

## *Rasbora vulcanus*, a new species of cyprinid fish from central Sumatra

Tan Heok Hui\*

\* Department of Biological Sciences, National University of Singapore, Kent Ridge 119260, Republic of Singapore.

### Abstract

*Rasbora vulcanus*, new species, is described from Painan, West Sumatra. It is allied to *R. reticulata*, but differs in having a more slender build and a fiery-red live coloration. Syntype material of *R. reticulata* is examined and a lectotype is designated.

KEYWORDS: *Rasbora reticulata*, *R. vulcanus*, Taxonomy, Sumatra, Biodiversity.

### Introduction

*Rasbora reticulata* was described by Weber & de Beaufort (1915) based on a large series of syntypes from Nias island, off the west coast of central Sumatra. Weber & de Beaufort (1916) later recorded the species from the Batang Hari, but this was a misidentification (see later). Brittan (1954) included the species in his revision of the genus *Rasbora*, with a detailed description. Since then, *R. reticulata* has been encountered rarely by scientists.

In 1996 and 1997, a series of *Rasbora* similar to *R. reticulata* was collected from Painan, West Sumatra. Upon comparison with the types of *R. reticulata* based in ZMA, it was discovered to be a new species, herein described as *R. vulcanus*. A lectotype is designated for *R. reticulata*.

### Material and methods

Specimens examined are deposited in the American Museum of Natural History, New York (AMNH); Museum Zoologicum Bogoriense, Bogor (MZB); Instituut voor Systematiek & Populatiebiologie, Universiteit van Amsterdam (ZMA); Zoological Reference Collection, National University of Singapore, Singapore (ZRC); and the collection of Maurice Kottelat, Cornol (CMK).

Specimens were collected with push nets and purchased from fish dealers. They were immediately preserved in 10 % formalin and later transferred to 75 % ethanol for long term storage. Specimens were measured with a dial calipers (0.5 mm accuracy) on

the left side according to Kottelat (1984), colour pattern terminology follows that of Brittan (1954). Abbreviations used: SL - standard length, HL - head length, BL - trunk length (from posterior edge of opercle to caudal fin base).

### *Rasbora reticulata* Weber & de Beaufort, 1915 (Figure 1)

*Rasbora reticulata* Weber & de Beaufort, 1915: 268; 1916: 81 (part), fig. 29; Brittan, 1954: 197, fig. 48; Kottelat et al., 1993: 47, Pl. 19.

**Lectotype.** ZMA 109.585, lectotype, 39.2 mm SL; Indonesia, West Sumatra: Nias island, Lolowua, ca. 5 hours southwest from Gunung Sitoli in chain of mountains; J. P. Kleiweg de Zwaan, 1910.

**Paralectotypes.** ZMA 109.586, 9 ex., 37.5-47.5 mm SL, 211 ex., 11.7-47.5 mm SL; ZRC 43264-43268, 5 ex., 32.6-41.0 mm SL; AMNH, 5 ex., 35.9-44.3 mm SL; same locality data as lectotype. — ZMA 109.587, 77 ex., 21.5-44.3 mm SL; Indonesia, West Sumatra: Nias island, Lolowua; J. P. Kleiweg de Zwaan, 1910. — ZMA 109.588, 3 ex., 26.8-38.0 mm SL; Indonesia, West Sumatra: Nias island, Tolok dalam; J. P. Kleiweg de Zwaan, 1910. — ZMA 109.589, 9 ex., 27.1-45.3 mm SL; Indonesia, West Sumatra: Nias island, Gunung Sitoli; J. P. Kleiweg de Zwaan, 1910.



Figure 1. *Rasbora reticulata*, ZMA 109.585, 39.2 mm SL, lectotype.

### Diagnosis

*Rasbora reticulata* is differentiated from its congeners by the following combination of characters: distinct reticulate pattern on side of body, formed by three longitudinal series of lateral scales with corresponding series of black patches (up to 20 lateral scales); incomplete lateral line which ends at 12th lateral scale; distinct symphyseal knob; body depth at dorsal fin origin 26.3-31.4 % SL; predorsal scales 11-12; lateral scales 24-26; transverse scales  $4\frac{1}{2}$ .1.2- $2\frac{1}{2}$ ; circumpeduncular scales 13; predorsal length (52.5-57.9 % SL).

