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OCCURRENCE AND REDESCRIPTION OF *THRYSSA SETIROSTRIS* (BROUSSONET, 1782) (CLUPIFORMES, ENGRAULIDAE) FROM IRAQI MARINE WATER

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ABSTRACT

Nine fish specimens of *Thryssa setirostris* (Broussonet, 1782) were collected from the Arabian Gulf, during the period from July 2015 to April 2016. Because of the scarcity of this fish and overlapping and ambiguous of its taxonomic characters with other *Thryssa* spp., a detailed taxonomic study was conducted. The present study includes the most important meristic and morphometric characteristics.

The mean of the total length of the specimens was 149.67 mm; dorsal fin consists of 12 rays, anal fin with 34-37 rays and pectoral fin with 12-13 rays; Gill rakers were 4 upper,1 medial and10 lower. The most important character that isolates *T. setiristis* from other close *Thryssa* spp. is the maxilla which is considered very long and reach beyond the tip of the pectoral fin.

INTRODUCTION

Clupeid fishes is a group of the most important global commercial fish, which include well-known fishes as herrings, sardines and anchovies (Li and Orti, 2007); According to Froese and Pauly (2018) this group is divided into seven families Dentricipidae, Pristigasteridae, Engraulidae, Clupeidae, Chirocentridae, Dussumieriidae and Sundusalangidae.

Engraulidae are distributed in all marine habitats, extended from 60° N to 50°S. They are abundant along the Indo-Pacific coasts, Atlantic and Indian oceans (Whitehead *et al*., 1988; Froese and Pauly, 2018). The engrulids characterized by having prominent snout (overhanging the mouth), single dorsal fin without spines, maxilla well extends behind the eye and scutes are present in most species (Young *et al*., 1994; Carpenter *et al*., 1997). This family comprises 17 valid genera, including *Thryssa*. This genus has 31 nominal species, mostly distributed in Indo-Pacific regions, and the Indian Ocean including Gulf of Oman; they are abundant in the Arafura Sea (Froese and Pauly, 2018). Kuronuma and Abe (1972, 1986) mentioned *Thryssa mystax* in both studies, while the latter mentioned *T, purava*, *T. malabarica* and *T. hamiltonii* in the Arabian gulf. Carpenter *et al*. (1997) mentioned five species vis., *T. baelama*, *T. dussumieri*, *T. hamiltonii*, *T. vitrirostris* and *T. whiteheadi*. Bishop (2003) mentioned six species of Engraulidae off Kuwait, including three species of *Thryssa* but he didn't mention *T. setirostris*. Al-Faisal (2012) published a taxonomic study of three species of *Thryssa* including *T. whiteheadi*, *T. mystax* and *T. vitrirostris*. Six species of *Thryssa* were recorded in Iraq, including *T. setirostris* (Nader and Jawdat, 1977; Coad, 1991;

Adday, 2013). The present study deals with the occurrence of this rare species in the Iraqi marine water and detailed merestic and morphometric measurements.

MATERIALS AND METHODS

Nine specimens of *T. setirostris* (Broussonet,1782) were collected during the period from July 2015 till April 2016 from the north western Arabian Gulf (48° 44′ to 48° 46′ N; 29° 46′ to 29° 47′ E); Fish specimens were caught by means of a trawl net, and kept in ice, then transferred to the laboratory where it was examined as soon as possible. Morphometric and meristic measurements were achieved according to Wangratana (1987). Fine characters were detected under Meiji dissecting microscope.

Total, fork and standard lengths were measured by scale measurement to the nearest 0.1 mm, lengths of different morphometric terms were measured using digital vernier; the ranges of measurements were given followed by means between parenthesis.

RESULTS AND DISCUSSION

Thirty nine parameters were detected from nine specimens of long jaw thryssa *Thryssa setirostris* (Pl. 1) from the Iraqi marine water.

Plate (1)*:Thryssa setirostris*, 125 mm in standard length.

The total length of the specimens ranged from 116-165 (149.67) mm; dorsal fin consists of 12 rays; anal fin with 34-37 rays (Tab. 1).

Table(1)*: Meristic and morphometric characters of *T. setirostris*.

