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13. Elfin birch woodland - *Vaccinio-Piceetea*

Prodromus

Vaccinio-Piceetea BRAUN-BLANQUET in BRAUN-BLANQUET *et al.* 1939

Piceetalia excelsae PAWLOWSKI in PAWLOWSKI *et al.* 1928

Rhododendro caucasici-Betulion litwinowii all.nov.

Rhododendro caucasici-Betuletum litwinowii ass.nov.

Derived association

Senecioni nemorensis-Betuletum litwinowii ass.nov. [*Rhododendro caucasici-Betulion litwinowii* / *Calamagrostion arundinaceae* OBERD 1950]

13.1. *Rhododendro caucasici-Betulion litwinowii*

Elfin birch forests with dense cover of *Rhododendron caucasicum* are widespread in the Caucasus (GROSSGEIM 1949, TUMADZHANOV 1960, GULIASHVILI *et al.* 1975). We suggested a new alliance *Rhododendro caucasici-Betulion litwinowii* for such communities. Due to high frequency of several diagnostic species of *Vaccinio-Piceetea* and *Piceetalia excelsae* (*Dicranum scoparium*, *Hylocomium splendens*, *Vaccinium myrtillus*, *V.vitis-idaea*) we consider the communities within these syntaxa (MIRKIN *et al.* 1989, OBERDORFER 1992, WALLNOFFER 1993). There is one association in the alliance.

Rhododendro caucasici-Betuletum litwinowii

Floristic features

The diagnostic species set is represented by numerous species belonging to different life forms: trees (*Betula litwinowii*, *Sorbus aucuparia*), shrubs (*Rhododendron caucasicum*, *Juniperus communis*, *Rubus idaeus*), herbs (*Oxalis acetosella*, *Senecio renifolius*), bryophytes (*Hypnum pallescens*, *Barbilophozia barbata*, *Sanionia uncinata*) and lichens (*Cetraria islandica*, *Cetraria pinastri*). *Rhododendron caucasicum* and *Betula litwinowii* are the main dominants.

Floristic richness of the communities is moderate. We registered 61 vascular plant species, 41 bryophytes and 9 lichens in 10 relevés (Table 13.1.).

Table 13.1. (continued)

Releve No	0	0	1	0	1	0	1	1	1	0	0	0	0	0	0	0	0	1						
	22	23	43	63	01	98	73	91	33	62	46	60	3	4	5	11	12	29	26	95				
year	93	93	94	95	95	94	94	94	95	95	83	83	93	95	95	95	95	95	94	94				
<i>D.sp. Senecioni nemorensis-Betuletum litwinowii</i>																								
<i>Senecio nemorensis</i>	-															1				1	IV			
<i>Heracleum asperum</i>	-										2	1	2	+	+					1	1	IV		
<i>Poa nemoralis</i>	+	+														+	+	+	+	+	+	IV		
<i>Geranium sylvaticum</i>	2	r	+								1		1	1		1	+	+	+	+	+	IV		
<i>Pulmonaria mollissima</i>	-											1	1						1	+	1	III		
<i>Chaerophyllum aureum</i>	-												1		+	1	1			+	1	III		
<i>Cruciata laevipes</i>	-										+		+		+	+	+			+		III		
<i>Astrantia maxima</i>	-										1		2			1	1			+	+	III		
<i>Acer trautvetteri</i>	-											2	2	2	1	+				1		III		
<i>Silene vulgaris</i>	-										1		+			1	+				+	III		
<i>Cephalaria gigantea</i>	-										1	1				+	+			+		III		
<i>Lapsana communis</i>	-												+	+	+						+	III		
<i>Dryopteris filix-mas</i>	-										+	1		2						1	1	III		
<i>Campanula latifolia</i>	-												1	+						+	1	+	III	
<i>Betonica macrantha</i>	-										1	+	+			1	2				+	III		
<i>Aconitum nasutum</i>	-										1	+	1	+			+					III		
<i>Hieracium umbellatum</i>	-										1	+			+	+						II		
<i>Petasites albus</i>	-											2	1	1						1		II		
<i>Pterigynandrum filiforme</i>	-													1		+	+	+				II		
<i>Galium odoratum</i>	-												2	1	+					+		II		
<i>Sedum spurium</i>	-															+				+		II		
<i>Cirsium obvallatum</i>	-										1		+								+	II		
<i>Bupleurum falcatum</i>	-														+	+	+					II		
<i>Ligusticum alatum</i>	-										2	1								+		II		
<i>Daphne mezereum</i>	-												+	+						+		II		
<i>Pimpinella rhodantha</i>	-												+			+					+	II		
<i>Carduus adpressus</i>	-											1	+			+						II		
<i>Athyrium filix-femina</i>	-													+						1	+	II		
<i>Polystichum lonchitis</i>	-										+	+								+		II		
<i>Millium effusum</i>	-										1	1	1								1	II		
Other species																								
<i>Aconitum orientale</i>	-															1	1				+	+	II	
<i>Alchemilla vulgaris aggr.</i>	+															+	1	1			+	+	+	III
<i>Anthoxanthum odoratum</i>	-																				+		-	
<i>Brachythecium reflexum</i>	-																			1	1	+	I	
<i>Brachythecium salebrosum</i>	-																			+	+		III	
<i>Brachythecium starkei</i>	-																			1	1		I	
<i>Brachythecium velutinum</i>	-																			+	+	+	II	
<i>Calamagrostis arundinacea</i>	1	1	1																	+	+		IV	
<i>Campanula collina</i>	-																			1	+		I	
<i>Chamerion angustifolium</i>	2	+																		+	+	1	III	
<i>Cicerbita racemosa</i>	+																			+	1		II	
<i>Cladonia pyxidata</i>	+	+																		+	+		I	
<i>Dicranoweisia crispula</i>	-																				1		I	
<i>Grimmia sessitana</i>	-																			+	+		I	
<i>Hedysarum caucasicum</i>	-																			+			I	
<i>Hieracium macrolepis</i>	-																			+			I	

