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First overview of the south Albanian Orthoptera fauna

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Abstract

The Orthoptera fauna in southern Albania is still largely unexplored. In the summer and autumn of 2014, several entomological field trips were conducted in various habitats from the coast to the mountains. A total of 87 species were noted. Among them were some first records for the region.

Zusammenfassung

Die Heuschreckenfauna im Süden Albaniens ist noch weitgehend unerforscht. Im Sommer und Herbst 2014 wurden daher von der Küste bis in die Berge mehrere entomologische Exkursionen in verschiedenen Lebensräumen durchgeführt. Insgesamt konnten 87 Heuschreckenarten nachgewiesen werden. Darunter waren auch einige Erstnachweise für die Region.

Introduction

Southern Albania has been under-sampled for Orthoptera; the rare papers found are not recent (MURRAJ et al. 1971, SALFI 1937), and moreover, the structure of populations could have changed over the past decades. Faunistic studies in such areas are of high conservation concern. They are an important prerequisite for further studies on insect ecology and/or habitat management. During 2014, we performed an extensive field study in southern Albania. The mountain chain arrangement, under the influence of northern and southern biogeographic areas, is very particular, and these mountains are potentially a hot spot for Orthoptera (KENYERES et al. 2009). Our study was aimed to analyse the Orthoptera populations in different sampling sites, the causes of their richness, the micro-climate influences and the possible threats. This paper presents the list of species found, including some new species (for science and/or the country), the structure of the populations (dominant species etc.), the habitat and the interpretation of this information to provide status and trends in each locality.

Material and method

Study area

Our study was focused on areas located in the Mediterranean biogeographic domain and in interface with thermonemoral [according to the terminology used by OZENDA (1990, 1994)] and alpine domains. We divided the study zone in 3 areas, corresponding to 3 counties, covering one third of the country, and in each area, we selected different sampling sites in different biogeographic areas in order to get the broadest vision of the current situation. Anthropized biotopes such

as cultivated lands and around towns and villages were excluded from our analysis.

The 3 areas of our study are as follows (Figure 1):

1. The county of **Vlorë** is located along the western coastline, mainly composed of lowlands and hills but including the closest chains of mountains along the sea. This area includes three districts: Sarandë, Delvinë and Vlorë. The north of this studied area includes a typical Mediterranean mountain chain, parallel to the sea, inducing a particular micro climate. In the south, we note low lands, wetlands. This area is entirely within the Mediterranean domain, from the meso-Mediterranean stage up to the alti-Mediterranean stage [according to the terminology used by OZENDA (2002)] on the top of mountains.
2. The county of **Gjirokastër** starts after the first mountain barrier and is composed of successive mountain chains, parallel to the sea. This area is connected to the Pindus massif in Greece. This district includes 3 prefectures: Gjirokastër, Tepelenë and Përmet. This area is mainly included within the Mediterranean domain (supramediterranean) but with some more alpine influences related to the mountain chain of Pindos, in its eastern part.
3. The county of **Korçë** is located in the south east of the country and is mainly within the thermonemoral domain, at the border of the supra-Mediterranean domain. This area is influenced by the presence of the Pindos mountains in the south and, Macedonian mountains in the north. This county includes 4 districts: Pogradec, Korçë, Devoll and Kolonjë.

Figure 1:
Map of studied area.

All sampling sites investigated are shown on Figure 2. Sampling sites with interesting features or containing original species are detailed in this chapter (Fig. 3).

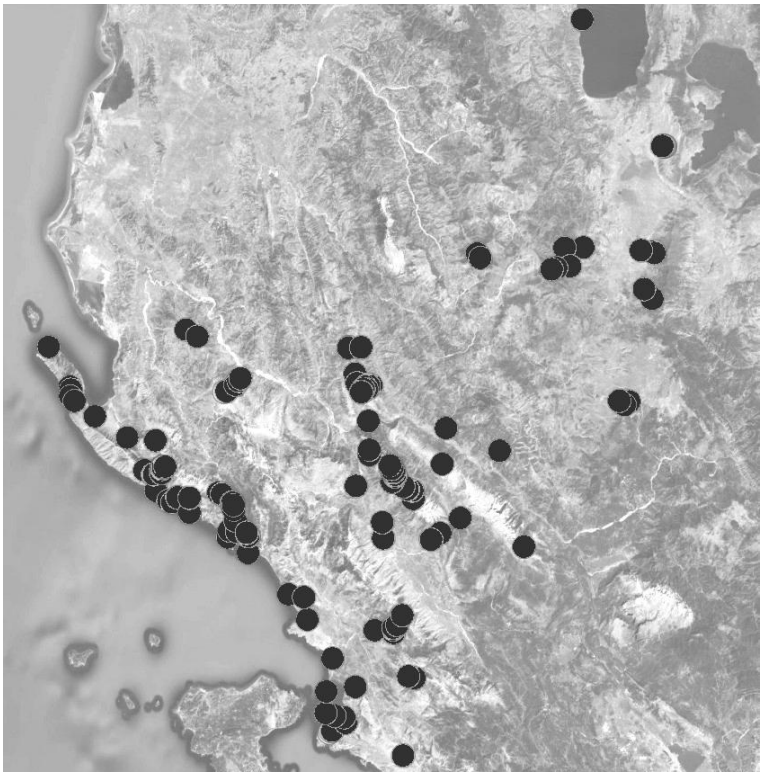

Figure 2: All visited sampling sites.

