at CAS, 3 specimens, 107–113 mm SL, Honk Kong; USNM 176939,

179 mm SL, Great Barrier Reef, Queensland, Australia; ZRC 16818, 143 mm SL, Singapore.

Diagnosis. Distinguished from other species of *Acanthopagrus* by the following combination of characters: scale rows between fifth dorsal-fin spine base and lateral line $3^1/_2$; ventral edge of first two infraorbitals above rear end of maxilla straight in fish less than ~30 cm SL, but a moderate concavity of the ventral edge of the first two infraorbitals above the posterior part of upper jaw obvious in specimens >~35 cm SL (Fig. 3A–D); front edge of dorsal scaly area on head slightly curved (convex) without small scales (Fig. 4A); total gill rakers higher, 15–19, modally17; deeper body, 45–48% SL (mean 47% SL; Fig. 5A); anal-fin rays III, 8–9 but usually III, 8; smaller orbit diameter, 2.9–4.9 (mean 3.7) in head length/orbit diameter (Fig. 5B); second anal-fin spine (2AS) clearly longer than third anal-fin spine (3AS), 2AS/3AS 1.2–1.56 (mean 1.4); no scales on preopercle flange; pelvic and anal fins uniformly dark black.

Description. Counts and measurements of the holotype and 8 paratype specimens are given in Table 1. Data for the holotype are presented first, followed by paratype data in parentheses. Characters stated in the diagnosis are not repeated.

Body compressed, with weakly ctenoid scales, mouth somewhat oblique; lips thick; snout pointed; anterior nostrils round, just in front of eye, posterior nostrils long oval or slit-like; posterior tip of maxilla reaching beyond vertical at middle of eye or anterior one-third of eye); upper jaw length greater than orbit diameter; lower jaw somewhat included; molariform teeth rows 3–5, smaller anteriorly and larger, typical molariform teeth posteriorly; upper jaw with 6 (rarely 7) canines anteriorly 6 canines at front of lower jaw; suborbital depth slightly less than dermal eye opening (clearly less than dermal eye opening), but greater than orbit diameter in specimens of ~30 cm SL, no scales on suborbital region; 7 (6 or 7) transverse rows of scales on preopercle; anterodorsal profile slightly convex from above eye; scaly sheath in soft dorsal- and anal-fin ray bases; dorsal spines strong, second less than twice length of first, and shorter than third; fourth spine longest (rarely fifth subequal); first soft dorsal ray longest (second or third in some specimens), clearly shorter than longest spine; first anal-fin spine short, much less than eye; third anal spine shorter than second spine, which is slightly longer than snout; first soft anal-fin ray slightly longer than third anal-fin spine (or subequal); pectoral- fin tip clearly reaching vertical at anus, length clearly greater than head length; longest pelvic-fin ray clearly less than head length; pelvic-fin spine longer than snout.

Color of fresh specimens based on color photographs of Akazaki (1984, pl. 167-D), MUFS 22938 (Taiwan, Fig. 2A), and two uncatalogued specimens from Vietnam: Head and body silvery gray, ventral portion of head and abdomen somewhat whitish; dorsal, caudal, anal, and pelvic fins dusky, especially membranes; pectoral fin hyaline or somewhat dusky dorsally.

Color of preserved specimens: Head and body yellowish dusky gray, ventral portion of head and abdomen whitish; dorsal, caudal, anal, and pelvic fins dusky, especially membranes; pectoral fins yellowish or somewhat dusky in dorsal portion.

Distribution. Currently known only from western Pacific: Iriomote Island, Ryukyu Islands, Japan, Taiwan, southern China, Vietnam, Philippines, Thailand, Malaysia, Indonesia, Papua New Guinea, and Australia (Fig. 6).

Etymology. The specific name is proposed for the western Pacific distributional pattern (Fig. 6) of *A. pacificus* sp. nov.

Comparisons. Acanthopagrus bifasciatus has two conspicuous vertical black bars on the head (Bauchot and Smith, 1983). *Acanthopagrus palmaris* is limited to southwestern Australia and has a gibbous head (Whitley, 1935; Gomon *et al.*, 1994), which separates it from *A. pacificus* sp. nov., *A. berda, A. omanensis*, and *A. vagus,* although we consider that *A. palmaris* needs further taxonomic study. *Acanthopagrus australis, A. chinshira,* and *A. latus* have yellow pelvic, anal, and caudal fins, while *A. pacificus* sp. nov. and other *Acanthopagrus* species do not have yellow fins, the fins being dusky (Carpenter,

