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## FOOD COMPOSITION OF THE FAR EASTERN SKINKS (*Plestiodon finitimus*) ON THE KUNASHIR ISLAND (KURIL ISLANDS, RUSSIAN FAR EAST)

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The study of 23 excrements of Far Eastern skinks collected on the Kunashir Island revealed 75 species of invertebrates that served for the skinks as a food source. Coleopteran (41 taxa from 14 families) were most diverse, which is explained by the good preservation of chitin of beetles during passage through the digestive tract of lizards. The crickets *Dianemobius fascipes nigrofasciatus* (Matsumura, 1904) (96 specimens), caddisflies (*Trichoptera* indet. 2, 36 specimens), and barkflies (*Psocoptera* indet., 19 specimens) prevailed in number of identified specimens in the samples.

**Keywords:** Scincidae; *Plestiodon finitimus*; food composition; Kunashir Island; Russian Far East.

The Far Eastern skink (*Plestiodon finitimus* Okamoto et Hikida, 2012) is one of the rarest and most beautiful lizards in the fauna of Russia, which is reliably known only from the island of Kunashir, Far East. The main distribution of this species is Japan: the islands of Hokkaido and the northeastern and central parts of Honshu (Griffith et al., 2000; Brandley et al., 2012). For this reason, the Far Eastern skink is included in the Red Data Books of the Russian Federation (2001) and the Sakhalin Region (2016) with the status of the 3<sup>rd</sup> category of rarity — as a rare species known within Russia on the periphery of its range.

Special studies on the nutrition of the Far Eastern Skinks in Russia have not been conducted. A few random observations of skinks hunting tiger beetles (*Cicindela* sp.), butterflies, earthworms, and proboscisless leeches were reported by the Sakhalin herpetologist A. M. Basarukin (1998, 2000). In one of these publications, he presented the result of the initial analysis of lizard faeces in

the field, which revealed a wide range of their nutrition — “spiders, mollusks, and various insects” (Basarukin, 1998). The Red Book of the Sakhalin Region says that skinks “feed on various small invertebrates, including mollusks, insects, millipedes, worms, spiders and amphipods. They actively seek out and pursue prey” (Litvinchuk and Borkin, 2016). However, this information is given with reference to the same publications by A. M. Basarukin.

The recent distribution and status of the *P. finitimus* populations on the island were reported in our recent publications (Orlov et al., 2018; Sundukov and Sundukova, 2017). This paper presents information on nutrition of skinks obtained in nature.

The Far Eastern Skink is a protected species included in the Red Books of the federal and regional levels. Therefore, the commonly used methods based on trapping the animals and studying the contents of their stomachs are unacceptable for studying their nutrition (Galitsyn, 2014; Shamgunova and Starikov, 2008; Shlyakhtin et al., 2006; and others). During a survey of the skink population in the northwestern part of Kunashir Island in August 2017, we collected a small amount of excrements from these lizards. The purpose of these collections was an attempt to determine food objects from the fragments preserved in excrements.

A total of 14 excrements were collected bearing the label “Kunashir Island, the western slope of volcano

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Ruruy, Lake Vodopadnoe, 500 m a.s.l., 06/VIII 2017, L. A. Sundukova leg.,” and 9 excrements labeled “Kunashir Island, the western slope of volcano Ruruy, “Dalniye Istochniki,” solfataric field “Bolshoye,” 390 m a.s.l., 08/VIII 2017, L. A. Sundukova leg.”

All collected material was disassembled into fragments in the laboratory using a MBS-9 microscope and sorted into taxonomic groups. For ease of identification of the animals found in the excrements, all fragments were pasted onto separate sheets of thick paper using Czech “Herkules” glue for insects. Then they were handed out to entomologists for identification.

A total of about 310 – 330 invertebrates belonging to 3 classes, 13 orders, 31 families, and 75 species were identified in the fragments. A significant portion of the fragments could not be determined, since they were represented by strongly deformed wings, fragments of cephalothoraxes of spiders, and fragments of antennae, legs and abdominal segments.

