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Orthoptera records (Orthoptera; Ensifera, Caelifera) from the Bol'šoj Thač (Russian Federation, Autonomous Republic of Adygeâ), North-West Caucasus, with remarks on the immediate surroundings

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Abstract

The Orthoptera fauna of the Bol'šoj Thač/NW Caucasus was studied in 2002. Altogether, 30 species were recognised in a representative selection of typical habitats. 12 species were observed in the mountain region around Dahovskaâ and 26 species were found within the lower mountain range and the massif of the Bol'šoj Thač. *Saga pedo* (Pallas, 1771), a species of the Red Data Book of the Russian Federation, belongs to the most important findings of all recognised species. *Isophya gracilis* Miram, 1938, *Poecilimon scythicus* Shchelkanovtsev, 1911 and *Pholidoptera pustulipes* (Fischer v. Waldheim, 1846) were noticed by its frequency and wide distribution in the area. *Isophya gracilis* is an endemic species of the northern Caucasus.

Zusammenfassung

Orthopteren-Funde (Orthoptera; Ensifera, Caelifera) vom Bol'šoj Thač (Russische Förderation, Autonome Republik Adygeâ), Nordwest-Kaukasus, mit Anmerkungen zur unmittelbaren Umgebung – Im Rahmen von zoologisch-botanischen Untersuchungen, die seit 1996 kontinuierlich erfolgten, wurden 2002 im Gebiet des Bol'šoj Thač erstmalig Untersuchungen zur Orthopterenfauna durchgeführt. Dabei konnten insgesamt 30 Arten in einer repräsentativen Auswahl typischer Lebensräume nachgewiesen werden. 12 Arten wurden für die Bergregion um Dahovskaâ und 26 Arten im Bereich des Vorgebirges und des Massivs des Bol'šoj Thač festgestellt. *Saga pedo* (Pallas, 1771), eine Art des Rotbuches der Russischen Förderation, gehört zu den aus naturschutzfachlicher Sicht wichtigsten Arten. *Isophya gracilis* Miram, 1938, *Poecilimon scythicus* Shchelkanovtsev, 1911 und *Pholidoptera pustulipes* (Fischer v. Waldheim, 1846) fielen durch ihre Häufigkeit und weite Verbreitung im Gebiet auf. *Isophya gracilis* ist eine Endemit des Nord-Kaukasus.

Резюме

Находки прямокрылых (Orthoptera; Ensifera, Caelifera) в районе Большого Тхача (Российская Федерация, Автономная республика Адыгея), северо-западный Кавказ, с примечаниями на непосредственную окрестность – В рамках зоологическо-ботанических исследований, которые непрерывно происходили с 1996 года, в районе Большого Тхача в 2002 году впервые были проведены исследования

фауны прямокрылых. При этом можно доказать репрезентативный выбор типичных местообитаний в целом 30 видов. Было определено 12 видов прямокрылых в горном районе села Даховская, а также 26 видов в районе предгорья и горного массива Большого Тхача. *Saga pedo* (Pallas, 1771), занесенный в Красную Книгу Русской Федерации, относится к видам прямокрылых, которые охраняются, как редкие. *Isophya gracilis* Miram, 1938, *Poecilimon scythicus* Shchelkanovtsev, 1911 и *Pholidoptera pustulipes* (Fischer v. Waldheim, 1846) замечено из-за частоты и широкого распространения в этом районе. *Isophya gracilis* – ендемит Северного Кавказа.

Keywords: bush crickets, crickets, grasshoppers, katydids, locusts

1. Introduction

The foundation »Umwelt & Bildung e.V.« organised since 1996 a series of expeditions to the Bol'šoj Thač area to perform basic investigations on the regional fauna and flora. In this context, the first orthopterological investigations were carried out in 2002. This study aimed to obtain a first overview of the Orthoptera species inventory of this region to establish a basis for further detailed investigations of the Orthoptera fauna. Therefore, standard qualitative methods were applied for field sampling omitting special approaches to find arboricolous species.

