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3. Scree and pebbles - *Thlaspietea rotundifolii*

Prodromus

Thlaspietea rotundifolii BRAUN-BLANQUET 1948

Chaerophylletalia humilis ord.nov.

Chaerophyllion humilis all.nov.

Veronico minutae-Chaerophylletum humilis ass.nov.

V.t.-C.h. typicum subass.nov.

V.t.-Ch.h. lamietosum tomentosum subass.nov.

V.t.-Ch.h. saxifragetosum flagellaris subass.nov.

Androsacetalia alpinae BRAUN-BLANQUET in BRAUN-BLANQUET & JENNY 1926

Murbeckiellion huetii all.nov.

Hyalopoo ponticae-Oxyrietum digynae ass.nov.

H.p.-O.d. typicum subass.nov.

H.p.-O.d. ranunculetosum oreophili subass.nov.

Scrophulario variegatae-Epilobietum dodonaei ass.nov.

Allosuro-Athyrium alpestris NORDHAGEN 1936

Dicranoweisio crispulae-Rubetum idaei ass.nov.

Epilobietalia fleischeri MOOR 1958

Salicion incanae AICHINGER 1933

Silene compactae-Salicetum purpureae ass.nov.

Thlaspietea rotundifolii BRAUN-BLANQUET 1948

This class comprises open plant communities on unstable stony substrates (scree, rock streams, pebbles along rivers etc.). They can be relatively stable, but their stability depends upon permanent disturbance regime and/or extremely hard climatic conditions (in the subnival zone).

There exists a problem with diagnostic species combination for this class: practically all diagnostic species of the class are absent from the Caucasus. Therefore, we had to suggest an alternative regional species combination for the class (Table 3.1). Some diagnostic species from the European orders and alliances are well represented, so we were able to use one of the recent systems proposed for the class (ENGLISCH *et al.* 1993, VALACHOVIC *et al.* 1997).

Table 3.1.
Diagnostic table of *Thlaspietea rotundifolii*

	1	2	3	4	5	6	7	8
D.sp. <i>Veronico minutae</i> - <i>Chaerophylletum humilis</i> ,								
<i>Chaerophyllion humilis</i> , <i>Chaerophylletalia humilis</i>								
<i>Chaerophyllum humile</i>	V	II	IV	II	-	-	-	-
<i>Delphinium caucasicum</i>	III	III	I	-	-	-	-	-
<i>Corydalis alpestris</i>	IV	III	I	-	-	-	-	-
<i>Dentaria bipinnata</i>	II	III	III	-	-	-	-	-
<i>Eunomia rotundifolia</i>	II	I	II	-	-	-	-	-
<i>Noccaea pumila</i>	II	II	-	-	-	-	-	-
<i>Draba scabra</i>	II	I	III	-	-	-	-	-
<i>Draba siliquosa</i>	I	I	III	-	-	-	-	-
<i>Alopecurus dasyanthus</i>	II	I	V	-	-	-	-	-
<i>Potentilla gelida</i>	II	I	V	-	-	-	-	-
<i>Cruciata valentinae</i>	II	-	II	-	-	-	-	-
D.sp. V.t.-Ch.h. <i>lamietosum tomentosum</i>								
<i>Lamium tomentosum</i>	-	V	-	-	-	I	-	I
<i>Alopecurus glacialis</i>	I	II	I	I	-	-	-	-
D.sp. V.t.-Ch.h. <i>saxifragetosum flagellaris</i>								
<i>Saxifraga flagellaris</i>	-	-	V	-	-	-	-	-
<i>Minuartia circassica</i>	-	-	III	-	-	-	I	-
<i>Primula algida</i>	-	-	III	-	-	-	-	-
<i>Dactylina madreporiformis</i>	-	-	III	-	-	-	-	-
<i>Campanula ciliata</i>	-	-	III	-	-	-	-	-
<i>Campanula saxifraga</i>	-	-	III	-	-	-	-	-
<i>Minuartia recurva</i>	-	-	III	-	I	I	I	-
D.sp. <i>Hyalopoo ponticae</i> - <i>Oxyrietum digynae</i>								
<i>Carex atrata</i>	-	-	-	III	III	I	I	-
<i>Gnaphalium supinum</i>	-	-	-	I	IV	-	I	-
<i>Hyalopoa pontica</i>	III	I	-	V	III	I	I	-
<i>Primula meyeri</i>	I	I	-	III	II	-	-	-
<i>Cladonia pyxidata</i>	I	-	-	III	IV	-	V	-
<i>Senecio taraxacifolius</i>	-	-	-	III	II	-	-	-
<i>Carex pyrenaica</i>	-	-	-	I	III	-	-	-
D.sp. H.p.-O.d. <i>ranunculetum oreophili</i>								
<i>Ranunculus oreophilus</i>	-	I	I	V	-	I	I	-
<i>Sanionia uncinata</i>	-	-	-	V	-	-	II	-
<i>Valeriana alpestris</i>	-	I	-	V	I	-	-	-
<i>Carum caucasicum</i>	II	II	IV	V	I	I	-	-
<i>Ranunculus caucasicus</i>	-	-	-	IV	-	-	-	-
D.sp. <i>Scrophulario variegatae</i> - <i>Epilobietum dodonaei</i>								
<i>Scrophularia variegata</i>	I	I	I	-	I	IV	-	II
<i>Trifolium spadiceum</i>	-	-	-	-	I	III	-	I
<i>Pohlia filum</i>	-	-	-	-	-	III	-	-
<i>Betula litwinowii</i>	-	-	-	-	-	III	I	III
<i>Poa nemoralis</i>	-	I	-	-	-	IV	V	III
D.sp. <i>Dicranoweisio crispulae</i> - <i>Rubetum idaei</i> , <i>Allosuro</i> - <i>Athyrium alpestris</i>								
<i>Dryopteris filix-mas</i>	-	-	-	I	I	I	V	-
<i>Rubus idaeus</i>	-	-	-	-	-	I	V	II
<i>Calamagrostis arundinacea</i>	-	-	-	-	-	I	V	-
<i>Dicranoweisia crispula</i>	-	-	-	I	II	I	IV	-

Table 3.1. (continued)

