
# A checklist of damselfishes (Pomacentridae) from Palawan, Philippines

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## ABSTRACT

This study was conducted to generate information on the number of damselfish species in Palawan, the most common tropical reef-associated fishes in the world. Photos of reef-associated fishes taken in conjunction with other reef surveys in 10 localities between 2019 and 2021 were used and evaluated for the presence of damselfishes. A total of 4,038 photos of reef-associated fishes were compiled and analyzed. Only 60 species of damselfishes were identified wherein Puerco Island in the municipality of Roxas had the highest number (14 genera and 32 species) while Hartman's Beach in Puerto Princesa City had the lowest (3 genera and 8 species). Three of the identified damselfishes were potentially new records in Palawan: *Amblypomacentrus clarus* Allen & Adrim, 2000, *Dischistodus darwiniensis* (Whitley, 1928); and *Pomacentrus aurifrons* Allen, 2004. The current data make a total of 137 damselfish species already documented in Palawan. Continued photo-video documentation is encouraged to increase understanding on the species richness of damselfishes and other reef-associated fauna.

**Keywords**: biodiversity, marine fishes, marine water, species checklist, species richness

## INTRODUCTION

Damselfishes (family Pomacentridae) are one of the most diverse and widespread family of marine fishes found throughout the tropical oceans (Bellwood and Wainwright 2002; Allen et al. 2003). According to Parenti (2021), there are 423 valid species of damselfishes in the world and only 202 species are found in tropical Pacific (Allen et al. 2003).

Although the majority of damselfishes were categories as major fishes (English et al. 1997), they have varied ecological and economic importance such promoting the abundance of preferred algae for the settlement of depleted corals through a variety of 'farming' activities (Jones et al. 2006), which also serve as refuge for juvenile benthic and demersal plankton (Lobel 1980). Chase et al. (2020) reported that coral colonies with damselfishes accumulated much less sediment up to 10-fold with higher chlorophyll and protein concentrations compared to colonies without fishes. Some damselfishes (*Abudefduf sexfasciatus, A. vaigensis, A. zonatus, Dischistodus perspillatus* and *Hemiglyphidodon plagiometapon*) are also consumed as food (Gonzales

2013), while the colorful species are in high demand in the aquarium industry (Bruckner 2005; Muyot et al. 2019). The global aquarium fish trade consists of over 1,400 species of reef fishes that constitute over 50% of the global volume in which damselfish and anemonefish are included (Bruckner 2005).

The fish surveys and documentations of damselfishes resulted to the increasing number of species and expanding distribution range. For example, Allen and Wright (2003) reported a new species *Pomacentrus rodriguesensis* from Rodrigues Island, Indian Ocean in 2003. Pyle et al. (2008) described five new species (*Chromis abyssus, C. circumaurea, C. degruyi, C. brevirostris* and *C. earina*) of damselfish from deep coral reefs in the tropical Western Pacific in 2008. In the same year, Allen et al. (2008) also described a new species *(Amphiprion barberi)* of anemonefish fish, from coral reefs of Fiji, Tonga, and Samoa. The following year, two new pomacentrids (*Chromis albicauda* and *Chromis unipa*) from Indonesian seas were described by Allen and Erdmann (2009). In 2010, another species (*Amphiprion pacificus*) was discovered from Wallis Island and Tonga in the Western Pacific and in the reefs of Fiji and Samoa (Allen et al. 2010). In the Philippines, several species have also been described. For example, *Pomacentrus cheraphilus* was described based on 19 specimens collected at Brunei and northern Palawan, Philippines (Allen et al. 2011). A shallow inhabiting species *(Altrichthys alelia)* was also described from specimens collected off Busuanga Island, Palawan Province, Philippines (Bernardi et al. 2017), while Arango et al. (2019) described three new species of Chromis (*Chromis gunting, C. hangganan,* and *C. bowesi*) from mesophotic coral ecosystems of Batangas, Lubang, Puerto Galera, and Verde Island.

The expanded distribution range of a few damselfish species were also reported thus increasing the number of species listed for a particular locality. For example, *Pomacentrus caeruleopunctatus*, previously restricted to the Seychelles Islands, Madagascar, and Tanzania, to the Mascarene Archipelago has been recorded from Reunion Island (Boujorn et al. 2019). Four new records of damselfish species have also been reported for the first time in the reefs of Saint Martin's Island in the northern Bay of Bengal, Bangladesh (Islam and Habib 2020).

In the province of Palawan, Philippines, the information about damselfishes mostly form part of reef fish assessment studies (Gonzales 2013; Balisco and Dolorosa 2019), however, there is no information as to the total number of species found in the province. This study is the first to provide a list of damselfish species known to occur in the reefs of Palawan, Philippines.

## METHODS

### Study Sites and Photo-documentation

The day scuba diving activities were conducted in shallow reef areas (2-10 m deep) in the municipalities of El Nido, Taytay, Roxas, Narra, San Vicente, Araceli, and in Puerto Princesa City (PPC) between 2019 and 2021 (Figure 1; Table 1). Opportunistic photo-documentation of reef-associated fishes were carried out during fish visual census and in conjunction with other scuba diving activities such as in-situ induced spawning and restocking of giant clams. A total of 4,038 photos of reef-associated fishes were compiled and evaluated for the presence of damselfishes.

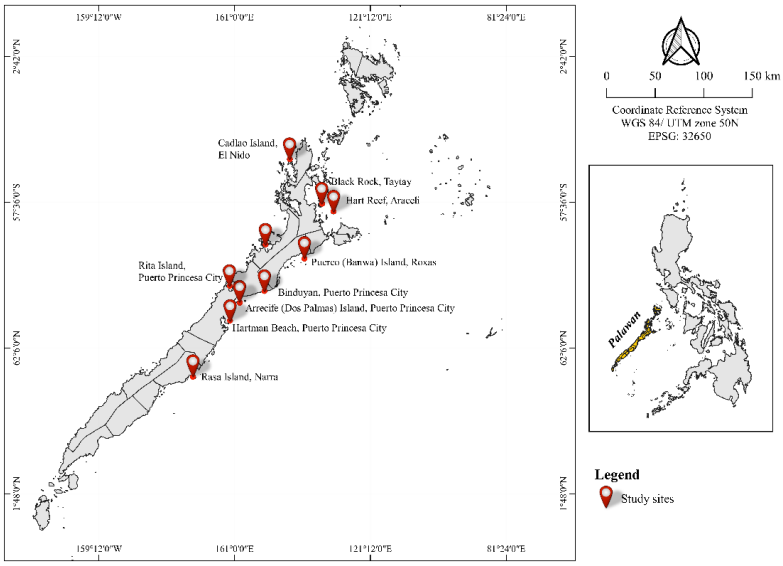


**Figure 1**. Map of Palawan showing the ten study sites.

**Table 1**. Number of dives, number of divers, and dive duration spent at each study site for the documentation of reef-associated fishes.