2. Investigation area

The Bol'šoj Thač area is located in southern Russia in the Autonomous Republic of Adygeâ, Majkop district. It borders on the Krasnodarskij Kraj of the Russian Federation in the east. The other borders are formed by the State Caucasian Zapovednik to the south, the catchment area of the river Kuna to the west, and the village of Novoprohladnoe to the north. Physical-spatially it belongs to the north-western foothills of the Great Caucasus.

The investigation area was properly divided for the evaluation into four parts:

Mountain region around Dahovskaâ (DA),

Closer surroundings of the village of Novoprohladnoe (Sahraj) (NP) with rural use,

Foothills with the two rivers Bol'šoj and Malyj Sahraj (FH),

Massif of Bol'šoj Thač (TM).

The most important collecting sites including co-ordinates and a short description are listed in Tab. 1.

3. Materials and methods

Hand catches were made in well-chosen, representative habitat types between 24 June and 10 July 2002. This material was complemented with collections of the Department of Natural Studies of the Adygč State University, Majkop, generously donated to the author for deposition in his collection (PCL). The publications of HARZ (1969, 1975), HARZ & KALTENBACH (1976) as well as BEI-BIENKO (1954 [1965], 1964) and BEI-BIENKO & MISTSHENKO (1951a, b [1964]) were used for species determination. Species of the *Chorthippus biguttulus* group were determined using BUKHVALOVA (1993, 1998) and BENEDIKTOV (1999). Nomenclature follows HELLER et al. (1998) with the exception of

Tab. 1 The most important Orthoptera collecting sites within the Bol'šoj Thač area

Co-ordinates	Description
Mountain region around Dahovskaâ (DA)	
44°11'38"N 40°12'12"E	Species-rich mountain meadow with scattered shrubs, approx. 700 – 850 m a.s.l.
Closer surroundings of the village of Novoprohladnoe (Sahraj) (NP) with rural use	
44°08'25"N 40°17'30"E	meadows and pastures around the village, pastures with *Inula helenium*, approx. 650 m a.s.l.
	500 m in direction to Dahovskaâ, pastures with *Inula* and *Sambucus ebulus*, approx. 650 m a.s.l.
	village of Novoprohladnoe, central parts, trampling-resistant vegetation, ruderal vegetation, approx. 625 – 650 m a.s.l.
Foothills with both river courses Bol'šoj und Malyj Sahraj (FH)	
44°08'26"N 40°18'09"E	Sahraj valley, tall grass vegetation with *Juncus* on a track verge, approx. 650 m a.s.l.
44°08'04"N 40°19'12"E	Sahraj valley, E of the bridge across the river, meadow, approx. 650 m a.s.l.
44°08'05"N 40°18'40"E	Sahraj valley, sparse steppe vegetation above an oak forest, approx. 750 – 850 m a.s.l.
44°07'60"N 40°20'33"E	Sahraj valley, former but ruined village Brilevo, old orchard trees, tall herb vegtation, approx. 750 m a.s.l.
44°07'11"N 40°22'40"E	Sahraj valley, junction of Bol'šoj and Malyj Sahraj (Taiwan), *Heracleum*, tall herb vegetation, approx. 850 m a.s.l.
44°06'55"N 40°23'52"E	Valley of the Malyj Sahraj, montane beech forest zone, *Petasites* stands on forest tracks, approx. 1000 m a.s.l.
44°05'25"N 40°19'26"E	Kuna valley, Krasnye Skalki, steppe vegetation, rocky outcrops, 970 m a.s.l.
Thač massif (TM)	
44°03'28"N 40°24'35"E	Bol'šoj Thač massif, Polâna Knâžeskaâ; subalpine meadow with tall herbs and pasture use, approx. 1750 m a.s.l.

Isophya gracilis Miram, 1938, which is considered here as a separate species (in HELLER et al. 1998 under *I. kalishevskii* Adelung, 1907). Nomenclature of subspecific taxa was derived from OTTE (1994, 1995, 1997a, b). The definition of oreographic and vegetation zones as well as the nomenclature of vascular plants follows OTTE (2007) in this volume.

4. Results

Species overview – A total of 30 species was recorded in the four investigated districts (Tab. 2). Twelve species were recognised in the mountain region around Dahovskaâ (DA), 21 around the village of Novoprohladnoe (NP), 25 in the foothills (FH) and only one species on the top of the Bol'šoj Thač massif (TM) (subalpine zone). At least 26 species were observed in the oak forest zone of the lower mountain parts. In the montane beech forest zone, however, only 13 species were found.