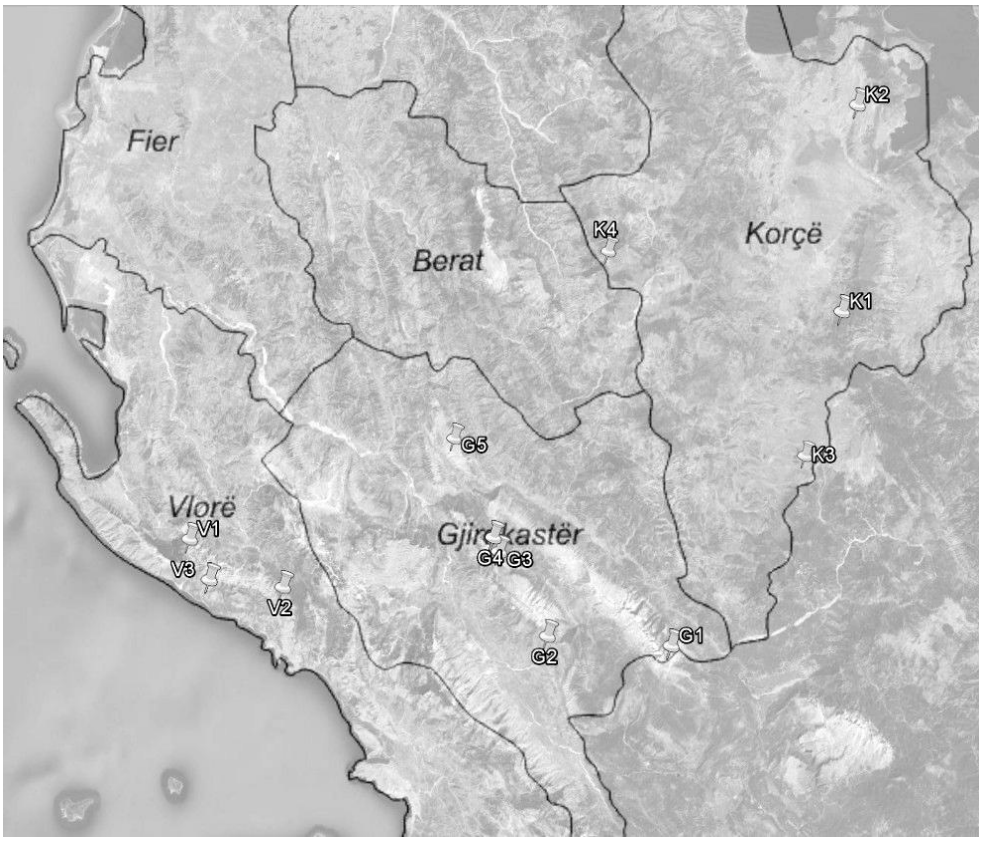

Figure 3: Selected sampling sites.

Methods

The sampling sites are first selected using virtual maps (Google Earth), in order to have a range of points sufficiently representative of the different stages of vegetation and landscape features of the area studied. The highly anthropized areas such as around cities, industrial and tourist areas, intensive crops were not taken into account in this study.

Seven field trips were carried out between May and October 2014. In each sampled locality, recordings were performed by visual and acoustic searching. Only specimens to be confirmed were collected (with a net or by hand). The use of a bat detector allowed detecting and localising more discreet singers. We also performed threshing of shrubs and bushes (with a Japanese umbrella), for the leaf-dwelling species. Finally, some groups such as Gryllidae were looked for under rocks, in dead wood, and in the litter.

In each locality, the list of species and their relative abundance were reported. The characteristics of the biotope and anthropization issues were noted. Through the interpretation of the structure of the population, we categorized the status and trends in each locality. The taxonomic nomenclature used follows the Orthoptera Species File (OSF) (EADES et al. 2014).

Results

87 taxa were found throughout all of our investigations in this southern part of Albania (see Table 1). We could note one more species (*Yersinella raymondii*) found by Ph. Ponel on Sazan Island in September 2012.

