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NOTES ON GEOGRAPHIC DISTRIBUTION

A new record of *Pteragogus flagellifer* (Valenciennes, 1839), Cocktail Wrasse (Actinopterygii, Perciformes, Labridae), from Taiwan, northwestern Pacific Ocean

Yo Su[1], Yu-Chieh Hsu[2], Tzu-Yung Lin[1]

1 *Department and Graduate Institute of Aquaculture, National Kaohsiung University of Science and Technology No.142, Haijhuan Rd., Nanzih Dist., Kaohsiung 81157, Taiwan*
2 *Department of Biological Sciences, National Sun Yat-sen University, 70 Lienhai Rd. Gushan Dist. Kaohsiung 80424, Taiwan*

Corresponding author: *Tzu-Yung Lin (plextorx0428@nkust.edu.tw)*

Abstract. *Pteragogus flagellifer* (Valenciennes, 1839), Cocktail Wrasse, is recorded from Taiwan based on a single specimen. Although this species has previously been recorded in Taiwanese literature, we found all the previous records to be based on misidentifications. Therefore, our specimen represents the first reliable record from Taiwan and fills the distribution gap of this species between the Philippines and Japan. A checklist of *Pteragogus* Peters, 1855 recorded from Taiwan is provided and discussed. A key to species of *Pteragogus* from the northwestern Pacific Ocean is also provided.

Key words. Biodiversity, biogeography, checklist, ichthyology, identification key, morphology

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INTRODUCTION

The labrid genus *Pteragogus* Peters, 1855 (Actinopterygii, Perciformes, Labridae) is characterized by having: dorsal-fin spines IX–XI; anal-fin rays II I, 9; branched caudal-fin rays 10–11; lateral line continuous, uninterrupted; corner of moth without canine teeth; posterior margin of preopercle serrated; and cheek scaley (Westneat 2001; Iino and Motomura 2022a). Currently, 11 species are recognized as valid and distributed in the Indo-Pacific Ocean (Randall 2013; Randall and Victor 2022; Iino and Motomura 2022a), of which four species have been recorded from Taiwan: *P. aurigarius* (Richardson, 1845), *P. cryptus* Randall, 1981, *P. enneacanthus* (Bleeker, 1853), and *P. flagellifer* (Valenciennes, 1839) (Randall 1981; Shen 1984, 1993; Shen and Wu 2011; Koeda 2019; Iino and Motomura 2021). However, the figures of *P. flagellifer* depicted by Shen (1993) are not *P. flagellifer* (see Discussion), and the population of *P. cryptus* from the Pacific and eastern Indian Oceans was described as a new species, *P. turdus* Iino & Motomura, 2022 (Iino and Motomura 2022a).

Recently, a specimen belonging to the wrasse genus *Pteragogus* collected by local fisherman from southern Taiwan was purchased via aquarium trade. It is identified as *P. flagellifer* based on its unique coloration and several characteristics. The specimen represents the first confirmed record from Taiwan and fills the distribution gap of this species between the Philippines and Japan. A detailed description and a fresh photograph of the specimen are provided and compared to data of other specimens. A revised list of *Pteragogus* from Taiwan and a key to *Pteragogus* found in northwestern Pacific Ocean are provided.

METHODS

The specimen was fixed in 4% formaldehyde and transferred to 70% ethanol for long-term preservation, and deposited at the Pisces Collection, National Museum of Marine Biology and Aquarium, Pingtung, Taiwan (NMMB-P)

Counts and measurements follow Hubbs and Lagler (1947) and Iino and Motomura (2021). Data taken from bilateral characters were counted on both sides and expressed as left/right whenever available. Measurements were made using digital calipers to the nearest 0.1 mm. Morphometric data were expressed as percentages or ratios of standard length (SL) and/or head length (HL), except where otherwise indicated. The distribution map was generated from Ocean Data View (Schlitzer 2025).