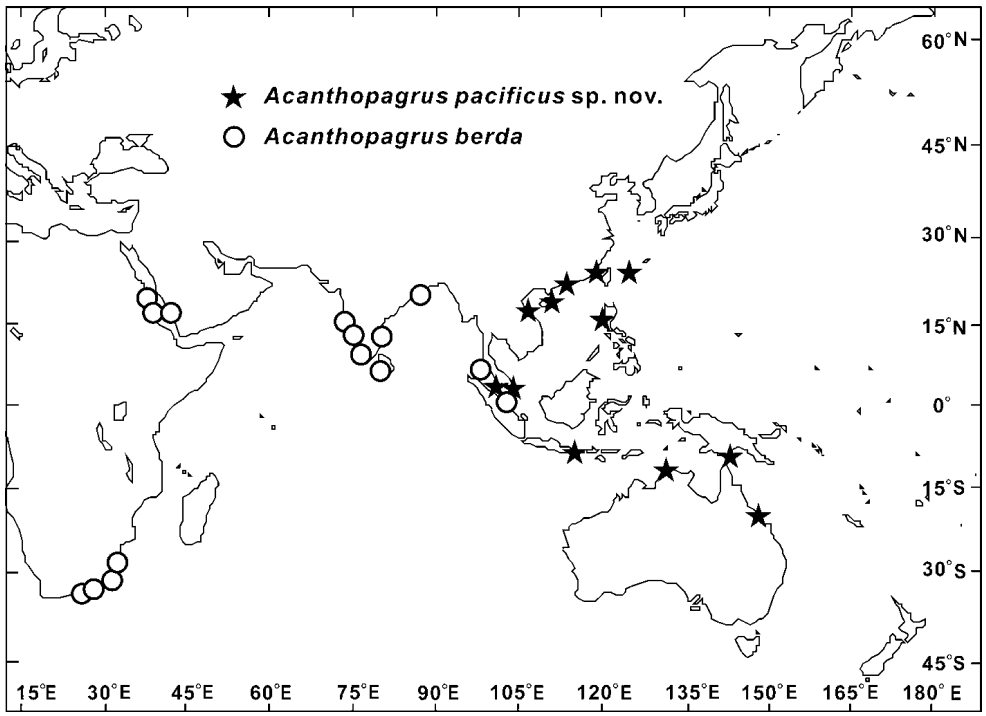

Fig. 6. Distributional pattern of *Acanthopagrus pacificus* sp. nov. and *A. berda* from the Indo-West Pacific.

2001; Kume and Yoshino, 2008; Akazaki, 1984). *Acanthopagrus akazakii, A. butcheri*, *A. omanensis, A. randalli, A. schlegelii,* and *A. sivicolus* have $4^1/_2$–$6^1/_2$ scale rows between the 5th dorsal fin spine and lateral line (Iwatsuki *et al.*, 2006; Iwatsuki and Carpenter, 2006; Kume and Yoshino, 2008; Gomon *et al.*, 1994; Iwatsuki and Heemstra, 2010), *Acanthopagrus pacificus* sp. nov. is most similar to *A. berda, A. taiwanensis* and *A. vagus* in having overall appearance of body generally dusky color with silvery reflection and $3^1/_2$ scale rows between the 5th dorsal-fin spine and lateral line (Iwatsuki and Carpenter, 2006; Iwatsuki and Heemstra, 2010). However, *A. taiwanensis* has well developed, flattened molar teeth on both upper and lower jaws (see fig. 6A, B of Iwatsuki and Carpenter, 2006) and three or four cheek scale rows (Iwatsuki and Carpenter, 2006), while *A. pacificus* sp. nov. has typical (rounded) molariform teeth (see fig. 5C, D of Iwatsuki and Carpenter, 2006) and six or seven cheek scale rows. Furthermore, *A. vagus* has scales on preopercle flange from zero to six, number increasing with growth, obvious in specimens over 20 cm SL (fig. 3H of Iwatsuki and Heemstra, 2010) and black streaks near anal-fin base on inter-radial membranes (figs. 2, 3E–H, and 5C of Iwatsuki and Heemstra, 2010). *Acanthopagrus berda* develops a deep concavity on the ventral edge of the first two infraorbitals above the posterior part of the maxilla in specimens over ca. 13 cm SL, lower counts of total gill rakers (13–17, modally 15), higher counts of anal-fin rays (usually III, 9; Table 1), somewhat greater body depth (45–54% SL, mean 50% SL; Figs. 2B, 5A) and larger orbit diameter (Fig. 5B; 2.4–3.7, mean 3.1 in head length/orbit diameter), while *A. pacificus* sp. nov. has a generally straight infraorbital series until 35 cm SL (then, developing a moderate concavity of the ventral edge of the first two infraorbitals above the maxilla), lower counts of anal-fin rays (usually III, 8; Table 1), higher counts of total gill rakers (15–19, modally 17), lower body depth (40–49% SL,

mean 45% SL; Figs. 2A, 5A), and smaller orbit diameter (Fig. 5B; 2.9–4.9, mean 3.7 in head length/orbit diameter).

In addition, the following characters are often helpful for identification to differentiate the two species as well as information of their collection sites (Indian Ocean for *A. berda* and western Pacific for *A. pacificus* sp. nov., respectively; Fig. 6). *Acanthopagrus pacificus* sp. nov. usually has a dusky silver or dusky yellowish to black color on the body, and a somewhat slender body, while *A. berda* often has a uniformly dense black color on the body and the anterior membrane of each scale pocket, and deeper body (Fig. 2A, B).

Remarks. In proposing *Acanthopagrus pacificus* as a new species, consideration must also be given to the following nominal species from the Indo-West Pacific. *Acanthopagrus pacificus* sp. nov., mainly collected from western Pacific (Fig. 5) has long been confused with *Acanthopagrus berda* (Forsskål, 1775) because of having $3^1/_2$ scale rows between the fifth dorsal-fin spine and lateral line, similar looking body and coloration, and molariform teeth, but, recently, *A. berda* was redescribed by Iwatsuki and Heemstra (2010), who listed the following species as junior synonyms of *A. berda*: *Sparus hasta* Bloch and Schneider, 1801, *Sparus calamara* Cuvier, 1829, *Chrysophrys madagascariensis* Valenciennes in Cuvier and Valenciennes, 1830, and *Chrysophrys robinsoni* Gilchrist and Thompson, 1908. Furthermore, in their review of *Acanthopagrus*, Iwatsuki and Heemstra (2010) recognized *A. vagus* Peters, 1852 as a valid endemic species from the southeastern coast and estuaries of Africa, with *Pagrus caffer* Castelnau, 1861 and *Chrysophrys estuarius* Gilchrist and Thompson, 1908 as junior synonyms of *A. vagus*. The above species and *A. taiwanensis* have $3^1/_2$ scale rows between the fifth dorsal-fin spine base and lateral line. Most of the other nominal species of *Acanthopagrus: A. akazakii, A. butcheri, A. omanensis, A. randalli, A. sivicolus* and *A. schlegelii*) (except *A. australis, A. chinshira* and *A. latus*) of Iwatsuki and Heemstra (2010) have $4^1/_2$–$6^1/_2$ scale rows between the fifth dorsal-fin spine and lateral line. We consider that Yellowfin Seabream II (*A. latus*) needs to be redescribed and compared with all nominal species in *Acanthopagrus*: *Chrysophrys auripes* Richardson, 1846, *Sparus chrysopterus* Kishinouye, 1907, *Sparus latus* Houttuyn, 1782, *C. longispinnis* Valenciennes in Cuvier and Valenciennes, 1830, *C. novaecaledoniae* Castelnau, 1873, *C. rubroptera* Tirant, 1883, and *C. xanthopoda* Richardson, 1846 but these nominal species clearly have yellow pelvic and anal fins, which separates them from *A. pacificus* sp. nov. with black pelvic and anal fins according to Iwatsuki *et al*. (2006), Iwatsuki and Carpenter (2006, 2009), Kume and Yoshino (2008), and Iwatsuki and Heemstra (2010).

