A Revision of the Family Engraulidae (Pisces) from Taiwan

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Shuh-Sen Young, Tai-Sheng Chiu and Shih-Chieh Shen (1994) A revision of the family Engraulidae (Pisces) from Taiwan. Zoological Studies 33(3): 217-227. Twelve species, belonging to five genera, have been found in the coastal waters around Taiwan. They are: Engraulis japonica, Encrasicholina punctifer, E. heteroloba, Stolephorus commersonii, S. indicus, S. insularis, S. waitei, Setipinna tenuifilis, Thryssa chefuensis, T. dussumieri, T. hamiltonii and T. setirostris. This record of Stolephorus waitei is the first in Taiwan. Misidentifications of Setipinna taty and Thryssa kammalensis previously are corrected as Setipinna tenuifilis and Thryssa chefuensis, respectively. The identification key, diagnostic characteristics, synonyms, and detailed illustration of the engraulid species are presented.

Key words: Anchovies, Fish taxonomy, Herringlike fishes.

The members of Engraulidae, commonly known as anchovies or engraulid, are small to moderate-sized fishes in suborder Clupeoidei, characterized by having a common prominent snout overhanging the mouth. Sixteen genera and 139 species have been identified around the world (Nelson 1984). Engraulid fish ranges widely from 60°N to 50°S. Primarily, this family includes marine coastal species with schooling behavior. Some species penetrate into brackish water while most species dwell in seawater permanently (FAO 1988).

Twelve anchovies species in Taiwan were reported by Shen (1959), i.e., Engraulis japonica, Setipinna taty, Stolephorus zollingeri (=Encrasicholina punctifer), S. pseudoheterolobus (=Encrasicholina heteroloba), S. tri, S. commersonii, S. indicus, Thrissa (=Thryssa) dussumieri, T. setirostris, T. kammalensis and T. hamiltonii. Shen (1984) categorizes 15 species to the family Engraulidae and amended the following species: replaced S. zollingeri with S. punctifer, S. pseudoheterolobus with S. heterolobus, and S. insularis with S. bataviensis, substituted genus name Thrissa with Thryssa and subjoined T. mystax, Coilia mystus and C. grayi. These fifteen species of Shen (1984), were recognized by Chen and Yu (1986). However, S. pseudoheterolobus (not S. heterolobus, treated as a separate species) and Thrissina baelama were listed as Engraulidae. Additionally Thryssa was replaced by Thrissocles.

Engraulidae are abundant along the Indo-Pacific coast. The most recent comprehensive Engraulidae classification was undertaken by Wongratana (1980). After examining specimens from around the world, Wongratana (1980) was able to clear up many nomenclatural questions and to correct documented misidentification which had previously been based on limited material. He described 11 new species of Engraulidae (Wongratana 1983) and provided keys to the species of Engraulis, Encrasicholina, and Stolephorus (Wongratana 1987).

A survey of literature concludes that 14 engraulid species are potentially distributed to the waters around Taiwan: Engraulis japonica, Encrasicholina punctifer, E. heteroloba, E. devise, Setipinna tenuifilis, Stolephorus commersonii, S. indicus, S. chensis, S. insularis, Thryssa chefuensis, T. adelae, T. dussumieri, T. hamiltonii, and T. setirostris (Shen 1959 1984, Wongratana 1980, FAO 1988). In addition, three species of Coilia (C. grayi; C. mystus and C. nasus) are present in the coastal waters of China, in both brackish water and freshwater areas; but, these fishes have not been located in the waters of Taiwan.

Herring-like fishes, especially engraulid, are
heavily utilized in the waters around Taiwan. The general biology of three major species, *Engraulis japonica*, *Encrasicholina punctifer* and *Encrasicolina heteroloba*, are relevant realized (Shen 1969 1971, Chen 1979 1980 1984 1986 1987 1989, Chen and Jean 1982, Young et al. 1992). However, knowledge of classification and distribution of engraulid is relative limited. We conducted a general survey of engraulid specimens from the waters around Taiwan. The current status of engraulid classification stands revised as foundation for further taxonomic, fishery, and biological investigations.

