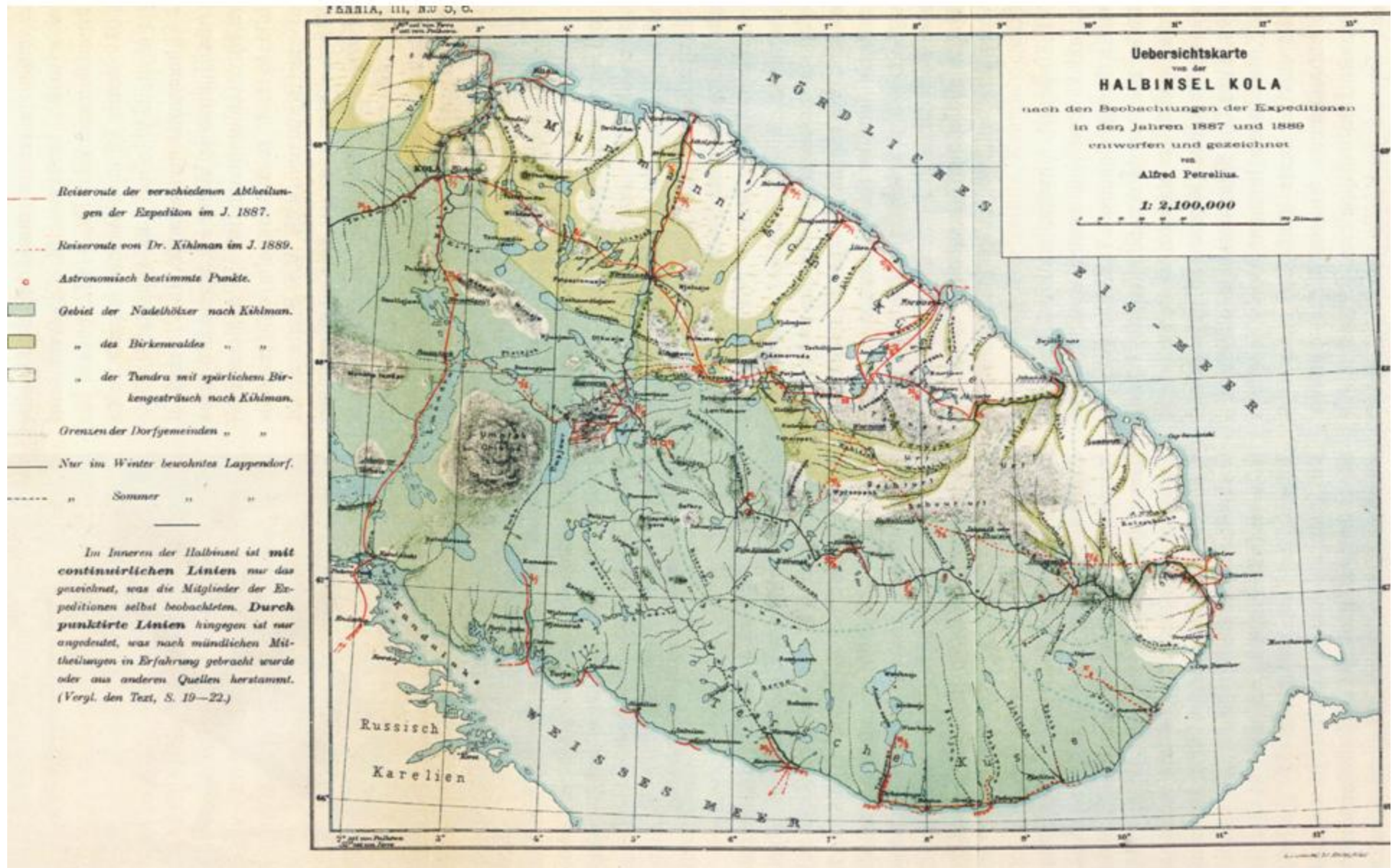


Tundra zone of Kola Peninsula on the syntaxonomical 'conjunction' in the European Arctic

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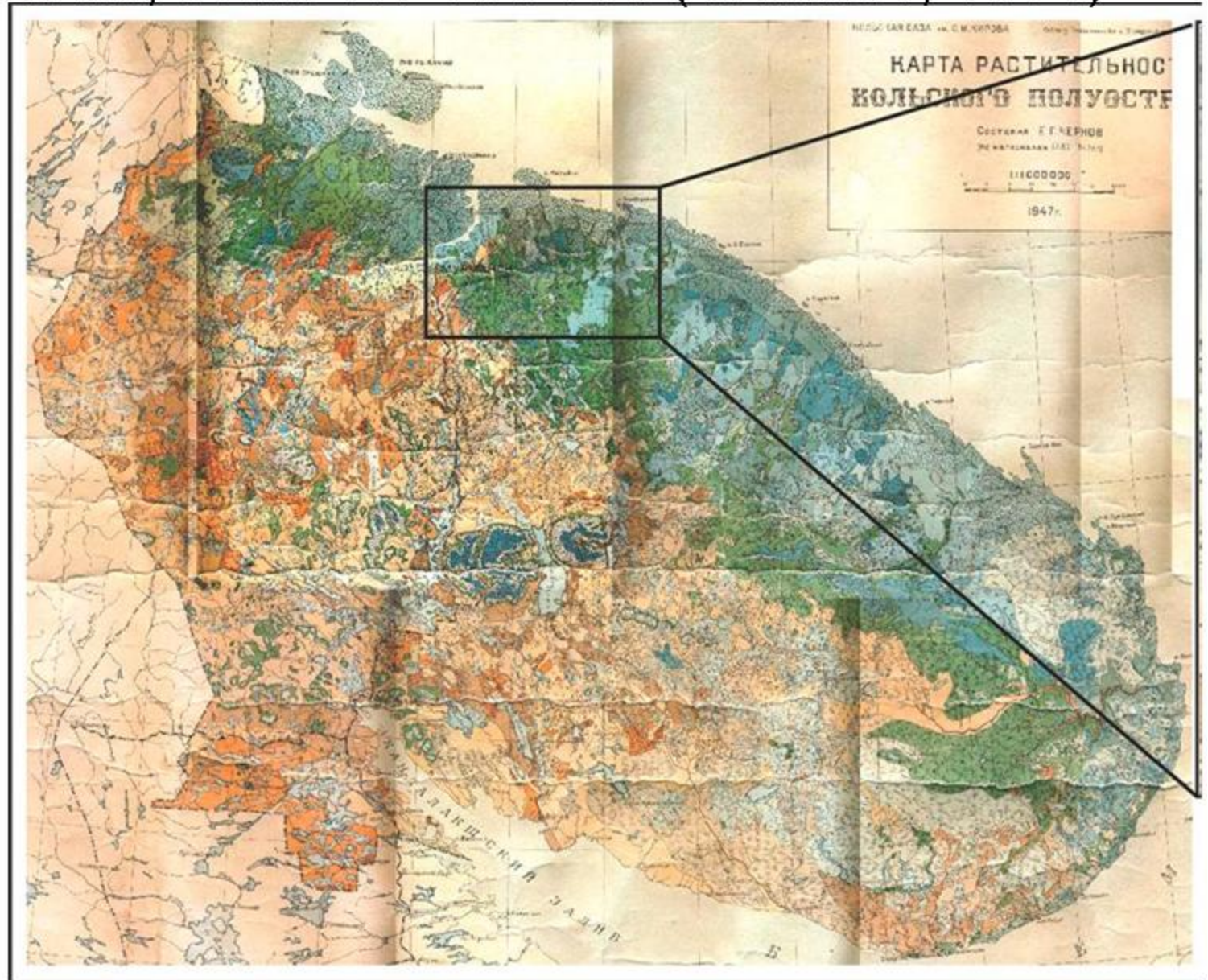
Survey map 1:2 100 000 of the Kola Peninsula after A. Petrelius expeditions (1887, 1889)