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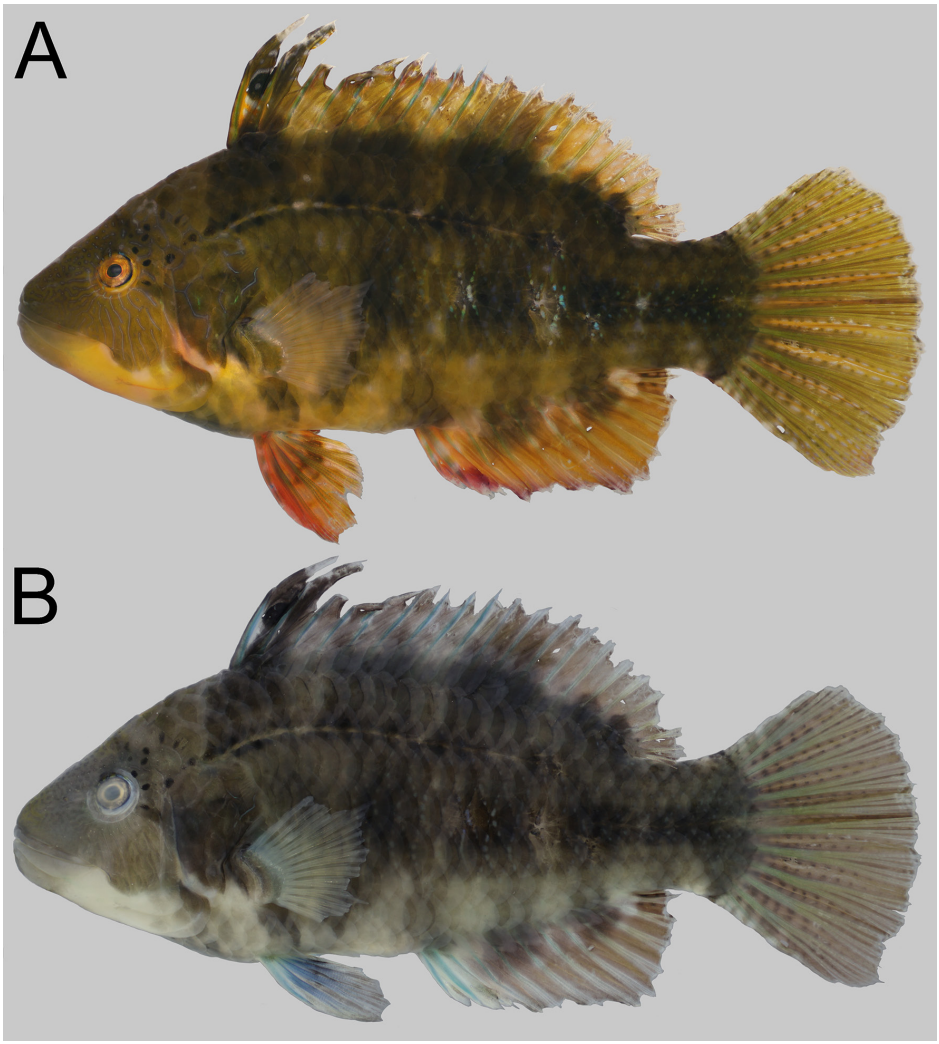

Figure 1. *Pteragogus flagellifer* (Valenciennes, 1839), NMMB-P 42263, 95.5 mm SL. **A.** Fresh condition. **B.** Preserved condition.

RESULTS

Family Labridae Cuvier, 1816
Genus *Pteragogus* Peters, 1855

***Pteragogus flagellifer* (Valenciennes, 1839)**
English name: Cocktail Wrasse
Chinese name: 絲鰭長鰭鸚鯛
Figure 1; Tables 1, 2

Ctenolabrus flagellifer Valenciennes in Cuvier and Valenciennes, 1839: 240 [original description. Type locality unknown. Holotype: MNHN A-7368].

Pteragogus flagellifer (Valenciennes, 1839) — Randall in Smith and Heemstra (1986: 701) [western Indian Ocean]; Randall et al. (1994: 233) [Arabian Gulf]; Randall (1995: 288) [Oman]; Carpenter et al. (1997: 199) [Kuwait]; Parenti and Randall (1998: 473) [Red Sea]; Allen et al. in Hoese et al. (2006:1410) [listed, Australia]; Allen and Erdmann (2012: 717) [East Indies]; Randall (2013: 39) [in key, western Indian Ocean]; Gloerfelt-Tarp and Kailola (2022: 245) [Indonesia]; Iino and Motomura (2022a: 213) [mentioned, compared to the new species described]; Iino and Motomura (2022b: 7) [first specimen-based record from Japan]; Randall and Victor in Heemstra et al. (2022: 247) [western Indian Ocean].