**MATERIALS AND METHODS**

Most specimens, 284 examined and 166 measured, were collected fresh from the coastal water of Taiwan and currently are deposited in the Economic Fish Laboratory, Department of Zoology, National Taiwan University. The other 242 specimens catalogued in the Museum of Department of Zoology, National Taiwan University (NTUM) were also checked.

Pigmentation and external morphology were observed on fresh specimens. Formalin preserved specimens were used as reference. Counts and measurements were obtained in accordance with those proposed by Hubbs and Lagler (1964), Shen (1959), and Wongratana (1983 1987), with minor modification. Small specimens were examined under binocular microscope. Vertebrin and fin ray counts were performed on the cleared-and-stained specimens; the Potthoff (1984) clear and stain method was used. The abbreviations for meristic and morphometric characteristics are: SL — standard length, D — dorsal fin ray, A — Anal fin ray, P — pectoral fin ray, V — pelvic fin ray, VERT — vertebrae, PRS — Pre-pelvic keeled scute, PS — pelvic scute, POS — Post-pelvic keeled scute, GR — 1st gillraker, UGR — 1st upper gillraker, LGR — 1st lower gillraker, PDS — pre-dorsal spine, PCV — precaudal vertebrae, CV — caudal vertebrae, IH — inter-haemal spine, SD — length from snout to dorsal fin origin, DB — length of dorsal fin base, POD — length from dorsal fin posterior to last haemal vertebra, POA — length from anal fin posterior to last haemal vertebra, AB — length of anal fin base, PA — length from pectoral fin to anal fin origin, SV — length from snout to pelvic fin base, SP — length from snout to pectoral fin base, SA — length from snout to anal fin origin, BH — body height at the first dorsal fin ray, and DA — length from origin of dorsal fin to origin of anal fin (Fig. 1).

**RESULTS AND DISCUSSION**

Twelve engraulid species from the coastal waters of Taiwan have been assigned to five genera. Those genera include *Engraulis*, *Stolephorus*, *Setipinna* and *Thryssa* (Shen 1984); and the addition of *Encrasicholina*. Two species, assigned to *Stolephorus* previously, now constitute the genus of *Encrasicholina* (Nelson 1983), i.e. *S. punctifer = E. punctifer* and *S. heterolobus = E. heteroloba*. Nelson (1983) made this proposal based on the morphology of the sensory canal system and urohyal structure. Given no further phylogenetic analysis, the proposed genus name *Encrasicholina* is adopted in this study. *Setipinna tatyi* mentioned by Shen (1959 1984) and Chen and Yu (1986) is considered to be misidentified from *Setipinna tenuifilis*. *Thrissa kammalensis* also noted by Shen (1959 1984) should be identified as *Thrissa chefuensis*. Three species described by Shen in 1984 but not in his 1959 work; *Thrissa mystax*, *Collia mystus*, and *Collia grayii*, are no longer considered indigenous to Taiwan. The change of the genus name *Thrissa* to *Thrissoces* by Chen and Yu (1986) should be regraded as invalid. The distribution charts worked out by Wongratana (1983) should be revised so that *Stolephorus commeronii* and *Stolephorus waieti* extend to the Taiwan coast. *Encrasicholina devise*, possibly indigenous to Taiwan, is not found in this study.

**Key to genera and species**

1a. Anal fin ray less than or equal to 22, postpelvic scutes absent ........................................... 2
1b. Anal fin ray more than 22, postpelvic scutes present ........................................... 8

2a. Prepelvic scutes absent, anal fin originates well behind last dorsal fin ray (*Engraulis*) ............ *Engraulis japonica*

**Fig. 1.** Diagram for morphometric measurements.
Identification of engraulid species from Taiwan is feasible based on meristic and morphometric characteristics (Tables 1, 2). In short, monotypic genera of *Engraulis* and *Setipinna* are readily separated by PRS and CV characteristics. Further separation of *Thryssa* is possible based on higher PRS counts. More care is needed to discriminate *Encrasicholina* and *Stolephorus*; however, other qualifiable key characteristics are reading available (see Key to genera and species).

*Engraulis japonica* Temminck and Schlegel

(Fig. 2)

*Engraulis japonica* Temminck and Schlegel, 1846: 239 (Japan).