The beetles (41 identified taxa from 14 families) were the most diverse group in the samples, which is explained by a high resilience of the hard coverings of beetles to enzymatic breakdown in the digestive track of lizards allowing taxonomic identification even from small preserved fragments of the elytra, head, and sometimes legs.

The crickets *Dianemobius fascipes nigrofasciatus* (Matsumura, 1904) (96 specimens), caddisflies (*Trichoptera* indet. 2, 36 specimens), and barkflies (*Psocoptera* indet., 19 specimens) prevail in number of identified specimens in the samples, with the latter two groups possibly including several species. Almost all crickets are found in the excrements of young skinks collected on thermal sites, where the number of these insects is very high. For the list of invertebrates identified by the analysis of excrements collected on the western slope of the Ruruy volcano see Table 1.

**TABLE 1.** List of Invertebrates Found in the Excrements of Far Eastern Skinks (*Plestiodon finitimus*) on the Western Slope of the Ruruy volcano, Kunashir Island

Order	Family	Species	Number of specimens
<b>Class Insecta</b>			
Plecoptera	Perlodidae	<i>Megarcys</i> sp.	8 – 10
Plecoptera	Nemouridae	<i>Nemoura</i> sp.	6
Plecoptera		Plecoptera indet.	1
Megaloptera	Sialidae	<i>Nipponosialis jezoensis</i> (Okamoto, 1910)	3
Megaloptera	Sialidae	<i>Sialis</i> sp.	5 – 8
Orthoptera	Gryllidae	<i>Dianemobius fascipes nigrofasciatus</i> (Matsumura, 1904)	96
Psocoptera		Psocoptera indet. (several species are possible)	19
Hemiptera	Aphrophoridae	Aphrophoridae indet.	7
Coleoptera	Carabidae	<i>Agonum subtruncatum</i> (Motschulsky, 1860)	2
Coleoptera	Carabidae	<i>Carabus arboreus</i> Lewis, 1882	2
Coleoptera	Carabidae	<i>Carabus blaptoides rugipennis</i> Motschulsky, 1861 (larva)	2
Coleoptera	Carabidae	<i>Cicindela sachalinensis</i> A. Morawitz, 1862	2 – 3
Coleoptera	Carabidae	<i>Leistus niger</i> Gebler, 1847	1
Coleoptera	Carabidae	<i>Nebria shibanaei shiretokoana</i> Nakane, 1960	2
Coleoptera	Carabidae	<i>Pterostichus adstrictus</i> Eschscholtz, 1823	1
Coleoptera	Carabidae	<i>Pterostichus thunbergi</i> A. Morawitz, 1862	1
Coleoptera	Carabidae	<i>Synuchus melantho</i> (Bates, 1883)	1
Coleoptera	Silphidae	Silphini indet. (larva)	1 – 2
Coleoptera	Staphylinidae	<i>Othius</i> sp.	1
Coleoptera	Staphylinidae	Mycetoporini indet.	3
Coleoptera	Staphylinidae	Staphylinidae indet.	3
Coleoptera	Elateridae	<i>Ampedus</i> sp.	3
Coleoptera	Elateridae	<i>Fleutiauxellus yezoensis</i> Ôhira, 1973	2
Coleoptera	Elateridae	<i>Hypnoidus rivularis nivalis</i> Lewis, 1894	2
Coleoptera	Elateridae	<i>Hypogonomorphus</i> sp.	2
Coleoptera	Elateridae	<i>Melanotus</i> sp.	1
Coleoptera	Elateridae	<i>Paracardiophorus pullatus</i> (Candeze, 1873)	1
Coleoptera	Elateridae	<i>Selatosomus puncticollis</i> (Motschulsky, 1866)	1

In addition to the identified specimens, numerous small fragments of spiders, stoneflies and caddisflies (wings, legs, abdominal segments) were noted in the samples. Occasionally small pebbles and blades of grass come across in excrement, possibly eaten by lizards by chance.

In addition, on August 5, near Lake Vodopadnoye, an attack of a young skink (10 – 11 cm long) was observed

on a painted lady (*Vanessa cardui* (Linnaeus, 1758), Nymphalidae) sitting on a stone. The hunt was unsuccessful and the butterfly flew away.