Table 1: List of Taxa. Abbreviations: **IUCN:** International Union for Conservation of Nature; **EN**: endangered; **HD**: Habitats Directive; **AL**: Albania; **BG**: Bulgaria; **GR**: Greece; **MK**: Republic of Macedonia; **RS**: Republic of Serbia.

Recorded species	Counties / Districts										Patrimonial interest
	Vlorë			Gjirokastër			Korçë				
	Sarandë	Delvinë	Vlorë	Gjirokastër	Tepelenë	Përmet	Progradec	Korçë	Kolonjë	Devoll	
PHANEROPTERIDAE											
Acrometopa servillea macropoda					x		x				
Leptophyes punctatissima			x				x				
Poecilimon gracilioides		x	x	x		x					Sub-endemic : AL,GR
Poecilimon jonicus jonicus	x	x	x	x	x	x		x	x		Endemic Balkans
Poecilimon ornatus				x		x			x		
Poecilimon zimmeri				x		x					Sub-endemic : AL,GR
Polysarcus denticauda						x		x			
Tylopsis lilifolia				x		x	x	x	x		

Recorded species	Counties / Districts										Patrimonial interest
	Vlorë			Gjirokastër			Korçë				
	Sarandë	Delvinë	Vlorë	Gjirokastër	Tepelenë	Përmet	Progradec	Korçë	Kolonjë	Devoll	
TETTIGONIIDAE											
Bucephaloptera bucephala				x							Endemic South Balkans
Conocephalus hastatus hastatus						x					
Decorana incerta			x								
Decticus albifrons			x	x		x		x			
Decticus verrucivorus			x	x		x		x			
Ephippiger ephippiger ephippiger								x	x		
Eupholidoptera schmidti	x		x	x				x	x		
Gampsocleis abbreviata								x			Endemic Balkans
Modestana ebneri ebneri						x		x			Endemic Balkans
Modestana ebneri excurvata									x		Endemic Balkans
Pholidoptera femorata			x	x		x		x	x		
Pholidoptera griseoaptera			x					x			
Pholidoptera macedonica macedonica			x			x		x			Sub-endemic: BG, GR, MK, AL
Pholidoptera stankoi / ebneri[1]						x		x			Sub-endemic: GR, MK, AL
Platycleis (s.l.) n.sp.			x			x					
Platycleis affinis affinis			x	x		x		x			
Platycleis grisea			x	x	x	x		x			
Platycleis intermedia intermedia			x	x				x			
Psorodonotus fieberi macedonicus						x		x			Endemic Balkans
Rhacocleis germanica			x			x		x	x		
Saga hellenica	x		x	x							Sub-endemic: AL, GR, MK
Sepiana sepium			x	x							
Tessellana orina			x	x		x			x		Endemic Balkans
Tettigonia caudate			x	x		x		x			
Tettigonia viridissima				x		x		x	x		
Vichetia oblongicollis				x		x		x			Endemic Balkans
GRYLLIDAE											
Gryllus bimaculatus	x	x	x								
Gryllus campestris			x	x	x	x		x	x		
Melanogryllus desertus	x		x								
Modicogryllus bordigalensis bordigalensis					x	x	x				
Oecanthus pellucens pellucens			x	x		x		x	x		
Pteronemobius heydenii heydenii	x	x	x	x		x					

[1] We have grouped these two taxa together because their synonymy is assumed by some taxonomists.

Recorded species	Counties / Districts										Patrimonial interest
	Vlorë			Gjirokastër			Korçë				
	Sarandë	Delvinë	Vlorë	Gjirokastër	Tepelenë	Përmet	Progradec	Korçë	Kolonjë	Devoll	
MOGOPLISTIDAE											
Arachnocephalus vestitus			x								
RHAPHIDOPHORIDAE											
Troglophilus zorae			x								Sub-endemic : AL, GR, MK
TRIDACTYLIDAE											
Xya pfaendleri pfaendleri	x			x							
TETRIGIDAE											
Paratettix meridionalis		x									
Tetrix bolivari	x										
Tetrix depressa			x								
Tetrix tenuicornis				x							
ACRIDIDAE											
Acrida sp.[2]			x	x							
Acrotylus insubricus insubricus	x	x	x								
Acrotylus patruelis			x			x					
Aiolopus strepens strepens	x	x	x	x	x	x					
Anacridium aegyptium	x	x	x		x						
Arcyptera fusca									x		
Arcyptera microptera microptera			x	x		x		x			
Calliptamus italicus italicus			x	x		x		x	x		
Celes variabilis variabilis				x		x		x			
Chorthippus apricarius apricarius								x	x		
Chorthippus biguttulus euhedickei						x		x	x		Endemic south Balkans & western Anatolia
Chorthippus bornhalmi		x	x	x	x	x		x	x		
Chorthippus dorsatus dorsatus			x	x		x		x	x		
Chorthippus mollis mollis			x			x		x	x		
Dociostaurus brevicollis						x		x	x		
Dociostaurus maroccanus						x					
Euchorthippus declivus			x	x	x	x		x	x		
Euthystira brachyptera								x	x		
Gomphocerus sibiricus sibiricus						x					
Locusta migratoria migratoria	x		x		x	x					

