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Thryssocypris wongrati, a new anchovy-like cyprinid (Cypriniformes) from the Chao Phraya basin, Thailand

CHAIWUT GRUDPAN[1,2] & JARUNGJIT GRUDPAN[1,3]

[1]*Department of Fisheries, Faculty of Agriculture, Ubon Ratchathani University, Warin Chamrab, Ubonrachathani, Thailand 34190*
[2]*E-mail: chaiwut@agri.ubu.ac.th*
[3]*E-mail: jarungjit@agri.ubu.ac.th*

Abstract

Thryssocypris wongrati, a new species of cyprinid from the Chao Phraya basin, Thailand, is distinguished from all other species of *Thryssocypris* by having a combination of the origin of the dorsal fin behind the origin of the anal fin, 37–40 lateral-line scales, 16 circumpeduncular scales, and a dark spot at the base of the caudal fin. *Thryssocypris wongrati* occupies the lower part of the Chao Phraya basin where it has been recorded from irrigation canals in Sing-Buri up to the most northern part of the basin in the Nan River in Phitsanulok Province.

Key words: fish, teleost, new species

Introduction

Roberts and Kottelat (1984) described *Thryssocypris* as a new genus of anchovy-like cyprinid fishes with two new species, *T. smaragdinus* and *T. tonlesapensis*, from the Kapuas River, Kalimantan, Indonesia, and Tonle Sap Lake in the Mekong basin of Cambodia, respectively. Kottelat (1991) subsequently described *T. ornithostoma* from the Kapuas River, Kalimantan, Indonesia, and Rainboth (1996a) reported a larger distribution for *T. tonlesapensis*, noting that it is a Mekong endemic found from Tonle Sap to the Mekong delta.

Vidthayanon *et al.* (1997) reported *T. tonlesapensis* from the Chao Phraya basin in the central part of Thailand. Later, Kohanantakul *et al.* (2000) reported the species upstream of the Chao Phraya Dam in Chinat in the lower part of the Chao Phraya basin and noted differences between populations of *T. tonlesapensis* in the Chao Phraya from those in the Mekong. Most recently, Deein *et al.* (2006) reported *T. tonlesapensis* from the Nan River, a tributary of Chao Phraya, in Phitsanulok. Kohanantakul *et al.* (2000) noted differences between populations in the Chao Phraya and the Mekong. The Chao Phraya population can be distinguished from that in the Mekong by its larger scales and is described here as a new species.

Materials and methods

Our observations are based on preserved specimens of *Thryssocypris smaragdinus*, *T. tonlesapensis* and *T. wongrati* from the California Academy of Sciences (CAS), Kasetsart University Museum of Fisheries (KUMF), National Science Museum, Thailand (THNHM), Can Tho University (CTU), Inland Fisheries Research and Development Institute (IFREDI) and Ubon Ratchathani Natural History Museum of Fisheries (UNMF). Data on *T. ornithostoma* are from the original description by Kottelat (1991). All measurements were taken point to point with digital calipers, and data were recorded to the nearest 0.1 mm. Measurements and counts, made on the left side of individuals whenever possible, followed those of Roberts and Kottelat (1984). Measurements of parts of the head and fin lengths are presented as proportions of head length (HL). The head length and measurements of other parts of the body are given as percentages of standard length (SL). Fin rays were counted using a binocular dissecting microscope. Vertebrae were counted from radiographs. The Weberian complex and urostylar complex are included in the counts of total vertebrae.

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***Thryssocypris wongrati* sp. nov.**
(Figs. 1–3)

Holotype. CAS 234133, 50.1 mm SL, Bang Nok Kra-Yang Village, Sap-Phaya, Chai-Nat, Chao Phraya River, 15º08’22.88’’N, 100º08’47.32’’E, 01 November 2008, C. Grudpan *et al*.