### Description

General body shape and appearance as shown in Fig. 1; meristic and morphometric data in Table 1. Head broadly pointed, relatively long (HL 27.4-32.0 % SL), relatively wide (head width 14.8-17.3 % SL, 48.7-59.0 % HL) and deep (head depth 18.9-21.4 % SL); symphyseal knob present; orbit diameter small (22.2-28.6 % HL); interorbital width small (23.8-26.2 % HL); predorsal scales 11-12; body depth at dorsal fin origin relatively deep (26.3-31.4 % SL); transverse scales  $4\frac{1}{2}$ .1.2- $2\frac{1}{2}$ ; lateral scales 24-26; lateral line incomplete, ends at lateral scale 12, at pelvic fin origin or just anterior of anal fin origin; dorsal and anal fins placed relatively far back (52.5-57.6 % SL and 66.6-75.1 % SL respectively); caudal peduncle depth deep (12.9-15.3 % SL).

**Preserved coloration.** See Fig. 1. Body yellowish-brown, darker brown above. Dorsum of head dark brown; mid-dorsal stripe present. Black streak on body along posterior edge of opercle, extending diagonally backward to pectoral origin. Distinct re-

ticulate pattern on side of body on middle 3 lateral scale rows, formed by black patch on posterior margin of scales, up to 20 lateral scales long. Axial streak from area just anterior to dorsal fin to caudal base. Dorsal and anal fins slightly yellowish with subdistal black margin; pectoral fin hyaline; first few rays of pelvic fin with subdistal black margin; broad black supra-anal blotch present; caudal fin with rudimentary unbranched rays and first principal rays of both lobes black, middle caudal rays black.

### Distribution

*Rasbora reticulata* is known only from Nias island, off the coast of west Sumatra (Indian Ocean) (Fig. 2).

### Remarks

*Rasbora reticulata* can be differentiated from *R. vulcanus* by the following characters: upper and lower margins and median rays on caudal fin black (vs. not black); absence of black lateral stripe (vs. presence); incomplete lateral line (vs. complete); well developed symphyseal knob (vs. not well developed); more pectoral fin rays (15, vs. 12-14); more predorsal scales (11-12, vs. 10); more transverse scales ( $4\frac{1}{2}$ .1.2- $2\frac{1}{2}$ , vs.  $3\frac{1}{2}$ .1.1- $2\frac{1}{2}$ ); more circumpeduncular scales (13, vs. 10); greater prepelvic fin length (50.0-56.5 % SL, vs. 46.5-51.4); greater head length (27.4-32.0 % SL, vs. 24.6-28.4); greater median caudal fin length (15.6-21.6 % SL, vs. 13.3-16.1; 20.0-28.7 % BL, vs. 17.6-22.4); smaller orbit diameter (22.2-28.6 % HL, vs. 30.5-35.6), smaller interorbital width (23.8-26.2 % HL, vs. 28.9-31.8); greater head depth (18.9-21.4 % SL, vs. 16.1-18.2); greater head width (14.8-17.3 % SL, vs. 11.2-12.7); greater snout length (7.3-9.3 % SL, vs. 6.1-7.5).

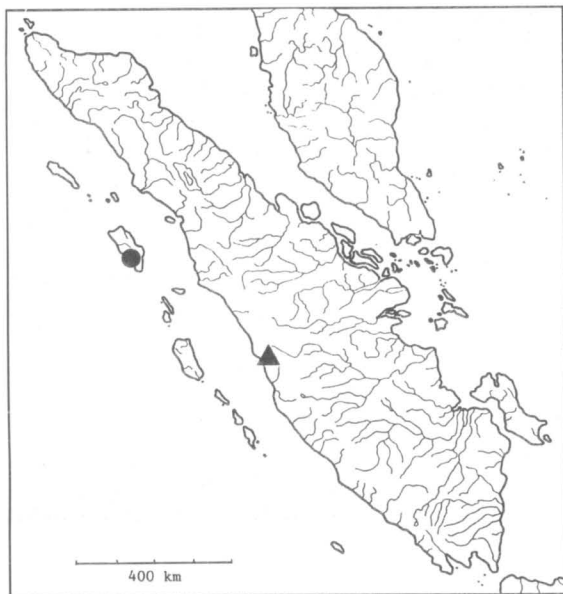


Figure 2. Map of Sumatra showing known distribution of *R. reticulata* (●) and *R. vulcanus* (▲).

