

## Collection of freshwater and coastal fishes from Sulawesi Tenggara, Indonesia

[Koleksi ikan-ikan air tawar dan pantai di Sulawesi Tenggara]

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### Abstract

We report 69 fish species in 34 teleost families nearly all collected during a preliminary survey of the Sungai Pohara and coastal localities in Sulawesi Tenggara, including Muna Island, in June 2010. Of these species, nine are introduced or exotic and another is questionably native. The family Gobiidae is the most diverse taxon, represented by 14 native species. Atherinomorph fishes of the family Adrianichthyidae are represented in the province by four endemic species and two others that are widespread, all in the genus *Oryzias*. This fish fauna contrasts sharply with the riverine ichthyofauna of the adjacent Sulawesi Tenggara islands of Buton and Kabaena in which there are reportedly no ricefishes and few endemics. New species are being described by the field team and collaborators. Our ultimate goal is to discover, describe, highlight, understand and encourage the conservation of the native freshwater and coastal fish biota of Sulawesi.

Keywords: endemic fishes, introduced species, *Oryzias*, Sungai Pohara

### Abstrak

Kami melaporkan hasil survei pendahuluan di Sungai Pohara dan perairan pantai di Sulawesi Tenggara, termasuk Pulau Muna. Tujuan utama kami adalah menemukan, mendeskripsikan, menggarisbawahi, memahami, dan menggiatkan upaya konservasi biota ikan air tawar dan pesisir asli Sulawesi. Survei yang dilakukan pada bulan Juni 2010 berhasil mendapatkan 69 spesies dari 34 famili Teleostei. Sembilan spesies di antaranya merupakan ikan introduksi atau bersifat eksotik dan satu spesies masih diragukan, asli setempat atau bukan. Gobiidae merupakan famili yang paling beragam, terwakili oleh 14 spesies asli. Ikan Atherinomorph dari famili Adrianichthyidae terwakili oleh empat spesies endemik di provinsi ini dan dua spesies lain yang penyebarannya sangat luas. Keenam spesies tersebut termasuk dalam genus *Oryzias*. Keragaman jenis fauna ikan ini sangat berbeda dengan jenis-jenis ikan sungai di dua pulau terdekat di wilayah Sulawesi Tenggara, yaitu Buton dan Kabaena. Di dua pulau tersebut tidak ditemukan ikan padi (*Oryzias*, ricefishes) dan hanya sedikit spesies endemik. Beberapa spesies baru dideskripsikan oleh tim lapangan dan para kolaborator.

Kata penting: ikan endemik, introduksi, ikan padi, *Oryzias*, Sungai Pohara

### Introduction

Sulawesi is well-known for its high percentage of endemic species, especially of its freshwater fish fauna (Whitten *et al.* 1987, Kottelat *et al.* 1993). Historical fish collecting efforts focused on the tectonic lakes of the Province of Sulawesi Selatan and Sulawesi Tengah to the near exclusion of Sulawesi Tenggara (Parenti 2011, Parenti *et al.* 2013). Coastal and ri-

verine habitats throughout Sulawesi have been particularly neglected (Tweedley *et al.* 2013).

In June 2010 we conducted a preliminary survey focused on freshwater fishes of the Sungai Pohara, Konawe, Sulawesi Tenggara that we expanded to include a variety of freshwater and coastal habitats throughout the province. Our field team spent two weeks collecting fishes and surveying field sites for future research projects. We were drawn to the region by the discovery in 2007 by carcinologist Daisy Wowor of a remark-

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ably colorful ricefish species from Muna Island subsequently described as *Oryzias woworae* Parenti & Hadiaty (2010) in her honor (Figure 1a). Equally compelling were the reports by explorer Hans-Georg Evers of colorful, new ricefishes in spectacular habitats in Sulawesi Tenggara, including the Summersari waterfalls (Figure 1b). Evers was also recognized with a species of ricefish named in his honor, *O. eversi* Herder *et al.* (2012a). There was a particular urgency to our work as the Sungai Pohara is a site of excavation of sand for export outside of Sulawesi (Figure 1c).

Thus, the four objectives of this project were: (1) to collect taxonomic materials (specimens and tissue samples) of freshwater and coastal fishes from Sulawesi Tenggara, (2) to capture color digital images of living specimens of fishes collected in the field, (3) to discover and describe new freshwater and coastal fishes in this region, (4) to increase our knowledge of the natural history of Sulawesi and encourage conservation of the endemic freshwater and coastal biota of Sulawesi.

Each of these objectives was met. The broader impact of the project is to provide data and materials on fish diversity not only for systematic ichthyological studies but also for other scientific investigations such as comparative morphology and molecular biology, comparative biogeography, and conservation in southeastern Sulawesi. Our ultimate goal is to discover, describe, highlight, understand and, in so doing, encourage the conservation of the native freshwater and coastal fish biota of Sulawesi.

### Materials and methods

Specimens were collected under a permit from the Sekretariat Perizinan Peneliti Asing (Secretariat of Foreign Research Permit), Ke-

menterian Negara Riset dan Teknologi (State Ministry for Research and Technology), Republic of Indonesia, with the cooperation of LIPI (Lembaga Ilmu Pengetahuan Indonesia), Indonesian Institute of Sciences. Material collected of each taxon is listed below in the following format: catalogue number (number of specimens; field station). The higher classification is modified from that in Nelson (2006), the online *Catalog of Fishes* by Eschmeyer (2013) and Eschmeyer & Fong (2013), the last of which should be consulted for citations of species descriptions (Table 1). Specimens were collected according to the protocols of the National Museum of Natural History Institutional Animal Care and Use Committee (IACUC) using standard field techniques (Baldwin *et al.* 1996) including seining, dip-netting, and push-netting. Specimens were also purchased at the Pasar Ikan at Kendari or from local fishermen who collected fishes with seines and dipnets. Specimens were anesthetized using MS-222 or by chilling prior to fixation in 10% formalin or 95% ethanol. In addition to photographing select specimens, we preserved tissue samples in alcohol and whole specimens in formalin or alcohol. The senior author may be contacted for information on and/ or use of tissue samples. Formalin-fixed specimens were subsequently transferred through graded series of alcohol to 75% ethanol for long-term storage.

Specimens are housed in the Museum Zoologicum Bogoriense (MZB), Cibinong, Indonesia and the Smithsonian Institution, National Museum of Natural History (USNM), with distribution of paratypes of newly described taxa to other institutions as appropriate. To accurately maintain the collection data, the bulk of the material was catalogued initially at the USNM and subsequently divided between the USNM and MZB, as reflected in the catalog numbers, below.

Institutional abbreviations follow the Standard Symbolic Codes for Institutional Research Col-

lections in Herpetology and Ichthyology (Leviton *et al.* 1985).



Figure 1. Photos of some field activities: a. *Oryzias woworae*, LRP 10-26, 22 June 2010; b. Summersari Falls, LRP 10-06, 14 June 2010; c. Sand excavation from the bed of Sungai Sampara, tributary of Sungai Pohara, LRP 10-07, 15 June 2010.

*Collection stations*

We collected fishes at 28 stations. All localities are in the Province of Sulawesi Tenggara (Southeastern Sulawesi), Indonesia (Figure 2).