[2] On the adults collected in September, the use of standard keys (HARZ 1975) leads to *A. turrita*. In the Republic of Macedonia, the same keys applied on local exemplars lead to *A. hungarica*. However, we cannot state that the collected species in Albania is *A. turrita,* because the genital plates of males differ from typical plates of *A. turrita* and are rather close to *A. hungarica* (while being different). It could be a local form of *A. hungarica*. This has to be further investigated.

Recorded species	Counties / Districts										Patrimonial interest
	Vlorë			Gjirokastër			Korçë				
	Sarandë	Delvinë	Vlorë	Gjirokastër	Tepelenë	Përmet	Progradec	Korçë	Kolonjë	Devoll	
Myrmeleotettix maculatus maculatus						x		x			
Oedaleus decorus			x	x		x					
Oedipoda caerulescens caerulescens			x	x		x		x	x		
Oedipoda germanica germanica			x	x		x		x	x		
Omocestus haemorrhoidalis haemorrhoidalis								x	x		
Omocestus minutus								x			
Omocestus Petraeus						x		x			
Omocestus rufipes	x	x	x	x	x	x		x	x		
Oropodisma macedonica								x	x		Sub-endemic: MK, RS, AL, GR
Paracaloptenus caloptenoides caloptenoides			x	x		x		x	x		HD : Annex II
Peripodisma ceraunii n.sp.			x								Local endemic ?
Peripodisma llofizii				x		x					Local endemic ?
Peripodisma n.sp. ?			x								Local endemic ?
Peripodisma tymphii						x					Local endemic / IUCN: EN
Pezotettix giornae			x	x		x			x		
Pseudochorthippus parallelus parallelus						x		x			
Ramburiella turcomana				x							
Stauroderus scalaris scalaris				x		x		x			
Stenobothrus fischeri fischeri			x	x				x			
Stenobothrus lineatus lineatus						x		x	x		
Stenobothrus nigromaculatus nigromaculatus						x					
Stenobothrus rubicundulus			x	x		x		x			

County of Gjirokastër

Locality G1: Mount Tumba located in the southeast of the Nemërçkës chain, near the Greek border (40°03'51.2" / 020°29'23.0"). Figure 4.

Recording date: 9 August 2014

Recorded species:
Poecilimon zimmeri, Poecilimon graciloides, Psorodonotus fieberi macedonicus, Decticus verrucivorus, Gomphocerus sibiricus, Myrmeleotettix maculatus, Celes variabilis, Stenobothrus nigromaculatus, Stenobothrus rubicundulus, Stauroderus scalaris, Chorthippus biguttulus euhedickei , Peripodisma tymphii.

Figure 4: Locality G1 (40°03'51.2" / 020°29'23.0").

Site characteristics and its Orthoptera fauna:
These mountains are located in the geographical extension of the Pindos mountains of Greece and undergo cold influences, mainly in the high stages of vegetation. The presence of *P. thymphii* in this locality, endemic to this massif, is also an indicator of some biological continuity.

Sampled meadows are located in the ubac and ridge between 1800 m and 1850 m above sea level and have the characteristics of subalpine stage as evidenced by the presence of *G. sibiricus*, boreo-alpine and clearly thermophobic species, mainly found above 1700 m altitude in the south of Europe. Mediterranean elements are missing and the population consists mainly of typical species of this type of mountain. *Celes variabilis,* a species that has an affinity for the steppe, occurs mainly near the ridge, where the vegetation is shorter and rocky outcrops more frequent, which is also the case for *M. maculatus*, a typical species of these xeric and windy habitats.

Several flocks of sheep graze these mountains on both sides (Albanian and Greek side). The persistence of dense herbaceous areas in early August, even along the ridge, the diversity of the population of Orthoptera and the likely well balanced abundance of the species, seem to show that this grazing pressure is not excessive.

The most emblematic Orthoptera of this site is probably *P. tymphii*. This taxon was known only from few localities of Pindos massif in Greece (Mt. Tymphi, Mt. Tomaros, Mt. Soulion, Mt. Khionistra (WILLEMSE 1972, 1984, WILLEMSE & WILLEMSE 2008), where it is threatened by extinction mainly by sheep and cattle overgrazing; it is classified as Endangered (EN) on the IUCN Red List of Threatened Species (IUCN 2014). The discovery in this region of a population whose survival does not currently appear to be threatened, according to its abundance and also the good health of the biotope, is an encouragement for the survival of this species.