Table 13.1. (continued)

Releve No.	0	0	1	0	1	0	1	1	1	0	0	0	0	0	0	0	0	0	1		
	22	23	43	63	01	98	73	91	33	62	46	60	3	4	5	11	12	29	26	95	
Year	93	93	94	95	95	94	94	94	95	95	83	83	93	95	95	95	95	95	94	94	
<i>Hieracium prenanthoides</i>				+											+		+				
<i>Lescurea mutabilis</i>										+				1	1						
<i>Lescurea saxicola</i>		1		+		+				+							1	+		1	
<i>Leskeella nervosa</i>				+		+	+						+	+			1				
<i>Lophocolea heterophylla</i>				+				+											+		
<i>Myosotis alpestris</i>	+	+				+		+				+								+	
<i>Orthotrichum pumilum</i>				+											+	+					1
<i>Polygonatum verticillatum</i>										+			+					+			1
<i>Polygonum bistorta</i>				+														+		+	
<i>Populus tremula</i>	2					+							1								
<i>Pseudoleskea incurvata</i>										+	1			1	1				+		
<i>Racomitrium canescens</i>	+					+									+				+		
<i>Radula complanata</i>				+			+								+		+				
<i>Rhodobryum roseum</i>				+						+	1	2									
<i>Salix caprea</i>				1										1		1					
<i>Seseli alpinum</i>	+	+				1				+									+		
<i>Veratrum album</i>										+	1	+	+	+							

