First Japanese Record of the Engraulid *Thrissina chefuensis* (Teleostei: Clupeiformes), from Yamaguchi Prefecture

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A single specimen of *Thrissina chefuensis* (Günther, 1874) (88.0 mm in standard length), collected from the Japan Sea coast off Shimonoseki City, Yamaguchi Prefecture, Japan, and representing the easternmost record of the species and first from Japanese waters, is described in detail and comparisons made with closely related species. The suitability of previously proposed Japanese names is questioned, and the new name “Tairiku-katakuchi” is proposed.

Key Words: *Thrissa chefuensis*, *Thrissina kammalensis*, Japan Sea, distribution, new country record.

**Introduction**

*Thrissina* Jordan and Seale, 1925, an Indo-Pacific genus of marine and/or brackish water anchovies (Engraulidae Gill, 1861), comprises 24 valid species (Whitehead et al. 1988; Wongratana et al. 1999; Kottelat 2013), many being abundantly caught and marketed in Southeast Asia (Rau and Rau 1980; Conlu 1986; Kimura 2009; Matsunuma 2011, 2013; Chiang et al. 2014; Hata 2018b), although rarely seen off Japan. In fact, only *Thrissina baelama* (Forsskål, 1775) and *Thrissina hamiltonii* (Gray, 1835) have been formally recorded from Japanese waters (Aonuma and Yagishita 2013), the former being included on the Red List of threatened marine fishes issued by the Ministry of the Environment, Government of Japan as “CR (Critically Endangered)” (Kimura 2018).

During a survey of natural history collections, related to the conservation of highly endangered fish species, a single engraulid specimen collected from Toyoura, west coast of Shimonoseki City, facing the Japan Sea, and previously reported as *T. baelama* by Doi et al. (2015), was re-identified as *Thrissina chefuensis* (Günther, 1874). The latter has been reported from the northwestern Pacific from the Korean Peninsula to northern Vietnam (Whitehead et al. 1988; Young et al. 1994: 224, fig. 10 (Tanshui, Lukang, Kaohsiung, Tachi, Wangkun, and Taichung, Taiwan); Wongratana et al. 1999: 1705 (from Hong Kong, China to Korea); Ni and Kwok 1999: 135 (Hong Kong, China); Shao et al. 2008: 236 (Kaohsiung and Pingtung, Taiwan); Munroe and Nizinski 2000: 588 (South China Sea); Tsai et al. 2015: 111 (estuary of Puzih River, Taiwan); Hata 2018a: 42, unnumbered fig. (Ha Long Bay, northern Vietnam). *Thrissa chefuensis*: Wongratana 1987: 109 (South Korea to Hong Kong); Whitehead et al. 1988: 427, unnumbered fig. (Western Pacific from Korea to Hong Kong, China); Young et al. 1994: 224, fig. 10 (Tanshui, Lukang, Kaohsiung, Tachi, Wangkun, and Taichung, Taiwan); Wongratana et al. 1999: 1705 (from Hong Kong, China to Korea); Ni and Kwok 1999: 135 (Hong Kong, China); Shao et al. 2008: 236 (Kaohsiung and Pingtung, Taiwan); Munroe and Nizinski 2000: 588 (South China Sea); Tsai et al. 2015: 111 (estuary of Puzih River, Taiwan); Hata 2018a: 42, unnumbered fig. (Ha Long Bay, northern Vietnam).

**Materials and methods**

Counts and proportional measurements, expressed as percentages of standard length (SL), generally followed Hata and Motomura (2017), the transverse scales not including ventral and predorsal scutes. All measurements were made with digital calipers to the nearest 0.01 mm. The specimen examined here is deposited at Osaka Museum of Natural History (OMNH). Nomenclature and authorship of the genus *Thrissina* followed Kottelat (2013).