Paratypes. CAS 234134, 46.4 mm SL, same data as holotype. MNHN 2012–0135, 45.2 mm SL, same data as holotype. KUMF 8793, 46.3 mm SL, Chao Phraya River mainstem in front of Chao Phraya Dam, Chainat, Thailand, 15º09’38.56’’N, 100º11’04.19’’E, 16 September 1997, C. Grudpan *et al*. KUMF 8794, 7, 42.7–42.8 mm SL, Chao Phraya River mainstem in front of Chao Phraya Dam, Chainat, Thailand, 15º09’38.56’’N, 10º11’04.19’’E, 16 September 1997, C. Grudpan *et al*. KUMF 8795, 3, 42.3–52.2 mm SL, mainstem of Chao Phraya River in front of Chao Phraya Dam, Chainat, Thailand, 7 July 1994, C. Grudpan *et al*. UNMF-P06995, 4, 39.0–46.8 mm SL, same data as holotype. UNMF-P 06996, 46.6 mm SL, Naresuan Dam, Promphiram, Phitsanulok, Nan River, 14º02’45’’N, 100º10’57.86’’E, 6 July 2009, G. Deein *et al*. RLIKU 1889, 48.6 mm SL, Pra-Sauk, In-Buri, Sing-Buri, Chao Phraya River, 15º0.3’43.3’’N, 100º18’30.1’’E, 12 September 2008, S. Arbsuwan *et al*. RLIKU 1890, 5, 28.6–37.4mm SL, Chan-Nasutra irrigation canal, along road number 3251, km. 27, Sra-Jaeng, Bang-Rachan, Sing-Buri, 14º54’15.2’’N, 100º13’24.3’’E, 12 September 2008, S. Arbsuwan *et al*.

Diagnosis. *Thryssocypris wongrati* differs from all other species of *Thryssocypris* by having the origin of the dorsal fin behind the origin of the anal fin, 37–40 lateral-line scales, 16 circumpeduncular scales, and a dark spot at the base of the caudal fin. It is distinguished from *T. smaragdinus* in having the origin of the dorsal fin behind (vs. over or in front of) the origin of the anal fin and 16 (vs. 15) circumpeduncular scales, and from *T. tonlesapensis* and *T. ornithosoma* in having 37–40 (vs. 42–46) lateral-line scales and 39–41 (vs. 43–45) vertebrae. It further differs from *T. ornithosoma* by having a dark spot at the base of the caudal fin.