Weber & de Beaufort (1916: 82) recorded *R. reticulata* from the Batang Hari basin. The specimen they examined was a juvenile 20.5 mm SL (ZMA 109.590). The specimen was misidentified and is actually the young of another species, based on the following characters: presence of caudal spot (vs. absence); narrow supra-anal blotch (vs. broad); indistinct reticulate pattern (vs. distinct).

*Rasbora vulcanus*, new species  
(Figures 3-4)

**Holotype.** MZB 9317, 40.1 mm SL; Indonesia, West Sumatra: Painan, Batang Si Joontour, ca. 53 km to Painan on Padang-Painan road (1°04'52.8"S 100°27'26.0"E); H. H. Tan & H. H. Ng, 21 July 1997.

**Paratypes.** ZRC 43269-43288, 20 ex., 16.0-41.2 mm SL; MZB 9318, 9325-9327, 4 ex., 21.8-29.8 mm SL; ZMA 121.826, 5 ex., 21.7-34.0 mm SL; same locality data as holotype. — ZRC 43289-43313, 25 ex., 26.8-48.5 mm SL; ZMA 121.827, 5 ex., 32.7-45.7 mm SL; CMK 14812, 5 ex.; Indonesia, West Sumatra: Padang, Painan; H. H. Tan et al., Nov 1996.

**Non-type material.** ZRC 43314, 10 ex., 29.0-48.5 mm SL; West Sumatra: Padang, ornamental fish trade; H. H. Tan et al., July 1997. — ZRC 43315, 20 ex., 30.8-54.5 mm SL; West Sumatra: Padang, ornamental fish trade; H. H. Tan et al., Aug 1998.

**Diagnosis**

*Rasbora vulcanus* can be differentiated from its congeners by the following combination of characters:

distinct reticulate pattern on side of body, formed by three longitudinal series of lateral scales with corresponding series of black patches (up to 20 lateral scales); complete lateral line; symphyseal knob present; body depth at dorsal fin origin 25.0-29.7 % SL; predorsal scales 10; lateral scales 25-28; transverse scales  $3^{1/2} \cdot 2.1.1^{1/2}$ ; circumpeduncular scales 10; predorsal length (51.4-54.6 % SL).

**Description**

General body shape and appearance as shown in Figs. 3-4; meristic and morphometric data in Table 1. Head broadly pointed, relatively short (HL 24.6-28.4 % SL), relatively narrow (head width 11.2-12.7 % SL, 43.0-50.0 % HL) and deep (head depth 16.1-18.2 % SL); symphyseal knob present; orbit diameter relatively large (30.5-35.6 % HL); interorbital width large (28.9-31.8 % HL); predorsal scales 10; body depth at dorsal fin origin relatively deep (25.0-29.7 % SL); transverse scales  $3^{1/2} \cdot 2.1.1^{1/2}$ ; lateral scales 25-28; lateral line complete, running diagonally backwards from opercle edge towards pelvic fin origin, running 1-2 scales above ventrum to caudal base; dorsal and anal fins placed relatively far back (51.4-54.6 % SL and 64.7-70.2 % SL respectively); caudal peduncle depth relatively deep (11.4-13.7 % SL).

**Live coloration.** See Fig. 4. Dorsal half of body and caudal reddish-orange; belly whitish, gold sheen may be present. Head brownish, snout reddish-orange. Eye orange. Opercle with shiny operculum with scattered melanophores, distal edge whitish. Side of body with distinct reticulate pattern on middle 3 lateral scale rows, formed by black patch on posterior margin of scale, up to 20 lateral scales long. Axial streak not distinct, lateral stripe indistinct on posterior half of body, golden-orange iridescence maybe present above lateral stripe. Dorsal, pelvic, anal and caudal fins reddish with faint or distinct subdistal black margin, distal reddish edge. Pectoral reddish. Supra-anal blotch narrow and distinct, sub-peduncular streak faint.

