



On the Occurrence of the Eastern Montpellier Snake in Central and Southern Iraq with Some Sexual Dimorphism Remarks

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Abstract

In Iraq, Montpellier Snakes belongs to *Malpolon insignitus* (Geoffroy de St-Hilaire, 1827). Their subspecific membership is sometimes still debated. The occurrence of the Eastern Montpellier Snake has been reported from central and southern Iraq and, in this study, we report new localities. To know the subspecific status of this species, we examined morphological characters. 16 morphometric and meristic characters were studied in 23 specimens of Eastern Montpellier Snake. The main features are the lack of the black saddle, only typical of the Western Montpellier Snake *Malpolon monspessulanus* (Hermann, 1804), in males the general colour of both the head and the nape is rather light and resembles the light overall dorsum colour. Females present a marbled pattern but usually forming a dark longitudinal strip on the flank. The number of ventral scales is quite low: 164-177 and mid-body dorsals are arranged in 17 rows. Our specimens raising features absolutely typical of the subspecies *Malpolon insignitus fuscus* (Fleischmann, 1831). Even if morphological characters are clear, it will be interesting to know the ecological preferences of this species in Iraq, and to know its genetic diversity with molecular studies.

Keywords: Eastern Montpellier Snake; Central and Southern Iraq; *Malpolon Insignitus Fuscus*

Introduction

The genus *Malpolon* Fitzinger 1826 belongs to the subfamily Psammophiinae (family Lamprophiidae [1]; includes back-fanged species, with one or two large, grooved fangs, situated approximately below the posterior border of the eye. The genus currently counts two Mediterranean species [2], which show allopatric geographic distributions: *Malpolon monspessulanus* Hermann 1804 (western Montpellier snake), which ranges from Liguria (West Italy) through France, Iberian Peninsula, Morocco, and Western Sahara [3-5]; *M. insignitus* Geoffroy Sant-Hilaire 1827 (eastern Montpellier snake), which spreads from eastern Morocco eastward around the Mediterranean Sea, reaching Anatolia and Balkans, Middle East, Iraq and Iran, and also Caucasi and Transcaucasia [5].

Malpolon insignitus Geoffroy Sant-Hilaire 1827 Common name: Montpellier Snake *Malpolon monspessulanus*, [6] Snake and Snake

Bite in Iraq, p.22. - [7], Reptiles of Iraq with Notes on the Amphibians, p. 72. *Malpolon insignitus* [8], Molecular Phylogenetics and Evolution, 40: p. 533.

- **Range:** Balkan, Greek Islands, Turkey, Caucasia extending to the Caspian Sea, Turkey, Syria, Lebanon, Palestine, Jordan, eastern North Africa. *M. insignitus insignitus* Geoffroy Sant-Hilaire 1827, which occurs in the eastern coast of Mediterranean Africa (from eastern Morocco to Egypt) and Middle East [9, 8], and *M. i. fuscus* Fleischmann 1831, which occupies the remnant part of the area (Balkans, Anatolia, Caucasia and Transcaucasia, Iraq and Iran [10].
- **Distribution in Iraq:** It has been recorded from Baghdad, Mosul, north of Mosul, at an altitude of 2000 ft. Tuz Khurmatu; Saladin Province north of Baghdad, and Suwara Tuka in Kurdistan. One specimen smashed by car on the road to Biara vil-

lage, Hawraman steppe, altitude 700 m a.s.l.; Halabja Governorate, located about 240 km north-east of Baghdad and 14 km from the Iranian border. [11]. A total of eight specimens were collected from five localities in central and southern Iraq. Of these two specimens were collected in Al-Najaf province Al-Kufa district Al Abassya sub district, one specimen were collected from Al-Najaf district Bahr Al-Najaf, three specimens were collected from AL-Mashkhab district, one specimen from Babylon province, Al- Hila district, Al-Mahawil sub district; one specimen from Al-Diwania province, Al Shamia district [12].

