

## Article

# Redescription of *Stolephorus ronquilloi* Wongratana, 1983 and Description of *Stolephorus hindustanensis*, a New Anchovy from the Western Coast of India (Teleostei: Clupeiformes: Engraulidae) <sup>†</sup>

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<sup>†</sup> This article is registered in ZooBank under urn:lsid:zoobank.org:pub:7A95E42B-6A4B-45E4-BA1A-1E480AB28A5D. *Stolephorus hindustanensis* is registered in ZooBank under urn:lsid:zoobank.org:act:0474C717-034E-425B-867A-87308CAE7AC9.

**Abstract:** The new anchovy *Stolephorus hindustanensis* n. sp., described on the basis of 11 specimens collected from Mumbai, western coast of India, closely resembles *Stolephorus ronquilloi* Wongratana, 1983 in sharing an indented preopercle posterior margin, long maxilla extending beyond the preopercle posterior margin, double pigmented lines on the dorsum behind the dorsal fin, and lacking a predorsal scute. However, the new species differs from *S. ronquilloi* in having lower counts of gill rakers on the first and second gill arches, higher counts of total vertebrae, a deeper body, greater distances between the snout tip and anal-fin origin, origins of the dorsal and anal fins, and pelvic-fin insertion and anal-fin origin, and longer pelvic fin, third dorsal-fin ray, third anal-fin ray, and postorbital length.

**Keywords:** taxonomy; Actinopterygii; Clupeomorpha; Indian Ocean



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## 1. Introduction

*Stolephorus* Lacepède, 1803, an Indo-Pacific genus of marine and/or brackish water anchovies (Clupeiformes: Engraulidae), was reviewed by Whitehead et al., (1988), who recognized 18 valid and one undescribed species. Currently, the genus comprises 37 valid species [1–18], seven of which (including a number described in recent studies [16,18]) are diagnosed by an indented preopercle posterior margin. In addition, 11 specimens with a similarly indented preopercle margin, collected from the western coast of India and found during an ongoing revisionary study of the genus, are described herein as a new species of *Stolephorus*. The new species closely resembles *Stolephorus ronquilloi* Wongratana, 1983, endemic to the Philippines, in sharing the similar coloration and lacking a predorsal scute. As detailed morphological data of *S. ronquilloi* has never been provided since the original description, the species is redescribed herein.

## 2. Materials and Methods

Counts and proportional measurements followed Hata and Motomura (2017) [19]. All measurements were made to the nearest 0.01 mm using digital calipers. Standard and head lengths are abbreviated as SL and HL, respectively. “Pelvic scute” refers to a scute joined to the pelvic girdle, and “prepelvic scute”, “postpelvic scute” and “predorsal scute” to hard spine-like scutes anterior to the pelvic fin, posterior to the pelvic fin, and just anterior to the dorsal-fin origin, respectively. Osteological characters, including vertebral counts, were

observed on 11 specimens each of *S. ronquilloi* and the new species. Abbreviations are as follows—SL: standard length; HL: head length; and UGR, LGR, and TGR: rakers on upper limb, lower limb, and total gill rakers, respectively, with associated numbers indicating the specific gill arch. Institutional codes follow Sabaj (2020) [20].

***Stolephorus ronquilloi* Wongratana, 1983**

[English name: Ronquillo's Anchovy]

Figure 1; Tables 1–3



**Figure 1.** (A) Lateral view of the holotype of *Stolephorus ronquilloi* (BMNH1969.5.30.88, 48.7 mm SL; Luzon, Philippines); (B) lateral and (C) dorsal views of the non-type specimen (USNM 23845, 44.3 mm SL, Luzon, Philippines).

**Table 1.** Meristics of specimens of *Stolephorus ronquilloi* and *Stolephorus hindustanensis* n. sp. Bold characters indicate non-overlapping meristics between the two species.

|                                      | <i>Stolephorus ronquilloi</i>             |                             |            | <i>Stolephorus hindustanensis</i> n. sp.    |                             |            |
|--------------------------------------|---|-----------------------------|------------|---|-----------------------------|------------|
|                                      | <b>Holotype<br/>BMNH<br/>1969.5.30.88</b> | <b>Non-Types<br/>n = 11</b> | Modes ± SD | <b>Holotype<br/>BMNH<br/>1969.4.22.1648</b> | <b>Paratypes<br/>n = 10</b> | Modes ± SD |
| Standard length (mm)                 | 48.7                                      | 43.6–52.0                   | Modes ± SD | 53.1  | 47.3–59.9                   | Modes ± SD |
| Dorsal-fin rays (unbranched)         | 3   | 3                           | 3 ± 0      | 3   | 3                           | 3 ± 0      |
| Dorsal-fin rays (branched)           | 13  | 12–13                       | 13 ± 0.4   | 13  | 12–13                       | 13 ± 0.4   |
| Anal-fin rays (unbranched)           | 3   | 3                           | 3 ± 0      | 3   | 3                           | 3 ± 0      |
| Anal-fin rays (branched)             | 18  | 16–18                       | 18 ± 0.8   | 18  | 16–18                       | 18 ± 0.6   |
| Pectoral-fin rays (unbranched)       | 1   | 1                           | 1 ± 0      | 1   | 1                           | 1 ± 0      |
| Pectoral-fin rays (branched)         | 11  | 11–12                       | 11 ± 0.5   | 12  | 10–12                       | 12 ± 0.7   |
| Pelvic-fin rays (unbranched)         | 1   | 1                           | 1 ± 0      | 1   | 1                           | 1 ± 0      |
| Pelvic-fin rays (branched)           | 6   | 6                           | 6 ± 0      | 6   | 6                           | 6 ± 0      |
| Gill rakers on 1st gill arch (upper) | 20  | 18–21                       | 20 ± 0.7   | 19  | 17–20                       | 19 ± 0.8   |

Table 1. Cont.