	1	2	3	4	5	6	7	8
<i>Dicranum scoparium</i>	-	-	-	-	-	-	III	-
<i>Lescurea saxicola</i>	I	-	-	I	-	I	III	-
<i>Juniperus communis</i>	-	-	-	-	-	-	III	-
<i>Hypnum cupressiforme</i>	-	-	I	-	-	-	II	-
<i>Sempervivum caucasicum</i>	-	-	-	-	-	-	II	-
<i>Polygonum alpinum</i>	I	-	-	-	-	-	II	-
<i>Cladonia mitis</i>	-	-	-	-	-	-	II	-
<i>Cryptogramma crispa</i>	-	-	-	-	-	-	II	-
<i>Deschampsia flexuosa</i>	-	-	-	II	-	I	III	-
D.sp. <i>Silene compactae</i> - <i>Salicetum purpureae</i>								
<i>Salix purpurea</i>	-	-	-	-	-	I	-	V
<i>Rumex acetosella</i>	-	-	-	-	-	-	-	IV
<i>Silene compacta</i>	-	-	-	-	-	-	-	IV
<i>Taraxacum officinale</i> aggr.	-	-	-	-	I	-	-	IV
<i>Trifolium repens</i>	-	-	-	-	-	-	-	IV
<i>Agrostis stolonifera</i>	-	-	-	-	-	II	-	IV
<i>Anthyllis vulneraria</i>	-	-	-	-	-	I	-	III
<i>Cicerbita racemosa</i>	-	I	-	-	II	I	-	III
<i>Lotus corniculatus</i>	-	-	-	-	-	I	-	III
<i>Alnus incana</i>	-	-	-	-	-	I	-	III
<i>Cerastium holosteoides</i>	-	-	-	-	-	I	-	III
<i>Gnaphalium sylvaticum</i>	-	-	-	-	-	I	-	III
<i>Pinus silvestris</i>	-	-	-	-	-	-	I	III
<i>Poa palustris</i>	-	-	-	-	-	-	-	III
D.sp. <i>Murbeckiellion huetii</i>								
<i>Alopecurus ponticus</i>	I	-	-	I	V	III	-	-
<i>Oxyria digyna</i>	I	-	-	V	V	V	-	I
<i>Phleum alpinum</i>	-	-	-	IV	I	III	-	-
D.sp. <i>Androsacetalia alpinae</i>								
<i>Sibbaldia procumbens</i>	-	-	-	IV	-	-	-	-
<i>Cerastium cerastioides</i>	II	-	-	II	III	III	-	-
<i>Sagina saginoides</i>	-	-	-	I	I	-	-	I
D.sp. <i>Salicion incanae</i> , <i>Epilobietalia fleischeri</i>								
<i>Erigeron podolicus</i>	-	-	-	-	-	-	-	IV
<i>Myricaria germanica</i>	-	-	-	-	-	I	-	IV
D.sp. <i>Thlaspietea rotundifolii</i> (reg.)								
<i>Saxifraga sibirica</i>	II	I	-	III	IV	IV	II	-
<i>Sedum tenellum</i>	I	I	III	V	IV	III	IV	-
<i>Veronica minuta</i>	III	II	IV	I	V	III	-	II
<i>Cerastium polymorphum</i>	II	I	-	II	II	III	-	III
<i>Chamerion dodonaei</i>	-	-	-	I	IV	V	-	V
<i>Matricaria caucasica</i>	III	I	-	IV	V	IV	-	III
<i>Vicia caucasica</i>	-	I	-	-	-	III	-	IV
<i>Racomitrium canescens</i>	-	-	-	I	III	III	II	V
<i>Poa badensis</i>	-	-	-	I	III	III	I	I
<i>Murbeckiella huetii</i>	II	I	-	I	IV	III	IV	-
<i>Minuartia imbricata</i>	I	I	II	I	IV	II	-	-
<i>Calamagrostis epigeios</i>	-	-	-	-	-	IV	I	IV

Syntaxa:

1 - *Veronico minutae*-*Chaerophylletum humilis typicum*, 2 - *V.t.-Ch.h. lamietosum tomentosum*, 3 - *V.t.-Ch.h. saxifragetosum flagellaris*, 4 - *Hyalopoo ponticae*-*Oxyrietum digynae ranunculetosum oreophilii*, 5 - *H.p.-O.d. typicum*, 6 - *Scrophulario variegatae*-*Epilobietum dodonaei*, 7 - *Dicranoweisio crispulae-Rubetum idaei*, 8 - *Silene compactae*-*Salicetum purpureae*

3.1. *Chaerophylletalia humilis*

This order combines communities of the upper alpine and subnival zones developing on loose siliceous screes and stone fields. Floristic distinctiveness of the communities is very high. Many Caucasian endemics are well represented in it (VOROB'EVA 1977). In relation to the restricted study area we lumped all such communities within one alliance (*Chaerophyllion humilis*) and one association (*Veronico minutae-Chaerophylletum humilis*) with a unified set of diagnostic species (Table 3.1). We don't know of any other syntaxonomic publication describing similar communities from the area, therefore we consider all syntaxa new.

Floristic features

Among diagnostic species the role of *Brassicaceae* (*Dentaria bipinnata*, *Eunomia rotundifolia*, *Noccaea pumila*, *Draba scabra*, *D. siliquosa*) is very important. Most of the species are polycarpic perennials with special adaptation to loose scree environment (deep roots, creeping shoots and stolons). The ecology and biology of subnival plants in the Caucasus is discussed in some detail in NAKHUTSRISHVILI & GAMTSEMLIDZE (1984).

The mean number of vascular plant species per releve in this syntaxon is low (13). Species composition varies considerably: the ratio of the total number of species to the mean number of species is about 8 for 24 releves (Table 3.2). The role of bryophytes and epigeal lichens is low in terms of species number and cover.

According to floristic composition, we distinguish three subassociations with small ecological differentiation: ***V.t.-Ch.h. typicum*** (typus, or nomenclature type, No. 11/89), ***V.t.-Ch.h. lamietosum tomentosum*** (typus, or nomenclature type, No. 134/90), ***V.t.-Ch.h. saxifragetosum flagellaris*** (typus, or nomenclature type, No. 57/95). The typical subassociation is characterized by absence of *Lamium tomentosum* and species of *V.t.-Ch.h. saxifragetosum flagellaris* group. The rate of stone mobility decreases in the order: *V.t.-Ch.h. lamietosum tomentosum* > *V.t.-Ch.h. typicum* > *V.t.-Ch.h. saxifragetosum flagellaris*. There are several species of rock and stable dry stonefields in the last syntaxon.

Ecological features

Plant communities of the association occupy slopes of varying aspect and steepness (from horizontal ridges to 35°, with the mean 23°). They are typical for the upper reaches of vegetation in the region within both alpine and subnival zones. This community is found between 2750 and 3540 m elevation (mean 3090 m). Boulders of siliceous rocks (granites, gneises, shists) cover 50-95% of the area. Winter snow cover is low or moderate.

Plant cover is scarce (about 10%). In contrast with other associations the communities are not connected with permanent or temporary water flows.

Human influence on these communities is not very important due to their low productivity. There are many rare and endemic species belonging to this association, so a stronger protection regime preventing sheep grazing might be necessary in some areas.

