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New records of *Hyla savignyi* Audouin, 1827 (Amphibian: Hylidae) from south-eastern Iraq

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Abstract: During a herpetological study on the Central and Southern Iraq in spring 2016, we collected 10 (eight males and two females) specimens of *Hyla savignyi* from Maysan provaice Al-Kahla subdistrict marsh of Al-Hawizeh. Morphometric characters of the collected specimens were investigated.

Keywords: *Hyla savignyi*, New record, South-eastern Iraq.

تسجيل جديد لضفدع الأشجار (Audouin, 1827(Amphibian: Hylidae *Hyla savignyi* في جنوب شرق العراق .

الخلاصة:
تسجل جديد لضفادع الاشجار *Hyla savignyi* ، في جنوب شرق العراق حيث تم جمع عشرة عينات من ضفادع الاشجار . تم قياس الصفات المورفولوجية للعينات التي تم جمعها.
الكلمات المفتاحية: *Hyla savignyi* ، تسجيل جديد ، جنوب شرق العراق.

1. Introduction

Audouin (1827) was described *Hyla savignyi* for the first time in Syria (Duellman, 1977). The species was designated by Boulenger (1882) as *Hyla arborea* i.e. *savignyi.* Subsequently Nieden (1924) elevated it to the subspecies rank as *Hyla arborea savignyi*. On the other hand, some herpetologists (e.g., Schneider & Nevo 1972;(Brzoska, Schneider, and Nevo 1982) ; Schneider *et al*. 1984;) accepted *Hyla savignyi* as a distinct species based on its featured mating calls differing from other *Hyla* species. More ever *Hyla savignyi* also is different in morphological characterstics i.e. *Hyla savignyi* is intermediate between *H. meridionalis*

and H. arborea in all parameters (Schneider & Nevo 1972; Balletto *et al*., 1985). Tree frogs of the genus *Hyla* are small, semiaquatic vertebrates and widely distributed throughout suitable environments in the Middle Eastern region. The reproduction occur mainly on open waters such as pools, springs and artificial water reservoirs especially in the warm-climate preference (Recuero *et al*., 2007). The distribution of the genus *Hyla* includes western and northern Iran, Iraq, Yemen, Southern Saudi Arabia, Turkey, Syria, Palestine, Georgia, and generally the southeastern part of Europe eastern Turkey, eastern Transcaucasia, , Levant, and the north-eastern part of Sinai. Two isolated populations live in Cyprus and south-western Arabian Peninsula (Gvoždík *et al*., 2010 ; Gvoždík *et al* ., 2008)

In this paper we reported that new record of *Hyla savignyi* from south-eastern Iraq.

2. Materials and Methods

2.1. Study area

Maysan province is located between the line along 47º 2' N and 31º 54' E. The provincial capital, located beside the Tigris, is Al Amarah. The province is traditionally home to many Marsh Arabs and also contains part of the Marshlands in southern Iraq. Once the area was an important agricultural and industrial center (Hudson, 2000; Rhadi ,2016). Situated to the east of the River Tigris, marsh of Al-Hawizeh (Hawizeh) and its associated marshes cover an area of approximately 2,200 km^2 between Amara and Basrah. A small portion of the Haur extends over the border into the Iranian territory, where it is known as the marsh of Al-Azim (Evans, 1994). Samples were collected from Al-Hawizeh marsh (2 females and 8 males) on 17 February 2016 (31° 32′ 32″ N, 47° 42′ 24″ E) (Fig. 1).

2.2. Materials

In *Hyla savignyi* males have large obvious yellowish or brownish vocal sacs beneath the chin so they are easily recognizable from females (Fig. 2.A).All the specimens were anaesthetized using Chloroform, fixed in

96% ethanol, and stored in 70% ethanol. The specimens are deposited in the collection of the Razi University Zoological Museum (RUZM), tagged as RUZM-HH 11-20. The collected specimens classified by standard taxonomic keys (Baloutch & Kami, 1995; Disi, 2001).