Nevertheless, a direct comparison of these districts with regard to their species numbers is not possible, as they were not investigated with the same intensity. Furthermore, some typical species of the upper mountain and the subalpine zone could not be observed. One reason could be that adults of these species are usually not yet present at this time of the year. Furthermore, larval development might have been exceptionally long in 2002 due to prolonged and very extensive rainfall leading to the predominant presence of juvenile stages.

A total of 16 species was exclusively found in the lower mountain zone (oak forest zone) including the surroundings of the village of Novoprohladnoe. Among them are *Stenobothrus lineatus*, *Stauroderus scalaris*, *Chorthippus macrocerus*, *Calliptamus barbarus*, *Oedipoda caerulescens*, *Chrysochraon dispar*, *Mecostethus parapleurus*, *Tetrix* species, *Tettigonia viridissima*, *Gryllus campestris*, and *Pteronemobius heydenii*. Nevertheless, it cannot be excluded that at least some of these species could be found at higher altitudes (based on a more intensive sampling strategy in this area). Two species, *Saga pedo* and *Tettigonia cantans*, were only found within the montane beech forest zone. The occurrence of another *Isophya* species, which could not yet be identified, was limited to the subalpine zone.

Mountain region around Dahovskaâ (DA) – Oak forest zone – Two neighbouring mountain meadows with partial invasion of shrubs between 700 and 850 m a.s.l. were subjected to closer investigations. Typical plant species of these areas were *Polygala alpicola*, *Filipendula vulgaris*, *Brachypodium* sp., *Campanula* sp., *Rhinanthus minor*, *Melampyrum caucasicum* and *Galega orientalis*. *Sambucus ebulus* was present in the ecotone areas next to the shrub formations and hornbeam woods.

In the upper parts, *Isophya gracilis* (Fig. 1) and *Stauroderus scalaris* were found in higher densities. *Pholidoptera griseoaptera* inhabited parts with shrub invasion as well as the *Sambucus* coppice. In contrast, the larger *Pholidoptera pustulipes* was exclusively represented in the dense meadow vegetation living on the ground. *Modicogryllus frontalis*, *Chrysochraon dispar*, and *Chorthippus apricarius* ssp. *ciscaucasicus* were found to represent other typical mountain pasture species. *Tetrix subulata* was recognised on forest tracks through neighbouring hornbeam stands, which were very wet and unfavourable at the time of observations, as well as in the scanty road-accompanying vegetation. *T. tenuicornis* was only represented in the wayside and meadow vegetation.

Closer surroundings of the village of Novoprohladnoe (NP) – The closer surroundings of the village of Novoprohladnoe (Sahraj) and the area along the small river Bezymyanka were characterised by several types of meadows and pastures with a high diversity of habitat structures. Here, a small-scaled mosaic of coppices, forest patches and settlement patterns was

Tab. 2 Species list with records according to altitudinal zones and habitat types (DA mountain region around Dahovskaâ, NP surroundings of the village of Novoprohladnoe, FH foothills of the Bol'šoj Thač, TM Thač massif)