| Date of Survey | Sites | Number of dives | Number of divers | Diving duration (h) | Total dive duration (h) |
|---|---|---|---|---|---|
| 05 October 2020 | Cadlao Island, El Nido | 1 | 2 | 2 | 13 |
| 09 December 2020 | | 1 | 3 | 3 | |
| 10 May 2019 | Hart Reef, Araceli | 1 | 2 | 2 | 4 |
| 10 April 2019 | Black Rock, Taytay | 1 | 2 | 2 | 12 |
| 11 May 2019 | | 1 | 2 | 2 | |
| 12 May 2019 | | 1 | 2 | 2 | |
| 30 November 2018 | Puerco Island, Roxas | 1 | 3 | 3 | 90 |
| 24 August 2019 | | 2 | 3 | 6 | |
| 25 August 2019 | | 2 | 3 | 6 | |
| 26 August 2019 | | 1 | 3 | 3 | |
| 26 April 2019 | Port Barton, San Vicente | 2 | 3 | 6 | 72 |
| 27 April 2019 | | 2 | 3 | 6 | |
| 25 September 2019 | Binduyan, Puerto Princesa City | 2 | 4 | 8 | 130 |
| 25 November 2019 | | 1 | 4 | 4 | |
| 12 December 2020 | | 1 | 5 | 5 | |
| 14 December 2020 | | 1 | 5 | 5 | |
| 23 September 2020 | | 1 | 4 | 4 | |
| 04 May 2019 | Rita Island, Puerto Princesa City | 1 | 3 | 3 | 31 |
| 09 October 2019 | | 1 | 3 | 3 | |
| 12 November 2019 | | 1 | 3 | 3 | |
| 15 August 2021 | | 1 | 2 | 2 | |
| 17 December 2020 | Arrecife Island, Puerto Princesa City | 1 | 2 | 2 | 4 |
| 17 November 2019 | Hartman Beach, Puerto Princesa City | 1 | 2 | 2 | 8 |
| 23 November 2019 | | 1 | 2 | 2 | |
| 13 January 2018 | Rasa Island, Narra | 2 | 2 | 4 | 52 |
| 02 May 2019 | | 2 | 3 | 6 | |
| **TOTAL** | **10** | **33** | **74** | **96** | **416** |

**Identification**

The work of Allen et al. (2003) was used in identifying the species. Unidentified photo of damselfishes was posted on a Facebook page ID please (Marine Creature Identification) (https://www.facebook.com/groups/396180553763159) for initial identification and was validated using the reef fishes field guide Allen et al. (2003). Taxonomic classification of all identified damselfishes was updated base from World Register of Marine Species (WORMS; http://www.marinespecies.org) and Fish Base Worlds Wide Web electronic publication (http://fishbase.org). An offline database serves as current repository of the photographs.

**RESULTS**

Among the 10 sites, Puerco Island had the highest number of species (32) belonging to 14 genera. This was followed by Binduyan, PPC with 30 species belonging to 9 genera, while the Hartman Beach in PPC had the lowest species (8) belonging to 3 genera recorded (Figure 2; Table 2).

In total, 60 species of damselfishes were recorded (Table 2), three of which were potential new record in Palawan: A*mblypomacentrus clarus* Allen & Adrim, 2000 cf.; *Dischistodus darwinensis* (Whitley, 1928) cf.; and *Pomacentrus aurifrons* Allen, 2004, cf. (Figure 3; Table 3).

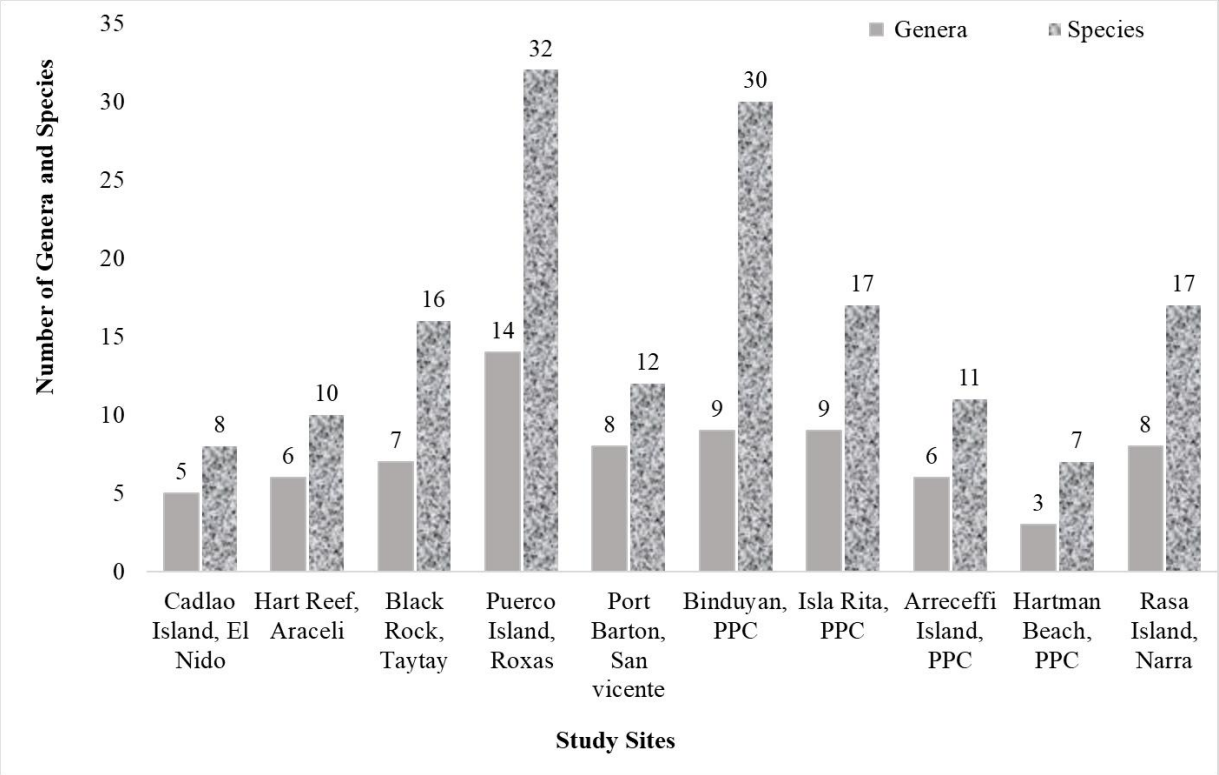


**Figure 2.** Number of genera and species of damselfishes been recorded in Palawan.

**Table 2.** Damselfish species encountered during the survey in various localities in Palawan. Note: (✓) Indicates the present species in the area. CIEN – Cadlao Island, El Nido; HRA – Harts Reef, Araceli; BRT – Black Rock, Taytay; PIR – Puerco Island, Roxas; PBSV – Port Barton, San Vicente; BPPC – Binduyan, Puerto Princesa City; RIPPC – Rita Island, Puerto Princesa City; AIPPC – Arrecife Island, Puerto Princesa City; HBPPC – Hartman Beach, Puerto Princesa City; RIN – Rasa Island, Narra.