The most accurate is the unpublished Map of Vegetation of Kola Peninsula, scale 1:1 000 000 (Chernov, 1954)

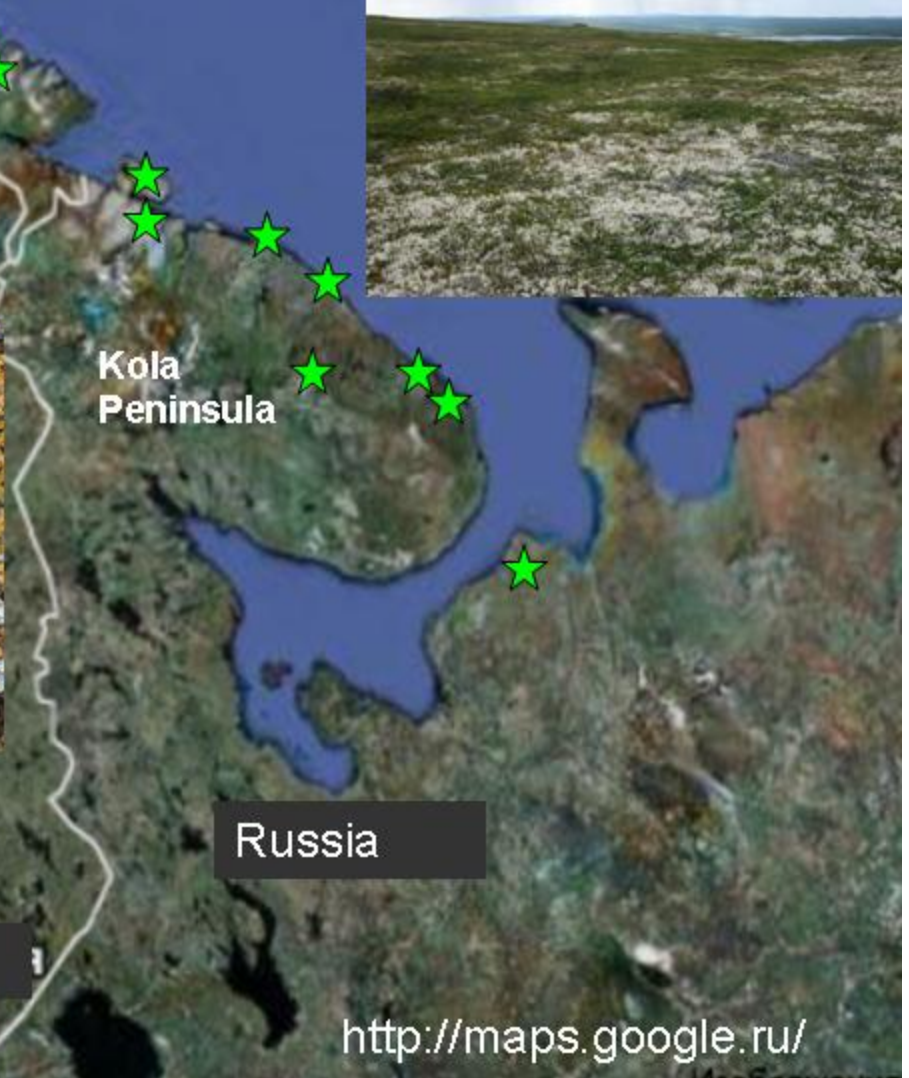
Legend for tundra zone

- Lichen tundra,
- Dwarf shrubs-lichens tundra,
- Shrub tundra,
- Shrub-lichen tundra,
- Lapland aapa-fens,
- Sedges and Sphagna fens,
- Dwarf shrubs and Sphagna palsa bogs



Dwarf shrubs, mosses and lichens dominated zonal plant communities of Fennoscandian tundra (Alliances *Loiseleurio-Diapension* and *Phyllodoco-Vaccinion myrtilli*)

- ★ Points of descriptions of dwarf shrubs (*Empetrum hermaphroditum*, *Betula nana*, *Vaccinium myrtillus*, *Calluna vulgaris*), mosses and lichens – dominated tundra vegetation (103 relevès)



Norway

Sweden

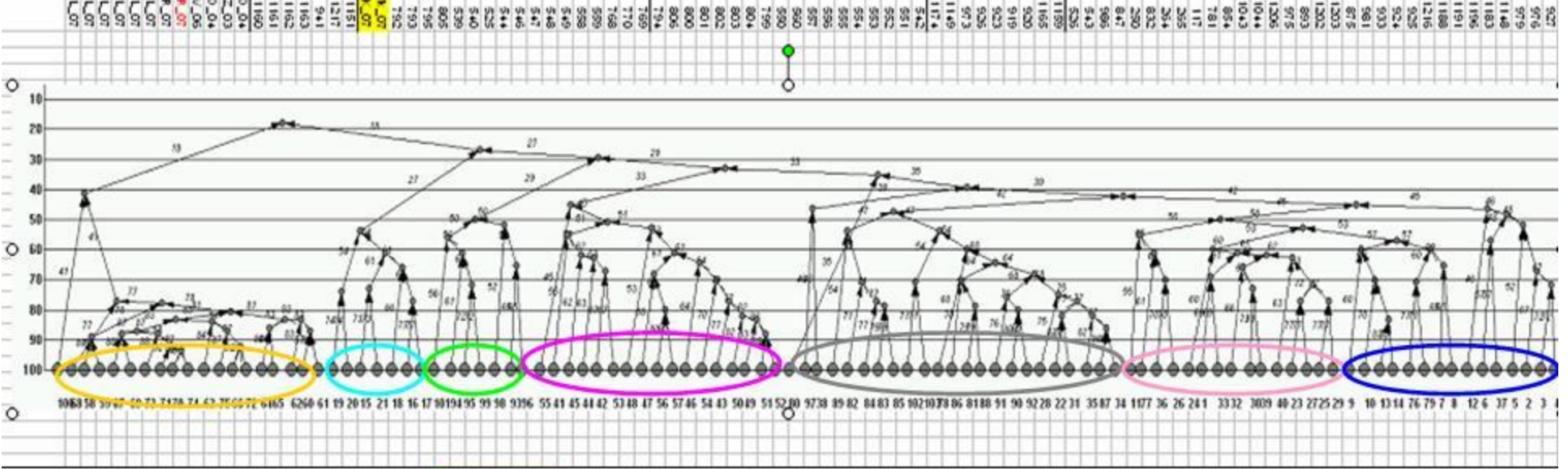
Finland

Russia

<http://maps.google.ru/>

Empetrum hermaphroditum, *Betula nana*, *Vaccinium myrtillus*, *V. uliginosum*

dominated zonal tundra communities in the North of Fennoscandia, GRAPHS clustering of 103 relevés (average distance as a measure of similarity, Sørensen-Chekanovsky coefficient)



