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NEW FINDS OF THE RACERUNNER OF *Eremias multiocellata* COMPLEX IN KAZAKHSTAN

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New finds of the lizards of *Eremias multiocellata* complex became known for extreme southeast of Kazakhstan. In 2006 – 2007 we recorded the lizards in the mountain valleys of Kegen and Tekes Rivers crossing an intermountain depression located between Ketmen' and Terskey-Alatau ranges at altitude 1850 – 1950 m a.s.l. Morphological analysis revealed the reliable differences of the specimens collected from other species of *multiocellata* complex inhabited the close areas — *E. stummeri* from Issyk-Kul' Depression and *E. kokshaaliensis* from Sary-Dzhaz River Basin of Kyrgyzstan. Morphological peculiarity of the populations recorded may be caused by their isolative position in extreme southeast of Kazakhstan and needs future elucidation.

Keywords: Reptilia; Squamata; *Eremias multiocellata* complex; distribution; habitats; morphology.

First information on the Multiocellated Racerunner (*Eremias multiocellata*) in Kazakhstan appeared in the book of Paraskiv "Reptiles of Kazakhstan" in 1956. The author mentioned the finds of the lizards in the Central Tien-Shan Mountains made in early fiftieth by D. Bibikov in Malyy Kakpak River and Elyubay Ravine[3] and A. Bannikov in Narinkol River Valley (Fig. 1). The racerunners collected near the same years in Eastern Kazakhstan are stored in the Zoological Museum of Moscow State University. There are the specimens from the environs of Kamyshenka Village (left bank of Irtysh River) and Buran Village (Zayssan Depression) and from the Saykan, Aktal, and Saur Ranges. All following records were known only from the eastern part of Kazakhstan — Zayssan Depression and Saur Mountain System (Fig. 1). Late September 1970 Ananjeva (1972) got two specimens of *E. multiocellata* in the vicinity of Maykapchagay Village (the eastern part of Zayssan Depression). By April 13, 1971, two adult racerunners were found in the gullet of the Kestrel (*Falco tinnunculus*) caught near Bazar River in the southwestern part of Zayssan Depression. 25 April 1977 the young racerunner male was detected in the slope of Ashutas Hill located in 12 km east from Buran Village (Prokopov, 1978). During next 25 years inhabitancy of multiocellated racerunners was confirmed for northern slopes of Saur Mountains (confluence of Akkolka and Kara-Ungur Rivers), first recorded for Bukon' (or Kuludzhun) Sands (left bank of Boukhtarma Water Reservoir) and Aygyrkum Sands (southern part of Zayssan Depression) (Brushko, 1995; Prokopov, 1996/1997, 2002; author's data). The records of the lizards in Central Tien-Shan Mountains within Kazakhstan territory needed to be confirm. Having in mind this goal in 2006 – 2007 we undertook a special trip to extreme southeast of Kazakhstan. The results of our search proved to be quite fruitful and presented in this paper.

MATERIAL AND METHODS

The fieldwork were conducted in July – August 2006 and in May, August and September in 2007 in intermountain depression placed between Ketmen' and Terskey – Alatau Ranges at altitude 1500 – 2500 m a.s.l. We inspected the valleys of Kegen, Shalkudisu and Tekes Rivers and the low flows of Bayankol, Malyy Kakpak, and Bol'shoy Kakpak Rivers. The lizard records were fixed with GPS Garmin 12 (latitude, longitude, al-

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[3] In the original source Paraskiv (1956:119) wrote "Khlyubay Ravine" that was rather misprinted.

