



Title	Type status and taxonomic accounts for <i>Ambiserrula jugosa</i> (McCulloch 1914) and <i>Inegocia harrisii</i> (McCulloch 1914) (Scorpaeniformes: Platycephalidae)
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Type status and taxonomic accounts for *Ambiserrula jugosa* (McCulloch 1914) and *Inegocia harrisii* (McCulloch 1914) (Scorpaeniformes: Platycephalidae)

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Abstract Platycephalids *Ambiserrula jugosa* (McCulloch 1914) and *Inegocia harrisii* (McCulloch 1914) were described as new species based on 10 and 2 specimens, respectively, collected from the coast of Queensland, Australia by the F.I.S. Endeavour in 1910. McCulloch (1914) listed additional specimens at the end of the description, which he did not exclude from the type series. Previous authors considered the specimens, which McCulloch stated the species to have been described from, to be types of the two species, it was revealed that all 43 and 9 specimens included in these species by McCulloch are type specimens, according to the fourth edition of International Code of Zoological Nomenclature, stating "type series of a nominal taxon consists of all the specimens included by the author in the new nominal taxon" in Article 72.4.1. In *I. harrisii*, it was assumed that a specimen later designated as the lectotype was figured with the original description. Because its plate legend includes the words "sp. nov. Type", the specimen is regarded to be the holotype of the species and the designation of the lectotype was unnecessary. This study newly recognizes additional 12 paratypes of *A. jugosa* and 5 paratypes of *I. harrisii*, and gives taxonomic accounts of the two species to show range extensions of intraspecific variation and distribution newly found. Also comments are given about the type status of other species taken by the Endeavour described by McCulloch in a series of five papers.

Keywords Endeavour · Type series · Holotype · Paratype · Intraspecific variation

Introduction

In 1914, Allan R. McCulloch, a vertebrate zoologist of the Australian Museum, Sydney (Paxton and McGrouther 1997), published a paper on Australian fishes obtained by the F.I.S. Endeavour and described nine platycephalids, including four new species. Of them, *Ambiserrula jugosa* (McCulloch 1914) (as *Insidiator jugosus*) and *Inegocia harrisii* (McCulloch 1914) (as *Insidiator harrisii*) were newly described based on 10 and 2 specimens, respectively, collected from Queensland in 1910 (Figs. 1–2), and these specimens have been recognized as types (Fricke et al. 2023). In addition, McCulloch (1914) also referred to 27 and 5 specimens of these species, respectively. Although they have not been regarded as type specimens of these species, they are also types according to ICZN (1999: Art. 72.4.1), stating "type series of a nominal taxon consists of all the specimens included by the author in the new nominal taxon".

An alternate view for the type designation is that the types should only be the specimens upon which the description was based. However, ICZN (1999) does not require that an author actually examine or describe characters of the holotype and that where a holotype or syntypes are not exclusively designated, then all specimens recognized by the author prior to the descriptions are syntypes. If a holotype is designated, then other species become paratypes, unless they are exclusively excluded from the type series. For example, Whitley (1937) described *Epinephelus forsythi* Whitley 1937 based on specimens from Middleton and Elizabeth reefs, which were not kept, and designated a specimen from Lord Howe Island as holotype, but gave no characters of that specimen. The description was based on what is now recognized as *Epinephelus polyphekadion* (Bleeker 1849), but the holotype was a different species, now recognized as *Epinephelus daemeli* (Günther 1876). In the example below of *Polyipnus tridentifer* McCulloch 1914, a lectotype was subsequently selected from a specimen listed in the paper by Schultz (1961), but one that was not one used

in the original description. Both of these cases and others would cause conflict with other parts of the Code by not following Articles 71.4.1 and 72.4.1.1.

In addition to the two platycephalids mentioned above, McCulloch (1914) described other new species and varieties (Table 1). That study was a part of five publications by McCulloch (McCulloch 1911, 1914, 1915, 1916, 1926) describing several species, subspecies and varieties of fishes obtained by the fisheries vessel "Endeavour". We found that holotype designation was often on the plate legends, rather than in the description, particularly in Part 2, in which the two platycephalids described. We also noted inconsistencies regarding the status and number of type specimens within Eschmeyer's Catalog of Fishes (Fricke et al. 2023), sometimes agreeing with our interpretation above and sometimes agreeing with the alternate interpretation. For example, in the two cases mentioned above (*Ambiserrula jugosa* and *Inegocia harrisii*), only the material listed as described from and considered composing the type series and other specimens appear to be excluded from the type series. However for *Hoplostethus mediterraneus* var. *latus* McCulloch 1914, which was described from three specimens, Fricke et al. (2023) recognized nine specimens as syntypes (see Table 1). We focus here primarily on Part 2 of the series (McCulloch 1914), but briefly discuss our interpretation of types in all five of the publications. The discussion will hopefully lead to standardize recognition of type material, that is consistent with ICZN (1999).

This study newly recognizes additional type specimens of the two platycephalid species, in which type status in specimens not used for original descriptions has not been discussed or considered among species described by McCulloch (1914), and gives taxonomic accounts of the two species and shows range extensions of intraspecific variation and distribution newly obtained here.

Johnson (1999a) designated the lectotype of *Inegocia harrisii* and the specimen is assumed to have been figured in McCulloch (1914) in this study. Because the legend of the plate (pl. 30, fig. 1) includes the words "sp. nov. Type", the figured specimen is regarded to be

the holotype of the species (ICZN 1999: Art. 73.1.1).

Materials and methods

Methods for counts and measurements generally follow Imamura (2008), being routinely taken from the left side, although gill rakers, defined as depressible bony elements and not including tooth plates, were counted on the right side. Terminology of head spines follows Knapp et al. (2000). Pectoral fin rays are expressed as "upper unbranched rays + middle branched rays + lower unbranched rays = total rays". All measurements were made to the nearest 0.1 mm with calipers. Standard, total and head lengths are abbreviated as SL, TL and HL, respectively. Institutional abbreviations follow Fricke and Eschmeyer (2023).

On Fig. 3, start and end positions of eight hauls, and Hervey Bay Fairway Buoy (now Hervey Bay Fairway Beacon; see Imamura and Hoese 2020b: table 1), the landmark of Haul 319, were plotted based on latitudes and longitudes calculated by Imamura and Hoese (2020b). It is unclear whether distance in Endeavour data was expressed as "mile (1.609344 km)" or "nautical mile (1.85200 km)". However, because AMS, in which many fish specimens collected by Endeavour are deposited, uses mile for conversion to kilometer judging from AMS specimen data (for example, "13 miles SE Cape Capricorn" and "21 km SE Cape Capricorn", both collected on 29 July 1910 by Endeavour, are recognized in AMS data), this study follows that practice. Australian states New South Wales, Northern Territory, Queensland and Western Australia are abbreviated as NSW, NT, Qld and WA, respectively.

Location of museum specimens has been determined from the Endeavour register held at AMS. Much of the material from the Endeavour cruises was deposited in other museums in Australia and some overseas. In some cases, Endeavour material was sent out from AMS, but without any record of the transaction. Consequently, it is often not possible to

easily determine the location of type material from those cruises. Also some material has been destroyed due to their poor condition. When the collection data was entered into a digital database, often distances and locality information was modified to a metric system from the original records, resulting in some errors. Consequently, it was necessary to examine original records to resolve some of the station data for this study.

Results and discussion of type status

Type status in five publications by McCulloch. McCulloch in a series of five publications described several new species obtained by the Fisheries Investigator Ship Endeavour. He named 9 new species in Part 1 (McCulloch 1911); 13 new species and 3 new varieties (thus regarded to be subspecies according to ICZN 1999: Art. 45.6.4 and recognized by Whitley 1964 to meet criteria in Art. 45.6.4.1) in Part 2 (McCulloch 1914); 9 new species and 1 subspecies in Part 3 (McCulloch 1915); 5 new species in Part 4 (McCulloch 1916); and 8 new species and 2 new varieties in Part 5 (McCulloch 1926). There have been considerable inconsistencies in determining which specimens represent types and which are the primary types in Fricke et al. (2023). In the series of papers McCulloch only referred to "type" or "the type" in Parts 1 to 4 and only used the words holotype and paratype in Part 5. In those publications, McCulloch also provided information and descriptions of some of the types of Endeavour specimens described by Ogilby (1910), although he did not accept Ogilby (1910) as a published paper, but recognized the species in Parts 2 to 5.

In Part 1, five of the nine species were described from a single specimen and no other specimens mentioned, with the word type used in the text for one of these species. These have normally been accepted as holotypes. Types were designated in the species descriptions by indicating which sized specimen was selected as the type for four species,

three with multiple specimens. No type was indicated for one species with multiple specimens, which clearly identified them as syntypes. Consequently for eight species holotypes are known and for one syntypes are known. The word Type was not used on any plate legend.

