

Distribution and Natural History of the Lidless Skinks, *Asymblepharus alaicus* and *Ablepharus deserti* (Sauria: Scincidae) in the Aksu-Djabagly Nature Reserve (Western Tian-Shan Mountains), Kazakstan

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Abstract.— The data of 8 years observations on two species of the Lidless Skinks, *Asymblepharus alaicus* and *Ablepharus deserti* from the Aksu-Djabagly Nature Reserve (Western Tian-Shan Mountains) are analysed with special attention to geographical distribution and to some aspects of the natural history of these lizards. It is noted that in spite of altitude contiguity the two species form few sympatric zones with low population density. Both species have prolonged seasonal activity, ranging from March–April to October–November. The appearance of the skinks after winter hibernation, their activity and the beginning of breeding season depend on climatic conditions, slope exposition and altitude of the site.

Key words.— Reptilia, Squamata, Scincidae, *Asymblepharus alaicus*, *Ablepharus deserti*, Kazakstan, distribution, activity, breeding.

Introduction

The Aksu-Djabagly Reserve is one of the unique natural reserves of Kazakstan. Its flora and fauna are of a great interest because of the presence a number of endemic and localized species, as well as of species adapted to extreme environmental conditions. The Aksu-Djabagly Reserve occupies the western part of the Talas Alatau Range in the Western Tian-Shan Mountains between 1100–4200 m s. l. Permanent snow level is at about 3000 m. The climate is very continental with an average monthly temperature of -4.9 C for the coldest month (January) and of +21.6 C for the hottest month (July). Four basic altitudinal zones are present in the Reserve (Karmisheva, 1973; Kovschar, Ivashchenko, 1990). These are mountain foothill zone with a low mountain dry steppe and xerofitic plant association; the steppe meadows, with scattered tree-like *Juniperus* forests; subalpine zone and alpine high mountain meadows. The relatively small territory of the Aksu-Djabagly Reserve (7400 h) is inhabited by many species typical for the zoogeographical provinces of the Europe, North Africa and Middle Asia. Among reptiles (total number 10 species) there are two species of the skinks, the Alpine Lidless Skink (*Asymblepharus alaicus*) and the Desert Lidless Skink (*Ablepharus deserti*). The first species (Fig. 1) is widespread in the Reserve, the other is rare species of the region.

Asymblepharus alaicus and *Ablepharus deserti* are of an interest from few points. The taxonomic position *Asymblepharus alaicus* and *Ablepharus deserti*

was cleared only recently after detailed revision by Eremchenko and Shzherbak (Eremchenko, 1981; Eremchenko a. Shzherbak, 1986) who separated the genus *Asymblepharus* and suggested an independent evolution for the two lineages of ablepharid lizards. Data on morphology and biology of the Alpine and the Desert Lidless Skinks are not numerous and scattered through a number of works (Atayev, 1985; Bannikov et al., 1977; Bogdanov, 1960; 1965; Bruschko, 1995; Said-Aliyev, 1979; Shammakov, 1981; Shnitnikov, 1929; Terentjev a. Chernov, 1949; Yakovleva, 1964). The monograph by Eremchenko and Shzherbak (1986) deserves special attention because it contains all known data on the morphology, distribution and biology of the ablepharid lizards of the former USSR.

The distribution and biology of two skink species remains poorly studied. The present paper deals mainly with the distribution of the Alpine and the Desert Lidless Skinks in the Aksu-Djabagly Nature Reserve and presents data on their natural history.

Material and Methods

Field observations together with the description of live and museum material carried out on *Asymblepharus alaicus* and *Ablepharus deserti* over a period of 8 years (1988–1996) and served as a basis for the present paper. We observed and collected skinks from 22 localities of the Aksu-Djabagly Nature Reserve (Fig. 2). We identified the species in the field basing on their external morphology and altitude distribution.