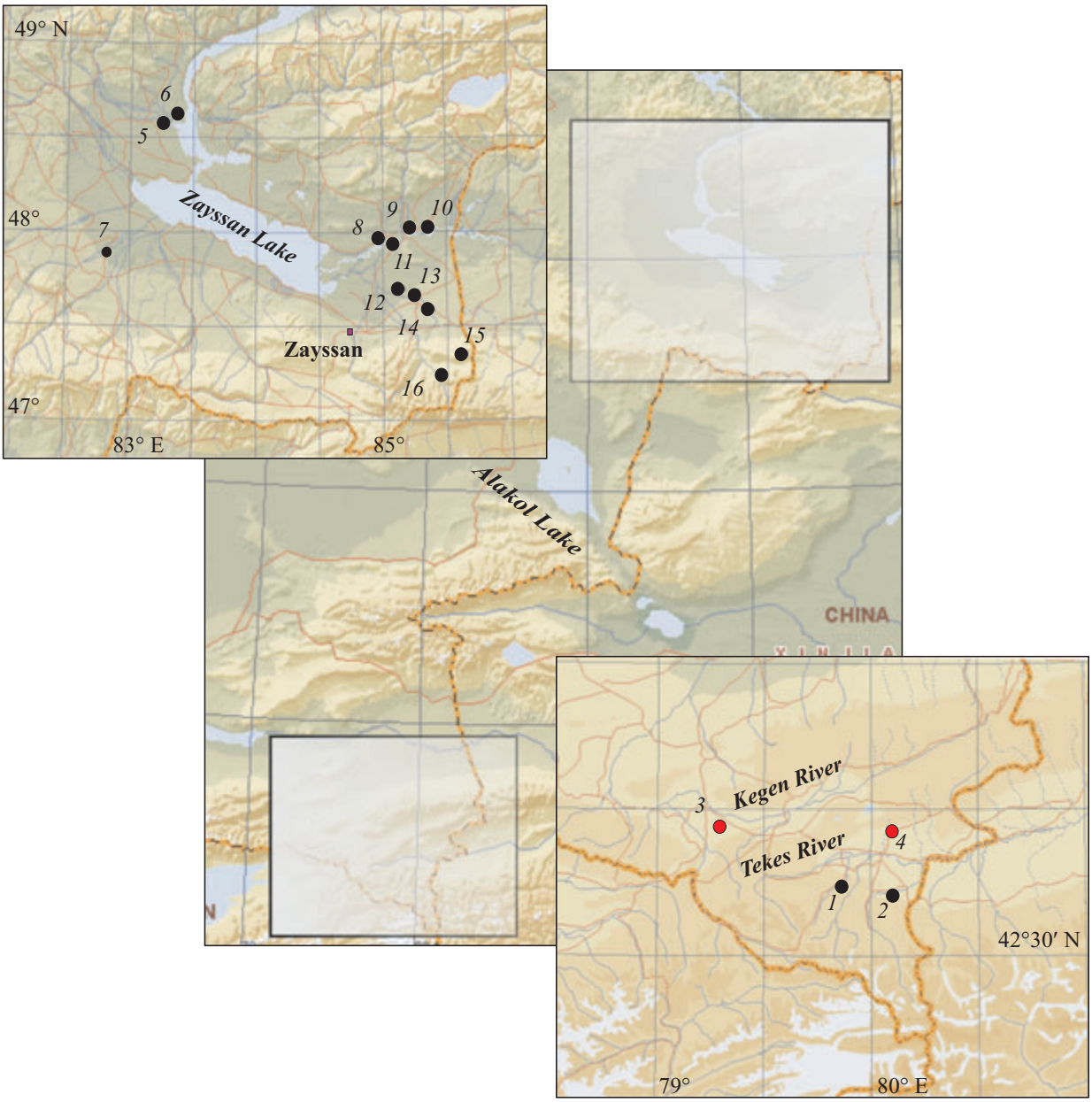

Fig. 1. Known finds of the racerunners of *Eremias multiocellata* in Kazakhstan (acronyms are ZISP for Zoological Museum of Russian Academy of Sciences, St. Petersburg, Russia; ZMMSU for Zoological Museum of Moscow State University, Moscow, Russia): *1*, Central Tien-Shan, Malyy Kakpak River, and Elyubay Ravine, early 1950s (coll. Bibikov, cited after Paraskiv, 1956); *2*, Central Tien-Shan, Narynkol River, early 1950s (coll. Bannikov, cited after Paraskiv, 1956); *3*, Central Tien-Shan, Kegen River Valley, 10 km SE of Kegen Village, May and August 2007 (present paper); *4*, Central Tien-Shan, Tekes River Valley, southern foothills of Zhabyrtau Mountains, September 10, 2007 (present paper); *5*, Eastern Kazakhstan, Kamyshenka Village vicinity, May 1956 (coll. Vorontzov, ZMMSU); *6*, Eastern Kazakhstan, NW part of Zayssan Depression, Bukon'skiye Sands, July 30, 2002 (Prokopov, 2002); *7*, Eastern Kazakhstan, SW part of Zayssan Depression, Bazar River, April 13, 1971 (Prokopov, 1978); *8*, Eastern Kazakhstan, Chernyy Irtysh River, 17 – 20 km W of Buran Village, 2002 (Prokopov, 2002); *9*, Eastern Kazakhstan, Buran Village vicinity, August – October, 1956 (coll. Severtzov, ZMMSU); *10*, Eastern Kazakhstan, NE part of Zayssan Depression, 12 km E of Buran Village, Ashutass Hill, April 25, 1977, and June 2002 (Prokopov, 1978, 2002); *11*, Eastern Kazakhstan, N corner of Aygyrkum Sands, May 26, 2003 (Chirikova et al., personal communication); *12*, Eastern Kazakhstan, 10 km N of Karatal Village, July 12, 1985 (Kovshar, personal communication, cited after Brushko, 1995); *13*, Eastern Kazakhstan, N corner of Aygyrkum Sands, 10 km NE of Karatal Village, July 1, 1997 (ZISP); *14*, Eastern Kazakhstan, S part of Zayssan Depression, 15 – 20 km NW of Maykapchagay Village, September 27, 1970 (Ananjeva, 1972), Eastern Kazakhstan, Saur, Saykan, and Aktal Ranges, June 1930 and June 1958 (coll. Sukhanov, ZMMSU); *15*, Eastern Kazakhstan, Saur Range, N slope at a confluence of Akkolka and Kara-Ungur Rivers, July 24, 1992 (Prokopov, 1996/1997).