Locality G2: north of Suhë (40°04'41.8" / 020°15'46.3).

Recording date: 23 July 2014

Recorded species:
Tylopsis lilifolia, Platycleis affinis affinis, Tessellana orina, Pholidoptera femorata, Sepiana sepium, Tettigonia viridissima, Decticus albifrons, Decticus verrucivorus, Saga hellenica, Calliptamus italicus, Pezotettix giornae, Paracaloptenus caloptenoides caloptenoides, Ramburiella turcomana, Oedipoda germanica, Oedipoda caerulescens, Acrida sp. (nymphs).

Description of the site and of population of Orthoptera:
Mediterranean wasteland with *Paliurus spina-christi* and *Phlomis*, located at 470 m asl. It is composed of patches of plant formations, rather heterogeneous. The population of Orthoptera shows a rich and relatively well balanced population abundance, without noticeable irruption. It is fairly representative of the meso-Mediterranean storey, with a population mainly composed of thermophilic species. We notice the record of *P. caloptenoides caloptenoides*, listed in Annex II of the Habitats Directive, usually inhabiting the supra-Mediterranean storey, and of *R. turcomana*, only found in this locality during our research in Albania.

Locality G3: Lunxhëri chain, Çajupi Pass north of Erind (40°11'46.2" / 020°10' 30.6").

Recording date: 24 July 2014

Recorded species:
Poecilimon jonicus jonicus, Platycleis intermedia intermedia, Platycleis affinis affinis, Tessellana orina, Sepiana sepium, Tettigonia viridissima, Decticus verrucivorus, Eupholidoptera schmidti, Pholidoptera femorata, Decticus verrucivorus, Saga hellenica, Stauroderus scalaris, Stenobothrus rubicundulus, Stenobothrus fischeri, Celes variabilis, Oedipoda germanica, Paracaloptenus caloptenoides caloptenoides.

Description of the site and of population of Orthoptera:
Meadow with *Juniperus sp*. at 1325 m altitude. Located in the supra-Mediterranean vegetation storey, this station has steppe affinities and hosts a majority of xero-thermophilic taxa. It is the preferred habitat of *C. variabilis*, *S. rubicundulus* or *S. fischeri* which are particularly abundant there.

Whereas grazed grassland areas are mostly colonized by *O. germanica* and *P. caloptenoides caloptenoides,* in the densest herbaceous strips *S. scalaris* and a majority of *Ensifera* which also appreciate the shelter offered by low woody areas such as *Juniperus,* are concentrated. This is particularly the case of *E. schmidti*, and various Platycleidini.

The grazing and browsing pressure on this biotope, apparently grazed by small ruminants (sheep and goats probably), seems rather moderate.

Locality G4: Lunxhëri chain, north of Erind, Mt. Strakavec (Mt. Llofiz) (40°12' 56.67" / 020°09'52.88").

Recording date: 25 July 2014

Recorded species:
Poecilimon zimmeri, Poecilimon graciloides, Bucephaloptera bucephala, Decticus verrucivorus, Pholidoptera femorata, Saga hellenica, Celes variabilis, Stenobothrus rubicundulus, Stauroderus scalaris, Arcyptera microptera, Peripodisma llofizii.

Description of the site and of population of Orthoptera:
Meadow with *Astragalus sp.* and few *Juniperus sp.* in the upper limit of the montane / Mediterranean stage near 1750 m asl.

This station, located in the north west extension of the Pindos massif, has similarities with the locality of *P. tymphii* described above (G1), in terms of plant structure and altitude. Among other species, we found *P. zimmeri* here, whereas its distribution in Albania appears to be in the continuity of the Pindus. However, we noted the presence of significantly more thermophilic elements of plant formation as well as Orthoptera, including *B. bucephala*, *S. hellenica*, *P. femorata*. The particular arrangement of these mountains, in rows parallel to the sea - that only covers a distance of about thirty kilometres - presumably enhances the penetration of Mediterranean influences and the biogeographic break with some mountainous regions located in the north. This also seems to be confirmed by the discovery on the site of a new species of *Peripodisma*, being well different from *P. tymphii*: *Peripodisma llofizii* (Lemonnier-Darcemont & Darcemont 2015). This new taxon is particularly well represented in this mountain above 1700 m altitude. It currently does not seem threatened by human activities, the locality being relatively isolated (no road or forest trail nearby). Grazing pressure is noticeably moderate.

Locality G5: Mt. Trebeshinë above Podgoran (40°21'15.7" / 020°05'35.3").