|  | <i>Stolephorus ronquilloi</i>    |                            |           | <i>Stolephorus hindustanensis</i> n. sp. |                            |          |
|--|----------------------------------|----------------------------|-----------|--|----------------------------|----------|
|  | Holotype<br>BMNH<br>1969.5.30.88 | Non-Types<br><i>n</i> = 11 |           | Holotype<br>BMNH<br>1969.4.22.1648       | Paratypes<br><i>n</i> = 10 |          |
| Gill rakers on 1st gill arch (lower)           | 28                               | 28–29                      | 28 ± 0.4  | 25                                       | 24–27                      | 26 ± 1.0 |
| Gill rakers on 1st gill arch (total)           | 48                               | 47–49                      | 48 ± 0.6  | 44                                       | 42–46                      | 44 ± 1.3 |
| Gill rakers on 2nd gill arch (upper)           | 14                               | 13–15                      | 13 ± 0.7  | 14                                       | 13–15                      | 14 ± 0.6 |
| Gill rakers on 2nd gill arch (lower)           | 24                               | 24–27                      | 24 ± 1.1  | 22                                       | 21–24                      | 24 ± 1.0 |
| Gill rakers on 2nd gill arch (total)           | 38                               | 37–42                      | 38 ± 1.6  | 36                                       | 35–39                      | 36 ± 1.2 |
| Gill rakers on 3rd gill arch (upper)           | 9                                | 10–11                      | 10 ± 0.6  | 12                                       | 11–12                      | 11 ± 0.5 |
| Gill rakers on 3rd gill arch (lower)           | 14                               | 13–15                      | 14 ± 0.6  | 13                                       | 13–14                      | 13 ± 0.4 |
| Gill rakers on 3rd gill arch (total)           | 23                               | 23–26                      | 24 ± 1.1  | 25                                       | 24–26                      | 24 ± 0.7 |
| Gill rakers on 4th gill arch (upper)           | 6                                | 8–9                        | 8 ± 0.8   | 9  | 8–9                        | 9 ± 0.5  |
| Gill rakers on 4th gill arch (lower)           | 9                                | 10–12                      | 11 ± 0.8  | 11                                       | 10–12                      | 11 ± 0.7 |
| Gill rakers on 4th gill arch (total)           | 15                               | 18–20                      | 20 ± 1.5  | 20                                       | 19–21                      | 20 ± 0.8 |
| Gill rakers on posterior face of 3rd gill arch | damaged                          | 4–6                        | 5 ± 0.6   | 5  | 5–7                        | 5 ± 0.7  |
| Prepelvic scutes                               | 7                                | 5–7                        | 6 ± 0.6   | 6  | 6–7                        | 6 ± 0.4  |
| Scale rows in longitudinal series              | 36                               | 35                         | 36 ± 0.5  | 34                                       | 34                         | 34 ± 0   |
| Transverse scales                              | 8                                | 8                          | 8 ± 0     | 8  | 8                          | 8 ± 0    |
| Pseudobranchial filaments                      | 17                               | 16                         | 16 and 17 | 17                                       | 16–18                      | 16 ± 0.7 |
| Total vertebrae                                |                                  | 38–40                      | 38 ± 0.6  | 39                                       | 39–40                      | 39 ± 0.5 |

Table 2. Morphometrics of specimens of *Stolephorus ronquilloi* and *Stolephorus hindustanensis* n. sp. Bold characters indicate non-overlapping morphometrics between the two species.