Fig. 2. Biotope of the racerunner of *Eremias multiocellata* complex in Kegen River Valley (Central Tien-Shan).

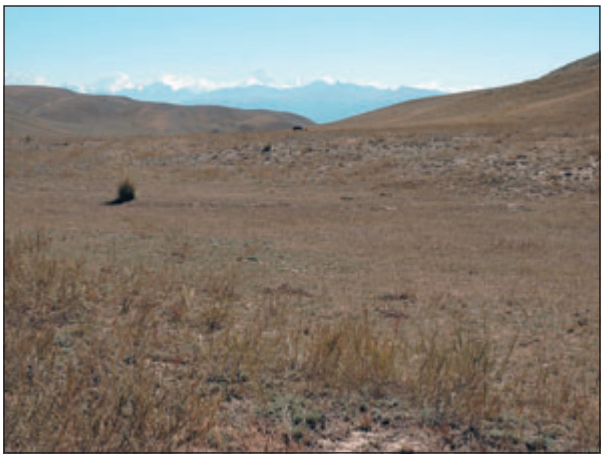

Fig. 3. Biotope of the racerunner of *Eremias multiocellata* complex in Tekes River Valley (Central Tien-Shan).

titude) and their habitats were shortly described with indication to type of landscape, soil and dominative plants.

Totally 16 specimens (7 ♀♀, 5 ♂♂, 4 juv.) were described. Morphological analysis conducted in 5 metric characters and their indexes and in 9 age- and size independent meristic scale characters: SVL, snout-vent length; LCD, length of tail; SVL/LCD, relation snout-vent length to tail length; HL, head length from rostral shield to corner of mandibles; HW, head width at broadest point; HL/SVL, relative head length; HW/HL, relation head width to head length; HLL, length of hind limb (measured from glenoacetabulum to base of 4th claw); HLL/SVL, relative length of hind limb; SQ, number of dorsal scales around of mid-body; Ventr, number of ventral scales in the left central longitudinal row from the collar fold to the first scale contacted femoral pores; G, number of gular scales; PF, number of femoral pores on right hind limb; SQFP, number of scales between femoral pore rows; FPMIN, number of immature femoral pores; SQK, number of scales from distal femoral pore to knee; SQCD, number of scales around 9 – 10 tail ring.

For statistic analysis we used "STATISTICA for Windows (version 6.0)."

RESULTS

New finds of the lizards of *Eremias multiocellata* complex and their habitats in extreme southeast of Kazakhstan. Our inspection of the valleys of low flows of Bol'shoy and Malyy Kakpak Rivers in July 17 – 18, 2006, did not give a positive result. However, May 11, 2007, in the edge of small sandy area Kumtekey located 10 km to southeast from Kegen Village (42°56′54.3″ N 79°18′3.48″ E, 1873 m) we caught a female of lizard determined as *E. multiocellata* according to its morphological characters. On August 28 1.5 km north from the first record (42°57′54.54″ N, 79°18′45.6″ E), we collected 12 lizards (5 ♀♀, 5 ♂♂, 2 juv.). At last, September 10, 2007, 2 females and 2 juveniles were found in the southern foothills of Zhabyrtau Mountains in the valley of Tekess River (42°55′34.8″ N 80°05′23.22″ E, 1940 m) (Fig. 1). Morphological description showed that all the lizards belonged to *E. multiocellata* complex.