Empetro-Betuletum
nanae typicum and
Arctoo-Empetretum
hermaphroditi

Empetro-Betuletum
nanae Dicranetosum
elongati

Empetro-Betuletum
nanae Pleurozietosum
and Phyllodoco-
Vaccinietum myrtilli

Calluna vulgaris -
Racomitrium lanuginosum-

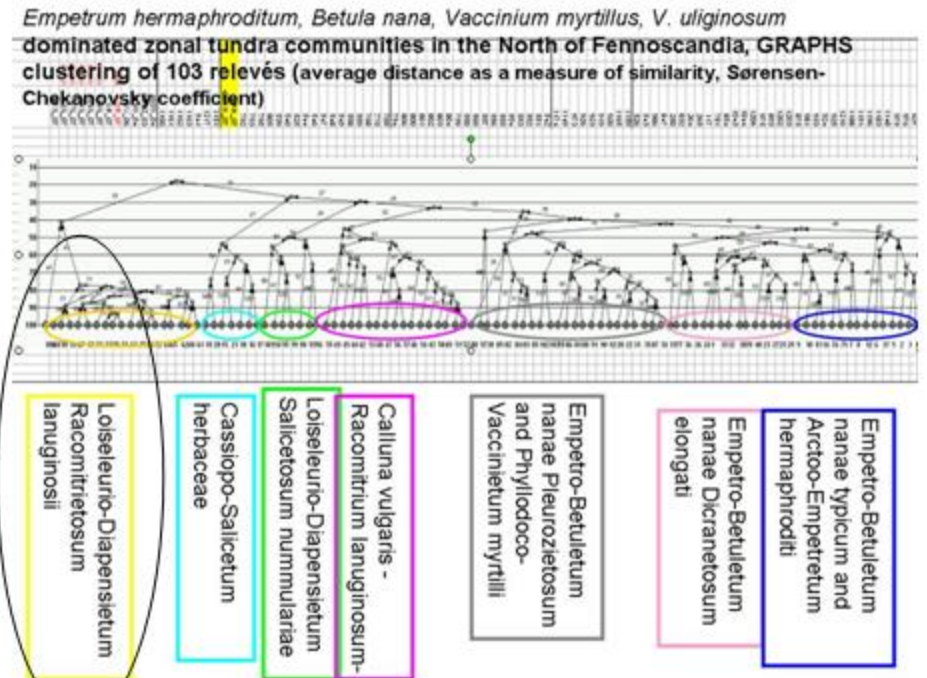
Loiseleurio-Diapensietum
Salicetosum nummulariae

Cassiope-Salicetum
herbaceae

Loiseleurio-Diapensietum
Racomitrietosum
lanuginosii

subass. *Loiseleurio-Diapsietum racomitriosum lanuginosi*

Diagnostic taxa (DT) *Empetrum hermaphroditum* (D - Dominant), *Loiseleuria procumbens*, *Racomitrium lanuginosum* (D), *Sphaerophorus fragilis*, *Ochrolechia frigida*

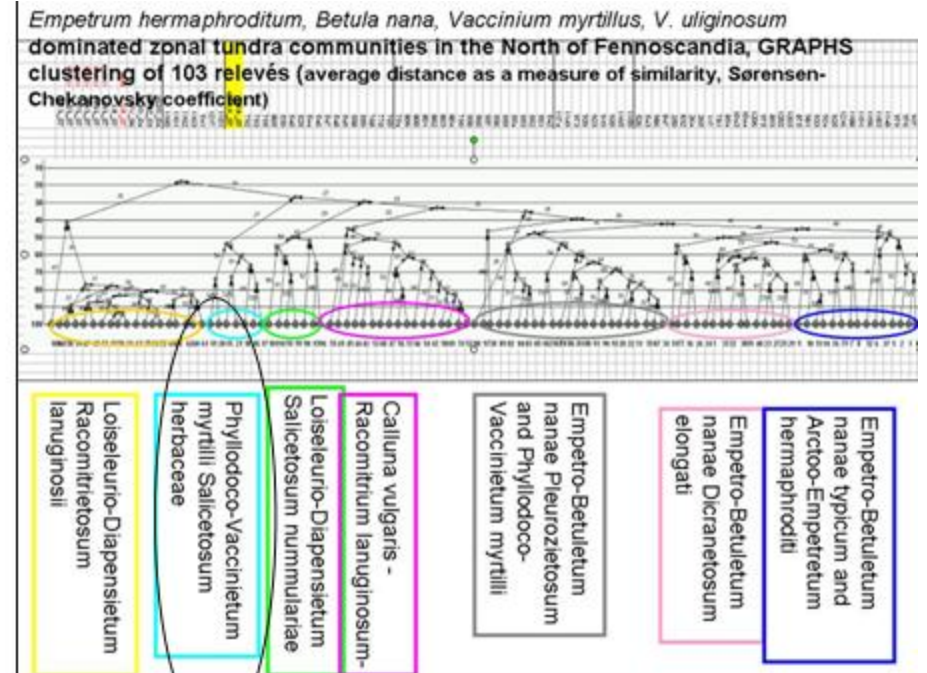


On the north-west of Fennoscandia



subass. *Phyllodoco-
Vaccinietum myrtilli
salicetosum herbaceae*

DT *Salix herbacea*, *Kiaeria starkei*,
Vaccinium myrtillus (D), *Avenella
flexuosa*, *Barbilophozia lycopodioides*,
Orthocaulis kunzeanus