3.2. *Androsacetalia alpinae*

This order includes open communities on siliceous pebble and screes within the alpine and subalpine zones. *Sibbaldia procumbens*, *Cerastium cerastioides* and *Sagina saginoides* are noted as diagnostic species of the order (ENGLISCH *et al.* 1993). Two alliances with contrast ecological features were distinguished within the order.

3.2.1. *Murbeckiellion huetii*

Open communities on alpine moraines, talus slopes and flood plain pebble beds belong to the alliance. All of them occupy areas near permanent or seasonal water bodies, such as rivers, streams of glacial origin, etc. There is no water deficit, but flooding is also unusual. Fluctuating water courses, stony and mud streams, are the main factor of disturbance there.

The diagnostic species combination of the alliance includes *Alopecurus ponticus*, *Oxyria digyna*, *Phleum alpinum* (Table 3.3).

Typus, or nomenclature type, is *Scrophulario variegatae-Epilobietum dodonaei*.

Sporadic species (number of releve in parenthesis, abundance are shown after ":", unless it is not "+", Braun-Blanquet scale) *Aetheopappus caucasicus* (53/95:1, 11/95), *Agrostis vinealis* (55/95), *Alchemilla caucasica* (41/91:r, 53/95), *Alopecurus ponticus* (36/95:1), *Androsace lehmanniana* (53/95), *Anemone speciosa* (37/94), *Anthemis cretica* (36/95), *Astragalus brachytrypis* (53/95, 111/95), *Astragalus levieri* (111/95), *Botrychium lunaria* (21/89), *Bryum imbricatum* (93/95), *Campanula collina* (36/95, 37/94) *Campanula tridentata* (51/95), *Campylopus schimperi* (51/95), *Carex sempervirens* (37/94), *Catabrosella variegata* (21/89:1), *Cerastium cerastifoides* 93/95, 14/89:1), *Cerastium kazbek* (43/94, 162/94), *Cerastium undulatifolium* (43/94), *Ceratodon purpureus* (37/95, 55/95), *Cetraria islandica* (160/94, 111/95), *Cicerbita racemosa* (50/91:r), *Cladonia pyxidata* (42/94:1), *Corniculana divergens* (51/95), *Cruciata laevipes* (134/90), *Dillichium flexicaule* (21/89), *Draba rigida* (49/91), *Erigeron alpinus* (111/95), *Euphrasia ossica* (49/91:r), *Festuca brunnescens* (51/95), *Festuca varia* (50/91:r), *Galium verum* (37/94), *Grimmia incurva* (37/04), *Gypsophila tenuifolia* (111/95), *Hedysarum caucasicum* (111/95), *Heracleum freynianum* (36/95, 50/91:1), *Hypnum cupressiforme* (111/95), *Hypnum revolutum* (37/94), *Jurinella moschus* (111/95), *Kobresia schoenoides* (37/94), *Koeleria eriostachya* (53/95), *Leontodon hispidus* (36/95:1), *Lescuraea saxicola* (14/89), *Leskeella nervosa* (37/94), *Lloydia serotina* (26/89), *Minuartia inamoena* (53/95:1), *Nepeta supina* (134/90:1), *Orfhotrichum rupestre* (37/94), *Oxyria digyna* (26/89:2), *Pedicularis comosa* (53/95, 111/95), *Pedicularis crassirostris* (51/95), *Poa nemoralis* (49:91), *Poa sp.* (37/95), *Pogonatum urnigerum* (37/95, 51/95), *Pohlia longicollis* (55/95), *Pohlia nutans* (42/94, 93/95), *Polygonum alpinum* (36/95), *Polygonum bistorta* (37/94, 111/95), *Polytrichastrum alpinum* (93/95), *Polytrichum piliferum* (37/95, 55/95), *Primula meyeri* (26/89:1, 21/89), *Pulsatilla albana* (53/95), *Ranunculus oreophilus* (37/94, 53/95), *Senecio vernalis* (36/95, 50/91:1), *Solidago virgaurea* (36/95), *Taraxacum stevenii* (23/89), *Taraxacum tenuisectum* (53/95), *Thamnolia vermicularis* (160/94), *Tortella tortuosa* (21/89), *Tortula ruralis* (14/89, 37/95), *Trifolium polyphyllum* (53/95), *Valeriana alpestris* (37/94:1), *Veronica monticola* (49/91).

Date (day month), size (sq.m) and location of the releves (all releves were made by V. Onipchenko, unless other author is noted). 26/89 - 14.08, 25, Kyrkol; 42/94 - 11.07, 100, Kyskhkadzher, permafrost polygonal relief; 93/95 - 25.07, 50, Khadzhibey; 14/89 - 13.08, 25, Kyrkol; 12/89 - 13.08, 25, Epchik; 11/89 - 13.08, 25, Epchik; 37/95 - 07.07, 50, Chuchkhur; 36/95 - 07.07, 50, Chuchkhur; 23/89 - 14.08, 25, Kyrkol; 19/89 - 14.08, 100, Kyrkol; 50/91 - 19.08, 9, Gonachkhir; 37/94 - 10.07, 25, Kyskhkadzher; 43/94 - 11.07, 50, Kyskhkadzher; 162/94 - 05.09, 25, Oriuchat; 95/95 - 25.07, 100, Khadzhibey; 134/90 - 16.08, 25, Khadzhibey; 49/91 - 19.08, 25, Gonachkhir; 160/94 - 05.09, 25, Oriuchat; 55/95 - 10.07, 25, Epchik; 57/95 - 10.07, 25, Epchik; 53/95 - 10.07, 25, Epchik; 51/95 - 19.08, 25, M.Khatipara.

Table 3.3.