Part of investigation area	DA		NP						FH						TM
Vegetation/Altitudinal zone	Montane oak forest zone 650 – 850 m a.s.l												mont. beech forest zone		sub-alpine
Habitat type	*Polygala-Melampyrum*-mountain meadow	wet forest tracks and forest track verges	pond bank vegetation (*Alopecuretum*)	trampled lawns, inner village areas	village ruderal vegetation and fallows	meadows and pastures around Novoproh.	untilled pastures with *Inula*	grass-herb vegetation adjoining tracks	river-accompanying meadows	scree vegetation with *Sedum*, *Campanula*	sparse steppe vegetation 750 – 850 m a.s.l.	rush-tall grass vegetation, river Sabraj	valleys up to 1000 m a.s.l., on *Petasites*	tall herb vegetation (*Heracleum* u.a.)	steppe vegetation above 900 m a.s.l.	subalpine meadow with tall herbs, 1750 m a.s.l.
Phaneropteridae																
Isophya gracilis Miram, 1938	●					●	●		●				●	●		
Isophya sp.																●
Poecilimon scythicus Shchelkanovtsev, 1911	●					●	●	●	●		●				●	
Phaneroptera sp.											●				●	
Conocephalidae																
Conocephalus discolor Thunberg, 1815						●									●	
Conocephalus dorsalis (Latreille, 1804)												●				
Tettigoniidae																
Tettigonia viridissima Linnaeus, 1758						●										
Tettigonia caudata (Charpentier, 1845)									●					●		
Tettigonia cantans (Fuessli, 1775)														●		
Metrioptera bicolor (Philippi, 1830)						●	●	●			●				●	
Metrioptera roeselii (Hagenbach, 1822)						●	●	●	●		●	●		●	●	
Pholidoptera griseoaptera (De Geer, 1773)	●						●		●		●					
Pholidoptera pustulipes (Fischer v. Waldheim, 1846)	●					●	●	●	●		●				●	
Saga pedo (Pallas, 1771)															●	
Gryllidae																
Gryllus campestris Linnaeus, 1758	●				●	●	●				●					
Modicogryllus frontalis (Fieber, 1844)	●		●	●		●	●							●	●	
Pteronemobius heydenii (Fischer, 1853)			●													
Tetrigidae																
Tetrix subulata (Linnaeus, 1761)		●	●			●						●				
Tetrix tenuicornis Sahlberg, 1893	●	●	●			●						●				
Acrididae																
Calliptaminae																
Calliptamus barbarus (Costa, 1836)										●						
Oedipodinae																
Oedipoda caerulescens (Linnaeus, 1758)					●			●		●						
Mecostethus parapleurus (Hagenbach, 1822)							●									
Gomphocerinae																
Chrysochraon dispar (Germar, 1834)	●					●	●		●			●				
Euthystira brachyptera (Ocskay, 1826)						●									●	
Stenobothrus lineatus (Panzer, 1796)											●					
Stauroderus scalaris (Fischer v. Waldheim, 1846)	●										●					
Chorthippus porphyropterus (Vorontsovskij, 1928)				●	●	●	●	●			●	●			●	
Chorthippus macrocerus (Fischer v.Waldheim,1846)						●	●									
Chorthippus apricarius (Linnaeus, 1758)	●				●						●					
Chorthippus parallelus (Zetterstedt, 1821)	●			●	●	●	●				●					

Note: following specimens were deposited in coll. K.-G. Heller (PCH): *Isophya gracilis* (7 Ex.), *Isophya* sp. (2 Ex.), *Poecilimon scythicus* (4 Ex.) and *Pholidoptera pustulipes* (1 Ex.), all other specimens in PCL.

found to be typical. Species such as *Salvia verticillata, Betonica officinalis, Prunella vulgaris* and *Inula helenium* characterise the vegetation of this meadow type. Initial shrub invasion with *Rubus* sp., *Rosa* sp. and *Acer campestre* had developed partially.

A typical species of this meadow vegetation was *Metrioptera bicolor*. Solitarily growing tall herbaceous perennials such as *Inula helenium* and *Verbascum* sp. were inhabited preferentially by individuals of *Isophya gracilis*. *Poecilimon scythicus* was found on *Rubus* and *Acer* shrubs (Fig. 2 and 3). *Tetrix subulata* occured within *Juncus inflexus*-rich vegetation of wet places, sometimes together with *Poecilimon scythicus*. Some unused cattle pastures were characterised by tall herbaceous species such as *Inula helenium* and shrubs of *Rubus* sp. and *Sambucus ebulus* that were strongly spread. Here, *Mecostethus parapleurus*, *Chrysocharon dispar*, *Chorthippus porphyropterus* and *Metrioptera bicolor* represented characteristic Orthoptera species besides species inhabiting tall herbaceous plants (e.g *Isophya gracilis*, *Poecilimon scythicus*, *Pholidoptera griseoaptera*).