Recording date: 21-22 August 2014

Recorded species:
Poecilimon gracilioides, Poecilimon jonicus jonicus, Decticus verrucivorus, Modestana ebneri ebneri, Platycleis affinis, Platycleis grisea, Platycleis (s.l.) n.sp., Pholidoptera femorata, Psorodonotus fieberi macedonicus, Gryllus campestris, Arcyptera microptera, Celes variabilis, Oedipoda germanica, Peripodisma llofizii,

Chorthippus bornhalmi, Chorthippus mollis mollis, Dociostaurus brevicollis, Euchorthippus declivus, Myrmeleotettix maculatus, Stauroderus scalaris, Stenobothrus lineatus, Stenobothrus rubicundulus.

Description of the site and of population of Orthoptera:
Grazed rocky montane grasslands on limestone 1880 m asl, east of the ridge. Mt. Trebeshinë (Mali i Trebeshinës) is the northern part of two mountain chains mainly stretching from the Vjosë to Drino rivers. In the upper stage of the mountain, there is no natural pool but an artificial lake (among abandoned military facilities) turning this area into a very suitable pasture during the summer. Grazing pressure is moderate on the grasslands of the gentle eastern slopes. This side of the mountain is composed of many small valleys; the different grassland types and the good diversity of Orthoptera assemblages result from these diverse micro reliefs. A conservation action for the endangered snake *Vipera ursinii graeca*, using grazing exclusion experiments (MIZSEI et al. 2014), is currently applied on these biotopes.

The most notable Orthoptera taxa in this locality are the two newly discovered species: *Peripodisma llofizii* and a *Platycleis* (s.l.) under description. Both of them are abundant on this mountain above 1700 m.

County of Vlorë

Locality V1: Çika Mountain under the peak Maja e Qorrës (40°12'33.4" / 019°36' 04.8"). Figure 5.

Recording date: 14 September 2014

Recorded species:
Eupholidoptera schmidti, Platycleis grisea, Chorthippus mollis mollis, Stenobothrus rubicundulus, Peripodisma ceraunii n.sp.

Description of the site and of population of Orthoptera:
Rocky meadow in the lower part of alti-Mediterranean stage (OZENDA 2002), at 1861m altitude, with *Juniperus sp*. and a few groves of *Pinus heldreichii*. These mountains overhanging the sea have very specific microclimatic conditions. Some moisture is almost always maintained because of fog banks that cover this area very often, from Llogara pass at 1000 m asl up to the summit. Due to sudden rain, during the day of our survey, we unfortunately had to shorten our brief inventory of the fauna of Orthoptera of this locality. It should be noted that all recorded *E. schmidti* there (and in the Dukat area, north of Vlorë) were atypical. Therefore, further surveys are planned there in 2015 to study these populations.

The most noticeable point of this locality is nevertheless a *Peripodisma* with intermediate morphological criteria between populations of *P. tymphii* and of *P. llofizii.* This new taxon *Peripodisma ceraunii*, which bears the name of the mountain chain where we discovered it, is currently under description.

This mountain is used by a herd of cattle, which seems to graze primarily the lowest and forested parts; the upper pastures probably do not provide for enough grass.

Figure 5: Locality V1 (40°12'33.4" / 019°36'04.8").

Locality V2: North of Pilur (40°08'44.5" /019°46'25.7").

Recording date: 16 September 2014

Recorded species:
Rhacocleis germanica, Pholidoptera femorata, Sepiana sepium, Tessellana orina, Platycleis affinis affinis, Decticus verrucivorus, Eupholidoptera schmidti, Saga hellenica, Oecanthus pellucens, Gryllus campestris, Pezotettix giornae, Oedipoda germanica, Oedipoda caerulescens, Chorthippus dorsatus, Euchorthippus declivus.

Description of the site and of population of Orthoptera:
Supra-Mediterranean stage meadows with *Prunus sp*., *Crataegus sp*. and plots of plentiful *Cirsium sp*., between 1065 m and 1090 m asl. Sheep, and more scarcely goat, grazing was noticed. Although some parts seem more strongly affected by it (predominance of *Cirsium sp*., bare ground areas), other parts, less visited by cattle, keep a more dense herbaceous layer that houses a rich and diverse insect fauna. In these latter areas, *S. hellenica,* as well as most *Ensifera,* is particularly common. However, our sampling is not exhaustive because performed at a somewhat late period for such a xero-thermophilic environment, where many species that appear earlier in the season, such as *Poecilimon,* have already disappeared.

Locality V3: Village of Dhërmi (40°09'21.27" / 019°38'24.79")

Recording date: 17 May & 22 September 2014

Recorded species: *Troglophilus zorae*.