Murbeckiellion huetii

Releve No.	0 0 0 0 0	1 1 1 1 0 0 0	0 1 0 0 0 1 0 1 1 1
	49 27 29 72 28	52 53 87 89 80 56 40	94 10 26 27 44 26 6 97 13 36
Year	89 88 88 93 88	90 90 94 94 95 91 93	94 94 95 94 95 95 95 94 94 90
Altitude (* 10)	2 2 2 2 2	2 2 2 2 2 2 2	2 2 2 1 2 2 2 1 2 2
	65 90 85 50 90	90 90 75 70 60 20 20	40 68 05 90 10 60 00 98 30 33
Steepness	25 35 35 25 35	20 15 7 2 20 20 2	2 30 10 2 2 2 10 1 2 2
Exposition	ne ne ne ne ne	ne ne w nw ne ne n	n ne ne w nw sw se nw ne se
Vascular plant cover	50 80 35 20 20	10 10 30 15 10 5 5	10 10 10 10 15 5 15 10 15 3
Bryophyte cover	10 20 10 5 5	10 2 10 5 10 2 -	1 + + 3 + 1 5 10 + -
Lichen cover	+ + + + +	2 + + + 3 + -	0 0 0 0 0 1 0 0 0 -
Stone cover	30 10 40 80 70	60 90 60 70 75 85 90	90 85 70 70 80 95 70 75 70 90
Bryophyte spec. number	8 4 7 15 7	4 3 1 3 5 4 0	4 6 7 3 4 5 5 2 1 0
Lichen spec.number	1 1 3 4 3	2 2 1 2 3 0 0	0 0 0 0 0 3 0 0 0 0
Vasc.pl.spec. number	29 25 40 34 22	18 9 21 21 33 20 28	33 18 37 25 47 18 23 27 57 22
<i>D.sp. Hyalopoo ponticae-Oxyrietum digynae</i>			
<i>Carex atrata</i>	+ + +	+ + +	r
<i>Gnaphalium supinum</i>	+ + +	+ r 1 2 +	
<i>Hyalopoa pontica</i>	1 1 1 + 1	1 1 +	+ +
<i>Primula meyeri</i>	+ + + + 1	+ + + + +	
<i>Cladonia pyxidata</i>	+ + + + +	+ + + + +	
<i>Carex pyrenaica</i>	+ + + + +	+ + + + +	
<i>Senecio taraxacifolius</i>	2 2 1	+ + + + +	
<i>D.sp. H.p.-O.d. ranunculetosum oreophili</i>			
<i>Ranunculus oreophilus</i>	+ 1 1 + +		+ + +
<i>Sanionia uncinata</i>	+ 1 1 1 1		
<i>Valeriana alpestris</i>	1 2 1 + +		+ +
<i>Carum caucasicum</i>	1 + 1 + +		r +
<i>Ranunculus caucasicus</i>	+ 1 1 +		
<i>D.sp. Scrophulario variegatae-Epilobietum dodonaei</i>			
<i>Betula litwinowii</i>			+ + + 1 +
<i>Poa nemoralis</i>			+ + + + + + + +
<i>Scrophularia variegata</i>		+ + + + +	+ + +
<i>Trifolium spadiceum</i>		+ + + + +	+ + + +
<i>Pohlia filum</i>			+ + + + 1
<i>D.sp. Murbeckiellion huetii</i>			
<i>Alopecurus ponticus</i>		+ 1 2 + + 1	+ + + 1
<i>Oxyria digyna</i>	1 1 1 + 2	+ 1 2 + + 1 1	1 + + 1 + 1 + +
<i>Phleum alpinum</i>	+ + + +		+ + + + + +
<i>D.sp. Androsacetalia alpinae</i>			
<i>Sibbaldia procumbens</i>	1 1 1 +		
<i>Cerastium cerastioides</i>	+ + + + 1	+ + + + +	1 + + + + +
<i>D.sp. Thlaspietea rotundifolii (reg.)</i>			
<i>Murbeckiella huetii</i>		+ + + + +	+ + + + + + +
<i>Poa badensis</i>	+ + + + +	+ + + + +	+ + + + + + +
<i>Saxifraga sibirica</i>	1 2 + 1	+ + + + +	+ + + + + + +
<i>Sedum tenellum</i>	+ + + + 1	+ + + + +	+ + + + + + +
<i>Veronica minuta</i>		+ + + + +	+ + + + + + +
<i>Calamagrostis epigeios</i>			1 1 + 1 1 + +
<i>Cerastium polymorphum</i>	+ + + + +	+ + + + +	+ + + + + + +
<i>Chamerion dodonaei</i>		1 + + 2 +	+ 1 1 2 1 2 1 1 1

Table 3.3. (continued)

Releve No.	0	0	0	0	0	1	1	1	1	0	0	0	0	1	0	0	0	1	0	1	1	1
Year	49	27	29	72	28	52	53	87	89	80	56	40	94	10	26	27	44	26	6	97	13	36
Year	89	88	88	93	88	90	90	94	94	95	91	93	94	94	95	94	95	95	95	94	94	90
<i>Polytrichum juniperinum</i>	1			+									+					+				
<i>Polytrichum piliferum</i>				+		1	+			+						+	+		+			
<i>Rumex alpestris</i>									+								+					+
<i>Salix caprea</i>											+					+			+		+	
<i>Salix kazbekensis</i>				+		1														+		
<i>Saxifraga kolenatiana</i>			+	1	+	+									+			1				
<i>Saxifraga moschata</i>				+						+			+					1				
<i>Silene saxatilis</i>										+								+	+			
<i>Silene vulgaris</i>																+	+				+	+
<i>Stereocaulon alpinum</i>	+			+		1	+		+	+								+				
<i>Taraxacum stevenii</i>	1		+							1										+		r
<i>Trisetum flavescens</i>				+									+								+	
<i>Veronica gentianoides</i>		+	+		+					+	r	r			+		+	+				