New localities of the racerunners were represented with deserted or steppe-like biotopes at altitude 1850 – 1950 m a.s.l. In Kumtekey Sands they were found in low depression between not high sandy dunes overgrowing with rare vegetation at domination of *Ziziphora bungeana* and *Astragalus* sp. In surrounding areas the lizards were recorded in the clay field with grass association and shallow ravine with steep clay slopes and bottom densely overgrowing with *Festuca valesiaca* and rare grasses of *Achnatherum splendens* (Fig. 2). According to our observations all the habitats of the racerunner in Kegen River Valley were characterized with quite dense vegetation (up to 80%). Only in the Tekes River Valley the lizards were met near the road in crushed stone and clay soil where scanty vegetation was mainly presented by *Artemisia* bushes (Fig. 3).

Morphological description. Except of relative length of hind limb (HLL/SVL) where a sexual dimorphism was detected we gave a general description of metric features irrespective of sex.

Fig. 4. Male of the racerunner of *Eremias multiocellata* complex from Kegen River Valley (Central Tien-Shan).

Body Sizes and Proportions

Adult specimens: SVL (n = 12) 52.71 – 68.17 (57.37 ± 1.19); LCD (n = 8) 61.30 – 73.26 (67.56 ± 1.18); SVL/LCD (n = 8) 0.76 – 1.00 (0.85 ± 0.03); HL (n = 11) 13.49 – 16.75 (14.86 ± 0.31); HW (n = 11) 7.28 – 8.50 (7.85 ± 0.14); HL/SVL (n = 11) 0.24 – 0.29 (0.25 ± 0.005); HW/HL (n = 11) 0.50 – 0.57 (0.52 ± 0.006); HLL (n = 11) 22.53 – 28.57 (25.08 ± 0.57); HLL/SVL: females (n = 7) 0.37 – 0.43 (0.40 ± 0.009); males (n = 5) 0.42 – 0.50 (0.46 ± 0.014).

Juvenile specimens: SVL (n = 4) 33.94 – 39.45 (36.40 ± 1.13), LCD (n = 3) 46.72 – 50.46 (48.1 ± 1.18); SVL/LCD (n = 3) 0.76 – 0.78 (0.77 ± 0.005); HL (n = 4) 9.41 – 10, 63 (10.11 ± 0.25); HW (n = 4) 4.88 – 5.65 (5.30 ± 0.15); HL/SVL (n = 4) 0.25 – 0.29 (0.27 ± 0.008); HW/HL (n = 4) 0.50 – 0.55 (0.51 ± 0.011); HLL (n = 4) 15.87 – 19, 60 (17.92 ± 0.77); HLL/SVL (n = 4) 0.46 – 0.50 (0.48 ± 0.008).

Scalation

Adult and juvenile specimens: SQ 46 – 63 (51.64 ± 1.01); V 26 – 31 (28.35 ± 0.34); G 17 – 23 (20.58 ± 0.42); PF 11 – 14 (11.94 ± 0.23); SQCD 24 – 29 (26.94 ± 0.41); number of scales between femoral pore rows 5 – 8 (7.00 ± 0.19); number of scales from distal femoral pore to knee 2 – 4 (2 in 16.12%, 3 in 54.83%, 4 in 29.03%); immature femoral pores are present in 32.25% specimens; subocular touches mouth in 100% specimens; fifth chin shield touches sublabials in 19.35%; supralabials 5 – 6 (5 in 73.3%); sublabials 5 – 8 (6 in 51.61%); supraciliars 4 – 8 (6 in 45.16%); number of granules before supraoculars 1 – 3; three pares of chin shields contact in 100%; additional prefrontal presents in 5.88% specimens; 58.82% specimens have large gulars, located under third chin shield and represented rather splitting from its low edge; head is smooth.

Coloration in life. Dorsum light brown or grayish brown, in some specimens clearly tinged with green or blue. Dorsum pattern presented with 6 longitudinal rows of ocelli (three rows of ocelli on each side of the dorsum); third row located on the lateral surface of body (Fig. 4). The ocelli edged with dark; in some specimens these dark contours fuse in transversally oblique streaks separated in middorsum; ocelli of two medial rows in 29% specimens edged with black only medially and laterally; lateral ocelli green; unlike females the green ocelli in males well distinguished being bright and clearly edged with dark; ocelli of third row in some females have weakly detected dark contours. Ventrally from third ocelli row there are dark spots or blotches of middle and small sizes; some specimens have dark dots also in ventrum; 1 – 2 green ocelli on dorsal femur surface; tail ventrally white in adults and yellowish in subadults; long black blotches on dorsal neck surface; well visible black and dark brown marks on head dorsum (mainly on parietals, interparietal, frontonasal and supraoculars) and head lateral surfaces.

