Stipa austroitalica garigues and mountain pastureland in the Pollino National Park (Calabria, Southern Italy)

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Abstract
As part of a LIFE-Nature project promoted by the Pollino National Park, the semi-open mountain pastureland of the Pollino karstic massif has been studied. The most important habitats in terms of nature conservation have been found at lower altitudes in the *Stipa austroitalica* garigues, that are composed of a very complex mosaic of successional habitats ranging from open grassland to more or less mature forest. Cattle grazing and burning seem to be the most effective rejuvenation factors and both are helpful in maintaining high biodiversity levels in birds (many lark species), butterflies and Carabid beetles (some quantitative data are presented for invertebrates). Vegetation features, relationships with land use and possible management in relation to faunal conservation are discussed.

1 Introduction

In the southern Italian Apennines, mountain pasturelands and semi-open garigues are one of the most widespread landscape types. At higher altitudes the pastures originate directly from deforestation, at lower ones the abandonment of cropland sometimes plays a very important role. The Pollino National Park covers an area of about 190,000 hectares at the boundary between the Calabria and Basilicata ("Lucania") regions and its peaks of more than 2,000 metres a.s.l. form the southernmost karstic massif of the Italian peninsula. Our study area, called "Petrosa", lies near the city of Castrovillari 50 km north of Consenza, at an altitude of 300-2267 metres. The core of the area comprises a Natura 2000 pSCI (proposed Site of Community Interest), not far from the city, and is entirely composed of the Habitats Directive Annex 1 habitat "Semi-natural dry grasslands and scrubland facies on calcareous substrates" (Festuco-Brometalia). These grasslands are well characterized by the Annex 2 priority graminaceous species, *Stipa austroitalica*. In 1996 a LIFE-Nature project was initiated by the National Park, with the aim of ensuring the initial protection of the species and of developing a management plan for this landscape, which also extends to the medium-altitude (around 1000-1500 m) and upper parts of the Petrosa mountain, the latter being characterized by alpine, above-timberline habitats.

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Fig. 1. Pasture landscape at the edge of Monte Pollino Massif with *Stipa austroitalica* and *Spartium junceum* sporadicly grazed by sheep and goats (Monte Pollino National Park) (Photo: Eckhard Schröder)

The lower Petrosa in particular exhibits very active dynamic processes of spontaneous ecosystem restoration, mostly driven by a few widespread shrub species: *Spartium junceum*, *Rhamnus saxatilis*, *Calicotome infesta*, *Cistus incanus* and others. The mosaic of the semi-open pastureland is complicated by several *Pinus halepensis* plantations managed by the forestry authorities; fires are frequent, agriculture (cereals) and extensive cattle, sheep, goat and horse raising are the dominant human activities in the area.

In addition to the primary project target, i.e. the study of the factors influencing biodiversity maintenance, the Pollino LIFE project catered for the construction of an artificial alimentation fence for large birds of prey, *i.e.* the golden eagle *Aquila chrysaetos* and the Egyptian vulture *Neophron percnopterus*. Bird community censuses were carried out at random sites on the southern slope of the Pollino main range, whereas studies on invertebrates (Carabidae and Lepidoptera) concentrated in the lower Petrosa by direct gradient analysis of an open-land/forest habitat sequence.

2 Climate

Climatic contrasts, which are evident even within limited areas, are characteristic of the Calabrian Apennines, and in the Mediterranean a typical seasonal alternation between dry and warm summers and rainy and mild winters is found. The climate of the Pollino National Park is influenced by differences of altitude,

the slopes' expositions and proximity to Thyrrenian and Jonian Seas. Available weather data are mainly from localities below 1,000 metres a.s.l. In the core of the National Park the average annual precipitation is 1,278 mm with 561.5 mm in the winter, 288.5 mm in spring, 75 mm in summer and 353 mm in the autumn. During the last decades a maximum of 120 days of dry weather was recorded in summer. The precipitation increments with altitude and from east to west; as a consequence, the Thyrrenian portion of the Pollino National Park is more humid than the Jonian one. This difference is due to the north-south alignment of the mountain ranges and to the dominance of westerly winds which discharge most of their humidity on the Thyrrenian side.