- **Systematics:** [8] found that the western and eastern units of *M. monspessulanus* have different dorsal colour pattern, differences in skull structure and exhibit an 8.4% uncorrected genetic divergence. They recommended that these populations should be treated as separate species *M. monspessulanus* and *Malpolon insignitus* for the populations in the Middle East.
- **Diagnosis:** Opisthoglyphous. This is a robust and large snake. Head is slightly distinct from the neck, with a deep distinctive furrow. Nasal undivided. Eyes large with a rounded pupil, entered by the fourth and fifth of eight supra-labials. Two loreals, one pre- and two to three postocular. Temporals 1 + 1 or 1 + 2 (3 + 2 or 4 + 2. 10-11 infra-labials four or five lower labials in contact with the anterior chin shields; anterior chin shield as long as or shorter than posterior chin shields [13]. The dorsals are grooved and number 17-19 rows. The ventrals vary from 160 to 200 and the subcaudals from 68 to 100. The anal is divided. The tail tapers uniformly and is about a quarter of the body length. Maximum total length may reach up to 180-200 cm. [6,13,14].
- **Colouration:** The dorsum is brown, olive, grey, or bluish-grey, unicolor or with dark brown edged pale spots margin of scales occasionally with yellow spots or mixed dark and white spots [13]. The belly is usually a uniform yellow or white. The chin may be spotted beneath [6]. Sometimes olive-greenish grey. Juveniles have small dark spots with weak white longitudinal lines [15]. Male of this species have a uniform and paler coloration in the entire body, without black saddle or dark coloration on the flanks. Female and juveniles are more difficult to

distinguish through coloration, as the also present a marbled pattern but usually forming a dark longitudinal stripe on the flank [16]. [11] described a new color pattern in Iraq, dorsal color uniformly bright yellow-green or bright olive-green, pure white venter without spots.

- **Habitats:** The Montpellier Snake occur in most Mediterranean habits of Iraq, usually associated with vegetated areas near streams and springs, gardens and orchards where bushes and tree occur. Sandy area with scarce vegetation full of mammal burrows, among oaks in dry area [6].

Materials and Methods

Project areas

The study area is located between 30° 18' to 34° 30' N and 43° 92' to 47° 58' E. Altitude range from 1 to 344 m. in the central and southern Iraq representing all major ecological type of habitats of the central and southern regions of Iraq. Snakes were collected from several localities (Table 1).

Morphological Study of Collected Specimens: Metric (mensural) characters were measured using a digital caliper with an accuracy of 0.01 millimeters. A ruler was used for measuring length of body (LB). Pholidosis (meristic) features were counted under a dissecting microscope (Table 2).

Results

Malpolon insignitus fuscus Fleischmann 1831. A total of twenty-three specimens (eleven ♂ and twelve ♀), were collected from seven localities in central and southern Iraq (Figure 1). Of these two specimens were collected in Al-Najaf province Al-Kufa district Al Abassya sub district, with geographical coordinates (32° 04' 50.0" N, 44° 26' 46.3" E; alt. 23 m.), one specimens were collected from Al-Najaf district Bahr Al-Najaf (31° 52' 03.2" N, 44° 15' 51.7" E; alt. 20m.), two specimens were collected from AL-Mashkhab district (31° 50' 28.4" N, 44° 30' 13.7" E; alt. 22m), one specimen from Babylon province, Al- Hila district, Al-Mahawil sub district (32° 40' 07.5" N, 44° 24' 17.2" E; alt. 67m.); one specimen from Al-Diwania province, Al Shamia district (31° 58' 17.1" N, 44° 36' 36.4" E; alt. 55m.). fifteen specimens were collected from Babil province, Al-Hila sub district- Al Muradiah (32° 16' 07.5" N, 44° 23' 17.2" E; alt. 15m.) (Table 3).