| No. | Scientific Name | CIEN | HRA | BRT | PIR | PBSV | BPPC | RIPPC | AIPPC | HBPPC | RIN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | *Abudefduf bengalensis* (Bloch, 1787) | | | | | | | ✓ | | | |
| 2 | *Abudefduf lorenzi* Hensley & Allen, 1977 | | | | | | | ✓ | | | |
| 3 | *Abudefduf sexfasciatus* (Lacepède, 1801) | ✓ | ✓ | | ✓ | ✓ | | ✓ | ✓ | | |
| 4 | *Abudefduf vaigiensis* (Quoy & Gaimard, 1825) | | | | ✓ | | ✓ | | | ✓ | ✓ |
| 5 | *Acanthochromis polyacanthus* (Bleeker, 1855) | | | ✓ | ✓ | | | ✓ | | | ✓ |
| 6 | *Amblyglyphidodon aureus* (Cuvier, 1830) | | | | | ✓ | | ✓ | | | ✓ |
| 7 | *Amblyglyphidodon batunai* Allen, 1995 | | | | ✓ | | | ✓ | | | |
| 8 | *Amblyglyphidodon curacao* Bloch, 1787) | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ |
| 9 | *Amblyglyphidodon leucogaster* (Bleeker, 1847) | | | | | | ✓ | | | | |
| 10 | *Amblypomacentrus clarus* Allen & Adrim, 2000 | | | | ✓ | | | | | | |
| 11 | *Amphiprion clarkii* (Bennett, 1830) | | | | | ✓ | ✓ | ✓ | | | ✓ |
| 12 | *Amphiprion frenatus* Brevoort, 1856 | | ✓ | | | | ✓ | ✓ | | | |
| 13 | *Amphiprion ocellaris* Cuvier, 1830 | | | | | | ✓ | ✓ | ✓ | | |
| 14 | *Amphiprion perideraion* Bleeker, 1855 | | | | | | ✓ | | | | |

| No. | Scientific Name | CIEN | HRA | BRT | PIR | PBSV | BPPC | RIPPC | AIPPC | HBPPC | RIN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 15 | *Amphiprion polymnus* (Linnaeus, 1758) | | | | | | ✓ | | | | |
| 16 | *Amphiprion sandaracinos* Allen, 1972 | | | | ✓ | ✓ | | | | | ✓ |
| 17 | *Chromis atripectoriales* Welander & Schultz, 1951 | ✓ | | | | | | | | | |
| 18 | *Chromis retrofasciata* Weber, 1913 | | | | | | ✓ | | | | |
| 19 | *Chromis ternatensis* (Bleeker, 1856) | | | | | | ✓ | | | | ✓ |
| 20 | *Chromis viridis* (Cuvier, 1830) | | ✓ | | ✓ | | ✓ | | | | ✓ |
| 21 | *Chromis weberi* Fowler & Bean, 1928 | | | | ✓ | | ✓ | | | | |
| 22 | *Chromis xanthura* (Bleeker, 1854) | | | | | | ✓ | | | | |
| 23 | *Chrysiptera parasema* (Bleeker, 1877) | | | | ✓ | ✓ | ✓ | ✓ | | | |
| 24 | *Chrysiptera oxycephala* (Fowler, 1918) | | | | | | | ✓ | | | |
| 25 | *Chrysiptera rex* (Snyder, 1909) | | | ✓ | | | | | | | |
| 26 | *Chrysiptera rollandi* (Whitley, 1961) | | | | | | ✓ | | | | |
| 27 | *Dascyllus auranus* (Linnaeus, 1758) | ✓ | | | | | ✓ | | | | |
| 28 | *Dascyllus melanurus* Bleeker, 1854 | | | | ✓ | | | | | ✓ | |
| 29 | *Dascyllus reticulatus* (Richardson, 1846) | ✓ | | ✓ | ✓ | | ✓ | | ✓ | ✓ | ✓ |
| 30 | *Dascyllus trimaculatus* (Rüppell, 1829) | ✓ | ✓ | | ✓ | | ✓ | | ✓ | | ✓ |
| 31 | *Dischistodus chrysopoecilus* (Schlegel & Müller, 1839) | | | | ✓ | | | | | ✓ | |
| 32 | *Dischistodus darwiniensis* (Whitley, 1928) | | | | ✓ | | | | | | |
| 33 | *Dischistodus perspicillatus* (Cuvier, 1830) | | | | ✓ | | | ✓ | | | |
| 34 | *Dischistodus prosopotaena* (Bleeker, 1852) | | | | ✓ | | | ✓ | | | |
| 35 | *Hemiglyphidodon plagiometapon* (Bleeker, 1852) | | | | ✓ | | | ✓ | | | |
| 36 | *Neoglyphidodon melas* (Cuvier, 1830) | | | ✓ | ✓ | ✓ | ✓ | | | | |
| 37 | *Neoglyphidodon nigroris* (Cuvier, 1830) | | ✓ | ✓ | ✓ | ✓ | | | | | |
| 38 | *Neoglyphidodon oxyodon* (Bleeker, 1858) | | | | ✓ | | | | | | |
| 39 | *Neopomacentrus filamentosus* (MacLeay, 1882) | | | | ✓ | ✓ | | | | | |
| 40 | *Plectroglyphidodon lacrymatus* (Quoy & Gaimard, 1825) | | | ✓ | ✓ | | ✓ | | ✓ | | ✓ |
| 41 | *Pomacentrus adelus* Allen, 1991 | | | | | | | | | | |
| 42 | *Pomacentrus alexanderae* Evermann & Seale, 1907 | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ |
| 43 | *Pomacentrus amboinensis* Bleeker, 1868 | | | | | | ✓ | | | | |
| 44 | *Pomacentrus armillatus* Allen, 1993 | | | ✓ | ✓ | | ✓ | | ✓ | | |
| 45 | *Pomacentrus aurifrons* Allen, 2004 | | | ✓ | ✓ | | | | | | |
| 46 | *Pomacentrus auriventris* Allen, 1991 | | | | | | | | ✓ | | |
| 47 | *Pomacentrus bankanensis* Bleeker, 1854 | | ✓ | | ✓ | | | | | | |
| 48 | *Pomacentrus brachialis* Cuvier, 1830 | | ✓ | | | | ✓ | | | | |
| 49 | *Pomacentrus burroughi* Fowler, 1918 | | | | | | | | | | |