Sparus calamara Cuvier, 1829, based on a drawing of Russell (1803: pl. 92), was considered a synonym of *Acanthopagrus berda* (Forsskål, 1775) (Iwatsuki and Heemstra, 2010). According to the original description, *Chrysophrys calamara* Valenciennes in Cuvier and Valenciennes, 1830, was based on two syntypes (Fig. 7A–B; MNHN 5261, 151 mm SL, collected by Bélenger from Madras [=Chennai], and RMNH D420, 211 mm SL collected by Kuhl and van Hasselt from Java, and the drawing of Russell (1803: pl. 92. However, Valenciennes did not refer to Cuvier's (1829) description of *Sparus calamara* in his description, although both authors, were working together at the Natural History Museum in Paris at the same time, and both must have seen the painting that Russell (1803: pl. 92) had labeled Calamara. According to the description (Cuvier in Cuvier and Valenciennes, 1830), these two species descriptions must be considered as independently published new species' descriptions. Valenciennes' name '*Chrysophrys calamara'* is an objective synonym of Cuvier's nominal species *Sparus calamara* and Valenciennes' nominal species is also a secondary junior homonym (in the genus *Acanthopagrus*) of Cuvier's species. The Madras (=Chennai) specimen (Fig. 7A, shows the concave ventral edge of first two infraorbitals above rear end of maxilla) and the drawing of Russell (1803: pl. 92) are identified as young *Acanthopagrus berda* (see Iwatsuki

Table 1. Counts and proportional measurements of sparid specimens of the *Acanthopagrus pacificus* sp. nov. and *A. berda*, expressed as percentages of standard length (means in parentheses).

	Acanthopagrus pacificus sp. nov.			*Acanthopagrus berda* (Forsskål, 1775)	
	Holotype NSMT-P 93818 348 mm SL, $n=1$	Paratypes 127–273 mm SL, $n=6$	Non-type specimens 64–283 mm SL $n=47$	Holotype* ZMUC P50555 ca. 213 mm SL $n=1$	Non-type specimens** 33–288 mm SL $n=42$
Counts:					
Dorsal-fin rays	XI, 11	XI, 11	XI, 10–11 (usually XI, 11)	XI, soft rays missing	XI–XII, 10–12 (usually XI, 11)
Anal-fin rays	III, 8	III, 8	III, 8–9 (usually III, 8)	III, 9	III, 8–9 (usually III, 9)
Pelvic- and pectoral-fin rays	I, 5; 15	I, 5; 15	I, 5; usually 15 (rarely 14 or 16)	15	14–15 (usually 15)
Pored lateral line scales	43	43–45	42–46	–	42–44
Scale rows above and below lateral line	$4^1/_2/11^1/_2$	$4^1/_2/11^1/_2$	$4^1/_2/10–12^1/_2$	4/11	$3^1/_2$–4/11–12
Scale rows between 5th dorsal fin spine base and lateral line	$3^1/_2$	$3^1/_2$	$3^1/_2$	$3^1/_2$	$3^1/_2$
Scale rows between 9th dorsal fin spine base and lateral line	$3^1/_2$	$3^1/_2$	$3^1/_2$	$3^1/_2$	$3^1/_2$
Gill rakers	6+11=17	5–7+10–12=15–18	5–8+9–12=15–19 (modally 6+11=17)	–	5–7+8–12=13–17 (modally 5+10=15)
Ventral edge of first two inraorbitals above posterior part of upper jaw	narrowly concave	straight	straight	widely concave	widely concave in fish over ca. 150 mm SL
Measurements:					
Body depth	45	45–49 (47)	40–49 (45)	–	45–53 (50)
Head length	35	35–37 (36)	32–37 (35)	32	31–41 (35)
Body width	20	17–18 (18)	16–22 (18)	–	13–23 (18)
Snout length	14	12–14 (13)	10–15 (13)	13	10–15 (13)
Orbit diameter	7	8–11 (9)	8–12 (10)	10	8–16 (12)
Dermal eye opening	6	7–9 (8)	7–10 (9)	–	7–14 (10)
Interorbital width	11	9–10 (9)	8–10 (9)	–	10–12 (11)
Upper jaw length	16	14–16 (15)	12–16 (14)	13	12–17 (14)
Caudal peduncle depth	13	13–14 (13)	12–15 (13)	–	10–15 (13)
Caudal peduncle length	20	17–19 (18)	15–22 (19)	–	15–23 (18)
Predosal fin length	45	44–47 (46)	40–49 (44)		42–52 (46)
Preanal fin length	70	65–73 (70)	61–74 (70)	15	62–74 (70)
Prepelvic fin length	39	38–42 (40)	36–45 (39)	–	35–45 (40)
Dorsal fin base length	57	55–61 (58)	55–63 (58)	–	52–64 (58)

Table 1. (continued).