- Station LRP 10-01. Pasar Ikan Kendari (Kendari Fish Market) (S 03°58'29.6", E 122°35'40.9"), Kotamadya Kendari, 13 June 2010, 0700-0730, specimens purchased by L. R. Parenti, R. K. Hadiaty, S. Sauri & D. N. Lumbantobing (hereafter L. R. Parenti *et al.*).
- Station LRP 10-02. Sungai Andauna where crossed by road near village of Andambao (S 04°15'05.2", E 122°29'03.0"), Desa Andambao, Kecamatan Wolasi, Kabupaten Konawe Selatan, 13 June 2010, 1130-1245, 85 m elev., (L. R. Parenti *et al.*)
- Station LRP 10-03. Sungai Wolasi (S 04°09'62.1", E 122°29'56.1"), Kecamatan Wolasi, Kabupaten Konawe Selatan, 13 June 2010, 1330-1415, 167 m elev., L. R. Parenti *et al.*
- Station LRP 10-04. Sungai Alulua (S 04°06'92.9", E 122°28'42.9"), Kecamatan Wolasi, Kabupaten Konawe Selatan, 13 June 2010, 1530-1600, 37 m elev., L. R. Parenti *et al.*
- Station LRP 10-05. Sungai Wolasi (S 04°09'62.1", E 122°29'56.1"), Kecamatan Wolasi, Kabupaten Konawe Selatan, 14 June 2010, 0700-0730, 167 m elev., purchased from Hajar Malani.
- Station LRP 10-06. Steep mountain stream with multiple waterfalls to Summersari Falls (S 04°13'16.0", E 122°44'76.5"), Kecamatan Moramo, Kabupaten Konawe Selatan, 14 June 2010, 1200-1530, 167 - 200 m elev., L. R. Parenti *et al.*
- Station LRP 10-07. Sungai Sampara, tributary of Sungai Pohara (S 03°57'06.1", E 122°25'31.1"), Desa Mandikonu, Kecamatan Bondoala Sampara, Kabupaten Konawe, 15 June 2010, 0900-1030, 20 m elev., L. R. Parenti *et al.*
- Station LRP 10-08. Sungai Pohara at Kampung Wawolimbue (S 03°59'77.6", E 122°23'77.4"), Desa Wawolimbue, Kabupaten Konawe, 15 June 2010, 1130-1300, 33 m elev., L. R. Parenti *et al.*
- Station LRP 10-08. Sungai Pohara at Kampung Wawolimbue (S 03°59'77.6", E 122°23'77.4"), Desa Wawolimbue, Kabupaten Konawe, 15 June 2010, 0900-1030, 20 m elev., L. R. Parenti *et al.*
- Station LRP 10-03. Sungai Wolasi (S 04°09'62.1", E 122°29'56.1"), Kecamatan Wolasi, Kabupaten Konawe Selatan, 13 June 2010, 1330-1415, 167 m elev., L. R. Parenti *et al.*
- Station LRP 10-04. Sungai Alulua (S 04°06'92.9", E 122°28'42.9"), Kecamatan Wolasi, Kabupaten Konawe Selatan, 13 June 2010, 1530-1600, 37 m elev., L. R. Parenti *et al.*
- Station LRP 10-05. Sungai Wolasi (S 04°09'62.1", E 122°29'56.1"), Kecamatan Wolasi, Kabupaten Konawe Selatan, 14 June 2010, 0700-0730, 167 m elev., purchased from Hajar Malani.
- Station LRP 10-06. Steep mountain stream with multiple waterfalls to Summersari Falls (S 04°13'16.0", E 122°44'76.5"), Kecamatan Moramo, Kabupaten Konawe Selatan, 14 June 2010, 1200-1530, 167 - 200 m elev., L. R. Parenti *et al.*
- Station LRP 10-07. Sungai Sampara, tributary of Sungai Pohara (S 03°57'06.1", E 122°25'31.1"), Desa Mandikonu, Kecamatan Bondoala Sampara, Kabupaten Konawe, 15 June 2010, 0900-1030, 20 m elev., L. R. Parenti *et al.*
- Station LRP 10-08. Sungai Pohara at Kampung Wawolimbue (S 03°59'77.6", E 122°23'77.4"), Desa Wawolimbue, Kabupaten Konawe, 15 June 2010, 1130-1300, 33 m elev., L. R. Parenti *et al.*

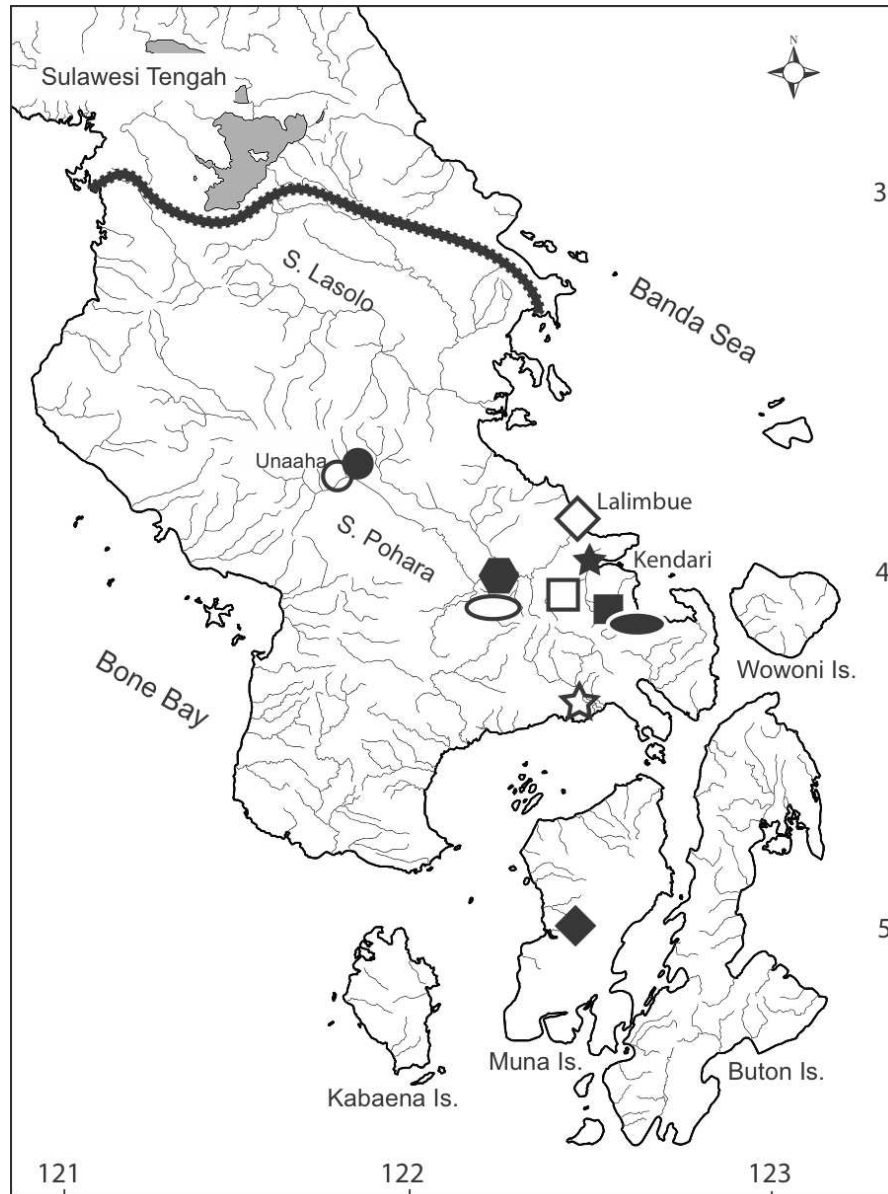


Figure 2. Sulawesi Tenggara collecting localities. A symbol may represent more than one station:

- ★ Kotamadya Kendari: LRP10-01, LRP10-09, LRP 10-21, LRP 10-22, LRP 10-25.
- Kabupaten Konawe Selatan, Kecamatan Wolasi: LRP 10-02, LRP 10-03, LRP 10-04, LRP 10-05. LRP 10-28.
- Kabupaten Konawe Selatan, Kecamatan Moramo: LRP 10-06.
- Kabupaten Konawe Selatan, Kecamatan Ranomeeto Barat: LRP 10-20.
- Kabupaten Konawe Selatan, Kecamatan Ranomeeto: LRP 10-23, LRP 10-24.
- ☆ Kabupaten Konawe Selatan, Kecamatan Laeya: LRP 10-27.
- Kabupaten Konawe, Kecamatan Bondoala Sampara: LRP 10-07, LRP 10-17, LRP 10-18. LRP 10-19 and Desa Wawolimbue, LRP 10-08.
- ◇ Kabupaten Konawe, Batu Gong beach LRP 10-10,
- Kecamatan Kapoiala, LRP Kabupaten Konawe, Kecamatan Unaaha: LRP 10-14, LRP 10-15.
- Kabupaten Konawe, Kecamatan Asinua: LRP 10-16.
- ◆ Kabupaten Muna, Kecamatan Parigi: LRP 10-26. Border of Sulawesi Tengah and Sulawesi Tenggara approximated by solid/hatched line





Figure 3. Batu Gong Beach, northwest of Kendari, Kabupaten Konawe, 16 Jun 2010 (LRP 10-10)

- Station LRP 10-09. Artificial pond (*tambak*) at Sungai Wantgtu (S 03°58'70.9", E 122°31'86.0"), Kotamadya Kendari, 15 June 2010, 1500-1630, 9 m elev., L. R. Parenti *et al.*
- Station LRP 10-10. Sandy beach (S 03°52'36.0", E 122°30'40.6"), Batu Gong Beach (Figure 3), northwest of Kendari, Kabupaten Konawe, 16 June 2010, 0930-1015, 9 m elev., L. R. Parenti *et al.* and locals.
- Station LRP 10-11. Artificial pond (*tambak*) in mangrove/nipah palm swamp near Lalimbue (S 03°51'66.9", E 122°29'96.5"), Desa Lalimbue, Kecamatan Kapoiala, Kabupaten Konawe, 16 June 2010, 1130-1300, L. R. Parenti *et al.*
- Station LRP 10-12. Rice paddies and area cleared for future paddies near Kapoiala (S 03°52'01.4", E 122°28'47.5"), Kecamatan Kapoiala, Kabupaten Konawe, 16 June 2010, 1430-1500, 13 m elev., L. R. Parenti *et al.*
- Station LRP 10-13. Artificial pond (*tambak*) in mangrove/nipah palm swamp near Kapoiala (S 03°51'91.7", E 122°28'13.4"), Kecamatan Kapoiala, Kabupaten Konawe, 16 June 2010, 1530-1630, 5 m elev., L. R. Parenti *et al.*
- Station LRP 10-14. Sungai Pohara at town center, site of ikan pasar (S 03°53'16.4", E 122°01'19.6"), Desa Rawua, Kecamatan Unaaha, Kabupaten Konawe, 17 June 2010, 1200-1330, 71 m elev., L. R. Parenti *et al.*
- Station LRP 10-15. Sungai Pohara where crossed by bridge at Ameroro dam (S 03°52'74.8", E 122°03'42.6"), Desa Tuoy, Kecamatan Unaaha, Kabupaten Konawe, 17 June 2010, 1500-1600, 47 m elev., L. R. Parenti *et al.*
- Station LRP 10-16. Sungai Asinua (S 03°42'77.2", E 121°47'92.1"), Desa Asipako, Kecamatan Asinua, Kabupaten Konawe, 18 June 2010, 1200-1500, 80 m elev., L. R. Parenti *et al.*
- Station LRP 10-17. Sungai Pohara at town center (site of ikan pasar) (S 03°53'82.7", E 122°27'89.2"), Desa Laosu, Kecamatan Bondoala Sampara, Kabupaten Konawe, 19 June 2010, 0945-1000, 15 m elev., L. R. Parenti *et al.*

- Station LRP 10-18. Tributary stream of Sungai Pohara (S 03°52'96.6", E 122°27'65.4"), Kecamatan Bondoala Sampara, Kabupaten Konawe, 19 June 2010, 1015-1130, 16 m elev., L. R. Parenti *et al.*
- Station LRP 10-19. Tributary stream of Sungai Pohara (S 03°56'25.9", E 122°24'60.2"), Kecamatan Bondoala Sampara, Kabupaten Konawe, 19 June 2010, 1230-1330, 51 m elev., L. R. Parenti *et al.*
- Station LRP 10-20. Sungai Tunduno, tributary of Sungai Pohara (S 04°01'38.0", E 122°21'57.1"), Desa Tunduno, Kecamatan Ranomeeto Barat, Kabupaten Konawe Selatan, 19 June 2010, 1500-1600, 45 m elev., L. R. Parenti *et al.*
- Station LRP 10-21. Artificial pond (*tambak*) near Kendari (S 03°59'03.9", E 122°31'16.5"), Kotamadya Kendari, 20 June 2010, 1500-1630, 29 m elev., L. R. Parenti *et al.*
- Station LRP 10-22. Artificial pond (*tambak*) at Sungai Wantgtu (S 03°58'70.9", E 122°31'86.0"), Kotamadya Kendari, 20 June 2010, 1645-1730, 9 m elev., L. R. Parenti *et al.*
- Station LRP 10-23. Mountain stream through forest near town of Boroboro (S 04°05'95.6", E 122°20'83.9"), Desa Boroboro, Kecamatan Ranomeeto, Kabupaten Konawe Selatan, 21 June 2010, 1000-1045, 106 m elev., L. R. Parenti *et al.*
- Station LRP 10-24. Mountain stream through forest near town of Boroboro (S 04°05'68.5", E 122°21'45.8"), Desa Boroboro, Kecamatan Ranomeeto, Kabupaten Konawe Selatan, 21 June 2010, 1220-1345, 132 m elev., L. R. Parenti *et al.*
- Station LRP 10-25. Artificial pond (*tambak*) near Kendari (S 03°58'99.7", E 122°32'12.2"), Kotamadya Kendari, 21 June 2010, 1600-1710, 19 m elev., L. R. Parenti *et al.*
- Station LRP 10-26. Mata air Fotuno (Fotunooe) (S 05°04'66.0", E 122°30'43.3"), Desa Wakumoro, Kecamatan Parigi, Kabupaten Muna, 22 June 2010, 1215-1330, 63 m elev., L. R. Parenti *et al.*
- Station LRP 10-27. Coastal stream where crossed by road to Torobulu (S 04°18'83.7", E 122°29'61.1"), Desa Ambolodangga, Kecamatan Laeya, Kabupaten Konawe Selatan, 23 June 2010, 1045-1200, 50 m elev., L. R. Parenti *et al.*
- Station LRP 10-28. Sungai Andauna where crossed by road, near village of Anadambao (S 04°15'05.2", E 122°29'03.0"), Desa Anadambao, Kecamatan Wolasi, Kabupaten Konawe Selatan, 23 June 2010, 1245-1415, 85 m elev., L. R. Parenti *et al.*

## Results

We report 69 fish species in 34 teleost families (Table 1), nearly all collected during a preliminary survey of the Sungai Pohara and coastal localities in Sulawesi Tenggara, including Muna Island, in June 2010.

