

REEVALUATION OF THE STATUS OF *Lacerta agilis tauridica* SUCHOV, 1926

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According to our results based on the nucleotide sequences of mitochondrial cytochrome *b* gene of *Lacerta agilis* sand lizards from Crimean mountain region turned to be genetically different from known subspecies. The Crimean sand lizards form a separate group, closely related to *Lacerta agilis exigua* subspecies. A comparative morphological analysis of the Crimean *Lacerta agilis* was conducted and revealed some differences of analyzed lizards with respect to other subspecies of the sand lizards. Both molecular and morphological data led to the conclusion about the distinct taxonomical status of the Crimean *Lacerta agilis*. Redescription of *Lacerta agilis tauridica* is given and neotype is designated.

Keywords: lacertid lizards, *Lacerta agilis tauridica*, taxonomic status, Crimea.

INTRODUCTION

In the framework of the project on phylogeography of *Lacerta agilis* sampled through its whole distribution range (Kalyabina et al., 2001) we have received results suggesting the need for the reevaluation of the systematic position of Crimean sand lizards.

Distinct morphological characters of the sand lizards in Crimea were first mentioned by K. L. Hablizl (1785). He noted two forms in Crimea: the usual “green” sand lizard and the green lizard with black spots on the back, *Lacerta punctata*, distributed both in the plains and in the mountains (Hablizl, 1785). Later P. S. Pallas (1795, 1813), N. M. Kulagin (1888), and A. M. Nikolsky (1891) recorded some differences of the sand lizards found in Crimea. The last two authors recognized in Crimean sand lizards, especially in those from Southern Crimea (Yalta region) “intermediate form” between this species and *L. viridis*.

From the Northern Black Sea region they were described several distinct forms.

1. *Lacerta paradoxa* Bedriaga, 1886 from Suchum-Kale, Taurien, Trapezunt and Konstantinopol, which was later considered as *Lacerta exigua paradoxa*, or *Lacerta agilis paradoxa* subspecies, inhabiting the Western Transcaucasian region (Suchov, 1948)

2. E. Schreiber (1912) discussed the sand lizards from the Northern Black Sea region in his “Herpetologia Europaea.” He described two specimens from Bessarabia (recent Moldavia) and Crimea as distinct color variations: var. *eremioides* — multicolor specimen of the sand lizard originated probably from Bessarabia, and var. *concolor* — unicolor specimen from Crimea.

3. In 1926 G. F. Suchov examined specimens of *Lacerta agilis* from Crimea stored in collections of Zoological Institute, Russian Academy of Science (ZISP) and collection of Zoological Museum, National Natural History Museum, Ukrainian Academy of Sciences (NNHM NASU) and described the distinct subspecies *Lacerta agilis tauridica* Suchov, 1926.

However in subsequent publications Suchov (1948) no longer mentions the subspecies status of the Crimean sand lizards anymore. Later all authors (Terentyev and Chernov, 1949; Taratschuk, 1959; Szczerbak, 1966; Yablokov, 1976; Bannikov et al., 1977) considered the Crimean sand lizards as *Lacerta agilis exigua* subspecies. It has been widely accepted (Darevsky et al., 1976) that the Northern Black Sea region to the west from Cri-

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Fig. 1. Distribution of subspecies in Crimea region with map of DNA-samples. ●, the localities of *L. a. tauridica*; ■, *L. a. exigua*; ▲, *L. a. chersonensis*.

mea is inhabited by *L. a. chersonensis*, described from Cherson, and Azov Sea coast and that the western Precaucasian region is occupied by *L. a. exigua*.

In order to clarify the status of the sand lizard from Crimea a genetic analysis was conducted using DNA sequences. Mitochondrial DNA has been proven to be a useful tool to solve different systematic and phylogenetic questions for groups of organisms with different divergence times. Cytochrome *b*, 12Ss and 16Ss rRNA genes appear to be very sufficient for studies on genera, species and subspecies levels (Wilson et al., 1985; Moritz et al., 1987; Harrison, 1989). Comparative morphological analysis of the sand lizards from Crimea and adjacent territories was also done.