| No. | Scientific Name | CIEN | HRA | BRT | PIR | PBSV | BPPC | RIPPC | AIPPC | HBPPC | RIN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 50 | *Pomacentrus chrysurus* Cuvier, 1830 | | | | | | | | | ✓ | |
| 51 | *Pomacentrus coelestis* Jordan & Starks, 1901 | ✓ | | ✓ | ✓ | | ✓ | | ✓ | ✓ | ✓ |
| 52 | *Pomacentrus grammorhynchus* Fowler, 1918 | | | | ✓ | | | | ✓ | | |
| 53 | *Pomacentrus geminospilus* Allen, 1993 | | | | | | ✓ | | | | |
| 54 | *Pomacentrus lepidogenys* Fowler & Bean, 1928 | | ✓ | ✓ | | | ✓ | | | | ✓ |
| 55 | *Pomacentrus moluccensis* Bleeker, 1853 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | ✓ |
| 56 | *Pomacentrus philippinus* Evermann & Seale, 1907 | | | ✓ | | | ✓ | | | | ✓ |
| 57 | *Pomacentrus stigma* Fowler & Bean, 1928 | | ✓ | ✓ | ✓ | | | | | | ✓ |
| 58 | *Pomacentrus tripunctatus* Cuvier, 1830 | | | | | | | | | ✓ | |
| 59 | *Pomacentrus vaiuli* Jordan & Seale, 1906 | | | | | | ✓ | | | | |
| 60 | *Premnas biaculeatus* (Bloch, 1790) | | | | ✓ | ✓ | | ✓ | | | |
| **Total** | | **8** | **10** | **16** | **32** | **12** | **30** | **17** | **11** | **8** | **17** |


**Figure 3.** Underwater photographs of three potential new records of damselfishes in Palawan. A) *Amblypomacentrus clarus* Allen & Adrim, 2000; B) *Dischistodus darwiniensis* (Whitley, 1928); and C) *Pomacentrus aurifrons* Allen, 2004.

**Table 3.** Distribution of damselfish species in the Philippines and in this study. (*) asterisk as indicated in numbers 20, 111, and 150 were the new records for Palawan.

| No. | Scientific Name | Tropical Pacific (Allen et al. 2003) | Northern Palawan (Allen et al. 2011) | Taytay, Palawan (Gonzales et al. 2014) | EL Nido, Palawan (Allen et al. 2015) | Busuanga Island, Palawan (Bernardi et al. 2017) | Western Sulu Sea (Balisco and Dolorosa 2019) | Tubbataha Reefs Natural Park (Unpublished data) | This Study |
|---|---|---|---|---|---|---|---|---|---|
| 1 | *Abudefduf bengalensis* (Bloch, 1787) | ✓ | | | | | ✓ | | ✓ |
| 2 | *Abudefduf lorenzi* Hensley & Allen, 1977 | ✓ | | | | | ✓ | | ✓ |
| 3 | *Abudefduf notatus* (Day, 1870) | ✓ | | | | | | | |
| 4 | *Abudefduf septemfasciatus* (Cuvier, 1830) | ✓ | | | | | ✓ | | |
| 5 | *Abudefduf sexfasciatus* (Lacepède, 1801) | ✓ | | | | | ✓ | ✓ | ✓ |
| 6 | *Abudefduf sordidus* (Forsskål, 1775) | ✓ | | | | | ✓ | | |
| 7 | *Abudefduf vaigiensis* (Quoy & Gaimard, 1825) | ✓ | | | | | ✓ | ✓ | ✓ |

| No. | Scientific Name | Tropical Pacific (Allen et al. 2003) | Northern Palawan (Allen et al. 2011) | Taytay, Palawan (Gonzales et al. 2014) | EL Nido, Palawan (Allen et al. 2015) | Busuanga Island, Palawan (Bernardi et al. 2017) | Western Sulu Sea (Balisco and Dolorosa 2019) | Tubbataha Reefs Natural Park (Unpublished data) | This Study |
|---|---|---|---|---|---|---|---|---|---|
| 8 | *Abudefduf whitleyi* Allen & Robertson, 1974 | ✓ | | | | | | | |
| 9 | *Acanthochromis polyacanthus* (Bleeker, 1855) | ✓ | | ✓ | | | ✓ | ✓ | ✓ |
| 10 | *Altrichthys curatus* Allen, 1999 | ✓ | | | | | | | |
| 11 | *Altrichthys alelia* Bernardi, Longo & Quiros, 2017 | | | | | ✓ | | | |
| 12 | *Altrichthys azurelineatus* (Fowler & Bean, 1928) | ✓ | | | | | | | |
| 13 | *Amblyglyphidodon aureus* (Cuvier, 1830) | ✓ | | ✓ | | | ✓ | ✓ | ✓ |
| 14 | *Amblyglyphidodon batunai* Allen, 1995 | ✓ | | | | | ✓ | | ✓ |
| 15 | *Amblyglyphidodon curacao* (Bloch, 1787) | ✓ | | ✓ | | | ✓ | ✓ | ✓ |
| 16 | *Amblyglyphidodon leucogaster* (Bleeker, 1847) | ✓ | | ✓ | | | ✓ | ✓ | ✓ |
| 17 | *Amblyglyphidodon orbicularis* (Hombron & Jacquinot, 1853) | ✓ | | | | | | | |
| 18 | *Amblyglyphidodon ternatensis* (Bleeker, 1853) | ✓ | | | | | ✓ | | |
| 19 | *Amblypomacentrus breviceps* (Schlegel & Müller, 1839) | ✓ | | | | | ✓ | ✓ | |
| 20 | ***Amblypomacentrus clarus* Allen & Adrim, 2000 | ✓ | | | | | | | ✓ |
| 21 | *Amphiprion akallopisos* Bleeker, 1853 | ✓ | | | | | | | |
| 22 | *Amphiprion akindynos* Allen, 1972 | ✓ | | | | | | ✓ | |
| 23 | *Amphiprion barberi* Allen, Drew & Kaufman, 2008 | ✓ | | | | | | | |
| 24 | *Amphiprion Chrysopterus* Cuvier, 1830 | ✓ | | | | | | ✓ | |
| 25 | *Amphiprion clarkii* (Bennett, 1830) | ✓ | | ✓ | | | ✓ | ✓ | ✓ |
| 26 | *Amphiprion ephippium* (Bloch, 1790) | ✓ | | | | | | | |
| 27 | *Amphiprion frenatus* Brevoort, 1856 | ✓ | | | | | ✓ | ✓ | ✓ |
| 28 | *Amphiprion latezonatus* Waite, 1900 | ✓ | | | | | | | |
| 29 | *Amphiprion leucokranos* Allen, 1973 | ✓ | | | | | | | |
| 30 | *Amphiprion mccullochi* Whitley, 1929 | ✓ | | | | | | | |
| 31 | *Amphiprion melanopus* Bleeker, 1852 | ✓ | | | | | ✓ | ✓ | |
| 32 | *Amphiprion ocellaris* Cuvier, 1830 | ✓ | | | | | ✓ | ✓ | ✓ |
| 33 | *Amphiprion pacificus* Allen, Drew & Fenner, 2010 | ✓ | | | | | | | |
| 34 | *Amphiprion percula* (Lacepède, 1802) | ✓ | | | | | | | |
| 35 | *Amphiprion perideraion* Bleeker, 1855 | ✓ | | | | | ✓ | ✓ | ✓ |
| 36 | *Amphiprion polymnus* (Linnaeus, 1758) | ✓ | | | | | ✓ | | ✓ |

