

**Zeitschrift:** Veröffentlichungen des Geobotanischen Institutes der Eidg. Tech. Hochschule, Stiftung Rübel, in Zürich

**Herausgeber:** Geobotanisches Institut, Stiftung Rübel (Zürich)

**Band:** 130 (2002)

**Artikel:** Alpine vegetation of the Teberda Reserve, the northwestern Caucasus = Die Alpine Vegetation des Teberda Reservates, Nordwest-Kaukasus

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**Kapitel:** 6: Cold water springs : "Monito-Cardaminetea"

**DOI:** <https://doi.org/10.5169/seals-308994>

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## 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 relevés 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	+	
<i>D.sp. Cerastio cerastioidis-Cardaminetum uliginosa</i>												
<i>Cardamine uliginosa</i>	1	2	3	3	2	1	2		3	1	3	V
<i>Cerastium cerastioides</i>	+	+	+	1	+	1	+	+	1	1	+	V
<i>Epilobium algidum</i>	1	+	+		1	+	1	2				IV
<i>Hyalopoa pontica</i>	1		1	1	+	1		1	1		+	IV
<i>Saxifraga sibirica</i>	+		+			+		1		+		III
<i>D.sp. Montio-Cardaminetea, Montio-Cardaminetalia, Cardamino-Montion</i>												
<i>Philonotis fontana</i>	3	3	1		2	2	1	+	1	3		V
<i>Bryum pseudotriquetrum</i>		1		2			1	+	2	+	+	IV
<i>Palustriella commutata</i>	1	1			1	1	2		2	3	+	IV
<i>Bryum schleicheri</i>			1			3	3	4			2	III
<i>Brachythecium rivulare</i>	1		2	2	+			+			+	III
<i>Cratoneuron filicinum</i>			1	2								I
<i>Scapania uliginosa</i>	1											I
<i>Wamstorfia exannulata</i>		1										I
Other species												
<i>Alopecurus ponticus</i>			1		+			1				II
<i>Carex nigra</i>		+								+	+	II
<i>Cirsium simplex</i>	+	+	+			+						II
<i>Deschampsia caespitosa</i>		+		1			1		+	1	+	III
<i>Primula auriculata</i>	2				+		+					II
<i>Taraxacum stevevii</i>						+		+	+			II

Sporadic species (number of releve in parenthesis, abundance are shown 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 weigeli* (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.