Description of the site and of population of Orthoptera:
Shallow natural cave (< 20 m) located at 216 m altitude. This cavity is used by a shepherd from the village as an occasional shelter for the sheep. The floor is covered by a thick layer of livestock droppings and ammonia odour resulting in a fairly inhospitable environment except for some invertebrates: arachnids, myriapods and some insects such as *Troglophilus zorae*. The latter is represented by a small population located in the many crevices of the cave at different levels of depth and height. In May, only juveniles were observed. In September the cave housed mainly adults and a few juveniles. This locality is interesting for this species, up to now known with a far more northern distribution: Republic of Macedonia and Mt. Hekurave (Prokletije Mts.) in the far north of Albania (KARAMAN et al. 2011).

County of Korçë

Locality K1: North-west of Dardhë (40°31'30.0" / 020°48'26.4").

Recording date: 2 August 2014

Recorded species:
Poecilimon jonicus jonicus, Vichetia oblongicollis, Eupholidoptera schmidti (nymphs), Pholidoptera griseoaptera, Pholidoptera stankoi / ebneri, Platycleis albopunctata, Tettigonia viridissima, Ephippiger ephippiger (nymphs), Gryllus campestris, Calliptamus italicus, Paracaloptenus caloptenoides, Dociostaurus brevicollis, Euthystira brachyptera, Omocestus rufipes, Stenobothrus lineatus, Chorthippus parallelus, Euchorthippus declivus.

Description of the site and of population of Orthoptera:
Mesophilic grassland on the edge of beech of the montane stage at 1488 m asl. This dense herbaceous formation is visited by a herd of cattle, but the pressure on the biotope seems moderate. This locality hosts a good species richness of Orthoptera. The biotope is fresh and juvenile stages are still numerous. Different species are distributed in the different microhabitats of the locality according to their ecological requirements. For example, in areas where the grass cover is the highest, we found a majority of *E. brachyptera*, *T. viridissima*, *V. oblongicollis*. The edge of beech forest is mostly taken by *P. stankoi*/*ebneri*, *P. griseoaptera* and *Eupholidoptera schmidti*, but on the roadside, the few plots of open and stony grass attract some xero-thermophilic species such as *D. brevicollis*, *C. italicus*, *P. caloptenoides* and *P. albopunctata*.

Locality K2: Above Bregas (40°48'41.8" / 020°50'28.0").

Recording date: 6 August 2014

Recorded species:
Poecilimon jonicus jonicus, Platycleis albopunctata, Modestana ebneri, Psorodonotus fieberi macedonicus, Decticus verrucivorus, Gampsocleis abbreviata, Gryllus campestris, Oedipoda germanica, Celes variabilis, Arcyptera microptera, Stenobothrus rubicundulus, Stenobothrus lineatus, Chorthippus biguttulus euhedickei

Description of the site and of population of Orthoptera:
Heathland with *Buxus sempervirens*. Dry meadow between 1700 to 1750 m asl. From 1500 m up to the K2 locality, the landscape is strongly impacted by the sheep and goat grazing. The reduced vegetation cover is based on rocky ground where mainly thorny plants less consumed by livestock survive. This overexploitation of the environment is further enhanced by the illegal removal of beech wood in the few remaining groves. The timber is then transported by donkey to be sold in town (L. Bouriaud, pers. comm.). That day, the Orthoptera observed were limited to a few individuals of *P. albopunctata* and *Chorthippus biguttulus euhedickei*.

Above 1700 m asl the flock track patterns become scarce, vegetation composition becomes more dense and diverse and therefore the richness of Orthoptera population increases. 13 taxa were observed and some of them are interesting species typical of the dry grasslands of adret: *G. abbreviata*, *Modestana ebneri*, *C. variabilis*, *A. microptera*, *Stenobothrus rubicundulus* and, in the cooler bottom of the sinkholes at 1750 m altitude: *P. fieberi macedonicus*.

Locality K3: Grammos Mts. above Rehovë (40°19'39.7" / 020°44'12.4").

Recording date: 8 October 2014

Recorded species:
Ephippiger ephippiger, Poecilimon jonicus jonicus, Poecilimon ornatus, Eupholidoptera schmidti, Modestana ebneri excurvata, Pholidoptera femorata, Rhacocleis germanica, Tessellana orina, Gryllus campestris, Oedipoda germanica, Oropodisma macedonica, Paracaloptenus caloptenoides caloptenoides, Chorthippus dorsatus, Chorthippus mollis mollis, Dociostaurus brevicollis, Euchorthippus declivus, Euthystira brachyptera, Omocestus haemorrhoidalis, Stenobothrus lineatus.