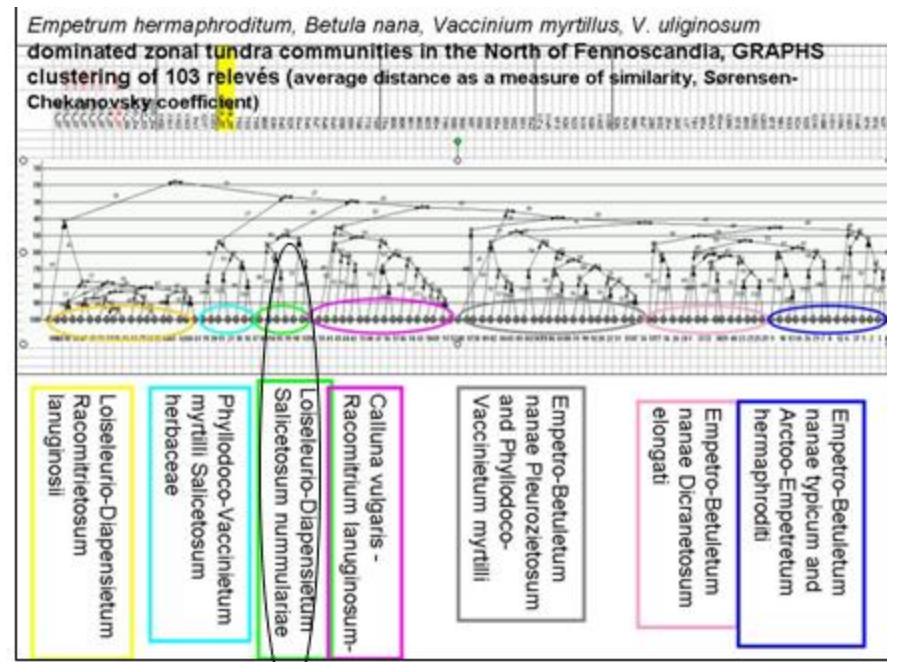


On the whole Fennoscandia, but
more common in the western part



Subass. *Loiseleurio-Diapsietum salicetosum nummulariaea*

DT *Salix nummularia*, *Flavocetraria nivalis*, *Bryocaulon divergens*, *Sphaerophorus fragilis*, *Ochrolechia frigida*

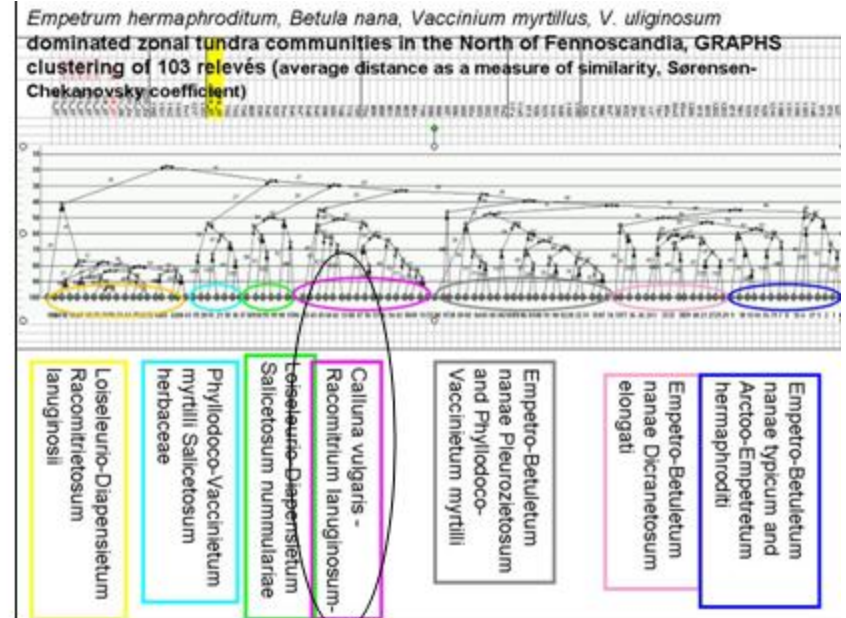


In the eastern part of Fennoscandia



Community type *Calluna vulgaris* – *Racomitrium lanuginosum*

DT *Calluna vulgaris* (D), *Hylocomium splendens*, *Racomitrium lanuginosum*

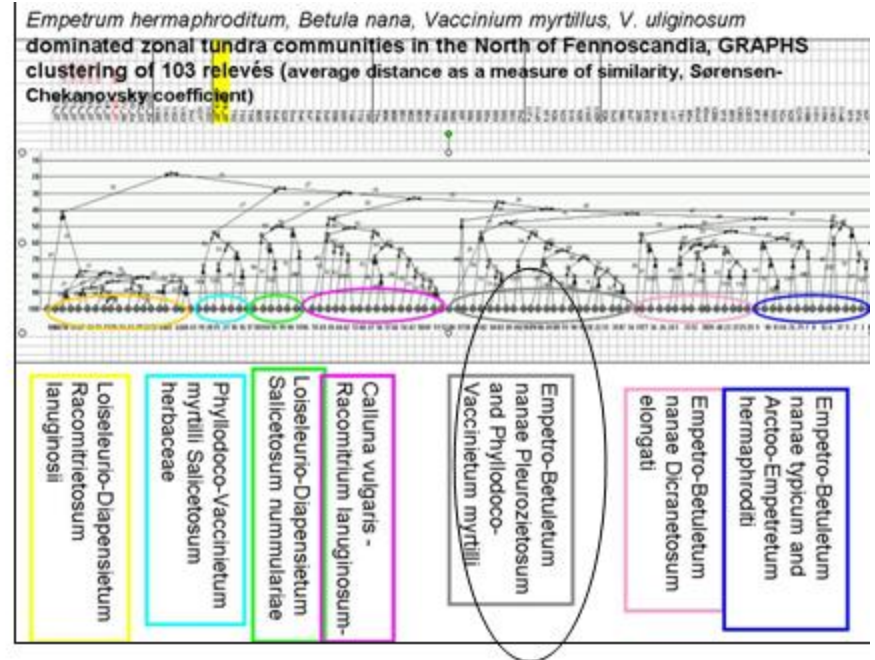


More common in the western part



subass. *Empetro-Betuletum nanae pleurozietosum* and ass. *Arctoo-Empetretum hermaphroditum*

DT of the group: *Empetrum hermaphroditum* (D), *Arctous alpina*, *Chamaepericlymenum suecicum*, *Hylocomium splendens*, *Ptilidium ciliare*

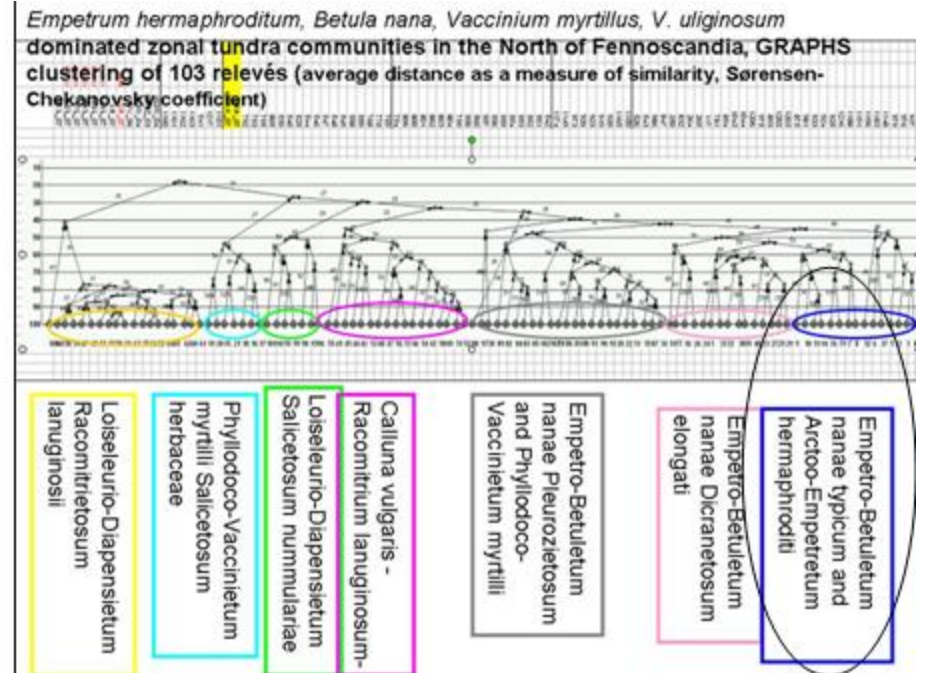


Throughout the all tundra zone



subass. *Empetro-Betuletum nanae typicum*

DT: *Empetrum hermaphroditum* (D), *Ptilidium ciliare*, *Cladonia arbuscula*, *C. stellaris*, *C. uncialis*