Locality		Coordination and elevation	Ecoregions
Province	Name of project site		
Karbala	Ain-Tamor District	32°33'56.52"N 43°29'25.89"E; alt. 30m	Arabian Desert and East Sahero-Arabian Xeric Shrublands
ThiQar	Tel al- Lahm region	30° 39' 29.1" N 46° 29' 26.9" E; alt. 40m.	Tigris-Euphrates alluvial salt marsh, Arabian Desert and East Sahero-Arabian Xeric Shrublands
	Said Dakheel subdistrict	31° 07' 51.7" N 46° 26' 03.9" E; alt. 5m	
	Albu-Yosif village	31° 09' 29.3" N, 46° 17' 23.5" E; alt. 10 m	
	Albu-Jumaa village	31° 08' 43.8" N, 46° 19' 50.4" E; alt. 6 m.	
Diyala	Al-Khalis district	34° 30' 1.63" N, 44° 38' 56.60" E; alt. 210m.	Mesopotamian Shrub Desert
	Khanaqin district	34° 18' 26.28" N, 45° 23' 27.54" E; alt.216m.	
Al-Muthanna	Al-Salman district	30° 32' 35.79" N, 44° 35' 9.35" E; alt. 240m.	Arabian Desert and East Sahero-Arabian Xeric Shrublands
Babil	Al-Hilla district	32° 28' 43.2" N, 44° 24' 59.2" E; alt. 159m.	Tigris-Euphrates alluvial salt marsh, Arabian Desert and East Sahero-Arabian Xeric Shrublands
	Al-Mahawil sub district	32° 40' 07.5" N, 44° 24' 17.2" E; alt. 67m.	
	Al Muradiyah	32° 16' 07.5" N, 44° 23' 17.2" E; alt. 15m.	
Wasit	Al-Dalmaj depression	32° 7' 55.3" N, 45° 37' 38" E; alt. 13m.	Tigris-Euphrates alluvial salt marsh, and Mesopotamian Shrub Desert
Al-Amarah	Al-Kahla subdistrict - Islamic shrine Al-Majed	31° 35' 17.59" N, 47° 25' 7.24" E; alt. 7m.	Tigris-Euphrates alluvial salt marsh, and South Iran Nubo-Sindian desert and semi-desert
Al-Basra	Al-Rumaila Desert	30° 30' 26.3" N, 47° 27' 12.0" E; alt. 5m.	Tigris-Euphrates alluvial salt marsh, Arabian Desert and East Sahero-Arabian Xeric Shrublands, Persian Gulf desert and semi-desert, and South Iran Nubo-Sindian Desert
	Khor-Al-Zubair - AL-Zubair District	30° 18' 51.4" N, 47° 44' 50.7" E; alt. 6m.	
	Naher Jassim	30° 29' 33.6" N, 47° 58' 12" E; alt.1 m	
	Al-Salhiya, Kut al Kawam	30° 30' 33.6" N, 47° 53' 12" E; alt. 4 m	
	Al-Basra district	30° 32' 35" N, 47° 49' 26.6" E; alt. 3 m	
Al-Najaf	Al-Shabakah village	30° 48' 19.6" N, 43° 40' 5.87" E; alt. 344m	Arabian Desert and East Sahero-Arabian Xeric Shrublands
	Um- Qrun village	31° 46' 17.3" N, 44° 13' 37.8" E; alt. 58m	
	Al-Mushkhab District (Al-Jayir)	31° 50' 28.4" N, 44° 30' 13.7" E; alt. 22m	
	Al-Abassya subdistrict	32° 04' 50.0" N, 44° 26' 46.3" E; alt. 23 m	
	Bahr Al-Najaf	31° 55' 39.9" N, 44° 16' 31.9" E; alt. 5m	
Al- Diwania	Al Hamza district	31° 43' 42.1" N, 44° 57' 35.6" E; alt. 35m	Arabian Desert and East Sahero-Arabian Xeric Shrublands
	Afak district	32° 04' 51.4" N, 45° 10' 38"E; alt. 11m	
	Shamiya district ghamas subdistrict	31° 47' 17.1" N, 44° 34' 36.4" E; alt. 3m	
	Highway	31° 55' 12. 7" N, 45° 06' 16.7" E; alt. 21m	

Table 1: List of localities indicated in the text and their coordinates and specific terrestrial ecoregion.