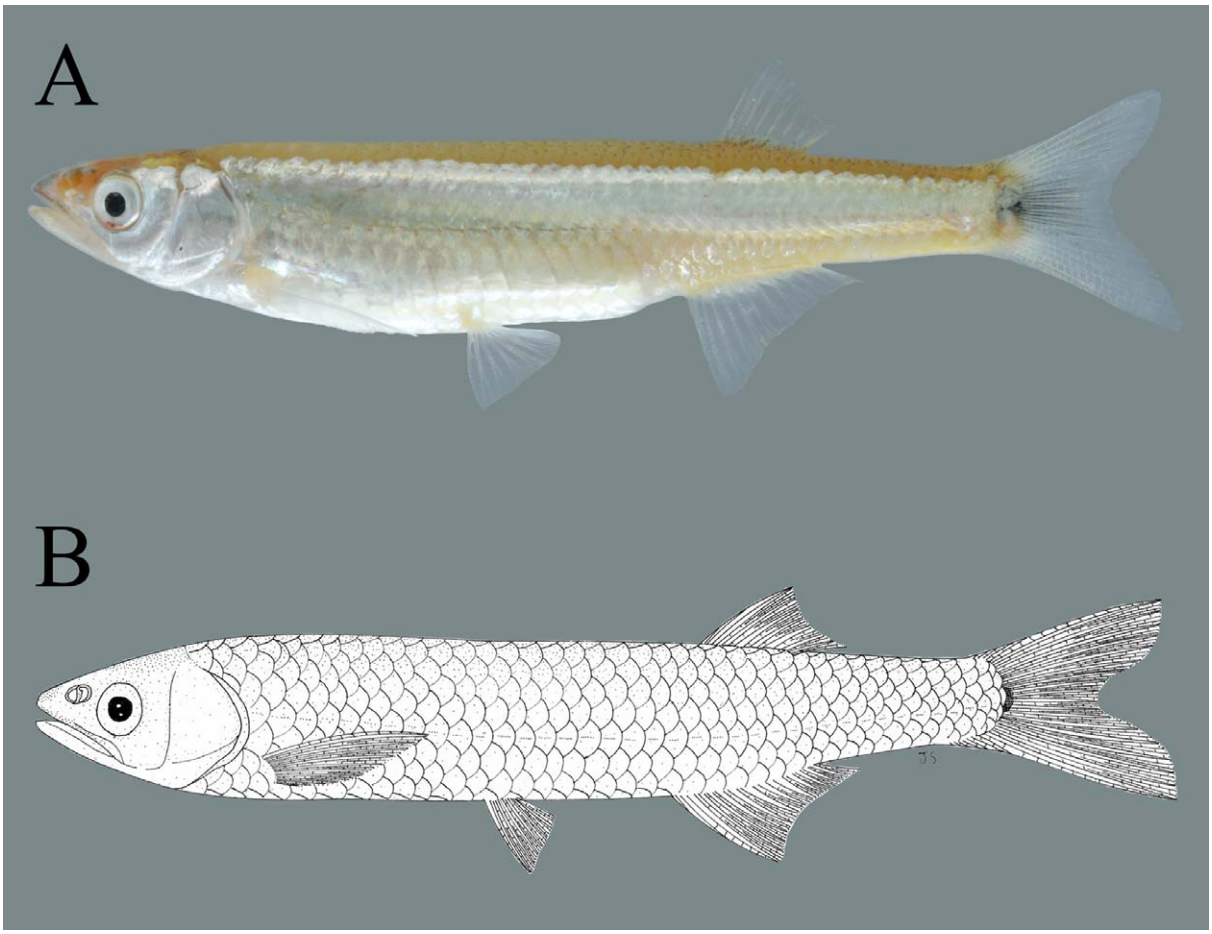

FIGURE 1. (A) *Thryssocypris wongrati* sp. nov. CAS 234133, holotype, 50.1 mm SL, Bang NokKra-Yang Village, Sap-Phaya, Chai-Nat, Chao Phraya River, 15º08’22.88’’N, 100º08’47.32’’E, 01 November 2008; (B) Illustration of paratype of *Thryssocypris wongrati* sp. nov., KUMF 8793, 1 (46.3 mm SL), Chao Phraya River mainstem in front of Chao Phraya Dam, Chainat, Thailand, 15º09’38.56’’N, 100º11’04.19’’E, 16 September 1997.