In Part 2, there has been disagreement with Fricke et al. (2023) as to the status of various type specimens, some being listed as holotypes or syntypes (see Table 1). Holotypes were mainly designated on the plate legends rather than the text. Two of the species (*Squatina tergocellata* McCulloch 1914 and *Ammotretis macrolepis* McCulloch 1914) were described from a single specimen, with no indication that other specimens were considered identical. We agree that these are unique holotypes as indicated by Fricke et al. (2023). For three of the species (*Plagiogeneion macrolepis* McCulloch 1914, *Ambiserrula jugosa* and *Pseudorhombus spinosus* McCulloch 1914), a type was designated in the main description. We agree the holotype designation, but do not agree on the number of paratypes for *A. jugosa* and *Plagiogeneion macrolepis*. In one case (*Hoplostethus mediterraneus* var. *latus*) we agree that the subspecies includes nine specimens, all of which are syntypes because the type was not designated. For the other nine cases there is disagreement over the status of the types and in most cases the number of type specimens.

We found that additional material of the type series was included in the original descriptions and that much of that material must be considered as type material under ICZN (1999: Art. 72.4.1) and provides greater stability for the nomenclature of the species. The two platycephalid species treated here were described in this publication. See further discussion relating to our disagreements over types in Part 2 below.

In Part 3, the type was clearly indicated on the plate legends on the legends for all nine species and one subspecies. For *Amia fasciata stevensi* McCulloch 1915 no type was indicated in the text and Fricke et al. (2023) lists types as syntypes, but McCulloch (1915) clearly indicated the type on the plate legend as "Type of the subspecies, 79 mm. long, from

the New Hebrides". Only one species was known only from a single specimen. Three species and the one subspecies were described from a single specimen and the type was not indicated in the text for the subspecies (based on 62 specimens) and *Chaunax penicillatus* McCulloch 1915 (described from 2 specimens). For all other cases the type was indicated both in the text and on the plate legends, by reference to a particular specimen. There have been no disagreements over the type status of these, except for the subspecies, with all having holotypes and many having paratypes.

In Part 4, of the five species named, one species was described from two specimens without any indication of type in the description or figure, clearly identifying the two specimens as syntypes. Another species, also described from two specimens, the type selection is clear, with a specimen mentioned as selected type indicated in the text and on the plate legend. The three remaining species were described from a single specimen and the plate legends indicate Type and a size. All of the type status of these species agrees with Fricke et al. (2023).

In Part 5, the holotype is indicated on the plates of all 10 species described as new, five of which are indicated as holotype in the original descriptions. Four of the other five were based on unique specimens. In all 10 cases McCulloch (1926) indicated that the species description was based on a single specimen, suggesting he might have used that type of designation in his Part 2. In addition, two varieties were described from multiple specimens, without any indication in the text or on the plates of a holotype. These are clearly syntypes, with a lectotype being designated subsequently for one variety. The varieties were not figured.

The status of type specimens recognized here as differing from Fricke et al. (2023) includes *Amia fasciata stevensi* and many of the species described by McCulloch (1914) in Part 2 (Table 1). The ICZN (1999) articles that are relevant are the following: "72.4.7. The mere citation of "Type" or equivalent expression, in a published work other than that on

which the nominal species-group taxon is established, or in an unpublished catalogue of a museum, or on a label, is not necessarily evidence that a specimen is or is fixed as any of the kinds of types referred to in this Chapter." and "73.1.1. If an author when establishing a new nominal species-group taxon states in the original publication that one specimen, and only one, is the holotype, or "the holotype", or uses some equivalent expression, that specimen is the holotype fixed by original designation".

Further discussion on Part 2. In four cases [*Polyipnus tridentifer*, *Hoplostethus gigas* McCulloch 1914, *Inegocia harrisii* and *Ratabulus diversidens* (McCulloch 1914)], lectotypes were subsequently designated. The lectotype was selected for three of the four species from described specimens, even though multiple specimens were included in the description. For two of the three new varieties (*Neocyttus rhomboidalis* var. *gibbosus* McCulloch 1914 and *Allocyttus verrucosus* var. *propinquus* McCulloch 1914), the subspecies was described from one specimen, but others were also listed and in both cases a range of values was given for some meristic characters. For both of these described specimens have traditionally been treated as the holotype and others paratypes, such as in Eschmeyer's Catalog and Paxton et al. (2006a), presumably because ICZN (1999) indicates the holotype is the basis for the taxon name. However, ICZN (1999) only indicates the holotype either must be designated by the author or be the only specimen included in the description. The wording in ICZN (1999: Art. 73.2) is not clear, whether saying that a species described from a single specimen, meets the criteria for holotype designation or whether it only applies to only a single specimen being included by the author. However, for the three varieties, it is clear that data were included in the descriptions from more than one specimen, even though in two there was an indication that the species was described from a single specimen. It is apparent for *Neocyttus rhomboidalis* var. *gibbosus* and *Allocyttus verrucosus* var. *propinquus*, that more than one specimen was included in the description, and we regard the types as syntypes. For the other eight species, there was no mention of a single type specimen in the description,

however, the plate legends were labelled "*Genus species*, sp. nov. Type" (see Table 1).

McCulloch (1914) did not use the term type in the text or on plate legends in four species (3 varieties and *Ammotretis macrolepis*) (Table 1). Also he did not use the terms cotype and other specimens in all his descriptions of new species, which under ICZN (1999: Art. 72.4.6) would result in the other specimens not treated as paratypes.

McCulloch (1914) used the term "Type" for 12 of his new species in their respective plate legends, with only three of the 12 having the word type in the original descriptions (see Table 1). For those species described from one specimen, but for which other specimens were mentioned (*Allocyttus verrucosus* var. *propinquus* and *Neocyttus rhomboidalis* var. *gibbosus*), one might regard the statement of "described from one specimen" as an indication of the McCulloch's intention, which would meet Art. 73.1.1, stating "If an author when establishing a new nominal species-group taxon states in the original publication that one specimen, and only one is the holotype, or 'the type', or uses some equivalent expression that specimen is the holotype fixed by original designation" as an equivalent expression. Fricke et al. (2023) recognizes the holotypes in the two species (see Table 1). However it is clear that data are included of other specimens in the descriptions and that the indication of described from a single specimen does not in these cases meet the criteria of Art. 73.1, and we regard all the specimens included in the subspecies as syntypes. For the species, where the word Type was used only on the plate legends, our view is that the use of the term "*Genus species*, sp. nov. Type" on plate legends meets Art. 73.1.1 as an equivalent expression. It is also consistent with Art. 72.4.7, which implies that "Type" in the original publication would be an acceptable designation, and it is clear that McCulloch was designating the holotype on the plate legends.

Among the four species where lectotypes have been designated subsequently, the two lectotypes of platycephalids are the same specimens as the holotypes. Schultz (1961) selected a lectotype specimen for *Polyipnus tridentifer* that was not one of the three specimens upon which the description was based. We regard the holotype as one of the three specimens

included in the original description and the designation of the lectotype was unnecessary. Determining which specimen was the figured specimen typically can be difficult and involves examination of specimens and records held in AMS. In the case of platycephalids *R. diversidens* and *Inegocia harrisii*, lectotypes were selected by Imamura and Gomon (2010) and Johnson (1999a), respectively. Discussion of one of us (DH) with Bill Eschmeyer indicated that both agreed that the usage of the word type on the plate legend was an equivalent expression that fixed the figured specimen as the holotype. For example, on plate 30 of McCulloch (1914), the plate legend is "Fig. 1. *Insidiator harrisii*, sp. nov. Type.". However, some workers might disagree with that interpretation. For other species described by McCulloch (1914) some have been updated to holotype in the Australian Faunal Directory (<https://biodiversity.org.au/afd/home>), but others have not yet been updated. In the case of the three platycephalid species having subsequent lectotype designations, our study regards the lectotypes chosen for *Inegocia harrisii* and *R. diversidens* are the same specimens as those figured by McCulloch, which does not affect the allocation of the names. The holotype registration number of *R. diversidens* has been confirmed by information in the E and I registers in the Australian Museum. Similarly information in the register indicates that the holotype of *Inegocia harrisii* can also be confirmed. See discussion below for the holotype of *Inegocia harrisii*.