Characters	Definition	Characters	Definition
DS	Dorsal scales on mid-body	END	Eye - Nostril Distance
SUBC	Subcaudals	NND	Nostril-Nostril Distance
SumSL	Number of supralabials, counted as sum of right and left sides	SVL	Snout-Vent Length
SumIL	Number of infralabials, counted as sum of right and left sides	TL	Tail Length
VS	Ventral scales	WAP	Width of Anal Plate
HW	Head Width	WCB	Width of Caudal Base
HL	Head Length	ACS	Length of anterior chin shield
ERD	Eye to Rostral Distance	PCS	Length of posterior chin shield

Table 2: The quantitative (metric and meristic) and color pattern characters used in this study.

Family	Species (No.)		Museum No.	Locality
Lamprophiidae	a	2	RUZM-CM 22.1	Al-Najaf province, AL-Mashkhab district
			RUZM-CM 22.8	
		1	RUZM-CM 22.2	Al-Diwania province - High way
		1	RUZM-CM 22.3	Al-Najaf province Bahr Al-Najaf depression
		2	RUZM-CM 22.4	Al-Najaf province, Al Abassya sub district
			RUZM-CM 22.6	
		1	RUZM-CM 22.5	Babil province, Al-Mahawil sub district
		1	RUZM-CM 22.7	Al-Diwania province, Al Shamia distric
		b	15	

Table 3: Localities of the specimens: a) museum materials, b) collected specimens, which used for the quantitative (metric and meristic) characters included in study.

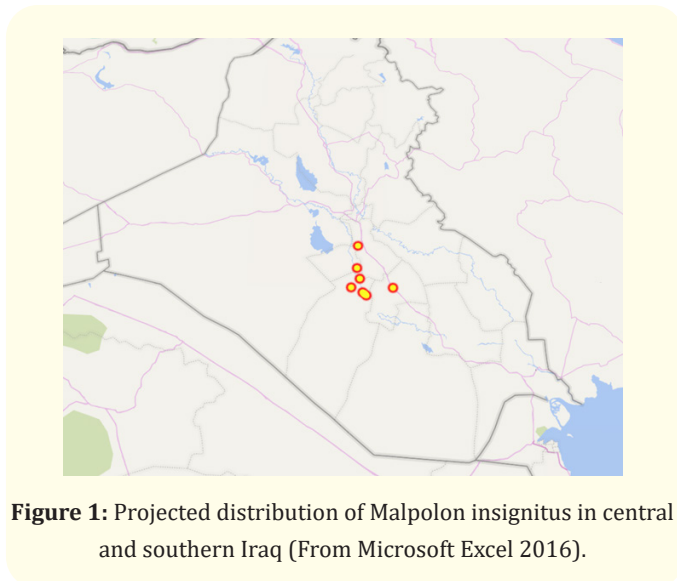


Figure 1: Projected distribution of Malpolon insignitus in central and southern Iraq (From Microsoft Excel 2016).

- Description:** Head is slightly distinct from the neck, with a deep distinctive furrow. Nasal undivided. Eyes large with a rounded pupil, entered by the fourth and fifth of eight supralabials the 4th and 5th in contact with eye. 10-11 infra-labials four or five the first 5 in contact with anterior chin shield and the 5th and 6th one in contact with posterior chin shield; anterior chin shield as long as or shorter than posterior chin shields. Two loreals, one preocular and two to three postocular. Temporals 2 + 3 or 2 + 4. The body is stout (mostly adult males) or rather slender (Female), covered by smooth but slightly grooved dorsal scales which count 17 rows. 164-177 ventrals; anal divided; subcaudals divided which count 76-92 scales (Table 3). Longitudinal concave furrow between supraoculars and surface of the snout. This species has strong sexual dimorphism; males of this species have a uniformly bright yellow-green or bright olive-green, pure white venter without spots.