|                                     | <i>Stolephorus ronquilloi</i>    |                            |            | <i>Stolephorus hindustanensis</i> n. sp. |                            |            |
|-------------------------------------|----------------------------------|----------------------------|------------|--|----------------------------|------------|
|                                     | Holotype<br>BMNH<br>1969.5.30.88 | Non-Types<br><i>n</i> = 11 |            | Holotype<br>BMNH<br>1969.4.22.1648       | Paratypes<br><i>n</i> = 10 |            |
| Standard length (mm)                | 48.7                             | 43.6–52.0                  | Means ± SD | 53.1                                     | 47.3–59.9                  | Means ± SD |
| As % SL                             |                                  |                            |            |  |                            |            |
| Head length (HL)                    | 25.2                             | 24.2–26.2                  | 25.2 ± 0.6 | 25.2                                     | 24.8–26.2                  | 25.4 ± 0.4 |
| <b>Body depth</b>                   | 21.1                             | 21.3–22.6                  | 21.9 ± 0.5 | 23.5                                     | 23.3–25.3                  | 24.0 ± 0.7 |
| Pre-dorsal fin length               | 56.0                             | 53.7–57.5                  | 55.9 ± 1.1 | 56.8                                     | 54.9–56.2                  | 55.6 ± 0.6 |
| Snout tip to pectoral-fin insertion | 27.4                             | 26.1–27.6                  | 27.1 ± 0.4 | 26.3                                     | 26.3–28.2                  | 27.2 ± 0.7 |
| Snout tip to pelvic-fin insertion   | 44.4                             | 44.2–46.4                  | 45.4 ± 0.7 | 45.6                                     | 45.3–48.2                  | 46.7 ± 1.0 |
| <b>Snout tip to anal-fin origin</b> | 62.3                             | 62.8–64.0                  | 63.4 ± 0.5 | 65.4                                     | 65.1–67.1                  | 66.0 ± 0.7 |
| Dorsal-fin base length              | 15.2                             | 12.9–14.8                  | 14.3 ± 0.7 | 13.6                                     | 13.5–15.0                  | 14.3 ± 0.5 |
| Anal-fin base length                | 20.5                             | 19.5–20.9                  | 20.2 ± 0.5 | 19.4                                     | 19.2–20.8                  | 19.8 ± 0.5 |
| Caudal-peduncle length              | 17.5                             | 16.8–18.8                  | 17.6 ± 0.6 | 17.5                                     | 17.1–20.0                  | 18.4 ± 1.1 |
| Caudal-peduncle depth               | 10.5                             | 10.1–11.0                  | 10.6 ± 0.3 | 11.0                                     | 10.6–11.3                  | 11.0 ± 0.2 |
| D–P1                                | 35.8                             | 35.2–38.3                  | 37.0 ± 0.9 | 38.4                                     | 36.9–40.0                  | 38.5 ± 0.9 |
| D–P2                                | 25.2                             | 22.8–26.5                  | 24.9 ± 1.0 | 25.6                                     | 25.2–27.6                  | 26.1 ± 0.9 |
| D–A                                 | 22.2                             | 21.2–22.9                  | 22.4 ± 0.5 | 24.3                                     | 23.4–25.7                  | 24.4 ± 0.8 |
| P1–P2                               | 18.6                             | 18.2–21.6                  | 19.8 ± 1.1 | 20.7                                     | 20.6–21.6                  | 21.1 ± 0.3 |
| P2–A                                | 17.8                             | 16.6–19.4                  | 18.0 ± 0.7 | 19.0                                     | 19.0–21.5                  | 20.4 ± 1.0 |
| Pectoral-fin length                 | 15.2                             | 15.0–15.7                  | 15.4 ± 0.3 | broken                                   | 15.7                       | 15.7 ± 0   |
| <b>Pelvic-fin length</b>            | 8.0                              | 8.1–9.0                    | 8.5 ± 0.3  | 9.8                                      | 9.5–10.1                   | 9.8 ± 0.2  |
| Maxilla length                      | 21.4                             | 20.2–21.6                  | 21.0 ± 0.5 | 20.3                                     | 20.5–22.3                  | 21.1 ± 0.8 |
| Lower-jaw length                    | 16.9                             | 15.7–17.0                  | 16.4 ± 0.4 | 15.9                                     | 15.6–17.0                  | 16.4 ± 0.5 |
| Supramaxilla end to maxilla end     | 4.2                              | 4.7–6.2                    | 5.6 ± 0.5  | 6.3                                      | 5.7–6.7                    | 6.3 ± 0.3  |
| 1st dorsal-fin ray length           | 2.1                              | 1.0–2.2                    | 1.7 ± 0.4  | 1.5                                      | 1.2–1.8                    | 1.5 ± 0.2  |
| 2nd dorsal-fin ray length           | 6.4                              | 7.3–9.0                    | 7.7 ± 0.8  | broken                                   | 7.2–8.0                    | 7.7 ± 0.3  |
| <b>3rd dorsal-fin ray length</b>    | damaged                          | 16.5–17.0                  | 16.8 ± 0.2 | broken                                   | 18.6–18.8                  | 18.7 ± 0.1 |
| 1st anal-fin ray length             | 2.1                              | 1.3–2.2                    | 1.8 ± 0.2  | 1.8                                      | 1.3–2.1                    | 1.7 ± 0.2  |
| 2nd anal-fin ray length             | damaged                          | 5.1–6.1                    | 5.5 ± 0.5  | broken                                   | 4.5–6.0                    | 5.3 ± 0.6  |
| <b>3rd anal-fin ray length</b>      | 13.7                             | 13.4–14.9                  | 14.1 ± 0.5 | broken                                   | 15.7–16.1                  | 15.8 ± 0.2 |
| as % of HL                          |                                  |                            |            |  |                            |            |
| Maximum orbit diameter              | 36.5                             | 33.2–36.9                  | 35.5 ± 1.0 | 33.7                                     | 32.9–34.4                  | 33.6 ± 0.4 |
| Eye diameter                        | 31.8                             | 29.4–32.2                  | 30.8 ± 0.9 | 29.8                                     | 27.4–30.8                  | 29.5 ± 1.0 |
| Snout length                        | 15.2                             | 14.5–16.0                  | 15.3 ± 0.4 | 14.6                                     | 14.1–15.4                  | 14.6 ± 0.3 |
| Interorbital width                  | 22.9                             | 20.8–23.9                  | 22.3 ± 0.8 | 23.2                                     | 22.0–24.0                  | 23.1 ± 0.6 |
| Postorbital length                  | 47.2                             | 48.2–51.3                  | 49.4 ± 1.2 | 53.5                                     | 51.0–53.5                  | 52.5 ± 0.8 |

Abbreviations: D–P1 (distance from dorsal-fin origin to pectoral-fin insertion); D–P2 (distance from dorsal-fin origin to pelvic-fin insertion); D–A (distance between origins of dorsal- and anal fins); P1–P2 (distance between insertions of pectoral- and pelvic fins); P2–A (distance between pelvic-fin insertion and anal-fin origin).

**Table 3.** Frequency distribution of total vertebral numbers in *Stolephorus ronquilloi* and *Stolephorus hindustanensis* n. sp.

|  |               | Total Vertebrae |    |    |
|--|---------------|-----------------|----|----|
|  |               | 38              | 39 | 40 |
| <i>Stolephorus ronquilloi</i>            | <i>n</i> = 11 | 8               | 2  | 1  |
| <i>Stolephorus hindustanensis</i> n. sp. | <i>n</i> = 11 |                 | 7  | 4  |

*Stolephorus ronquilloi* Wongratana, 1983 [1]: 399, figure 17 (type locality: Manila Bay, Luzon, Philippines; paratype localities: Mindanao and Luzon, Philippines); Wongratana 1987 [3]: 8 (Philippines); Whitehead et al., 1988 [4]: 418, unnumbered figure (Philippines); Wongratana et al., 1999 [5], 1740, unnumbered figure (Philippines); Munroe and Nizinski 2000 [21]: 588 (South China Sea); Hata et al., 2020 [16]: 10 (Manila Bay, Philippines); Hata and Motomura 2021 [13]: 11 (Philippines).