Biometric characters	1	2	3	4	5	6	7	8	9
Total length	154	116	148	152	150	153	155	154	165
Standard length	126	95	121	128	121	124	127	125	132
Forked length	135	104	130	134	131	135	135	135	144
Body d. d.	34.2	24.6	32.4	36.1	33.2	33.6	34.5	33.3	33.8
Body d. a.	30.7	22.0	30.3	30.9	30.8	29.5	31.2	31.5	30.6
Body width	12.1	8.6	11.2	12.0	11.5	11.6	12.2	11.2	11.3
Head length	24.8	18.9	25.3	25.3	25.5	23.6	25.5	26.5	27.4
Head depth	23.2	16.8	21.7	22.7	21.6	21.2	22.2	12	22.5
Head width	9.3	7.8	10.4	11.3	10.5	10.1	10.8	10	10.4
Int. orb. w.	5.5	4.7	5.5	6.2	5.6	5.8	5.8	5.9	5.8
Eye diameter	6.5	5.9	6.8	6.7	6.6	6.9	7.2	7.1	7.0
Snout length	2.53	2.4	2.5	3.1	3.01	3.3	3.4	3.5	3.4
Post orb. length	16.7	10.7	15.4	16.7	15.8	15.4	16.3	16.4	17.5
Up. jaw length	13.7	11.3	13.1	13.5	16	14.2	13.7	12.9	15.2
Lo. jaw length	13.1	10.8	12.5	13.0	14.9	12.4	12.3	11.8	13.5
Dorsal fin b. l.	11.9	11.6	12.3	12.8	12.3	12.5	14.3	12.5	13.4
Dorsal fin h.	23.4	20.8	23.0	23.2	23.7	23.0	25.5	22.5	25.8
Pect. fin b. l.	8.1	4.0	6.7	6.8	8.0	7.0	7.2	6.9	8.5
Pectoral high	24.5	19.3	23.3	24.5	23.8	23.4	26.1	26.2	28.5
Anal fin b. l.	38.2	31.0	36.5	38.2	40.5	38.5	40.2	38.6	38.7
Anal fin high	17.3	13.9	16.4	17.2	17.8	17.2	18.3	17.6	19.5
Pre-dorsal d.	60.8	43.8	62	65	16.7	62.2	62	63.2	63.9
Pre-pelvic d.	46.9	37.7	48.2	48.3	46.3	47.7	50	49.2	54.4
Pre-pectoral d.	24.4	20.2	23.6	23.3	24.4	22.7	23.4	23	26.8
Pre-anal length	74.3	59.2	71.9	73.3	74.2	75.7	78.4	72.5	82.2
Pre-anus length	71.0	56.4	68.2	70	72.2	72.4	74.8	69.1	79.0
Pelvic anal d.	26.6	18.2	24.4	23.6	24.5	23.3	27	22.8	28.3
Caudal p. l.	13.0	10.8	13.1	13.4	11.6	11.9	12	12.4	12.9
Caudal p. d.	13.2	10.0	12.8	13.3	12.8	12.4	13.1	13.0	13.1
Dorsal fin rays	12	12	12	12	12	12	12	12	12
Anal fin rays	34	37	36	36	34	34	34	36	36
Pect. fin rays	I+ 13	I+ 12	I+ 12	I+12	I+12	I+12	I+12	I+12	I+12
Pelvic fin rays	I+ 6	I+ 6	I+6	I+6	I+ 6	I+6	I+6	I+6	I+6
Total Scutes	27	25	27	27	26	26	26	26	26
Pre pel. scutes	16	16	17	17	17	17	17	17	17
Bran. Steg. rays	12 ?	12	12	12	12	12	12	12	12
Gill rackers		4,1,10	4,1,10	4,1,10	**4,1, 10**		**4,1,10**		
Maxilla length	62.2	52.2	64.1	72.8	66.4	63.1	7.1.8	68.6	73.2
Pv length	16.8	11.6	15.6	13.3	15.8	13.4	13.9	15.5	17.2