*Thrissina chefuensis* Günther, 1874

[English name: Chefoo Thryssa; new standard Japanese name: Tairiku-katakuchi]  
(Fig. 1)

*Engraulis chefuensis* Günther, 1874: 158 (type locality: Chefoo, Shantung Province, China).  
*Engraulis koreanus* Kishinouye, 1908: 101, pl. 20, fig. 2, pl. 21, fig. 6 (type locality: southern coast of Korean Peninsula); ?Mori 1952: 33 [Chinnampo (currently Nampo), North Korea and Chemulpo (currently Incheon), Korea].  
*Stolephorus koreanus*: Mori 1952: 33 [Fusan (currently Busan) and western coast of Korea].  

*Thrissa chefuensis*: Wongratana 1987: 109 (South Korea to Hong Kong); Whitehead et al. 1988: 427, unnumbered fig. (Western Pacific from Korea to Hong Kong, China); Young et al. 1994: 224, fig. 10 (Tanshui, Lukang, Kaohsiung, Tachi, Wangkun, and Taichung, Taiwan); Wongratana et al. 1999: 1705 (from Hong Kong, China to Korea); Ni and Kwok 1999: 135 (Hong Kong, China); Shao et al. 2008: 236 (Kaohsiung and Pingtung, Taiwan); Munroe and Nizinski 2000: 588 (South China Sea); Tsai et al. 2015: 111 (estuary of Puzih River, Taiwan); Hata 2018a: 42, unnumbered fig. (Ha Long Bay, northern Vietnam).

*Thrissa kammalensis* (not of Bleeker, 1849): Zhang 2001: 138, fig. II-65 (Shipu, Zhejiang, Xiamen, Shacheng, Dongxiang, and Suao, Fujien, and Haimen and Guanghai, Guangdong, China): Kim et al. 2005: 97, unnumbered fig. (Korea); Yamada et al. 2007: 218, pl. 10, fig. 6 and unnumbered fig. (Bohai and Yellow seas).

*Thrissa baelama* (not of Forsskål, 1775): Doi et al. 2015: 134
**Material examined.** OMNH-P 25893, 88.0 mm SL, off Murotsu, Toyoura, Shimonoseki City, Yamaguchi Prefecture, Japan, 12–16 m depth, 30 Mar. 2004, set net, coll. by H. Doi.

**Description.** Unbranched dorsal-fin rays 3; branched dorsal-fin rays 11; unbranched anal-fin rays 4; branched anal-fin rays 27; unbranched pectoral-fin ray 1; branched pectoral-fin rays 6; gill rakers on first gill arch 23+29=52; gill rakers on second gill arch 19+30=49; gill rakers on third gill arch 15+18=33; gill rakers on fourth gill arch 12+14=26; gill rakers on posterior face of third gill arch 7; prepelvic and postpelvic scutes 17+10; scale rows in longitudinal series 34; transverse scales 9. Morphometrics (expressed as percentages of SL): head length 27.2; body depth 22.3; pre-dorsal-fin length 50.4; distance from snout tip to pectoral-fin insertion 27.9; distance from snout tip to pelvic-fin insertion 45.9; pre-anal-fin length 66.2; dorsal-fin base length 11.3; anal-fin base length 26.5; caudal-peduncle depth 10.3; pectoral-fin length 11.3; anal-fin ray length 3.8; 4th anal-fin ray length 10.7; 5th dorsal-fin ray length 17.7; pelvic-fin ray length 10.7; interorbital width 6.3; snout length 5.7; orbit diameter 7.9; maxillary length 20.4; mandibular length 17.6; 1st dorsal-fin ray length 2.3; 2nd dorsal-fin ray length 9.5; 3rd dorsal-fin ray length 19.5; 4th dorsal-fin ray length 19.1; 5th dorsal-fin ray length 17.7; 1st anal-fin ray length 0.9; 2nd anal-fin ray length 1.6; 3rd anal-fin ray length 3.8; 4th anal-fin ray length 10.7; 5th anal-fin ray length 12.5.