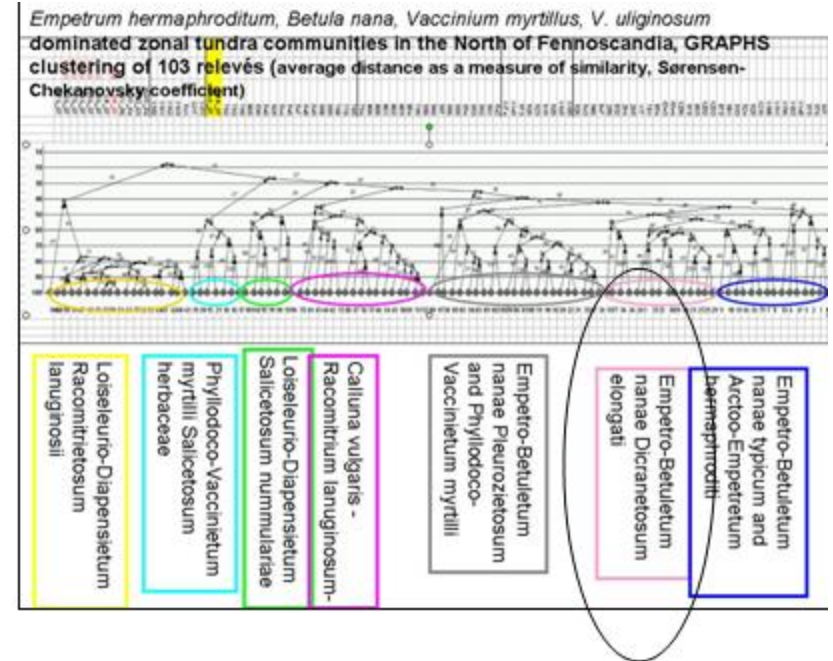
Throughout the all tundra zone



Transitional to tundra bogs are communities of subass.

Empetro-Betuletum nanae dicranetosum elongati

DT: *Empetrum hermaphroditum* (D), *Rubus chamaemorus*, *Dicranum elongatum*



Throughout the all tundra zone



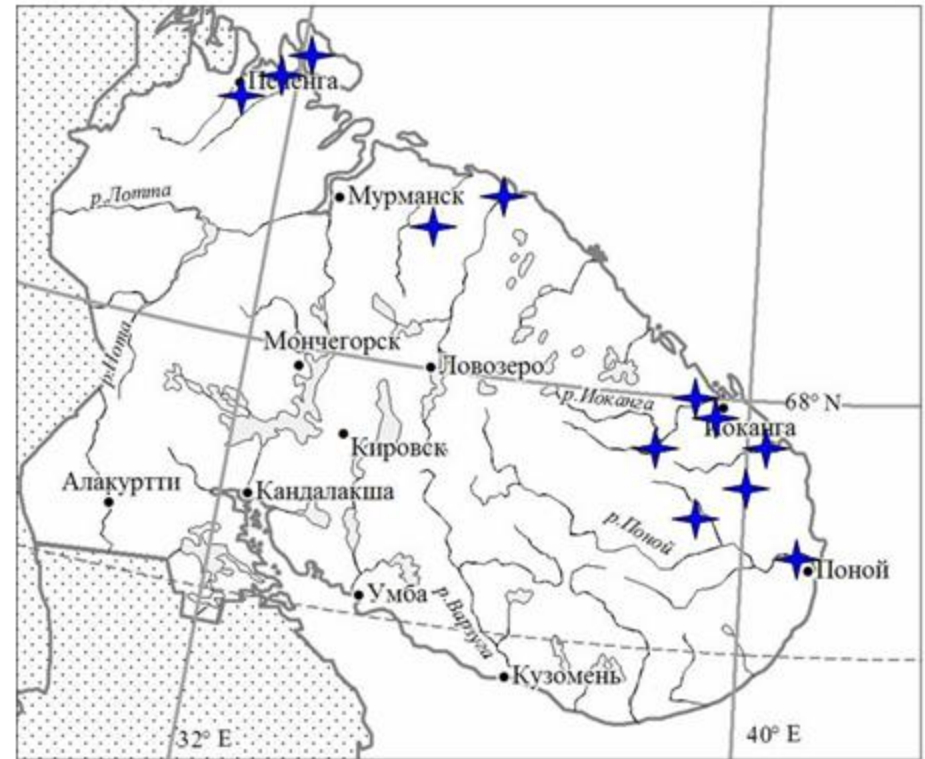
There is the longitudinal gradient in syntaxa distribution in tundra zone from the north-west to the south-east of Fennoscandia.

For All. *Loiseleurio-Diapension* this gradient is detected on the subassociations level. This alliance separates sub-arctic tundra from boreal forest in Fennoscandia.

Associations of All. *Phyllodoco-Vaccinion myrtilli* keep the constancy of diagnostic composition on longitudinal gradient and demonstrates common traits between tundra and boreal zones.

Communities of All. *Cassiopo-Salicion herbaceae* (and transitional to this from All. *Phyllodoco-Vaccinion myrtilli*) are well-represented throughout all tundra zone of Fennoscandia. They are common and extensive in the western part and become rare and scanty eastwards.