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

Abietinella abietina (46/83:1), *Achillea millefolium* (26/94), *Actaea spicata* (29/95:1), *Aegopodium podagraria* (3/93), *Agasyllis latifolia* (4/95), *Agrostis vinealis* (98/94), *Angelica purpurascens* (26/94:1), *Anomodon rugelii* (60/83:1), *Antennaria dioica* (98/94), *Anthemis macroglossa* (5/95, 12/95), *Anthriscus sylvestris* (46/83:1, 60/83:1), *Aquilegia olympica* (46/83, 26/94), *Asyneuma campanuloides* (22/93, 3/93), *Athyrium distentifolium* (46/83), *Barbilophozia hatcheri* (98/94, 62/95), *Brachypodium pinnatum* (3/93:2, 11/95:1), *Brachypodium sylvaticum* (3/93), *Brachythecium rutabulum* (63/95:1), *Bryum capillare* (46/83:1), *Bryum sp.* (98/94), *Bryum subelegans* (5/95, 29/95), *Calamagrostis epigeios* (26/94), *Campanula lactiflora* (3/93:1), *Campanula rapunculoides* (46/83:1), *Cardamine uliginosa* (3/93, 26/94), *Carduus nutans* (3/93), *Carex digitata* (63/95, 62/95), *Carex mingrelica* (12/95, 26/94), *Centaurea nigriffimbria* (11/95, 12/95), *Centaurea salicifolia* (5/95, 12/95), *Cerastium davuricum* (3/93:1), *Chamerion dodonaei* (46/83:1), *Cirsium chlorocomos* (11/95), *Cirsium vulgare* (26/94), *Cladonia ecmocyna* (22/93, 23/93), *Cladonia mitis* (98/94:1, 173/94), *Cladonia sp.* (173/94), *Clinopodium vulgare* (12/95, 195/94), *Conocephalum conicum* (3/93), *Corylus avellana* (3/93:2), *Cratoneuron filicinum* (3/93), *Crepis glabra* (3/93:1), *Crepis paludosa* (26/94:1), *Dactylis glomerata* (60/83:1, 26/94), *Delphinium schmalhausserii* (195/94), *Deschampsia caespitosa* (26/94), *Dichodontium pellucidum* (143/94), *Digitalis ciliata* (5/95, 12/95), *Doronicum macrophyllum* (60/83, 3/93:1), *Dryopteris carthusiana* (191/94), *Dryopteris oreades* (22/93), *Eleutherosperrum cicutarium* (3/93:1), *Epipactis helleborine* (29/95), *Equisetum hyemale* (195/94:1), *Equisetum palustre* (26/94), *Euphorbia macroceras* (195/94), *Eurhynchium pulchellum* (98/94), *Fagus orientalis* (11/95, 29/95), *Festuca altissima* (4/95:1), *Festuca brunnescens* (12/95), *Festuca djimilensis* (11/95), *Festuca ovina* (98/94:1), *Festuca pratensis* (46/83:1), *Filipendula ulmaria* (195/94), *Fragaria vesca* (3/93, 195/94:1), *Frullania dilatata* (29/95), *Galeopsis bifida* (195/94), *Galium verum* (46/83), *Geranium sanguineum* (11/95), *Geum urbanum* (4/95, 26/94), *Grimmia elatior* (101/95, 4/95), *Helictotrichon versicolor* (98/94), *Hieracium murorum* aggr. (62/95, 29/95), *Homalothecium philippeanum* (3/93), *Hypericum perforatum* (3/93:r), *Kemulariella caucasica* (62/95), *Lamium album* (3/93), *Lathyrus pratensis* (3/93), *Leontodon hispidus* (5/95), *Lepidozia reptans* (191/94), *Lilium monadelphum* (11/95), *Lonicera caucasica* (29/95), *Lophocolea minor* (143/94), *Luzula multiflora* (98/94, 26/94), *Luzula pilosa* (22/93, 23/93), *Melica nutans* (3/93), *Mnium stellare* (29/95), *Mycelis muralis* (29/95), *Myosotis amoena* (3/93, 4/95), *Nepeta grandiflora* (3/93), *Nephroma bellum* (29/95), *Orchis euxina* (3/93), *Orobanche purpurea* (3/93:r), *Orthodicranum montanum* (173/94), *Orthotrichum pallens* (3/93), *Orthotrichum rupestre* (11/95, 12/95), *Orthotrichum speciosum* (173/94, 4/95), *Oxyria digyna* (46/83), *Padus avium* (60/83:1), *Paraleucobryum longifolium* (63/95:1, 29/95:1), *Pedicularis condensata* (46/83), *Pedicularis wilhelmsiana* (60/83), *Peltigera canina* (23/93, 29/95), *Peltigera malacea* (22/93), *Phegopteris connectilis* (101/95), *Plagiochila porelloides* (143/94), *Plagiomnium affine* (46/83:2), *Plagiomnium medium* (60/83:1, 3/93), *Plagiomnium rostratum* (3/93), *Plagiothecium denticulatum* (63/95, 191/94), *Poa longifolia* (22/93, 143/94), *Poa palustris* (3/93), *Poa pratensis* (46/83:2), *Pohlia longicollis* (143/94), *Polygonatum multiflorum* (3/93), *Polytrichastrum alpinum* (143/94), *Polytrichum piliferum* (22/93), *Primula veris* (60/83, 26/94), *Ptilidium pulcherrimum* (173/94), *Pulsatilla aurea* (62/95), *Ranunculus caucasicus* (62/95, 46/83), *Ranunculus oreophilus* (98/94), *Ranunculus subtilis* (26/94),

Rhynchospora elephas (26/94), *Ribes biebersteinii* (60/83:1, 3/93), *Ribes uva-crispa* (29/95), *Rosa canina* (3/93), *Rosa iberica* (60/83:1, 12/95), *Rubus saxatilis* (143/94, 11/95), *Rumex alpestris* (46/83:1), *Salix apoda* (191/94), *Salix caprea* (46/83), *Salix kazbekensis* (22/93, 98/94:2), *Salix sp.* (60/83:1), *Salvia glutinosa* (3/93), *Scabiosa ochroleuca* (11/95:r), *Scrophularia scopolii* (3/93), *Senecio caucasicus* (191/94, 133/95), *Senecio platyphylloides* (60/83:1, 26/94:1), *Silene multifida* (60/83, 3/93:1), *Silene sp.* (62/95), *Sphenolobus minutus* (143/94), *Stellaria media* (3/93:r, 26/94), *Stellaria nemorum* (3/93, 26/94:1), *Stellaria sp.* (3/93), *Swertia iberica* (3/93:1, 26/94), *Taraxacum confusum* (98/94), *Taraxacum officinale aggr.* (5/95, 26/94), *Thesium alpinum* (5/95), *Tortula ruralis* (46/83:1), *Tragopogon reticulatus* (5/95), *Trifolium ambiguum* (12/95), *Trollius ranunculinus* (46/83:1), *Ulotia crispa* (173/94), *Urtica dioica* (60/83:1, 3/93), *Valeriana allianifolia* (3/93, 29/95), *Valeriana alpestris* (98/94), *Veronica filiformis* (3/93, 26/94), *Veronica gentianoides* (98/94), *Veronica peduncularis* (3/93, 11/95), *Vicia abbreviata* (5/95, 11/95), *Vicia balansae* (3/93:1), *Vicia sepium* (60/83:1, 26/94).