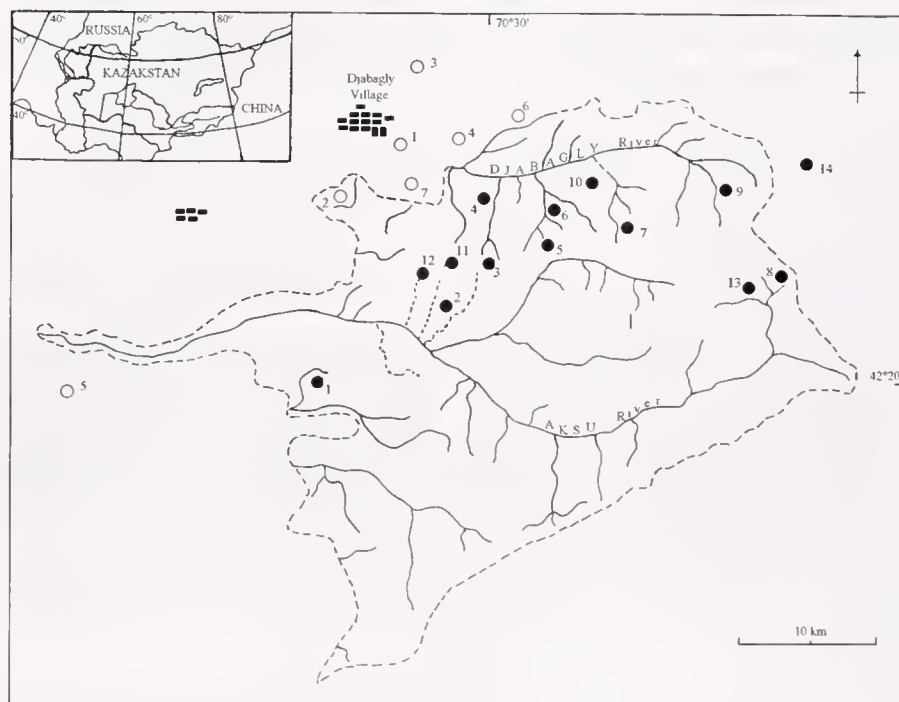


Figure 1. The map of the localities of the Lidless Skink in the Aksu-Djabagly Nature Reserve (Western Tian-Shan Mountains). *Asymblepharus alaicus* and *Ablepharus deserti* have independent enumeration: open circles represent the localities of *Asymblepharus alaicus*; closed circles represent the localities of *Ablepharus deserti*. *Asymblepharus alaicus*: 1) Chuuldak (2000 m); 2) Minzhilky Ravine (2600 m); 3) Kshy-Kaindy Pass (2200 m); 4) Kshy-Kaindy Ravine (1850 m); 5) Ulken-Kaindy Pass (2900 m); 6) Ulken-Kaindy Ravine (2000 m); 7) Kaskabulak (2600-3300m); 8) Aksay Pass (2900 m); 9) the Upper of the Djabagly River (3000 m); 10) Kizolgenkol Lake (2200 m); 11) the upper of the Middle Karasay River (3000-3100 m); 12) Low Karasay Ravine (3000-3100 m); 13) south-western slope of Kokseky Ravine (3100-3200 m); 14) eastern slope of the Aksay Ravine (2600 m). *Ablepharus deserti*: 1) western mountain foothill of the Talas Alatau Range (1300 m); 2) Taldibulak Ravine (1100 m); 3) northern mountain foothills of the Talas Alatau Range near Djabagly Village (1200m); 4) Djabaglitau Range (1300 m); 5) valley between Aksu and Baldabrek Rivers near the Kizilblek Village (1400m); 6) eastern slope of the Baldabrek Ravine (1600 m); 7) mountain foothills near the Ergaly Ravine (1200 m).

Additionally we used museum material fixed in 10 % neutralized formalin and preserved in 70 ethanol. The confirmation of species identification was mainly based on the peculiarities of the scalation around the eyes (see Eremchenko a. Shzherbak, 1986).