Bogs and fens of
tundra zone of Kola
Peninsula
(Alliances *Oxycocco-
Empetrion
hermaphroditi*,
Caricion rotundatae
and *Sphagno
warnstorffii-
Tomenthypnion*)



Areas of descriptions of bogs
and fens in tundra zone of Kola
Peninsula (54 relevès)

Ombrotrophy,
oligotrophy

All. **Oxycocco
(microcarpi)-
Empetrion
hermaphroditi**

DT: *Rubus chamaemorus*,
Sphagnum fuscum,
Eriophorum vaginatum,
Andromeda polifolia,
Orthocaulis kunzeanus,
Myrica anomala,
Oxycoccus microcarpus,
Ledum palustre,
Dicranum bergeri

Minerotrophy,
meso-eu-trophy

All. **Caricion
rotundatae**

DT: *Carex stans*,
Carex rariflora,
Carex rotundata,
Baeothryon cespitosum,
Eriophorum polystachion,
Eriophorum russeolum,
Sphagnum lindbergii,
Sphagnum compactum,
Warnstorfia exannulata,
Warnstorfia sarmentosa,
*Straminergon
stramineum*

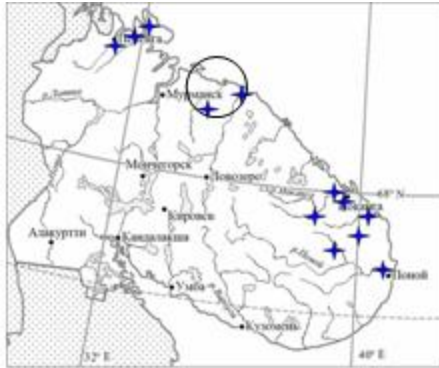
All. **Sphagno
warnstorffii-
Tomenthypnion**

DT: *Salix myrsinites*,
Potentilla erecta,
Molinia caerulea, *Carex
dioica*, *Comarum
palustre*, *Saussurea
alpina*, *Pinguicula
alpina*, *Pinguicula
vulgaris*, *Bartsia alpina*,
*Selaginella
selaginoides*,
Equisetum palustre,
Aulacomnium palustre,
Sphagnum warnstorffii,
Lophozia longiflora

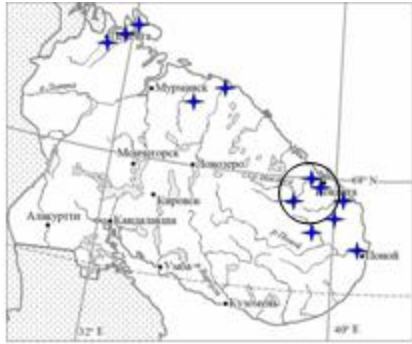


On the Fisher (Rybatchiy) Peninsula there were described flat-palsa complex bogs and fens

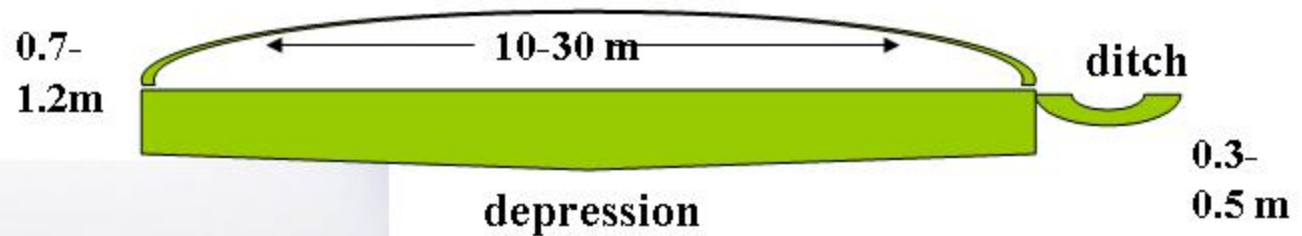


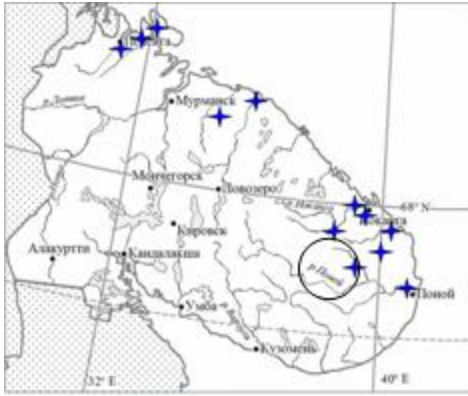


In the Teriberka valley
there were found
pounikkos-and-flarks
complexes



On the east of Kola Peninsula there were described flat palsa-and-flarks complexes





On the southern border of tundra zone there occur palsa-and-flark-lawn complexes



Picture of Petrova Olga

All. *Oxycocco-Empetrion hermaphroditi* shows essential stability of DT composition on both latitudinal and longitudinal gradients of ombrotrophic and oligotrophic bogs in Fennoscandia.

The type '*Empetro-Dicranetum elongatae*, *Racomitrium lanuginosum* noda' is specific for oligotrophic bog in the north-western part of Fennoscandia (Vorren, 1979)

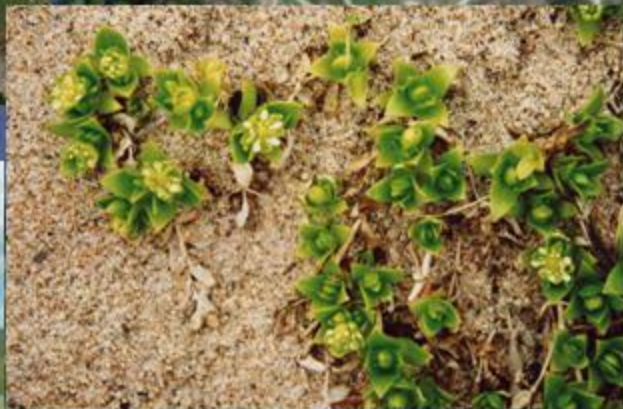


All. *Caricion rotundatae* is supposed to separate tundra zone from boreal forest. Meso-, eutrophic fens of boreal zone are characterized by All. *Caricion lasiocarpae* and *Rhynchosporion albae*

★ Areas of descriptions of seashore vegetation (81 relevè)