**Holotype.** BMNH1969.5.30.88, 48.7 mm SL, Manilla Bay, Luzon, Philippines, coll. by I. A. Ronquillo.

**Non-type specimens.** USNM 238425, 11 specimens, 43.6–52.0 mm SL, Manila Bay, Manila, Luzon, Philippines.

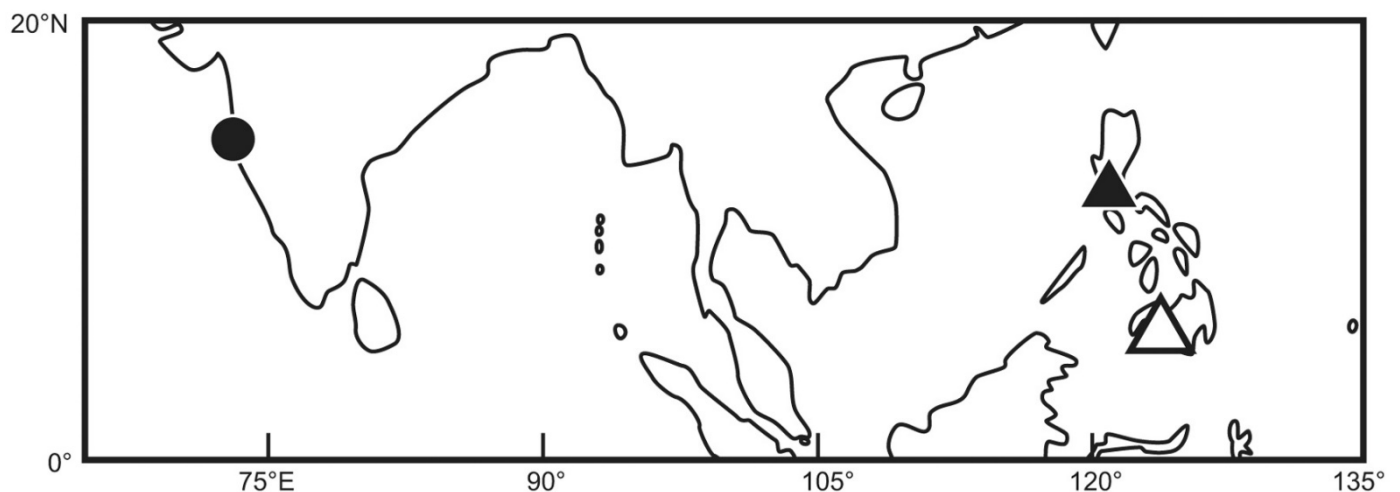
**Diagnosis.** A species of *Stolephorus* with the following combination of characters: 1UGR 18–21 (modally 20), 1LGR 28–29 (28), 1TGR 47–49 (48); 2UGR 13–15 (13), 2LGR 24–27 (24), 2TGR 37–42 (38); 3UGR 9–11 (10), 3LGR 13–15 (14), 3TGR 23–26 (24); 4UGR 6–9 (8), 4LGR 9–12 (11), 4TGR 15–20 (20); prepelvic scutes 5–7 (6); total vertebrae 38–40 (38); long maxilla, posterior tip just reaching or slightly short of posterior margin of opercle; no predorsal scutes; pelvic scute without spine; posterior margin of preopercle indented; paired dark patches on parietal area, with a few following pigment spots; distinct double pigment lines along dorsum posterior to dorsal fin; black spots below eye and lower-jaw tip absent; body rather elongate, 21.1–22.6% of SL; pre-anal-fin length short, 62.3–64.0% of SL; distance between origins of dorsal and anal fins rather short, 21.2–22.9% of SL; distance between pelvic-fin insertion to anal-fin origin relatively short, 16.6–19.4% of SL; pelvic fin rather short, 8.1–9.0% of SL; third dorsal-fin ray short, 16.5–17.0% of SL; third anal-fin ray short, 13.4–14.9% of SL; postorbital area relatively short, 48.2–51.3% of HL.

**Description.** Data for holotype presented first, followed by data for other specimens in parentheses (if different). Counts and measurements expressed as percentages of SL or HL are given in Tables 1 and 2. Body laterally compressed, elongate, deepest at the dorsal-fin origin. Dorsal profile of head and body slightly convex from snout tip to dorsal-fin origin, gently lowering to the uppermost point of the caudal-fin base. Ventral profile of head and body slightly convex from lower-jaw tip to pelvic-fin insertion, thereafter slowly rising to lowermost point of the caudal-fin base. Abdomen somewhat rounded, covered with seven (five or seven) spine-like scutes. Pelvic scute without a spine. Postpelvic and predorsal scutes absent. Anus just anterior to anal-fin origin. Snout tip rounded; snout length less than eye diameter. Mouth large, inferior, ventral to body axis, extending backward beyond posterior margin of eye. Maxilla rather long, its posterior tip pointed, just reaching (short of or slightly beyond) posterior margin of preopercle. Lower jaw slender. Single row of conical teeth on each jaw and palatines. Several distinct conical teeth on vomer. Teeth patch on pterygoid. One or two rows of conical teeth on upper edges of basihyal and basibranchial. Eye large, round, covered with adipose eyelid, positioned laterally on head above horizontal through pectoral-fin insertion, visible in dorsal view. Pupil round. Orbit elliptical. Nostrils close to each other, anterior to orbit. Posterior margin of preopercle distinctly indented. Subopercle and opercle with smoothly rounded posterior margins. Gill membrane without serrations. Interorbital space flat, width less than eye diameter. Pseudobranchial filaments present, length of longest filament shorter than eye diameter. Gill rakers long, slender, rough, visible from side of head when mouth opened. Single row of asperities on anterior surface of gill rakers. Isthmus muscle long, reaching anteriorly to posterior margin of gill membranes. Urohyal hidden by isthmus muscle, not visible without

dissection. Gill membranes on each side joined distally, isthmus muscle mostly exposed, not covered by gill membrane. Body scales deciduous, completely lacking on specimens, except for prepelvic scutes. Head scales absent. Lateral line absent. Fins scaleless, except for broad triangular sheath of scales on caudal fin. Dorsal-fin origin posterior to vertical through base of last pelvic-fin ray, slightly posterior to middle of body. Dorsal and anal fins with three anteriormost rays unbranched and closely spaced. First dorsal- and anal-fin rays minute. Anal-fin origin just below base of seventh (seventh to ninth) dorsal-fin ray. Posterior tip of depressed anal fin not reaching caudal-fin base. Uppermost pectoral-fin ray unbranched, inserted below midline of body. Posterior tip of pectoral fin not reaching to pelvic-fin insertion. Dorsal, ventral, and posterior margins of pectoral fin nearly linear. Pelvic fin shorter than pectoral fin, insertion anterior to vertical through dorsal-fin origin. Posterior tip of depressed pelvic fin not reaching to vertical through dorsal-fin origin. Caudal fin forked, posterior tips pointed.