Uniform and paler coloration in entire body without black saddle or dark coloration on the flanks, males with thin hemipenis. Females and juveniles are more difficult to distinguish through coloration as they also present a marbled pattern but usually forming a dark longitudinal strip on the flank (Figure 2).



Figure 2: *Malpolon insignitus fuscus* "photo by Fadhil Abbas Rhadi" (A): Adult male from Al-Najaf province, Al Abassya sub district; (B): Adult female from Al-Najaf province, AL-Mashkhab district Showing a marbled pattern; (C): Adult male Showing Longitudinal concave furrow between supraoculars and surface of the snout; (D): Males with thin hemipenis; (E): The habitat where the male was found Al Abassya sub district Al-Najaf province-Iraq.

- **Remarks:** Terrestrial snakes but can climb on trees or bushes and swim very quickly. Diurnal except in the hottest months when they become crepuscular and nocturnal. Some specimens found in holes at the root of balm tree and others captured in shady place during the day.
- **Measurements and scale counts analysis:** For each mean and standard deviation combination of 16 morphometric and meristic characters a theoretical normal distribution has been determined. The result of (Shapiro-Wilk test) shows that 13 characters (VS, SUBC, SVL, TL, HL, HW, ACS, PCS, WCB, WCP, END, NND, and ERD), are normally distributed $p > 0.05$ (Table 4). The existence of sexual dimorphism was checked by using independent sample t-test for 13 normal distributed characters (Table 5).

Seven out of thirteen meristic and morphometric variables VS (172 ± 1.870) were male biased which in turn were insignificant. Significant differences were not observed in remaining variables, but NND (4.94 ± 0.50), END (6.23 ± 0.77), PCS (9.15 ± 0.66) and WCB (10.08 ± 0.78) 84.67 ± 2.33 were male biased. In the other hand SUBC (84.67 ± 2.33), WAP (11.35 ± 1.74), and SUBC (84.67 ± 2.33) were female biased (Table 5). Multivariate analysis of meristic and morphometric characters was carried out to determine whether distinct sexual dimorphism exist within Montpellier Snake. Results of a PCA preformed are summarized in table 6.

Characters	Sex (n)	Min.	Max.	Mean	Std. Error	Std. Deviation	Shapiro-Wilk		
							Statistic	Df	Sig.
SumSL	♂ (11)	16	16	16	0	0	-	-	-
	♀ (12)	16	16	16	0	0	-	-	-
SumIL	♂ (11)	20	22	21.5	0.5	1	0.664	7	0.001
	♀ (12)	20	22	20.67	0.67	1.15			
DS	♂ (11)	17	17	17	0	0	-	-	-
	♀ (12)	17	17	17	0	0	-	-	-
VS	♂ (11)	168	177	172	1.870	3.74	0.962	7	0.834
	♀ (12)	164	172	168.67	2.40	4.16			
SUBC	♂ (11)	76	92	83.33	4.66	8.08	0.973	6	0.913
	♀ (12)	81	89	84.67	2.33	4.04			
SVL	♂ (11)	770	1050.5	940.33	66.32	132.65	0.944	7	0.679
	♀ (12)	600	840.50	706.83	70.71	122.47			