Seashore marshes - All. *Puccinellion phryganodis* and All. *Caricion glareosae*

Sandy and shingle beaches - All. *Honckenyo–Elymion arenariae*



Sweden



Finland

Хельсинки

Kola Peninsula





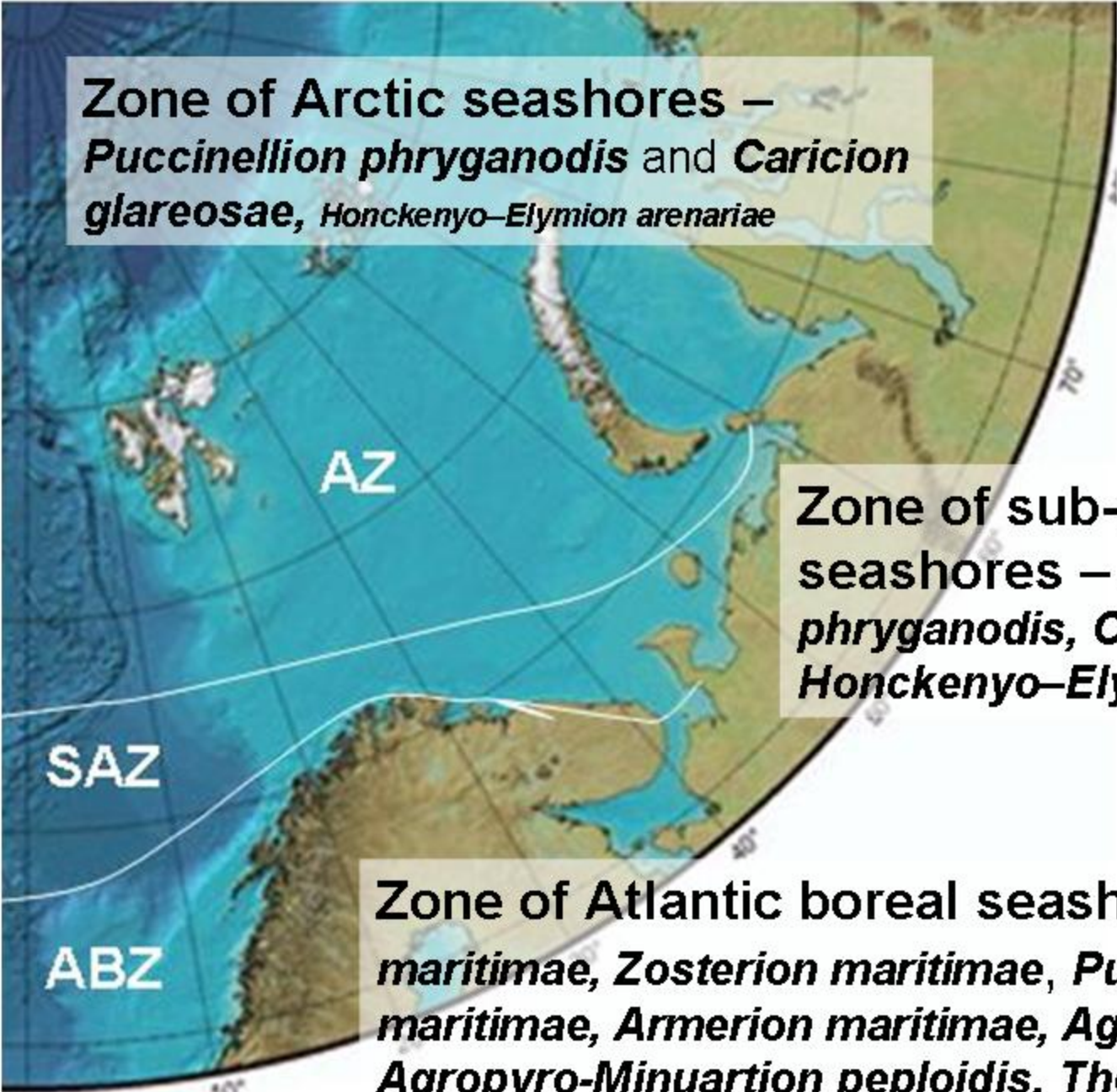
Stellaria humifusa
Rottb.



Arctanthemum hulthenii (A. et D. Löve Tzvel.



Leymus arenarius (L.)
Hochst.

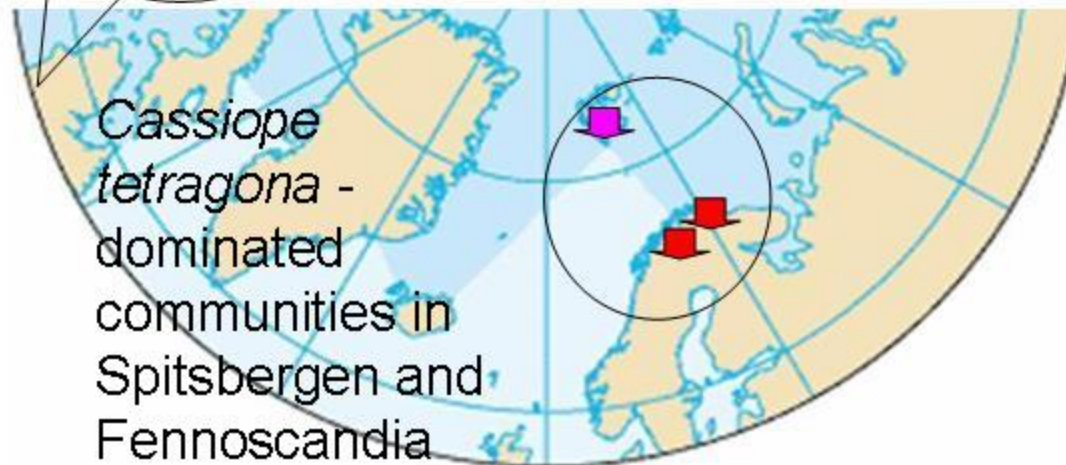
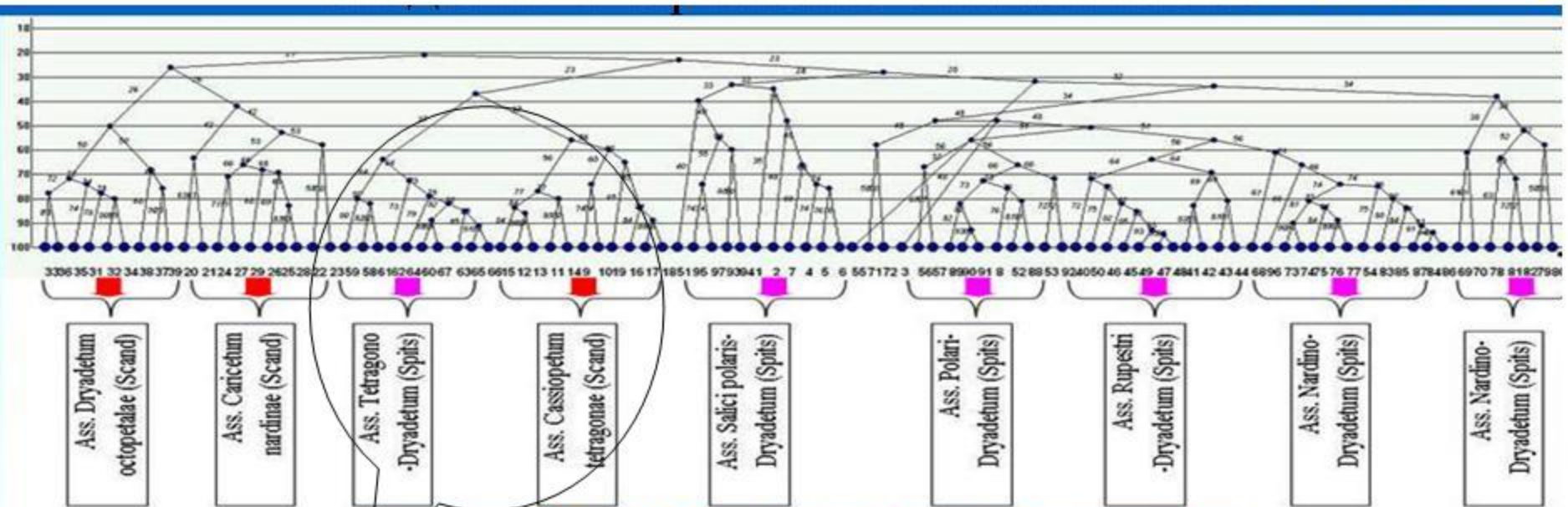


Zone of Arctic seashores –
Puccinellion phryganodis and *Caricion glareosae*, *Honckenyo–Elymion arenariae*