3 Herbaceous vegetation of the "Petrosa"

The Pollino National Park is remarkably diverse in its vegetation with many factors acting contemporaneously. Most important are ecological factors, biogeographic constraints and land use. Human activity is particularly important in understanding the herbaceous vegetation, which originated from forest cutting, grazing and farming. Over centuries of traditional land use herbaceous vegetation became dominant in the landscape.

Field observations have been utilized to characterize and map plant communities; moreover, these studies allowed for the observation of structural particularities, dynamic evolution and anthropogenic pressure.

Starting from the highest altitudes we can define a number of herbaceous formations (Fig. 2).

Alpine and subalpine grasslands which can be subdivided into:

1. *Festuca bosniaca* grass-mats, widely distributed over 2,000 metres a.s.l.
2. mountain ridge grasslands with *Carex kitaibeliana*
3. relict formations of *Juniperus nana*

The mountain tips of the Pollino range are today abandoned by shepherds.

Acidophilic grasslands of karst depressions occur at altitudes between 1,400 and 2,660 metres a.s.l. Amongst these is the natural formation of Subalpine southern Italian mat-grass swards dominated by acidophilic species; due to its small area it is absent in Fig. 2. *Meum athamanticum* pastures, on the other hand, are widely distributed. This formation suffers from intensive overgrazing and the spread of unpalatable plants.

Sesleria nitida pastures replace beech woodlands on many slopes of the Pollino Massif between 1,600 and about 2,000 metres a.s.l.; they are secondary dry, baso-neutrophilic grasslands with variable cover depending on slope inclination.

At lower altitudes the open habitats start to become rich in chamaephytes and dwarf shrubs that prelude to the Mediterranean or sub-Mediterranean garigue. This formation is present at altitudes between 1,200 and 1,600 metres a.s.l., partly in the beech zone, partly in the oak zone, in climatic conditions more typically Mediterranean. Chamaephytic pasture vegetation is less intensively grazed.

Sometimes these pastures are derived from old abandoned fields; in such cases their structure (particularly the biomass), their floristic composition and their biodiversity is different. In the Colle Moschereto zone *Juniperus* species have recolonized large areas.