Inensively grazed lawns affected by trampling were found especially in central parts of the village. Nevertheless, singly growing tall individuals of *Inula helenium*, *Cirsium* sp., *Rubus* p., *Urtica* sp., *Juncus* sp. and some Fabaceae were not or only rarely browsed by grazing animals. *Modicogryllus frontalis* was one of the most frequent species in this type of habitat. It was conspicuous because of the low vegetation height and the low species diversity. This species was widely distributed on mountain meadows and pastures and, therefore, can be considered as frequently occurring. Again, *Isophya gracilis* and (rarely) *Poecilimon scythicus* were found only on tall herbaceous plants. The strongly shaded bank vegetation (*Alopecuretum geniculatae*) of a village pond was inhabited by the Pygmy grasshopper

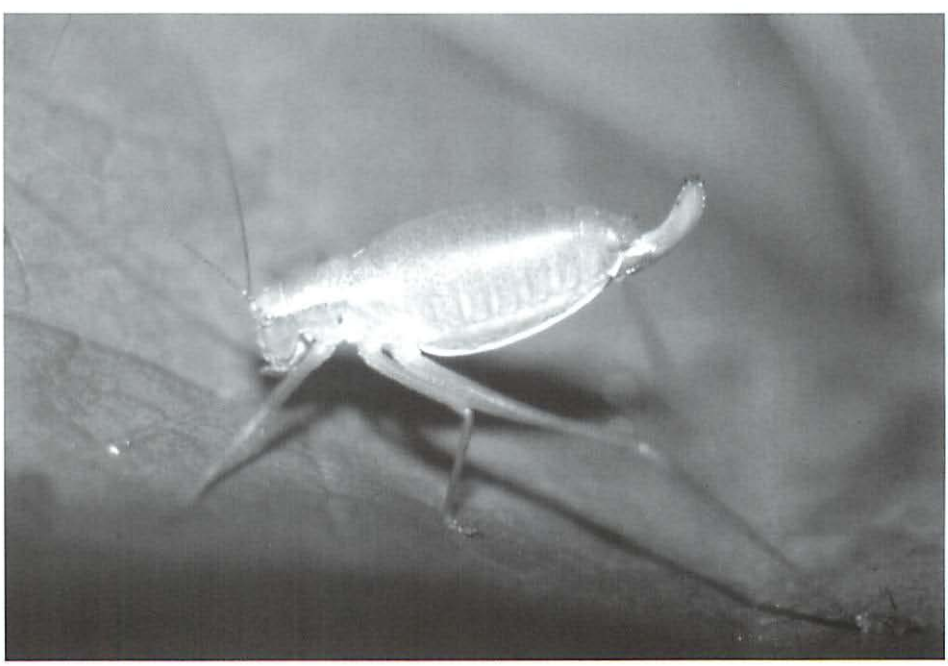

Fig. 1 Female of *Isophya gracilis* see also App. 2, Fig. A2-66

Fig. 2 Male of *Poecilimon scythicus* see also App. 2, Fig. A2-67

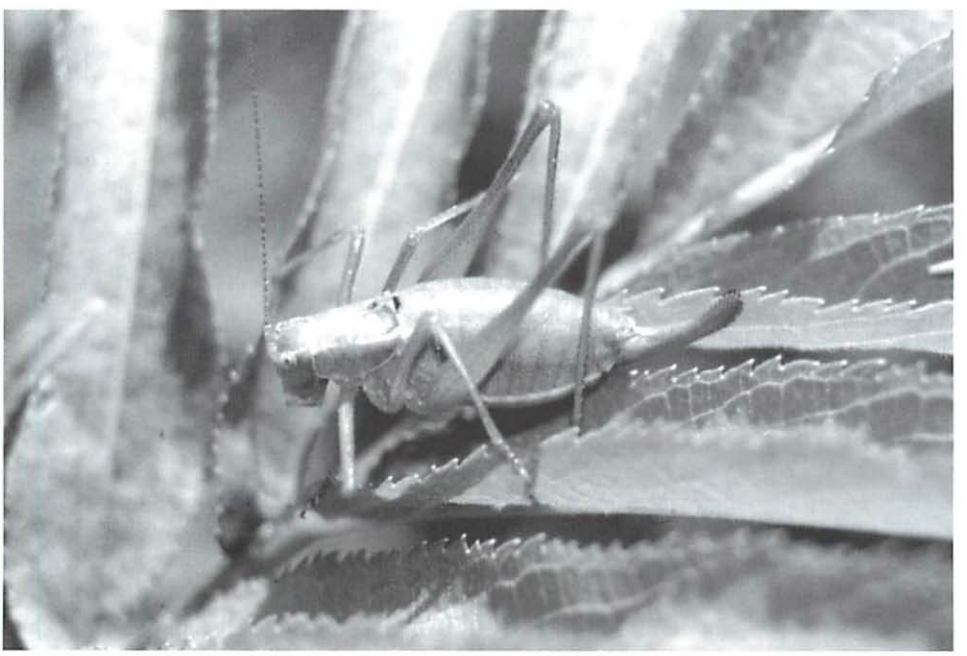

Fig. 3 Female of *Poecilimon scythicus* see also App. 2, Fig. A2-68

species *Tetrix subulata* and *Pteronemobius heydenii*. *Chorthippus macrocerus* was observed only in few individuals on meadows and pastures close to the village, where it mainly lives in the short-grass vegetation.

Foothills with the river courses Bol'šoj and Malyj Sahraj (FH) – This study area was strongly affected by the heavy early-summer flood. The water level sank shortly before the beginning of these investigations and the Bol'šoj and Malyj Sahraj still retained flood water. Sandy river banks and alluvials were shifted or at least strongly deformed. Depending on the relief, sediment layers as thick as one metre were deposited into riverine forest areas. Therefore, none of the species typical for river bank habitats were found [e.g. *Xya variegata* Latreille, 1809, *Bryodemella tuberculata* (Fabricius, 1775), *Sphingonotus* spp.]. Thus, the occurrence of these species remains unrecognised.