**Stolephorus celebicus**: Hardenberg, 1933: 262.


**Coloration**: In fresh specimens, brown dorsally, head to tip of snout. Abdominal silvery white. Young stage has silver banding lateral.

**Distribution**: Most of Taiwan strait and north of Hualien in the east.

**Remark**: Two forms of *E. japonica* are found. Normal form: slender, black body with deeper color on dorsal, located in the northern coast of Taiwan from February to May. Local form: hatched during spring, growth in coastal waters of Taiwan is characterized by round body shape, pale color dorsally and silver stripe laterally.

*Encrasicholina heteroloba* (Rüppell)

(Fig. 3)

*Encrasicholina heteroloba* Rüppell, 1837: 79 (Massawa, Red Sea).


**Coloration**: In fresh specimens, brown dorsally, head to tip of snout. Abdominal silvery white. Young stage has silver banding lateral.

**Distribution**: Most of Taiwan strait and north of Hualien in the east.

**Remark**: Two forms of *E. japonica* are found. Normal form: slender, black body with deeper color on dorsal, located in the northern coast of Taiwan from February to May. Local form: hatched during spring, growth in coastal waters of Taiwan is characterized by round body shape, pale color dorsally and silver stripe laterally.
Table 1. Meristic characteristics for engraulid species

<table>
<thead>
<tr>
<th>Species</th>
<th>N</th>
<th>SL</th>
<th>D</th>
<th>A</th>
<th>P</th>
<th>V</th>
<th>PRS</th>
<th>PS</th>
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<tr>
<td><strong>Engraulis japonica</strong></td>
<td>48</td>
<td>34-100.3</td>
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<td>3,15-18(16)</td>
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<td>34</td>
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<td>3,11-13(12)</td>
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<td>13-15(14)</td>
<td>7</td>
<td>4-6(5)</td>
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<tr>
<td><strong>E. punctifer</strong></td>
<td>22</td>
<td>39.3-66.6</td>
<td>2,11-12(11)</td>
<td>2,12-14(13)</td>
<td>14-16(16)</td>
<td>7</td>
<td>6-4(4)</td>
<td>0</td>
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<tr>
<td><strong>Stolephorus commersonii</strong></td>
<td>6</td>
<td>83.9-90.9</td>
<td>3,12-13(13)</td>
<td>3,17-19(18)</td>
<td>13-14(13)</td>
<td>7</td>
<td>3-4(4)</td>
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<td>14(14)</td>
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<td>7</td>
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**Table 2. Morphometric characteristics for engraulid species**

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<th>PA</th>
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<th>SP</th>
<th>SA</th>
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<td>36.4</td>
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<td>19.1</td>
<td>47.5</td>
<td>28.6</td>
<td>66.2</td>
<td>17.7</td>
<td>21.8</td>
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<td>36.7</td>
<td>18.2</td>
<td>14.2</td>
<td>22.0</td>
<td>47.0</td>
<td>25.2</td>
<td>66.7</td>
<td>16.2</td>
<td>22.0</td>
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<td>19.2</td>
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<td>30.1</td>
<td>17.2</td>
<td>19.3</td>
<td>18.9</td>
<td>45.6</td>
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<td>26.0</td>
<td>64.0</td>
<td>27.1</td>
<td>27.6</td>
</tr>
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</table>


N — sample size, SL — standard length, SD — length from snout to dorsal fin origin, DB — length of dorsal fin base, POD — length from dorsal fin posterior to last haemal vertebra, POA — length from anal fin posterior to last haemal vertebra, AB — length of anal fin base, PA — length from pectoral fin to anal fin origin, SV — length from snout to pelvic fin base, SP — length from snout to pectoral fin base, SA — length from snout to anal fin origin, BH — body high at the first dorsal fin ray, DA — length from origin of dorsal fin to origin of anal fin.


Coloration: In fresh specimens, body color yellowish below, a little grayish on back, a light silvery later band on sides.

Distribution: Waters around Taiwan.

Remark: *E. heteroloba* (= *S. pseudoheterolobus*, Shen (1959), *S. heterolobus*, Shen (1984), and *S. heterolobus*, Chen and Yu (1986)). This species is characterized by having 3 first unbranched dorsal and anal rays. The first tiny ray may not be seen in un-treated specimens. It might be confused with *E. devisi* which also has three unbranched rays on dorsal and anal fins. Other characteristics are basically similar to the co-generic species of *E. heteroloba*.