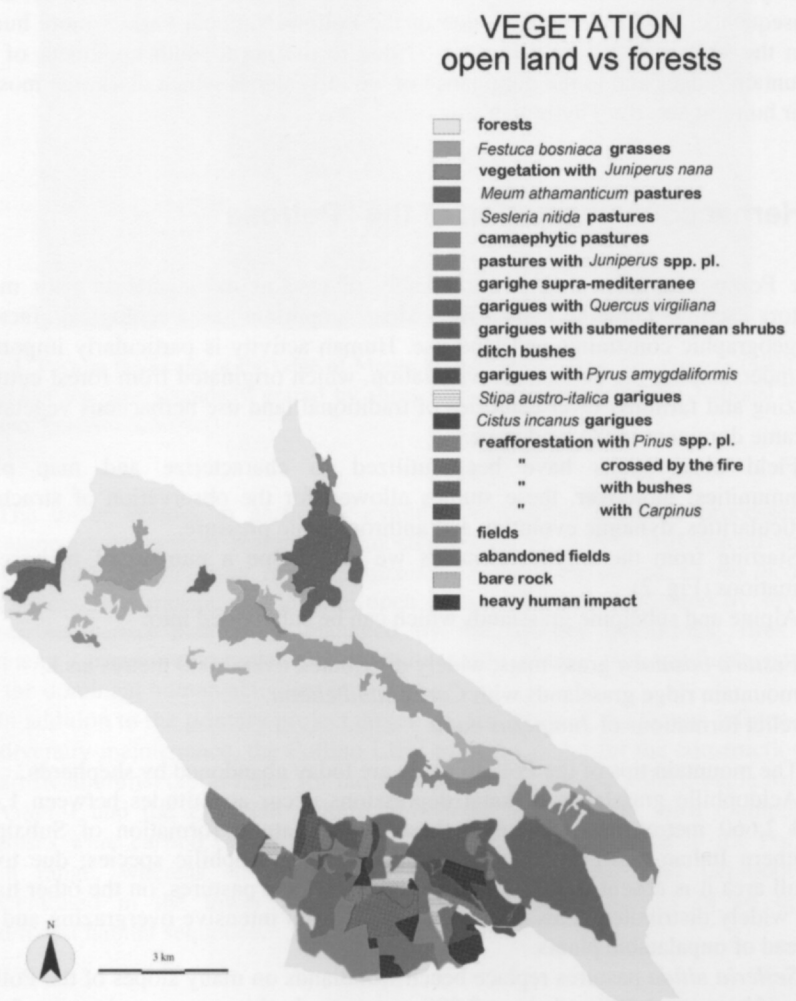

Fig. 2. Vegetation of open land in the study area (From BRANDMAYR et al. 1977)

At altitudes below 1,200 metres secondary grasslands change into supra-Mediterranean garigues, rich in chamaephytes. These habitats are easily accessible to people from surrounding villages, and for this reason we found a mosaic-like habitat. Human activities, grazing and burning influence dynamic series of vegetation, rejuvenating them continuously. In the Le Serre zone, between 700 and 1,300 metres, we can find isolated plants of *Quercus virgiliana* in garigues which are accompanied by other small trees (as *Ostrya carpinifolia*) and shrubs (Semi-natural dry grasslands and scrubland facies on calcareous substrates, Festuco-Brometalia). Some garigues are dominated by *Pyrus amygdaliformis* trees, the fruits were probably used to raise pigs.

Some level zones in this belt show dense populations of *Stipa austroitalica*. These habitats are characterized by the occurrence of Habitats Directive Annex 2 priority species of the genus *Stipa* and originated probably from fields abandoned for some decades and now only rarely grazed or burned.

Cistus incanus garigues have been observed in some afforested areas which leads us to think that this formation was more widespread prior to afforestation activities.

Sub-Mediterranean scrubs as *Spartium junceum*, *Calicotome infesta* and *Rhamnus saxatilis* are abundant in less disturbed areas, where re-colonization probably leads to deciduous oaks forests.

In the study area there are also *Pinus* afforestations and *Carpinus* afforestations.

Finally, fields and abandoned fields are present in a large part of the lower Petrosa.

4 Vegetation dynamics

There are no specific studies on the vegetation dynamics of our study area and, as a consequence, it is only possible to present a hypothesis. The high variability and variation of environmental, historic and anthropogenic parameters that contributed to determine the current vegetation may be misleading, except for the beech zone. At lower altitudes, mainly between 600 and 1,200 metres a.s.l., it is possible to find up to four different forest types that should represent the potential ecosystem.

According to the literature (BARBERO and BONIN 1969; AVENA and BRUNO 1975), we can consider alpine and sub-alpine grasses and herbaceous formations of karst depressions as natural habitats, mainly because they present a structure and composition very different from pastures which are known to be of secondary origin. Moreover, the transition between beech forest and these grasslands is often gradual and the forest slowly grades into a scrub formation. The succession from grass mats to forests seems very slow; forest maps drawn from aerial photographs taken about 50 years ago (1954) show little or no advancement at their upper borders. The progressive dynamic of vegetation and soils tends to increase the biomass of the grasslands, supporting dispersal of larger species. The only factor that may cause regression is the grazing by horses or cows which, however, at this

altitude is absent. At present, the dynamic of vegetation and soils does not seem to affect the floristic composition, but biomass and, as a consequence, structure are affected by pasturing.