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

Acer trautvetteri (6/95), *Achillea millefolium* (113/94), *Aconitum nasutum* (27/88), *Aconitum orientale* (40/93:r), *Ajuga orientalis* (113/94), *Alchemilla caucasica* (40/93), *Alchemilla sericea* (28/88), *Alnus incana* (27/94), *Alopecurus glacialis* (49/89:2), *Alyssum murale* (113/94), *Alyssum repens* (94/94), *Anemone speciosa* (29/88), *Anthemis macroglossa* (27/94, 6/95), *Anthemis marshalliana* (26/95, 44/95), *Anthyllis vulneraria* (197/94, 113/94), *Arenaria lychnidea* (26/95, 44/95), *Arenaria rotundifolia* (40/93, 44/95), *Astragalus brachytropis* (94/94, 113/94), *Astragalus levieri* (126/95), *Astragalus oreades* (27/94), *Astragalus psoraloides* (113/94), *Athyrium distentifolium* (56/91:r, 26/95), *Barbilophozia barbata* (27/88, 80/95), *Barbilophozia lycopodioides* (72/93), *Bartramia ithyphylla* (27/88:1, 28/88), *Brachythecium velutinum* (27/88:1, 28/88), *Briza marcoviczii* (49/89), *Bryum argenteum* (94/94, 26/95), *Bryum caespiticium* (110/94, 26/95), *Bryum capillare* (49/89, 44/95), *Bryum imbricatum* (153/90, 80/95), *Bryum pallescens* (56/91), *Bryum schleicheri* (94/94), *Bryum weigelii* (26/95), *Bupleurum falcatum* (44/95, 113/94), *Calamagrostis arundinacea* (26/95), *Carduus adpressus* (27/94), *Carum meifolium* (197/94), *Centaurea cheiranthifolia* (113/94), *Cerastium holosteoides* (94/94), *Cerastium purpurascens* (49/89), *Chaerophyllum humile* (29/88, 28/88), *Cichorium intybus* (27/94), *Cirsium simplex* (44/95), *Crepis glabra* (40/93:r), *Cruciata laevipes* (40/93, 113/94), *Cystopteris fragilis* (72/93:r), *Dicranum congestum* (29/88:1, 72/93), *Dryopteris filix-mas* (72/93, 153/90:r), *Empetrum nigrum* (29/88, 72/93), *Epilobium algidum* (94/94, 136/90), *Eritrichium caucasicum* (29/88), *Eurhynchium pulchellum* (28/88), *Galium verum* (94/94, 113/94), *Gentiana septemfida* (80/95), *Geranium gymnocaulon* (44/95), *Geranium sylvaticum* (26/95, 113/94), *Gnaphalium sylvaticum* (44/95, 6/95), *Grimmia sessitana* (80/95), *Gymnocarpium dryopteris* (110/94), *Helictotrichon versicolor* (29/88), *Heracleum leskovii* (187/94), *Hesperis matronalis* (94/94), *Hieracium pilosella* (197/94), *Huperzia selago* (80/95), *Hygrohypnum luridum* (26/95), *Hylocomium splendens* (72/93), *Hypnum vaucheri* (126/95), *Kemulariella caucasica* (56/91:r), *Lamium tomentosum* (94/94), *Lapsana communis* (27/94, 44/95), *Lescurea saxicola* (72/93), *Ligusticum alatum* (136/90:r), *Lotus comiculatus* (197/94, 113/94), *Minuartia recurva* (80/95, 44/95), *Myricaria germanica* (197/94), *Myurella julacea* (29/88), *Onchophorus virens* (110/94), *Orthodicranum montanum* (72/93), *Pedicularis comosa* (126/95, 113/94), *Pedicularis wilhelmsiana* (72/93), *Peltigera rufescens* (72/93, 126/95), *Petasites albus* (26/95, 27/94), *Phleum phleoides* (94/94, 113/94), *Poa caucasica* (136/90), *Poa longifolia* (40/93:r), *Pogonatum umigerum* (110/94, 6/95), *Pohlia cruda* (29/88, 110/94), *Polygonum viviparum* (29/88, 113/94), *Polytrichum sexangulare* (189/94), *Ranunculus brachylobus* (187/94, 44/95), *Ranunculus subtilis* (26/95, 44/95), *Rhinanthus minor* (72/93), *Rhododendron caucasicum* (29/88, 72/93), *Rhynchocorys elephas* (6/95), *Rhytidadelphus triquetrus* (49/89, 28/88), *Rhytidium rugosum* (28/88), *Rubus idaeus* (113/94), *Rumex alpinus* (44/95), *Sagina saginoides* (28/88, 187/94), *Salix apoda* (72/93), *Salix purpurea* (113/94), *Salix pantosericea* (44/95), *Salix pentandroides* (113/94), *Scapania imigua* (29/88), *Scrophularia ruprechtii* (40/93), *Sedum hispanicum* (40/93), *Senecio vernalis* (110/94, 113/94), *Silene alba* (26/95), *Solidago virgaurea* (72/93, 44/95), *Solorina crocea* (80/95), *Stellaria anagalloides* (94/94), *Taraxacum confusum* (113/94), *Taraxacum officinale* aggr. (40/93), *Tayloria serrata* (49/89), *Thymus nummularius* (44/95), *Tortula ruralis* (72/93), *Trifolium ambiguum* (197/94:1, 113/94), *Trifolium polyphyllum* (44/95).

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

49/89 - 01.09, 25, M.Khatipara; 27/88 - 19.08, 9, Gigam; 29/88 - 19.08, 15, Gidam; 72/93 - 17.08, 25, Baduk; 28/88 - 19.08, 15, Gidam; 152/90 - 19.08, 9, Baduk; 153/90 - 19.08, 20, Baduk; 187/94 - 09.09, 100, Kichi-Murudzhu; 189/94 - 09.09, 100, Kichi-Murudzhu; 80/95 - 07.07, 25, Chuchkhur; 56/91 - 31.08, 25, Sev.Ptysh; 40/93 - 31.07, 25, Azgek; 94/94 - 20.07, 30, Goralykol; 110/94 - 22.07, 100, Goralykol; 26/95 - 05.07, 50, Amanauz; 27/94 - 09.07, 50, Dombai-Ulgen; 44/95 - 07.07, 100, Buul'gen; 126/95 - 29.08, 100, Nazalykol; 6/95 - 02.07, 32, Alibek; 197/94 - 11.09, 100, Klukhor; 113/94 - 22.07, 50, Goralykol; 136/90 - 17.08, 25, Khadzhibey

3.2.1.1. *Hyalopoo ponticae-Oxyrietum digynae*

Floristic features

Open communities of the alpine zone on unstable stony substrates belong to this association. The cold and moist environment is responsible for a significant floristic similarity between these and *Salicetea herbaceae*-communities. Floristic composition of the communities is complex. Three main groups of species can be distinguished: species of disturbed areas (*Matricaria caucasica*, *Oxyria digyna*, *Saxifraga sibirica*, *Chamerion dodonaei*, *Murbeckiella huetii*, *Minuartia imbricata*, *Cerastium polymorphum*), species of snowbed communities (*Sibbaldia procumbens*, *Gnaphalium supinum*, *Carex pyrenaica*, *Hyalopoa pontica*), and species of alpine grasslands (*Leontodon hispidus*, *Anthoxanthum odoratum*, *Phleum alpinum*). Mosses (*Racomitrium canescens*) and lichens (*Stereocaulon alpinum*) are well represented in several communities.

We separate two subassociations: ***H.p.-O.d. typicum*** (typus, or nomenclature type, No. 187/94) and ***H.p.-O.d. ranunculetosum oreophili*** (nom. type, or typus, No. 29/88) (Table 3.3). Communities of the second subassociation are typical of steep (25-35°) moist screes on the northeastern slopes. Diagnostic species of the subassociation are represented by *Ranunculus oreophilus*, *Sanionia uncinata*, *Valeriana alpestris*, *Ranunculus caucasicus*, *Carum caucasicum*.

Overall, we registered 101 vascular plant species, 31 bryophytes and 6 macrolichens in 12 relevés of this association. Mean numbers per relevé were 25, 5, and 2 species respectively.

Ecological features

The communities are common within the altitude range of 2200-2900 m (mean 2670 m). They were developed on slopes of northern (northeast, northwest) exposure and varying steepness (2-35°, mean 20°). Stone cover varies greatly (10-90%, mean 63%), and so does the percentage of plant cover (5-80%). Moss cover is about 5-10%. Soils are rather stable and rich due to some organic matter accumulation from the upper slopes and high water availability. Slow creeping of stones and mud-stream disturbance preclude development of closed communities and competitive exclusion of species by dominants. Therefore, these communities have the highest

production rate and moderate species richness among all the communities of *Thlaspietea rotundifolii*.