**Encrasicholina punctifer** Fowler

(Fig. 4)

Encrasicholina punctifer Fowler, 1938: 158 (Fare Bay, Society Island).


**Fig. 2.** *Engraulis japonica* Temminck and Schlegel. A: local form, SL = 75 mm; B: normal form, SL = 120 mm.

**Fig. 3.** *Encrasicholina heteroloba* (Rüppell). SL = 74 mm.

**Fig. 4.** *Encrasicholina punctifer* Fowler. SL = 67 mm.
Coloration: In fresh specimens, dorsally brown, ventrally pale yellow, a light silvery lateral band. 

Distribution: Waters around Taiwan.

**Stolephorus commersonii Lacepede**

(Fig. 5)

Stolephorus commersonii Lacepede, 1803: 361 (Mautitius).


Coloration: Body translucent, flesh brown, silver lateral stripe when fresh. A black spot on occipital. A pair of dark patches behind occipital, followed by a pair of dark lines extending to dorsal fin origin in preserved specimens.

Distribution: Waters south-west of Taiwan.

**Stolephorus indicus (van Hasselt)**

(Fig. 6)

Engraulis indica van Hasselt, 1823: 329 (Java).
Stolephorus indicus nanus: Hardenberg, 1933: 236.
Stolephorus extensus: Jordan and Seale, 1926: 382.
Stolephorus insularis: Jordan and Seale, 1926: 381.


Coloration: Body translucent, flesh brown, silver lateral stripe when fresh. A black spot on occipital. No dark pigment lines on back (compare to S. commersonii) when preserved.

Distribution: Waters south-west of Taiwan.

Remark: S. indicus (= S. insularis of Shen 1959), is characterized by a truncated maxilla, reaching anterior margin of preoperculum in contrast to other Stolephorus species. The maxilla of Stolephorus, other than S. indicus, extends to gill opening.

**Stolephorus insularis Hardenberg**

(Fig. 7)

Stolephorus insularis Hardenberg, 1933: 260 (Java).
Stolephorus insularis oceanicus: Hardenberg 1933: 261.
Anchoviella bataviensis: Fowler, 1941: 708.


Coloration: Body translucent, pale white, silver lateral stripe, tail is deeply yellow when fresh. A double dark pigment line on back, behind dorsal fin to caudal fin when preserved.

Distribution: Western Taiwan coastal waters.

Remark: S. insularis was misidentified as S. tri in Taiwan coastal waters (Shen 1959). Currently, we have not located any specimen of S. tri, which is characterized by having a pelvic scute and a double dorsal pigment line.

Stolephorus waitei Jordan and Seale  
(Fig. 8)

Stolephorus waitei Jordan and Seale, 1926: 380 (Queensland).  
Stolephorus insularis bataviensis: Hardenberg, 1933: 261.  
Anchoviella waitei: Fowler, 1941: 702.  


Coloration: Several black spots below eye level, situated behind eye and lower jaw; both distinctive to other engraulid species. When fresh, body translucent, pale yellow, silver stripe lateral, tail yellow.

Distribution: Only collected from Suao (eastern Taiwan coastal waters).

Setipinna tenuifilis (Valenciennes)  
(Fig. 9)

Engraulis tenuifilis Valenciennes, in Cuvier and Valenciennes, 1848: 62 (Rangoon).  
Setipinna gilbert: Jordan and Starks, 1905: 194.  


**Distribution:** Southern coastal waters of Taiwan.

**Remark:** *Setipinna tenuifilis* was previously misidentified as *S. taty* (Shen, 1959). *S. taty* is distinct from *S. tenuifilis* in the number of scutes and gill rakers.

**Thryssa chefuensis** (Gunther)  
(Fig. 10)

*Engraulis chefuensis* Gunther, 1874: 158 (Chefu, China).  
*Scutengraulis kammalensis:* Tchang et al., 1955: 54.  

**Materials:**  

**Diagnosis:**  

**Coloration:** A dark blotch behind upper part of gill opening when fresh, in preserved specimens the dark blotch pales.