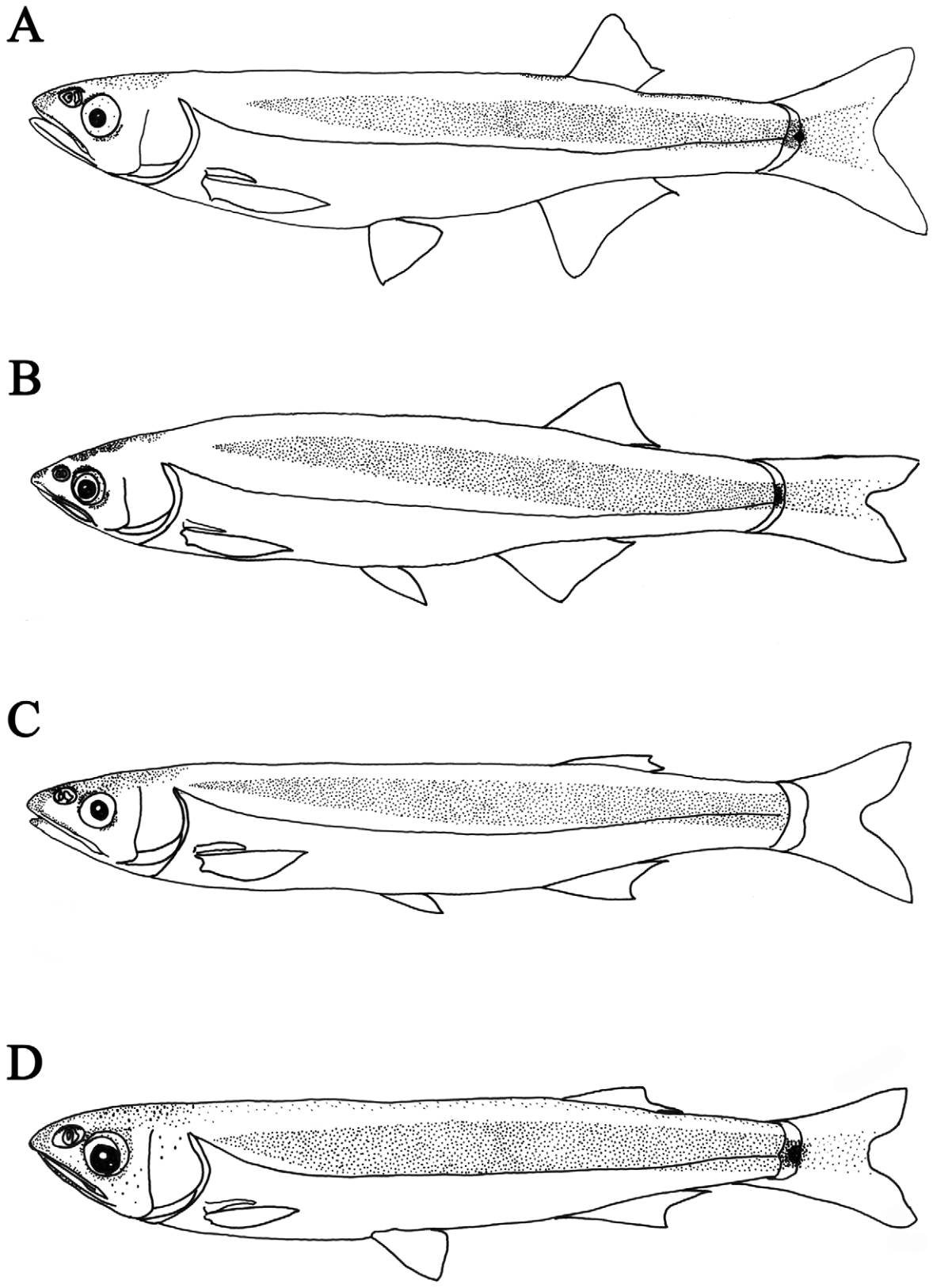

FIGURE 2. Body proportions and color pattern of species of *Thryssocypris*. (A) *T. wongrati*, CAS 234133, holotype, 50.1 mm SL; (B) *T. tonlesapensis*, CTU-P 24, 52.9 mm SL; (C) *T. ornithostoma*, modified from photograph in original description, ZSM/CMK 6842, 86.6 mm SL (Kottelat1991); (D) *T. smaragdinus*, CAS 49314, 46 mm SL.