	Acanthopagrus pacificus sp. nov.			*Acanthopagrus berda* (Forsskål, 1775)	
	Holotype NSMT-P 93818 348 mm SL, $n=1$	Paratypes 127–273 mm SL, $n=6$	Non-type specimens 64–283 mm SL $n=47$	Holotype* ZMUC P50555 ca. 213 mm SL $n=1$	Non-type specimens** 33–288 mm SL $n=42$
Anal fin base length	17	17–20 (18)	17–22 (19)	–	16–22 (19)
Caudal fin length	23	27–31 (30)	24–35 (30)	–	25–39 (31)
Pelvic spine length	16	16–19 (17)	15–20 (17)	16	15–20 (17)
First pelvic ray length	21	22–28 (25)	21–29 (25)	20	21–31 (26)
Pectoral fin	39	38–44 (40)	29–44 (39)	41	34–43 (39)
First dorsal-fin spine length	6	5–7 (6)	5–9 (7)	–	5–10 (8)
Second dorsal-fin spine length	9	10–13 (12)	10–15 (12)	–	9–18 (13)
Third dorsal-fin spine length	15	14–18 (16)	13–18 (16)	–	13–21 (17)
Fourth dorsal-fin spine length	17	16–20 (17)	14–20 (17)	–	14–22 (19)
Fifth dorsal-fin spine length	16	15–19 (16)	14–20 (17)	–	14–21 (18)
Sixth dorsal-fin spine length	15	14–19 (16)	13–18 (16)	–	15–20 (17)
Last dorsal-fin spine length	11	11–13 (12)	10–14 (12)	–	11–16 (13)
First dorsal-fin ray length	13	12–15 (13)	11–17 (14)	–	13–19 (16)
First anal-fin spine length	5	5–6 (6)	5–8 (6)	–	5–10 (7)
Second anal-fin spine length	15	15–21 (19)	15–24 (20)	–	15–26 (21)
Third anal-fin spine length	13	13–17 (15)	13–18 (15)	–	11–18 (16)
First anal-fin ray length	12	13–17 (15)	13–19 (15)	–	14–20 (17)
Suborbital width	6	5–7 (6)	3–11 (5)	3	3–6 (4)
Posteriormost jaw width	16	12–16 (14)	12–16 (14)	–	12–17 (14)
Head length/orbit diameter	4.94	3.35–4.50 (3.81)	2.85–4.44 (3.65)	3.26	2.42–3.74 (3.05)
Ratio of second anal-fin spine/third spine	1.14	1.17–1.44 (1.32)	1.15–1.56 (1.36)	1.27	1.23–1.50 (1.36)

* Data are based on Iwatsuki and Heemstra (2010).