Pteragogus flagellifera (Valenciennes, 1839) — Allen and Swainston (1988: 118) [northwestern Australia]; Westneat in Carpenter and Niem (2001: 3403) [listed, western Central Pacific].

Cossyphus filamentosus Peters, 1855: 453 [original description. Type locality: Mozambique. Syntypes: ZMB 2472-73 and BMNH 1861.5.2.47].

Crenilabrus nematopterus Bleeker, 1851: 250 Banda Neira, Banda Islands, Indonesia

Duymaeria caeruleomaculata Günther, 1862: 122 [original description. Type locality: Aneiteum Island, Vanuatu. Holotype: BMNH 1860.7.18.19].

Duymaeria japonica Bleeker, 1856: 53 [original description. Type locality: Nagasaki, Japan].

Labrus ramentosus Forsskål, 1775: 34, xi [original description. Type locality: Mocha, Yemen, Red Sea. No types known]

New record. Taiwan–Pingtung • ca. 22°08′N, 120°41′E; 29 March 2025; Y.-C. Hsu leg., collected by local fisherman; 95.5 mm SL; 1♂; NMMB-P 42268.

Identification. Among the four species of *Pteragogus* in the northwestern Pacific Ocean, the present specimen is identified as *Pteragogus flagellifer* in having: dorsal-fin elements IX, 11 (vs. X in *P. turdus*); ocellated black spot on opercle absent (vs. present in *P. aurigarius* and *P. enneacanthus*); a distinct oblique white band from lower margin of eye to pectoral-fin base (vs. absent in *P. aurigarius* and *P. enneacanthus*); black spots on abdomen absent (vs. present in *P. aurigarius*); and several black spots present behind eye (vs. absent in *P. aurigarius* and *P. enneacanthus*; Randall 2013; Iino and Motomura 2022b).

Description of NMMB-P 42268. Meristic and morphometric data are provided in Tables 1 and 2. Paired-fin characters are presented as left/right.

Dorsal-fin rays IX, 11. Pectoral-fin rays 13/13. Pelvic-fin rays I, 5/ I, 5. Anal-fin rays III, 9. Gill rakers on outer face of first arch 4 + 9 = 13. Lateral-line scales 24/24; scale rows above lateral line 2/2; scale rows below lateral line 6/6.

Body oblong, body depth 2.5 in SL. Head moderately large, length 2.5 in SL; upper profile of head rounded and curved to dorsal-fin origin; eyes large, 3.5 in HL; interorbital space narrow and slightly convex, width 5.2 in HL; snout slightly pointed, length 3.5 in HL.

Mouth moderate, upper-jaw length 2.1 in HL; posterior end of maxilla reaching vertical through middle of eye. Two nostrils anterior to eye, with anterior nostril forming tube and posterior nostril forming pore; posterior nostril slightly larger and situated higher than anterior nostril; both nostrils above horizontal through middle of eye. Premaxilla with two large, recurved canine teeth anteriorly, followed by one row of small conical teeth; those teeth on posterior portion slightly enlarged. Dentary with one large, recurved canine tooth anteriorly, followed by one row of small, conical teeth.

Gill rakers on first arch short and laterally compressed; their size gradually becoming smaller from first to fourth arches. Gill filaments present on all four arches. No slit between fourth arch and fifth ceratobranchial.

Body scales cycloid, covering body, nape, opercle, subopercle, chest, and dorsal-, caudal-, and anal-fin bases. Lateral line single, its anterior portion slightly curved, with abrupt downturn below eighth dorsal-fin soft ray, and straight to caudal-fin base; lateral-line scales same size as adjacent scales, with their midline forming ridge.

Dorsal-fin origin above first lateral-line scale; its base 1.9 in SL; membrane of first-six spines distinctly elongated; all soft rays branched. Pectoral-fin origin below vertical through lower margin of eye. Pelvic-fin origin below lower end of pectoral-fin base; its length 5.2 in SL; its tip reaching anus when adpressed. Anal-fin origin below eighth dorsal-fin spine; its base 3.4 in SL; membrane between first-three spines elongated; all rays branched. Caudal fin rounded, with middle 5+5 rays branched. Caudal-peduncle stout, its length and depth 2.3 and 2.1 in HL, respectively.