### Division **Teleostei**

#### Order **Elopiformes**

##### Family **Megalopidae**

*Megalops cyprinoides* (Broussonet, 1782)

Material collected: MZB 21478 (3; LRP 10-13), USNM 427179 (1; LRP 10-13), USNM 399452 (1; LRP 10-13), USNM 427180 (1; LRP 10-21).

Remarks: These tarpon specimens were all collected in artificial ponds or *tambak*.

#### Order **Anguilliformes**

##### Family **Anguillidae**

*Anguilla marmorata* Quoy & Gaimard, 1824

Material collected: MZB 21479 (1 juvenile; LRP 10-17), USNM 410191 (1; LRP 10-24).

Table 1. List of species in classification

No.	Order	No.	Family	No.	Species	Author
1	Elopiformes	1	Megalopidae	1	<i>Megalops cyprinoides</i>	(Broussonet, 1782)
2	Anguilliformes	2	Anguillidae	2	<i>Anguilla marmorata</i>	Quoy & Gaimard, 1824
3	Clupeiformes	3	Clupeidae	3	<i>Spratelloides</i> sp.	
4	Gonorynchiformes	4	Engraulidae	4	<i>Stolephorus commersoni</i>	Lacepède, 1803
5	Cypriniformes	5	Chanidae	5	<i>Chanos chanos</i>	(Forsskål, 1775)
6	Siluriformes	6	Cyprinidae	6	<i>Barbonymus gonionotus</i>	(Bleeker, 1849),
				7	<i>Puntius binotatus</i>	(Valenciennes 1842)
		7	Clariidae	8	<i>Clarias</i> sp	
				9	<i>Clarias batrachus</i>	(Linnaeus, 1758)
7	Cyprinodontiformes	8	Aplocheilidae	10	<i>Aplocheilus panchax</i>	(Hamilton, 1822)
		9	Poeciliidae	11	<i>Poecilia reticulata</i>	Peters, 1859
8	Beloniformes	10	Adrianichthyidae	12	<i>Oryzias asinua</i>	Parenti <i>et al.</i> 2013
				13	<i>Oryzias celebensis</i>	(Weber, 1894)
				14	<i>Oryzias javanicus</i>	(Bleeker, 1854)
				15	<i>Oryzias woworae</i>	Parenti & Hadiaty, 2010
				16	<i>Oryzias wolasi</i>	Parenti <i>et al.</i> , 2013
				17	<i>Oryzias</i> n.sp	
		11	Zenarchopteridae	18	<i>Nomorhamphus ebrardtii</i>	(Popta 1912)
				19	<i>Nomorhamphus</i> sp.1	
				20	<i>Nomorhamphus</i> sp.2	
		12	Belonidae	21	<i>Xenentodon canciloides</i>	(Bleeker, 1854)
9	Mugiliformes	13	Mugilidae	22	<i>Liza</i> sp.	
				23	<i>Moolgarda cunnesius</i>	(Valenciennes, 1836)
10	Syngnathiformes	14	Syngnathidae	24	<i>Micropis argulus</i>	(Peters, 1855)
11	Scorpaeniformes	15	Platycephalidae	25	<i>Inegocia japonica</i>	(Cuvier, 1829)
12	Perciformes	16	Eleotridae	26	<i>Butis</i> sp.	
				27	<i>Butis amboinensis</i>	(Bleeker, 1853)
				28	<i>Eleotris melanosoma</i>	Bleeker, 1852
				29	<i>Ophieleotris aporos</i>	(Bleeker, 1854)
				30	<i>Ophiocara porocephala</i>	(Valenciennes, 1837)
		17	Gobiidae	31	<i>Acentrogobius janthinopterus</i>	(Bleeker, 1853)
				32	<i>Acentrogobius viridipunctatus</i>	(Valenciennes, 1837)
				33	<i>Drombus globiceps</i>	(Hora, 1923)
				34	<i>Glossogobius</i> sp.	
				35	<i>Glossogobius celebius</i>	(Valenciennes, 1837)
				36	<i>Mugilogobius cavifrons</i>	(Weber, 1909)
				37	<i>Mugilogobius notospilus</i>	(Günther, 1877)
				38	<i>Periophthalmus argentilineatus</i>	Valenciennes, 1837
				39	<i>P. darwini</i>	Larson & Takita, 2004
				40	<i>P. malaccensis</i>	Eggert, 1935
				41	<i>Pseudogobius javanicus</i>	(Bleeker, 1856)
				42	<i>P. melanostictus</i>	(Day, 1876)
				43	<i>Redigobius penango</i>	(Popta, 1922)
				44	<i>Stenogobius</i> sp.	
		18	Anabantidae	45	<i>Anabas testudineus</i>	(Bloch, 1792)
		19	Channidae	46	<i>Channa striata</i>	(Bloch, 1793)
		20	Osphronemidae	47	<i>Trichopodus trichopterus</i>	(Pallas, 1770)
		21	Sillaginidae	48	<i>Sillago sihama</i>	(Forsskål, 1775)
		22	Synodontidae	49	<i>Synodus</i> sp.	
		23	Menidae	50	<i>Mene maculata</i>	(Bloch & Scheinder, 1801)
		24	Mullidae	51	<i>Upeneus</i> sp.	
				52	<i>Upeneus sulphureus</i>	Cuvier, 1829
		25	Carangidae	53	<i>Carangoides</i> sp.	
				54	<i>Caranx</i> sp.	
		26	Cichlidae	55	<i>Oreochromis</i> sp.	
		27	Ambassidae	56	<i>Ambassis</i> sp.	
				57	<i>Ambassis interrupta</i>	Bleeker, 1853
				58	<i>Ambassis nalua</i>	(Hamilton, 1822)
		28	Gerreidae	59	<i>Gerres filamentosus</i>	Cuvier, 1829
		29	Leiognathidae	60	<i>Eubleekeria splendens</i>	(Cuvier, 1829)



Table 1. (continue)

No.	Order	No.	Family	No.	Species	Author
				61	<i>Leiognathus</i> sp.	
				62	<i>Photopectoralis aureus</i>	(Abe & Haneda 1972)
				63	<i>Photopectoralis bindus</i>	(Valenciennes, 1835)
				64	<i>Secutor megalolepis</i>	Mochizuki & Hayashi, 1989
		30	Scatophagidae	65	<i>Scatophagus argus</i>	(Linnaeus, 1766)
		31	Terapontidae	66	<i>Pelates quadrilineatus</i>	(Bloch, 1790)
		32	Toxotidae	67	<i>Toxotes jaculatrix</i>	(Pallas, 1767)
13	Tetraodontiformes	33	Tetraodontidae	68	<i>Arothron reticularis</i>	(Bloch & Schneider, 1801)
14	Pleuronectiformes	34	Paralichthyidae	69	<i>Pseudorhombus argus</i>	Weber, 1913

### Order Clupeiformes

#### Family Clupeidae

*Spratelloides* sp.