MATERIAL AND METHODS

Genetic Analysis

A total of 194 samples of *Lacerta agilis* comprising all known subspecies from different parts of the distribution range were used for the analysis. Nine samples of the sand lizards from different parts of Crimea and 5 samples from adjacent regions were of particular importance for the present work (Appendix 1, Fig. 1). A complete sample list of the analyzed lizards is represented in Kalyabina-Hauf (2003). Standart proteinase k and phenol chloroform protocols were used to extract total DNA (Sambrook et al., 1989) from liver, muscle tissue and blood. DNA aliquots were subjected to PCR using specific primer pairs which amplify an approximately 930 bp fragment of the cytochrome *b* gene. The light and heavy strand primers were used after modified versions

of those given by Kocher (Kocher et al., 1989): mtA-new (L 14995) 5'-TCCCAGCCCCATCCAACA-TCTCAGCATGATGAAACTTCG-3' and mtFs-H (H 15917) 5'-AACCAGTAGAACACCCATTCATCATC-ATTGGCCAACTA-3'. Amplification conditions were as follows: after an initial denaturation step of 94°C for 300 sec, 31 cycles followed with a denaturation at 94°C for 30 sec, annealing at 47°C for 45 sec, and extension at 72°C for 60 sec. Cycle sequencing reactions were run with 25 cycles consisting of denaturation at 96°C for 10 sec, annealing at 50°C for 5 sec, extension at 60°C for 240 sec. For sequencing three primers were used: the light strand primers mtA-new (L 14995) and L-lac-428 (L 15422) 5'-TTTGCAATYGAYAACGCAACCCTCAC-3', which was specifically designed for this study and the heavy strand primer mtB2 (H 15298) 5'-GCCAGAAkGATATTTGTCCTCA-3'. Sequences were generated using Automatic capillary Sequencer ABI 3100 (Applied Biosystems). For statistical and genetic analysis 897 bp of the amplified cytochrome *b* gene fragment were used. Distance and cladistic methods were used to reconstruct phylogenetic trees such as Neighbour-Joining, Maximum Parsimony, and Maximum Likelihood (detailed analysis parameters see in Kalyabina-Hauf (2003) and Kalyabina-Hauf et al., (2004). All analyses were performed using PAUP software (Swofford, 2000). All heuristic searches for optimal trees were carried out by TBR (Tree-bisection-reconnection) branch swapping with option MULPARS in effect.

Morphological Analysis

The voucher specimens used for DNA samples and specimens (Appendix 2) from Crimea stored in Zoological Institute, Russian Academy of Sciences, St. Petersburg (ZISP), and Ukrainian Zoological Museum, Kiev (NNHM NASU) including specimens of *Lacerta agilis tauridica* studied by G. F. Suchov were morphologically examined. The following characters were recorded for each specimen: body length (*Longitudo corporis*, L.), tail length (*Longitudo caudalis*, L.cd.), number of scales around midbody except for ventral shields (*Squamae dorsalis*, Sq.), number of transversal rows of the ventral scales (*Ventrals*, Ventr.), number of femoral pores on left/right side (*Pori femorales*, P.f.), number of gular scales (*Squamae gulares*, G.), number of granules between supraciliar and supraocular scales (*Granulae*, Gran.), number and arrangement of postnasal (*Postnasalia*) and frenal (*Frenale*) shields — postnasal combination (*Postnasalia/Frenale*), number of frenocular shields (*Frenoculare*), presence of enlarged temporal

shield (*Massetericum*), number of rows of preanales (*Praeanalia*, Pr.an.), and presence of one or two pairs of enlarged central shields, ratio of width to length of the anal shield (L_a/L_a), type of the dorsal coloration pattern.

RESULTS AND DISCUSSION

Pairwise genetic distances (absolute and p-distances) among samples of *Lacerta agilis* range from 0 to 7.3% for nucleotide sequences of the cytochrome *b* fragment (Table 1). Genetic distances between subspecies vary from 0.6 to 7.3%. Little or no genetic differences were observed between populations belonging to the same subspecies. The analysed samples of *Lacerta agilis exigua* from the entire samples distribution range (53 populations) show very high genetic similarity. Three samples from Crimea (Chetyrdag mt., Alushta region and Simferopol) show significant genetic differences to the samples of *L. a. exigua* subspecies (2.3% in average, which exceeds the “between population” level). Other investigated samples from the Crimea region (L_a 105, L_a 232, L_a 233, L_a 140, L_a 241, L_a 244) are genetically very similar or even identical to *L. a. exigua* samples. Genetic distances between the Crimean samples and the *exigua*-group are comparable to those between other subspecies of *Lacerta agilis* and even higher with respect to the West European subspecies (*L. a. agilis*, *L. a. argus*, and *L. a. garzoni*) (Table 1).

