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AN ESTIMATION OF HERPETOLOGICAL INVESTIGATION IN THE SOUTH RUSSIAN FAR EAST

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Abstract
The herpetofauna of the continental Russian Far East is analysed, based on more than 700 sources as well as on original data.

Key words Russian Far East, amphibians, reptiles.

The South of the Russian Far East (RFE) includes the areas of the Middle and Lower Amur River (Amurskaya Region, Jewish Autonomous Region and part of Khabarovsk Krai), the basin of the Ussuri River (south of Khabarovsk Krai and the greater part of the Primorsky Krai), as well as river basins of the Sea of Japan.

Herpetological investigations in the RFE started about 150 years ago. More than 900 publications on amphibians and reptiles are known; 700 of them are about the southern RFE.

There are nine amphibian (Hynobiidae: *Salamandrella keyserlingii*, *Onychodactylus fischeri*; Bufonidae: *Bufo gargarizans*, *B. raddei*; *Discoglossidae*: *Bombina orientalis*; Hylidae: *Hyla japonica*; Ranidae: *Rana amurensis*, *R. dybowskii*, *R. nigromaculata*) and 15 reptilian species (Trionychidae: *Pelodiscus sinensis*; Lacertidae: *Lacerta vivipara*, *Takydromus amurensis*, *T. wolteri*; Colubridae: *Amphiesma vibakari*, *Rhabdophis tigrina*, *Coluber spinalis*, *Dinodon rufozonatum*, *Elaphe dione*, *E. rufodorsata*, *E. schrenckii*; Viperidae: *Gloydius halys*, *G. intermedius*, *G. ussuriensis*, *Vipera sachalinensis*), which are terrestrial and whose presence in the southern RFE is undoubted. Some other species have been described, probably *ex errore*.

Herpetological investigations seem incomplete. Information on systematics, distribution, morphology, biology, ecology, and abundance of different species must be included in terms of 《study completeness》, as well as information on any changes due to human impacts on the wild populations.

The species may be divided into groups according to the completeness of their study:
■ Sufficiently studied: *Salamandrella keyserlingii*, *Bufo gargarizans*, *Bombina orientalis*, *Rana dybowskii*, *Elaphe dione*, *Elaphe schrenckii*, *Gloydius intermedius*, *Gloydius ussuriensis*;
■ Insufficiently studied: *Onychodactylus fischeri*, *Bufo raddei*, *Rana amurensis*, *Rana nigromaculata*, *Pelodiscus sinensis*, *Takydromus amurensis*, *Lacerta vivipara*, *Amphiesma vibakari*, *Rhabdophis tigrina*, *Elaphe rufodorsata*, *Gloydius halys*, *Vipera sachalinensis*;
■ Unstudied: *Takydromus wolteri*, *Coluber spinalis*, *Dinodon rufozonatum*.

The species may be grouped according to distribution and abundance data as follows:
■ Common (widely distributed): *Salamandrella keyserlingii*, *Bufo gargarizans*, *Bufo raddei*, *Hyla japonica*, *Rana dybowskii*, *Rana amurensis*, *Rana nigromaculata*, *Lacerta vivipara*, *Rhabdophis tigrina*, *Elaphe dione*, *Gloydius halys*, *Gloydius intermedius*, *Gloydius ussuriensis*, *Vipera sachalinensis*;
■ Locally common: *Bombina orientalis*, *Takydromus amurensis*, *Amphiesma vibakari*, *Elaphe schrenckii*, *Elaphe rufodorsata*;
■ Rare and endangered: *Onychodactylus fischeri*, *Pelodiscus sinensis*, *Takydromus wolteri*;
■ Registered only once: *Elaphe taeniura*, *Dinodon rufozonatum*.
■ Doubtful: *Rana rugosa*, *Eumeces latiscutatus*,

Gecko japonicus.

The doubtful species are sometimes are included in the herpetofauna of the continental RFE (Emelianov, 1923, 1928; Terentiev & Chernov, 1949; Bannikov *et al*., 1977).

■ *Rana rugosa*. Described by A. M. Nikol'sky as *Rana emeljanovi* after A. A. Emelianov's work in Manchuria (now Heilonjiang Province, China) (Emelianov, 1923, 1928). Probably not truly found in the RFE.

■ *Eumeces latiscutatus*. There were a few published records of this lizard in the continental RFE (Nikol'sky, 1915; Terentiev & Chernov, 1949; and others). But within Russia it is known only from Kunashir Island (Kurile Islands).

■ *Gecko japonicus*. A. M. Nikol'sky (1915) and A. A. Emelianov (1923, 1928) wrote about some locations on the eastern shore of the Sikhote-Alin' Range based on Dr. P. Burtsev's collections in 1888, but there were no other specimens found. The specimens in Moscow University Zoological Museum (ZMMU R-191) probably are tagged erroneously.