TL	♂ (11)	260	300.5	283.53	12.14	21.03	0.87	6	0.227
	♀ (12)	180.70	280.30	220.33	30.50	52.82			
HL	♂ (11)	33.19	40.94	38.49	1.82	3.65	0.906	7	0.37
	♀ (12)	25.85	35.49	29.90	2.89	5.00			
HW	♂ (11)	14.55	22.53	18.66	1.65	3.31	0.9	7	0.331
	♀ (12)	12.56	14.02	13.37	0.43	0.74			
ACS	♂ (11)	5.54	9.57	8.27	0.93	1.87	0.94	7	0.635
	♀ (12)	4.16	7.08	5.86	0.88	1.52			
PCS	♂ (11)	7.25	10.22	9.15	0.66	1.33	0.897	7	0.313
	♀ (12)	7.12	9.48	8.38	0.69	1.19			
WCB	♂ (11)	7.84	11.47	10.08	0.78	1.56	0.935	7	0.592
	♀ (12)	7.32	12.83	9.49	1.69	2.94			
WAP	♂ (11)	8.09	11.97	10.13	0.82	1.64	0.932	7	0.569
	♀ (12)	9.10	14.78	11.35	1.74	3.02			
END	♂ (11)	4.24	7.74	6.23	0.77	1.54	0.828	7	0.077
	♀ (12)	4.24	7.12	5.22	0.95	1.65			
NND	♂ (11)	3.50	5.77	4.94	0.50	1.00	0.879	7	0.221
	♀ (12)	3.60	5.51	4.52	0.55	0.96			
ERD	♂ (11)	8.40	12.24	10.42	0.91	1.83	0.86	7	0.15
	♀ (12)	8.39	10.44	9.13	0.66	1.14			

Table 4: Descriptive table including Descriptive statistics (minimum, maximum, mean, standard deviation, and standard error), and normality test for 16 morphometric (mm) and meristic characters of *Malpolon insignitus* included in the study.

Characters	Sex	n	Range	Mean ± SD	P-value
VS	♂	11	168-177	172 ± 1.870	.016
	♀	12	164-172	168.67 ± 2.40	
SUBC	♂	11	76-92	83.33 ± 4.66	.501
	♀	12	81-89	84.67 ± 2.33	
SVL	♂	11	770-1050.5	940.33 ± 66.32	.000
	♀	12	600-840.50	706.83 ± 70.71	
TL	♂	11	260-300.5	283.53 ± 12.14	.003
	♀	12	180.70-280.30	220.33 ± 30.50	
HL	♂	11	33.19-40.94	38.49 ± 1.82	.000
	♀	12	25.85-35.49	29.90 ± 2.89	
HW	♂	11	14.55-22.53	18.66 ± 1.65	.000
	♀	12	12.56-14.02	13.37 ± 0.43	
ACS	♂	11	5.54-9.57	8.27 ± 0.93	.001
	♀	12	4.16-7.08	5.86 ± 0.88	

PCS	♂	11	7.25-10.22	9.15 ± 0.66	.140
	♀	12	7.12-9.48	8.38 ± 0.69	
WCB	♂	11	7.84-11.47	10.08 ± 0.78	.732
	♀	12	7.32-12.83	9.49 ± 1.69	
WAP	♂	11	8.09-11.97	10.13 ± 0.82	.124
	♀	12	9.10-14.78	11.35 ± 1.74	
END	♂	11	4.24-7.74	6.23 ± 0.77	.133
	♀	12	4.24-7.12	5.22 ± 0.95	
NND	♂	11	3.50-5.77	4.94 ± 0.50	.362
	♀	12	3.60-5.51	4.52 ± 0.55	
ERD	♂	11	8.40-12.24	10.42 ± 0.91	.044
	♀	12	8.39-10.44	9.13 ± 0.66	

Table 5: Independent Sample t-test for meristic and morphometric characters for existence of sexual dimorphism.

Characters	PC1	PC2	PC3	PC4
VS	.362	.896	.230	.074
SVL	.974	-.070	-.078	-.120
TL	.886	-.057	-.174	.420
HL	.980	-.035	-.151	.018
HW	.923	.214	.075	-.151
ERD	.704	-.472	.527	.055
ACS	.958	-.038	-.151	-.208

Table 6: Extraction of principle components 1-4 using the component matrix.

With seven variables there are four principle components, the details of these principle components are given in table 7. As is shown, the first four principal components (PC1-PC4) account for 72.711%, 15.440%, 5.974%, and 3.793% of the total information, respectively. Jointly they explain 97.919b of sexual dimorphism.