An applied phylogenetic analysis show the same branching topology for all calculated trees. Three samples from southern Crimea (mountain region) reproducibly form a separate group, genetically clearly distinct from all known subspecies groups, including the *exigua*-group (Fig. 2), which appears to be a sister group to the Crimean lizards.

To reevaluate morphological data we addressed to Suchov’s original description of *Lacerta agilis tauridica* (Suchov, 1926). In tables he provided the data on the number of postnasal, frenal and frenocular shields of males and females of the Crimean sand lizards:

Postnasale. 2 females (14.3%) have a single shield; 20 males (100%) and 12 females (85.7%) have two shields.

Frenale. in 2 males (10%) and 2 females (14.3%) — absent; 8 males (40%) and 3 females (21.4%) have single shield; 7 males (35%) and 8 females (52.2%) have 2 shields; 3 males (15%) and 1 female (7.1%) have 3 shields.

Frenoculare. 18 males (90%) and 7 females (100%) have single shield; 2 males (10%) have 2 shields.

Suchov compared the Crimean *Lacerta agilis*, Caucasian sand lizards (*Lacerta agilis kaukasica* Suchov, 1926, an invalid name that most probably refers to *Lacerta agilis exigua* subspecies) and the sand lizards from Bessarabia (*Lacerta agilis chersonensis*). He considered the following morphological characters: the number of Postnasale (= Postnasalschild), Frenale (= Frenalschild), Frenoculare (= Frenokularschild), and femoral pores (= Schenkelporen). According to the analysis Crimean specimens appear to be considerably different from Bessarabian *L. a. chersonensis* and similar to Caucasian sand lizards. However the Caucasian sand lizards have 1 – 3 Postnasalia, whereas the Crimean specimens — 1 – 2 Postnasalia. The Crimean specimens differ from Caucasian and Moldavian lizards also by the number of Frenale. These shields are very rarely absent in the Crimean lizards. The most specimens have 2 shields, some — 3, like a *Lacerta agilis exigua* from Siberia. According to Suchov’s data, the number of postnasal and frenal shields is 3.5 in average for Crimean lizards, 2.6 — for *L. a. chersonensis* from Bessarabia and

TABLE 1. Average Genetic Distances (Absolute and P-) of the cytochrome *b* fragment for groups and subspecies of the sand lizard, *Lacerta agilis**

Genetic distances	<i>agilis</i>	<i>argus</i>	<i>boemica</i>	<i>bosnica</i>	<i>brevicaudata</i>	<i>grusinica</i>	<i>chersonensis</i>	<i>exigua</i>	<i>garzoni</i>	Crimea
<i>agilis</i> group		0.0130	0.0680	0.0600	0.0610	0.0610	0.0310	0.0570	0.0180	0.0590
<i>argus</i> group	12.06		0.0670	0.0560	0.0550	0.0550	0.0310	0.0510	0.0210	0.0530
<i>boemica</i> group	60.67	60.23		0.0700	0.0710	0.0700	0.0700	0.0710	0.0670	0.0730
<i>bosnica</i> group	53.52	50.44	62.52		0.0550	0.0530	0.0580	0.0530	0.0610	0.0560
<i>L. a. brevicaudata</i>	54.62	49.11	63.86	49.57		0.0070	0.0580	0.0060	0.0630	0.0230
<i>L. a. grusinica</i>	55.02	49.55	62.48	47.50	5.86		0.0580	0.0090	0.0630	0.0240
<i>chersonensis</i> group	27.71	27.93	63.23	52.25	52.19	52.01		0.0560	0.0340	0.0590
<i>L. a. exigua</i>	51.34	45.94	63.27	47.45	5.56	7.97	49.89		0.0590	0.0230
<i>garzoni</i> group	16.19	18.86	60.29	54.33	56.43	56.83	30.27	53.20		0.0610
Crimea group	53.19	47.68	65.39	50.42	20.86	21.79	52.90	20.64	55.00	

* Over the diagonal, absolute genetic distances; below the diagonal, P-distances.