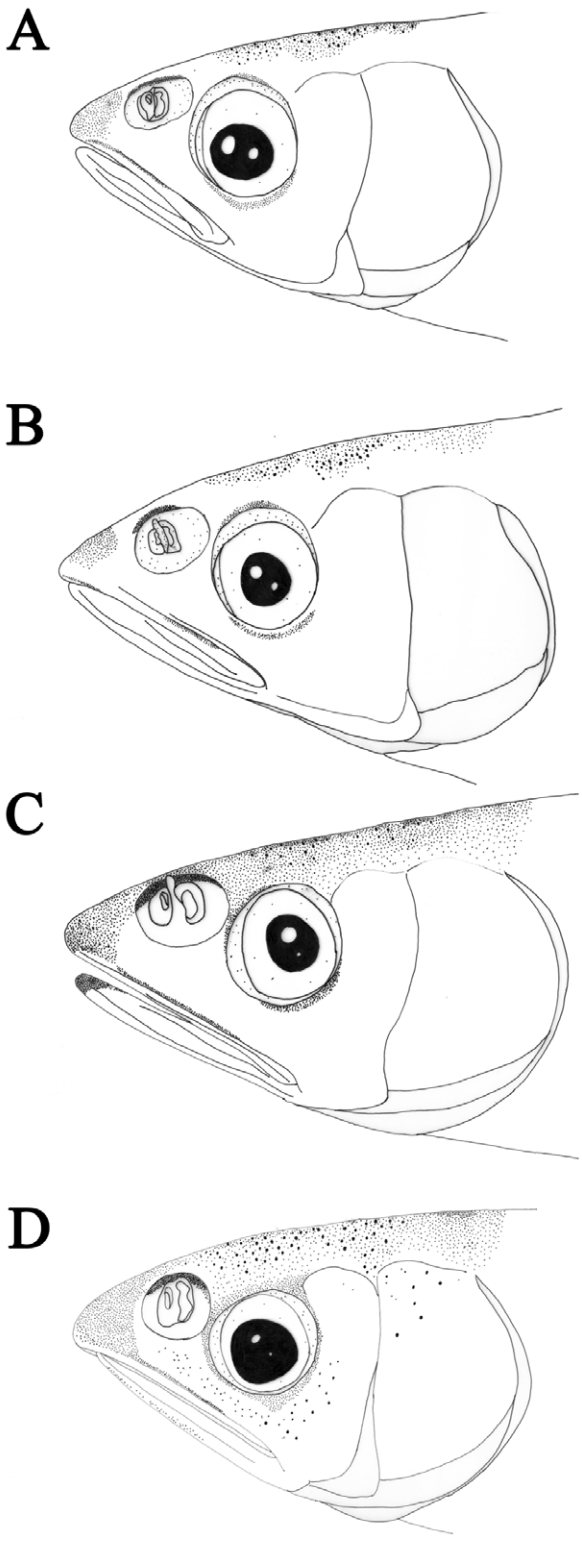

FIGURE 3. Lateral views of heads of *Thryssocypris* species. (A) *T. wongrati*, CAS 234133, holotype, 50.1mm SL; (B) *T. tonlesapensis*, CAS 50946, 52.2 mm SL; (C) *T. ornithostoma*, modified from photograph in original description, ZSM/CMK 6842, 86.6 mm SL (Kottelat 1991); (D) *T. smaragdinus* CAS 49314, 46 mm SL.

Description. Meristic and morphometric characters are given in Tables 1–4. Body elongate and compressed (Figs.1, 2). Head length 17.8–25.0% SL. Snout conical, length 25.4–34.5% HL (Table 4). Mouth terminal; maxilla extending well beyond anterior margin of eye (Fig. 3). Scales thin, deciduous; 37–40 lateral-line scales (Table 2), 23–25 predorsal scales, 16 circumpeduncular scales (Table 1). Dorsal-fin rays 9–10; anal-fin rays 14–16; pectoral-fin rays 11–12; pelvic-fin rays 7–9. Anal and dorsal fins closer to caudal fin than to head. Origin of anal fin in front of origin of dorsal fin. Caudal fin deeply forked, rounded tips (Fig.1). Total vertebrae 39–41 (Table 3).

Color. In life, *T. wongrati* has a clear yellow body with a wide metallic silver stripe along the side (Fig. 1), a black spot on the caudal-fin base and black on the proximal portion of the medial caudal-fin rays (Fig. 2). All fins are transparent. In 10% formalin, the body is dark brown.

Distribution. *Thryssocypris wongrati* occupies the lower part of the Chao Phraya Basin where it has been recorded from irrigation canals in Sing-Buri up to the most northern part of the basin in Nan River, Phitsanulok (Fig. 4). In the upper part of Chao Phraya basin it is found in floodplain habitats (Jutagate *et al.* 2011), irrigation canals, and the river mainstem.

Ecology. Most specimens of the new species were collected by large seines with small mesh (2 mm) from open water in the Chao Phraya River mainstem. Some specimens were captured in current in irrigation canals. Schools of this species were observed at the surface of the water, swimming very fast with other species such as *Clupeiodes borneensis*, *Rasbora* spp., *Barilius koratensis*, *Paralaubuca* spp. and *Discherodontus halei*.

Etymology. *T. wongrati* is named in honor of Dr. Prachit Wongrat, who was our first teacher in ichthyology.