At lower altitudes we find secondary pasture lands derived from the degradation of beech forests (BONIN 1978; AVENA and BRUNO 1975). The *Meum athamanticum* mat-grasslands are more suited than other species to growing on deep, cool and wet ground; these grasses probably grew at the boundaries of pools and puddles, enlarging their range when the beech forest disappeared. The present grassland composition is strongly affected by intensive grazing, so there is a dominance of unpalatable species (*Meum athamanticum, Asphodelus albus, Gentiana lutea*). They must be considered strongly degraded pastures, with an impoverished species suite, biomass and pasture quality. The capacity of succession towards the potential natural vegetation is nevertheless remarkable: on the border of beech forests good woodland regeneration is discernible, which apparently does not need to move through the transitional scrub phase.

Presumably, the dynamic progression series of *Sesleria nitida* pastures and chamaephytic pasture vegetation needs a transitional scrub phase to favour the development of tree species because of the lack of soil; this stage can be represented by pastures with *Juniperus* spp..

The garigues can be separated into two main evolutionary series (BONIN 1978): the first series moving towards deciduous oaks, and the second towards Ostryetum forests on sloped sites. Despite of the presence of scattered trees or shrubs, garigue structure and composition suggest a very low evolution level, with a reduced potential except where the soil is deep and wet.

A big question is the origin of *Stipa austroitalica* garigues which show a high structural stability and a high dispersal power; old abandoned fields, in particular, are easily colonized by this species. At the moment it is difficult to predict which factors favour this kind of habitat, and we can only hypothesize that they have been burned, grazed and cultivated.

The evolution of afforested sites towards natural conditions is slower than in meadows and pastures; it will only be possible when the trees are taller and canopies will no longer inhibit the development of other plants.

5 Zoocoenoses

In this mosaic of habitats we carried out population analyses on three key taxa that have a very different home range: birds, Lepidoptera and Carabid beetles.

5.1 Birds

The ornithological studies have been concentrated on numerical consistence and habitat selection of species linked to herbaceous habitats of the Pollino National Park.

For this survey, we used semi-quantitative samples such as the classic method of "Point Counts" (PC), or "listening stations" (BLONDEL et al. 1981; BIBBY et al. 1992) which were applied by point sampling (birds seen or heard) of frequency or abundance, of variable duration (in this case: 10 minutes). The survey considered only breeding populations. The 88 point count samples covered the mosaic of steppe and garigues at different successional stages in the "Petrosa" area (57), and the high altitude grasslands of the top-zone of the Massif (31).

We found 65 species of which 55 were nesting in the area. Ten of the breeding species are typical of woody formations (forest plantations, or natural formations), nine are linked to rocky areas (or buildings) and 36 are more strictly associated with herbaceous formations: sixteen with garigues, seven with pastures and thirteen with both formations.

The three more abundant species are, in decreasing order, *Alauda arvensis*, *Miliaria calandra* and *Lullula arborea*. They are small Passeriformes, rather common at regional level, which in the study area attain high punctual density values and are distributed at a large range of altitude.

The faunistic list includes all Italian lark species (Alaudidae: *Lullula arborea, Alauda arvensis, Galerida cristata, Melanocorypha calandra* and *Calandrella brachydactyla*). The Petrosa is the only Italian area where it is possible to find breeding populations of all these species together.

The quantitative analysis of the bird census of the lower "Petrosa" demonstrated that both grazing and the use of fire are helpful in rejuvenating this semi-open landscape, and that the *Stipa austroitalica* garigues show a real concentration of vulnerable or priority species, among them many larks. The abundance of the Calandra lark, (*Melanocorypha calandra*), is perhaps the outstanding feature of the *Stipa* habitats investigated.

5.2 Lepidoptera

Moths and butterflies were collected in pitfall traps usually used to collect walking arthropods. Eight sites were chosen among the habitats of the lower Petrosa (Fig. 3); in each station 3-6 pitfall traps were set, emptied each month and treated with a mixture of formaline (5%) and vinegar as bait. The bait was scarcely used to sample moths communities but their efficacy was tested by SÜSSENBACH and FIEDLER (1999) with good results. The list and a summary description of stations is given in Table 1. The same stations and traps were also used to collect Carabids.