Coloration: when fresh (Figure 1A), body yellow, with six dark-green vertical bars across body and extends onto both dorsal- and anal-fin bases. Head green, with white radial lines around eye; one distinct white oblique band running from lower margin of eye to pectoral-fin base; about nine black spots behind eye; lower jaw orange yellow. Dorsal fin yellow or green; one black spot and several white spots between first two spines. Pelvic fin yellow, becoming more orange anteriorly. Pectoral fin slightly orange. Anal-fin or-

Table 1. Meristic characters of *Pteragogus flagellifer* (Valenciennes, 1839). Data of other specimens were retrieved from Iino and Motomura (2022b). Paired characters are presented as left/right whenever available. Abbreviations: F, female; M, male.

	This study	Iino and Motomura 2022b		
	NMMB-P 42268	KAUM–I. 59434	CSIRO CA 4030	ROM 57127
Sex	M	F	M	M
Locality	Taiwan	Okinawa	Australia	Comores
Dorsal-fin rays	IX, 11	IX, 11	IX, 11	IX, 11
Pectoral-fin rays	13/13	13	13	13
Pelvic-fin rays	I, 5/I, 5	I, 5	I, 5	I, 5
Anal-fin rays	III, 9	III, 9	III, 9	III, 9
Principal caudal-fin rays	12	12	12	12
Gill rakers	4 + 9 = 13	4 + 7 = 11	4 + 6 = 10	4 + 8 = 12
Lateral-line scales	24/24	24	24	24
Scale rows above lateral line	2/2	2	2	2
Scale rows below lateral line	6/6	6	6	6

Table 2. Morphometric characters of *Pteragogus flagellifer* (Valenciennes, 1839). Data of other specimens were retrieved from Iino and Motomura (2022b). Abbreviations: A, anal-fin; AS, anal-fin spine; C, caudal-fin; D, dorsal-fin; DS, dorsal-fin spine; F, female; HL, head length; M, male; P, pectoral-fin; SL, standard length; V, pelvic-fin.

	This study	**Iino and Motomura 2022b**		
	NMMB-P 42286	**KAUM–I. 59434**	**CSIRO CA 4030**	**ROM 57127**
Sex	M	F	M	M
Locality	Taiwan	Okinawa	Australia	Comores
SL	95.5	35.0	70.9	83.2
% SL				
HL	37.6	37.1	38.1	40.1
Body depth	41.7	30.3	41.2	46.6
Body width	17.7	10.3	16.2	17.1
Predorsal length	36.7	37.7	38.4	40.3
Prepelvic length	38.1	37.4	37.5	40.9
Preanal length	60.1	58.0	56.8	61.9
Caudal-peduncle length	16.5	18.6	15.0	15.3
Caudal-peduncle depth	18.1	14.3	15.4	18.0
Snout length	13.1	12.3	13.4	15.0
Orbit diameter	7.9	10.0	9.7	9.0
Interorbital width	7.8	9.1	7.1	8.3
D base	59.0	52.0	65.0	61.8
1 DS	14.9	11.4	11.8	12.3
9 DS	N/A	16.9	19.0	16.5
Longest D soft ray	N/A	14.0	26.7	26.0
A base	29.8	24.6	33.1	32.5
1 AS	9.6	9.7	9.0	8.2
2 AS	N/A	16.6	14.8	13.5
3 AS	N/A	15.7	16.5	16.3
Longest A soft ray	N/A	17.4	26.9	28.0
P length	N/A	20.6	23.7	24.8
V spine	12.5	13.4	13.1	13.9
V soft ray	21.9	17.1	20.5	23.0
C length	N/A	24.6	39.9	42.9

ange, becoming red distally. Membranes between caudal-fin rays scattered with small black spots. Dorsal-, anal-, caudal-, and pelvic-fin rays blueish green, with soft rays slightly paler than spines.

When preserved (Figure 1B), coloration similar to fresh, with yellow and orange colors faded.