■ *Elaphe taeniura* was found only once in Posiet (south of Primorsky Krai) in 1862. The main range of this species is very far from the RFE (Indochina, Eastern India). Its presence in North-Eastern China and on the Korean Peninsula has not been confirmed (Zhao & Adler, 1993).

This grouping is conditional and may vary with locality, e. g. boreal species (*Lacerta vivipara*, *Vipera sachalinensis*) are extremely rare in the south; common species in the Primorsky Krai become rare in the North (*Bombina orientalis*, *Takydromus amurensis*).

The brown frogs of East Asia, as well as those of RFE (*Rana amurensis*, *R. chensinensis* / *dybowskii*), have been intensively studied recently (Matsui *et al*., 1994, Tanaka-Uena *et al*., 1998). Continental *Hyla japonica stepheni* is considered by several authors to be a separate species from the one in Japan (Green & Borkin, 1993).

For some widely distributed species (*B. raddei*, *R. amurensis*, *R. nigromaculata*, *Lacerta vivipara*, *Elaphe dione*, *Vipera sachalinensis*) a few topics (morphology, abundance, ecology) are still poorly investigated.

Morphology and specific structure of the *Gloydius halys* – intermedius – *ussuriensis* complex and of *Vipera sachalinensis* are insufficiently known yet, as are their distributions, especially within the limits of their ranges (the southern limits of *V. sachalinensis* are reached in the Middle Amur area), and there is an intergradation zone with a closely related species (*Gloydius halys* – *intermedius*).

Recently, common species (*Rana dybowskii*, *Pelodiscus sinensis*, *Elaphe schrenckii*, *Gloydius ussuriensis*, *Gloydius intermedius*) are locally decreasing due to human activity (mainly by illegal collection).

Many herpetological investigations were conducted in the 15 protected areas (Zapovedniks) within the RFE, six of which have been established since 1987. Almost all amphibian and reptilian species of the region inhabit these reserves. Only *Dinodon rufozonatum* is found outside of the reserves.

Thus, the herpetofauna of the RFE remains incompletely studied. The most important topics of herpetological investigations in the future may be species' origins and ecological adaptation, as well as the conservation of biodiversity within the RFE and its vicinity.

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PHYLOGENY AND BIOGEOGRAPHY OF THE WALL LIZARDS GENUS *EREMIAS* (REPTILIA: LACERTIDAE) OF CHINA

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Eremias is a genus of the family Lacertidae and typically adapted to surviving in arid areas such as deserts, hills and steppes. *Eremias* is mostly distributed in southeastern Europe, Africa, western Asia, and Central Asia. This Genus can be found at north latitude 53°, and some species are distributed in the north of China and Korea. There are 8 species in China, distributed in the north at the Qinlin Mountains and Huaihe River; in the south it reaches the Jianghuai Plain but doesn't get across the Yangtze Rive. There are three major problems in the research of the Genus *Eremias* of China: (1) studies on chromosome and genes are very rare, (2) there are few studies on the phylogeny of *Eremias*, and (3) there were few data on the distribution of *Eremias*. The present study treats the taxonomy and phylogeny of Eremias from the standpoint of morphology, chromosomes and DNA, as well as from biogeography, in an attempt to explain its evolution.

First, the history of the taxonomy of *Eremias* in China and the latest research on Eremias are reviewed in brief. Then our researches on classification and cladistics are explained and listed:

Taxonomy

Morphology

Fifty-seven characters of 339 specimens of 78 populations have been examined. Of these characters, 30 were selected for data reduction of principal components, and 17 principal characters were found. Following, we carried out hierarchical cluster analysis based on the 17 characters, and the results show that the *Eremias* in China can be classified into three parts (1) *E. argus* and *E. brenchleyi* (2) *E. multiocellata*, *E. przewalskii*, and *E. arguta* and (3) *E. velox*, *E. vermiculata*, and *E. grammica*.

Cytology

Based on Giemsa-dyeing karyotypes and silver-staining bands of 15 populations from different localities in China belonging to 6 species of the genus *Eremias*, we found that all species studied have 19 pairs of chromosomes; the size of chromosomes reduces gradually and there are no marked differences between the arranged pairs of macrochromosomes except the last pair of microchromosome. The karyotype formula $2n = 38 = 36I + 2m$ with $NF = 38$ occurs in *E. argus*, *E. multiocellata*, *E. velox*, *E. arguta* and *E. grammica* but it is different in *E. vermiculata*: $2n = 38 = 12V + 2sI + 22I + 2m$ with $NF = 50$. The NOR are all located on one small pair in females of *E. velox*, and *E. arguta*, in males of *E. grammica* and *E. vermiculata*, and in both sexes of *E. multiocellata*. We have not found multiple pairs of NOR. Having one pair of NOR may be common in *Eremias* and a trait of that genus. We speculate that