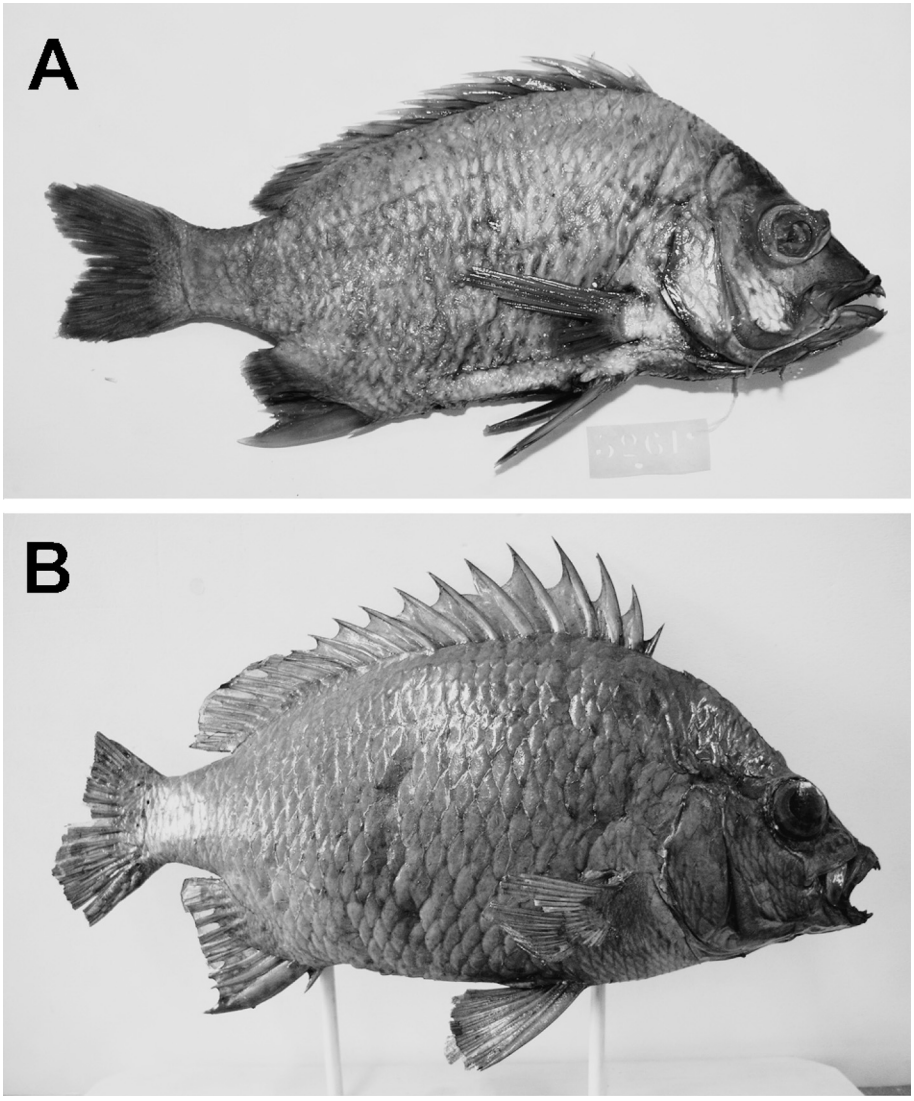

Fig. 7. The lectotype (A) and the paralectotype (B) of *Chysophyrys calamara* Valenciennes in Cuvier and Valenciennes, 1830. A, MNHN 0000-5261, 151 mm SL, Madras (=Chennai), India, collected by Bélenger; B, RMNH D420, 211 mm SL, Java, Indonesia, collected by Kuhl and van Hasselt.

and Heemstra, 2010). The Java specimen (Fig. 7B, has a straight ventral edge of the first two infraorbitals) and was identified as a distinct species, *Acanthopagrus* sp. of Iwatsuki and Heemstra (2010), the latter species being common in the western Pacific region.

In order to avoid further confusion of *Acanthopagrus* taxonomy, we designate the Madras' (=Chennai) specimen (MNHN 0000-5261, 151 mm SL; Fig. 7A) as the lectotype of *Chrysophrys calamara* Valenciennes, 1830; and the other Java specimen (RMNH D420, 211 mm SL; Fig. 7B) automatically becomes the paralectotype of the species. We choose the Madras specimen as the lectotype because Cuvier (1829) and Valenciennes (1830) independently described it as a new species named "*calamara*" which is here identified as a junior synonym of *A. berda* (see Iwatsu-

ki and Heemstra 2010). Valenciennes (1830) overlooked the Java specimen of the two additional specimens (Java and Madras) of *A. calamara,* evidently assuming that both specimens were the same species. Consequently, Valenciennes' *C. calamara* becomes a secondary homonym of Cuvier's (1829) *Sparus calamara,* as both species are now assigned to *Acanthopagrus.* Valenciennes' *calamara* is also considered a junior synonym of *A. berda.* Hence the species designated as *Acanthopagrus* sp. of Iwatsuki and Heemstra (2010), and widely distributed in the western Pacific, has no scientific name. Accordingly, we here describe this species as *Acanthopagrus pacificus* sp. nov.

Comparative material examined. Acanthopagrus australis: BMNH 1855.9.19.2, 1 of 8 syntypes, 185 mm SL, Australian seas and rivers; MUFS 3494–3497, 143–274 mm SL, Port Jackson, Sydney, N.S.W., Australia; MUFS 3500–3502, 3 specimens, 130–139 mm SL, 29°53′S, 153°18′E, Australia. *A. berda*: MNHN 0000-5261 (1 syntype of *Chrysophrys calamara* Valenciennes, 1830, herein designated as the lectotype of *C. calamara*), 151 mm SL, Chennai (=Madras), India: MUFS 2915, 283 mm SL, Penan, Malaysia; ZMUC-P 50555 (holotype of), left dried skin, ca. 213 mm SL (calculated from a formula giving head-standard length relationship), Luhaiya (=Al Luhayyah; approximately 15°41′52″N, 42°41′07″E), Yemen, Red Sea. *A. bifasciatus*: ZMUC P50557 (holotype of *Chaetodon bifasciatus*), dried, 115 mm SL, Jidda, Saudi Arabia. *A. butcheri*: AMS IB.1895 (holotype of *Sparus berda*), 228 mm SL, Gippsland Lakes, Victoria, Australia; MUFS 3498–3499, 2 specimens, 83–91 mm SL, Victoria, Australia**.** *A. chinshira*: MUFS 23014 (paratype), 117 mm SL, Nago Fish Market, Okinawa Island, Japan; MUFS 23015 (paratype), 112 mm SL, nearshore Atsuta, Nakagusuku Bay, Okinawa Island, Japan. *A. latus*: MUFS 21352, 136 mm SL, Miyazaki, Japan; MUFS 65280, 209 mm SL, Miyazaki, Japan; MUFS 22740–22743, 4 specimens, 186–270 mm SL, Izumi, Kagoshima, Japan. *A. omanensis*: BPBM 36099 (holotype of *A. omanensis*), 145 mm, Duqm (19°39′44″N, 57° 42′22″E), Oman, sex unknown, hand-line, collector J. L. Earle, Nov. 12, 1993; BPBM 40887 (paratype of *A. omanensis*), 136 mm, same data as the holotype. *A. palmaris*: AMS I.12965 (holotype), 238 mm SL, Port Hedland, Western Australia. *A. schlegelii*: RMNH 5727 (1 of 2 syntypes), 123 mm SL, Nagasaki, Japan. *A. sivicolus*: FAKU 32311 (paratype, recently detected), 112 mm SL, Ishigaki Island, Ryukyu Islands, Japan. *A. vagus*: ZMB 1087 (holotype), 261 mm SL, Sena at Zambezi River (approximately 17°27′30″S, 35°01′55″E), Mozambique. Materials of *A. akazakii, A. berda, A. taiwanensis, Chrysophrys novaecaledoniae,* and *C. longispinnis* are shown to Iwatsuki *et al*. (2006), Iwatsuki and Carpenter (2006) and Iwatsuki and Heemstra (2010). The two last are needed for further study in taxonomic identity.