DISTRIBUTION

This species is known from scattered localities throughout the Indo-West Pacific, including South Africa, Madagascar, the Comoros, Aldabra, Seychelles, Mauritius, Lakshadweep, and India (Randall and Victor 2022); the Arabian Gulf (Randall et al. 1994); the Red Sea (Parenti and Randall 1998); Oman (Randall 1995); Indonesia (Gloerfelt-Tarp and Kailola 2022); Australia, from the Bonaparte Archipelago southward to the Monte Bello Islands, Western Australia, and along the Great Barrier Reef, Queensland, to New South Wales in eastern Australia (Allen and Swainston 1988; Allen et al. 2006; Bray 2025); New Caledonia, Vanuatu (Randall and Victor 2022), the Philippines (Iino and Motomura 2022b); and Japan (Yaku-shima and Okinawa-jima islands; Iino and Motomura 2022b). The present specimen fills the distributional gap between the Philippines and Japan.

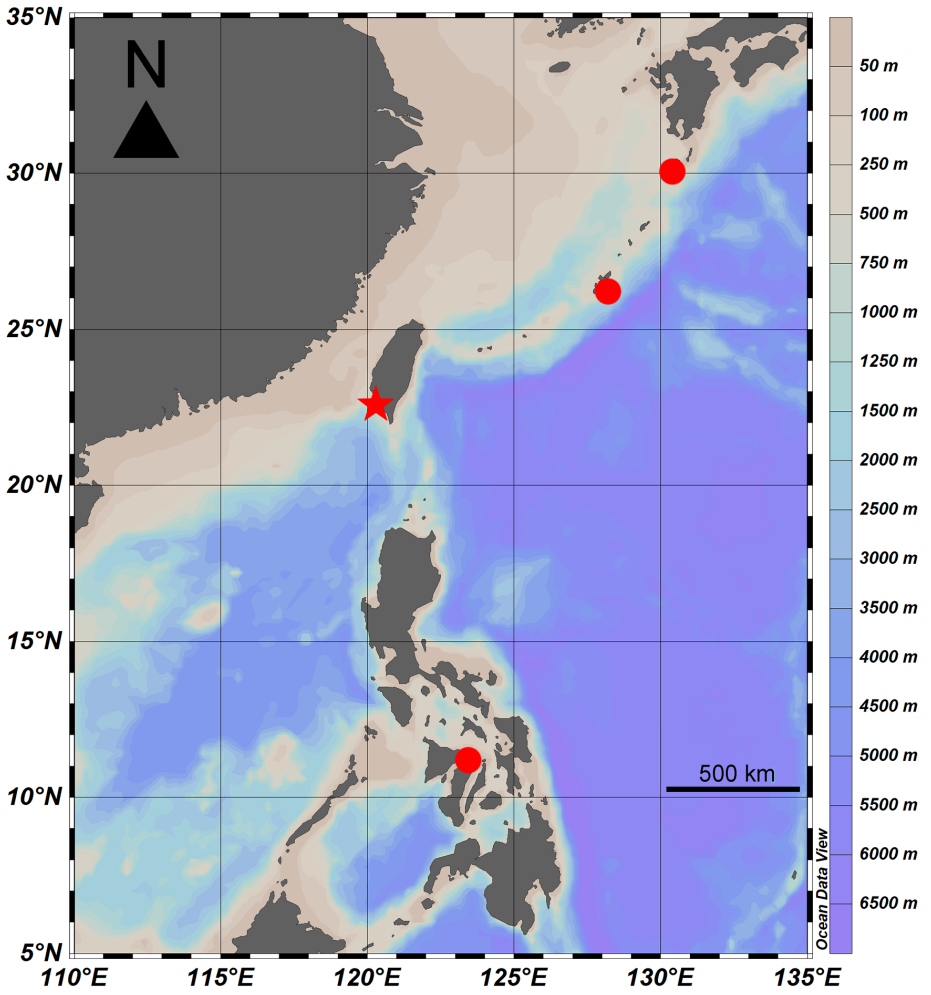

Figure 2. Previous records of *Pteragogus flagellifer* (Valenciennes, 1839) from northwestern Pacific Ocean. Star = present study; circle = previous records.