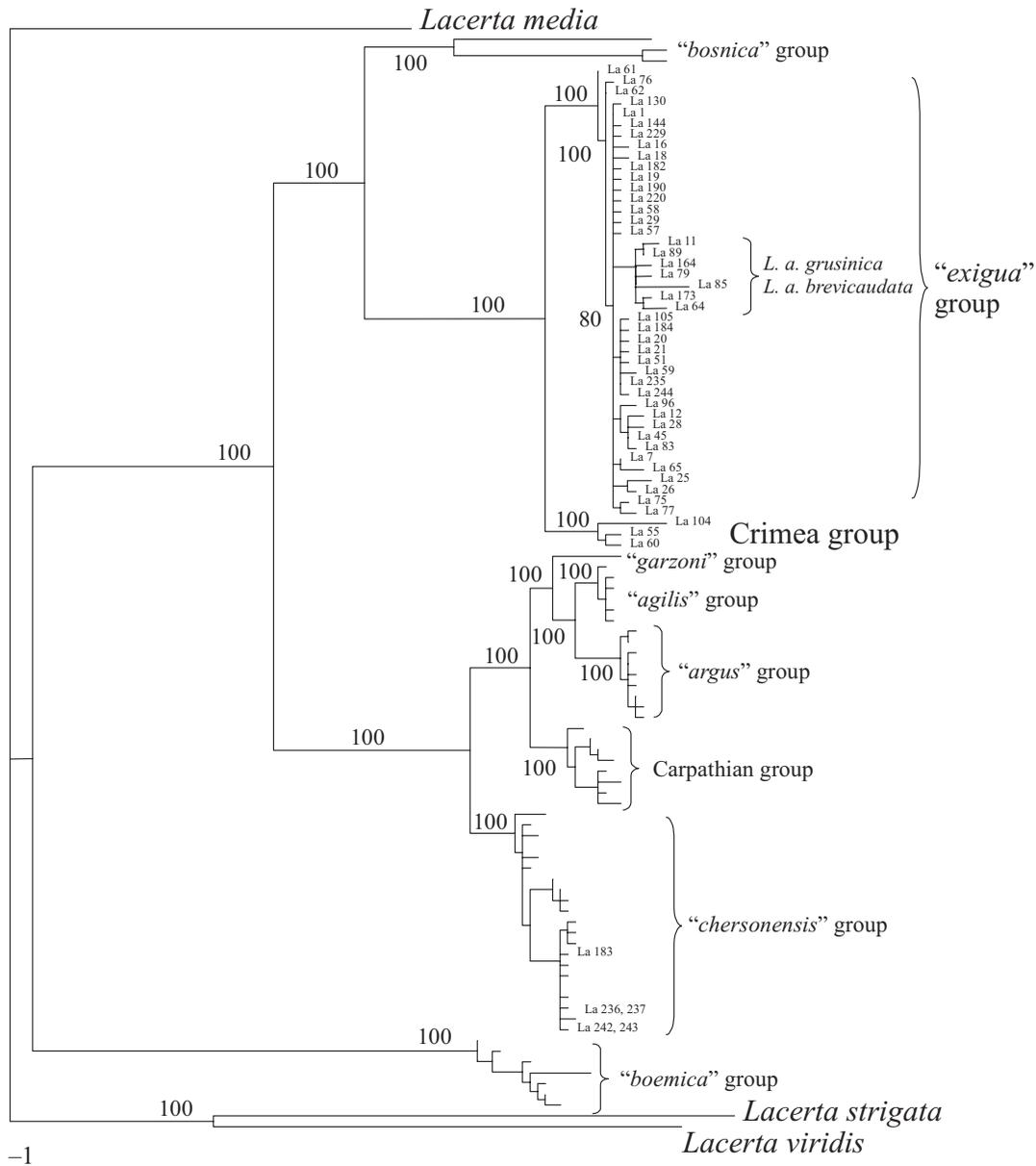


Fig. 2. A 50% consensus tree derived from 300 parsimony equal trees; length is 602 steps; scores CI = 0.56, RI = 0.90, RC = 0.50.