Of this total, 72.711% explained by PC1 in which SVL, TL, HL, HW, and ACS having greater values, hence having more contribution and importance in sexual dimorphism; 15.440% explained by PC2, the second axis, which is mainly attributed to VS; 5.974% explained by PC3 which is mainly attributed to ERD; and 3.793% explained by PC3 which is mainly attributed to TL.

The result showed that HL, SVL, ACS and VS are more important characters in distinctions sexual dimorphism. The magnitude and sign of the loadings on PC1 and PC2 showed significant separation between male and female.

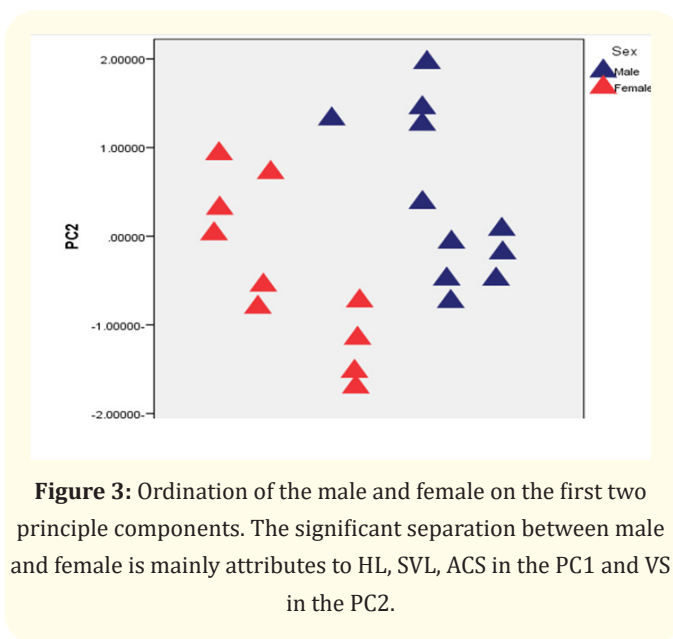


Figure 3: Ordination of the male and female on the first two principle components. The significant separation between male and female is mainly attributes to HL, SVL, ACS in the PC1 and VS in the PC2.

Discussion and Conclusion

The present study recorded altogether twenty-three specimens (eleven ♂ and twelve ♀), were collected from the study area among oaks in dry areas, with geographical coordinates between (31° 50' 28.4" - 32° 40' 07.5") N and (44° 15' 51.7" - 44° 36' 36.4") E., with altitude range from 15- m to 67m, which influenced by Arabian Desert and East Sahero-Arabian Xeric Shrublands Ecoregion. It is interesting; however, that prior to this study, there were no reports confirming the biological activity or existence of *M. insignitus* in the region they were recorded.

It is a region of little rain fall (annual precipitation is approximately 125 mm) with occasional oases. Many dry river channels (wadis) crisscross the desert and these carry water only during winter and spring rains daily temperature varies considerably reaching over 45°C or higher in July and August. Vegetation is sparse.

Some snakes have twice or more habitat, depending on in which country they were recorded. This snake is very thermophile and it is able to occupy almost every kind of habitats from coastal dunes, scrubland with low cover and open spaces to cultivated land and even urban areas, from sea level to 2200 m, known to tolerate a spectrum of climatic weather condition in different habitats [17], as Savannah, woodlands [18]; semi-desert, dry and moist savannas [19]. In Jordan Highest densities of *M. insignitus* are known from Mediterranean regions of the country, and other localities in arid regions have been reported.

The genus *Malpolon* Fitzinger 1826 is the only genus being present in Europe besides the Middle East and Africa [4,8]. Until 1995 one species, *Malpolon monspessulanus*, with the nominate subspecies *M. monspessulanus monspessulanus* (Hermann, 1804) SW Europe, Western Sahara, Morocco and extreme NW Algeria, and *M. monspessulanus insignitus* (Geoffroy, 1827) from E-Morocco, through Algeria, Tunisia, Libya, N-Egypt, Palestine, Israel, Jordan, Syria, Turkey, into SE-Europe, including Cyprus and up to Istria (and perhaps sporadic in NE-Italy), and from Syria through Iraq up to E-Iran and northern wards up to Volgograd in Ciscaucasia Europe [17,20]. In their treatment [10,21] proposed that the populations of East Europe and most of the Middle East (Southeast Europe and Turkey as far as western Iran) should be referred to the third subspecies *M. monspessulanus fuscus* (Fleischmann, 1831).