The analysis of excrements of young (small excrements) and adult (large excrements) skinks shows that young skinks feed primarily on spiders and small flightless insects. All large beetles and most winged insects are found only in adult skinks.

Order	Family	Species	Number of specimens
Coleoptera	Elateridae	Elateridae indet. 1	1
Coleoptera	Elateridae	Elateridae indet. 2	1
Coleoptera	Elateridae	Elateridae indet. 1 (larva)	1
Coleoptera	Elateridae	Elateridae indet. 2 (larva)	1
Coleoptera	Elateridae	Elateridae indet. 3 (larva)	2
Coleoptera	Geotrupidae	<i>Phelotrupes laevistriatus</i> Motschulsky, 1858	1
Coleoptera	Scarabaeidae	<i>Mimela testaceipes</i> (Motschulsky, 1860)	1
Coleoptera	Scarabaeidae	<i>Sericania sachalinensis</i> Matsumura, 1911	4
Coleoptera	Byrrhidae	Byrrhidae indet.	1
Coleoptera	Eucnemidae	<i>Hylocharis cf. harmandy</i> (Fleutiaux, 1900)	1
Coleoptera	Cerambycidae	<i>Glenea relicta</i> Pascoe, 1868	1
Coleoptera	Chrysomelidae	<i>Plateumaris</i> sp.	1
Coleoptera	Lagriidae	<i>Macrolagria cf. robusticeps</i> (Lewis, 1895)	2
Coleoptera	Rhynchitidae	<i>Byctiscus puberulus</i> (Motschulsky, 1860)	2
Coleoptera	Curculionidae	<i>Byrsopages villosus</i> Boheman, 1842	5
Coleoptera	Curculionidae	Cossoninae indet.	1
Coleoptera	Scolytidae	? <i>Scolytoplatus</i> sp.	1
Coleoptera		Coleoptera indet. (5 species)	6
Hymenoptera	Braconidae	Braconidae indet.	1
Hymenoptera	Formicidae	<i>Camponotus japonicus</i> Mayr, 1866	3
Hymenoptera	Formicidae	<i>Lasius (Dendrolasius)</i> sp.	2
Hymenoptera	Formicidae	<i>Lasius cf. japonicus</i> Santschi, 1941	1
Hymenoptera	Formicidae	<i>Lasius cf. hayashi</i> Yamauchi et Hayashida, 1970	1
Hymenoptera	Formicidae	<i>Formica cf. lemani</i> Bondroit, 1917	1
Trichoptera		Trichoptera indet. 1	2 – 3
Trichoptera		Trichoptera indet. 2 (several species are possible)	36
Lepidoptera	Noctuidae	Noctuidae indet.	1
Diptera	Tipulidae	Tipulidae indet. 1 (several species are possible)	5 – 6
Diptera	Tipulidae	Tipulidae indet. 2	1
Diptera	Simuliidae	<i>Striatosimulium cf. japonicum</i> (Matsumura, 1911)	1
Diptera	Psychodidae	Psychodidae indet.	1
Diptera	Syrphidae	<i>Cheilosia</i> sp.	1
Diptera	Syrphidae	Syrphinae indet.	1
<b>Class Arachnida</b>			
Araneae	Tetragnathidae	<i>Tetragnatha</i> sp.	1
Araneae	Agelenidae	Agelenidae indet.	3 – 5
Araneae	Clubionidae	Clubionidae indet.	3 – 5
Araneae	Gnaphosidae	Gnaphosidae indet.	2 – 3
Araneae	Lycosidae	Lycosidae indet. 1	2 – 3
Araneae	Lycosidae	Lycosidae indet. (several species are possible)	8 – 10
Araneae		Araneae indet. 1 (small species)	5 – 6
Araneae		Araneae indet. 2 (large species)	2 – 3
Opiliones		Opiliones indet.	10 – 12
<b>Class Gastropoda</b>			
Gastropoda	Valloniidae	<i>Vallonia</i> sp.	4

Given the numerous unidentified fragments of wings, legs and other body parts, we can conclude that the skinks prey on any prey available to them.

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