2.9 — for lizards from Caucasus. *Lacerta agilis* from Crimea has a higher number of femoral pores (15 – 16 pores in average) in comparison to Caucasian and Besarabian specimens (14 pores in average). Massetericum of the analyzed Crimean lizards is enlarged and exceeds the surrounding shields in its diameter about 1.5 – 2 times. Coloration of the Crimean sand lizards is specific — typical for *Lacerta agilis exigua* but with clear linea occipitalis. Color aberrations such as ab. *erythronotus* (absent in *L. a. chersonensis* and *L. a. exigua*) and

ab. *immaculata* (in 20% of males) are quite common for the Crimean *Lacerta agilis*.

The original description of *Lacerta agilis tauridica* subspecies was as followed (Suchov, 1926):

“...die Krimer Exemplare von *L. agilis* eine selbstständige Rasse (Subspezies) bilden, die sich von den Nachbar-Rassen durch folgende Merkmale unterscheiden: eine starke Entwicklung der Massetericum-Schilder; eine grosse Anzahl von Schenkelporen (von 13 bis 17, möglicherweise auch bis 18) mit einer mittleren Zahl

von mehr als 15 und durch die Anwesenheit von fast immer zwei postnasale Schildern. Ausserdem ist die Gesamtzahl der nasalen Schilder (postnasale und frenale Schilder zusammen) bei den Krimmer Exemplaren eine grössere als bei den nächstverwandten Subspezies und ist gleich im Mittel $3\frac{1}{2}$.

Diese Subspezies benenne ich *L. agilis tauridica* (subsp. nov.) weil die kontinentalen Exemplare aus Nord-Taurien sich ebenfalls⁵ durch all diese Merkmale auszeichnen. Als Grenze der Verbreitung dieser Subspezies erscheint die Krim und der ihr angrenzende kontinentale Teil des Taurischen Gouvernements (in alten Grenzen) nach Norden bis zu den südlichen Distrikten des Gouvernements Katharinoslaw.”

Description shows that Crimean sand lizards differ from lizards from the mainland by the increased number of shield in the nasal region and in the average by more high number of femoral pores. Besides it was noted extraordinary high percent of *immaculata* aberration and relatively often frequency of *erythronotus*-mutation. The last aberration found only in the western group of subspecies (*Lacerta agilis agilis*-group). V. G. Suchov limited distribution range of new subspecies by not only Crimea but also adjacent from the north territory until the south of Ekatherinoslaw Government (Dnepropetrovsk Region now).

Results of our morphological examination have confirmed the conclusions of Suchov concerning atypical polydosis of the Crimean lizards. The postnasal shield formula of the sand lizards from Southern Crimea varies as 1/2, 2/2, and 2/1, i.e., they have nearly always one or two *Postnasalia* and normally two *Frenale*. Nearly all specimens have enlarged *Massetericum*, and the number of gular scales (*Squamae gulares*) is less than in another subspecies of the “eastern” group. *Granulae* are absent in most cases. There are two rows of preanal scales (*Praenalia*) with one or two pairs of the middle shields of the inner row enlarged. Coloration is peculiar: for most specimens reduction of dorsal pattern is typical, *concolor* and *punctata* variations are most frequent, the *erythronotus*-mutation is common. Thus the sand lizards of the mountain Crimea differ from other subspecies in a number of characters.

The differences revealed by G. V. Suchov and confirmed by our morphological examination as well as the results of the molecular analysis allow us to consider the Crimean sand lizard as a separate subspecies and assign a trinomial name to this form. The name proposed by Schreiber — var. *concolor* has been preoccupied because it has been earlier used in the combination *Lacerta*

viridis var. *concolor* De Betta, 1857, as well as Bedriaga’s name *Lacerta paradoxa* Bedriaga, 1886 (Mertens, Wermuth, 1960; Peters, 1960). Therefore it is imperative to revalidate the name proposed by V. G. Suchov for the sand lizards from southern Crimea.

***Lacerta agilis tauridica* Suchov, 1926, stat. rest.**

Lacerta punctata L. — Hablizl, 1785:195 (part.)

Lacerta europaea — Pallas, 1813:29 (part.)

Lacerta paradoxa Bedriaga, 1886:170 (part.)

Lacerta agilis var. *concolor* Schreiber, 1912:482

Lacerta agilis tauridica Suchov, 1926:331 (part.)

Lacerta exigua exigua Eichw. — Suchov, 1948:111 (part.)