So far 97 species and 3,394 specimens of Lepidoptera have been collected on the Petrosa; the dominant species are: *Agrochola lychnidis* (21.3%), *Conistra torrida* (7.5%) and *Aporophila canescens* (6.6%) which fly during the autumn and in winter.

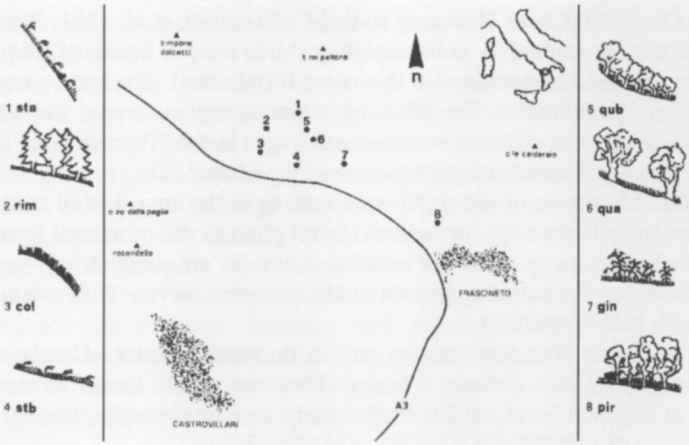

Fig. 3. Distribution and schematic structure of eight sampled stands

Table 1. List and description of stations used for the study

Stations	Traps	Locality	Altitude	Inclination	Dominant plant
Gin	3	Masseria Quercia Marina	610	5°	*Spartium junceum*
Qua	4	Masseria Quercia Marina	710	5°	*Quercus pubescens*
Qub	4	Masseria Quercia Marina	725	10°	*Quercus pubescens*
Sta	6	Timpone Pallone	830	30°	*Stipa austroitalica*
Rim	4	Masseria S. Iorio	730	15°	*Pinus* sp.
Col	6	Masseria S. Iorio	700	5°	Cereals
Stb	6	Colle Lanzarello	615	5°	*Stipa austroitalica*
Pir	4	Commenda di Malta	535	5°	*Pyrus amygdaliformis*

The communities described can be grouped on the basis of their similarity ratio (Syntax 5.02); cultivated fields, xeric pastures and *Spartium* maquis are connected to the forest habitats through the isolated trees and afforested habitats. In Table 2 some community data are presented.

The distribution of the forest cover highly influences the species number and the community structure; in fact, many species show a clear preference for only one stage of the ecological succession or "habitat sequence". The highest "activity-biomass" has been observed in intermediate stages, where also the highest number of species was recorded (Fig. 4).

None of the species is worth of conservation "per se", only one rare element, *Myinodes interpunctaria*, has been found in the *Stipa* grasslands; in this formation Mediterranean species are dominant because of the high aridity due to soil permeability and considerable sun radiation. The most interesting habitats seem to be the "preclimax" ones, perhaps because they are more favourable from a trophic point of view or because species at their southern limit are concentrated here.

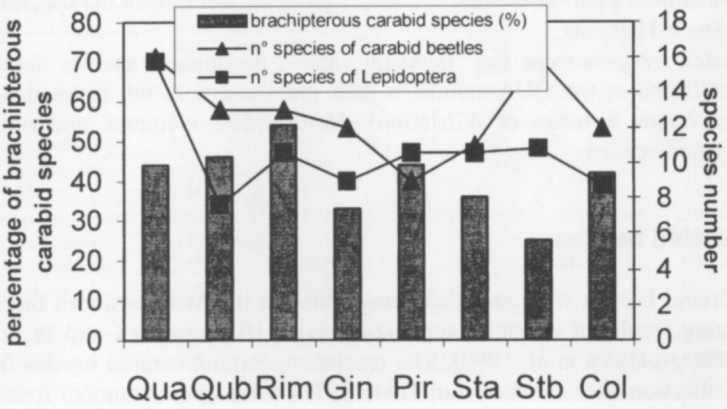

Fig. 4. Species numbers of Lepidoptera and Carabid beetles in the lower Petrosa habitat sequence. Histograms represent the percentage of brachypterous ground beetle species in the same habitat