3.2.1.2. *Scrophulario variegatae-Epilobietum dodonaei*

Floristic features

This association includes flood plain pebble communities of the lower part of alpine, subalpine and upper part of forested zones. Diagnostic species are *Scrophularia variegata*, *Trifolium spadiceum*, *Pohlia filum*, *Betula litwinowii* (juveniles), and *Poa nemoralis* (Table 3.1). Species of *Murbeckiellion huetii* as well as regional combination of the class are well represented. *Chamerion dodonaei* and *Oxyria digyna* are very typical species with highest frequency.

Racomitrium canescens is the most common bryophyte. The role of lichens is negligible.

Due to frequent disturbances, floristic richness of the communities is high. We registered 125 vascular plant species, 19 bryophytes and 3 macrolichens in 10 relevés. Average values per relevé were 31, 4 and 0.3 species respectively.

Ecological features

The communities occupy stony banks along rivers and small streams. The steepness of slopes varies from 1° to 30°, but gentle slopes (about 2°) are more common. Aspect is not a significant factor for the communities, they can occupy either northern or southern slopes.

Compared with previous associations, these communities are typical at a lower elevation. Altitude range is narrow (1900-2680 m, mean 2230 m), while stony cover percentage is high (70-95%, mean 80%) and plant cover percentage is low (3-15%, mean 10%).

3.2.2. *Allosuro-Athyrium alpestris*

Communities on large stone-stabilized mounds belong to this alliance. ENGLISCH *et al.* (1993) noted *Cryptogramma crispa* as the only characteristic species of the order. We consider all communities within one association - *Dicranoweisio crispulae-Rubetum idaei* (Table 3.4.).

Floristic features

The association occupies a rather separate position among other syntaxa of the class due to specific ecological conditions. There are several "forest" species growing here (*Dryopteris filix-mas*, *Dicranum scoparium*, *Rubus idaeus*), which belong to the diagnostic set of the association (Table 3.4.). Floristic richness of the community is lowest among other associations of the class. We registered only 81 vascular plant species, 30 bryophytes and 12 macrolichens for 12 relevés. Mean species numbers per relevé were 17, 6, and 3 respectively. Floristic composition varies significantly between the communities due to their isolated position and the influence of surrounding closed vegetation.

The role of bryophytes and lichens is prominent in term of their species number. The ratio vascular plants / (bryophytes + lichens) is the lowest for the association (1.9).

Ecological features

The communities of the association were described from within the lower part of the alpine, subalpine and upper part of forest zones. The elevation ranges between 1970 and 2650 m (mean 2270 m). They occupy lower parts of the alluvial zone where the largest boulders are found (from 0.5 to 3-5 m in diameter). Few plants can survive in the small amount of fine soil between the stones. Plants are dispersed mainly by wind and animals. Plant cover percentage is low (1-15%, mean 7%), but stone cover is the greatest within the class (80-98%, mean 91%). Steepness varies considerably (5-30°, mean 17°). It seems that there is no preferable aspect for these communities, they occur on both southern and northern slopes.

Table 3.4.

Dicranoweisia crispulae-Rubetum idaei and *Silene compactae-Salicetum purpureae*

Releve No.	0	0	0	1	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0
	83	58	82	31	37	21	81	15	21	61	89	59	74	47	96	25	26	27	28	30	24
Year	95	95	95	95	95	95	95	95	95	95	95	95	93	95	94	93	93	93	93	93	95
Altitude (* 10)	2	1	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1
	20	97	15	65	25	45	10	50	38	25	30	00	40	13	98	36	36	36	36	75	70
Steepness	15	20	10	20	20	10	5	15	30	30	20	10	-	-	1	-	2	-	-	3	2
Exposition	ne	ne	s	w	ne	s	s	s	nw	s	se	s	-	-	nw	-	sw	-	-	sw	n
Vascular plant cover	5	3	15	7	1	10	10	5	3	15	5	5	20	5	15	20	5	30	10	15	5
Bryophyte cover	5	3	1	2	1	3	+	5	5	+	1	2	3	10	70	7	1	40	-	2	5
Lichen cover	3	+	1	2	+	+	+	0	2	+	+	+	-	0	1	-	-	3	-	-	0
Stone cover	95	95	85	90	98	90	90	90	90	80	95	90	80	80	25	80	90	30	20	60	70
Bryophyte spec. number	8	7	5	3	10	2	5	3	14	3	7	6	6	3	2	1	2	3	0	3	5
Lichen spec. number	3	1	2	1	6	1	4	0	6	0	3	3	0	0	1	0	0	4	0	0	0
Vasc.pl.spec. number	18	11	13	27	14	7	24	13	19	22	17	20	31	31	27	35	39	34	22	34	28
D.sp. <i>Dicranoweisia crispulae-Rubetum idaei</i> , <i>Allosuro-Athyrium alpestris</i>																					
<i>Dryopteris filix-mas</i>				+	+	1	1	1	+	1	1	+									
<i>Rubus idaeus</i>		+	+	+	1	+	1	1	1	1	1	+			+			+			
<i>Calamagrostis arundinacea</i>			+	1		+	+	1	+	+	1	+									
<i>Dicranoweisia crispula</i>		+	+		+	+			1	+	+	+									
<i>Dicranum scoparium</i>			+			+			+			+									
<i>Lescurea saxicola</i>			+		1	+	1		1	1											
<i>Juniperus communis</i>					+					+	1	1									
<i>Deschampsia flexuosa</i>		+			+					+	+	+									
<i>Hypnum cupressiforme</i>		1						+		+											
<i>Sempervivum caucasicum</i>					+			+				+									
<i>Polygonum alpinum</i>					+				+		+	+									
<i>Cladonia mitis</i>						+		+		+		+									
<i>Cryptogramma crispa</i>		1	1	1																	
D.sp. <i>Silene compactae-Salicetum purpureae</i>																					
<i>Salix purpurea</i>													+	+		+	+	1	+	+	+
<i>Rumex acetosella</i>													+	1		+	+	1	+	+	
<i>Silene compacta</i>															+	+	+	1	r	1	1
<i>Taraxacum officinale aggr.</i>													+			+	+	1	+	+	+
<i>Trifolium repens</i>													+			1	+	+	+	+	+
<i>Agrostis stolonifera</i>														+	+	+		+	+	1	
<i>Anthyllis vulneraria</i>																1	1	+		1	+
<i>Cicerbita racemosa</i>																+	+		+	+	+
<i>Lotus corniculatus</i>																1			+	+	+
<i>Alnus incana</i>													1	1			+				+
<i>Cerastium holosteoides</i>													+			+	+	+			
<i>Gnaphalium sylvaticum</i>													+			+	+				+
<i>Pinus silvestris</i>								+					r	+						r	1
<i>Poa palustris</i>																	+	+	+	+	
D.sp. <i>Salicion incanae</i> , <i>Epilobietalia fleischeri</i>																					
<i>Erigeron podolicus</i>													r		+	+	+	1	+		
<i>Myricaria germanica</i>													1	+		+	+	1	1		
D.sp. <i>Thlaspietea rotundifolii</i> (reg.)																					
<i>Chamerion dodonaei</i>													2	+	1	+	+	+	1	1	1
<i>Racomitrium canescens</i>					+			+		+		+	1	2	4	2	+	2		1	1
<i>Calamagrostis epigeios</i>												+	+	+	1			+	1	+	+