Description of the site and of population of Orthoptera:
Grazed mountain grasslands on the W-SW slope of Mt. Mali i Mesit, 1650 up to 1800 m asl. Grammos is the second highest range of Pindos Mts. The slopes of the sampling site include many springs and watercourses. A high grazing pressure on pastures is noticed with visible effect of treading by livestock. At this altitude, a species of mountain meadows (*Oropodisma macedonica*) occurs together with thermophilous taxa (*E. ephippiger, Poecilimon j. jonicus, Eupholidoptera schmidti, Pholidoptera femorata Paracaloptenus c. caloptenoides, Oedipoda*

germanica). Before our study, *Modestana ebneri excurvata* was only known in Greece and the Republic of Macedonia.

Above 2000 m additional Orthopera taxa were recorded: *Arcyptera fusca, Chorthippus apricarius apricarius, Chorthippus biguttulus euhedickei, Chorthippus bornhalmi*, even though the following taxa were not noticed: *Paracaloptenus caloptenoides, Dociostaurus brevicollis, Gryllus campestris, Ephippiger ephippiger, Poecilimon jonicus, Rhacocleis germanica, Tessellana orina*.

Locality K4: Mt Mjetë above Mazrekë village (40°36'41.9" / 020°22'41.4"). Fig. 6.

Recording date: 9 October 2014

Figure 6: Locality K4 (40°36'41.9" / 020°22'41.4").

Recorded species:
Poecilimon jonicus jonicus, Polysarcus denticauda, Decticus verrucivorus, Eupholidoptera schmidti, Modestana ebneri ebneri, Pholidoptera femorata, Pholidoptera macedonica macedonica, Platycleis grisea, Rhacocleis germanica, Gryllus campestris, Oedipoda caerulescens, Calliptamus italicus, Oropodisma macedonica, Chorthippus apricarius apricarius, Chorthippus biguttulus euhedickei, Chorthippus dorsatus, Chorthippus mollis mollis, Pseudochorthippus parallelus, Dociostaurus brevicollis, Euchorthippus declivus, Myrmeleotettix maculatus, Omocestus haemorrhoidalis, Stenobothrus lineatus.

Description of the site and of population of Orthoptera:
Subalpine grasslands with *Juniperus sp.* on the ridge of Mt Mjetë, 3.5 km west of village Mazrekë, 1890 m asl. Mt Mjetë (Mali i Mietës) is connected with Ostrovicë (Mali I Ostrovicës), one of the highest mountain ranges in south-east Albania. Grazing pressure is moderate. Slopes above Mazrekë are covered by large beech forests; however, the deforestation rate seems to be alarming.

Near the ridge of the mountain *Juniperus* shrubs provide suitable habitat for thamnophilous Ensifera species, e.g. *Eupholidoptera schmidti, Pholidoptera m. macedonica* and *Rhacocleis germanica*, and on more grazed grassland patches, *Gryllus campestris, Oedipoda caerulescens, Calliptamus italicus, Dociostaurus brevicollis, Myrmeleotettix maculatus* are frequent.

Discussion

The southern part of the country shows relative homogeneity, from a climatic and geomorphological point of view. In the counties of Vlorë and Gjirokastër, the tourist areas of Sarandë and Vlorë excepted, we note many relatively low anthropized habitats where a degree of "naturalness" is maintained. Mediterranean influences on the Orthoptera population, predominate there, even at altitude.

In the area of Korçë which is located in the heart of a fertile plain, the relief is less pronounced and the influences of the continental climate are noticeable. Here the agro-forestry-pastoral activities have more strongly shaped the landscape. Very often, overgrazing and overexploitation of forest resources, mainly for firewood, cause deep worsening to environment structures and ultimately cause their uniformity. This is the case to Moscopole (Voskopojë) in the west of Korçë which undergoes excessive grazing pressure (sheep, goats, cattle) and where large areas of forest were destroyed. The environment is then reduced to a dry grassland cover more or less degraded, on which only a few forest spots bordered by a denser herbaceous layer remain. Ecosystem malfunctions occur inevitably as a result of these changes. Outbreaks of *Calliptamus italicus* observed during our visit during the beginning of August are certainly a good example. Hordes of this insect appeared for several days on the whole area up to close to the village, eating the smaller plants (Figure 7) and leaving quite nothing for other species of Orthoptera.

Southern Albania, almost completely under a Mediterranean climate, has a strong entomological potential. The discovery of this richness involves the systematic exploration of the whole of its territory and in particular the wilderness areas, undisturbed by human activities because of reduced accessibility. Mountains are valuable refuges for Orthoptera and their particular structure may contribute to endemisms.

However, in other areas a number of elements should be taken into account that could threaten the biodiversity in the near future. These are mainly the recent but fast development of the tourism infrastructure and urban development on the seafront and on the shore of Lake Ohrid, the standardization of habitats caused by destruction of forest cover, overgrazing, and the introduction of cattle in areas traditionally used for sheep and goats.

Figure 7: Outbreak of *Calliptamus italicus*.

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