Table 2. Summary data for Lepidoptera in each sampled habitat

Station	Specimens	Specimens /trap	Species	Sex ratio	Dominant species	Co-dominant species
COL	163/-	27.2/-	40/-	1.06	*Mythimna putrescens*	-
GIN	51/353	17/114.3	18/40	1.09	*Mythimna putrescens*, *Agrochola lychnidis*,	*Aporophyla canescens*, *Spudaea ruticilla*
PIR	75/388	18.8/94.5	27/48	0.97	*Lasyonicta calberlai* *Agrochola lychnidis*,	*Spudaea ruticilla*, *Polymixis rufocincta*
QUA	155/814	38.8/198.5	41/72	1.12	*Hipparchia fagi* *Agrochola lychnidis*,	*Aporophyla canescens*, *Aporophila australis*
QUB	34/200	8.5/47.8	10/34	0.92	*Lasyonicta calberlai* *Agrochola lychnidis*,	*Trigonophora flammea*, *Cymatophorina diluta*
RIM	68/694	17/169.5	23/47	1.08	*Hipparchia fagi* *Conistra torrida*	*Agrochola lychnidis*, *Dryobota labecula*
STA	54/449	9/71.8	22/47	1.00	*Mythimna putrescens*, *Agrochola lychnidis*	*Conistra torrida*, *Dryobotodes monochroma*
STB	57/322	9.5/52.2	22/49	1.05	*Mythimna putrescens*, *Agrochola lychnidis*	*Aporophyla canescens*, *Chemerina caliginearia*

The use of fire could play a positive role in maintaining the habitat mosaic; cattle raising and grazing could be equally effective in keeping the landscape natural and richer in trophic niches. Grazing and moderate burning, together with rotational crop growing seem to be the most compatible human activities because Lepidoptera are a very mobile taxon and can complete their life cycle in very small favourable habitats.

Forest remnants clearly contribute to species diversity, in spite of the fact that no species living here is listed in Red Data books. The species present in these

shaded habitats are mainly European or Palaearctic elements that find microclimatically favourable conditions here; this is the case for *Pinus* plantations which maintain a part of the original forest grouping but mostly the species simply prefer shaded habitats.

Isolated trees increase the "faunistic value", the highest species number has been collected in the QUA station, a park grassland with tall isolated oaks (70 species versus a mean of 47/station). Here, forest elements and open land Lepidoptera coexist.

5.3 Carabid beetles

The carabid beetles were sampled many times in the Mediterranean biome with interesting results of potential application value (BRANDMAYR and PIZZOLOTTO 1995; BRANDMAYR et al. 1998). The results concerning carabid beetles from the eight collection sites are shown in Table 3. The total species number found is not high (31), with the arid summers and the highly permeable limestone substrate being severely limiting factors. In the tree rich or forest stands (Qua, Qub, Rim, on the left in Table 3) at least six typical forest species were collected, some of them particularly rare or dendrophilic (*Leistus sardous*, linked to primeval woodlands, see PIZZOLOTTO et al. 1991). Successional scrublands are not so rich in species, but some rare Mediterranean thermophilous elements are found here (e.g.: *Metadromius nanus*). Typical *Stipa* habitats (Stb) show higher species numbers (16), many calciphilous elements (*Philorhizus crucifer*, *Licinus silphoides*) and grazing (cattle trampling) indicators (*Cymindis axillaris*), the high percentage of macropterous species (75%) reveals a strongly rejuvenated ecosystem, corresponding to the hypothesis of recently abandoned croplands put forward by botanists. As already seen for moths, the ground beetle diversity of the Petrosa semi-open landscape is also well spread over all succession phases of vegetation dynamics. Their species composition and number in forest stands indicate a deciduous oak climax (*Quercus virgiliana*, of the *Quercus pubescens* group). The evergreen *Quercus ilex* forests of Calabria never host more than four of five Carabid species, and their population activity density is normally very low, not exceeding 1.00 individuals/trap in the standard period of 10 days.

