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14. Anthropogenic changes to the vegetation

Most of the described communities can be found in the protected area within the Teberda Reserve. Vegetation surrounding the preserve has been greatly changed by human impact. There are several kinds of anthropogenic factors altering the high mountain ecosystems, mainly grazing, building of roads, summer tourist recreation and winter sports activity (LUKSCHANDERL 1983).

Undoubtedly, (over) grazing is the single most important factor of vegetation disturbance in the region. We compared the composition and structure of the alpine communities in the reserve and in surrounding grazed-over areas. The following main transformations were observed.

Alpine heaths (tundra) (*Pediculari comosae-Eritrichietum caucasicum*) rapidly lose their lichen cover and change to sparse dry scree-type communities. Similar changes can be observed in dry *Festuca varia* - grasslands (*Viola altaicae-Festucion variae geranietosum renardii*). But the communities of the typical subassociation (*V.a.-F.v. typicum*) are transformed to *V.a.-F.v. nardetosum*. The cover of *Festuca varia* decreases and *Nardus stricta* increases under severe grazing. Similarly, productive alpine grasslands (*Hedysaro caucasicae-Geranietum gymnocauli*) change into *Nardus*-dominated grasslands. The snowbed communities (*Hyalopoo ponticae-Pedicularietum nordmannianae*) remained relatively stable under grazing. The percentage of *Sibbaldia procumbens* and bare soil cover increased on grazed sites in comparison with the ungrazed areas.

Nardus stricta-dominated communities develop under strong grazing in subalpine zone as well. On rich moist soils ruderal tall herbaceous communities (*Anthrisko sylvestris-Rumicetum alpini*) are formed on overgrazing areas. Unpalatable plants (*Rumex alpinus*, *Veratrum album*, *Cirsium pugnax*, *C.obvallatum*) come to dominate in such places.

In most cases the cover percentage of different species changes greatly under grazing, but floristic composition remains relatively stable. Therefore, we can easily determine the syntaxonomic position of the altered communities. However, under severe grazing stress near cattle or sheep enclosures the vegetation has changed drastically. A new association with the following syntaxonomic position can be suggested for such communities (MUCINA 1993b, POTT 1995) (Table 14.1.).

Table 14.1.

Ranunculo oreophili - Polygonetum avicularis

Releve No.	118	122	141	116
Year	94	94	94	94
Altitude (* 10)	245	245	240	215
Steepness	5	3	5	5
Exposition	e	n	se	sse
Vascular plant cover	80	70	50	60
Bryophyte cover	0	0	1	0
Stone cover	0	1	5	5
bare soil	10	5	10	15
<i>D.sp. Ranunculo oreophili - Polygonetum avicularis</i>				
<i>Trifolium ambiguum</i>	2	1	1	2
<i>Ranunculus oreophilus</i>	+	1	+	
<i>Phleum alpinum</i>		+	+	
<i>Cirsium munitum</i>			2	2
<i>D.sp. Polygono arenastri - Poetea annuae,</i> <i>Polygono arenastri - Poetalia annuae</i>				
<i>Polygonum aviculare</i>	4	3	+	1
<i>Poa annua</i>	2	2	+	1
<i>D.sp. Matricario matricarioidis - Polygonion arenastri</i>				
<i>Poa pratensis</i>			2	2
Other species:				
<i>Achillea millefolium</i>			1	+
<i>Alchemilla vulgaris aggr.</i>	1	1	2	1
<i>Capsella bursa-pastoris</i>	1	1	+	+
<i>Carduus nutans</i>			2	1
<i>Cerastium holosteoides</i>	+		+	
<i>Draba nemorosa</i>	1		1	1
<i>Lamium album</i>			1	1
<i>Plantago major</i>	+		+	+
<i>Rumex alpinus</i>		1		+
<i>Stellaria media</i>	1	2		+
<i>Taraxacum officinale aggr.</i>	+	2	1	1
<i>Thlaspi arvense</i>	+	2		
<i>Urtica dioica</i>			1	1
<i>Veronica verna</i>			+	+

Sporadic species (number of releve in parenthesis, abundance is shown after ":", unless it is not "+", Braun-Blanquet scale).

Acinos arvensis (141/94), *Agropyron repens* (116/94), *Agrostis stolonifera* (141/94), *Alopecurus pratensis* (116/94), *Arctium tomentosum* (118/94), *Asperugo procumbens* (116/94), *Bromopsis variegata* (141/94), *Bryum argenteum* (141/94:1), *Cerastium arvense* (141/94), *Cirsium obvallatum* (141/94), *Dactylis glomerata* (122/94), *Deschampsia caespitosa* (141/94), *Entodon concinnum* (141/94), *Festuca pratensis* (122/94), *Galeopsis bifida* (116, 94), *Geranium pusillum* L. (116/94), *Veronica filiformis* (116/94).

Date (day.month), size (sq.m) and location of the relevés.

118/94 - 29.07, 25, Mukhu; 122/94 - 29.07, 25, Mukhu; 141/94 - 31.07, 25, Mukhu; 116/94 - 29.07, 25, Mukhu.

Polygono arenastri-Poetea annuae RIVAS-MARTINEZ 1975

Polygono arenastri-Poetalia annuae TÜXEN in GEHU *et al* 1972

? *Matricario matricarioides-Polygonion arenastris* RIVAS-MARTINEZ 1975

Ranunculo oreophili-Polygonetum aviculais EGOROV ass.nov.prov.

Species of various syntaxa of ruderal vegetation are represented in the communities (*Lamium album*, *Urtica dioica*, *Elytrigia repens*, *Alopecurus pratensis*, *Capsella bursa-pastoris*, *Stellaria media*, *Thlaspi arvensis*, *Plantago major*). The communities are not floristically rich (13-26 species per releve). Lichens are completely absent and the role of bryophytes is negligible. The communities occupy gentle (3-5) slopes of various exposure near enclosures ("koshi" in local tongue) within the subalpine zone (2150-2450 m a.s.l.).