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ON THE VARIABILITY OF STEPPERUNNER *EREMIAS ARGUTA* PALLAS (1773) FROM THE ARAL SEA BASIN

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Abstract

In present work the data on morphological variability of the Stepperunner from 6 populations of the Aral Sea Basin are resulted. Data analysis has shown that the lizards from the northern regions of Aral Sea Basin reliably differ from those inhabited the southwestern regions in length and width of a head, attitude of head length to length of a trunk, length of hind limb and its attitude to trunk length, number of scales around 9-10 tail segments and pattern of coloration.

Резюме

О морфологической изменчивости разноцветной ящурки (*Eremias arguta* Pallas, 1773) из Аральского региона

В работе приводятся сведения о морфологической изменчивости разноцветной ящурки из 6 районов Приаралья. Анализ данных показал, что по ряду признаков ящурки из Северного Приаралья достоверно отличаются от таковых из Юго-Западного Приаралья. К этим признакам относятся: длина и ширина головы, отношение длины головы к длине туловища, длина задней конечности и ее отношение к длине туловища, количество чешуй вокруг 9-10 кольца хвоста и рисунок верхней стороны тела.

Тұжырым

Бұл жұмыста Арал аймағының түрлі-түсті кесірткенің 6 популяциясының морфологиялық ерекшеліктері зерттелген. Аралдың солтүстіл-батыс аймақтарын мекендейтін популяциялар арасында 6 ерекшкдіктер табылды: бастың ұзындығы жане ені, бас ұзындығының денеге қатынасыб аяқтың ұзындығы, аяқ ұзындығының денеге қатынасы, түс жане құйрық маныңдағы 9-10 сақинасының қабыршақ саны.

Introduction

Stepperunner *Eremias arguta* is one of the most abundant species of *Eremias* genus. The area of this species comprises vast territory from North-Eastern Romania to Western Mongolia /1, 2, 3/. Within the territory of Kazakhstan southern border starts from Caspian Sea (Aktau), goes to south-western coast of Aral Sea, than passes along western and northern coasts of Aral Sea and Syr-Darya River to South-Eastern Kzylkum. Thus, the Aral Sea region is inhabited with marginal populations of *E. arguta*. Previous investigations /4, 5, 6, 7, 8/ show spatial distribution of Stepperunner in Aral Sea region and high ecological plasticity of the species. Aral Sea region is of most interest due to current regression of Aral Sea which allows *E. arguta* to colonize exposed bottom of the sea.

The external morphology of Stepperunner was rather poorly studied in this region. I've attempted to analyze external morphological characters of *E. arguta* collected from several localities in Priaralje and to provide interpopulation comparison as well.

Material and methods

77 specimens of *E. arguta*, originated from 6 different populations were examined.

1. BaykadamVillage Envirous, 2003 (n=8)
2. Chelkar Station 1983 (n=15)
3. Aralsk Town environs 1947 – 1952 (n=25)
4. Sarychaganak Gulf 2002- 2003 (n=8)
5. Usturt, Uzbekistan 1956 (n=8)
6. Usturt, Sudochje Lake, 1956 (n=9)

5 metric characters and their indexes were examined, as well as 10 pholidosis characters and pattern of coloration: **L**-snout-vent length, **LCD**-tail length, **L/LCD**-relation of snout-vent length to tail length, **LC**-length of head, **CC**-width of head, **LC/L**-relation of length of head to snout-vent length, **PP**–rear limb length, **PP/L**–relation, **SQ**-scales number around the body, **V**-number of ventral shields, **G**-gulars, **SQCD**-number of scales around 9-10 ring of tail, supralabial shields, low jaw shields,

femoral pores, scale amount from femoral pores to knee, rudimental femoral pores, additional shield between prefrontal shields.

We consider total sampling due to less difference of the body length meaning between males and females from the most area. The only Mongolian samples demonstrates reliable difference by number of scales around 9-10 ring of tail /2/. The collections of Zoological Museum of Moscow State University; Institute of Zoology MES, Kazakhstan; Institute of Zoology, Uzbekistan were used. The length of body and tail was measured with caliper (precision 0,1 mm). For all the characters enumerated we computed the minimum and maximum values (Min/Max), average meaning ± standard error of mean (M±m). The T-test (Student's ratio) (P=0,05) was used to determine the difference ratio between samples (Lakin, 1980).