Table 3. Results for Carabid beetles from the eight collection sites

	1	2	3	4	5	6	7	8			
	Qua	Qub	Rim	Gin	Pir	Sta	Stb	Col			
Altitude	710	725	730	610	535	830	615	700			
Slope aspect	S	S	S	S	S	S	S	S			
Inclination	5°	10°	15°	5°	5°	30°	5°	5°			
Vegetation cover in %	20	90	100	90	65	80	90	30	mean	w	c
Calathus montivagus	.605	.259	.396			.019		.021	.162	b	II
Carabus convexus	.044	.37	.495						.114	b	IV
Laemostenus cimmerius	1.583	.21	.132	.146	.007	.093	.025	.086	.285	b	II
Harpalus dimidiatus	.124	.035					.004		.02	m	IIIm
Notiophilus geminatus	.255		.007				.004		.033	m	IIIm
Pseudomasoreus canigoulensis	.036		.007						.005	m	IIIm
Pterostichus melas	.088		.007	.018	.014				.016	b	III
Percus bilineatus	.029	.769	.818		.813			.021	.306	b	II
Leistus sardous		.007							.001	m	IIIm
Trechus quadristriatus	.007								.001	m	V
Carabus lefebvrei		.028							.003	b	III
Calathus cinctus	.044	.007	.046	.355	.007	.	.049	.118	.078	d	III
Carabus coriaceus	.357	.622	.198	.992	.214	.111	.082	.129	.338	b	III
Acinopus picipes		.007			.007	.023	.004		.005	d	III
Cymindis axillaris			.007	.027		.042	1.691	.021	.224	d	V
Amara sicula	.007		.007	.018		.171	.029	.193	.053	b	II
Calathus fuscipes	2.779	.098	2.519	1.037	.071	1.601	1.843	8.013	2.245	d	III
Microlestes luctuosus		.021	.053	.073	.021		.004	.29	.058	d	IIIm
Ophonus azureus	.007					.019		.021	.006	d	III
Ophonus subquadratus				.018		.019	.106	.118	.033	m	IIIm
Brachinus peregrinus							.004		.001	d	IIIm
Licinus silphoides							.053		.007	m	IIIm
Carterus rotundicollis	.007								.001	m	IIIm
Ditomus clypeatus						.005			.001	m	III
Harpalus honestus								.011	.001	m	IV
Lebia fulvicollis				.009			.004		.002	m	IIIm
Metadromius nanus				.027	.007				.004	m	IIIm
Ophonus parallelus						.005			.001	m	III
Ophonus sabulicola		.007							.001	m	III
Philorhizus crucifer	.015			.009			.012		.004	m	IIIm
Platyderus canaliculatus							.004		.001	b	II
annual AD, all species	5.99	2.44	4.69	2.73	1.16	2.11	3.92	9.04			
N° species	16	13	13	12	9	11	16	12			
brachypterous sp. (%)	44	46	54	33	44	36	25	42			
II (%)	19	15	23	8	11	18	13	25			
IIIm (%)	31	23	23	42	22	9	50	17			
III (%)	38	54	38	42	67	64	31	42			
IV (%)	6	8	8	0	0	0	0	8			
V (%)	6	0	8	8	0	9	6	8			

In each column the mean annual activity density (DAa, individuals/trap in the standard period of 10 d) is reported.

w: b = brachypterous species; m = macropterous; d = wing dimorphic species

c: II = endemic to Italy or Apennines; IIIm = euro-Mediterranean; III = European; IV Eurasiatic or Eurosiberian; V = Palaearctic or Holarctic