Only the more river-distant gravel terraces and slope grits had mostly been preserved. Few individuals of *Calliptamus barbarus* and *Oedipoda caerulescens* were observed on a *Sedum*-rich scree vegetation site. *Metrioptera bicolor* and *Metrioptera roselii* were found on meadows close to the river. Dispersed and patchy growing plants of *Coronilla varia* (size: 1 to 3 m^2) and *Rubus* shrubs within unused or poorly used meadows were the habitat of *Poecilimon scythicus*. On vegetation types of felled areas (clearcuttings), which are nearly exclusively dominated by *Rubus* sp., this species was associated with *Pholidoptera griseoaptera*. Rushtall-grass vegetation near the Bol'šoj Sahraj river and on humid to wet places were the habitat of a grasshopper community consisting of *Conocephalus dorsalis*, *Metrioptera roeselii* and *Chrysochraon dispar*. Again, *Metrioptera bicolor* was observed in the transitional part to drier vegetation sites.

Vast tall herbaceous vegetation, as found for example in the area of the former but ruined village Brilevo, was the habitat of *Tettigonia cantans*. *Tettigonia caudata* was predominantly observed in rather sun-exposed, river-accompanying *Heracleum mantegazzianum*-tall-herb vegetation. Occasionally both species were found to be associated.

Mainly *Metrioptera bicolor* and *Stenobothrus lineatus*, together with *Chorthippus porphyropterus*, were observed co-occurring with the widespread and frequent *Pholidoptera pustulipes* in the very species-rich but sparse steppe vegetation on shallow, highly skeletal soils of the lower mountain zone (oak forest zone).

Montane beech forest zone – Only few species records were made in the montane beech forest zone. The strongly exposed steppe vegetation of a rock hilltop (area of the Krasnye Skalki, approx. 970 m a.s.l.) was scattered with shrubs of *Juniperus* as well as the herb species *Salvia* sp., *Geranium sanguineum, Filipendula vulgaris, Melampyrum* sp. and *Dianthus* sp. *Pholidoptera pustulipes* was observed as a frequent species in the herbal layer associated with the species *Metrioptera bicolor*, *Chorthippus porphyropterus* and the strongly threatened *Saga pedo*.