Lacerta agilis exigua Eichw. — Nikolsky, 1915:298 (part.); Terentyev, Chernov, 1949:181 (part.); Taratshuk, 1959:179 (part.); Mertens, Wermuth, 1960:102; Szczerbak, 1966:97 (part.); Darevsky et al., 1976 (part.); Bischoff, 1984:53 (part.); Bischoff, 1988:13 (part.).

It is impossible now to establish type series among specimens stored in ZISP and NNHM NASU mentioned by Suchov in the original description. The specimens collected along the territory outlined by Suchov present the mixed series containing both *L. a. tauridica* and *L. a. exigua*. Due these two reasons we feel necessary to designate here a neotype for *Lacerta agilis tauridica* Suchov, 1926 in agreement with the Code, Art. 75.3. Among the specimens deposited in the ZISP collection, we here select as neotype specimen with characters noted in original description originated from foothills of southern Crimea. According to the Code, Art. 73.3, this locality must stand as the type locality of *Lacerta agilis tauridica* Suchov, 1926.

Neotype. ZISP 12620, adult male, near Simferopol, Chumakarka settl., Ukraine, Crimea. Leg.: V. Kuznetsov, 2.06.1924 (Fig. 3).

Description of neotype. L. 83.6; L.cd. 139.0; Sq. 46; Ventr. 28; P.f. 16/16; G. 10; L.t_a/L_a 0.52. *Granulae* are absent, *Massetericum* is presented, *Postnasalia*/*Frenale* combination is 1/2 on both sides, *Frenoculare* are 1/1, two rows of *Praenalia* and 1 pair of enlarged central shields. A body is green with light *exigua*-like dorsum pattern.

Diagnosis. Medium-sized form of sand lizard of *Lacerta agilis exigua*-group. Green-colored lizard with reduced typical dorsum pattern. Postnasal and frenal shield combination is 1/2 or 2/2 and 2/1, *Massetericum* is presented, two rows of *Praenalia*, one or two pair of enlarged central shields of the inner row. Number of *Squamae gulares* is reduced, *Granulae* are absent.

Description. L_{·min-max} ad 67.4 – 97.5; L. ♂♂ (*n* = 24) 69.2 – 90.2 (78.2 ± 1.24); L. ♀♀ (*n* = 16) 67.4 – 97.5

⁵ It is probably misprint in original description (should be *ebenfalls*).



Fig. 3. Neotype of *Lacerta agilis tauridica* (ZISP 12620).

(77.91 ± 1.85); $L.cd_{\min-max}$ ad 97 – 97.5; $L.cd./L.$ ♂♂ ($n = 10$) 1.40 – 1.72 (1.59 ± 0.04); $L.cd./L.$ ♀♀ ($n = 9$) 1.38 – 1.76 (1.58 ± 0.03); $Sq_{\min-max}$ 39 – 51; $Sq.$ ♂♂ ($n = 21$) 40 – 51 (44.43 ± 0.69); $Sq.$ ♀♀ ($n = 15$) 39 – 49 (43.00 ± 0.70); $Ventr_{\min-max}$ 27 – 32; $Ventr.$ ♂♂ ($n = 25$) 27 – 30 (28.36 ± 0.20); $Ventr.$ ♀♀ ($n = 16$) 28 – 32 (30.06 ± 0.32); $P.f_{\min-max}$ 12 – 17; $P.f.$ ♂♂ ($n = 48$) 12 – 16 (14.60 ± 0.15); $P.f.$ ♀♀ 13 – 17 (14.13 ± 0.19); $G_{\min-max}$ 8 – 12 (10.12 ± 0.13); $L.t_a/L_{a \min-max}$ 0.37 – 0.69 (0.54 ± 0.02).

A *Granulae* between *Supraoculares* and *Supraciliares* are usually absent. A *Massetericum* is well pronounced in 75%. The most frequent combinations of *Postnasalia/Frenale* are 1/2 (31%), 2/1 (25%), 2/2 (25%), and 2/0 (12%). Other postnasal combinations — 1/3, 1/1 and 2/3 are rare (1%-5%). A large *Frenoculare* is presented. 79% of lizards have 1 *Frenoculare*, 21% — 2 or 3 *Frenoculare*. All lizards have two rows of *Praeanalia*, two pairs of enlarged central shields are represented in 51% of lizards whereas 49% have one pair. Dorsum of adult lizards is green with reduced dorsal color pattern (ab. *concolor* and ab. *punctata*) or *exigua*-type. *Exigua*-like coloration is represented in 32% of lizards, ab. *punctata* — 30%, ab. *concolor* — 28%. The individuals with the *erythronotus*-mutation are common (10%).