Material collected: MZB 21480 (1; LRP 10-10), USNM 406850 (1; LRP 10-10), USNM 406851 (1; LRP 10-10; alcohol fixed).

Remarks: This and other coastal marine fishes were collected opportunistically when we happened upon a group of local villagers pulling in a beach seine (Fig.3).

#### Family Engraulidae

*Stolephorus commersoni* Lacepède, 1803

Material collected: MZB 21481 (1; LRP 10-10).

### Order Gonorynchiformes

#### Family Chanidae

*Chanos chanos* (Forsskål, 1775)

Material collected: MZB 21482 (7; LRP 10-01), USNM 399448 (3; LRP 10-01), USNM 427190 (1; LRP 10-13), USNM 401640 (4, of which one specimen was cleared and counter-stained; LRP10-22).

### Order Cypriniformes

#### Family Cyprinidae

*Barbonymus gonionotus* (Bleeker, 1849), Introduced

Material collected: MZB 21483(2; LRP 10-07), USNM 400044 (1; LRP10-14).

*Puntius binotatus* (Valenciennes 1842), Introduced

Material collected: MZB 21484 (60; LRP 10-02), USNM 400049 (26; LRP 10-02), USNM 399992 (10; LRP 10-8), USNM 400047 (12; LRP 10-16), USNM 400048 (1; LRP 10-16), USNM 400050 (1; LRP 10-02).

Remarks: Additional material of this species collected at the following stations is deposited in the uncatalogued teaching collection at the USNM: LRP 10-3 (3), LRP 10-4 (3), LRP 10-17 (7), LRP 10-15 (1), LRP 10-18 (2), LRP 10-20 (4), LRP 10-23 (20), LRP 10-24 (1), LRP 10-27 (2), LRP 10-28 (1).

### Order Siluriformes

#### Family Clariidae

*Clarias* sp., Introduced

Material collected: MZB 21485(4; LRP 10-19), USNM 399454 (2; LRP 10-19), USNM 399451 (1; LRP 10-24).

*Clarias batrachus* (Linnaeus, 1758), Introduced  
Material collected: MZB 21486(1; LRP 10-16), USNM 401445 (1; LRP 10-16).

Remarks: Identification of species of *Clarias* is problematic (see Ng & Kottelat 2008); the identification of these specimens to species should be considered preliminary.

### Series Atherinomorpha

### Order Cyprinodontiformes

#### Family Aplocheilidae

*Aplocheilus panchax* (Hamilton, 1822) (Figure 4)

Material collected: MZB 21487 (28; LRP 10-09), USNM 400001 (25; LRP 10-09), MZB 21488 (6; LRP 10-02), USNM 400003 (6; LRP 10-02), MZB 21489 (10; LRP 10-22), MZB 21490 (6; LRP 10-22), USNM 399987 (3; LRP 10-22), USNM 399986 (1; LRP 10-21), MZB 21491 (6; LRP 10-28), USNM 399988 (5; LRP 10-28), USNM 400004 (9; LRP 10-20), USNM 400005 (6; LRP 10-07), USNM 399998 (1; LRP 10-15).  
 Remarks: The native or introduced status of our collections of *A. panchax* cannot be confirmed. This widespread species is considered native to parts of Sulawesi, such as Buton Island (Tweedley *et al.* 2013), although it was treated as introduced to the Malili lakes region (Herder *et al.* 2012b: 531). We collected *A. panchax* at eight localities in Sulawesi Tenggara and in relatively large numbers at several of these. Specimens of this killifish species collected in 1995 from Sulawesi Selatan (Parenti & Louie 1998) are catalogued as USNM 340418 (10 spec.) and USNM 340420 (5 spec.).

#### Family **Poeciliidae**

*Poecilia reticulata* Peters, 1859, Introduced  
 Material collected: MZB 21492 (10; LRP 10-20), USNM 399993 (3; LRP 10-6).  
 Remarks: Additional material of this invasive species collected at the following stations is deposited in the uncatalogued teaching collection at the USNM: LRP 10-20 (9), LRP 10-24 (1).

#### Order **Myctophiformes**

##### Family **Synodontidae**

*Synodus* sp.  
 Material collected: MZB 21539 (1; LRP 10-01).

#### Order **Beloniformes**

##### Family **Adrianichthyidae**

*Oryzias asinua* Parenti *et al.* 2013, Endemic.

Material collected: MZB 20782 (holotype; LRP 10-16). Paratypes, all from LRP 10-16: MZB 20783 (32), USNM 406788 (11, of which one male and one female were cleared and counter-stained), USNM 405329 (1, alcohol fixed), USNM 405299 (1, alcohol fixed), USNM 405300 (1, alcohol fixed), USNM 405301 (1, alcohol fixed), USNM 405302 (1, alcohol fixed), ANSP 192931 (2), ZFMK 47666-47667 (2), UF 183765 (2), and NSMT-P 111645 (2). Nontypes from LRP 10-16: USNM 405298 (13).

Remarks: This new species was described from specimens collected at one freshwater locality near the foothills of the Meluhu highlands. It was not collected with other ricefish species.

##### *Oryzias celebensis* (Weber, 1894)

Material collected: USNM 399989 (8, of which one male and one female were cleared and counter-stained; LRP 10-09), MZB 21493 (10; LRP 10-22), USNM 401662 (1; LRP 10-22).  
 Remarks: This ricefish species was collected from an artificial pond or *tambak* near the coast which was subject to tidal fluctuations (Figure 5). Although described from Sulawesi, it has also been reported from Timor; that record needs confirmation.

##### *Oryzias javanicus* (Bleeker, 1854)

Material examined: MZB 15400 (3, of which one female was cleared and counter-stained; Muna Island, Sungai Jompi, (S 04°50'50.2", E 122°42'59.0"), collected by Daisy Wowor, 13 September 2007.  
 Remarks: These specimens were collected on Muna Island in 2007. They do not represent the same species we list below as *Oryzias* n. sp. Both of these species will be treated in our review of the Javanicus Species complex.



Figure 4. *Aplocheilichthys panchax*, LRP 10-06, 14 June 2010, a possibly introduced species in Sulawesi Tenggara

*Oryzias woworae* Parenti & Hadiaty, 2010 (Figure 1a), Endemic

Material collected: MZB 20731 (40; LRP 10-26), USNM 399429 (68, of which two males and two females have been cleared and counter-stained; LRP 10-26), MZB 21494(8; LRP 10-26; alcohol fixed), USNM 399430 (5; LRP 10-26; alcohol fixed), USNM 405327 (1; LRP 10-26; alcohol fixed), USNM 405328 (1; LRP 10-26; alcohol fixed).