Table 3.4. (continued)

Releve No.	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0				
Year	83	58	82	31	37	21	81	15	21	61	89	59	74	47	96	25	26	27	28	30	24	
Year	95	95	95	95	95	95	95	95	95	95	95	95	93	95	94	93	93	93	93	93	95	
<i>Vicia caucasica</i>													+		1	+		+			1	+
<i>Cerastium polymorphum</i>													+		+		+				+	+
<i>Matricaria caucasica</i>													+			r	+				+	+
<i>Veronica minuta</i>													r									+
<i>Poa badensis</i>									+		+											r
<i>Murbeckiella huetii</i>	+	r	+		+		+	+	+	+	+	+										+
<i>Saxifraga sibirica</i>	+	r			+					+												
<i>Sedum tenellum</i>	+	+		+			+	+	+	+	+	+										+
Other species																						
<i>Achillea millefolium</i>															+	+		+				
<i>Agrostis vinealis</i>	+		+		+			1					+									
<i>Alchemilla vulgaris</i>	1		+	+						+	+		r			+	+	+			+	
<i>Astragalus sp.</i>															+		r			+		+
<i>Barbilophozia barbata</i>					+				+	+		+										+
<i>Betula litwinowii</i>					+								+		+	r	+					+
<i>Bupleurum falcatum</i>									+													+
<i>Campanula collina</i>				+		+									+							
<i>Carex sempervirens</i>	+				+										+							
<i>Cetraria islandica</i>	+		+		+		+			1								r				
<i>Chamerion angustifolium</i>			1		+		+	+		1	+											+
<i>Cladonia pyxidata</i>	+	+	+	+	+	+	+	+		+	+	+										+
<i>Dactylis glomerata</i>																+	r					r
<i>Deschampsia caespitosa</i>													+		+							+
<i>Euphrasia ossica</i>				+											+		+					+
<i>Festuca ovina</i>		+		+	+		+		+	+	+	+										+
<i>Festuca varia</i>				1						+	+											+
<i>Geranium sylvaticum</i>			+					+				+										+
<i>Hieracium cymosum aggr.</i>																+	1	+				
<i>Hieracium macrolepis</i>			+	+	+		+			+	+	+										+
<i>Leontodon hispidus</i>				+											+			1				
<i>Picea orientalis</i>													+		r	+						
<i>Plantago major</i>													r		+	+						
<i>Poa annua</i>															+	r			+			
<i>Poa nemoralis</i>	+	+	1		+	+	+		1	+	+	+	+			+					+	+
<i>Pogonatum umigerum</i>					+				+													+
<i>Polytrichum juniperinum</i>		+	+		+		+															
<i>Polytrichum piliferum</i>	+	+	+		+		+		+	+	+	+	+	+	1			1			+	+
<i>Rumex alpestris</i>								+			+							1	+			
<i>Salix caprea</i>																	+				+	+
<i>Sanionia uncinata</i>	+	1	+		+																	
<i>Saxifraga moschata</i>					+					+	+											+
<i>Scrophularia variegata</i>														+	+							+
<i>Silene saxatilis</i>							+		+			+		+								+
<i>Silene vulgaris</i>				+											+							+
<i>Solidago virgaurea</i>				+		+							r									+
<i>Stereocaulon alpinum</i>					+		+								1			+				
<i>Taraxacum stevenii</i>	+									+					+					+		
<i>Veronica gentianoides</i>							+		+						+							r
<i>Viola tricolor</i>																+	+	+				

For Table 3.4.