* Body d. d.= body depth at dorsal fin; Body d. a.= body depth at anal fin; Int. orb. w.= interorbital width; Post orb. length= postorbital length; Up. jaw length= upper jaw length; Lo. jaw length= lower jaw length; Dorsal fin b. l.= dorsal fin base length; Dorsal fin h.= dorsal fin high; Pect. fin b. l.= pectoral fin base length; Anal fin b. l.= anal fin base length; Pre-dorsal d.= pre-dorsal fin body depth; Pre-pelvic d.= pre-pelvic fin body depth; Pre-pectoral d.= prepectoral fin body depth; Caudal p. l.= caudal peduncle length; Caudal p. d.= caudal peduncle depth; Pect. fin rays= pectoral fin rays; Pre pel. scutes= number of pre-pelvic scutes; Bran. Steg. Rays= Number of branchiostegal rays; Pv. Length= Pelvic fin length.

Table (2): The ratio of parameters of *T. setirosris* to standard length

Parameters %	Min.	Max.	Average	SD
Total L./Stan. L	118.750	125.000	122.555	1.739
Fork L / Stan. L	105.469	109.474	107.783	1.328
Body d D / Stan. L	25.606	28.203	26.885	0.784
Body d A / Stan. L	23.158	25.455	24.322	0.837
Body w / Stan. L	8.561	9.606	9.253	0.343
Head L / Stan. L	19.032	21.200	20.266	0.747
Head D / Stan. L	17.045	18.413	17.693	0.435
Head W / Stan. L	7.381	8.828	8.247	0.457
Interorbit W / Stan. L	4.365	4.947	4.632	0.192
Eye diameter / Stan. L	5.159	6.211	5.544	0.315
Snout L / Stan. L	2.008	2.800	2.469	0.270
Post Orb. L / Stan. L	11.263	13.258	12.776	0.628
Upper Jaw L / Stan. L	10.320	11.895	11.041	0.505
Lower Jaw L / Stan. L	9.440	11.368	10.252	0.558
Dorsal fin b. L / Stan. L	9.444	12.211	10.386	0.831
Dorsal Height / Stan. L	18.000	21.895	19.262	1.210
Pect. Fin b. L. / Stan. L	4.211	6.612	5.708	0.736
Pectral height / Stan. L	18.871	21.591	19.978	0.924
Anal fin b. L. / Stan. L	29.318	33.471	31.037	1.348
Anal fin height / Stan. L	13.438	14.773	14.133	0.515
Predorsal D. / Stan. L	46.105	51.240	49.480	1.702
Prepvelvic D. / Stan. L	37.222	41.212	39.017	1.220
Pre. Pec. D. / Stan. L	18.203	21.263	19.326	1.085
Pre. Anal D. / Stan. L	57.266	62.316	60.261	1.892
Pre Anus D. / Stan. L	54.688	59.848	57.650	1.991
Pelvic anal D. / Stan. L	18.240	21.439	19.872	1.252
Caudal p. L. / Stan. L	9.449	11.368	10.145	0.650
Caudal p. D. / Stan. L	9.924	10.579	10.354	0.240
Maxilla / Stan. L	49.365	56.875	54.088	2.535
Pelvic length / Stan. L	10.391	13.333	12.119	1.116

Total length/ Standard length 122.555%, body depth/standard length 24.322%, head length/standard length 20.266% (Tab. 2). *T. setirostris* has very short rounded snout with its tip lay on the equator of the eye, the maxilla being very long, reaches the tip of the pectoral fin (Pl.1).

In general, fish species diversity in the Arabian Gulf is rather irregular, mainly because the deplete of water temperature in winter is also irregular, thus the diversity of individual species in the Gulf may fluctuate from year to another (Krupp and Müller, 1994). The Arabian Gulf is less biologically diverse than the adjacent Indian Ocean due to extreme environmental conditions (Al-Abdulrazzak *et al*., 2015); the Engraulids are small to moderate size fishes. However, some records refer to considerable fish size (Varghese *et al*., 2013).

Fricke *et al*. (2018) mentioned 24 species of *Thryssa*, all distributed in tropical and subtropical marine environments around the world (Froese and Pauly, 2018); according to

Carpenter *et al*. (1997) there are five *Thryssa* species in the Arabian Gulf excluding *T. setirostris*, this species was firstly recorded in the Gulf by Nader and Jawdat (1977).