6 Conclusions

The semi-open pasturelands of the Pollino National Park are of highly diverse origin. The grasslands above the treeline are natural, but pastures and grasslands of lower altitudes are mainly of secondary origin, except for probably some primeval rocky habitats (the area is rich in cliffs and calcareous walls) from which the *Stipa austroitalica* steppe spread after the beginning of land use by humans. The current situation is enriched by many several intermediate stages that evolve towards the climax. In fact, the result of traditional human uses of the past, i.e. livestock grazing, burning and other human activities, is a mosaic-like landscape that could play a positive role in maintaining high values of faunal diversity. The communities of birds, Lepidoptera and carabid beetles show species crowding in some habitats characterized by medium tree cover or in habitats with medium environmental perturbation; isolated old trees appear very important from a faunal point of view. The high percentage of macropterous ground beetle species (75%) in dense *Stipa* stages reveals that most abandoned croplands (wheat, other cereals) may have evolved rapidly into the "beautiful looking" wind blown silver grasses. Particularly interesting is the simultaneous presence in this anthropogenic landscape of typical species of herbaceous and woody habitats, which confirms the biodiversity conservation value of semi-open landscapes.

Garigues and low altitude grasslands are very important for the conservation management of the Pollino Natural Park. In the lower "Petrosa" the maintenance of moderate, extensive grazing seems to be equivalent to non-destructive burnings in ensuring habitat rejuvenation, but grazing seems largely preferable to avoid catastrophic burns that could reach *Pinus halepensis* afforestations. Moreover, if grazing is distributed homogeneously over the Petrosa area and is carried out every year, the presence of coprophilous species of the scarab genus *Scarabaeus, Onthophagus, Sysiphus, Aphodius* and *Copris* will be maintained at levels that spin off the predator food chains of mammals and birds. Future research should be devoted to quantitative aspects of these issues.

A management plan for the lower Petrosa has been proposed by the research group. It implies the maintenance of a highly diversified semi-open landscape based mostly on grazing. In this scenario a moderate cropland rotation seems also to be compatible with conservation objectives, if the hypothesis of a rapid transition from abandoned cultivated fields to *Stipa* habitats is confirmed. We expect that spontaneous woodland development will accelerate starting from soil rich landscape depressions, and that deciduous oak thickets (*Quercus virgiliana*) will spread in sinks, whereas evergreen *Quercus ilex* or mixed formations will cover hill tops and ridges, but most will be kept open by adjusting grazing intensity or by controlled burning.

7 German Summary

Die halboffenen Weidelandschaften und Fluren der Südseite des Pollino Nationalparkes in Kalabrien wurden im Laufe eines 2-jährigen Life-Projektes im Bezug auf Vegetation und Fauna untersucht. Das Karstmassiv des Monte Pollino erhebt sich bis über 2000 Meter in baumlose Rasenstufe des Appennin. Die wichtigsten Habitate sind jedoch meist sekundäre magere Federgraswiesen mit *Stipa austroitalica* einer prioritären Art der Habitat-Direktive 92/43. In den niederen Lagen mit mediterranem sommertrockenem Klima kommt diese Art oft in sehr dichten Beständen vor (Petrosa bei Castrovillari).

Hier wurden die Sukzessionsstadien der Vegetation und die Singvögel-, Laufkäfer- und Lepidopteren-Zönosen quantitativ untersucht. Basierend auf den daraus resultierenden Ergebnissen wurden die Auswirkungen verschiedener anthropogener Einflüsse und Maßnahmen auf die Artendiversität bewertet. Eine hohe Faunenvielfalt lässt sich besonders durch Brand bzw. Beweidung erhalten. Alle Phasen der Wiederbewaldung sowie manche Strauchformationen tragen zudem zur Gesamtdiversität der Landschaft bei.
Aus diesen Betrachtungen wurden einige Hinweise zur Landschaftspflege der „Petrosa" zusammenzustellen. Extensive Beweidung aber auch kurzfristiger Ackerbau scheinen wichtige Voraussetzungen für den Erhalt eines mosaikartigen Gleichgewichts zu sein, in dem sich Waldflächen verschiedenen Alters mit Parklandschaften und offenen Habitaten schrittweise abwechseln.

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