Body rather elongate, compressed, depth 82.1% of head length, deepest at dorsal-fin origin. Dorsal profile gently elevated from snout tip to dorsal-fin origin, thereafter gradually lowering to uppermost point of caudal-fin base with nearly straight contour. Ventral profile convex from snout tip to pelvic-fin insertion, thereafter gently rising to lowermost point of caudal-fin base. Pectoral-fin insertion slightly posterior to posteriormost point of opercle, lower than snout tip. Posterior tip of pectoral fin pointed, not reaching pelvic-fin insertion. Dorsal, ventral, and posterior margins of pectoral fin nearly straight. Uppermost fin ray of pectoral fin not extended as filament. Pelvic-fin insertion anterior to dorsal-fin origin. Posterior tip of depressed pelvic fin reaching to vertical through origin of 8th dorsal-fin ray.

Dorsal-fin origin posterior to posteriormost point of pelvic-fin insertion. Small spine-like scute located just anterior to dorsal-fin origin. Anal-fin origin posterior to posterior end of dorsal-fin base. Anus situated just anterior to anal-fin origin. Body covered with cycloid scales with numerous vertical grooves. Ventral edge of body covered with 27 keeled scutes from isthmus to anus. Snout tip pointed. Eye large, round, covered with adipose eyelid, positioned laterally on head dorsal to horizontal through pectoral-fin insertion, visible in dorsal view. Pupil round. Interorbital space flat. Orbit elliptical. Nostrils close to each other, anterior to orbit. Anterior nostril slit-like, posterior nostril nearly semi-circular. Mouth large, inferior, ventral to body axis, extending backward beyond posterior margin of eye. Maxilla short, its posterior tip not reaching posterior margin of preopercle. Lower jaw slender. First supramaxilla long, distance between anterior and posteriormost points 79.7% of length of second supramaxilla. Single rows of small conical teeth on both jaws. Teeth on posterior part of maxilla pointing forward. Several small teeth on vomer. Rows of palatine teeth increasing posteriorly (single and double rows anteriorly and on mid-section, respectively), forming a patch posteriorly on palatine and endopterygoid. Hyoid with small teeth on dorsal surface. Basihyal and basibranchial both with a teeth patch. Posterior margins of preopercle, subopercle and opercle convex, rounded, without serrations. Pseudobranchial filaments present, covered with fleshy membrane. Gill rakers long, slender. Serrae on gill rakers not clumped. Gill membrane on each side joined distally, most isthmus muscle exposed (not covered by gill membrane). Scales absent on head. Lateral line absent. Scales absent on fins.

**Color of preserved specimen:** Body uniformly silver without distinctive markings. Dorsum brown, blackish anterior to dorsal fin. Melanophores densely distributed from snout tip to occiput, less dense and scattered along dorsal- and caudal-fin rays.

**Distribution.** *Thrissina chefuensis* is distributed in the northwestern Pacific, from the southern coast of the Korean Peninsula to northern Vietnam, Taiwan, and Yamaguchi Prefecture, Japan (Whitehead et al. 1988; Young et al. 1994; Wongratana et al. 1999; Zhang 2001; Yamada et al. 2007; Hata 2018a; this study).
**Remarks.** The specimen collected from Yamaguchi Prefecture was assigned to the genus *Thrissina* [classified by Whitehead et al. (1988) and Wongratana et al. (1999) as *Thrissa*; see Kottelat (2013) for nomenclatural discussion], having keeled prepelvic and postpelvic scutes along the ventral edge, a small spined-scute just before the dorsal-fin origin, the dorsal and anal fins with 14 and 31 rays, respectively, the uppermost pectoral-fin ray not extended as a filament, and small conical teeth on both jaws. Moreover, the specimen was further identified on the basis of the following combination of characters that closely matched the diagnostical features of *Thrissina chefuensis* given by Wongratana (1987), Whitehead et al. (1988), and Wongratana et al. (1999): maxilla short, its posterior tip not reaching posterior margin of preopercle; 29 lower gill rakers on first gill arch; 17 + 10 keeled scutes on ventral edge of body; first supramaxilla long, its length 79.7% of length of second supramaxilla; and no distinct markings on body.