There are reports of overlapping and ambiguous taxonomic characters among the species of Engraulidae in general and especially in *Thryssa*, this might be resulting in misidentification of species and presentation of incorrect data (Ma *et al*., 2015; Gangan *et al.*, 2016).

The identification of *Thryssa* species is usually based on combination of some characters such as the length of maxilla which may either being short (reach the preopercular), or medium (reach gill slits), or long (reach base of pectoral fins), or some even very long (reach pelvic fin base or beyond) (Whitehead *et al*., 1988). In most *Thryssa* species the first supramaxilla is minute or lost while the second supramaxilla is prominent (Ganga, 2015), those with or without first supramaxilla, and the level of tip of snout with a line drawn through mid-eye as in Plate 1, comprises some species including *T. setirostris* (Whitehead *et al*., 1988), *T. setirostris* differ from other species in this group by having very long maxilla.

Randall (1995) recorded *T. setirostris* (Broussonet, 1782)from Gulf of Oman, he mentioned the number of rays of anal and pectoral fins which are in the same range with the specimens of the present study ; Moreover, the rays of the dorsal fin in the present study are 12 while in Randall (1995) they were 14-15 (Tab. 3); from the other hand, Ma *et al*. (2015) mentioned that the dorsal fin of *T. setirostris* (Broussonet, 1782)of Taiwan has 11-12 rays.

Iwatsucki (2013) stated that the meristic characters of fish may varied in different habitats,the dorsal rays of *T. setirostris* (Broussonet, 1782) are different in number from that of *T. whiteheadi* Wongranata, 1983 and *T. vitirostris* (Gilchrist & Thompson, 1908) (Tab. 3), but has the same range of the dorsal rays of *T. hamiltonii*, Gray,1835 and within the range of the number of rays of the anal fin of the same species (Tab. 2). *T. setirostris* (Broussonet, 1782)differ from *T. hamiltonii* Gray,1835 by having very long maxilla (Ganga, 2015), *T. dussumieri* (Valenciennes, 1848) is very close in appearance to *T. setirostris* (Broussonet, 1782), again the latter is different by having a very long maxilla.

Table (3): Comparative measurements of fin rays and gill rackers of *Thryssa* spp.

Species	Dorsal fin rays	Anal fin rays	Pectoral fin rays	Gill rackers	References
T.whiteheadi	13	42-46	14	18-21	Richards, 2008
T. viterostris	13-15	34-43	13-14	18-24	Richards, 2008
T. balamae	11-12	32-37	13-14	20-24	Young *et al*., 1994; Whitehead *et al*., 1988
T. hamiltoni	14-15	32-40	12-13	12-14	Richards, 2008
T. seterostris	14-15	32-39	12-14	10-12	Randall, 1995
*T. seterostris**	12	34-37	I+12-13	4.1.10	Present study

*Species identification confirmed by Dr. Uwe Zajong, Germany.

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تواجد و اعادة وصف لسمكة الشيغة *Thryssa setiroststris* (Broussonet,1782) (Clupiforms,Engraulidae) من المياه البحرية العراقية

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تاريخ الاستلام: 2018/03/19 **تاريخ القبول: 2018/05/15**

الخلاصة

جمعت تسعة نماذج من سمكة الشيغة *Thryssa* (Broussonet, 178 *setiroststris* من الخليج العربي للمدة من تموز 2015 و لغاية نيسان 2016؛ ولكون هذه السمكة نادرة ولها صفات تتداخل مع صفات بقية انواع الجنس *Thryssa*، فقد صممت هذه الدراسة التشخيصية التفصيلية لها.

كان معدل الطول الكلي للنماذج 149.67 ملم، وعدد أشعة الزعنفة الظهرية 12 شعاع، وتراوح عدد أشعة الزعنفة المخرجية من 34-37 شعاع، أما الزعنفة الكتفية فلها 12-13 شعاع. توزعت الاسنان الغلصمية على القوس الاول وكانت أربعة علوية وواحدة في الوسط و 10 سفلية.

اعتبرت أهم صفة مميزة للنوع و التي تفصله عن الانواع الاخرى للجنس *Thryssa* هي طول عظم الفك العلوي الذي يمتد ليصل الى الخلف من قمة الزعنفة الكتفية.