**Coloration of preserved specimens.** Body uniformly pale yellow. Light ivory longitudinal band running from just behind upper opercular margin to caudal-fin base. Head uniformly light yellow. No black spots on suborbital area. A pair of dark patches on parietal region and a few pigment spots on occipital area. Scale pockets on dorsum with black posterior margin. Melanophores scattered along bases of dorsal and anal fins. Double pigmented lines dorsally posterior to dorsal fin. All fins transparent, melanophores scattered along fin rays of caudal fin and anterior part of dorsal fin. Caudal fin with black upper and posterior margins.

**Distribution.** *Stolephorus ronquilloi* is endemic to the Philippines ([1,3–5]; this study; Figure 2).



**Figure 2.** Distributional records of *Stolephorus ronquilloi* (triangles) and *S. hindustanensis* n. sp. (circle). Solid symbols based on specimens examined in this study; open symbols based on the original description (Wongratana 1983).

**Comparisons.** *Stolephorus ronquilloi* is distinguished from all other congeners, except for *Stolephorus acinaces* Hata, Lavoué and Motomura, 2020, *Stolephorus andhraensis* Babu Rao, 1966, *Stolephorus bengalensis* (Dutt and Babu Rao, 1959), *Stolephorus carpentariae* (De Vis, 1882), *Stolephorus holodon* (Boulanger, 1900), *Stolephorus tamilensis* Gangan, Pavan-Kumar, Jahageerdar and Jaiswar, 2020, and *S. hindustanensis* n. sp. by an indented preopercle posterior margin, and long maxilla, extending well beyond the preopercle posterior margin ([1–18]; this study). However, *S. ronquilloi* differs from the other six species in having higher numbers of 1LGR (28 or more in *S. ronquilloi* vs. 27 or less in the other six, except in *S. holodon*), and double pigmented lines on the dorsum (vs. dorsal lines absent, except in *S. bengalensis*). *Stolephorus ronquilloi* can also be distinguished from *S. bengalensis* due to the lack of a predorsal scute (vs. spine-like scute located just anterior to the dorsal-fin origin in

*S. bengalensis*). *Stolephorus ronquilloi* differs from *S. carpentariae* in anal-fin origin position (anal-fin origin just below seventh to ninth dorsal-fin ray origin in *S. ronquilloi* vs. just below second to six dorsal-fin ray origin in *S. carpentariae*) and number of branched anal-fin rays (16–18 vs. 19 or 20) ([1,4,5,14,16]; this study).

Although *S. ronquilloi* has similar coloration (double dark lines on dorsum behind dorsal fin) to *Stolephorus baganensis* Delsman, 1931, *S. bengalensis*, *Stolephorus dubiosus* Wongratana, 1983, and *Stolephorus tri* (Bleeker, 1853), the former differs from the other species in lacking a predorsal scute (vs. spine-like scute located just anterior to dorsal-fin origin) [1,4,5,14]. Detailed comparisons of *S. ronquilloi* with *S. hindustanensis* n. sp. are given under “Comparisons” following the latter.

**Remarks.** *Stolephorus ronquilloi* was described by Wongratana (1983) [1] based on 15 type specimens and 59 non-type specimens collected from the Philippines. Subsequently, the species has appeared in revisional studies of the genus [3,4], or some ichthyofaunal studies (e.g., [5,21]). No studies however indicated voucher specimens, except for Hata et al., (2020) [16] who used the holotype of the species to compare with their new species. Because additional specimens have never been reported, non-type specimens reported in this study represent the second record of the species.

***Stolephorus hindustanensis* n. sp.**

[New English name: Hindustan Anchovy]

Figures 3 and 4; Tables 1–3



**Figure 3.** (A) Lateral and (B) dorsal views; and (C) dorsal-fin origin (without scute) of the holotype of *S. hindustanensis* n. sp. (BMNH 1969.4.22.1648, 53.1 mm SL, Mumbai, India).

*Stolephorus insularis* (not of Delsman): Whitehead et al., 1988 [4] (in part): 413 (north-western part of India).

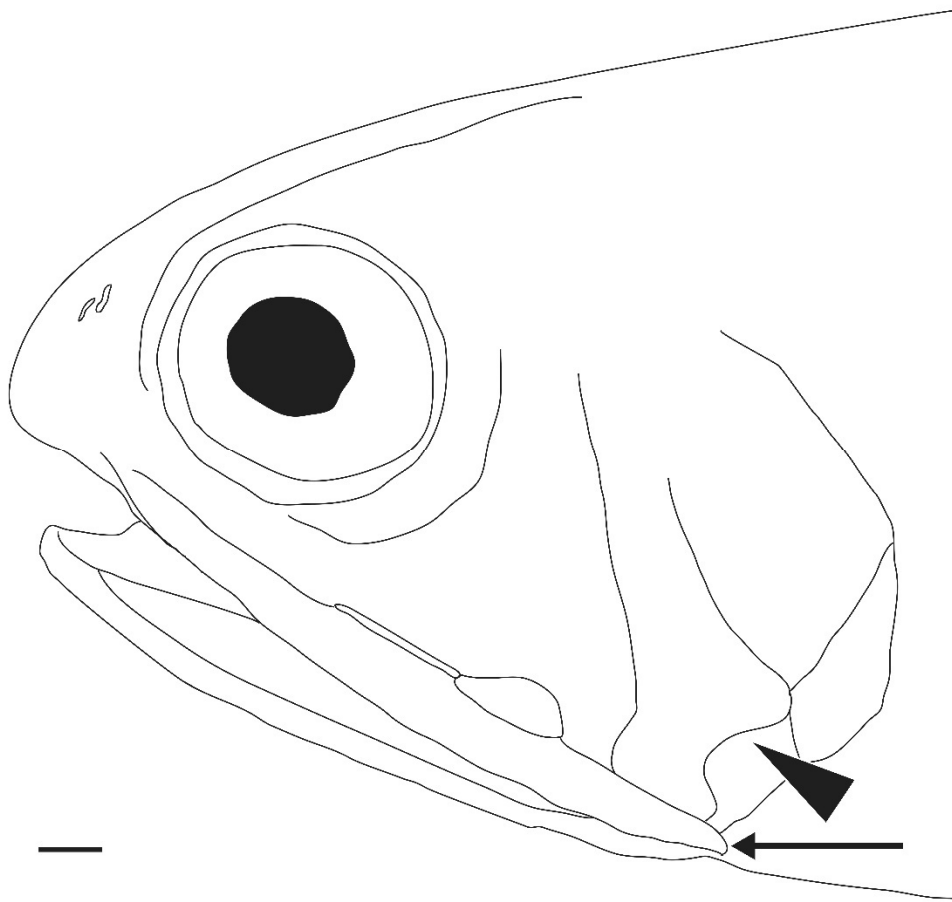
**Holotype.** BMNH 1969.4.22.1648, 53.1 mm SL, Sassoon Docks, Mumbai, Maharashtra State, India, collected by R. Ronquillo.