Results and discussion

Morphometric and pholidosis characters. The amount of supralabial shields in all samples is 7-12 with average meaning of 9.0-10.3. Some specimens with additional shields (1-2) between prefrontal shields were detected (Table 1). The third pair of low jaw shields is always (100%) contacted each other. The amount of femoral pores is 7-12 with average meaning of 9.12-10.4. All specimens examined have rudimental femoral pores. The scale amount from femoral pores to knee is 3-7 in all but one population, where this amount varies between four and eight scales (№ 5).

The comparison of samples examined reveals significant ($P > 0.05$, *t*-test) difference between Northern Aral populations (samples № 1-3) and South-Western ones (№ 5 and 6). Individuals from population № 4 have not so expressed differences from № 5, 6 (Table 2). The following characters demonstrate difference: the length and width of the head, the relation of head length to body length, the length of the rear leg and its relation to body length, and the number of scales around 9-10 tail ring. It is also noticeable that South-Western populations have higher meanings of absolute body length and smaller amount of the scales around the body and lesser amount of ventral shields (Table 1, Table 2).

Coloration of the dorsal surface. The pattern of coloration with transverse dark strips and small light spots was documented for North Aral specimens (Figure 1, A; Figure 2). Dark strips were often smoothly outlined and interrupted along the backbone. Some specimens with same pattern were registered for South-Western Aral. However, the type of coloration revealed in many samples has never been recorded from Kazakhstan /10/. White spots, whereas dark elements represented with transversely elongated spots with light outlines (Figure 1, B; Figure 2).

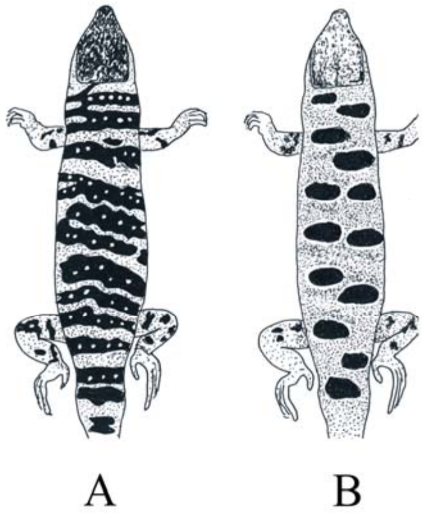

Figure 1. Pattern of coloration of Stepperunner from North Aral (A) and South-Western Aral (B).

The comparison of Aral populations with previously studied populations from Eastern Kazakhstan /10, 11/ reveals that North Aral populations are closer to Eastern

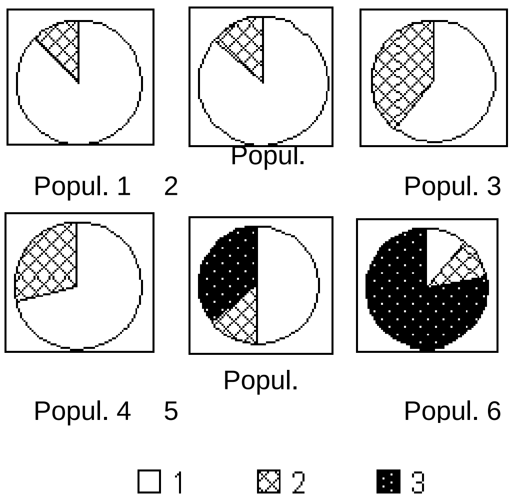

Figure 2. Correlation of diverse types of coloration of Stepperunner from 6 populations in Aral Sea Region. *Types of coloration:* 1 – transverse continually or interrupted dark strips with light spots inside; 2 – transverse rows of white spots interspersed with black markings; 3 – scattered oval dark spots without light elements

Kazakhstan populations than to South-Western Aral animals by most of morphological characters. We believe that such a situation is resulted from marginality of South-Western populations within the species area and from at least partial isolation of populations, inhabited the environs of Sudochje Lake. This Lake is delimited with Usturt Plateau from the west and with small lakes and Aral Sea from

North-East. Stepperunner was not detected southward from Sudochje Lake. If is also probable, that the differences noted are resulted from different biotopes. The most important factor in this case is the type of the soil /2/, which is one of the main factors of microevolution of this species.

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Table 1. The variability of some characters of the Stepperunner from Aral Sea region.