| No. | Scientific Name | Tropical Pacific (Allen et al. 2003) | Northern Palawan (Allen et al. 2011) | Taytay, Palawan (Gonzales et al. 2014) | EL Nido, Palawan (Allen et al. 2015) | Busuanga Island, Palawan (Bernardi et al. 2017) | Western Sulu Sea (Balisco and Dolorosa 2019) | Tubbataha Reefs Natural Park (Unpublished data) | This Study |
|---|---|---|---|---|---|---|---|---|---|
| 37 | *Amphiprion rubrocinctus* Richardson, 1842 | ✓ | | | | | | | |
| 38 | *Amphiprion sandaracinos* Allen, 1972 | ✓ | | | | | ✓ | | ✓ |
| 39 | *Amphiprion sebae* Bleeker, 1853 | ✓ | | | | | | ✓ | |
| 40 | *Cheiloprion labiatus* (Day, 1877) | ✓ | | | | | ✓ | | |
| 41 | *Chromis acares* Randall & Swerdloff, 1973 | ✓ | | | | | | ✓ | |
| 42 | *Chromis agilis* Smith, 1960 | ✓ | | | | | | ✓ | |
| 43 | *Chromis albicanda* | ✓ | | | | | | | |
| 44 | *Chromis albomaculata* Kamohara, 1960 | ✓ | | | | | | | |
| 45 | *Chromis alleni* Randall, Ida & Moyer, 1981 | ✓ | | | | | | | |
| 46 | *Chromis alpha* Randall, 1988 | ✓ | | | | | | | |
| 47 | *Chromis amboinensis* (Bleeker, 1871) | ✓ | | | | | ✓ | ✓ | |
| 48 | *Chromis analis* (Cuvier, 1830) | ✓ | | | | | ✓ | ✓ | |
| 49 | *Chromis atripectoralis* Welander & Schultz, 1951 | ✓ | | | | | ✓ | ✓ | ✓ |
| 50 | *Chromis atripes* Fowler & Bean, 1928 | ✓ | | | | | ✓ | ✓ | |
| 51 | *Chromis caudalis* Randall, 1988 | ✓ | | | | | ✓ | ✓ | |
| 52 | *Chromis chrysura* (Bliss, 1883) | ✓ | | | | | | ✓ | |
| 53 | *Chromis cinerascens* (Cuvier, 1830) | ✓ | | | | | | | |
| 54 | *Chromis delta* Randall, 1988 | ✓ | | | | | | ✓ | |
| 55 | *Chromis dimidiate* (Klunzinger, 1871) | ✓ | | | | | | | |
| 56 | *Chromis elerae* Fowler & Bean, 1928 | ✓ | | | | | ✓ | ✓ | |
| 57 | *Chromis flavipectoralis* Randall, 1988 | ✓ | | | | | | ✓ | |
| 58 | *Chromis flavomaculata* Kamohara, 1960 | ✓ | | | | | ✓ | | |
| 59 | *Chromis fumea* (Tanaka, 1917) | ✓ | | | | | | ✓ | |
| 60 | *Chromis iomelas* Jordan & Seale, 1906 | ✓ | | | | | | ✓ | |
| 61 | *Chromis lepidolepis* Bleeker, 1877 | ✓ | | | | | ✓ | ✓ | |
| 62 | *Chromis leucura* Gilbert, 1905 | ✓ | | | | | | ✓ | |
| 63 | *Chromis lineata* Fowler & Bean, 1928 | ✓ | | | | | | ✓ | |
| 64 | *Chromis margaritifer* Fowler, 1946 | ✓ | | | | | ✓ | ✓ | |
| 65 | *Chromis nitida* (Whitley, 1928) | ✓ | | | | | | ✓ | |