Distribution. Inhabits the mountain part of the Crimean peninsula (Fig. 1; Fig. 4). They are known from

the following localities: 1. Bakhchisaray distr., Albat settl. (Szczerbak, 1966); 2. Bakhchisaray district, between Kuybyshevo and Vysokoe (in litt., 1994); 3. Sokolinoe settl. (Szczerbak, 1966; in litt., 1994; NNHM NASU 2172); 4. near Yalta (Szczerbak, 1966); 5. near Simferopol (ZISP 12230, ZISP 10366b, ZISP 20702 — DNA samples; NNHM NASU 2279); 6. Simferopol distr., Trekhprudnoe (NNHM NASU); 7. Simferopol distr., Mramornoe (NNHM NASU); 8. Simferopol distr., Chistenkoe (NNHM NASU); 9. Krasnopeschernoe settl. (Szczerbak, 1966); 10. Simferopol distr., Perevalnoe (NNHM NASU); 11. Adalarakh, near Gurzuf settl (Szczerbak, 1966); 12. near Gurzuf, Roman-Kosh mt. (Szczerbak, 1966; NNHM NASU); 13. Alushta reserve, Vesely Shpil mt. (NNHM NASU); 14. Alushta reserve, Rybachye (NNHM NASU); 15. Alushta reserve, Rybachye (NNHM NASU); 16. Alushta distr., Luchistoe settl. (Szczerbak, 1966); 17. Alushta distr., Generalskoe settl.; 18. Chatyrdag mt., Ayan (ZISP. 20703); 19. lower plateau of Chatyrdag mt. (ZISP. 22629, ZISP 22630); 20. Belogorsk, Lesnaya Polyana (NNHM NASU 2179); 21. Belogorsk distr., Bogatoye settl. (ZISP. 22628); 22. Belogorsk distr., Karabi-Yaila (Szczerbak, 1966; NNHM NASU)

While the northern (steppe) part of Crimea peninsula as well the adjacent northern and north-eastern territories are inhabited by *Lacerta agilis exigua*, it is likely that Southern Crimea is occupied by relict population



Fig. 4. Map of localities of *Lacerta agilis tauridica*.

sand lizard, not only genetically but also morphologically different from *Lacerta agilis exigua* subspecies (pholidosis characters and a bright coloration). Therefore the distribution of the Crimean sand lizards should be restricted only by mountain part of Crimea

Habitat. Lizards live in the area of the table-lands (yaila) where inhabit the outcrops of limestone, along the edges of the karst craters and in the edge of forest on the elevation up to 1545 m (peak of Roman-Kosh mountain). They are rare in yaila — one specimen per 650 m of route.). Sand lizards are recorded on the northern slope of the Crimean Mountains where they have mosaic distribution along grassy slopes, forest clearing and water-meadows. They number is not high (one specimen per 250 m of route — Szczerbak, 1966) in foothills area: in ravines, meadows with rare bushes, on dry stony crests of hills covered by vegetation.

Relationships and Morphological Affinity

According to our results of the molecular analysis *L. a. tauridica* is a sister group to *L. a. exigua* and correspondingly it refers to the eastern group of subspecies (Fig. 2). Genetic distances between Crimean lizards and *exigua*-group are significant (2.3% in average which even exceed the ones between western subspecies).