We also described character of the skink habitats together with plant composition and visually classified the dominant substrate of the sites. Altitudes and slope exposition were also taken into consideration. All colonlected and museum specimens were measured in mm according to Eremchenko and Shzherbak (1986); their life history stages were recorded as juvenile, subadult, adult. All the skinks captured for the present study were returned to the sampling sites.

Skink populaton density inferred by counting the numbers of lizards active on the ground surface along

a transect and by turning over stones which were refuges over certain small square areas.

Results and Discussion

Distribution, habitats and density of the populations- Figure 2 shows 22 localities of two species examined. All the records (including museum material) were made by the authors themselves.

In the Aksu-Djabagly Nature Reserve the Alpine Lidless Skink mostly inhabits the subalpine and alpine zones between 2500-3000 m where the density of the lizards is highest, particularly just on passes and on mountain ridges. For example, on 5 August 1988 we recorded 47 specimens of *Asymblepharus alaicus* along the main ridge of the Kazanchukur Range (3100 m) over an area of 50 x 50 m and over turning more than 150 stones. During a sunny midday



Fig. 2. *Asymblepharus alaicus*.

in July 1995 we observed 16 adult specimens in an area of 200 x 30 m in the course of half of hour on the Ulken-Kaindy Pass (2900 m). Transect accounting on the way down to 2400 m revealed 8 specimens over an in area of 40 x 4 m. Using secondary ranges and lateral splinters of the main ridge the skinks can come down to a slope as low as 1500 m (extremely rare to 1200 m) where they have very low population density.

The habitats of *Asymblepharus alaicus* in the Aksu-Djabagly are very variable. There are alpine meadows scattered with stones (Fig. 3), rocky slopes with *Juniperus* brush (Fig. 4) and scree slopes. There is practically no Alpine Lidless Skink in sparse *Juniperus* forests. A combination of the slopes with different exposition is the first important condition for *Asymblepharus* habitats because of the possibility of using them during different times of the day. The second essential condition is in the presence of suitable refuges represented by bushes, screes or stone rubbles.

Typical habitats for the Desert Lidless Skink in the Aksu-Djabagly Reserve are dry-south exposed slopes of no more than 2000 m in altitude (Fig. 5). As a rule, the plant community includes *Ferula* plant xerofitic steppe, with bushes of *Rosa*, *Honeysuckle*, *Cotoneaster*, *Spirea* scattered juniper trees (Fig. 6). However, the density of *Ablepharus deserti* population in the Reserve is not high in general. Only in rare cases we observed the lizards near human settlements.

The Aksu and Djabagly rivers with their banks of southern and northern exposure are the natural boundaries separating the habitats of the Alpine and the Desert Lidless Skinks in the reserve. The two species were found as sympatric in few areas only. This occurs in the valleys of rivers flowing down a slopes



Fig. 3. Subalpine meadow at 3000 m of altitude is a typical locality of *Asymblepharus alaicus* in the Aksu-Djabagly Reserve.



Fig. 4. The locality of *Asymblepharus alaicus* in the Ulken-Kaindy Valley (2100 m).

having northern exposition. In this situation around at 1200-1500 m *Asymblepharus alaicus* occupies, as a rule, the river banks and *Ablepharus deserti* inhabits the slopes having an eastern and western exposition (Fig. 7). However, both species have here very low density.



Fig. 5. The locality of *Ablepharus deserti* in the mouth of the Djabagly River (1200 m).

Daily and seasonal activity

Eremchenko and Shzherbak (1986) noted that the appearance of the skinks after winter hibernation depends on climatic conditions, slope exposition and altitude. According to these authors, the earliest appearance of *Asymblepharus alaicus* in northern Kirgizstan was registered on 26 March 1977 in the Kirgiz Range (1600 m). In the mountains bordering the eastern coast of the Issik-Kul Lake (2400 m) and on the slopes of the San-Kul-Too Range having western exposition (2700 m) the lizards appear by late April. Yakovleva (1964) noted an earlier activity of males in comparison with females.