Juveniles with weakly distinguished medial rows of ocelli; two other rows consisted of ocelli edged with dark; lateral ocelli slightly green; pileus with dark marks; the only juvenile with greenish parietals and supraoculars; tail ventrally yellowish.

DISCUSSION

In known literature it was more than one noted to complexity of interspecies structure of *E. multiocellata* (Orlova, 1989; Orlova, Terbish, 1986, 1997; Eremchenko et al., 1992; Truweller et al., 1994; Ananjeva et al., 2004). Based on long standing morphological research and hybridization experiments Eremchenko et al. (1992) confirmed a heterogeneity of the species and substantiated an existence of 5 independent species of racerunners united them in the complex "*multiocellata*." According to these authors as minimum two forms of *E. multiocellata* complex inhabit the territory of Kazakhstan: certainly the Multiocellated Racerunner (*E. multiocellata* Günther, 1872) in the eastern part of the country and hypothetically the Tien-Shanic Racerunner (*E. stummeri* Wettstein, 1940) in extreme southeast of Kazakhstan.

Compared to *E. stummeri* inhabited Issyk-Kul' Depression and hypothetically occurred in extreme east of Kazakhstan (Eremchenko et al., 1992) the racerunners collected by us were reliably distinguished by lower Sq, G, higher Pf ($P = 0.05$) and by a pattern of color ocelli distribution (Table 1). It would be also important to note that in our sample ($n = 16$) we did not find the specimens with splitted fifth chin shield that was observed in 32% of *E. stummeri* from Issyk-Kul' and Kochcor Depressions (Eremchenko et al., 1992).

Compared to *E. kokshaaliensis* inhabited a close area of Sary-Dzhaz River Valley in Central Tien-Shan Mountains (Eremchenko, Panfilov, 1999) the new form reliably differed in lower G, Ventr and distance between the femoral pore rows and higher Pf ($P = 0.05$). Two populations were also well-distinguished in drawing pattern of dorsum and pattern of color ocelli distribution (Table 1). The tail of adult and young specimens of *E. kokshaaliensis* was colored in light green. Ventral and lateral surfaces of tail were white in adult lizards from Kegen and Tekes and yellowish in young specimens.

According to Paraskiv (1956), in extreme southeast of Kazakhstan in Central Tien-Shan Mountains the multiocellated racerunners were found in mountain steppes with *Artemisia*, *Festuca*, and *Stipa* plant associations along the river valleys, in dry ravines, mountain slopes down from forest zone and within the stone and shingle terraces at altitude 1500 – 3000 m a.s.l. In general, the habitats of other species of *E. multiocellata* complex distributed in surrounding territories are similar to described above. *E. stummeri* was found in Issyk-Kul' Depression in stone and gravid deserts with rare bushes of *Artemisia*, *Krascheninnikovia*, *Stipa*, *Anabasis*, and *Ephedra*. It was also met in *Festuca-Achnatherum* steppes with shingles and big stones at altitude no lower than 1400 – 1500 m (Shnitnikov, 1928; Yakovleva, 1964; our observations). The stone and gravid plains with sagebrush, fescue and grasses are the typical biotopes of *E. kokshaaliensis* in the valley of Sary-Dzhaz River in Kyrgyzstan (Eremchenko et al., 1999).

Similar biotopes with crashed stone soil and scanty vegetation represented mainly with *Artemisia* sp. were described here for the racerunners from Tekes River Valley (Fig. 3). On the contrary the habitats of the lizards in Kegen Valley were characterized by sandy or clay soils with dense vegetation (up to 80%) consisted of grass for the most part (Fig. 2). However, it was not unusual observation because as long ago as 1928 Shnitnikov wrote that unlike *E. arguta* the Multiocellated Racerunner was often met in the habitats "lost a steppe appearance and rather resembled the meadows" (p. 59). Later Eremchenko et al. (1999) also marked originality of some biotopes of *E. kokshaaliensis* found them near boundary of coniferous forests of Sary-Dzhaz River basin and represented by forest meadows. As was noted by Truweller et al. (1994), a wide range of landscapes and climatic conditions are typical for the species of *E. multiocellata* complex that determines high level of their morphological variation and accordingly complexity of intraspecies systematics.