Morphologically this subspecies displays some similarities with another subspecies of both western and eastern groups. Absence of *Granulae* and high percentage of *erythronotus* color aberration in *L. a. tauridica* resemble the western group of subspecies. Postnasal shield arrangement comprises combinations of both groups of subspecies (Fig. 5). The Crimean sand lizards have an increased number of *Squamae dorsalis*, *Ventrals*, and *Pori femorales* which are typical for subspecies

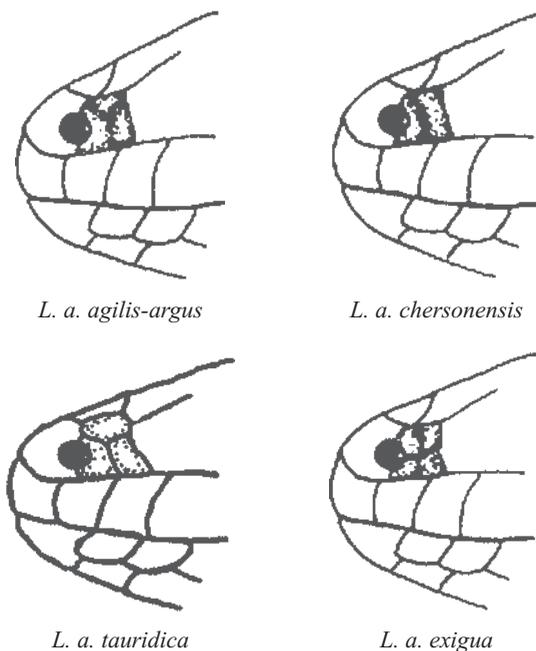


Fig. 5. Typical postnasal shield combinations in the different subspecies.

of the eastern group as well as two circles of preanal shields with one or two pairs of enlarged central shields. The number of *Squamae gulares* of *L. a. tauridica* is strongly reduced in comparison to the sand lizards of any other subspecies. *Exigua*-coloration type is common among the Crimean sand lizards, a number of specimens are colored like *L. a. grusinica* (ab. *concolor* and others).

In a number of morphological characters the Crimean subspecies resembles Caucasian subspecies (*L. a. boemica*, *L. a. grusinica*, *L. a. brevicaudata*, and *L. a. exigua*). *L. a. tauridica* with its limited distribution in the Southern Crimea is probably a relict form that keeps similarities with ancestral *Lacerta agilis*.

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APPENDIX 1. List of DNA-samples

L. a. tauridica: 1. near Simferopol (ZISP 20702); 2. near Alushta, Generalskoe settl. (ZISP 22689); 3. Chatyrdag mt., Ayan (ZISP 20703);

L. a. exigua: 1. Saki district, Pribrezhnoe-Morskoye; 2. Jankoy district, Zavet Leninsky; 3. Razdolnoe district, near Portovoe (ZISP 22627); 4. near Yevpatoria;

L. a. chersonensis: 1. Cherson region, Golaya Pristan (ZISP 22636); 2. Cherson region, near Skadovsk; 3. Cherson region, Golaya Pristan district, Geroyskoye settl.

APPENDIX 2. Material. 48 specimens

ZISP 10366b, 1 ♂, Simferopol, leg: Brauner, 1893; ZISP 12230, 1 ♂ + 1 ♀, Crimea, near Simferopol, kazak estate “Salgirka,” leg: W. Roszkowski, 16.07.1916; ZISP 12620, 1 ♂, near Simferopol, Chumakarka settl., in the steppe, leg: V. Kuznetsov, 2.06.1924; ZISP 20702, 2 ♀♀, Crimea, north-western part of Simferopol, leg: O. Kukushkin, 1996; ZISP 20703, 3 ♀♀, Crimea, Chatyrdag mt., Ayan, leg: O. Kukushkin, 1996; ZISP 22628, 1 ♂, Crimea, near Bogatoye settl., leg: T. I. Kotenko, 27.05.2003; ZISP 22629, 2 ♂♂ + 3 subad., Crimea, lower plateau of the Chatyrdag mt., leg: T. I. Kotenko, 18.05.2003; ZISP 22630, 1 subad., Crimea, lower plateau of the Chatyrdag mt., leg: T. I. Kotenko, 7.07.2003; NNHM NASU 2281, 14 ♂♂ + 5 ♀♀ + 2 subad., Crimea, Symferopol distr., Chistenkoye settl., leg: — ?, 25.04.1960; NNHM NASU 2172, 4 ♂♂ + 3 ♀♀, Crimea, Sevastopol distr., Baydarskaya valley, leg: A. A. Brauner, 1906; NNHM NASU 2179, 2 ♀♀, Crimea, Belogorsk, Lesnaya Polyana, leg: — ?, 26.04.1904; NNHM NASU 2518, 1 ♂, Crimea, Simferopol distr., Skvortsovo settl., leg: A. A. Brauner, 28.05.1906.