Most of the type specimens of *Ambiserrula jugosa* and all of *Inegocia harrisii* recognized in this study were collected during three Endeavour's Qld cruises from July to September of 1910 (cruise no. 25 from 6 to 19 July, no. 26 from 26 July to 9 August and no. 27 from 31 August to 13 September). Full station data of the Qld cruises was provided by Dannevig (1910) in his report to the Commonwealth of Australia. In many cases, data for trawls of Endeavour stations are different between Dannevig (1910), which shows detail data including both start and end positions of trawls, and the registration book for Endeavour collections in the AMS usually giving only a single locality for each specimen. Because

locality data provided by McCulloch (1914) is fundamentally based on the latter, a collation of these data is needed, as discussed below. In addition, it should be noted that the position in the station data indicates a landmark followed by a bearing and distance from the ship to that landmark in Dannevig (1910), which was normal navigation practice. However, many published records and museum databases [such as OZCAM (Online Zoological Collections of Australian Museums; <https://ozcam.org.au>)] have incorrectly assumed that the bearings given were from the landmark to the ship. McCulloch usually changed the bearing and distance as indicated from the landmark to the ship in the AMS data. Start and end positions for stations of Endeavour trawls provided by Dannevig (1910) and associated with discussion in this study are shown in Tables 2 and 3, respectively.

***Ambiserrula jugosa*.** When *Ambiserrula jugosa* was originally described, McCulloch (1914) stated that "Described from ten specimens, 139–206 mm. long, from off Hervey Bay, Queensland. The largest example is selected as the type" and "In all, thirty-three specimens were preserved from the following localities in Queensland". Because he included the 33 specimens collected by Endeavour in *A. jugosa*, they are type specimens of the species (ICZN 1999: Art. 72.4.1). Accordingly, 32 specimens other than the holotype (AMS E.3209) are regarded as the paratypes, although Fricke et al. (2023) showed only "9 paratypes" of the species as "Paratypes: (9) AMS I.12726–33 (1 ea.); ?TMH D150/13031 [old no. D36, ex AMS E.2688] (2); QM I.1409–11 (3)".

McCulloch (1914) listed the following five localities and date from where the 33 specimens he recognized as *A. jugosa* were collected: (1) near Bowen; (2) Hummocky Island, S.7° E, seven miles; 30 July 1910; (3) thirteen miles S. East from Cape Capricorn; 29 July 1910; (4) off Hervey Bay; 27 July 1910; and (5) mouth of Wide Bay; 15 July 1910. Among AMS specimens of *A. jugosa* collected during the Endeavour's Qld cruises in 1910, AMS data shows only AMS E.2670 (1 specimen) having the locality "near Bowen", but lacks other data. We assume that this specimen was collected from Haul 327 (landmark: Bowen Light) on

3 August 1910, because Bowen was the landmark only in Haul 327 in the Qld cruises (Dannevig 1910). However, it is also possible that it was collected from Haul 325 or 326 operated on 2 August with Gloucester Head as the landmark. Imamura and Hoese (2020b) suggested that McCulloch may have combined Hauls 325 and 326 into a more generalized locality having Bowen as the landmark (data in AMS: 12 miles NE Bowen, Queensland, 19–25 fathoms, 2 August 1910; see Tables 2–3 for data of Hauls 325 and 326), due to inadequate labelling of material collected from Hauls 325 and 326. See Imamura and Hoese (2020b) for detailed discussion. AMS E.2670 was not found in the AMS collection.

The second locality, Hummocky Island, is considered to be Haul 323 (landmark: Hummocky Island Peak at start position), which was the sole trawl operated on 30 July 1910. Accordingly, AMS E.2688 (2 specimens, transferred to TMH, now TMH D150, existing according to Andrews 1992) collected on 30 July 1910 was regarded as being obtained from Haul 323. The locality data provided in the AMS register is 7–10 miles NW of Hummocky Island, 14–16 fathoms, 30 July 1910, which agrees well with that for Haul 323, as reported by Dannevig (1910) (i.e., distance between ship and landmark 7 miles and water depths 16 fathoms at start position, 10 miles and 14 fathoms at end position in Haul 323; see also Tables 2–3).

Haul 322 is also the sole trawl collection on 29 July 1910 near Cape Capricorn Lighthouse and AMS E.2864 (1 specimen) was collected from this locality, although this specimen was not found at the AMS. The locality data of this specimen in the AMS collection (13 miles SE of Cape Capricorn, 13 fathoms, 29 July 1910) is considerably consistent with Dannevig's (1910) data for the start position of Haul 322 (see Table 2).

On 27 July 1910, Haul 319 occurred near Hervey Bay Fairway Beacon (previously Hervey Bay Fairway Buoy). This haul is the only one in Hervey Bay during the Qld cruises. Although another trawl, Haul 318 (landmark: Great Sandy Strait, off Point Inskip at start position, Elbow Point at end position; bearing and miles to landmark in both positions

unknown) was also took place on 27 July 1910, Inskip Point and Elbow Point are not situated in Hervey Bay (Fig. 3; see also Imamura and Hoese 2020b: table 1). Haul 319 yielded AMS E.2597 (1 specimen, transferred to WAM, now WAM P.68-001, leaving 3 specimens), AMS E.3209 (holotype, locality data recorded as 3–7 miles NW of Hervey Bay, 9–11 fathoms, 27 July 1910), AMS I.12726–I.12730 and AMS I.12732–I.12733 (11 specimens in total), and AMS I.12731 (2 specimens, transferred to Dept. Harbours & Marine – Brisbane 1952, current status unknown). The collection data for the holotype recorded in the AMS register is consistent that in Dannevig (1910) (see Tables 2–3). Of the specimen lots, WAM P.68-001 now comprises three specimens, while AMS E.2597, as originally registered, now only constitutes a single specimen. Therefore, at least one of the three WAM specimens is a paratype of *A. jugosa*, but the type status and correct locality of the other two specimens are unclear.

On 15 July 1910, two trawl collections were made near Boomerang Hill (Haul 315) and Double Island Lighthouse (Haul 316). The former locality is outside of Wide Bay, whereas the latter one is situated in the "mouth" of Wide Bay, which is consistent with the fifth locality of *A. jugosa* given McCulloch (1914) (Fig. 3). In addition, Dannevig (1910) stated that "After dark a haul was made off the mouth of Wide Bay...." in his report for Haul 316 on 15 July 1910. AMS I.10995 (1 specimen) and AMS I.10996 (1 specimen) were collected from Wide Bay in 1910, both lacking details for locality data and date, according to AMS records. Other than Haul 316, Double Island Lighthouse (or Double Island Point or Double Island Point Lighthouse) was used as a landmark for five hauls (Hauls 304, 305, 307, 317 and 332) among the Endeavour's cruises in 1910 (see Dannevig 1910). However, the Endeavour made these hauls outside of Wide Bay (Fig. 3) with dates other than 15 July 1910 (Tables 2–3). Therefore, we regard that AMS I.10995 and I.10996 as paratypes of *A. jugosa* collected in Haul 316, one of the five localities for the species McCulloch (1914) provided.

McCulloch (1914) also stated that "Four others are in the Australian Museum collection, of which three were trawled in Port Jackson, and one in Port Stephens, New South Wales". Because they were also included in *A. jugosa* by McCulloch (1914), they are paratypes of the species (ICZN 1999: Art. 72.4.1). AMS has three specimens of the species from Port Jackson collected before 1914 (AMS A.696 collected in 1885, AMS I.186 in 1886, AMS I.11509 in 1893; all existing). This study regards the three specimens also to be the paratypes of *A. jugosa*.

The following six specimens of *A. jugosa* in the original register (but now seven specimens) were also collected during the Qld cruises: AMS E.2840 (2 specimens, transferred to NMV, now NMV A1418, 1 specimen); AMS E.2841 (2 specimens, transferred to QM, now QM I.1409 to I.1411, 3 specimens) and AMS E.2842 (2 specimens, transferred to SAMA, now SAMA F135, 3 specimens). Of them, the three QM specimens are considered to be paratypes by Fricke et al. (2023). According to AMS data, the six specimens were obtained from 11–13 miles NE of Boomerang Hill, 25 fathoms, 15 July 1910, although the locality of the QM and SAMA specimens is "mouth of Wide Bay" in these museums. The locality in the original register can be considered to be Haul 315 (landmark: Boomerang Hill), because locality data of AMS and Dannevig (1910) well agree with each other (see Tables 2–3 for detail locality data). Because Boomerang Hill is not a locality of *A. jugosa* listed by McCulloch (1914), these six specimens may not be regarded as type specimens. However, the records in the Endeavour register for the six specimens transferred to NMV, QM and SAMA were registered in 1912 as *Thysanophrys jugosus* in the same handwriting as the other material, such as AMS E.2597, E.2688 and E.2864, paratypes of the species. Consequently, it is indicated that these specimens were considered by McCulloch to be the same species. ICZN (1999: Art. 72.4.1.1) does not require that specimens be listed in the original paper, if it can be shown from other records that they were considered the same species by the author. This study regards the six specimens to be paratypes of the species, but type status in one of

the three QM specimens and one of the three SAMA specimens is unclear. It is unclear why the above specimens are now listed as Wide Bay, although currently the Wide Bay district is a large area extending from Wide Bay to the Mary River, which may have caused some confusion. It is also possible that someone just incorrectly assumed that the specimens were from Wide Bay.