Tall-herb vegetation was found along the rivers in each valley. Whereas *Petasites* occurs on shady sites of the Sahraj and Kuna valley, *Heracleum mantegazzianum* with its 2.5 metre-high inflorescences dominated the sunny sites of river banks. Only *Isophya gracilis* and *Tettigonia caudata* und *T. cantans* were found as frequent species of this vegetation up to altitudes of approx. 1000 m a.s.l.

Subalpine zone – mountain pasture vegetation close to the timberline on the Thač Massif (TM) – Only few specimens were observed on the massif, predominantly as larvae. This was presumably a result of long persistent cold weather leading to prolonged development of individuals. Solely a few specimens of another, as yet unidentified, *Isophya* species were found.

5. Discussion

Distribution of species and zoogeographic aspects – A total of 30 species was found during the course of this study. It was striking that four species occurred in many different habitat types. *Pholidoptera pustulipes* is a character species of mountain pastures as well as of steppe vegetation and was widespread from the lower altitudes up to the montane beech forest zone. This species was often associated with *Modicogryllus frontalis*. However, the latter species was additionally found in habitats characterised by strong anthropogenic impact and rural vegetation resistant to trampling of livestock. *Poecilimon scythicus* was probably the most widespread species found in the investigation area. It often inhabited solitary structures like tall herbs, large-scale grown Fabaceae within meadows, shrubs of *Rubus* and vegetation types of clear-cut areas. In addition to *Poecilimon scythicus* also *Isophya gracilis* was observed in tall herbs. Although both species were found to be widespread in the tall-herb vegetation of shady valley sites, *Poecilimon scythicus* was preferentially found at sun-exposed sites.

The Bol'šoj Thač populations of numerous species represent their nominate subspecies, which are widely distributed through the continental Europe. This applies to the species *Conocephalus dorsalis*, *Metrioptera bicolor*, *Metrioptera roeselii*, *Pholidoptera griseoaptera*, *Calliptamus barbarus*, *Oedipoda caerulescens*, *Mecostethus parapleurus*, *Chrysochraon dispar*, *Euthystira brachyptera*, *Stenobothrus lineatus* and *Stauroderus scalaris*.

The subspecies *turanicus* Tarbinskii, 1928 of *Mecostethus parapleurus* has an East Caucasian distribution and does not occur in the investigation area.

Other species that are widespread in Eurasia are represented as particular subspecies in the area of the Bol'šoj Thač. Among them is *Chorthippus apricarius*, which occurs as ssp. *ciscaucasicus* Mistshenko, 1951 [1964]. This subspecies was described from the region around Stavropol. However, *Chorthippus apricarius* ssp. *major* (Pylnov, 1914), which is widely distributed in the whole Caucasus and the Krasnodar area, was not observed.

Pholidoptera pustulipes is distributed in the Caucasus, parts of southern Russia (nominate subspecies) and as ssp. *jailensis* Miram, 1927 on the Crimea (Ukraine). The distribution area of *Isophya gracilis* is exclusively restricted to parts of the Northern Caucasus (northern mountain slopes). *Poecilimon scythicus* occurs from the Ukraine (e.g., Lugansk) to the river Don, the Volga area to the Northern Caucasus. *Chorthippus macrocerus* is a species of the central and southern area of Eastern Europe (central and southern Ukraine, southern parts of the Russian Federation) and even occurs outside of Europe. This species was found as ssp. *macrocerus*, which is known to be distributed from Caucasus to Asia Minor, in the Bol'šoj Thač area. Other subspecies are *ponticus* Mistshenko 1951 [1964] inhabiting the neighbouring Black Sea coastal region and ssp. *purpuratus* (Vorontsovskij, 1928) distributed in parts of the Ukraine and the southern European part of the Russian Federation. Similarly, *Chorthippus porphyropterus* was found as nominate subspecies in the investigation area. The distribution area of this form encompasses in Europe only the Caucasus and adjoining areas; further to the east it reaches Siberia to a large extent (Benediktov 1999).

The genus *Chorthippus* – Only four species of this problematic genus were recognised during the present investigations in the Bol'šoj Thač area. Nevertheless, several species of the genus *Chorthippus* have a very wide distribution in Europe such as *Ch. albomarginatus* (De Geer, 1773), *Ch. dorsatus* (Zetterstedt, 1821), *Ch. biguttulus* (Thunberg, 1815), *Ch. mollis* (Charpentier, 1825) and *Ch. brunneus* (Thunberg, 1815). However, these species were not observed.