Our observations on the Alpine Lidless Skink in the Aksu-Djabagly show that lizards appear after winter hibernation in mid April and, as a rule, are active until late October-early November. On 29 October 1992 we observed some active adult specimens on the northexposed slopes at 1900 m. On 1 November 1995 skinks were registered on northern slope at 1300 m. For southern slopes, active lizards were recorded later. Based on data of Eremchenko and Shzherbak (1986) the last active lizards in the Kirgiz Range (up to 3000 m) were registered on 3 November 1974. It seems the skinks have very prolonged seasonal activity. According to Veventzev (1978) who studied *Asymblepharus alaicus* in the Almaty Nature Reserve (Northern Tian-Shan Mountains) some individuals were occasionally found active during sunny days even in January-February when small areas of ground get free of snow. On 5 August 1988 at altitude 3100 m we recorded the beginning of morning activity of the lizards about 11:00 hrs; air temperature +13°C. That low temperature be enough for primary skink activity may shed some light on the prolonged yearly activity of the lizards.

The daily activity of the Alpine Skink from the Aksu-Djabagly doesn't visibly differ from that of the



Fig. 6. View on southern slopes of the Djabaglitau Range (1500 m). The locality of *Ablepharus deserti* is in the background, the locality of *Asymblepharus alaicus* in the foreground.

Alpine skink, described by Eremchenko and Shzherbak (1986) for the Kirgiz Range. These authors wrote that in spring (April - first half of May) skinks were active between 11:00-12:00 hrs and 19:00-20:00 hrs. According to our data for summer period, these lizards appear on ground surface earlier and are active until 20:00-21:00 hrs. In autumn their activity shifts to the second half of the day.

As a rule, *Ablepharus deserti* appears after winter hibernation earlier than *Asymblepharus alaicus* because of lower altitude of its habitats and the exclusively southern slope expositions. In the Aksu-Djabagly the earliest record for the beginning of *Ablepharus deserti* spring activity was noted on 8 March 1989 at 1300 m. Most of the population, however, emerges from hibernation in mid March. Kaluzhina (1951) reported that also in the Turkmenistan the Desert Skink appears after hibernation in first half of March. According to Yakovleva (1964), in Kirgizstan lizards of this species come to the ground surface around mid March. Paraskiv (1956) studied the Desert Skink in southern Kazakstan also noted the first half of March as the time for the beginning of lizard activity.

In the Aksu-Djabagly the Desert Lidless Skink is active until late October-early November. The latest record here belongs to 3 November 1988. In other regions of southern Kazakstan the skinks have the same activity pattern (Paraskiv, 1956). Yakovleva (1964) for Kirgizia and Said-Aliyev (1979) for Tad-jikistan reported late September - mid October as the period for winter leaving of *Ablepharus deserti*. The daily activity pattern of *Ablepharus deserti* in the Aksu-Djabagly Reserve doesn't differ markedly from that of the Desert Skink previously described by other authors from the surrounding territories. A visibly variable daily activity of *A. deserti* was observed by Bogdanov (1960) in Uzbekistan. For two months in

the year (March and September) skinks are active for most of the day (from 10:00-11:00 hrs to 18:00-19:00 hrs), whereas in summer they have a two-peak day activity. The first peak occupies the time between 09:00 and 12:00 hrs. The second peak is between 17:00 and 19:00 hrs. In February and October their activity is maximal after the midday. A two-peak activity is also typical for the Desert Skink from Kirgizia (Yakovleva, 1964).

All previous authors noted that juveniles and sub-adults appear after winter hibernation earlier than adult specimens and return later to their winter refuges.