**Preserved coloration.** See Fig. 3. Body light yellowish-brown, darker above. Dorsum of head dark brown; mid-dorsal stripe present. Faint black streak on body along posterior edge of opercle, extending diagonally backward to pectoral origin. Opercle distal margin white, shiny operculum, spotted with melanophores. Distinct reticulate pattern on side of body on middle 3 lateral scale rows, formed by black patch on posterior margin of scale, up to 20 lateral scales long. Axial streak and lateral stripe from area in front of dorsal fin origin to caudal base, not extending to caudal fin. Dorsal, pelvic, anal and cau-

**Table 1.** Meristic and morphometric data of *Rasbora reticulata* and *R. vulcanus*.

	<i>R. reticulata</i>		<i>R. vulcanus</i>	
	Nias island		Painan, West Sumatra	
Locality of data presented				
Sample size (unless otherwise stated)	12		12	
SL (mm)	35.9-41.8		29.6-48.5	
<b>Meristics (mode)</b>				
Vertebrae (total)	29-30	(30, n=20)	30-31	(31, n=20)
Dorsal fin rays*	2, 7	(2, 7)	2, 6-7	(2, 7)
Anal fin rays*	3, 5	(3, 5)	3, 5	(3, 5)
Pelvic fin rays	1, 7	(1, 7)	1, 6-7	(1, 7)
Pectoral fin rays	15	(15)	12-14	(14)
Lateral scales	24-26	(26)	25-28	(27)
Predorsal scales	11-12	(11)	10	(10)
Transverse scales	4 <sup>1</sup> / <sub>2</sub> .1.2-2 <sup>1</sup> / <sub>2</sub>	(4 <sup>1</sup> / <sub>2</sub> .1.2)	3 <sup>1</sup> / <sub>2</sub> .1.1 <sup>1</sup> / <sub>2</sub>	(3 <sup>1</sup> / <sub>2</sub> .1.1 <sup>1</sup> / <sub>2</sub> )
Caudal peduncle scales	3 <sup>1</sup> / <sub>2</sub> .1.2	(3 <sup>1</sup> / <sub>2</sub> .1.2)	2 <sup>1</sup> / <sub>2</sub> .1.1 <sup>1</sup> / <sub>2</sub>	(2 <sup>1</sup> / <sub>2</sub> .1.1 <sup>1</sup> / <sub>2</sub> )
Circumpeduncular scales	13	(13)	10	(10)
<b>Morphometrics</b>				
% standard length (mean, standard deviation)				
Total length	131.3-133.0 (n=2)	—	126.9-136.8	(131.4, ± 2.49)
Body length	71.5- 78.7	(75.7, ± 2.12)	69.7 - 76.3	(73.6, ± 2.03)
Predorsal length	52.5- 57.9	(55.8, ± 1.75)	51.4 - 54.6	(53.5, ± 1.23)
Preanal length	66.6- 75.1	(69.6, ± 2.65)	64.7 - 70.2	(67.3, ± 1.87)
Prepelvic length	50.0- 56.6	(52.6, ± 2.02)	46.5 - 51.4	(48.7, ± 1.50)
Head length	27.4- 32.0	(29.7, ± 1.26)	24.6 - 28.4	(26.4, ± 1.06)
Dorsal depth	26.3- 31.4	(29.2, ± 1.58)	25.0 - 29.7	(27.1, ± 1.37)
Body depth	22.0- 25.5	(23.4, ± 1.07)	20.5 - 23.8	(21.9, ± 1.04)
Caudal peduncle depth	12.9- 15.3	(14.2, ± 0.67)	11.4 - 13.7	(12.6, ± 0.60)
Caudal peduncle length	20.2- 23.7	(21.5, ± 1.19)	20.4 - 24.6	(22.3, ± 1.13)
Dorsal fin base length	9.9- 13.5	(11.7, ± 0.97)	10.5 - 14.5	(11.8, ± 1.13)
Anal fin base length	10.6- 12.0	(11.4, ± 0.51)	11.1 - 13.8	(12.1, ± 0.81)
Pelvic fin length	14.1- 19.7	(17.3, ± 1.60)	16.9 - 20.9	(18.1, ± 1.29)
Pectoral fin length	18.5- 22.8	(21.6, ± 1.27)	20.9 - 23.6	(22.1, ± 0.83)
Upper caudal lobe length	34.6 (n=1)	—	28.7 - 33.5	(30.9, ± 1.91)
Median caudal length	15.6- 21.6	(18.9, ± 1.92)	13.3 - 16.1	(14.7, ± 0.93)
Lower caudal fin length	32.1 (n=1)	—	28.9 - 36.1	(31.7, ± 2.21)
% head length (mean, standard deviation)				
Head depth	63.5- 72.2	(67.4, ± 2.80)	61.8 - 73.7	(66.4, ± 3.23)
Head width	48.7- 59.0	(53.3, ± 2.81)	43.0 - 50.0	(46.0, ± 2.18)
Snout length	23.5- 29.9	(27.5, ± 1.96)	23.6 - 29.8	(26.8, ± 1.68)
Orbit diameter	22.2- 28.6	(26.2, ± 1.71)	30.5 - 35.6	(32.9, ± 1.63)
Interorbital width	23.8- 26.2	(25.1, ± 0.81)	28.9 - 31.8	(30.3, ± 0.90)