Remarks: All specimens listed here are topotypes as they were collected at the single known locality of *O. woworae*, a spring-fed pond on Muna Island. The holotype is MZB 15398.

*Oryzias wolasi* Parenti *et al.*, 2013 (Figure 6), Endemic

Material collected: MZB 20874 (Holotype; LRP 10-02). Paratypes: MZB 29785 (20; LRP 10-02), USNM 403644 (103; LRP 10-02), ANSP 192932 (4; LRP 10-02), ZFMK 47668—47671 (4, LRP 10-02), UF 183766 (4; LRP 10-02), NSMT--P 111646 (4; LRP 10-02), USNM 405311 (1; LRP 10-02; EtOH fixed), USNM 405312 (1; LRP 10-

02; alcohol fixed), USNM 405313 (1; LRP 10-02; alcohol fixed), USNM 405314 (1; LRP 10-02; alcohol fixed), USNM 405315 (1; LRP 10-02; alcohol fixed), USNM 405316 (1; LRP 10-02; alcohol fixed), USNM 405317 (1; LRP 10-02; alcohol fixed), USNM 403642 (4; LRP 10-02; alcohol fixed), USNM 403647 (102; LRP 10-28), USNM 404347(5; LRP 10-28; alcohol fixed), USNM 403639 (3; LRP 10-03), USNM 403660 (30; LRP 10-05), USNM 403640(5; LRP 10-05), USNM 405318 (1; LRP 10-05), USNM 403645 (12. LRP 10-06), USNM 403646(1; LRP-06; alcohol fixed), USNM 403643(1; LRP-27).

*Oryzias n. sp.*; Endemic

Material collected: USNM 403657 (1; LRP 10-08), MZB 21495 (45; LRP 10-09), USNM 403651 (25, of which 2 males and 2 females were cleared and counter-stained; LRP 10-09), USNM 405322 (1; LRP 10-09; alcohol fixed), USNM 403658 (4; LRP 10-09; alcohol fixed), USNM 403649 (30; LRP 10-11), USNM 403656 (3; LRP 10-11; alcohol fixed), USNM 405324 (1; LRP 10-12; alcohol fixed), USNM 405325 (1; LRP

10-12; alcohol fixed), MZB 21496 (75; LRP 10-13), USNM 403654 (53; LRP 10-13), USNM 405323 (1; LRP 10-13; alcohol fixed), MZB 21497 (26; LRP 10-21), USNM 403655 (25; LRP 10-21), USNM 403650 (5; LRP 10-21; alcohol fixed), MZB 21498 (36; LRP 10-22), USNM 403653 (30; LRP 10-22), USNM 403648

(10; LRP 10-25), USNM 403652 (1; LRP 10-25; alcohol fixed).

Remarks: This species most closely resembles *Oryzias javanicus*, a ricefish distributed broadly throughout the Indo-Australian Archipelago. It and the rest of the Javanicus Species complex are currently under review by our research team.



Figure 5. Artificial pond or *tambak* near Kendari, above, at high tide, 15 June 2010, 1500-1630 (LRP 10-09), below, at low tide, 20 June 2010, 1645-1730 (LRP 10-22).





Figure 6. *Oryzias wolasi*, LRP 10-05, 14 June 2010

Family **Zenarchopteridae**

*Nomorhamphus ebrardtii* (Poopta 1912)

Material collected: MZB 21499 (5; LRP 10-02), USNM 401628 (4; LRP 10-02), USNM 401626 (1; LRP 10-02; alcohol fixed), MZB 21500 (25; LRP 10-03), USNM 401634 (17; LRP 10-03), USNM 401639 (13; LRP 10-05), USNM 401663 (2; LRP 10-05; alcohol fixed), MZB 21501 (25; LRP 10-06), USNM 401638 (25; LRP 10-06), USNM 401635 (45; LRP 10-14), MZB 21502 (40; LRP 10-16), MZB 21503 (20; LRP 10-16), USNM 401633 (19; LRP 10-16), USNM 401630 (5; LRP 10-20), MZB 21504 (34; LRP 10-23), MZB 21505 (15; LRP 10-23), USNM 401637 (15; LRP 10-23), USNM 401627 (17; LRP 10-24), MZB 21506 (20; LRP 10-27), USNM 401636 (15; LRP 10-27), MZB 21507 (20; LRP 10-28), USNM 401625 (10; LRP 10-28).

Remarks: Halfbeaks of the genus *Nomorhamphus* were among the most abundant and widely distributed of the fishes that we encountered. Our material contains at least three species, the well-known *N. ebrardtii*, and two others that are likely undescribed.

*Nomorhamphus* sp. 1

Material collected: USNM 427067 (9; LRP 10-02), USNM 427066 (2; LRP 10-02; alcohol fixed), MZB 21508 (20; LRP 10-14), USNM

427069 (20; LRP 10-14), MZB 21509 (30; LRP 10-16), USNM 427068 (18; LRP 10-16), USNM 401632 (1; LRP 10-16; alcohol fixed), USNM 427070 (7; LRP 10-23), MZB 21510 (20; LRP 10-28), USNM 427065 (9; LRP 10-28).

Remarks: This species is sympatric with *N. ebrardtii*.

*Nomorhamphus* sp. 2

Material collected: MZB 21511 (9; LRP 10-26), USNM 401629 (9; LRP 10-26), USNM 401631 (1; LRP 10-26; alcohol fixed).

Remarks: This was the only species of halfbeak collected at the type locality of *Oryzias woworae*. Like *O. woworae*, it displayed a brilliant red colour in life, particularly on the ventral surface of the body and the fins of males.

Family **Belontiidae**

*Xenentodon canceloides* (Bleeker, 1854)

Remarks: One individual was seen but not taken (LRP 10-22).

Order **Mugiliformes**

Family **Mugilidae**

*Liza* sp.

Material collected: MZB 21512 (6; LRP 10-25), USNM 401653 (3; LRP 10-25), USNM 401651 (1; LRP 10-09), USNM 427063 (3, LRP 10-13).

*Moolgarda cunnesius* (Valenciennes, 1836)

Material collected: MZB 21513 (1; LRP 10-11).

Order **Syngnathiformes**

Family **Syngnathidae**

*Microphis argulus* (Peters, 1855)

Material collected: USNM 401614 (1; LRP 10-17).

Order **Scorpaeniformes**

Family **Platycephalidae**

*Inegocia japonica* (Cuvier, 1829)

Material collected: USNM 400768 (1; LRP 10-10).

Order **Perciformes**

Family **Eleotridae**

*Butis* sp.

Material collected: USNM 405336 (1; LRP 10-22).

*Butis amboinensis* (Bleeker, 1853)

Material collected: MZB 21514 (10; LRP 10-21), USNM 401495 (2; LRP 10-21), USNM 401494 (3; LRP 10-07), USNM 401492 (3; LRP 10-25), MZB 21515 (5; LRP 10-18), USNM 401493 (1; LRP 10-18), USNM 401491 (3; LRP 10-13), USNM 401496 (1; LRP 10-21; alcohol fixed).