Key to Species of *Acanthopagrus*

1a. Two conspicuous black bars on head, one wide bar over posterior third of head, and a smaller black bar through eye; dorsal-fin soft rays 12–15. . . . . *A. bifasciatus*
1b. No black bars on head; dorsal-fin soft rays 10–13 2
2a. Scale rows from fifth dorsal-fin spine to lateral line $5^1/_2$–$6^1/_2$; 3
2b. Scale rows from fifth dorsal-fin spine to lateral line $3^1/_2$–$4^1/_2$; molariform teeth well developed 4
3a. Dorsal, caudal, anal, and pelvic fins pale, with wide black margin; molariform teeth poorly developed . . . . . *A. omanensis*
3b. Dorsal, caudal, anal, and pelvic fins pale, with black or dusky color; molariform teeth moderately developed . . . . . *A. schlegelii*
4a. Scale rows from 5th dorsal-fin spine to lateral line usually $3^1/_2$ (rarely $4^1/_2$;); anal fin yellow . . 5

4b. Scale rows from 5th dorsal-fin spine to lateral line $3^1/_2$ or $4^1/_2$; anal fin black 7
5a. Pelvic fins mostly bright yellow; diffuse black blotch at origin of lateral line . . . . . *A. latus*
5b. Pelvic fins whitish (or hyaline) or (rarely) margin yellowish hyaline; no diffuse black blotch at origin of lateral line 6
6a. Black spot on upper base of pectoral fins; cheek with 5 rows of scales . . . . . *A. australis*
6b. No black spot on upper base of pectoral fins; cheek with 6 rows of scales . . . . . *A. chinshira*
7a. Scale rows from 5th dorsal-fin spine to lateral line $3^1/_2$ 8
7b. Scale rows from 5th dorsal-fin spine to lateral line $4^1/_2$ 12
8a. Fish >13 cm SL with prominent concavity in ventral edge of infraorbitals for rear end of maxilla; anterior edge of dorsal scaly area of head with small scales . . . . . *A. berda*
8b. Ventral edge of infraorbitals usually straight; anterior edge of dorsal scaly area of head without small scales 9
9a. Head of adults gibbous dorsally . . . . . *A. palmaris*
9b. No gibbous head in adults 10
10a. No dark streak on each inter-radial membrane of soft anal fin . . . . . *A. pacificus* sp. nov.
10b. A dark streak on each inter-radial membrane of soft anal fin 11
11a. W-shaped naked area at front of dorsal scaly area; often scales on preopercular flange . . . . . *A. vagus*
11b. Dorsal scaly area on top of head rounded; no scales on preopercular flange . . . . . *A. taiwanensis*
12a. Adults with front profile of head prominently convex from snout to just above eye with growth; 4 or 5 wide black bands on body . . . . . *A. randalli*
12b. Snout profile straight from snout to just above eye; no bands or 8–12 bands on body 13
13a. Front part of upper lip extended dorsally and ventrally in specimens over ~16 cm SL; molariform teeth in jaws generally flat . . . . . *A. akazakii*
13b. Front part of upper lip without extensions dorsally and ventrally; molariform teeth in jaws convex with a relatively bluntly pointed cusp. 14
14a. Anal-fin membranes black or dusky black; scale rows below lateral line $10^1/_2$–$12^1/_2$ . . . . . *A. sivicolus*
14b. Anal-fin membranes (second to third spines and 1st to 3rd or 4th fin rays) black, remaining part hyaline without melanophores; scale rows below lateral line $12^1/_2$–$14^1/_2$ . . . . . *A. butcheri*

Acknowledgments

We are grateful to the following persons and institutions for specimen loan, information and facilities among the first author's visits: M. McGrouther (AMS); J. Maclaine (BMNH); A. Suzumoto and J. Randall (BPBM); D. Catania, T. Iwamoto and B. Eschmeyer (CAS); A. Graham (CSIRO); Y. Kai and T. Nakabo (FAKU); R. Causse, P. Pruvost and G. Duhamel (MNHN); W. Mototani and A. Chakraborty (MUFS); D. J. Bray and M. Gomon (NMV); K. Matsuura and G. Shinohara (NSMT); J. Johnson (QM); M. J. P. van Oijen and J. van Egmond (RMNH); P. Skelton, P. C. Heemstra, R. Bills, K. Dubula, M. Mwale, O. Alvheim, V. B. Kongobe, V. Hanisi, V. Mthombeni, E. Heemstra, R. Holleman, E. M. Anderson, and D. Tweddle (SAIAB); M. Bougaardt, L. Compagno and P. A. Hulley (SAM); F. Krupp (SMF); J. T. Williams (USNM); S. Morrison (WAM); P. Bartsch, H.-J. Paepke and C. Lamour (ZMB); T. Menne and J. Nielsen (ZMUC); A. K. Karmakar (Calcutta, ZSI); K. P. Lim (ZRC); M. N. Venugopal (Mangalore Fisheries College, Karnataka, India); M. Motomura (Kagoshima University, Museum, Kagoshima University, Japan). Furthermore, we thank I. Akagawa for translation of French articles into Japanese, G. S. Hardy, Ngunguru, New Zealand, for his critical comments on the initial manuscript and great help in English, David S. Smith (USNM) for useful comments on nomenclature, and J. E. Randall (BPBM) for a photo-

graph use of *Acanthopagrus berda*. Lastly, we are much appreciative of two anonymous reviewers for useful comments on our paper. This study was supported in part by grants of the Ministry of Education, Science, Sports and Culture, Japan (No. 16570079, No. 19208019, and No. 20570091) and the National Research Foundation of South Africa (Grant UID #: 70611).

References

Akazaki, M. 1962. Studies on the Spariform fishes: anatomy, phylogeny, ecology and taxonomy. Misaki Marine Biological Institute, Kyoto University, Special Report, 1: 1–368.