As a result, this study specifies 30 of 43 type specimens of *A. jugosa*. Of them, 12 specimens with an asterisk after the register number are newly recognized as type in this study.

Holotype: AMS E.3209.

Paratypes (29 specimens): AMS A.696* (1 specimen); AMS E.2670* (1 specimen, not found in AMS); AMS E.2864* (1 specimen, not found in AMS); AMS I.186* (1 specimen); AMS I.10995* (1 specimen); AMS I.11509* (1 specimen); AMS I.10996* (1 specimen); AMS I.12726 (1 specimen); AMS I.12727 (1 specimen); AMS I.12728 (1 specimen); AMS I.12729 (2 specimens); AMS I.12730 (2 specimens); AMS I.12731 (2 specimens, transferred to Dept. Harbours & Marine – Brisbane 1952, current status unknown); AMS I.12732 (2 specimens); AMS I.12733 (2 specimens); SAMA F135* (2 of 3 specimens, formerly AMS E.2842, type status in other 1 specimen unclear); TMH D150 (2 specimens, formerly AMS E.2688, see also Andrews 1992); NMV A1418* (1 specimen, formerly AMS E.2840 including 2 specimens, current status in other 1 specimen* unknown); 2 specimens of QM I.1409, I.1410 and I.1411 (2 of 3 specimens, formerly AMS E.2841; type status in other 1 specimen unclear); WAM P.68-001* (1 of 3 specimens, formerly AMS E.2597; type status in other two specimens unclear).

Inegocia harrisii. McCulloch (1914) originally described *Inegocia harrisii* (as *Insidiator harrisii*) based on two specimens collected from near Pine Peak and Moreton Bay, although other locality data and date are not shown. One of the two specimens (AMS E.2844) is the lectotype designated by Johnson (1999a), and the other one (AMS I.12765) has been

recognized as a paralectotype (Johnson 1999a) and is identical with *Inegocia japonica* (Cuvier in Cuvier and Valenciennes 1829) (Johnson 1999a; this study). McCulloch (1914) also included five specimens collected from off Bowen, about 16 fathoms in the species; and thus, they are also type specimens of *Inegocia harrisii* (ICZN 1999: Art. 72.4.1).

McCulloch (1914) used the term of type in the plate legend of the drawing of *Inegocia harrisii* and the specimen used for the drawing is regarded to be the holotype of the species in this study. The drawing shows 11 second dorsal- and anal-fin rays, and 23 or 24 pectoral-fin rays, which agree with these fin ray counts in species recently known as *Inegocia harrisii* and AMS E.2844, but not with those in *Inegocia japonica* and AMS I.12765 (usually 11 and 22–25 in *Inegocia harrisii* vs. usually 12 and 19–21 in *Inegocia japonica*) (Knapp 1999; this study), although the pectoral-fin ray number in the drawing is somewhat unclear. In addition, although McCulloch (1914) included the five specimens from off Bowen in *Inegocia harrisii*, he did not include them in the original description. This study confirmed three of the five specimens from Bowen as *Inegocia japonica* (see below) but remaining two specimens are unidentified. However, it is unlikely that a specimen not included in the original description was used for the drawing and designated as the holotype. This study indicates that McCulloch (1914) designated AMS E.2844 as the type, because it is in a larger size [169.7 mm SL and 207.5 mm TL, nearly maximum size of the species (about 24 cm TL; see Knapp 1999)] and good condition as at present (see Fig. 2a, b), and suitable for the original description and drawing for him, although the data of AMS E.2844 in the Endeavour register lacks the word type. Also holotypes were to be returned to the Commonwealth and normally McCulloch designated Endeavour register specimens as holotypes and AMS E.2844 is the only one of the two specimens included in the original description in the Endeavour register and the only one from the locality. Normally at least one paratype was to be retained by the AMS and those were registered in the I register, in this case AMS I.12765, which was labelled as a co-type in the register. In this study, above mentioned six specimens other than the

holotype and two additional specimens (see discussion below) included in the species are regarded to be paratypes. The locality data of the holotype in AMS is 11–14 miles (18–23 km) NW Pine Peak, 1 August 1910. Endeavour operated only one trawl, Haul 324 (landmark: Pine Peak), in the day. In addition, Haul 324 is the sole locality using Pine Peak as the landmark in the Qld cruises.

AMS I.12765 was reregistered from AMS E.2865. The original data for that record in AMS is Moreton Bay, 31 August 1910. Endeavour operated two trawls, Hauls 328 and 329, near Cowan Cowan Lighthouse in the day. The present study avoids specifying the locality of AMS I.12765. The data of AMS I.12765 in the Endeavour register includes the word cotype in handwriting, considered to be made by McCulloch.

It can be considered that the five paratypes from off Bowen, 16 fathoms were collected from Haul 327 (landmark: Bowen Light, 3 August 1910), because the depth at the start position is 15 fathoms and that at the end position is 17 fathoms in Haul 327, and they are similar to the water depth shown by McCulloch (1914) (it is probable to assume 16 fathoms was lead from average of 15 and 17 fathoms). Original records of *Inegocia* in AMS show that AMS E.3240 (2 specimens) and E.3241 (1 specimen) were collected from 7 miles NNE Bowen, 16 fathoms, 3 August 1910. Therefore, AMS E.3240 and E.3241 are regarded to be paratypes of *Inegocia harrisii*. The former specimens were transferred to NMV and WAM, and the latter to QM, and they are now catalogued as NMV A18430, WAM P.60-001 and QM I.1437, respectively, although the QM specimen was previously regarded as a non-type specimen by Eschmeyer (1998) and Johnson (1999a). In addition, WAM P.60-001 and QM I.1437 are identical with *Inegocia japonica*, both commonly having 12 second dorsal- and anal-fin rays, 20 pectoral-fin rays, and interopercular flap (WAM P.60-001 identified in this study, QM I.1437 by M. McNamara) (e.g., Knapp 1999; this study). NMV A18430 having the interopercular flap is also identified with *Inegocia japonica* here.

It is considered that an additional specimen (AMS E.3239) taken off Bowen

[specifically off Gloucester Head, not a locality given by McCulloch (1914)] on 2 August 1910 is a paratype of *Inegocia harrisii* corresponding to Haul 325 and/or 326. See discussion above about possible combination of these two stations. The specimen was registered at the same time (1912) as AMS E3240 and E.3241 as *Thysanophrys harrisii* in the same handwriting, suggesting that McCulloch identified the specimen before publication of the description and satisfying ICZN (1999: Art. 72.4.1.1). This specimen has tentatively been reidentified as *Inegocia japonica* by K. Graham (AMS) and is regarded here as a paratype.

Johnson (1999a) also regarded AMS I.12805 to be a non-type of *Inegocia harrisii*, although this specimen was previously considered to be a syntype of the species by Eschmeyer (1998). This specimen was also collected from off Bowen on 2 August 1910 according to AMS data (thus it may have been actually collected from off Gloucester Head, which is also off Bowen). However, it is considered McCulloch registered this specimen in 1913 (thus before publication of McCulloch 1914) as a paratype of *Insidiator harrisii*. The locality given is "Bowen, hauls 1–2", suggested trawl material of Hauls 325 and 326 may have been combined as discussed above. Because it was registered under the name of *Insidiator harrisii* and labelled as a paratype, before the description, it undoubtedly represents a paratype from off Bowen. This specimen is identical with *Inegocia japonica* (Imamura and Yoshino 2009; this study).

Consequently, seven of nine specimens shown below are specified as the type specimens of *I. harrisii* with two additions (AMS E.3239 and I.12805) as paratypes. Five of the seven specimens with an asterisk after the register number are newly recognized as type specimen in this study.

Holotype: AMS E.2844.

Paratypes (6 specimens, all identical with *Inegocia japonica*): AMS E.3239* (1 specimen); AMS I.12765 (1 specimen); AMS I.12805* (1 specimen); NMV A18430* (1 specimen, formerly AMS E.3240); WAM P.60-001* (1 specimen, formerly AMS E.3240); and

QM I.1437* (1 specimen, formerly AMS E.3241).

Taxonomic accounts

***Ambiserrula jugosa* (McCulloch 1914)**

(Common English name: Mud Flathead)

(Fig. 1; Table 4)

Insidiator jugosus McCulloch 1914: 144, fig. 11, pl. XXX-fig. 2 (original description, type locality: Hervey Bay, Qld); McCulloch 1929: 403 (species list, off Hervey Bay).

Suggrundus jugosus: Paxton and Hanley 1989: 471 (species list, Bowen, Qld to Botany Bay, NSW); Kuitert 1993: 101, an unnumbered fig. (short description, southern Qld to Botany Bay, NSW).

Ambiserrula jugosa: Imamura 1996: 216 (new combination of generic and specific names); Johnson 1999b: 728 (species list, Moreton Bay, Qld); Knapp 1999: 2391, an unnumbered fig. (description, Bowen, Qld to Botany Bay, NSW); Paxton et al. 2006b: 934 (species list, Bowen, Qld to Botany Bay, NSW).