*Eleotris melanosoma* Bleeker, 1852

Material collected: MZB 21516 (3; LRP 10-07), USNM 401610 (2; LRP 10-07), MZB 21517 (3; LRP 10-08), USNM 401611 (2; LRP 10-08), USNM 401613 (3; LRP 10-18).

*Ophieleotris aporos* (Bleeker, 1854)

Material collected: MZB 21518 (5; LRP 10-8), USNM 400002 (4; LRP 10-8), USNM 401619 (1; LRP 10-18).

*Ophiocara porocephala* (Valenciennes, 1837)

Material collected: MZB 21519 (1; LRP 10-09); USNM 399997 (1; LRP 10-09); MZB 21520 (1; LRP 10-11); USNM 399995 (1; LRP 10-11); USNM 401446 (1; LRP 10-18).

Family **Gobiidae**

*Acentrogobius janthinopterus* (Bleeker, 1853)

Material collected: MZB 21521 (5; LRP 10-21), USNM 401499 (2; LRP 10-21), MZB 21522 (3; LRP 10-22), USNM 401498 (2; LRP 10-22), USNM 401497 (1; LRP 10-25), USNM 405337 (1; LRP 10-22), USNM 405341 (1; LRP 10-09).

*Acentrogobius viridipunctatus* (Valenciennes, 1837)

Material collected: USNM 401500 (1; LRP 10-21).

*Drombus globiceps* (Hora, 1923)

Material collected: USNM 405345 (1; LRP 10-25).

*Glossogobius* sp.

Material collected: MZB 21523 (5; LRP 10-01), USNM 399453 (4; LRP 10-01).

*Glossogobius celebius* (Valenciennes, 1837)

Material collected: MZB 21524 (5; LRP 10-07), USNM 401447 (2; LRP 10-07), USNM 401448 (4; LRP 10-11), USNM 401504 (1; LRP 10-11; alcohol fixed), USNM 401464 (1; LRP 10-13), MZB 21525 (8; LRP 10-18), USNM 401460 (5; LRP 10-18).

*Mugilogobius cavifrons* (Weber, 1909)

Material collected: MZB 21526 (2; LRP 10-09), USNM 405335 (1; LRP 10-09).



*Mugilogobius notospilus* (Günther, 1877)

Material collected: MZB 21527 (2; LRP 10-18), USNM 405343 (1; LRP 10-18).

Remarks: This species was not reported from Sulawesi by Kottelat *et al.* (1993) or by Larson (2001) in her revision of the genus *Mugilogobius*.

*Periophthalmus argentilineatus* Valenciennes, 1837

Material collected: USNM 403664 (1; LRP 10-13), USNM 403663 (2; LRP 10-13; alcohol fixed). MZB 21528 (2; LRP 10-11), USNM 403662 (2; LRP 10-11).

Remarks: In a review of the gobiid subfamily Oxudercinae, which includes the genus *Periophthalmus*, Murdy (1989:74) remarked that no representatives of the subfamily had ever been reported from Sulawesi. In the extensive review of the fish fauna of western Indonesia and Sulawesi, Kottelat *et al.* (1993:148) did not specify Sulawesi in the distribution of any oxudercine, although they noted that the widespread distribution of the oxudercine *P. argentilineatus* included the Indo-West Pacific. This species was reported, as *P. vulgaris*, a junior synonym, from the Malangke estuaries in the northern extent of Bone Bay, Sulawesi Selatan by Whitten *et al.*, (1987). Recently, this species was also reported from Buton Island, one of the islands off the southeastern coast of the main island of Sulawesi, by Tweedley *et al.* (2013) and from Northern Sulawesi as a personal observation on the Mudskipper website maintained by Gianluca Polgar (<http://www.mudskipper.it/>), accessed on 23 December 2013. The reported absence of this and other oxudercine species from Sulawesi likely reflects the limited fish collections made from mangrove habitats throughout the island

complex rather than the restricted distribution of this widespread gobiid genus.

*Periophthalmus darwini* Larson & Takita, 2004

Material collected: USNM 403665 (1; LRP 10-11).

*Periophthalmus malaccensis* Eggert, 1935

Material collected: MZB 21529 (1; LRP 10-11), USNM 403661 (1; LRP 10-11).

*Pseudogobius javanicus* (Bleeker, 1856)

Material collected: USNM 405340 (4; LRP 10-21), MZB 21530 (8; LRP 10-25), USNM 405344 (3; LRP 10-25).

*Pseudogobius melanostictus* (Day, 1876)

Material collected: MZB 21531 (16; LRP 10-09), USNM 405342 (1; LRP 10-09), USNM 405339 (5; LRP 10-21), USNM 405338 (10; LRP 10-22).

*Redigobius penango* (Popta, 1922), Endemic

Material collected: USNM 405334 (1; LRP 10-27), MZB 21532 (8; LRP 10-6), USNM 405330 (2; LRP 10-6), USNM 405331 (2; LRP 10-24), USNM 405332 (1; LRP 10-28), USNM 405333 (2; LRP 10-14).

Remarks: *Redigobius* was reviewed by Larson (2001). As currently understood, the genus is broadly distributed throughout the Indo-west Pacific in estuarine and freshwaters. This single species of *Redigobius* endemic to Sulawesi is known from collections from Sulawesi Selatan as well as Sulawesi Tenggara (Larson, 2001:208).

*Stenogobius* sp.

Material collected: MZB 21533 (10; LRP 10-07), USNM 401443 (10, LRP 10-07).

Family **Anabantidae**

*Anabas testudineus* (Bloch, 1792), Introduced  
Material collected: MZB 21534 (1; LRP 10-04).

Family **Channidae**

*Channa striata* (Bloch, 1793), Introduced  
Material collected: MZB 21535 (4; LRP 10-01),  
USNM 400386 (2; LRP 10-01), USNM 401459  
(1; LRP 10-18), USNM 404449 (1; LRP 10-20).

Family **Osphronemidae**

*Trichopodus trichopterus* (Pallas, 1770), Introduced  
Material collected: MZB 21536 (4; LRP 10-04),  
USNM 400045 (1; LRP 10-04), MZB 21537 (4;  
LRP 10-07), USNM 399991 (1; LRP 10-07),  
USNM 399994 (1; LRP 10-18).  
Remarks: Additional material of this exotic species collected at the following stations is deposited in the uncatalogued teaching collection at the USNM: LRP 10-2 (7), LRP 10-9 (1), LRP 10-14 (1), LRP 10-16 (1), LRP 10-20 (1).

Family **Sillaginidae**

*Sillago sihama* (Forsskål, 1775)  
Material collected: MZB 21538 (10; LRP10-10),  
USNM 401489 (6; LRP 10-10), USNM 401503  
(3; LRP 10-10; alcohol fixed).

Family **Menidae**

*Mene maculata* (Bloch & Scheinder, 1801)  
Material collected: MZB 21540 (4; LRP 10-01),  
USNM 400006 (4; LRP 10-01).

Family **Mullidae**

*Upeneus* sp.  
Material collected: USNM 401487 (1; LRP 10-10).

*Upeneus sulphureus* Cuvier, 1829

Material collected: MZB 21541 (1; LRP 10-10).