It cannot be excluded that morphological peculiarities of racerunners from Kegen and Tekes Valleys can be conditioned by isolation of Kazakhstan populations separated from areas of *E. stummeri* and *E. kokshaaliensis*

TABLE 1. Some External Morphological Characters of the Lizards of *Eremias multiocellata* Complex (numerator, males; denominator, females)

Character	*Eremias stummeri* (after Eremchenko, et al., 1992)	The racerunners from Kegen and Tekes Valleys (Kazakhstan)	*Eremias kokshaaliensis* (after Eremchenko, et al., 1999)
SVL	44.3 – 60.4 (51.48 ± 0.62), $n = 50$ / 46.0 – 61.0 (53.11 ± 0.54), $n = 47$	52.71 – 68.17 (57.37 ± 1.19), $n = 12$	53.0 – 57.0 (55.0 ± 1.4), $n = 2$ / 44.6 – 55.4 (52.0 ± 0.7), $n = 17$
SVL/LCD	0.58 – 0.8 (0.71 ± 0.01), $n = 40$ / 0.69 – 1.1 (0.83 ± 0.02), $n = 32$	0.76 – 1.0 (0.85 ± 0.03), $n = 8$	0.57 – 0.64 (0.6 ± 0.03), $n = 2$ / 0.54 – 0.7 (0.64 ± 0.02), $n = 14$
SQ	46 – 65 (55.06 ± 0.34), $n = 124$	46 – 63 (51.64 ± 1.01), $n = 16$	45 – 59 (50.7 ± 0.7), $n = 34$
G	21 – 32 (26.09 ± 0.21), $n = 124$	17 – 23 (20.58 ± 0.42), $n = 16$	23 – 31 (26.5 ± 0.5), $n = 34$
Ventr	27 – 34 (30.64 ± 0.12), $n = 124$	26 – 31 (28.35 ± 0.34), $n = 16$	30 – 34 (31.6 ± 0.2), $n = 34$
SQCD	22 – 34 (27.06 ± 0.21), $n = 124$	24 – 29 (26.94 ± 0.41), $n = 16$	22 – 28 (25.1 ± 0.4), $n = 34$
PF	5 – 14 (10.07 ± 0.09), $n = 123$	11 – 14 (11.94 ± 0.23), $n = 16$	8 – 13 (10.7 ± 0.1), $n = 34$
SQPF	7 – 13 (10.18 ± 0.1), $n = 123$	5 – 8 (7.0 ± 0.19), $n = 16$	10 – 13 (11.5 ± 0.2), $n = 34$
Subocular	Touch mouth in 100 %	Touch mouth in 100 %	Touch mouth in 100 %
5th chin	Touch sublabials in 21.9 %	Touch sublabials in 19, 35 %	Touch sublabials in 38.3 %
Drawing pattern of dorsum	2, rarely 3 rows of ocelli; low (lateral) row (rarely two low) of ocelli green or blue completely or partially edged with dark contours	3 rows of ocelli; low (lateral) row of ocelli green completely or partially edged with dark contour	Dorsum with dark dots; males with single lateral row of bluish or greenish ocelli

by high mountain ranges of Kungey and Terskey Alatau. A supposition on possible connection of Kazakhstan populations and Issyk-Kul *E. stummeri* through the intermountain depression placed between these ranges seems doubtful. This depression is crossed by two large mountain rivers — Tyup and Karkara with wide marshy area between them and peripheral tall herbage meadows. A distance between Kegen and Tekes finds is not big and comes near 60 km. The distance from them to closest finds of *E. stummeri* and *E. kokshaaliensis* is a little more and reaches 100 km. Two Kazakhstan populations are separated from each other by marshy basins of Kegen, Karkara, and Tekes rivers and extreme northern mountain spurs of Terskey Alatau Range. We cannot exclude a proposition they are not connected between themselves. Possibly the Kegen racerunners are more close to Issyk-Kul *E. stummeri* and the lizards from Tekes Valley to Sary-Dzhaz *E. kokshaaliensis*. In any case a taxonomic status position of the racerunner from Kazakhstan part of Central Tien-Shan needs verification.

CONCLUSION

We provided the new data on distribution of the racerunners of *Eremias multiocellata* complex in extreme southeast of Kazakhstan — in Central Tien-Shan Mountains. The lizards were found in the valleys of Kegen and Tekes Rivers at altitude 1850 – 1950 m a.s.l. The specimens collected were reliably differed from other closely distributed species of *multiocellata* complex — *E. stummeri* and *E. kokshaaliensis* in several morphological characters. A taxonomic position of new form needs future verification.

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