2.3. Morphometrics

Fifteen external measurements were taken according to Gvozˇdík *et al*. (2008); using a caliper with an accuracy of ±0.1 mm. All measurements were reported in mm and were studied the qualities in table (1). Morphological measurements included , **SUL** , snout–urostyle length: from the tip of snout to the posterior margin of urostyle ; **FmL**, femur length: from the middle of cloacal gap to the external margin of knee joint, when thighs and shins are in perpendicular position to body axis; **TbL**, tibia length: from the external margin of knee joint to the external margin of heel articulation; **TrL**, tarsus length: from the external margin of heel articulation to the proximal edge of inner metatarsal tubercle; **HW**, head width: the largest head width; **HLt**, head length: from the tip of head to the posterior margin of tympanum; **ES**, eye-snout distance: from the tip of head to the anterior corner of eye; **TD**, horizontal tympanum diameter; **IOD**, interorbital distance: the shortest distance between upper eye lids; **IND**, internarial distance: the distance between the midpoints of nostrils; **IMTL**, inner metatarsal tubercle length: the length of the base of tubercle; **T1L,** first toe length: from the distal edge of the inner metatarsal tubercle to the tip of the first toeand ; **LM**l,ength of the lower jaw ; **WEL**width of eyelids and **DET** distance from the eyes to tympanum.

2.4. Statistical Analysis – The data were analyzed statistically using SPSS version 22 and the maximum, minimum and mean values were measured for all the examined specimens.

3. Results and discussion

3.1. Description: Length of body about 35-41 mm. The color is brown, subgular vocal sac in male. Ventral surfaces whitish. Skin smooth above granulated beneath. Tongue rather round, free and nicked behind. Large eyes possess an elliptical, horizontal pupil. Tympanum distinct but small, not more than half of the diameter of the eye. Nostril mid-way between the eye and the tip of the snout, or nearer the later. Iris golden, more or less obscured by brown vermiculation. Sometimes with small dark spots on the back of the body. It is possible to quickly change the color. White stripes on sides of the body. Extremities are rather long, especially hind legs. Fingers and toes are terminated with adhesive disks allowing to climb very easily on vertical surfaces (fig. 2 A, B)

Khalaf (1959) described *Hyla savignyi* Audouin, 1827 in Iraq under the name (*Hyla arborea savignyi*) without localities .as well as described in northeastern Iraq (Erbil, Saladin, Kirkuk ,Sulyimaniyah and Hawraman Mountain) by Reed & Marx (1959) , Lahony, *et al*.,(2013).

Leviton *et al*., (1992) not reported this species in Iraq. The spread of this species in the northern Euphrates interrupts the geographical distribution called as the Turkish–Iranian lineage which comprises tree frogs from Cyprus and southern Mediterranean Turkey and eastern Turkey, Transcaucasia, Iran, Iraq (Baghdad) and eastern Syria (Gvoždík *et al*. 2010). During a herpetological study on the Central and Southern Iraq in spring 2016, we collected 10 (eight males and two females) specimens of *H. savignyi* from Maysan province Al-Kahla subdistrict marsh Al-Hawizeh N31˚ 43′ 24.84″, E47˚ 30′ 0.09″ and Elevation -8 (Fig. 1).

The importance of this record is explaining distribution of *Hyla savignyi* Audouin, 1827 in Iraq wich is not limited to the historical locations. This report shows that *Hyla savignyi* Audouin, 1827 has a much wider distribution than the previously thought and suggests that existence of continuous populations.