**Paratypes.** 10 specimens, 47.3–59.9 mm SL: BMNH 1969.4.22.1649–1654, 6 specimens, 49.1–59.9 mm SL, KAUM–I. 165550, 52.0 mm SL, KAUM–I. 165551, 53.0 mm SL, NSMT-P 143988, 47.3 mm SL, NSMT-P 143989, 53.0 mm SL, collected with the holotype.

**Diagnosis.** A species of *Stolephorus* with the following combination of characters: 1UGR 17–20 (modally 19), 1LGR 24–27 (26), 1TGR 42–46 (44); 2UGR 13–15 (14), 2LGR 21–24 (24), 2TGR 35–39 (36); 3UGR 11 or 12 (11), 3LGR 13 or 14 (13), 3TGR 24–26 (24); 4UGR 8 or 9 (9), 4LGR 10–12 (11), 4TGR 19–21 (20); prepelvic scutes 6 or 7 (6); total vertebrae 39 or 40 (39); long maxilla, posterior tip just reaching or slightly short of posterior margin of opercle; no predorsal scutes; pelvic scute without spine; posterior margin of preopercle indented; paired dark patches on parietal area, with a few following pigment spots; distinct double pigment lines along dorsum posterior to dorsal fin; black spots below eye and lower-jaw tip absent; body deep, 23.3–25.3% of SL; pre-anal-fin length relatively long, 65.1–67.1% of SL; distance between origins of dorsal and anal fins long, 23.4–25.7% of SL; distance between pelvic-fin insertion to anal-fin origin relatively long, 19.0–21.5% of SL; pelvic fin long, 9.5–10.1% of SL; third dorsal-fin ray long, 18.6–18.8% of SL; third anal-fin ray long, 15.7–16.1% of SL; postorbital area long, 51.0–53.5% of HL.

**Description.** Data for holotype presented first, followed by data for paratypes in parentheses (if different). Counts and measurements expressed as percentages of SL or HL are given in Tables 1 and 2. Body laterally compressed, elongate, deepest at dorsal-fin origin. Dorsal profile of head and body slightly convex from snout tip to dorsal-fin origin, gently lowering to uppermost point of caudal-fin base. Ventral profile of head and body slightly convex from lower-jaw tip to pelvic-fin insertion, thereafter slowly rising to lowermost point of caudal-fin base. Abdomen somewhat rounded, covered with six (six or seven) spine-like scutes. Pelvic scute without spine. Postpelvic and predorsal scutes absent (Figure 3C). Anus just anterior to anal-fin origin. Snout tip rounded; snout length less than eye diameter. Mouth large, inferior, ventral to body axis, extending backward beyond posterior margin of eye. Maxilla rather long, its posterior tip pointed, just reaching (short of or slightly beyond) posterior margin of preopercle (Figure 4). Lower jaw slender. Single row of conical teeth on each jaw and palatines. Several distinct conical teeth on vomer. Teeth patch on pterygoid. One or two rows of conical teeth on upper edges of basihyal and basibranchial. Eye large, round, covered with adipose eyelid, positioned laterally on head above horizontal through pectoral-fin insertion, visible in dorsal view. Pupil round. Orbit elliptical. Nostrils close to each other, anterior to orbit. Posterior margin of preopercle distinctly indented (Figure 4). Subopercle and opercle with smoothly rounded posterior margins. Gill membrane without serrations. Interorbital space flat, width less than eye diameter. Pseudobranchial filaments present, longest filament length less than eye diameter. Gill rakers long, slender, rough, visible from side of head when mouth opened. Single row of asperities on anterior surface of gill rakers. Isthmus muscle long, reaching anteriorly to posterior margin of gill membranes. Urohyal hidden by isthmus muscle, not visible without dissection. Gill membranes on each side joined distally, isthmus muscle mostly exposed, not covered by gill membrane. Body scales deciduous, completely lacking on specimens, except for prepelvic scutes. Head scales absent. Lateral line absent. Fins scaleless, except for broad triangular sheath of scales on caudal fin. Dorsal-fin origin posterior to vertical through base of last pelvic-fin ray, slightly posterior to middle of body. Dorsal and anal fins with three anteriormost rays unbranched and closely spaced. First dorsal- and anal-fin rays minute. Anal-fin origin just below base of tenth (eighth to tenth) dorsal-fin ray. Posterior tip of depressed anal fin not reaching caudal-fin base. Uppermost pectoral-fin ray unbranched, inserted below midline of body. Posterior tip of pectoral fin not reaching to pelvic-fin insertion. Dorsal, ventral, and posterior margins of pectoral fin nearly linear. Pelvic fin shorter than pectoral fin, insertion anterior to vertical through dorsal-fin origin. Posterior

tip of depressed pelvic fin not reaching to vertical through dorsal-fin origin. Caudal fin forked, posterior tips pointed.



**Figure 4.** Lateral view of the head of holotype of *S. hindustanensis* n. sp. (BMNH 1969.4.22.1648, 53.1 mm SL, Mumbai, India). Triangle and arrow indicate indented preopercle posterior margin, and posterior tip of maxilla, respectively. Bar indicates 1 mm.