dal fins hyaline with subdistal black margin, distal white edge; pectoral fin dusky; black supra-anal blotch present; sub-peduncular streak present.

#### Distribution

*Rasbora vulcanus* has been found in coastal hill streams of Painan, Priaman (near Padang) in West Sumatra draining into the Indian Ocean (Fig. 2).

#### Field notes

*Rasbora vulcanus* inhabits clear fast flowing coastal hill streams draining to the Indian Ocean, in small schools (up to 30 or more). The stream at the type locality is about 5 m wide and up to 1 m deep with a rocky bottom, pH 7.8 (Fig. 5). Syntopic species include *Puntius binotatus*, *R. lateristriata* (Cyprinidae), *Nemacheilus pfeifferae* (Balitoridae), *Aplocheilus*



Figure 3. *Rasbora vulcanus* - ZRC 43269, 41.2 mm SL, paratype.



Figure 4. *Rasbora vulcanus* - ZRC 43269, ca. 40 mm SL, freshly preserved.

*panchax* (Aplocheilidae), *Sicyopterus* spp., *Stiphodon ornata* (Gobiidae). Three exotic species were also present: *Poecilia reticulata* (Poeciliidae), *Archocentrus nigrofasciatus* and *Oreochromis mossambicus* (Cichlidae).

#### Etymology

From the Latin *Vulcanus*, the God of fire, alluding to the fiery red colour of the fish and to the volcanic nature of the geographic area. Used as a noun in apposition.

#### Remarks

*Rasbora vulcanus* appears to belong to the *R. trifasciata* group (as defined by Brittan, 1954) and is similar to *R. reticulata* in having a distinct reticulated pattern on body and same general body form. *Rasbora vulcanus* can be differentiated from *R. reticulata* in the following characters: presence of subdistal black

margin on caudal fin (vs. absence); presence of black lateral stripe (vs. absence); complete lateral line (vs. incomplete); not well developed symphyseal knob (vs. well developed; less pectoral fin rays (12-14, vs. 15); less predorsal scales (10, vs. 11-12); less transverse scales ( $3^1/2.1.1^1/2$ , vs.  $4^1/2.1.2-2^1/2$ ); less circumpeduncular scales (10, vs. 13); smaller prepelvic fin length (46.5-51.4 % SL, vs. 50.0-56.5); smaller head length (24.6-28.4 % SL, vs. 27.4-32.0); smaller median caudal fin length (13.3-16.1 % SL, vs. 15.6-21.6; 17.6-22.4 % BL, vs. 20.0-28.7); greater orbit diameter (30.5-35.6 % HL, vs. 22.2-28.6), greater interorbital width (28.9-31.8 % HL, vs. 23.8-26.2); smaller head depth (16.1-18.2 % SL, vs. 18.9-21.4); smaller head width (11.2-12.7 % SL, vs. 14.8-17.3); smaller snout length (6.1-7.5 % SL, vs. 7.3-9.3).