| No. | Scientific Name | Tropical Pacific (Allen et al. 2003) | Northern Palawan (Allen et al. 2011) | Taytay, Palawan (Gonzales et al. 2014) | EL Nido, Palawan (Allen et al. 2015) | Busuanga Island, Palawan (Bernardi et al. 2017) | Western Sulu Sea (Balisco and Dolorosa 2019) | Tubbataha Reefs Natural Park (Unpublished data) | This Study |
|---|---|---|---|---|---|---|---|---|---|
| 66 | *Chromis notata* (Temminck & Schlegel, 1843) | ✓ | | | | | | ✓ | |
| 67 | *Chromis opercularis* (Günther, 1867) | ✓ | | | | | ✓ | ✓ | |
| 68 | *Chromis ovatiformes* Fowler, 1946 | ✓ | | | | | | ✓ | |
| 69 | *Chromis retrofasciata* Weber, 1913 | ✓ | | | | | ✓ | ✓ | ✓ |
| 70 | *Chromis scotochiloptera* Fowler, 1918 | ✓ | | | | | | ✓ | |
| 71 | *Chromis ternatensis* (Bleeker, 1856) | ✓ | | | | | ✓ | ✓ | ✓ |
| 72 | *Chromis vanderbilti* (Fowler, 1941) | ✓ | | | | | | ✓ | |
| 73 | *Chromis viridis* (Cuvier, 1830) | ✓ | | ✓ | | | ✓ | ✓ | ✓ |
| 74 | *Chromis weberi* Fowler & Bean, 1928 | ✓ | | | | | ✓ | ✓ | ✓ |
| 75 | *Chromis westaustralis* Allen, 1976 | ✓ | | | | | | | |
| 76 | *Chromis xanthochira* (Bleeker, 1851) | ✓ | | | | | ✓ | ✓ | |
| 77 | *Chromis xanthura* (Bleeker, 1854) | ✓ | | | | | ✓ | ✓ | ✓ |
| 78 | *Chrysiptera arnazae* Allen, Erdmann & Barber, 2010 | ✓ | | | | | | | |
| 79 | *Chrysiptera biocellata* (Quoy & Gaimard, 1825) | ✓ | | | | | ✓ | ✓ | |
| 80 | *Chrysiptera bleekeri* (Fowler & Bean, 1928) | ✓ | | | | | | | |
| 81 | *Chrysiptera brownriggii* (Bennett, 1828) | ✓ | | | | | ✓ | | |
| 82 | *Chrysiptera caeruleolineata (*Allen, 1973) | ✓ | | | | | | | |
| 83 | *Chrysiptera chrysocephala* Manica, Pilcher & Oakley, 2002 | | | | ✓ | | | | |
| 84 | *Chrysiptera cyanea* (Quoy & Gaimard, 1825) | ✓ | | ✓ | | | ✓ | ✓ | |
| 85 | *Chrysiptera cymatilis* Allen, 1999 | ✓ | | | | | | | |
| 86 | *Chrysiptera flavipinnis (*Allen & Robertson, 1974) | ✓ | | | | | | | |
| 87 | *Chrysiptera glauca* (Cuvier, 1830) | ✓ | | | | | | ✓ | |
| 88 | *Chrysiptera hemicyanea* (Weber, 1913) | ✓ | | | | | | | |
| 89 | *Chrysiptera kuiteri* Allen & Rajasuriya, 1995 | ✓ | | | | | | | |
| 90 | *Chrysiptera oxycephala* (Fowler, 1918) | ✓ | | | | | ✓ | ✓ | ✓ |
| 91 | *Chrysiptera parasema* (Bleeker, 1877) | ✓ | | ✓ | | | ✓ | ✓ | ✓ |
| 92 | *Chrysiptera rex* (Snyder, 1909) | ✓ | | | | | ✓ | ✓ | ✓ |
| 93 | *Chrysiptera rollandi* (Whitley, 1961) | ✓ | | | | | ✓ | ✓ | ✓ |
| 94 | *Chrysiptera sinclairi* Allen, 1987 | ✓ | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|
| 95 | *Chrysiptera* sp. | ✓ | | | | | | | |
| 96 | *Chrysiptera springeri* (Allen & Lubbock, 1976) | ✓ | | | | | | ✓ | |
| 97 | *Chrysiptera starcki* (Allen, 1973) | ✓ | | | | | | | |
| 98 | *Chrysiptera talboti* (Allen, 1975) | ✓ | | | | | | ✓ | |
| 99 | *Chrysiptera taupou* (Jordan & Seale, 1906) | ✓ | | | | | | | |
| 100 | *Chrysiptera traceyi* (Woods & Schultz, 1960) | ✓ | | | | | | ✓ | |
| 101 | *Chrysiptera tricincta* (Allen & Randall, 1974) | ✓ | | ✓ | | | | | |
| 102 | *Chrysiptera unimaculata* (Cuvier, 1830) | ✓ | | | | | | ✓ | |
| 103 | *Dascyllus aruanus* (Linnaeus, 1758) | ✓ | | | | | ✓ | ✓ | ✓ |
| 104 | *Dascyllus auripinnis* Randall & Randall, 2001 | ✓ | | | | | | | |
| 105 | *Dascyllus carneus* Fischer, 1885 | ✓ | | | | | | ✓ | |
| 106 | *Dascyllus flavicaudus* Randall & Allen, 1977 | ✓ | | | | | | | |
| 107 | *Dascyllus melanurus* Bleeker, 1854 | ✓ | | | | | ✓ | | ✓ |
| 108 | *Dascyllus reticulatus* (Richardson, 1846) | ✓ | | ✓ | | | ✓ | ✓ | ✓ |
| 109 | *Dascyllus trimaculatus* (Rüppell, 1829) | ✓ | | ✓ | | | ✓ | ✓ | ✓ |
| 110 | *Dischistodus chrysopoecilus* (Schlegel & Müller, 1839) | ✓ | | | | | | ✓ | ✓ |
| 111 | ***Dischistodus darwiniensis* (Whitley, 1928)** | ✓ | | | | | | | ✓ |
| 112 | *Dischistodus fasciatus* (Cuvier, 1830) | ✓ | | | | | ✓ | | ✓ |
| 113 | *Dischistodus melanotus* (Bleeker, 1858) | ✓ | | ✓ | | | ✓ | ✓ | |
| 114 | *Dischistodus perspicillatus* (Cuvier, 1830) | ✓ | | ✓ | | | ✓ | | ✓ |
| 115 | *Dischistodus pseudochrysopoecilus* (Allen & Robertson, 1974) | ✓ | | | | | | | |
| 116 | *Dischistodus prosopotaenia* (Bleeker, 1852) | ✓ | | | | | ✓ | | ✓ |
| 117 | *Hemiglyphidodon plagiometopon* (Bleeker, 1852) | ✓ | | ✓ | | | ✓ | | ✓ |
| 118 | *Lepidozygus tapeinosoma* (Bleeker, 1856) | ✓ | | | | | | | |
| 119 | *Neoglyphidodon bonang* (Bleeker, 1852) | ✓ | | | | | ✓ | | |
| 120 | *Neoglyphidodon carlsoni* (Allen, 1975) | ✓ | | | | | | | |
| 121 | *Neoglyphidodon crossi* Allen, 1991 | ✓ | | | | | ✓ | ✓ | |
| 122 | *Neoglyphidodon melas* (Cuvier, 1830) | ✓ | | ✓ | | | ✓ | ✓ | ✓ |
| 123 | *Neoglyphidodon mitratus* Allen & Erdmann, 2012 | ✓ | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|
| 124 | *Neoglyphidodon nigroris* (Cuvier, 1830) | ✓ | | ✓ | | | ✓ | ✓ | ✓ |
| 125 | *Neoglyphidodon oxyodon* (Bleeker, 1858) | ✓ | | | | | ✓ | ✓ | ✓ |
| 126 | *Neoglyphidodon polyacanthus* (Ogilby, 1889) | ✓ | | | | | | | |
| 127 | *Neoglyphidodon thoracotaeniatus* (Fowler & Bean, 1928) | ✓ | | | | | ✓ | ✓ | |
| 128 | *Neopomacentrus anabatoides* (Bleeker, 1847) | | | | | | | ✓ | |
| 129 | *Neopomacentrus aquadulcis* Jenkins & Allen, 2002 | ✓ | | | | | | | |
| 130 | *Neopomacentrus azysron* (Bleeker, 1877) | ✓ | | | | | | ✓ | |
| 131 | *Neopomacentrus bankiere* (Richardson, 1846) | ✓ | | | | | | | |
| 132 | *Neopomacentrus cyanomos* (Bleeker, 1856) | ✓ | | | | | | ✓ | |
| 133 | *Neopomacentrus filamentosus* (MacLeay, 1882) | ✓ | | | | | ✓ | ✓ | ✓ |
| 134 | *Neopomacentrus nemurus* (Bleeker, 1857) | ✓ | | | | | | ✓ | |