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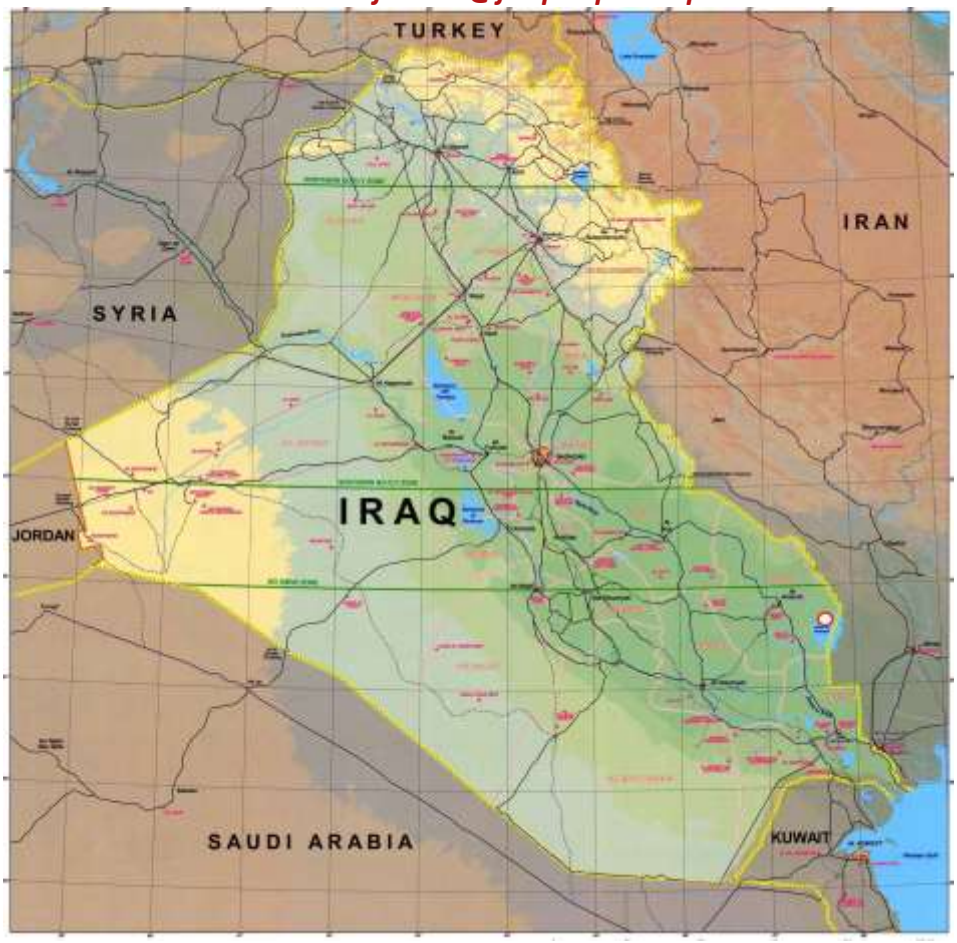

Fig. 1. Map shows the sampling localities of *Hyla savignyi* from South-eastern Iraq (Maysan Province: (AL-Hawizeh marsh).

Fig. 2. *Hyla savignyi*.(A) Males have large obvious brownish vocal sac,(B) ventral views

Table 1. Descriptive statistics (Min=minimum, Max=maximum, mean, Std. D=standard deviation,) for 15 Morphometric characters of *Hyla savignyi* included in the study.

samples	male (N= 8)				female (N= 2)			
	Mean	Std. D	Min	Max	Mean	Std. D	Min	Max
SUL	37.92	1.77	35.57	40.43	39.92	1.80	37.85	41.08
HLt	11.02	0.44	10.26	11.65	12.15	0.67	11.45	12.78
WH	11.77	0.64	10.75	12.90	12.46	0.91	11.91	13.51
LM	10.12	0.58	9.13	11.11	10.26	0.84	9.32	10.93
IND	2.58	0.35	2.05	3.37	2.72	0.47	2.37	3.25
IOD	3.72	0.44	3.11	4.65	4.14	0.12	4.05	4.27

WEL	2.28	0.26	1.65	2.56	2.51	0.13	2.40	2.66
ES	5.07	0.51	4.25	5.66	5.27	0.32	5.01	5.63
TD	2.44	0.35	1.84	2.97	2.22	0.40	1.76	2.52
DET	1.11	0.12	0.94	1.30	1.25	0.21	1.08	1.49
FmL	15.33	1.36	13.30	17.36	17.86	1.46	16.34	19.25
TbL	17.52	1.34	15.40	19.08	18.31	1.08	17.08	19.12
TrL	10.43	0.64	9.19	11.18	10.90	0.95	9.81	11.56
IMTL	1.65	0.22	1.28	1.99	1.67	0.31	1.40	2.00
T1L	4.59	0.40	3.76	5.27	4.46	0.41	3.99	4.74