Material examined (all from eastern Australia). Holotype: AMS E.3209, 169.2 mm SL, Hervey Bay, Qld, 27 July 1910 (see Tables 2–3 for detail locality data of Haul 319 from which holotype collected).

Paratypes (11 specimens, 112.5–166.5 mm SL): AMS I.12726, 166.5 mm SL, AMS I.12727, 148.5 mm SL, AMS I.12728, 132.8 mm SL, AMS I.12729 (2 specimens), 112.5–128.2 mm SL, AMS I.12730 (2), 119.2–125.7 mm SL, AMS I.12732 (2), 115.9–140.9 mm SL, AMS I.12733 (2), 118.8–121.1 mm SL, all collected with holotype.

Non-types (8 specimens, 101.7–168.0 mm SL): AMS I.25663-012 (2 of 3), 101.7–121.3 mm SL, southeast of Yamba, NSW (29°34'S, 153°25'E), 49–53 m depth, 24 March 1985; AMS I.25771-001, 168.0 mm SL, Manly, NSW (33°S, 151°E), 5 May 1981; AMS I.34361-013 (1 of 3), 125.2 mm SL, 2 km northeast of Cliff Point, Qld (22°38'17"S, 150°48'25"E, 15 m depth, 23 Oct. 1993; AMS I.34505-004, 152.7 mm SL, south of Newcastle, NSW (33°01'S, 151°47'E), 29–33 m depth, 30 March 1993; AMS IB.3314, 149.8 mm SL, Repulse Bay, Qld (20°35'S, 148°45'E), Oct. 1954; NMV A24613, 106.6 mm SL, Parsley Bay Sydney Harbour, NSW (33°50'S, 151°16'E), 10 Aug. 1980; QM I.40007, 143.8 mm SL, Qld (24°23'0"S, 152°35'0"E), 28 m depth, 5 Nov. 2005.

Diagnosis. A species of *Ambiserrula* with the following diagnostic characters: VIII–X first dorsal-fin rays in total (often IX); 10–12 second dorsal-fin rays (usually 11); 11–12 anal-fin rays (usually 11); 20–22 pectoral-fin rays; 51–55 pored lateral-line scales (anterior 10–25 scales with spine); 5–6 gill rakers in total (usually 6); upper iris lappet long and branched; upper surface of eye without flaps and papillae; pit behind eye absent; teeth on upper and lower jaws, palatine and vomer in two separated patches, no strong canine teeth; dorsal surface of head usually with many small spines and sometimes also tubercles; one strong preocular spine present, with 2–10 small spines around it; distinct preorbital spine absent; suborbital ridge finely serrated; uppermost preopercular spine longest, but rather short, not attaining to opercular margin; well-developed fleshy sensory tubes completely covering cheek region; interopercular flap present, usually slightly large and triangular, sometimes slender or blunt; pored scales in lateral line scales with two sensory ducts directed upward and downward, respectively, and each with single external opening (McCulloch 1914; Knapp 1999; this study). Counts and measurements shown in Table 4.

Distribution. Known only from eastern Australia, from off Bowen, Qld (20°01'S) to Botany Bay, NSW (34°S), occurring on weed-covered reefs and sea-grass beds in depths of 15–53 m (e.g., McCulloch 1914; Kuitert 1993; Knapp 1999; Paxton et al. 2006b; this study).

This study gives no range extension of this species.

Size. Maximum total length about 21 cm (Knapp 1999). The largest specimen examined during this study was the holotype in 169.4 mm SL (206.3 mm TL) (Fig. 1).

Remarks. *Ambiserrula jugosa* was referred to a new genus *Ambiserrula* Imamura 1996 based on the phylogenetic relationships of Platycephalidae and is the sole member of the genus (see Imamura 1996).

Some previous authors placed *A. jugosa* in the genus *Insidiator* Jordan and Snyder 1900 (e.g., McCulloch 1914) or *Suggrundus* Whitely 1940 (e.g., Paxton and Hanley 1989; Kuiter 1993), the latter being a junior synonym of *Insidiator* (see Imamura and Hoese 2020a). However, *A. jugosa* differs from all three members of *Insidiator* [*Insidiator cooperi* (Regan 1908), *Insidiator macracanthus* (Bleeker 1869) and *Insidiator meerdervoortii* (Bleeker 1860a)] in having the upper iris lappet long and branched (bilobed or scalloped in *Insidiator*), and suborbital ridge finely serrated (versus with several spines and not serrate) (e.g., Imamura 1996). Although species of *Rogadius* Jordan and Richardson 1908 (sensu Imamura 1996) and *Onigocia* Jordan and Thompson 1913 also possess the serrated suborbital ridge, *A. jugosa* differs from *Rogadius* in having an interopercular flap, and long and branched upper iris lappet (versus interopercular flap absent, and upper iris lappet bilobed or scalloped in *Rogadius*) and from *Onigocia* in having more than 50 pored lateral line scales (versus 42 or fewer in *Onigocia*) (e.g., Imamura 1996; Knapp 1999).

Imamura (1996) provided a single character, the dorsal surface of the head with spines but no tubercles, in his diagnosis of the genus *Ambiserrula*. However, our study recognizes that tubercles are also present on ridges on the dorsal surface of the lachrymal (= first infraorbital) in some paratypes and on most areas of the dorsal surface of the head in a non-type specimen (AMS I.25771-001). Therefore, this character is modified in the diagnosis of the present species in this study.

The examination of 20 specimens of *A. jugosa* for this study has expanded the ranges

of intraspecific variations for the following four meristic characters: VIII–X first dorsal-fin rays in total (versus VIII–IX in McCulloch 1914 and IX in Knapp 1999), and 10–12 second dorsal-fin rays, 20–22 pectoral-fin rays and 5–6 gill rakers in total (11–12, 21–22 and 6, respectively, in both). In addition, the number of scale rows above the lateral line slanting downward and forward (68–78) is reported for the first time. Although McCulloch (1914) described the number of caudal-fin rays as 12 or 13 and Kuitert (1993) as 15, it is unclear which rays they counted. Knapp (1999) did not give the caudal-fin ray number. We found that the branched caudal-fin ray number to be 11 or 12 in this species.

***Inegocia harrisii* (McCulloch 1914)**

(Common English name: Harris' Flathead)

(Fig. 2; Table 5)

Insidiator harrisii McCulloch 1914: 146, fig. 12, pl. XXX-fig. 1 (original description, type locality: near Pine Peak, Qld, Australia); McCulloch 1929: 403 (species list, off Pine Peak and Morton Bay, Qld).

Suggrundus harrisii: Sainsbury et al. 1984: 336, an unnumbered fig. (description, north and northwestern Australia).

Inegocia harrisii: Gloerfelt-Tarp and Kailola 1984: 121, an unnumbered fig. (short description, northwestern Australia); Paxton and Hanley 1989: 466 (species list, Napier Broome Bay, WA to off Pine Peak, Qld); Imamura 1996: 207 (discussion on generic position); Allen 1997: 80, pl. 21-14 (short description, north Australia); Larson and Williams 1997: 353 (species list, Darwin Harbour, NT); Knapp 1999: 2401 (description, northern Australia from northwestern shelf to Gulf of Carpentaria and Pine Peak, and Daru, Papua New Guinea); Hutchins 2001: 28 (species list, WA); Paxton et al. 2006b: 937 (species list,

Napier Broome Bay, WA to off Pine Peak, Qld); Russell and Smit 2007: 243 (species list, Kakadu National Park, Van Dieman Gulf, NT); Larson et al. 2013: 90 (species list, NT); Gloerfelt-Tarp and Kailola 2022: 129, an unnumbered fig. (short description, northwestern Australia).

Material examined (all from northern Australia). Holotype: AMS E.2844, 169.7 mm SL, Pine Peak, Qld, 1 Aug. 1910 (see Tables 2–3 for detail locality data of Haul 324 from which holotype collected).

