6. Cold water springs -***Montio-Cardaminetea***

Prodromus
Montio-Cardaminetea BRAUN-BLANQUET & TÜXEN ex KLIKA & HADAC 1944 em ZECHMEISTER 1993
Montio-Cardaminetalia PAWLOWSKI 1928 em ZECHMEISTER 1993
Cardamino-Montion BRAUN-BLANQUET 1926 em ZECHMEISTER 1993
Cerastio cerastioidis-Cardaminetum uliginosi ass.nov.

Cerastio cerastioidis-Cardaminetum uliginosi

Floristic features

These moss-rich communities have a well-represented set of diagnostic species of higher syntaxa (*Montio-Cardaminetea, Montio-Cardaminetalia, Cardamino-Montion*, see ZECHMEISTER 1993). *Philonotis fontana, Palustriella commutata, Bryum pseudotriquetrum, B. schleicheri* and *Brachythecium rivulare* are the most common (Table 6.1.).
Regional specificity of this community type depends on the vascular plants. All diagnostic species of the association (*Cardamine uliginosa* s.l., *Epilobium algidum, Cerastium cerastioides, Hyalopoa pontica,* and *Saxifraga sibirica*) are typical species of cold and moist habitats.
Typus, or nomenclature type, is the releve No. 96/95.
KOROTKOV (1990) described a similar association (*Primulo auriculatae-Cardaminetum raphanifoliae* Korotkov 1990) from the Adylsu valley (the Central Caucasus). He placed the association within the union *Cratoneurion commutati*. The communities of this alliance are typical of water with high (basic) pH (ELLENBERG 1988, POTT 1995). Our association significantly differs in both ecological (acidic water) and floristic features (presence of *Cerastium cerastioides, Hyalopoa pontica, Bryum schleicheri*, high frequency of *Philonotis fontana* and low frequency of *Primula auriculata*) from Korotkov's syntaxon.
We registered 33 vascular plant species, 25 bryophytes and 1 macrolichen (*Dermatocarpon* sp.) in the eleven releves of our association. The mean floristic richness per releve is very low (8 vascular plants and 5 bryophytes). The ratio vascular plants/(bryophytes + lichens) is the lowest among all the

Table 6.1.

Montio-Cardaminetea

Releve No.	185	54	79	20	211	96	167	135	131	56	121	
Year	94	94	94	88	94	95	94	95	94	94	94	
Altitude (* 10)	285	283	240	260	275	290	268	285	295	283	245	
Steepness	10	2	5	2	10	7	5	5	2	2	5	
Exposition	w	nw	n	ne	e	sw	nnw	ne	wnw	nw	ne	
Vascular plant cover	25	10	60	30	20	10	20	20	50	10	40	
Bryophyte cover	40	60	50	40	15	60	70	70	60	70	40	
Lichen cover	0	0	0	0	+	0	0	0	0	0	0	
Stone cover	20	0	20	10	60	25	15	5	5	5	+	
D.sp. *Cerastio cerastioidis-Cardaminetum uliginosi*												
Cardamine uliginosa	1	2	3	3	2	1	2		3	1	3	V
Cerastium cerastioides	+	+	+	1	+	1	+	+	1	1	+	V
Epilobium algidum	1	+	+		1	+	1	2				IV
Hyalopoa pontica	1		1	1	+	1		1	1		+	IV
Saxifraga sibirica	+		+			+		1		+		III
D.sp. *Montio-Cardaminetea, Montio-Cardaminetalia, Cardamino-Montion*												
Philonotis fontana	3	3	1		2	2	1	+	1	3		V
Bryum pseudotriquetrum		1		2			1	+	2	+	+	IV
Palustriella commutata	1	1			1	1	2		2	3	+	IV
Bryum schleicheri			1			3	3	4			2	III
Brachythecium rivulare	1		2	2	+			+			+	III
Cratoneuron filicinum			1	2								I
Scapania uliginosa	1											I
Warnstorfia exannulata		1										I
Other species												
Alopecurus ponticus			1		+			1				II
Carex nigra		+								+	+	II
Cirsium simplex	+	+	+			+						II
Deschampsia caespitosa		+		1			1		+	1	+	III
Primula auriculata	2				+		+					II
Taraxacum stevevii						+		+	+			II

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

Agrostis stolonifera (185/94:1, 211/94), Agrostis vinealis (167/94, 121/94), Alchemilla vulgaris (79/94:2, 167/94), Bryum weigelii (79/94), Carex atrata (185/94, 56/94), Carex canescens (121/94), Carex oligantha (131/94), Cephalozia sp. (185/94), Cerastium polymorphum (121/94), Chyloscyphus sp. (79/94:1), Climacium dendroides (121/94), Ctenidium molluscum (135/95), Dermatocarpon sp. (211/94), Drepanocladus aduncus (131/94:3), Erigeron caucasicus (79/94), Fontinalis antipyretica (121/94:1), Gagea fistulosa (96/95), Geranium gymnocaulon (79/94), Gnaphalium supinum (135/95), Hypnum lindbergii (79/94), Juncus triglumis (131/94), Luzula multiflora (185/94), Matricaria caucasica (211/94), Meesia longiseta (56/94), Onchophorus virens (96/95:1, 131/94), Pellia sp. (185/94, 79/94:1), Poa alpina (54/94, 56/94), Poa longifolia (54/94), Pohlia ludwigii (185/94), Pseudoleskea incurvata (79/94:2, 211/94), Racomitrium macounii (185/94), Ranunculus brachylobus (211/94), Ranunculus caucasicus (54/94, 79/94), Rhizomnium punctatum (135/94), Rumex alpestris (79/94), Rumex alpinus (79/94:1, 211/94), Salix kazbekensis (56/94), Scapania sp. (135/95), Tortula ruralis (211/94), Veronica beccabunga (54/94:1).

Date (day.month), size (sq.m) and location of the releves (all releves were made by V.Onipchenko, unless other author is noted).

185/94 - 09.09, 12, Kichi-Murudzhu; 54/94 - 12.07, 8, Kyshkadzher; 79/94 - 16.07, 9, Bol.Khatipara; 20/88 - 17.08, 9, Gidam; 211/94 - 12.09, 10, Klukhor; 96/95 - 25.07, 15, Khadzhybey; 167/94 - 06.09, 16, Nazalykol; 135/95 - 30.08, 10, Ullu-Murudzhu; 131/94 - 30.07, 20, Mukhu; 56/94 - 12.07, 10, Kyshkadzher; 121/94 - 29.07, 15, Mukhu.

associations of the reserve (1.3). The role of bryophytes is especially significant in terms of their cover, which ranges between 15 and 70% (mean 52%). Vascular plant cover is considerably lower (10-60%, mean 27%).

Ecological features

The communities develop along cold (snowmelt) streams and springs in the alpine zone within the elevation range of 2400-2950 m (mean 2750 m). They occupy both boulders, and the spaces in between. Moss cover and roots of plants are submerged in running water during all or most of the vegetative season. Long narrow stripes of the communities are typical on rather gentle (2-10°, mean 5°) slopes of different aspect. The existence of a more or less permanent source of water (snowbeds, glaciers) in the upper part of the slopes is a necessary condition for the development of these communities.