**Coloration of preserved specimens.** Body uniformly pale yellow. Light ivory longitudinal band running from just behind upper opercular margin to caudal-fin base. Cheek and opercle silver. A few melanophores scattered on dorsum of snout. No black spots on suborbital area. A pair of distinct dark patches on parietal region, a few pigment spots on occipital area. Scale pockets on dorsum with black posterior margin. Melanophores scattered along bases of dorsal and anal fins. Double pigmented lines dorsally posterior to dorsal fin. All fins transparent, melanophores scattered along fin rays of caudal fin and anterior part of dorsal fin. Caudal fin with black upper and posterior margins.

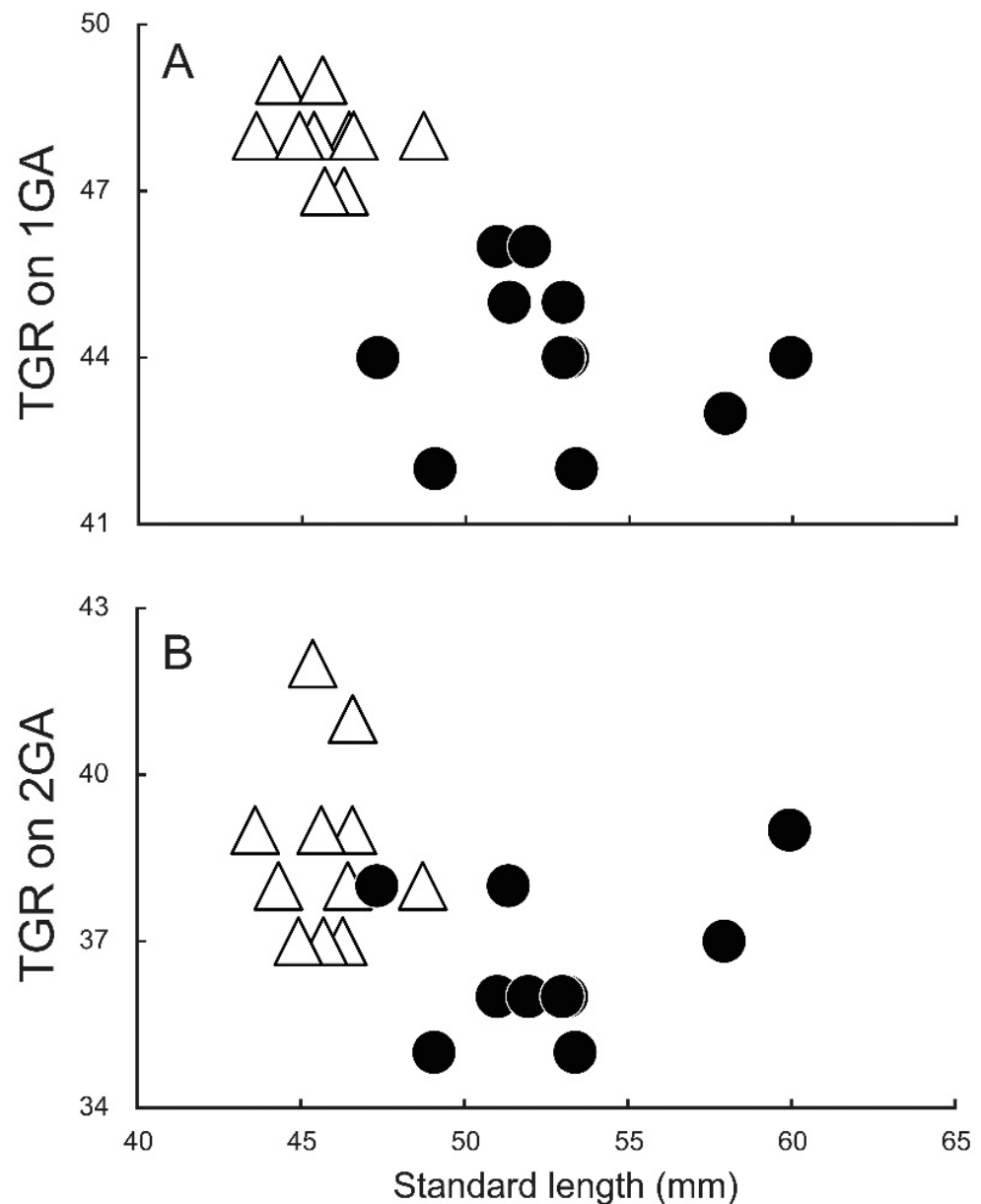
**Distribution.** *Stolephorus hindustanensis* n. sp. is currently known only from Mumbai, northwestern coast of India (Figure 2).

**Etymology.** The specific name “*hindustanensis*” is derived from the Persian name for India (Hindustan), the type locality of the new species.