At least *Ch. albomarginatus* does not reach the Caucasus. The south-eastern border of its distribution area runs from the Azov Sea to the north-east at a distance to the Bol'šoj Thač area (HELLER et al. 1998, VEDENINA & VON HELVERSEN 2003). According to VEDENINA & VON HELVERSEN (2003) *Ch. karelini* (Uvarov, 1927), which is distributed in Asia, substitutes *Ch. albomarginatus* in the investigation area (both *Ch. albomarginatus* species group). Out of the *Chorthippus dorsatus* group, the sibling species of *Ch. dorsatus* have to be expected in the region.

Especially confusing information is presented within the *Chorthippus biguttulus* species group due to several taxonomic and nomenclatural problems. Nevertheless, some of these problems could recently be clarified (BUKHVALOVA 1993, 1998, BENEDIKTOV 1999). From this group, *Ch. mollis, Ch. brunneus, Ch. biguttulus, Ch. maritimus* and *Ch. porphyropterus* are listed for the Caucasus region and adjacent territories (compare HELLER et al. 1998). During this investigation only *Ch. porphyropterus* was observed, and found to be widespread in the Bol'šoj Thač area. The distribution of all remaining species in the region needs to be checked thoroughly.

Endangered and protected species – Nearly all recognised species are widespread and not protected by law. Only *Pholidoptera p. pustulipes* and *Isophya gracilis* have a very small distribution area. The latter is an endemic species of the Northern Caucasus. *Saga pedo* as the only one of all recorded Orthoptera species is listed in the red data book of the Russian Federation (Krasnaâ kniga Rossijskoj Federacii [životnye] 2001) (rarity category 2 – population decreasing, comparably with »EN« + »VU« of IUCN [1994]). VOLKOVA et al. s.a.) classified this species, however, as »critically endangered«, which would mean that the species may disappear in the near future due to the rapid decrease in the number of individuals and inhabited sites and/or because of its extreme rarity.

Saga pedo is a species of the southern steppe zone of European and Asian Russia whose actual distribution area coincides with the most disturbed landscape part of Russia, the steppe zone. Its distribution area is in some regions strongly fragmented as a result of intensive agricultural use (SOBOLEV 1998, VOLKOVA et al. s.a.). The species preferentially inhabits unused steppes at places with species-rich and tall-grown grass-herbal vegetation or shrub vegetation as well as rock coppices and *Artemisia* steppes (KALTENBACH 1970, Krasnaâ kniga Rossijskoj Federacii (životnye) 2001). Reasons for the decline of this species are the loss of the last remains of steppe, decrease of non-ploughing area of the steppe zone, fragmentation of habitats as well as intensive grazing and mowing. Refuges are particular steppe protection areas and non-arable areas within landscapes with intenive agricultural use. Taking into account the native rarity of the species and its peculiarities it is expected to disappear soon in some parts of its distribution area. Current populations located close to the investigation area are known from Krasnodar and Stavropol territories as well as from Anapa district (KALACHEVA 2006, VOLKOVA et al. s.a.).

In the Bol'šoj Thač area, *Saga pedo* was observed on isolated rocky outcrops in steppe vegetation with *Juniperus* coppices within mountain forests. Its occurrence is at approx. 950 m a.s.l. on rocky hilltops of the Krasnye Skalki above the Kuna valley. It is connected with a relief-caused inversion of the vegetation zonality found in this area. Therefore, thermophilic oak forests spread up to altitudes of 1000 m a.s.l. (see OTTE 2007, in this volume). Generally, *Saga pedo* inhabits mountain pastures and steppe vegetation of lower mountain altitudes with tall-growing herbaceous plants and scattered shrubs or coppices. Nevertheless, as a large,

zoophagous species it occurs in distinctly lower population densities than other Orthoptera species. Therefore, it was easily overlooked on several sites presently investigated. *Saga pedo* is possibly more widespread in suitable habitats of the Bol'šoj Thač area. Basically, the foothills of the Bol'šoj Thač are another refuge for this species.

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