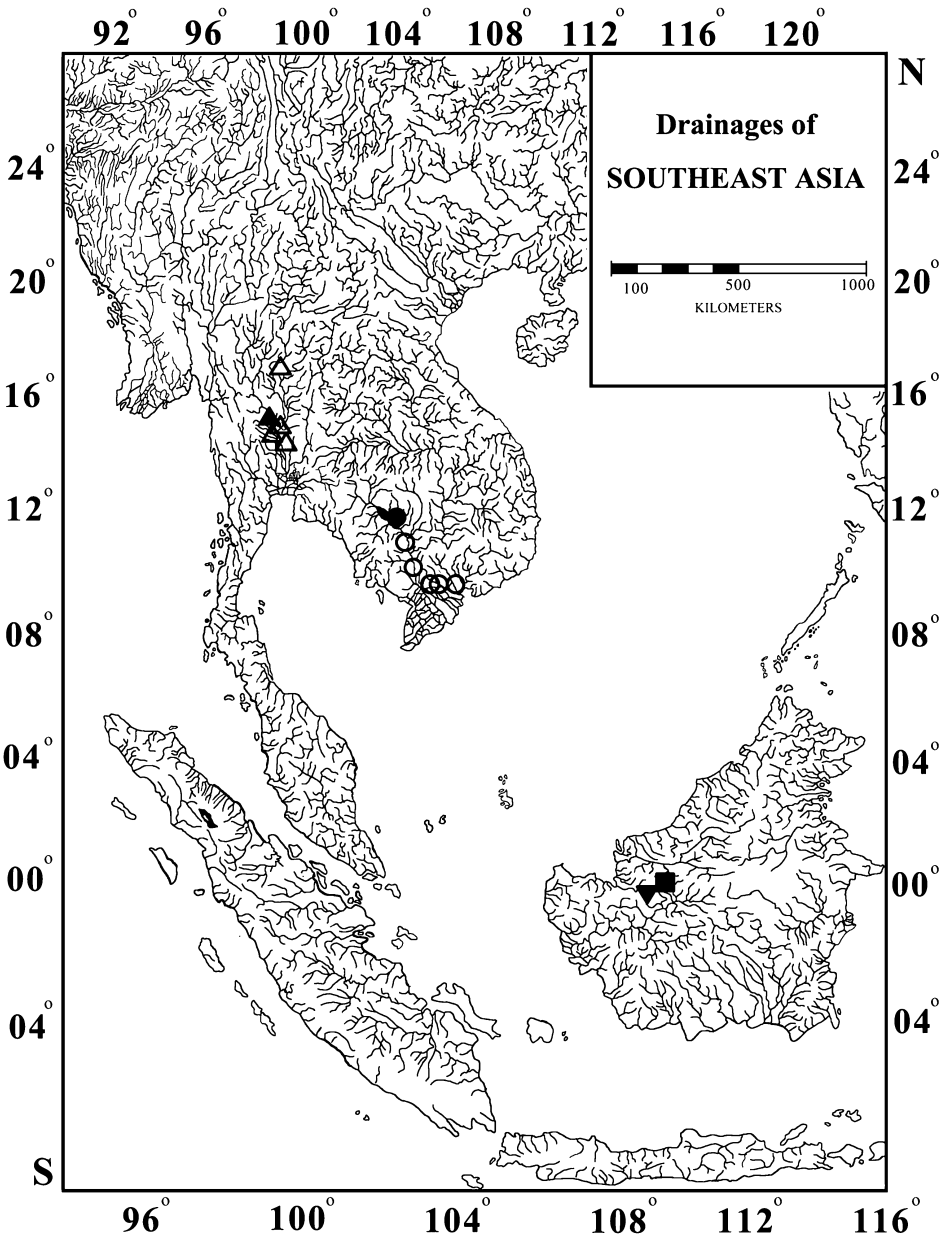

FIGURE 4. Geographic distribution of *Thryssocypris* in Southeast Asia.
(▲) *T. wongrati,* (●) *T. tonlesapensis,* (■) *T. smaragdinus,* (▼) *T. ornithostoma.*
Records are based on material examined (hollow symbols). Type localities are solid symbols. Map is modified from the distribution map for *Hypsibarbus* in Southeast Asia by Rainboth (1996b).

TABLE 1. Quantitative characters of species of *Thryssocypris*.

	T. ornithostoma	***T. smaragdinus***	***T. tonlesapensis***		***T. wongrati* sp. nov.**
	Kottelat (1991)	**Roberts & Kottelat (1984)**	**Roberts & Kottelat (1984)**	**Observed data**	**Observed data**
Dorsal-fin rays	10–11	9–10	9–10	8–10	9–10
Anal-fin rays	15–16	12–14	15–16	13–15	14–16
Pectoral-fin rays	12	11–12	10–12	10–12	11–12
Pelvic-fin rays	8	7–8	7–8	7–11	7–9
Lateral-line scales	44–46	36–39	43–46	42–45	37–40
Predorsal scales	25–27	25–27	26–31	25–29	23–25
Circumpeduncular scales	16	14–15	16–17	16	16
Total vertebrae	44–45	38–39	43–44	43–44	39–41

TABLE 2. Number of lateral-line scales in species of *Thryssocypris.*

Scientific Name	**Number of lateral-line scales (observed data)**									Original	Remark
	37	38	39	40	41	42	43	44	45	description	
T. ornithostoma										**44–46**	Kottelat (1991)
T. smaragdinus		2								**36–39**	Roberts & Kottelat (1984)
T. tonlesapensis						16	11	11	2	**43–46**	Roberts & Kottelat (1984)
***T. wongrati* sp. nov.**	3	3	9	10							

TABLE 3. Number of total vertebrae of *Thryssocypris*.