Non-types (21 specimens, 41.7–197.3 mm SL): AMS I.20473-009, 107.4 mm SL, Gulf of Carpentaria, Qld (12°S, 140°E), Feb. 1978; AMS I.21830-006, 168.9 mm SL, Arafura Sea, NT (11°01'S, 132°03'E), 32–33 m depth, 14 Nov. 1980; AMS I.34398-038, 102.5 mm SL, adjacent to West Flat, Port Clinton, South Arm channel, Qld (22°33'13.8"S, 150°45'25.2"E), 25 Oct. 1993; CSIRO A2476, 116.6 mm SL, Gulf of Carpentaria, Qld (16°58'S, 139°19'E), 6 Sep. 1963; CSIRO C3311, 167.5 mm SL, Gulf of Carpentaria, Qld (16°52'S, 140°55'E), 5 Aug. 1963; CSIRO CA2348, 131.2 mm SL, CSIRO CA2349, 135.6 mm SL, north of Joseph Bonaparte Gulf, WA (13°29'S, 129°01'E–13°27'S, 129°02'E), 29 June 1980; CSIRO CA2580, 197.3 mm SL, off Tasman Point, Groote Eylandt, NT (14°20'S, 136°10'E), 18 m depth, 27 May 1981; CSIRO CA2790, 119.7 mm SL, Joseph Bonaparte Gulf, WA (13°46'S, 128°14'E, 13°48'S, 128°13'E), 64–67 m depth, 28 June 1980; CSIRO CA4050, 141.1 mm SL, Bonaparte Archipelago, WA (15°31'S, 124°02'E–15°30'S, 124°01'E), 48–54 m depth, 23 June 1980; CSIRO H6730-01 (1 of 2 specimens), 119.5 mm SL, northwest of Bramble Cay, Torres Strait, Qld (9°02'S, 143°44'E–9°02'S, 143°45'E), 20 m depth, 27 Jan. 2004; CSIRO H6767-02 (1 of 2), 175.8 mm SL, Keppel Bay, Qld (23°22'S, 151°02'S), 19 m depth, 24 Apr. 2004; HUMZ 135134, 177.7 mm SL, Timor Sea, WA (13°43'30"S, 128°38'36"E), 62 m depth, 26 Dec. 1969; NTM S.14354-008 (1 of 2 specimens), 124.7 mm SL, Joseph Bonaparte Gulf, WA (14°23'45.6"S, 128°44'49.2"E), 10 June 1996; NTM

S.14356-004, 175.7 mm SL, Joseph Bonaparte Gulf, WA (13°53'09.6"S, 128°29'20.4"E), 50 m depth, 10 June 1996; NTM S.14362-011, 145.8 mm SL, northwest of West Holothuria Reef, Holothuria Banks, WA (13°25'12.0"S, 125°39'18.0"E), 50 m depth, 12 June 1996; NTM S.16029-001, 41.7 mm SL, south end of Mud Island, Kakadu National Park, NT (12°13'44.4"S, 132°23'06.0"E), 22 Nov. 2004; QM I.36198 (1 of 2), 158.0 mm SL, Shoalwater Bay, Qld (22°20'42.0"S, 150°23'06.0"E), 20 m depth, 11 May 2004; WAM P.14431-001 (2), 140.1–145.2 mm SL, 32 km northwest of Darwin, NT (12°15'S, 130°25'E), 4 Sep. 1965; WAM P.27700-001, 190.8 mm SL, Gulf of Carpentaria, Qld (15°S, 140°E), 15 m depth, 15 Nov. 1964.

Diagnosis. A species of *Inegocia* with the following diagnostic characters: VIII–IX first dorsal-fin rays in total (usually IX); 11 second dorsal- and anal-fin rays; 22–25 pectoral-fin rays; 51–54 pored lateral-line scales (anterior 6–37 scales with spine); gill rakers 5–7 in total (usually 6); upper iris lappet long and branched; upper surface of eye without flaps and papillae; pit behind eye absent; teeth on upper and lower jaws, palatine and vomer in two separated patches, lacking strong canine teeth; dorsal surface of head with many spines of variable size, and also tubercles on lachrymal, fourth and fifth infraorbitals, and area around postocular spine (and sometimes near suborbital and pterotic ridges); usually one, rarely two preocular spines present, without small spines or tubercles around it; distinct preorbital spine absent; suborbital ridge with many spines of variable size, including one spine below near anterior one-third of eye and one larger spine below and near posterior margin of eye; uppermost preopercular spine longest, but short, not reaching to opercular margin; fleshy sensory tubes not covering cheek region; interopercular flap absent; pored scales in lateral line scales with two sensory ducts directed upward and downward, respectively, each with single external opening (Knapp 1999; this study). Counts and measurements shown in Table 5.

Distribution. Known in northern Australia, from Bonaparte Archipelago, WA

(124°02'E) to Keppel Bay, Qld (23°22'S), including Bramble Cay, Torres Strait, Qld, and Daru, Papua New Guinea; occurring on sand and mud bottoms in depths of 8–67 m (e.g., McCulloch 1914; Gloerfelt-Tarp and Kailola 1984, 2022; Knapp 1999; Paxton et al. 2006b; this study).

Size. Maximum total length about 24 cm (Knapp 1999). The largest specimen examined during this study was 190.8 mm SL (224.9 mm TL).

Remarks. In addition to *Inegocia harrisii*, the genus *Inegocia* Jordan and Thompson 1913 includes two species, *Inegocia japonica* and *Inegocia ochiaii* Imamura 2010 (e.g., Imamura 1996, 2010; Knapp 1999). Although some authors have also included *Platycephalus bosschei* Bleeker 1860b in *Inegocia* (e.g., Gloerfelt-Tarp and Kailola 1984; Paxton and Hanley 1989; Imamura 1996), the species has been recently referred to *Cymbacephalus* Fowler 1938 (e.g., Knapp 1999; Imamura 2020). The present species can be distinguished from its two congeners in having usually 11 second dorsal- and anal-fin rays, and 22–25 pectoral-fin rays (usually 12 and 19–22, respectively, in *Inegocia japonica*), anterior 6–37 pored lateral-line scales with spine and 50–54 scale rows above the lateral line slanting downward and backward (2–3 and 63–76 in *Inegocia ochiaii*), and no interopercular flap (versus present in both) (Knapp 1999; Imamura 2010; this study).

As mentioned above, McCulloch (1914) included specimens of *Inegocia harrisii* and *Inegocia japonica* in the original description of the former. For example, second dorsal- and anal-fin rays are 11–12, and pectoral-fin rays 20–25 according to McCulloch (1914), whereas they are usually 11 and 22–25 in *Inegocia harrissi*, and usually 12 and 19–21 in *Inegocia japonica* (Knapp 1999; this study).

This study identified the range of intraspecific variation in the number of the first dorsal-fin rays in *Inegocia harrisii* wider based on an examination of 22 specimens (VIII or IX in total in this study vs. IX in Knapp 1999). Furthermore, previously unreported numbers of branched caudal-fin rays (10–12) and scale rows above the lateral line slanting downward

and forward (76–84) are presented for the first time in this study. Of them, the presence of 10 branched caudal-fin rays recognized in a 41.7 mm SL specimen is assumed to be due to incomplete branching of caudal-fin rays because the specimen has not fully matured.

Inegocia harrisii is known in northern Australia, from Bonaparte Archipelago, WA (124°02'E) to Keppel Bay, Qld (23°22'S), and northward to Daru, Papua New Guinea. It was previously known from Napier Broom Bay, WA (126°36'E) to Pine Peak, Qld (21°31'S) (Paxton et al. 2006b), this study extending its range shortly westward and southward.

Inegocia harrisii was previously recorded from Carnarvon, WA (Allen and Swainston 1988) and Moreton Bay, Qld (e.g., Stephenson et al. 1982). Although Johnson (1999b) also recognized this species from Moreton Bay, he doubted the record and regarded it to be almost certainly a misidentification of *Inegocia japonica*. Our study found no specimens collected from Carnarvon and Moreton Bay in major Australian museums. Knapp (1999) and Paxton et al. (2006b) also excluded these regions from the distribution of *Inegocia harrisii*. This study excluded Carnarvon and Moreton Bay from the distribution of the species.

Comparative materials. Twenty-one specimens of *Inegocia japonica*, including AMS I.12765 and AMS I.12805, both discussed above, and 10 specimens of *Inegocia ochiaii* as listed in Imamura and Yoshino (2009) and Imamura (2010), respectively. Two additional specimens, NMV A18430 and WAM P.60-001 (paratypes of *Inegocia harrisii*, re-identified as *Inegocia japonica*), were also examined in this study.

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Data availability The data generated during the present study are available in this published article.

Declarations

Ethics declarations Partial financial support was received from Hokkaido University and the Japan Society for the Promotion of Science, Tokyo to HI. HI was responsible for the study design, generation and analysis of the data, funding acquisition, and wrote the original draft manuscript. DH was responsible for review and editing on the manuscript, and funding acquisition. All authors read the manuscript and approved the final version.

Conflicts of interest This paper has no conflict of interest.

Ethics approval Fish species, treated in this study, are not listed as threatened or endangered by the IUCN Red List or CITES. All specimens used in this were collected from Australia before 2010 and registered in fish collections of natural history museums mainly in Australia.