Breeding

As was first observed by Shnitnikov (1928), viviparity is a typical feature of *Ablepharus* (= *Asymblepharus*) *alaicus*. According to Yakovleva (1964), period of breeding activity of *Asymblepharus alaicus* in Kirgizstan occupies May-June, although some specimens copulate in July as well. Such data contradict to Eremchenko and Shzherbak' (1986) who registered frequent copulation lizards in Kirgizstan in late March-early April. However, this contradiction could be a consequence of different climatic conditions in different years. According to Said-Aliyev' (1979) in the southern regions of Tadzhikistan the Alpine Skink copulates in late March-April, in the northern regions in late May-first decade of June. A single female pregnant with the eggs of 8.2 x 5.1 mm; 10.2 x 5.0 mm and 10.1 x 5.0 mm in diameter was found on 3 July 1954.

In the Aksu-Djabagly Reserve, we have found 5 gravid females on 5 August 1988 at an altitude of 3100 m. One of these delivered 3 youngs on the next day. Some pregnant females approaching delivery we have also observed 20 July 1995 at the Ulken-Kaindy Pass (2900 m). On the next day the new born lizards were met at 1900m. Based on our own data and Yakovleva's (1964) notes over a two-month period of embryonic development of *Asymblepharus alaicus* we consider mid May - mid June as a period of copulating activity of the Alpine Skink in the Aksu-Djabagly Reserve.

As noted by previous authors, for *Ablepharus deserti* the egg-laying period varies depending on the geographical location of the population. In Kirgizstan, this period occupies the first decade of June (Yakovleva, 1964). In Uzbekistan, the Desert Skink lays its eggs after mid May. Paraskiv (1956) recorded mid May - early June as optimal time for egg-laying by *A. deserti* in the Betpak-Dala Desert (southern Kazak-

stan) and in the northern coastal territory of the Aral Sea.

Unfortunately, we have no data on the breeding season or on the clutch size of *Ablepharus deserti* in the Aksu-Djabagly Reserve. However, some information on the breeding activity of the Desert Skink in Kazakhstan are present in the work by Bruscho (1995), who notes that the beginning of the breeding season depends on altitude. In the Borolday Mountains females with eggs at the last stage of the development were found from mid May to the second half of June. For Northern Aral Sea region Paraskiv (1956) recorded the beginning of egg-laying by *A. deserti* in second the half of May. As Eremchenko and Shzherbak (1986) wrote, in Kirgizstan the clutch size of the Desert Skink varies from 1 to 5 eggs and rarely reaches 11 per female. Yakovleva (1964) recorded 2-8 eggs per female for the Kirgizstan populations. Said-Aliyev (1979) has found 10 July 1959 one female having 3 eggs in every oviduct, the sizes of which varied from 9,1 x 3,2 mm to 11,1 x 4,1 mm in diameter. Shammakov (1981) notes 3-5 eggs in the clutch of the Desert Skink from Turkmenistan.

The lizards of both species become sexually mature in the second year (Eremchenko a. Shzherbak, 1986; Said-Aliyev, 1979).

Enemies

According to literature data (Eremchenko a. Shzherbak, 1986; Said-Aliyev, 1979; Yakovleva, 1964) and to our own observation, the Halys Pit Viper *Agkistrodon halys*, the Mountain Raser *Coluber ravergeri*, the Dione Snake *Elaphe dione*, the Steppe Ribbon Snake *Psammodphis lineolatum*, the Steppe Viper *Vipera ursini* and the among birds the Legger Grey Shrike *Lanius cristatus*, the Long-tailed Shrike *L. schach* and the Rock Thrush *Monticola saxalitis* are the main enemies of both the Alpine and the Desert Skinks in nature. We also found skink remnants in the nests of the Black-billed Magpie (*Pica pica*). Kuzmina (1970) observed the Himalayan Ruby Throat (*Calliope pectoralis*) feeding on the Alpine Skink in the Almaty Nature Reserve.

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