Scientific Name	**Number of vertebrae (observed data)**								Original	Remark
	38	39	40	41	42	43	44	45	description	
T. ornithostoma									**44 (2), 45 (1)**	Kottelat (1991)
T. smaragdinus	1	1							**38 (2)**	Roberts & Kottelat (1984)
T. tonlesapensis						9	1		**43 (12), 44 (1)**	Roberts & Kottelat (1984)
***T. wongrati* sp. nov.**		7	17	1						

TABLE 4. Morphometric data for species of *Thryssocypris.*

Measurement	*Thryssocypris wongrati* sp. nov.			*Thryssocypris tonlesapensis*			*Thryssocypris smaragdinus*		
	Range	**Mean ± SD**	**N**	**Range**	**Mean ± SD**	**N**	**Range**	**Mean ± SD**	**N**
Standard length	28.6–52.2	42.9 ± 6.0	25	20.5–59.5	45.1 ± 11.0	40	46.0–51.9	49.0 ± 4.2	2
% SL									
Head length	17.8–25.0	21.5 ± 2.4	25	16.7–23.6	20.7 ± 1.7	40	25.4–26.1	25.8 ± 0.5	2
Predorsal length	63.5–72.7	69.1 ± 2.1	25	64.4–73.9	68.6 ± 1.8	40	70.0–70.5	70.3 ± 0.4	2
Preanal length	61.4–69.3	66.4 ± 1.7	25	60.5–67.2	63.9 ± 1.6	40	71.6–74.7	73.2 ± 2.2	2
Body depth at dorsal	12.8–16.5	14.7 ± 1.0	25	10.8–16.8	13.9 ± 1.2	40	15.6–16.3	16.0 ± 0.5	2
Body depth at anus	13.4–17.1	15.3 ± 1.2	25	12.3–17.6	14.9 ± 1.2	40	15.4–15. 5	15.5 ± 0.1	2
Caudal peduncule depth	7.7–10.0	8.6 ± 0.7	25	5.9–9.7	8.4 ± 0.8	40	7.8–8.5	8.2 ± 0.5	2
Caudal peduncule length	16.1–21.2	18.6 ± 1.6	25	19.3–27.5	22.0 ± 1.9	40	14.5–17.0	15.7 ± 1.8	2
Prepelvic length	42.3–50.6	46.1 ± 2.2	25	40.7–47.1	44.6 ± 1.9	40	45.5–46.1	45.8 ± 0.4	2
Pelvic to vent distance	13.1–19.3	16.2 ± 1.7	25	9.2–21.0	17.0 ± 2.3	40	23.3–25.6	24.4 ± 1.7	2
Dorsal-fin base length	7.7–15.6	11.3 ± 2.1	25	6.3–14.8	11.4 ± 1.8	40	11.5–12.1	11.8 ± 0.4	2
Anal-fin base length	8.9–21.6	15.2 ± 2.9	25	9.1–19.7	15.5 ± 1.9	40	13.3–13.8	13.5 ± 0.4	2

.....continued on the next page

TABLE 4. (Continued)

Measurement	*Thryssocypris wongrati* sp. nov.			*Thryssocypris tonlesapensis*			*Thryssocypris smaragdinus*		
	Range	**Mean ± SD**	**N**	**Range**	**Mean ± SD**	**N**	**Range**	**Mean ± SD**	**N**
Standard length	28.6–52.2	42.9 ± 6.0	25	20.5–59.5	45.1 ± 11.0	40	46.0–51.9	49.0 ± 4.2	2
% HL									
Head width	32.8–43.7	36.6 ± 2.4	25	29.2–39.1	33.9 ± 2.4	40	30.3–33.3	31.8 ± 2.1	2
Interorbital width	30.0–33.1	31.6 ± 0.8	14	26.6–34.3	29.9 ± 2.0	35	30.8–30.8	30.8 ± 0.0	2
Head depth	53.8–67.8	59.7 ± 3.7	25	42.2–67.1	54.6 ± 3.8	40	52.5–56.8	54.7 ± 3.1	2
Snout length	25.4–34.5	30.2 ± 2.1	25	27.0–37.8	30.9 ± 2.6	40	31.8–34.2	33.0 ± 1.7	2
Pectoral-fin height	69.6–97.5	84.3 ± 6.6	25	68.3–105.0	83.3 ± 7.5	40	60.6–65.0	62.8 ± 3.1	2
Pelvic-fin height	39.1–61.3	52.1 ± 5.6	25	44.5–69.0	56.0 ± 5.8	40	43.3–45.5	44.4 ± 1.5	2
Dorsal-fin height	45.5–68.1	55.1 ± 6.7	25	51.1–77.9	63.7 ± 5.9	40	43.3–48.5	45.9 ± 3.6	2
Anal-fin height	45.7–69.3	58.9 ± 6.4	25	54.2–84.4	69.3 ± 7.1	40	41.7–49.2	45.5 ± 5.4	2
Caudal-fin length	81.6–123.5	101.5 ± 11.2	25	86.2–133.8	101.5 ± 10.8	40	76.5–76.7	76.6 ± 0.1	2
Eye diameter	18.4–27.2	23.3 ± 2.7	25	13.9–25.1	21.1 ± 2.5	40	21.7–23.5	22.6 ± 1.3	2
Mouth width	12.1–29.4	19.3 ± 4.6	25	16.2–26.7	20.5 ± 2.3	40	17.4–19.2	18.3 ± 1.2	2
Mouth length	30.3–49.3	40.6 ± 5.2	25	26.5–54.2	43.3 ± 6.0	40	53.8–55.0	54.4 ± 0.9	2