Akazaki, M. 1984. Sparidae. *In* Masuda, H., C. Amaoka, T. Araga, T. Uyeno and T. Yoshino (eds.): The Fishes of the Japanese Archipelago, pp. 171–173, pls. 166–167. Tokai University Press, Tokyo.

Allen, G. R., H. Midgley and M. Allen 2002. Field Guide to the Freshwater Fishes of Australia. 394 pp. CSIRO, Clayton South.

Bauchot, M.-L. and M. M. Smith 1983. Sparidae. *In* Fisher, W. and G. Bianchi (eds.): FAO Species Identification Sheets for Fisheries Purposes—Western Indian Ocean. Fishing Area 51, Vol. 4, pp. 1–11, "SPARID Acanth 1" to "SPARID Spond 2." FAO, Rome.

Bleeker, P. 1854. Faunae ichthyologicae japonicae. Species Novae. Natuurkundig Tijdschrift voor Nederlandsch Indië, 6: 395–426.

Bloch, M. E., and J. G. Schneider 1801. M. E. Blochii, Systema Ichthyologiae iconibus cx illustratum. Postobitum auctoris opus inchoatum absolvit, correxit, interpolavit Jo. Gottlob Schneider, Saxo. Sumtibus Auctoris Impressum et Bibliopolio Sanderiano Commissum, Berolini, Germany, lx + 584 pp., 110 pls.

Bray, D. J., D. F. Hoese and J. R. Paxton 2006. Family Sparidae. *In* Bray, D. J., D. F. Hoese and J. R. Paxton (eds.): Zoological Catalogue of Australia. Volume 35, Fishes. Part 2, pp. 1225–1230. CSIRO Publishing, Collingwood.

Carpenter, K. 2001. Family Sparidae. *In* Carpenter K. E. and V. H. Niem (eds.): Species Identification Guide for Fishery Purposes. The living marine resources of the western central Pacific, Vol. 5, Bony fishes, Part 3 (Menidae to Pomacentridae), pp. 2990–3003. FAO, Rome.

Castelnau, F. L. 1861. Mémoire sur les poissons de l'Afrique australe. Paris Mémoire sur les poissons de l'Afrique australe. 78 pp. Paris.

Castelnau, F. L. 1873. Contribution to the ichthyology of Australia. Proceedings of the Zoological Acclimatisation Society of Victoria, 2: 37–158.

Cuvier, G. 1829. Le Règne Animal, distribué d'après son organisation, pour servir de base à l'histoire naturelle des animaux et d'introduction à l'anatomie comparée. Nouvelle èdition.Tome II. 406 pp. Deterville, Libraire, Paris.

Cuvier, G. and A. Valenciennes 1830. Historie naturelle des poissons. Tome Sixième. Livre sixième. Partie I. Des Sparoïdes; Partie II. Des Ménides. Historie naturelle des poissons, 6: 1–559.

Forsskål, P. 1775. Descriptiones animalium avium, amphibiorum, piscium, insectorum, vermium; quae in itinere orientali observavit. Post mortem auctoris edidit Carsten Niebuhr. Hauniae. Descr. Animalium Descriptiones animalium avium, amphibiorum, piscium, insectorum, vermium; quae in itinere orientali observavit... Post mortem auctoris edidit Carsten Niebuhr. 164 pp. Mölleri, Copenhagen.

Fowler, H. W. 1933. Contributions to the biology of the Philippine Archipelago and adjacent regions. The fishes of the families Banjosidae, Lethrinidae, Sparidae, Girellidae, Kyphosidae, Oplegnathidae, Gerridae, Mullidae, Emmelichthyidae, Sciaenidae, Sillaginidae, Arripidae and Enoplosidae, collected by the United States Bureau of Fisheries steamer "Albatross," chiefly in Philippine seas and adjacent waters. Bulletin of the United States of Natural Museum, (100), 12: 1–465.

Gilchrist, J. D. F. and W. W. Thompson 1908. Descriptions of fishes from the coast of Natal. Annals of the South African Museum, 6: 145–206.

Gomon, M. F., J. C. M. Glover and R. H. Kuiter (eds.), 1994. The Fishes of Australia's South Coast. 992 pp. Flora and Fauna of South Australia Handbooks Committee, State Printer, Adelaide.

Günther, A. 1859. Catalogue of the Acanthopterygian Fishes in the Collection of British Museum. vol. 1. 524 pp. British Museum, London.

Harada, I. 1943. Freshwater Fishes of Hainan Island. 114 pp., 28 pls. Hainan Kaigun Tokumubu, Taipei.

Hayashi, M. 1993. Sparidae. *In* Nakabo, T. (ed.): Fishes of Japan with Pictorial Keys to the Species (2nd edition), pp. 746–749, 1327. Tokai University Press, Tokyo.

Hayashi, M. 2000. Sparidae. *In* Nakabo, T. (ed.): Fishes of Japan with Pictorial Keys to the Species (Japanese edition), pp. 856–859, 1567. Tokai University Press. Tokyo.

Hayashi, M. 2002. Sparidae. *In* Nakabo, T. (ed.): Fishes of Japan with Pictorial Keys to the Species (English edition), pp. 1558–1559. Tokai University Press. Tokyo.

Houttuyn, M. 1782. Beschryving van eenige Japanese visschen, en andere zee-schepzelen. Verhandelingen Hollandsche Maatschappij der Haarlm, 20: 311–350.

Hubbs, C. L. and K. F. Lagler 1964. Fishes of the Great Lakes region. Cranbrook Institute of Science Bulletin,

26: 1–213.