| 135 | *Neopomacentrus taeniurus* (Bleeker, 1856) | ✓ | | | | | | | |
| 136 | *Neopomacentrus violascens* (Bleeker, 1848) | ✓ | | | | | | ✓ | |
| 137 | *Plectroglyphidodon dickii* (Liénard, 1839) | ✓ | | | | | ✓ | ✓ | |
| 138 | *Plectroglyphidodon imparipennis* (Vaillant & Sauvage, 1875) | ✓ | | | | | | | |
| 139 | *Plectroglyphidodon johnstonianus* Fowler & Ball, 1924 | ✓ | | ✓ | | | | ✓ | |
| 140 | *Plectroglyphidodon lacrymatus* (Quoy & Gaimard, 1825) | ✓ | | ✓ | | | ✓ | ✓ | ✓ |
| 141 | *Plectroglyphidodon leucozonus* (Bleeker, 1859) | ✓ | | | | | | ✓ | |
| 142 | *Plectroglyphidodon phoenixensis* (Schultz, 1943) | ✓ | | | | | | ✓ | |
| 143 | *Pomacentrus adelus* Allen, 1991 | ✓ | | | | | ✓ | | ✓ |
| 144 | *Pomacentrus albimaculus* Allen, 1975 | ✓ | | | | | | | |
| 145 | *Pomacentrus alexanderae* Evermann & Seale, 1907 | ✓ | | ✓ | | | ✓ | ✓ | ✓ |
| 146 | *Pomacentrus alleni* Burgess, 1981 | ✓ | | | | | | | |
| 147 | *Pomacentrus amboinensis* Bleeker, 1868 | ✓ | | ✓ | | | ✓ | ✓ | ✓ |
| 148 | *Pomacentrus armillatus* Allen, 1993 | ✓ | | | | | ✓ | ✓ | ✓ |
| 149 | *Pomacentrus auriventris* Allen, 1991 | ✓ | | | | | | ✓ | ✓ |
| 150 | ***Pomacentrus aurifrons* Allen, 2004** | ✓ | | | | | | | ✓ |
| 151 | *Pomacentrus australis* Allen & Robertson, 1974 | ✓ | | | | | | | |
| 152 | *Pomacentrus azuremaculatus* Allen, 1991 | ✓ | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|
| 153 | *Pomacentrus bankanensis* Bleeker, 1854 | ✓ | | | | | ✓ | ✓ | ✓ |
| 154 | *Pomacentrus brachialis* Cuvier, 1830 | ✓ | | | | | ✓ | ✓ | ✓ |
| 155 | *Pomacentrus burroughi* Fowler, 1918 | ✓ | | | | | ✓ | ✓ | ✓ |
| 156 | *Pomacentrus caeruleus* Quoy & Gaimard, 1825 | | | | | | | ✓ | |
| 157 | *Pomacentrus cheraphilus* Allen, Erdmann & Hilomen, 2011 | | ✓ | | | | | | |
| 158 | *Pomacentrus chrysurus* Cuvier, 1830 | ✓ | | ✓ | | | ✓ | ✓ | ✓ |
| 159 | *Pomacentrus coelestis* Jordan & Starks, 1901 | ✓ | | | | | ✓ | ✓ | ✓ |
| 160 | *Pomacentrus colini* Allen, 1991 | ✓ | | | | | | | |
| 161 | *Pomacentrus cuneatus* Allen, 1991 | ✓ | | | | | | | |
| 162 | *Pomacentrus geminospilus* Allen, 1993 | ✓ | | | | | ✓ | | ✓ |
| 163 | *Pomacentrus grammorhynchus* Fowler, 1918 | ✓ | | | | | | ✓ | ✓ |
| 164 | *Pomacentrus imitator* (Whitley, 1964) | ✓ | | | | | | | |
| 165 | *Pomacentrus indicus* Allen, 1991 | | | | | | | ✓ | |
| 166 | *Pomacentrus javanicus* Allen, 1991 | ✓ | | | | | | | |
| 167 | *Pomacentrus komodoensis* Allen, 1999 | ✓ | | | | | | | |
| 168 | *Pomacentrus lepidogenys* Fowler & Bean, 1928 | ✓ | | | | | ✓ | ✓ | ✓ |
| 169 | *Pomacentrus limosus* Allen, 1992 | ✓ | | | | | | | |
| 170 | *Pomacentrus littoralis* Cuvier, 1830 | ✓ | | | | | ✓ | | |
| 171 | *Pomacentrus melanochir* Bleeker, 1877 | ✓ | | | | | | | |
| 172 | *Pomacentrus microspilus* Allen & Randall, 2005 | ✓ | | | | | | | |
| 173 | *Pomacentrus milleri* Taylor, 1964 | ✓ | | | | | | | |
| 174 | *Pomacentrus moluccensis* Bleeker, 1853 | ✓ | | ✓ | | | ✓ | ✓ | ✓ |
| 175 | *Pomacentrus nagasakiensis* Tanaka, 1917 | ✓ | | ✓ | | | | ✓ | |
| 176 | *Pomacentrus nigromanus* Weber, 1913 | | | | | | | ✓ | |
| 177 | *Pomacentrus nigromarginatus* Allen, 1973 | ✓ | | | | | | ✓ | |
| 178 | *Pomacentrus opisthostigma* Fowler, 1918 | ✓ | | | | | ✓ | | |
| 179 | *Pomacentrus pavo* (Bloch, 1787) | ✓ | | | | | | | |
| 180 | *Pomacentrus philippinus* Evermann & Seale, 1907 | ✓ | | | | | ✓ | ✓ | ✓ |
| 181 | *Pomacentrus polyspinus* Allen, 1991 | ✓ | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|
| 182 | *Pomacentrus proteus* Allen, 1991 | ✓ | | | | | ✓ | | |
| 183 | *Pomacentrus reidi* Fowler & Bean, 1928 | ✓ | | | | | | ✓ | |
| 184 | *Pomacentrus saksonoi* Allen, 1995 | ✓ | | | | | | | |
| 185 | *Pomacentrus similis* Allen, 1991 | ✓ | | | | | | ✓ | |
| 186 | *Pomacentrus simsiang* Bleeker, 1856 | ✓ | | | | | ✓ | ✓ | |
| 187 | *Pomacentrus smithi* Fowler & Bean, 1928 | ✓ | | | | | ✓ | ✓ | |
| 188 | *Pomacentrus* sp. | ✓ | | ✓ | | | | | |
| 189 | *Pomacentrus spilotoceps* Randall, 2002 | ✓ | | | | | | | |
| 190 | *Pomacentrus stigma* Fowler & Bean, 1928 | ✓ | | | | | ✓ | ✓ | ✓ |
| 191 | *Pomacentrus taeniometopon* Bleeker, 1852 | ✓ | | | | | | | |
| 192 | *Pomacentrus tripunctatus* Cuvier, 1830 | ✓ | | | | | ✓ | ✓ | ✓ |
| 193 | *Pomacentrus vaiuli* Jordan & Seale, 1906 | ✓ | | | | | ✓ | ✓ | |
| 194 | *Pomacentrus wardi* Whitley, 1927 | ✓ | | | | | | ✓ | |
| 195 | *Pomacentrus yoshii* Allen & Randall, 2004 | ✓ | | | | | | | |
| 196 | *Pomachromis guamensis* Allen & Larson, 1975 | ✓ | | | | | | | |
| 197 | *Pomachromis richardsoni* (Snyder, 1909) | ✓ | | ✓ | | | | ✓ | |
| 198 | *Premnas biaculeatus* (Bloch, 1790) | ✓ | | | | | ✓ | | ✓ |
| 199 | *Stegastes albifasciatus* (Schlegel & Müller, 1839) | ✓ | | | | | | | |
| 200 | *Stegastes altus* (Okada & Ikeda, 1937) | ✓ | | | | | | ✓ | |
| 201 | *Stegastes apicalis* (De Vis, 1885) | ✓ | | | | | | | |
| 202 | *Stegastes aureus* (Fowler, 1927) | ✓ | | | | | ✓ | ✓ | |
| 203 | *Stegastes fasciolatus* (Ogilby, 1889) | ✓ | | | | | | | |
| 204 | *Stegastes gascoynei* (Whitley, 1964) | ✓ | | | | | | | |
| 205 | *Stegastes lividus* (Forster, 1801) | | | ✓ | | | ✓ | ✓ | |
| 206 | *Stegastes nigricans* (Lacepède, 1802) | ✓ | | | | | ✓ | | |
| 207 | *Stegastes obreptus* (Whitley, 1948) | ✓ | | | | | | | |
| 208 | *Stegastes punctatus* (Quoy & Gaimard, 1825) | ✓ | | | | | | | |
| | **Total** | **200** | **1** | **26** | **1** | **1** | **87** | **106** | **60** |