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

Abies nordmanniana (25/93:r, 24/95), *Acer trautvetteri* (24/95), *Agropyron caninum* (30/93:r), *Agropyron repens* (47/95, 26/93), *Alchemilla caucasica* (196/94), *Alnus glutinosa* (26/93), *Amelanchier rotundifolia* (27/93:r), *Anthemis macroglossa* (30/93), *Anthemis marshalliana* (81/95), *Anthoxanthum odoratum* (131/95, 30/93), *Anthriscus velutina* (89/95), *Arenaria lychnidea* (59/95), *Arenaria rotundifolia* (27/93), *Artemisia campestris* (47/95), *Asperula* sp. (47/95), *Asplenium septentrionale* (59/95), *Aster alpinus* (61/95), *Athyrium distentifolium* (24/94), *Atrichum undulatum* (24/95), *Barbilophozia hatcheri* (58/95:1), *Betula pendula* (30/93), *Brachythecium albicans* (89/95, 74/93), *Brachythecium salebrosum* (121/95), *Brachythecium velutinum* (89/95), *Bromus tectorum* (47/95), *Bryum argenteum* (74/93, 47/95), *Bryum caespiticium* (74/93, 24/95), *Bryum subelegans* (121/95), *Bunias orientalis* (47/95), *Campanula tridentata* (81/95, 121/95), *Carex atrata* (131/95), *Carex umbrosa* (74/93), *Cerastium arvense* (47/95), *Ceratodon purpureus* (59/95, 27/93:1), *Cerintho minor* (24/95), *Chaerophyllum aureum* (21/95:r), *Chenopodium album* (47/95, 27/93:r), *Chenopodium botrys* (47/95), *Cirsium arvense* (47/95, 25/93), *Cirsium chlorocomos* (196/94), *Cirsium obvallatum* (25/93), *Cirsium vulgare* (27/93), *Cladonia chlorophaea* (27/91:1), *Cladonia coniocraea* (89/95), *Cladonia fimbriata* (89/95), *Cladonia furcata* (137/95), *Cladonia gracilis* (83/95:1, 121/95), *Cladonia squamosa* (59/95), *Cruciata laevipes* (15/95, 47/95), *Desmatodon latifolius* (89/95), *Dicranum spadiceum* (83/95, 82/95), *Dryopteris carthusiana* (83/95, 137/95), *Echium vulgare* (47/95), *Empetrum nigrum* (83/95, 121/95), *Festuca brunnescens* (131/95), *Festuca djimilensis* (15/95:1), *Festuca* sp. (27/93), *Fragaria vesca* (26/93, 27/93), *Galium verum* (61/95, 47/95), *Geranium gymnocaulon* (131/95), *Geranium renardii* (81/95), *Gnaphalium supinum* (131/95), *Grimmia ovalis* (121/95), *Grimmia sessitana* (83/95), *Gymnocarpium dryopteris* (131/95, 15/95), *Gypsophila elegans* (47/95), *Heracleum asperum* (81/95), *Heracleum freynianum* (131/95, 30/93), *Heterocladium dimorphum* (89/95), *Hieracium pilosella* (196/94, 30/93:r), *Hieracium prenanthoides* (83/95), *Hyalopoa pontica* (121/95), *Hylocomiastrum pyrenaicum* (83/95), *Hypericum perforatum* (25/93, 26/93:r), *Hypnum revolutum* (121/95:1), *Juncus* sp. (26/93:r), *Kemulariella caucasica* (15/95), *Lamium tomentosum* (74/93:r), *Lapsana communis* (25/93, 24/95), *Lescureaea incurvata* (21/95:1), *Lescureaea mutabilis* (83/95:1), *Leucanthemum vulgare* (30/93), *Linaria genistifolia* (47/95), *Lloydia serotina* (83/95), *Luzula pallescens* (25/93), *Luzula spicata* (131/95), *Melica nutans* (27/93), *Minuartia circassica* (81/95, 61/95), *Minuartia recurva* (81/95), *Mnium spinosum* (137/95), *Myosotis alpestris* (131/95, 24/95), *Oxyria digyna* (74/93), *Paraleucobryum enerve* (137/95, 121/95), *Peltigera canina* (121/95), *Peltigera rufescens* (137/95), *Peltigera* sp. (27/93), *Petasites albus* (24/95), *Phleum pratense* (26/93), *Pleurozium schreberi* (121/95:1, 59/95), *Poa annua* (25/93, 26/93:r), *Poa compressa* (28/93), *Poa longifolia* (131/95), *Poa pratensis* (47/95), *Pohlia nutans* (74/93), *Pohlia wahlenbergii* (30/93), *Polygonum aviculare* (26/93), *Polygonum convolvulus* (27/93), *Polypodium vulgare* (59/95), *Polytrichastrum alpinum* (26/93), *Prunella vulgaris* (25/93:1, 26/93), *Pyrethrum corymbosum* (74/93:r), *Racomitrium sudeticum* (131/95, 15/95:1), *Radula complanata* (89/95), *Ranunculus oreophilus* (121/95, 61/95), *Ranunculus subtilis* (28/93:r), *Rhinanthus minor* (121/95), *Sagina saginoides* (74/93:r, 26/93), *Salix apoda* (24/95), *Salix pentandroides* (25/93, 26/93), *Salvia verticillata* (47/95), *Saxifraga kolenatiana* (81/95), *Scorzonera cana* (131/95), *Scrophularia ruprechtii* (74/93, 30/93), *Sedum album* (196/94), *Sedum hispanicum* (74/93, 27/93), *Sedum spurium* (89/95, 59/95), *Sedum telephium* (58/95), *Seseli alpinum* (83/95, 131/95), *Seseli petraeum* (47/95), *Sorbus aucuparia* (58/95, 196/94), *Thamnolia vermicularis* (121/95), *Thesium alpinum* (24/95), *Thymus nummularius* (81/95, 61/95), *Tragopogon reticulatus* (196/94), *Trifolium ambiguum* (196/94), *Trifolium arvense* (27/93:r, 28/93), *Trifolium spadiceum* (30/93), *Trifolium pratense* (47/95), *Vaccinium myrtillus* (83/95, 121/95), *Vaccinium vitis-idaea* (121/95), *Valeriana cardamines* (59/95), *Valeriana officinalis* (25/93), *Veratrum album* (131/95), *Veronica chamaedrys* (26/93), *Veronica officinalis* (27/93), *Veronica peduncularis* (27/93), *Vicia cracca* (47/95), *Vicia tetrasperma* (26/93:r), *Viola canina* (83/95, 82/95).

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

83/95 - 17.07, 25, Khuty (A.Egorov); 58/95 - 12.07, 100, Baduk; 82/95 - 17.07, 25, Khuty (A.Egorov); 131/95 - 30.08, 100, Ullu-Murudzhu; 137/95 - 30.08, 225, Ullu-Murudzhu; 21/95 - 04.07, 30, Alibek; 81/95 - 18.07, 100, Khuty (A.Egorov); 15/95 - 03.07, 100, Alibek; 121/95 - 29.08, 100, Nazalykol; 61/95 - 12.07, 100, Baduk; 89/95 - 24.07, 100, Khadzhibey; 59/95 - 12.07, 100, Baduk; 74/93 - 13.07, 25, Baduk; 47/95 - 08.07, 100, Teberda flood plain; 196/94 - 11.09, 100, Klukhor; 25/93 - 09.07, 25, Teberda flood plain (N.Illarionova); 26/93 - 10.07, 25, Teberda flood plain (D.Sukhova); 27/93 - 10.07, 25, Teberda flood plain (E.Kuraeva), 28/93 - 10.07, 25, Teberda flood plain (N.Drenova); 30/93 - 24.07, 20, Gonachkhir; 24/95 - 05.07, 50 Amanauz.

3.3. *Epilobietalia fleischeri*, *Salicion incanae*

Mountain communities on flood plain pebble beds form this order and the alliance. Several diagnostic species are shared with the Alps, namely *Myricaria germanica*, *Chamerion dodonaei*, *Erigeron podolicus* (*E. acris* group). Abundant regional species allow us to distinguish a new association - *Silene compactae*-*Salicetum purpureae* (Table 3.4.).

Floristic features

The diagnostic set of the association includes species of varying ecology, with all, nevertheless, adapted to the disturbed regime of alluvial deposits. *Salix purpurea*, *Rumex acetosella*, *Silene compacta*, *Trifolium repens*, *Agrostis stolonifera*, *Calamagrostis epigeios*, *Racomitrium canescens* are the most frequent ones. Due to the lower elevation position of this community, it has many forest and meadow species well represented within it.

Floristic richness is high, we registered 124 vascular plant species, 11 bryophytes and 4 macrolichens for 9 releves. Mean values per releve were 31, 3 and 1 species respectively. The ratio vascular plants / (bryophytes + lichens) is the highest among the associations of the class (8.3). In spite of few bryophyte species present, the moss cover is considerable (mean 17%) and is often denser than the cover of vascular plants.

Ecological features

The association is the last along the elevation gradient of pebble communities in the Teberda reserve. The altitude for this association ranges between 1980 and 1130 m with the mean value of 1490 m. Communities of the association are especially well represented on the flood plain of the Teberda river. They occupy very gentle slopes (0-3°) of various aspects. Stones cover about 60% (20-90%) of the area. Vascular plant cover is low (5-30%), while cover of bryophytes (mainly *Racomitrium canescens*) varies from 0 to 70%. A significant area of bare soil (fine silt deposits) indicates frequent disturbances due to periodical flooding caused by spring snowmelt and summer rains. Most of the plants here are well adapted to disturbances. Modern human influence has little effect on the communities.