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

22/93 - 09.07, 100, Ullu-Murudzhu (N.Illarionova); 23/93 - 09.07, 25, Ullu-Murudzhu (N.Drenova); 143/94 - 31.07, 25, Mukhu; 63/95 - 12.07, 25, Baduk; 101/95 - 28.07, 25, Khadzhibey (A.Egorov); 98/94 - 21.07, 25, Goralykol; 173/94 - 07.09, 25, Oriuchat; 191/94 - 10.09, 25, Kichi-Murudzhu; 133/95 - 30.08, 25, Ullu-Murudzhu; 62/95 - 12.07, 25, Baduk; 46/83 - 08.09, 25, Bol.Khatipara; 60/83 - 15.09, 100, M.Khatipara; 3/93 - 04.07, 100, M.Khatipara (O.Gorbachevskaya); 4/95 - 02.07, 25, Alibek; 5/95 - 02.07, 25, Alibek; 11/95 - 03.07, 25, Alibek; 12/95 - 03.07, 24, Alibek; 29/95 - 05.07, 25, Amanauz; 26/94 - 09.07, 10, Dombay-Ulgen; 195/94 - 10.09, 25, Klukhor.

Mean species numbers per releve were 17, 9 and 3 correspondingly. Moss cover is well-represented (5-35%, mean 20%), which is typical for *Vaccinio-Piceetea* communities. Typus, or nomenclature type, No. 101/95.

Ecological features

The communities are typically found at the subalpine timberline within the altitude range 2220-2500 m (mean 2340 m). The birch forests can penetrate to lower zones along avalanche paths, because avalanches destroy coniferous forests whereas elfin birch remains undamaged. They occupy steep (5°-35°, mean 20°) "cold" (mainly northern) slopes.

Stones cover from less than 1% to 35% (mean 8%). As a whole, the communities develop at the sites of significant (several metres) snowpack accumulation and high avalanche activity (YASHINA 1981). Flexible birch trunks are often pressed to the ground by snow, but they easily spring up again after the snowmelt. Abundant water supply to the soils combined with good drainage leads to formation of acidic poor soils under the communities.

13.2. *Senecioni nemorensis-Betuletum litwinowii*

Floristic features

The other type of elfin birch woodland forms the derived association of unclear syntaxonomic position. Several *Vaccinio-Piceetea* species are poorly represented in it (*Pyrola minor*, *Dicranum scoparium*), while some frequent species are shared with the previous association (*Betula litwinowii*, *Sorbus aucuparia*, *Sanionia uncinata*, *Rubus idaeus*). On the other hand, significant species of *Mulgedio-Aconitetea* and *Calamagrostion arundinaceae* (*Geranium sylvaticum*, *Astrantia maxima*, *Silene vulgaris*, *Campanula latifolia*, *Aconitum nasutum*, *Bupleurum falcatum*, *Millium effusum*, *Calamagrostis arundinacea* etc.) are well represented. We are inclined to consider the association as a derivative syntaxon positioned between *Mulgedio-Aconitetea* and *Vaccinio-Piceetea*. Physiognomy of the communities combines the features of both classes. Moss cover may be well developed (from 1 to 80%, mean 19%). On the other hand tall forbs play a significant role in vascular plant cover, whose density ranges between 25% and 95% (mean 65%). *Rhododendron caucasicum* is completely absent.

The communities are floristically very rich. We registered 160 vascular plant species, 39 bryophytes and 3 lichens in 10 relevés. The mean values per relevé were 36, 8 and less than 1 species correspondingly.

Typus, or nomenclature type, No. 3/93.

Ecological features

The communities occupy steep (4°-35°, mean 22°) slopes of various, but mainly southern, exposures. They are typical of the upper forest and subalpine zones within the altitude range of 1830-2500 m (mean 2080 m). Stone and bare soil may cover up to 40%, but mean stone cover is about 12%. Significant winter snowpack accumulation does not reduce growth season significantly there due to high insolation on "warm" slopes. Snow movement is less usual here, so young *Abies nordmanniana* trees can be found in some communities of this syntaxon.