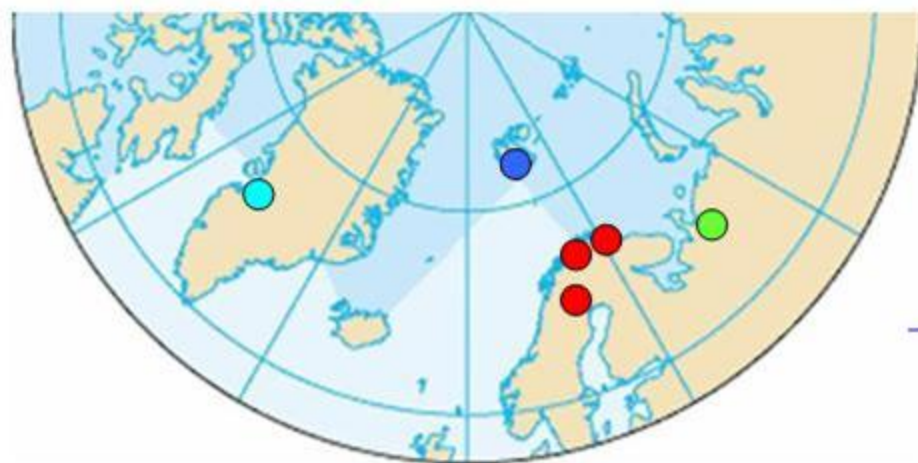
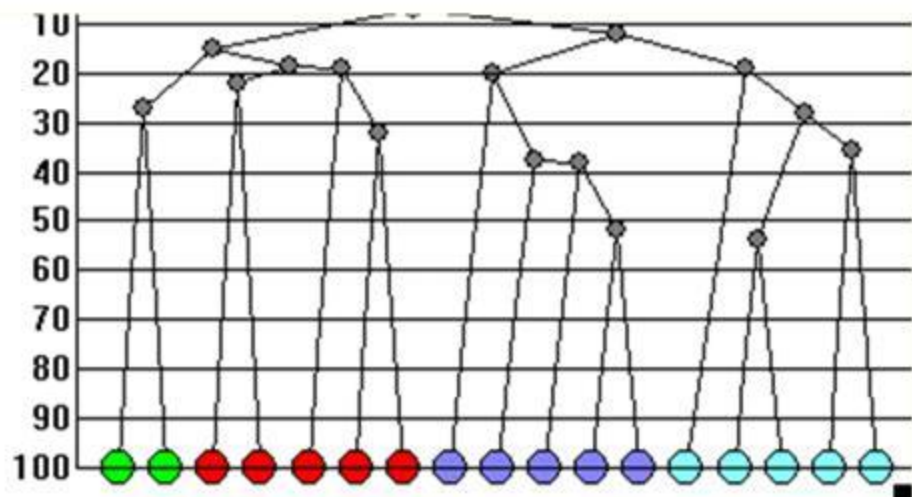
Zone of sub-Arctic seashores –
Puccinellion phryganodis, *Caricion glareosae*,
Honckenyo–Elymion arenariae.

Zone of Atlantic boreal seashores –
Ruppion maritima, *Zosterion maritima*, *Puccinellion maritima*, *Armerion maritima*, *Agropyro-Rumicion*,
Agropyro-Minuartion peploidis, *Thero-Salicornion*,
Scirpion maritima.

***Dryas octopetala*, *Carex hepburnii* and *Cassiope tetragona*-dominated communities on Kola Peninsula and Spitsbergen and results of GRAPHS clusterization (123 relevés)**

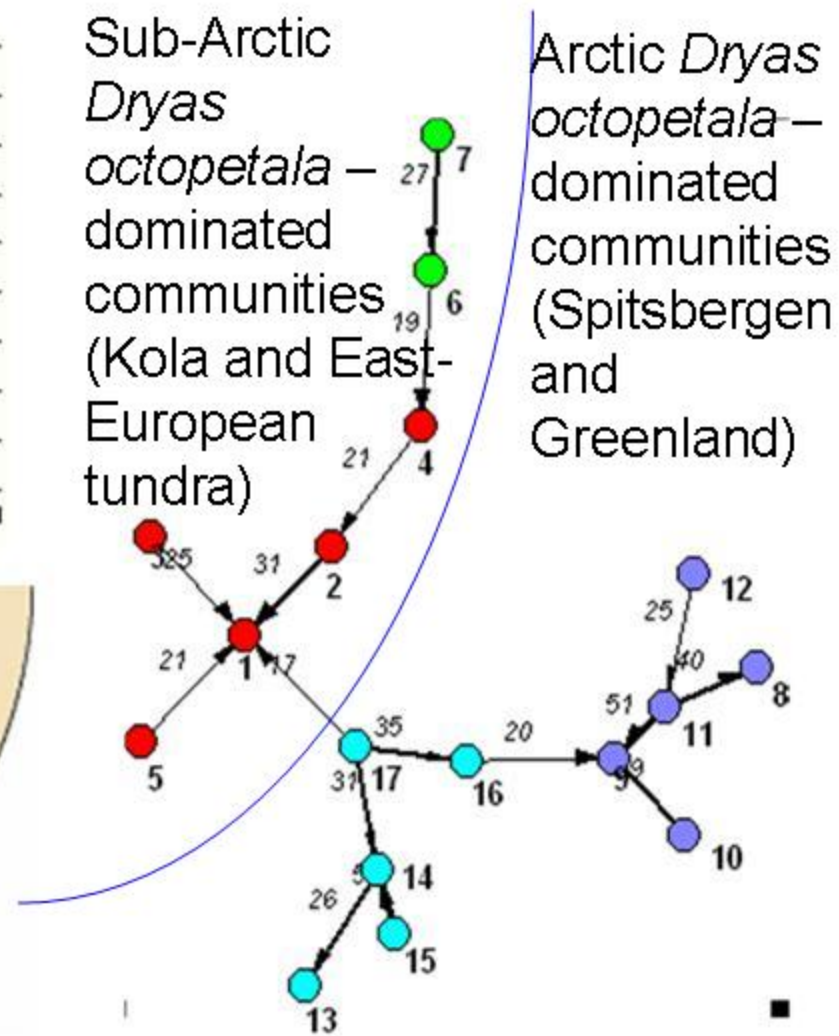


Dendrogram and dendrite of similarity of associations of *Dryas octopetala*, *Carex hepburnii*, *Cassiope tetragona*-dominated plant communities, after GRAPHS clusterization



Sub-Arctic
Dryas octopetala –
dominated
communities
(Kola and East-
European
tundra)

Arctic *Dryas octopetala* –
dominated
communities
(Spitsbergen
and
Greenland)



- Syntaxonomical databases, numerical techniques of their treatment and Braun-Blanquet approach to their classification are of great importance to discover regional geographical structure of Arctic vegetation.
- Not only zonal vegetation differentiation, but also traits of azonal vegetation (mires, seashore communities etc.) provide good basis for both zonal and regional Arctic and sub-Arctic differentiation.