**Distribution:** Western and north-eastern coastal waters of Taiwan.

**Remark:** *Thryssa chefuensis* was misidentified as *T. kammalensis* (Shen 1959). *T. kammalensis* is distinct from *T. chefuensis* in having a longer maxilla (reaching to or beyond the gill opening) and more anal fin ray (3/31-3/32) (Bleeker 1849, Fowler 1941, Whitehead et al. 1969, Wongratana 1980).

**Thryssa dussumieri** (Valenciennes)  
(Fig. 11)

*Engraulis dussumieri* Valenciennes, in Cuvier et Valenciennes, 1848: 69 (no locality).  
*Engraulis dussumieri:* Weber and de Beaufort, 1913: 41.  

**Materials:**  

**Diagnosis:**  

**Coloration:** In fresh specimens, a dark blotch behind the upper part of the gill opening is sometimes joined to a dark saddle on head.

**Distribution:** Coastal waters of western Taiwan.

**Thryssa hamiltonii** (Gray)  
(Fig. 12)

*Thrissa hamiltonii* Gray, 1835: pl.92 (India).  

**Materials:**  

**Diagnosis:**  

**Coloration:** In fresh specimens, a dark blotch behind the upper part of the gill opening is sometimes joined to a dark saddle on head.

**Distribution:** Coastal waters of western Taiwan.
Fig. 12. *Thryssa hamiltonii* (Gray). SL = 196 mm.


**Coloration**: Fresh specimens have a dark blotch behind the upper part of the gill opening. The anal fin and caudal fin are deep yellow when fresh.

**Distribution**: Taiwan strait.

**Remark**: *Thryssa mystax* was subjoined to the Engraulidae list of Taiwan (Shen 1984). Two specimens named with *T. mystax* was cataloged with NTUM01798 collected from Quemoy (near to Amoy). These specimens (or rather this species) very similar to *T. hamiltonii*. Based on the data of Wongratana (1980), *Thryssa mysta* (Shen 1984) should be assigned to *T. adelae*. Since no further specimens are available and Wongratana (1980) have examined limited sources from Amoy, this conclusion is tentative. The taxonomic status of *T. adelae* needs further investigation.

*Thryssa setirostris* (Broussonet) (Fig. 13)

Fig. 13. *Thryssa setirostris* (Broussonet). SL = 105 mm.

*Clupea setirostris* Broussonet, 1782: pl. 2 (New Hebrides).

*Clupea mystacina*: Bloch and Schneider, 1801: 428.


**Diagnosis**: D iii + 11-12, A iv + 33-40, P 13-14, V 7, GR 5-6 + 10-12, VERT 20 + 25. Body compressed. Pre-pelvic keel scute 17, pelvic 1, post-pelvic 7-8. Maxilla very long (the longest in Engraulidae), reaching least to the tip of the pectoral ray, usually at the pelvic fin base, or to the anal fin origin. Anal fin long, origin below the posterior part of dorsal fin base.

**Coloration**: Fresh specimens, gold tinted head. Anal fin and caudal fin deep yellow.

**Distribution**: Coastal waters of Taiwan.

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**REFERENCES**

台灣鰻科魚類分類之修訂

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鰻科魚類為台灣沿海重要的經濟魚類，根據過去的報告及目前所採集的標本，經整理後，共計分為5屬12種：日本鰻魚（Engraulis japonica）、刺公鰻（Encrasicholina punctifer）、異葉公鰻（E. heteroloba）、孔氏小公魚（Stolephorus coomersonii）、印度小公魚（S. indicus）、馬嶼小公魚（S. insularis）、魏氏小公魚（S. waiti）、黃鰻（Setipinna tenuifilis）、芝蕪綾鰻（Thryssa chefuensis）、杜氏綾鰻（T. dussumieri）、漢氏綾鰻（T. hamiltonii）、長領綾鰻（T. setirostris），其中魏氏小公魚為台灣的新記錄種，以往鑑定錯誤的干麥爾綾鰻（T. kammalensis）及絲翅鯽（S. taty）已修正為芝蕪綾鰻及黃鰻。檢索表、主要判別特徵、異名及種的圖繪亦在本報告中呈現。

關鍵詞：鰻魚、魚類分類、魶類魚。

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