Checklist of species of *Pteragogus* recorded from Taiwan

Table 3 lists all species of *Pteragogus* recorded from Taiwan as well as those re-identified in this study. In total, four species have been recorded: *P. aurigarius*, *P. enneacanthus*, *P. flagellifer*, and *P. turdus* (Shen 1984, 1993; Shen and Wu 2011; Koeda 2019; Iino and Motomura 2021, 2022a; this study). Although Shen (1993) reported and depicted two specimens (one male and one female) of *P. flagellifer* from Taiwan, plates 157-9 and 157-10 are clearly not of *P. flagellifer*. Both specimens figured by Shen (1993) possess a distinct ocellus on the opercle (vs. absent in *P. flagellifer*), and no elongation on membranes between anal-fin spines and first soft ray. As a result, plates 157-9 and 157-10 are here re-identified as *P aurigarius* and *P. enneacanthus*, respectively. The sp. 1 and sp. 2 reported by Shen (1984) are herein re-identified as *P aurigarius*.

Table 3. Checklist of *Pteragogus* recorded from Taiwan.

Species	Chinese name	Reference	Remarks
Pteragogus aurigarius (Richardson, 1845)	長鰭鸚鯛	Shen (1984; 1993); Chen (2003); Koeda (2019)	Shen (1984) reported as spp. 1 and 2; Shen (1993) reported as *P. flagellifer*
P. enneacanthus (Bleeker, 1853)	九棘長鰭鸚鯛	Shen (1984; 1993); Chen et al. (2010); Shen and Wu (2011)	Shen (1984; 1993) depicted as *P. flagellifer*; Shen and Wu (2011) depicted as *P. aurigarius*
P. flagellifer (Valenciennes, 1839)	絲鰭長鰭鸚鯛	This study	
P. turdus Iino & Motomura, 2022	白紋長鰭鸚鯛	Randall (1981); Shen and Wu (2011); Iino and Motomura (2022)	Previously recorded as *P. cryptus* (Randall 1981; Shen and Wu 2011)

Key to species of *Pteragogus* in the northwestern Pacific Ocean

1a. Dorsal-fin spines X ..... *P. turdus*
1b. Dorsal-fin spines IX 2
2a. Black ocellated spot on opercle absent; anal-fin membranes between first and third spines elongated; distinct white band from lower margin of eye to pectoral-fin base ..... *P. flagellifer*
2b. Black ocellated spot on opercle present; anal-fin membranes between first and third spines not elongated; no white band from lower margin of eye to pectoral-fin base 3
3a. White stripes on body present; one single white band from snout to anterior margin of eye; abdomen without black spots ..... *P. enneacanthus*
3b. White stripes on body very faint and only present on abdomen; no white band from snout to anterior margin of eye; abdomen with black spots (more distinct in adults) ..... *P. aurigarius*

DISCUSSION

Compared to previous data (Iino and Motomura 2022b; Tables 1, 2), the meristic characters agree with other specimens collected from Japan, Australia, and Comoros; however, several differences were found in the morphometric characters. Our specimen possesses shorter orbit diameter (7.9% SL vs. 9.0–10.0% SL in Iino and Motomura, 2022b; Table 2), shorter predorsal length (36.7% SL vs. 37.7–40.3% SL), and shorter pelvic-fin spine (12.5% SL vs. 13.1–13.9% SL). Given the broad range of variation observed in other morphometric characters (e.g. body depth, dorsal-fin base length; Table 2), these differences are likely attributable to intraspecific variation. However, additional specimens are needed to confirm this interpretation (Iino and Motomura 2022b).

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ADDITIONAL INFORMATION

Conflict of interest

The authors declare that no competing interests exist.

Ethical statement

No ethical statement is reported.

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Author contributions

Conceptualization: YS, YCH. Formal analysis: YS. Funding acquisition: TYL. Investigation: YS, YCH. Project administration: TYL. Supervision: TYL. Visualization: YS, YCH. Writing – original draft: YS. Writing – review and editing: YCH, TYL.

Author ORCID iDs

Yo Su https://orcid.org/0000-0002-3576-9229
Yu-Chieh Hsu https://orcid.org/0009-0000-1905-4656
Tzu-Yung Lin https://orcid.org/0000-0002-9034-4397

Data availability

All data that support the findings of this study are available in the main text.

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