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Figure caption

Fig. 1 Dorsal (**a, c**) and lateral (**b, d**) views of *Ambiserrula jugosa*. **a, b** AMS E.3209, 169.4 mm SL, holotype; **c, d** AMS I.25771-001, 168.0 mm SL

Fig. 2 Dorsal (**a, c**) and lateral (**b, d**) views of *Inegocia harrisii*. **a, b** AMS E.2844, 169.7 mm SL, holotype; **c, d** CSIRO H6767-02, 175.8 mm SL

Fig. 3 Map showing start and end positions for eight trawl hauls of the Endeavour during the Queensland cruise in 1910, their landmarks

Fig.1



Fig.2



Fig.3

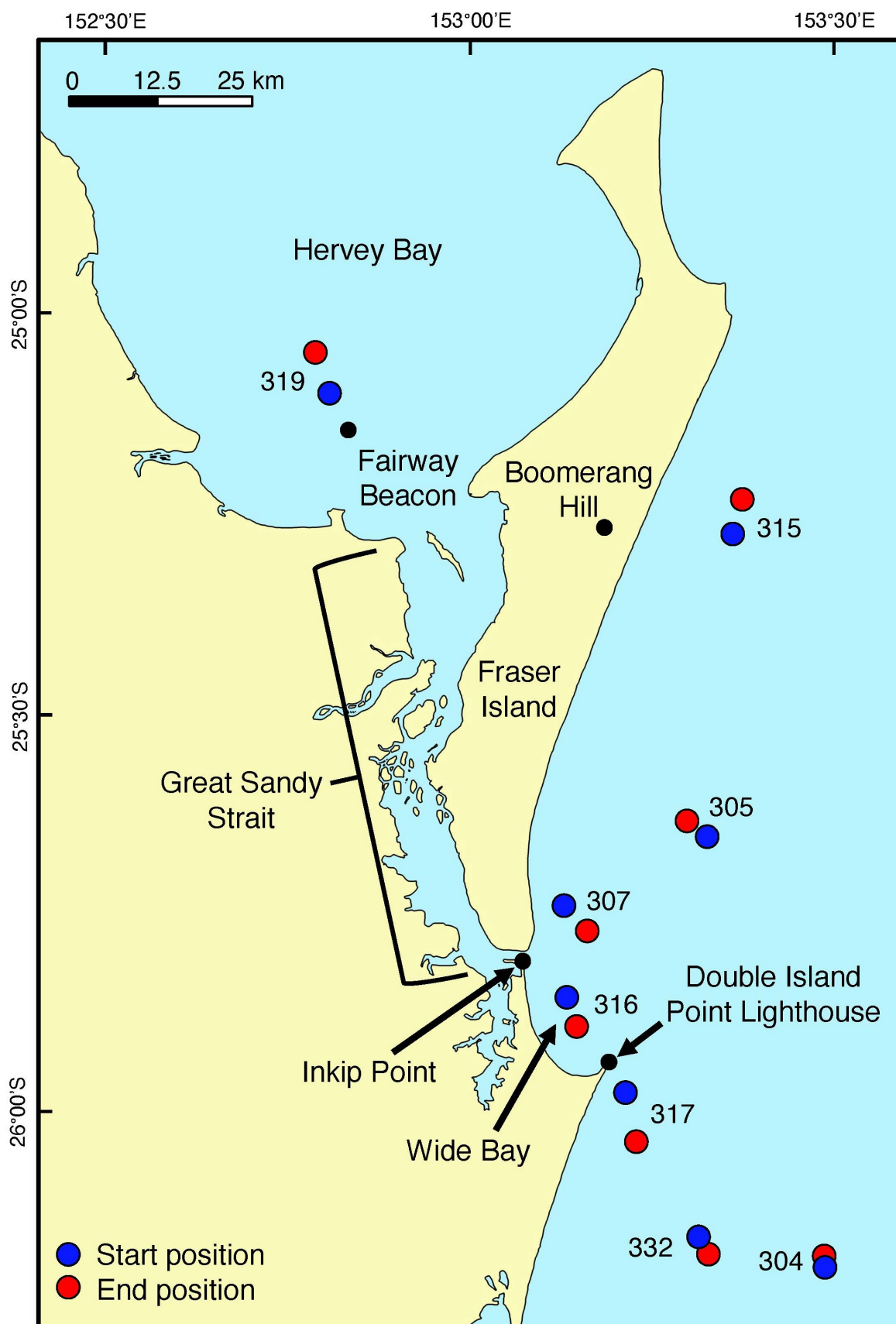


Table 1 Type status of species and varieties described by McCulloch (1914)

Species/varieties	Page, plate, fig	Current status	Type designed in text	Type indicated on plate	Described from	Total specimen included	Number and status of type specimens identified as types in Eschmeyer's Catalog of Fishes	Recognition of type specimens in this work
<i>Squatina tergocellata</i>	84, pl 15	<i>Squatina tergocellata</i> McCulloch 1914	no	yes	1	1	unique HT	HT
<i>Polyipnus tridentifer</i>	87, pl 16	<i>Polyipnus tridentifer</i> McCulloch 1914	no	yes	3	97	LT & 72 PL ^a	HT & PT
<i>Hoplostethus mediterraneus</i> var. <i>latus</i>	97, fig 5	<i>Hoplostethus latus</i> McCulloch 1914	no	no	3	9	8 of 9 ST	ST
<i>Hoplostethus gigas</i>	101, pl 19	<i>Hoplostethus gigas</i> McCulloch 1914	no	yes	11	11	LT & 3 PL ^b	HT & PT
<i>Plagiogeneion macrolepis</i>	104, pl 20	<i>Plagiogeneion macrolepis</i> McCulloch 1914	yes	yes	3	23	HT & 2 PT, 2 candidates of PT with question mark also listed ^c	HT & PT
<i>Allocyttus verrucosus</i> var. <i>propinquus</i>	116, fig 7	<i>Allocyttus verrucosus</i> (Gilchrist 1906)	no	no	1	8	HT & 7 PT	ST
<i>Neocyttus rhomboidalis</i> var. <i>gibbosus</i>	119, fig 8	<i>Neocyttus rhomboidalis</i> Gilchrist 1906	no	no	1	9	HT & 8 PT	ST
<i>Ammotretis elongatus</i>	123, pl 27	<i>Ammotretis elongatus</i> McCulloch 1914	no	yes	2	2	2 ST	HT & PT
<i>Ammotretis tudori</i>	124, pl 26	<i>Ammotretis lituratus</i> (Richardson 1844)	no	yes	not stated	5	5 of several ST	HT & PT
<i>Ammotretis macrolepis</i>	126, fig 9	<i>Ammotretis macrolepis</i> McCulloch 1914	no	no	1	1	unique HT	HT
<i>Pseudorhombus spinosus</i>	129, pl 25	<i>Pseudorhombus spinosus</i> McCulloch 1914	yes	yes	2	2	HT & 1 PT with question mark	HT & PT
<i>Hoplichthys ogilbyi</i>	132, pl 28	<i>Hoplichthys ogilbyi</i> McCulloch 1914	no	yes	2	2	HT & 1 PT	HT & PT
<i>Insidiator jugosus</i>	144, pl 30	<i>Ambiserrula jugosa</i> (McCulloch 1914)	yes	yes	10	37	HT & "9" PT (see text)	HT & PT
<i>Insidiator harrasii</i>	146, pl 30	<i>Inegocia harrisii</i> (McCulloch 1914)	no	yes	2	7	LT & 1 PL ^d (see text)	HT & PT
<i>Insidiator diversidens</i>	148, pl 31	<i>Ratabulus diversidens</i> (McCulloch 1914)	no	yes	3	3	LT & 2 PL ^e	HT & PT
<i>Insidiator parilis</i>	151, pl 31	<i>Cymbacephalus parilis</i> (McCulloch 1914)	no	yes	3	3	2 of 3 ST	HT & PT

HT Holotype, LT lectotype, PL paralectotypes, PT paratype, ST syntype

^aSchultz (1961) designated LT

^bRoberts and Gomon (2012) designated LT and recognized 9 PL but listed 3 catalog numbers

^cAndrews (1971, 1992) recognized these 2 specimens as cotypes and syntypes, respectively

^dJohnson (1999a) designated LT

^eImamura and Gomon (2010) designated LT

Table 2 Start positions for stations of Endeavour trawls in Queensland in June to September 1910 associated with discussion in this study. Data modified from Dannevig (1910), with calculated latitudes and longitudes from Imamura and Hoese (2020b)