*Rasbora vulcanus* can be separated from *R. johanna* and *R. tuberculata* by its complete lateral line (vs. incomplete); from *R. bankanensis* and *R. paucisqualis* in

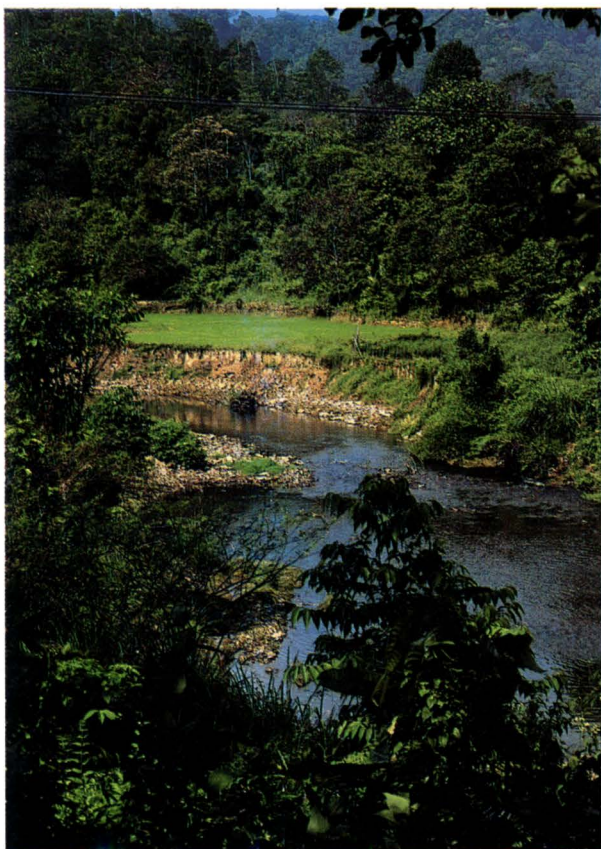


Figure 5. Batang Si Joontour, type locality of *Rasbora vulcanus*.

the presence of subdistal margin on anal fin (vs. absence of margin, but with subdistal marks near fin tip); from *R. trifasciata*, *R. hubbsi* and *R. rutteni* by the distinct reticulate pattern on body (vs. faint or indistinct); from *R. ennealepis* by the presence of subdistal margin on anal fin (vs. absence) and by the discontinuous supra-anal blotch and sub-peduncular streak (vs. continuous) (data of various *Rasbora* species from Brittan, 1954; Roberts, 1989; Kottelat et al., 1993; Kottelat, 1995; Siebert & Guiry, 1996; Siebert, 1997).

#### Comparative material

- Rasbora bankanensis* - ZRC 43051, 5 ex., 18.1-26.6 mm SL; Sumatra: Jambi, Leibong Sepbaju, stream in swampforest; H. H. Tan et al., 21 Nov 1996
- Rasbora ennealepis* - CMK 6812, 7 ex. (3 ex. examined), 34.7-36.4 mm SL; West Kalimantan: Sungai Tao, 22 km east of Sintang on road to Bukit Kelam (0°05'N 111°38'E) (a tributary of Sungai Melawi flowing south from Bukit Kelam); M. Kottelat et al., 24 Apr 1990.
- Rasbora paucisqualis* - ZRC 42359, 1 ex., 34.1 mm SL; Sumatra: Jambi, Batang Hari at Perlingat; H. H. Tan et al., 30 Nov 1996. — ZRC 42341, 1 ex., 24.6

mm SL; Sumatra: Jambi, Kumpeh Jalan Bahru; H. H. Tan et al., 29 Nov 1996.

*Rasbora tuberculata* - ZRC 37769, 10 ex., CMK 11021, 3 ex., 18.2-23.0 mm SL; Sarawak: Sungai Serait, Bako National Park; N. Sivasothi et al., 30 June 1994.

*Rasbora* sp. (juvenile) - ZMA 109.590, 1 ex., 20.5 mm SL; Indonesia, Sumatra: Jambi, Batang Hari; P. H. Moolenburgh, Apr 1909.

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