In addition, a new form is endemic in south-western Morocco and coastal Western Sahara, south to the Dakhla peninsula, which is the southernmost known location for the species *M. monspessulanus saharatlanticus* [4]. [8] split the European population of *M. monspessulanus* into two species based on different mitochondrial gene fragments and morphological aspects: the nominal form, *M. monspessulanus* (Hermann, 1804) in West Europe (western Montpellier snake) which ranges from Liguria (W Italy) through France, Iberian Peninsula, Morocco, and Western Sahara [3-5], and *M. insignitus* (Geoffroy Sant-Hilaire, 1827) in East Europe (eastern Montpellier snake) which spread from eastern Morocco eastward around the Mediterranean Sea, reaching Anatolia and Balkan, Middle East, Iraq and Iran, and also Caucasus and Transcaucasia. [5]. [4] suggested elevating the subspecies *insignitus* to full species status comprising two subspecies, *M. insignitus fuscus* (Fleischmann, 1831) and *M. insignitus insignitus* (Geoffroy Sant-Hilaire, 1827), since they show clear morphological differences, different ranges of colour patterns and different mitochondrial gene fragments. *M. insignitus insignitus* (from east Morocco through Algeria and Tunisia eastwards to western Syria) and *M. insignitus fuscus* (Turkey, Southeast Europe, North Iraq and Western Iran) [20].

Snake has been recorded from Baghdad, Mosul, north of Mosul, at an altitude of 2000 ft. Tuz Khurmatu; Saladin Province north of Baghdad, and Suwara Tuka in Kurdistan formerly attributed to *Malpolon monspessulanus insignitus* [6,7]. One specimen smashed by car on the road to Biara village, Hawraman steppe, altitude 700 m a.s.l.; Halabja Governorate, located about 240 km north-east of Baghdad and 14 km from the Iranian border attributed to *M. insignitus fuscus* [11]. The features that differentiate *M. insignitus* from the *M. monspessulanus* are: male with the light colour of the head and nape which is the same as that of the dorsum at mid-body and everywhere else, lack of the black saddle, lack of dark colouration on the flanks, high occurrence frequency of a square or horizontal rectangle shaped light stain on the preocular, Females and juveniles are more difficult to distinguish through coloration, as they present a marbled pattern but usually forming a dark longitudinal strip on the flank (first dorsal row of scales in *M. insignitus* female differentiated from the other flank scales by frequency of dark spots coalescing to form a line. The number of ventral scales is lower: 171-199 in *M. monspessulanus* and 162-177 in *M. insignitus*. The result of the current study showed that HL, SVL, ACS and VS are more important characters in distinctions sexual dimorphism

and show an agreement with [20], in his treatment he proposed the sexual dimorphism in this snake is the most conspicuous in Palearctic snakes studied until now: Males are not only differently colored when adults whilst the females keep the juvenile coloration but they are also larger than females.

The number of dorsal scale rows at mid-body which shows to be 19 among all specimens correspond to the *M. monspessulanus monspessulanus*, *M. monspessulanus saharatlanticus*, and *M. insignitus insignitus*. On the other hand 17 mid-body dorsals have been found in the specimens correspond to *M. insignitus fuscus* [4,9,22]. Our specimens differentiate themselves from the other subspecies by lack of the black saddle, in males the general colour of both the head and the nape is rather light and resembles the light overall dorsum colour. Females and juveniles present a marbled pattern but usually forming a dark longitudinal strip on the flank. The number of ventral scales is quite low: 164-177 and 17 mid-body dorsals. However, our specimens raising features that can remind characters of *M. insignitus fuscus* (Fleischmann, 1831).

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