Date	Haul	Landmark	Bearing to landmark	Miles to landmark	Calculated approximate latitude, longitude	Depth (fathoms)
28 June	304	Double Island Point	N 48° W	24.75	26°10'S, 153°29'E	32
29 June	305	Double Island Point Lighthouse	S 25° W	21.75	25°39'S, 153°20'E	30
29 June	307	Double Island Point Lighthouse	S 11° E	14	25°44'S, 153°08'E	25
15 July	315	Boomerang Hill	S 86° W	11.25	25°16.5'S, 153°22'E	25
15 July	316	Double Island Lighthouse	S 28° E	7	25°51'S, 153°08'E	18
16 July	317	Double Island Point Lighthouse	N 42° W	3.5	25°58'S, 153°13'E	32
27 July	318	Great Sandy Strait, off Point Inskip	—	—	—	10
27 July	319	Hervey Bay Fairway Buoy	S 18° E	3.5	25°06'S, 152°49'E	9
29 July	322	Cape Capricorn Lighthouse	N 52° W	14	23°36.5'S, 151°24.5'E	13
30 July	323	Hummocky Island Peak	S 7° E	7	23°19'S, 151°08.5'E	16
1 August	324	Pine Peak	S 58° E	11	21°26'S, 150°15'E	26
2 August	325	Gloucester Head	S 62° W	20.5	19°49.5'S, 148°44'E	35
2 August	326	Gloucester Head	S 13° E	5.5	19°53.5'S, 148°26'E	25
3 August	327	Bowen Light	S 22° W	6.75	19°55.5'S, 148°19'E	15
31 August	328	Cowan Cowan Lighthouse	N 1° E	8	27°15'S, 153°22'E	15
31 August	329	Cowan Cowan Lighthouse	N 23° E	8.5	27°15'S, 153°19'E	10
2 September	332	Double Island Lighthouse	N 30° W	18.75	26°10'S, 153°20'E	33

Table 3 End positions for stations of Endeavour trawls in Queensland in June to September 1910 associated with discussion in this study. Data modified from Dannevig (1910), with calculated latitudes and longitudes from Imamura and Hoese (2020b)

Date	Haul	Landmark	Bearing to landmark	Miles to landmark	Calculated approximate latitude, longitude	Depth (fathoms)
28 June	304	Double Island Point	N 46° W	25.5	26°11'S, 153°29'E	33
29 June	305	Double Island Point Lighthouse	S 22° W	19	25°38'S, 153°18'E	29
29 June	307	Double Island Point Lighthouse	S 6° E	12	25°46'S, 153°10'E	26
15 July	315	Boomerang Hill	S 74° W	13	25°14'S, 153°23'E	26
15 July	316	Double Island Lighthouse	S 30° E	4	25°53'S, 153°09'E	23
16 July	317	Double Island Point Lighthouse	N 22° W	7	26°02'S, 153°14'E	—
27 July	318	Elbow Point	—	—	—	12
27 July	319	Fairway Buoy	S 18° E	7	25°03'S, 152°48'E	11
29 July	322	Cape Capricorn Lighthouse	N 51° W	11.5	23°35'S, 151°22.5'E	12
30 July	323	Hummocky Island	S 11° E	10	23°15.5'S, 151°08'E	14
1 August	324	Pine Peak	S 60° E	14.5	21°25'S, 150°03.5'E	24
2 August	325	Gloucester Head	S 54° W	20	19°48'S, 148°42'E	35
2 August	326	Gloucester Head	S 26° E	4.75	19°54.5'S, 148°25'E	19
3 August	327	Bowen Light	S 40° W	8.75	19°55.5'S, 148°22'E	17
31 August	328	Cowan Cowan Lighthouse	N 7° W	9.25	27°16'S, 153°21'E	18
31 August	329	Cowan Cowan Lighthouse	N 36° E	9	27°14.5'S, 153°17'E	8
2 September	332	Double Island Lighthouse	N 30° W	16.75	26°08.5'S, 153°19'E	33

Table 4 Counts and proportional measurements of *Ambiserrula jugosa*

	Holotype AMS E.3209	Paratypes <i>n</i> = 11	Non-types <i>n</i> = 8
SL (mm)	169.4	112.5–166.5	101.7–168.0
Counts:			
First dorsal-fin rays	I + VIII	I + VII (1), I + VIII (9) or I + IX (1)	I + VII (2), I + VIII (5) or I + IX (1)
Second dorsal-fin rays	11	11 (9) or 12 (1)	10 (1) or 11 (7)
Anal-fin rays	11	11 (10) or 12 (1)	11 (8)
Pectoral-fin rays	2 + 13 + 6 = 21	2 + 11–14 + 6–8 = 20 (3), 21 (5) or 22 (3)	2 + 11–13 + 6–9 = 20 (1), 21 (4) or 22 (3)
Branched caudal-fin rays	12	11 (5) or 12 (4)	11 (2) or 12 (6)
Pored lateral-line scales (LLS) ^a	52	52–53 (10)	51–53 (8)
Anterior LLS with spine ^a	12	9–18 (11)	13–20 (8)
Scale rows above lateral line slanting downward and backward	53	52–54 (9)	52–53 (3)
Scale rows above lateral line slanting downward and forward	72	71–77 (9)	68–78 (3)
Gill rakers	1 + 5 = 6	1 + 4–5 = 5 (1) or 6 (10)	1 + 5 = 6 (8)
Proportional measurements (% SL):			
HL	38.4	37.5–39.9 (11)	36.5–39.8 (8)
Predorsal length	37.5	36.4–39.2 (11)	35.8–39.7 (8)
Length of first dorsal-fin base	22.0	19.9–21.7 (11)	20.6–22.9 (8)
Length of second dorsal-fin base	25.5	24.4–27.0 (11)	24.6–27.1 (8)
Length of anal-fin base	26.3	25.7–29.8 (11)	26.5–29.2 (8)
Snout length	11.6	10.9–12.0 (11)	10.4–11.9 (8)
Orbital diameter	8.9	9.1–9.9 (11)	8.0–9.4 (8)
Upper jaw	14.9	14.6–15.9 (11)	13.9–15.4 (7)
Lower jaw	21.5	21.5–23.1 (10)	21.0–23.1 (8)
Interorbital width	3.2	2.4–3.4 (11)	2.8–3.4 (8)
Pectoral-fin length	16.6	16.2–18.3 (11)	15.5–17.7 (7)
Pelvic-fin length	28.7	23.4–30.1 (11)	26.3–30.4 (8)
Caudal-fin length	21.0	19.2–22.6 (10)	19.5–21.5 (8)
Proportional measurements (% HL):			
Snout length	30.3	28.4–30.7 (11)	28.5–30.5 (8)
Orbital diameter	23.2	23.1–25.6 (11)	21.3–23.7 (8)
Upper jaw	38.8	37.2–40.0 (11)	37.2–39.5 (7)
Lower jaw	56.2	57.3–58.8 (10)	56.1–59.0 (8)
Interorbital width	8.5	6.1–8.6 (11)	7.0–9.4 (8)

Numbers in parentheses indicate specimens examined

^aAccording Knapp (1999), LLS 52–55 (usually 52 or 53), anterior LLS with spine 10–25 (mean 16.7)

Table 5 Counts and proportional measurements of *Inegocia harrisii*

	Holotype AMS E.2844	Non-types <i>n</i> = 21
SL (mm)	169.7	41.7–197.3
Counts:		
First dorsal-fin rays	I + VIII	I + VII (1) or I + VIII (20)
Second dorsal-fin rays	11	11 (21)
Anal-fin rays	11	11 (21)
Pectoral-fin rays	2 + 14 + 9 = 25	2 + 12–14 + 6–9 = 22 (2), 23 (8), 24 (9) or 25 (1)
Branched caudal-fin rays	12	10(1) ^a , 11 (4) or 12 (14)
Pored lateral-line scales (LLS)	52	51–54 (21)
Anterior LLS with spine ^b	13	10–37 (21)
Scale rows above lateral line slanting downward and backward	54	50–54 (18)
Scale rows above lateral line slanting downward and forward	79	76–84 (12)
Gill rakers ^b	1 + 5 = 6	1 + 4–5 = 5 (1) or 6 (20)
Proportional measurements (% SL):		
HL	38.3	36.7–39.8 (21)
Predorsal length	37.3	35.5–39.6 (18)
Length of first dorsal-fin base	21.3	18.7–22.0 (21)
Length of second dorsal-fin base	26.2	25.5–28.9 (21)
Length of anal-fin base	26.2	25.5–29.0 (21)
Snout length	10.1	9.5–11.0 (21)
Orbital diameter	8.6	7.6–10.8 (21)
Upper jaw	14.3	13.2–15.3 (21)
Lower jaw	20.3	19.0–22.1 (21)
Interorbital width	2.9	2.3–3.0 (21)
Pectoral-fin length	14.3	13.3–19.2 (20)
Pelvic-fin length	24.5	21.6–27.1 (22)
Caudal-fin length	19.8	16.5–22.1 (18)
Proportional measurements (% HL):		
Snout length	26.3	24.4–27.7 (21)
Orbital diameter	22.5	20.4–27.1 (21)
Upper jaw	37.4	35.7–38.6 (20)
Lower jaw	53.1	51.1–55.2 (21)
Interorbital width	7.5	6.0–8.1 (20)

Numbers in parentheses indicate specimens examined

^aTen branched caudal-fin rays recognized in smallest 41.7 mm SL specimen

^bAccording Knapp (1999), anterior 6–36 LLS with spine and total gill rakers 5–7 (usually 6)