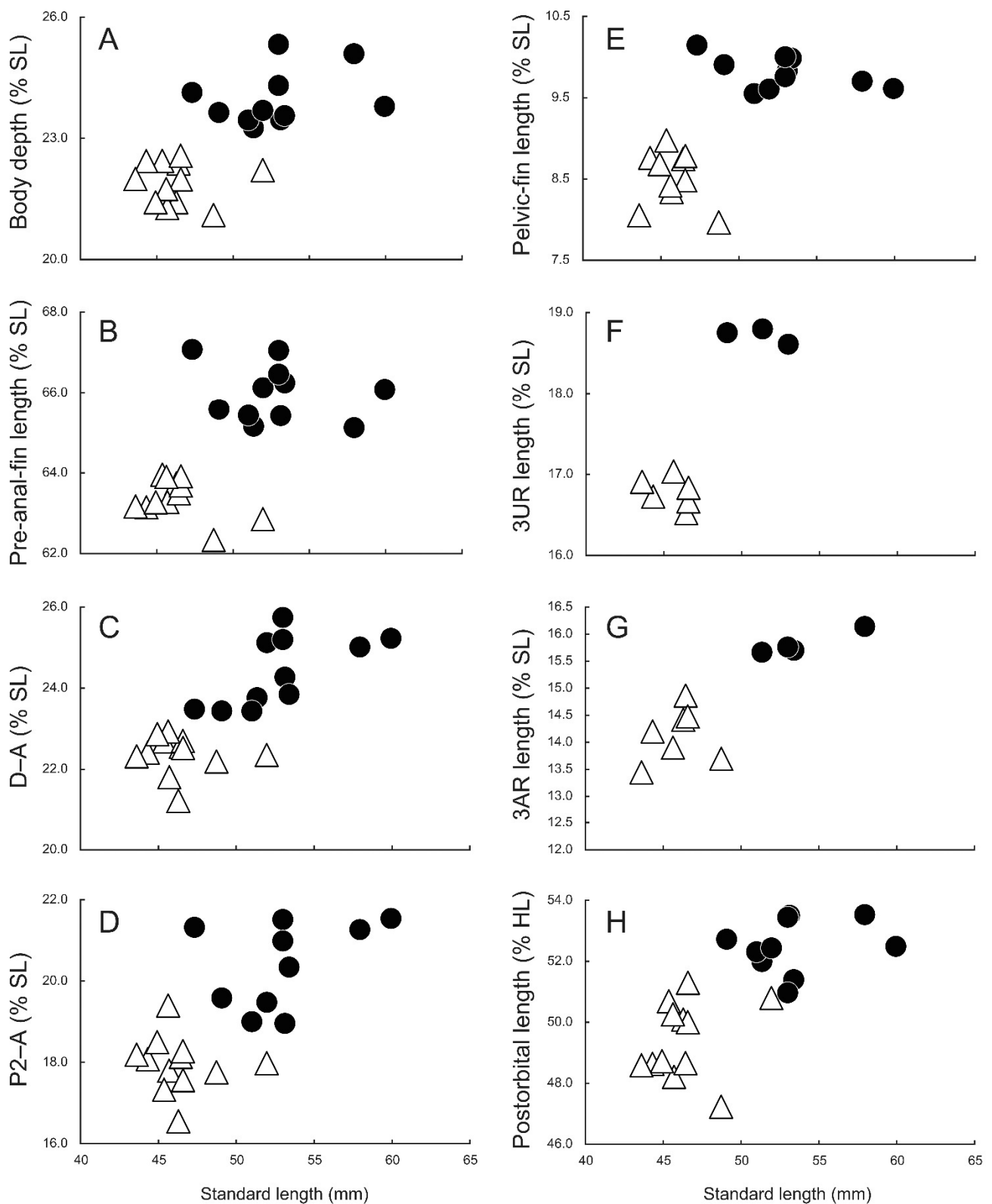
**Comparisons.** The new species is assignable to the genus *Stolephorus*, as defined by Whitehead et al. (1988) [4] and Wongratana et al. (1999) [5], having a long isthmus muscle reaching anteriorly to the posterior margin of the gill membrane, and hidden urohyal and prepelvic scutes, and postpelvic scutes absent. *Stolephorus hindustanensis* n. sp. most closely resembles *S. ronquilloi*, the two species sharing a long maxilla with the posterior tip slightly short of or just reaching the posterior border of the preopercle, indented preopercle posterior margin (Figure 4), and the dorsum with double pigmented lines behind the dorsal fin. Both species lack a predorsal scute, a spine on the pelvic scute, and black spots below the eye and lower-jaw tip ([1,4,5,14,16]; this study). Moreover, the new species differs



from *S. ronquilloi* in having lower numbers of gill rakers on the first and second gill arches (Table 1; Figure 5), higher numbers of total vertebrae [39 or 40 (modally 39) vs. 38–40 (modally 38) (Tables 1 and 3)], a deeper body (23.3–25.3% of SL in *S. hindustanensis* vs. 21.1–26.6% in *S. ronquilloi*), greater distances between the snout tip and anal-fin origin (65.1–67.1% of SL vs. 62.3–64.0%), origins of the dorsal and anal fins (23.4–25.7% of SL vs. 21.2–22.9%), and pelvic-fin insertion and anal-fin origin (19.0–21.5% of SL vs. 16.6–19.4%), and longer pelvic fin (9.5–10.1% of SL vs. 8.0–9.0%), third dorsal-fin ray (18.6–18.8% of SL vs. 16.5–17.0%), third anal-fin ray (15.7–16.1% of SL vs. 13.4–14.9%), and postorbital lengths (51.0–53.5% of HL vs. 47.2–51.3%) (Table 2; Figure 6).



**Figure 5.** Relationships of total gill raker numbers (TGR) on (A) first gill arch (1GA) and (B) second gill arch (2GA) to standard length in *Stolephorus ronquilloi* (triangles) and *S. hindustanensis* (circles) n. sp.



**Figure 6.** Relationships of (A) body depth (as % of standard length; SL), (B) preanal-fin length (as % of SL), (C) distance between origins of dorsal and anal fins (A–D) (as % of SL), (D) distance between pelvic-fin insertion and anal-fin origin (P2–A) (as % of SL), (E) pelvic-fin length (as % of SL), (F) third dorsal-fin ray (3DR) length (as % of SL), (G) third anal-fin ray (3AR) length (as % of SL), and (H) postorbital length (as % of head length) to standard length in *Stolephorus ronquilloi* (triangles) and *S. hindustanensis* (circles).

**Remarks.** Whitehead et al., (1988) [4] stated that some individuals lacked a predorsal scute in their *Stolephorus insularis* Delsman, 1931 (the authorship was shown as Hardenberg, 1933; the species is currently regarded as *S. bengalensis* [14]) referring to Wongratana (1980) [22]. Wongratana (1980) [22] also mentioned the lack of predorsal scute of his *S. insularis* and his list of examined specimens included specimens designated as the type series of *S. hindustanensis* (the type specimens were registered as BMNH 1969.4.22.1648–1658 at that time). Therefore, individuals of *S. insularis* without predorsal scute in Wongratana (1980) [22] and Whitehead et al., (1988) [4] are probably considered as *Stolephorus hindustanensis*.

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**Data Availability Statement:** The datasets generated during and/or analyzed during the current study are available from the corresponding author on request.

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**Conflicts of Interest:** The authors declare no conflict of interest.

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