Characters	Populations					
	1	2	3	4	5	6
L	51.07-68.72 63.70±1.91	52.20-68.00 61.28±1.35	49.00-79.00 65.40±1.76	53.00-83.20 68.35±3.51	58.30-89.20 69.07±3.51	60.00-78.00 67.94±2.31
LCD	50.00-79.00 65.53±3.75	55.00-75.50 66.70±2.31	53.00-90.00 72.95±2.26	63.00-75.00 69.24±1.99	68.00-93.00 77.72±3.34	73.00-83.00 77.76±2.89
L/LCD	0.79-1.24 0.98±0.05	0.84-1.06 0.90±0.02	0.79-1.03 0.91±0.01	0.84-1.08 0.93±0.03	0.80-1.80 1.04±0.13	0.77-0.89 0.84±0.03
LC	13.38-19.00 15.83±0.57	12.10-18.40 15.70±0.41	11.00-21.50 16.41±0.64	14.00-23.00 17.98±1.19	16.9-22.70 19.56±0.64	17.00-21.50 18.84±0.68
CC	7.76-11.17 9.72±0.34	8.80-12.40 10.13±0.28	8.00-13.00 10.31±0.31	8.80-15.20 11.66±0.93	11.00-15.50 12.98±0.55	10.50-14.10 12.27±0.54
LC/L	0.23-0.28 0.24±0.005	0.22-0.28 0.25±0.005	0.16-0.30 0.24±0.006	0.24-0.28 0.25±0.005	0.23-0.31 0.28±0.008	0.25-0.30 0.27±0.07
PP	25.37-33.30 28.71±0.82	26.2-32.60 29.10±0.52	21.00-38.00 30.42±0.87	26.50-35.60 30.34±1.64	31.00-41.90 35.11±1.32	31.00-40.00 34.41±1.24
PP/L	0.41-0.49 0.44±0.008	0.40-0.51 0.47±0.009	0.38-0.52 0.46±0.006	0.39-0.52 0.44±0.01	0.42-0.54 0.50±0.01	0.47-0.53 0.50±0.008
SQ	44.00-54.00 47.66±1.19	39.00-55.00 46.06±1.03	42.00-53.00 47.39±0.68	46.00-59.00 50.87±1.45	40.00-49.00 45.25±1.06	42.00-51.00 45.44±0.98
V	29.00-32.00 30.66±0.33	28.00-33.00 30.13±0.30	29.00-34.00 31.68±0.33	29.00-34.00 31.12±0.63	26.00-34.00 29.50±1.18	27.00-30.00 28.55±0.33
G	21.00-29.00 26.33±0.83	20.00-30.00 26.46±0.63	24.00-34.00 28.50±0.50	26.00-33.00 29.75±0.92	26.00-30.00 28.00±0.91	27.00-31.00 29.00±0.81
SQCD	26.00-30.00 27.33±0.50	21.00-26.00 24.07±0.43	23.00-36.00 28.40±0.64	25.00-29.00 27.00±0.50	24.00-28.00 25.87±0.44	20.00-26.00 23.55±0.64
Additional shield between prefrontal	12.5 %	20%	20%	37.5%	21.42%	11.11%

Table 2. The comparison of differences reliability (*t*) within *E. arguta* populations.

Populations	Charakters							
	LC	CC	LC/L	PP	PP/L	SQ	SQCD	V
1 and 2	0.42	0.98	1.42	0.88	2.00	2.13	0.97	0.37
1 and 3	0.37	0.41	1.38	1.62	3.00	1.50	3.20	0.42
1 and 4	1.64	1.95	1.42	0.89	0.00	1.56	0.32	0.62
1 and 5	3.03	3.41	3.37	3.87	6.00	2.57	2.21	0.84
1 and 6	2.38	2.62	0.28	3.59	6.00	2.54	1.36	4.58
2 and 3	0.93	0.51	1.42	3.42	1.00	1.08	5.62	3.52
2 and 4	1.82	1.57	0.00	0.72	0.33	2.71	4.61	1.43
2 and 5	5.07	4.67	3.19	4.26	3.00	0.55	2.95	0.52
2 and 6	2.04	3.56	0.28	3.96	3.00	0.43	0.72	0.14
3 and 4	0.70	1.37	1.42	0.51	2.00	2.16	1.72	0.78
3 and 5	3.50	4.24	4.00	2.96	4.00	1.71	3.28	1.78
3 and 6	2.61	3.16	0.42	2.64	4.00	1.63	7.57	6.8
4 and 5	1.17	1.22	3.33	2.03	6.00	3.13	1.71	1.21
4 and 6	0.62	0.57	0.28	1.98	0.75	3.10	4.25	1.55
5 and 6	0.79	0.92	0.14	0.38	0.00	0.13	3.01	2.07

Notes: The meaning *t* allocated by color show significant differences of populations.