Family **Carangidae**

*Carangoides* sp.  
Material collected: MZB 21542 (1; LRP 10-10);  
USNM 406852 (1; LRP 10-10; alcohol fixed).  
*Caranx* sp.  
Material collected: MZB 21543 (1; LRP 10-10).

Family **Cichlidae**

*Oreochromis* sp., Introduced  
Material collected: MZB 21544 (1, LRP 10-12),  
USNM 400046 (1; LRP 10-13).  
Remarks: Additional material of this invasive species collected at the following stations is deposited in the uncatalogued teaching collection at the USNM: LRP 10-9 (2), LRP 10-15 (1), LRP 10-22 (1).

Family **Ambassidae**

*Ambassis* sp.  
Material collected: USNM 401480 (1; LRP 10-13), USNM 401475 (7; LRP 10-22), USNM 401476 (1; LRP 10-11), MZB 21545 (7; LRP 10-25), USNM 401479 (1; LRP 10-25), MZB 21546 (10; LRP 10-18), USNM 401478 (6; LRP 10-18).

*Ambassis interrupta* Bleeker, 1853

Material collected: USNM 401501 (1; LRP 10-21), MZB 21547 (20; LRP 10-18), USNM 401453 (6; LRP 10-18), USNM 401458 (8; LRP 10-21), MZB 21548 (19; LRP 10-13), USNM 401484 (10; LRP 10-13), USNM 401485 (7; LRP 10-12), USNM 401452 (2; LRP 10-11), USNM 401450 (4; LRP 10-07), USNM 401481 (1; LRP 10-09).

*Ambassis nalua* (Hamilton, 1822)

Material collected: MZB 21549 (1; LRP 10-21),  
USNM 401451 (1; LRP 10-21).

Family **Gerreidae**

*Gerres filamentosus* Cuvier, 1829

Material collected: USNM 401486 (2; LRP 10-10),  
USNM 401998 (1; LRP 10-10; alcohol fixed),  
MZB 21550 (8; LRP 10-10), USNM 401461 (2; LRP 10-10),  
MZB 21551(5; LRP 10-22), USNM 401994 (4; LRP 10-22).

Family **Leiognathidae**

*Eubleekeria splendens* (Cuvier, 1829)

Material collected: MZB 21552 (4; LRP 10-10),  
USNM 402002 (3; LRP 10-10), MZB 21553 (1;  
LRP 10-10; alcohol fixed), USNM 401649 (1;  
LRP 10-10; alcohol fixed).

*Leiognathus* sp.

Material collected: MZB 21554 (2; LRP 10-10),  
USNM 401999 (1; LRP 10-10).

*Photopectoralis aureus* (Abe & Haneda, 1972)

Material collected: MZB 21555 (3; LRP 10-10)  
USNM 401996 (2; LRP 10-10), MZB 21556 (2;  
LRP 10-10), USNM 401997 (3; LRP 10-10;  
alcohol fixed).

*Photopectoralis bindus* (Valenciennes, 1835)

Material collected: MZB 21557 (4; LRP 10-10),  
USNM 402000 (4; LRP10-10).

*Secutor megalolepis* Mochizuki & Hayashi, 1989

Material collected: MZB 21558 (1; LRP 10-10).

Family **Scatophagidae**

*Scatophagus argus* (Linnaeus, 1766)

Material collected: MZB 21559 (1; LRP 10-21),  
USNM 399996 (1; LRP 10-21), MZB 21560 (2;

LRP 10-13), USNM 399450 (1; LRP 10-13),  
MZB 21561 (2; LRP 10-25), USNM 399990 (1;  
LRP 10-25), MZB 21562 (5; LRP 10-9), USNM  
399984 (4; LRP 10-9).

Family **Terapontidae**

*Pelates quadrilineatus* (Bloch, 1790)

Material collected: MZB 21563 (2; LRP 10-10),  
USNM 399983 (2; LRP 10-10).

Family **Toxotidae**

*Toxotes jaculatrix* (Pallas, 1767)

Material collected: MZB 21564 (1; LRP 10-21).

Order **Tetraodontiformes**

Family **Tetraodontidae**

*Arothron reticularis* (Bloch & Schneider, 1801)

Material collected: MZB 21565 (1; LRP 10-25).

Order **Pleuronectiformes**

Family **Paralichthyidae**

*Pseudorhombus argus* Weber, 1913

Material collected: MZB 21566 (1; LRP 10-10),  
USNM 427062 (1; LRP 10-10).

**Discussion**

We carried out a preliminary survey of the freshwater and coastal fishes of Sulawesi Tenggara in June 2010 with four stated objectives: to collect taxonomic materials, including formalin-fixed specimens as well as tissue samples of freshwater and coastal fishes; to capture color digital images of live specimens collected in the field; to discover and describe new freshwater and coastal fish species; and, to increase our knowledge of the natural history of Sulawesi and encourage conservation of its endemic freshwater and coastal biota. Each of these four objectives was met.

We report 69 fish species in 34 teleost families from the Sungai Pohara and coastal localities in Sulawesi Tenggara, including Muna Island (Table 1). Of these, nine are understood to be introduced or exotic species: *Barbonymus gonionotus*, *Puntius binotatus*, *Clarias* sp., *Clarias batrachus*, *Poecilia reticulata*, *Anabas testudineus*, *Channa striata*, *Trichopodus trichopterus*, and *Oreochromis* sp. A tenth species, the cyprinodontiform *Aplocheilichthys panchax*, is broadly distributed throughout the Indo-Australian Archipelago and is possibly exotic in Sulawesi, at least in part of its current distribution. Atherinomorph fishes of the family Adrianichthyidae are represented in the province by four endemic species (*Oryzias asinua*, *O. wolasi*, *O. woworae* and *Oryzias* n. sp.) and two that are more widespread (*O. celebensis* and *O. javanicus*). The Gobiidae is the most diverse family, represented by 14 native species, although just one Sulawesi endemic, *Redigobius penango*.

Our fish collection contrasts sharply with the riverine ichthyofauna reported for the adjacent Sulawesi Tenggara islands of Buton and Kabaena in which there are no ricefishes and only one confirmed Sulawesi endemic, the halfbeak *Nomorhamphus ebrardtii* (see Tweedley *et al.* 2013). Because the endemism of Sulawesi's freshwater fishes has been described almost exclusively from specimens collected in the tectonic lakes (Parenti 2011), Tweedley *et al.* (2013) concluded that the absence of endemic species in Buton and Kabaena was due to their predominantly riverine rather than lacustrine habitats. This was contradicted by our study in which we collected new, endemic species from rivers and streams. We propose that the differences in faunal composition identify Buton as a separate area of endemism, at least for fishes, distinct from mainland Sulawesi Tenggara and

from Muna Island. This hypothesis is bolstered by the geological hypothesis that Buton Island is part of a separate continental fragment, the Buton-Tukang Besi block (Spakman & Hall 2010). More detailed natural history exploration throughout the varied and diverse habitats of Sulawesi Tenggara is needed to test these hypotheses and potentially reveal additional areas of endemism that may then be used to discover biogeographic patterns, *sensu* Parenti & Ebach (2009).

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