ICZN 1999. International Code of Zoological Nomenclature. Fourth Edition. 306 pp. The International Trust for Zoological Nomenclature, London,

Iwatsuki, Y. and K. Carpenter 2006. *Acanthopagrus taiwanensis*, a new sparid fish (Perciformes), with comparisons to *Acanthopagrus berda* (Forsskål, 1775) and other nominal species. Zootaxa, 1202: 1–19.

Iwatsuki, Y. and K. E. Carpenter 2009. *Acanthopagrus randalli* (Perciformes: Sparidae), a new black seabream from the Persian Gulf. Zootaxa, 2267: 43–54.

Iwatsuki, Y. and P. C. Heemstra 2010. Taxonomic review of the western Indian Ocean species of the genus *Acanthopagrus* Peters, 1855 (Perciformes: Sparidae), with description of a new species from Oman. Copeia, 2010: 123–136.

Iwatsuki, Y., S. Kimura and T. Yoshino 2006. A new sparid, *Acanthopagrus akazakii* from New Caledonia with notes on nominal species of *Acanthopagrus*. Ichthyological Research, 53: 406–414.

Kishinouye, K. 1907. On the four Japanese species of the genus *Sparus*. Dobutsugaku Zasshi (=Zoological Magazine, Tokyo), 19: 326–329.

Kottelat, M., A. J. Whitten, S. N. Kartikasari and S. Wirjoatmodjo 1993. Freshwater Fishes of Western Indonesia and Sulawesi. 259 pp. Periplus Editions, Hong Kong.

Kuiter, R. H. 1997. Guide to Sea Fishes of Australia. A comprehensive reference for divers and fishermen. 434 pp. New Holland Publishers, Frenchs Forest.

Kume, M. and T. Yoshino 2008. *Acanthopagrus chinshira*, a new sparid fish (Perciformes: Sparidae) from the East Asia. Bulletin of the Natural Museum of the Nature and Science, Series A, Supplement, 2: 47–57.

Larson, H. K. and R. S. Williams 1997. Darwin Harbour fishes: a survey and annotated checklist. *In* Hanley, J. R., G. Caswell, D. Megirian and H. K. Larson (eds.): Proceedings of the sixth international marine biological workshop. The Marine Flora and Fauna of Darwin Harbour, Northern Territory, Australia, pp. 339–380. Museums and Art Galleries, Northern Territory and Australian Scientific Association, Darwin.

Leviton, A. E., R. H. Gibbs Jr., E. Heal and C. E. Dawson 1985. Standards in herpetology and ichthyology: Part I. Standard symbolic codes for institutional resource collections in herpetologists and ichthyologists. Copeia, 1985: 802–832.

Matsuura, K. 1997. Fish collection building in Japan, with comments on major Japanese ichthyologists. *In* Pietsch, T., W. D. Anderson, Jr. (eds.): Collection Building in Ichthyology and Herpetology. Special Publication, Number 3, pp. 171–182. American Society of Ichthyology and Herpetology, Kansas.

Mohsin, A. K. M. and M. A. Ambak 1996. Marine Fishes and Fisheries of Malaysia and Neighbouring Countries. 744 pp. Ampang Press, Kuala Lumpur.

Munro, I. S. R. 1949. Revision of Australian silver breams *Mylio* and *Rhabdosargus*. Memoirs of the Queensland Museum, 12: 182–223.

Peters, W. C. H. 1852. Diagnosen von neuen Flussfischen aus Mossambique. Monatsberichte der Königlichen Akademie der Wissenschaften zu Berlin, 1852: 275–276, 681–685.

Peters, W. C. H. 1855. Uebersicht der in Mossambique beobachteten Fische. Archiv für Naturgeschichte, 21: 234–282, 257–282.

Richardson, J. 1846. Report on the ichthyology of the Seas of China and Japan. Report of the British Association for Advancement of Science, 1845: 187–320.

Roberts, T. R. 1978. An ichthyological survey of the Fly River in Papua New Guinea with descriptions of new species. Smithsonian Contributions to Zoology, (281): 1–72.

Russell, P. 1803. Descriptions and figures of two hundred fishes; collected at Vizagapatam on the coast of Coromandel. Vol. 2. 85 pp. W. Bulmer & Co. Shakespeare Press, London.

Sadovy, Y. and A. S. Cornish 2000. Reef Fishes of Hong Kong. 321 pp. Hong Kong University Press, Hong Kong.

Skelton, P. H. 2003. Change of institution name and collection abbreviation. Ichthyological Research, 50: 106.

Tirant, G. 1883. Mémoire sur les poissons de la rivière de Hué. Bulletin de la Société des Études Indo-chinoises, Saigon, 1883: 80–101.

Weber, M. and L. F. de Beaufort 1936. The Fishes of the Indo-Australian Archipelago. VII. Perciformes (continued) families: Chaetodontidae, Toxotidae, Monodactylidae, Pempheridae, Kyphopsidae, Lutjanidae, Lobotidae, Sparidae, Nandidae, Sciaenidae, Malacanthidae, Cepolidae. 607 pp. E. J. Brill Ltd., Leiden.

Whitley, G. P. 1935. Studies in ichthyology. No. 9. Records of the Australian Museum, 19: 215–250.

Ye, T. 1991. Sparidae. *In* Pan, J.-H., L. Zhong, C.-Y. Zheng, H.-L. Wu and J.-H. Liu (eds): The Freshwater Fishes of Guangdong Province, pp. 401–405. Guangdong Science and Technology Press, Guangdong.

Yu, T. and B. Zhou 1986. Percoidei. *In* Kuang Y.-D. *et al.* The Freshwater and Estuaries Fishes of Hainan Island, pp. 215–257. Guangdong Science and Technology Press, Guangdong.