Discussion

Species of *Thryssocyrpis* occupy lowland areas of the Chao Phraya, the lower Mekong, and the Greater Sunda Islands (Fig. 4), a pattern noted for other cyprinoids by Taki (1975, 1978). *Thryssocypris wongrati* is the second species of this genus to be recorded from the mainland of Southeast Asia. It is known from the Chao Phraya River basin of Central Thailand, based on material examined and published records in Vidthayanon (1997), Kohanantakul *et al.* (2000) and Deein *et. al.* (2006). *Thryssocypris tonlesapensis* is known from Tonle Sap Lake and the Mekong delta in Cambodia and Vietnam based on material examined and published records in Roberts and Kottelat (1984), Rainboth (1996a) and Vidthayanon (2008). Two other species, *T. smaragdinus* and *T. ornithostoma,* have been recorded from the Kapuas River, western Kalimantan, Indonesia, (Roberts and Kottelat 1984; Kottelat1991 and Kottelat *et al.*1993).

Key to species of *Thryssocypris*

1a. Origin of dorsal fin over or in front of origin of anal fin, 14–15 circumpeduncular scales . . . . . *Thryssocypris smaragdinus*
1b. Origin of dorsal fin behind origin of anal fin, 16–17 circumpeduncular scales 2
2a. 37–40 lateral-line scales . . . . . *Thryssocypris wongrati* sp. nov.
2b. 42–46 lateral-line scales 3
3a. Black spot on caudal-fin base, hyaline caudal fin with black on proximal portion of medial caudal-fin rays . . . . . *Thryssocypris tonlesapensis*
3b. No dark spot on caudal-fin base, yellowish caudal fin without black on medial rays . . . . . *Thryssocypris ornithostoma*

Comparative material

Thryssocypris tonlesapensis: CAS 50946, 2, 48.2–52.2 mm SL, paratypes, Prek Tamen at or near Snoc Trou, Cambodia, 09 November 1961, F. D' Aubenton. CAS 55433, 3, 45.5–58.5 mm SL, paratypes, Can Tho fish market, Phong Dinh, Viet Nam, 23 June 1974, Walter J. Rainboth. IFREDI-P 4448, 20, 48.5–59.5 mm SL, Mekong River, Choe Khmau, Trapiang Chrey, Peam Chor, Prey Veng, Cambodia, 11°12.77'N, 105°16.36'E, 14 August 2009. CTU-P 24, 52.9 mm SL, Chau Thanh Market, Chau Thanh, An Giang, Vietnam, 10°26.60'N, 105°23.57'E, 26 July 2007. THNHM-F 00311, 9, 20.5–39.6 mm SL, Can Tho Market, Vietnam, Mekong Delta, 19–25 July 1995, Tyson R. Roberts. KUMF uncatalogued, 5, 27.3–35.5 mm SL, Mekong delta near Cantho, Vietnam, 20–25 July 1995, Tyson R. Roberts.

Thryssocypris smaragdinus: CAS 49314, 2, 46.0-51.9 mm SL, paratypes, Kapuas R. Basin, Kapuas River mainstem, 6 km west Putussibau, 9 August 1976, Tyson R. Roberts and S. Woerjoatmodjo.

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