## DISCUSSION

The observed variation in species richness across study sites could have been influenced by the health of the reef, level of protection, and sampling effort. Coral-obligate damselfishes tend to occupy larger coral colonies rather than a smaller one (Nadler et al. 2014). There is also a direct relation between the density of chaetodontid fishes and the diversity of the coral community (Bouchon-Navaro and Bouchon 1989). While we have no record of coral diversity and sizes of colonies in Puerco Island, it is assumed that effective fishing closure favored uninterrupted growth especially of branching *Acropora*, the usual habitats of damselfishes. No take MPAs are known to promote higher coral cover, greater fish biomass (Strain et al. 2019) and stabilized species diversity (Pettersen et al. 2022). The station in Binduyan has the second highest number of damselfishes, is situated right in front of the WPU-Binduyan Marine Research Station, an open-access area for the locals engaging in artisanal fishing while also serving as aquaculture demonstration site for abalone. This is also the site with the highest dive effort and photo-video-documentation activities. Other sampling sites, although part of MPAs (e.g. Hart Reef, Black Rock and Rasa Island), remained susceptible to fishing due to inadequate patrol mechanisms. The use of explosives and drive nets can either cause a decline or increase in abundance of reef associated (Russ and Alcala 1989), while local fishing pressures and hard coral cover have direct influence on the abundance of different fish trophic levels (Elston et al. 2020). Other factors that affect species distribution and abundance include depths and wave exposure (Depczynski and Bellwood 2005; Medeiros et al. 2010; De Chaves et al. 2021).

The current number of damselfish species in Palawan (140 species) is higher than in other biogeographic regions in the country: Celebes Sea (83), Northern Philippine Sea (85), West Philippine Sea (79), Southern Philippine Sea (64), Sulu Sea (87) and Visayan Region (72) species, respectively (see Nañola et al. 2011). In addition, the current number in Palawan is higher than what has been reported (118 species) for the Philippines a few decades ago (see Sin et al. 1994).

Of the 60 species documented in Palawan, three are potential new records. A*mblypomacentrus clarus* are known to occur in the reefs of Cambodia, Indonesia and the Philippines at 15-25 m deep (Allen and Erdmann 2012), hence, its occurrence in Palawan is highly possible. The species occurred in intertidal sandy-rubble flat with patches of seagrass, suggesting an expanded depth range for the species. The second species, *D. darwininensis* are known to occur in silty inshore and coral reefs in northern Australia (Hoese et al. 2006). In Palawan, the species are found in a shallow sandy-rubble substrate with patches of seagrass. Its possible occurrence in the reefs of Palawan reflects a wide geographic range for the species. The third species, *P. aurifrons,* are common at 2-14 m deep coastal and offshore reefs in Western Central Pacific particularly in New Caledonia, Papua New Guinea, Solomon Islands and Vanuatu (Allen 2004). Considering the limited and blurry photos that we have for each species, there is a need for further documentation and capture of specimens to ascertain the identity of the species.

The continued discovery of new damselfish species (Pyle et al. 2008, Randall and DiBattista 2013, Habib et al. 2020, McFarland et al. 2020, Allen et al. 2022), and reports on expanded distribution range (Bourjon et al. 2019, Bennett et al. 2019, Islam and Habib 2020, Sen et al. 2021) suggest that more species remained to be documented. Continued photo-video documentation could help increase in understanding species diversity and discovery of new species.

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## ETHICAL CONSIDERATIONS

No animals were captured in this study.

## DECLARATION OF COMPETING INTEREST

The authors declare that there is no competing interests to any authors.

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