Although *T. chefuensis* has been frequently regarded as a junior synonym of *Thrissina kammalensis* (Bleeker, 1849) (e.g., Fowler 1941; Matsubara 1955; Youn and Kim 1996; Zhang 2001; Kim et al. 2005), it can be easily distinguished from the latter by the shorter maxilla, its posterior tip not reaching the preopercle posterior margin (vs. reaching opercular margin in *T. kammalensis*), anal fin with 25–31 (vs. 30–33) branched rays, prepelvic and postpelvic scutes numbering 16–18+9–10=25–28 [vs. 15–16 (rarely 17)+8–9 (rarely 7)=23–25 (rarely 22 or 26)], and body without distinct markings (vs. a saddle-like black blotch on nape; Whitehead et al. 1988; Wongratana et al. 1999). Moreover, *T. kammalensis* is distributed in the Indo-West Pacific from Andaman coast of Thailand to Sulawesi, these two species occurring allopatrically (Whitehead et al. 1988; Wongratana et al. 1999).

The description of *Engraulis koreanus* Kishinouye, 1908 (Japanese name “Ainoko-iwashi”), unquestionably regarded as a junior synonym of *T. chefuensis* by Whitehead et al. (1988), was based on a specimen collected from the southeastern coast of the Korean Peninsula. The number of keeled scutes along the ventral edge of *E. koreanus* given by Kishinouye (1908) (17+7=24) was lower than in *T. chefuensis*, according to Whitehead et al. (1988) (16–18+9–10=25–28). Whitehead et al. (1988), noting the apparent loss of the type specimen of *E. koreanus*, suggested that the species may be conspecific with *Thrissina hamiltonii* (Gray, 1830). However, Kishinouye’s (1908) figure (fig. 2 of pl. 20) showed the posterior tip of the maxilla of *E. koreanus* just short of the opercular posterior margin (reaching or slightly beyond the margin in *T. hamiltonii*; Whitehead et al. 1988; Wongratana et al. 1999). Therefore, *E. koreanus* is not presently considered as conspecific with *T. hamiltonii*, although examination of further material is necessary to confirm the taxonomic status of the former.

*Thrissina chefuensis* has been recorded from the northwestern Pacific from the southern coast of the Korean Peninsula to northern Vietnam (see “Distribution”), but not previously from Japanese waters. In their list of fishes collected from the Hibikinada Sea, western Japan, Doi et al. (2015) reported the specimen examined here, but erroneously identified it as *Thrissa baekama*. Distinguished from *T. baekama* by having more pre- and post-pelvic scutes (4–9+7–10=12–18 in *T. baekama*) and higher counts of lower gill rakers on the first gill arch (27–30 in *T. chefuensis* vs. 18–26 in *T. baekama*; Whitehead et al. 1988; Wongratana et al. 1999), the present specimen represents the first record of *T. chefuensis* from Japan, and the easternmost record of the species.

Although Kishinouye (1908) proposed the Japanese name “Ainoko-iwashi” for the species, such may cause confusion due to more similar names having been given to the genera *Stolephorus* Lacepède, 1803 (Japanese name: Indo-ainokoiwashi-zoku) and *Encrasicholina* Fowler, 1938 (Taiwan-ainokoiwashi-zoku), than to *Thrissina* (Oiwashi-zoku). Therefore, “Ainoko-iwashi” is here considered as unsuitable as the standard Japanese name of *T. chefuensis*. Furthermore, although Mori (1952) proposed the Japanese name “Manshukatakuchiwashi” for *T. chefuensis* (as *Engraulis chefuensis*) in a checklist of fishes from Korea, he noted only the species name without a description or voucher specimens. Because he also included *E. koreanus* in the checklist, there remains the possibility that *T. chefuensis* sensu Mori (1952) is specifically different from *T. chefuensis* sensu Whitehead et al. (1988). Therefore, Mori (1952)’s “Manshu-katakuchi” is similarly considered as unsuitable for *T. chefuensis*. Accordingly, we propose the new standard Japanese name “Tairiku-katakuchi” for *T. chefuensis* (as *Engraulis chefuensis*), based on the specimen reported herein (OMNH-P 25893); “Tairiku” meaning “continent”, in reference to the species being mainly distributed along the coastal Northeast Asian Continent, and “katakuchi” being the common Japanese name for the family Engraulidae.

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