SVENSKA BOTANISKA FÖRENINGENS

styrelse och redaktionskommitté år 1956.

Styrelse:

E. MELIN, ordförande; R. FLORIN, v. ordförande; G. HARLING, sekreterare; S. AHLNER, redaktör och ansvarig utgivare av tidskriften; C.-A. TORÉN, skattmästare; I. HOLMGREN, E. HULTÉN, T. LAGERBERG, C. MALMSTRÖM, J. A. NANNFELDT, M. G. STÅLFELT, H. WEIMARCK.

Redaktionskommitté:

G. E. DU RIETZ, E. HULTÉN, T. LAGERBERG, C. MALMSTRÖM, J. A. NANNFELDT, M. G. STÅLFELT.

SVENSK BOTANISK TIDSKRIFT utkommer med fyra häften årligen.

Prenumerationsavgiften (för personer, som ej tillhöra Svenska Botaniska Föreningen) är 25 kronor. Svenska och utländska bokhandlare kunna direkt hos föreningen erhålla tidskriften till samma pris.

Medlemsavgiften, för vilken även tidskriften erhålls, är 20 kronor för medlemmar, bosatta i Sverige, Danmark, Finland, Island och Norge, och kan insättas på föreningens postgirokonto 2986 (giroblankett åtföljer häfte nr 1 för året) eller översändas på annat sätt. Har så ej skett före utgivandet av häfte nr 2, utsändes detta mot postförskott, varvid porto debiteras. Medlemmar erhålla i mån av tillgång tidigare årgångar av tidskriften till ett pris av 16 kronor per årgång.

Generalregister över de första 40 årgångarna finnas nu tillgängliga.

SVENSK BOTANISK TIDSKRIFT, edited by Svenska Botaniska Föreningen (The Swedish Botanical Society), is issued quarterly.

An annual fee of 25 Sw. Kr., which includes the journal, applies to members outside Sweden, Denmark, Finland, Iceland and Norway. The journal is available to booksellers for the same amount. Back volumes are available to members at 16 Sw. Kr. according to supply.

A general index, in two parts, to Volumes 1—40 is now available.

Föreningens adress är Svenska Botaniska Föreningen, Stockholm 50.
THE CERASTIUM ALPINUM COMPLEX.
A CASE OF WORLD-WIDE INTROGRESSIVE HYBRIDIZATION.
BY
ERIC HULTÉN.

Usually *Cerastium alpinum* is considered to have a circumpolar distribution. This is the case, for instance, in works as frequently referred to as *Ascherson & Graebner* 1919 and *Hegi* 1912, and even in such modern works as *Moss* 1920 it is given for Asia east to Japan, Arizona and California. During my work on the floras of Kamtchatka, Alaska and Yukon I realized that no plant that could be called *C. alpinum* occurred there, and in my Flora of Alaska and Yukon (*Hultén* 1944) I tried to state the area of *C. alpinum*, which is lacking on the Pacific side of the globe, but occurs both in Europe and America on the Atlantic side.

In order to compile a map of the total area of *C. alpinum* I resolved to look closer into the matter. It at once became clear that *C. alpinum* is a member of a confused complex and that in spite of careful treatment by *Murbeck* and others no clear picture has been given of these complicated conditions up to the present time.

The complex consists of a number of very different species which must not be confused with each other, and which occur profusely in areas characteristic for each of them, plants which every taxonomist would regard as highly distinct species. These very characteristic species are, however, united by a series of intermediate forms which are extremely difficult to classify on the basis of morphological characteristics and which have given rise to the present complicated situation.

The conditions within the group are thus somewhat the same as within the genus *Salix*, where such different species as *S. herbacea*
and *S. lapponum* regarded by every taxonomist as being different species are united by a series of intermediate forms.

In the genus *Salix* these intermediates are generally recognized as hybrids. To me it seems most natural that the intermediates within the *Cerastium alpinum* group should be regarded in the same way, but the question may be left open until a cytological investigation can produce further evidence as to their nature.

I propose therefore to give most of the more or less distinctly differentiated taxonomical groups varietal names under the species with which they have most morphological characteristics in common, that is, which they most closely resemble in general appearance, adding my opinion as to their hybrid origin. Only in a few instances where it seems quite obvious that the group is of hybrid origin shall I treat it nomenclatorically as a hybrid.

At first I shall give a characteristic description of the pure species, then I shall review the conditions within different areas where different combinations of species of the *Cerastium alpinum* group occur and then as a summary, I shall try to give a key to the entities treated. Finally each entity will receive taxonomical treatment with names, synonyms and localities.

A careful examination of the character of the hairs of each specimen has been necessary for this study. It has been carried out with the help of a Zeiss operational microscope with built-in light and with enlargements, from 6 to 40 times, easily changed by turning a knob. The distance between the object and the lens is about 10 cm, amply allowing for preparations to be made. It has proved very convenient for the task.

The sources of this investigation are the materials of the *Cerastium alpinum* group in the following museums:

The Swedish Museum of Natural History (Riksmuseum), Stockholm (S).
Herbarium of the University of Uppsala (U).
Herbarium of the University of Lund (L).
Herbarium of the University of Helsingfors (H).
Herbarium of the University of Copenhagen (C).
Herbarium of the University of Oslo (O).
Montreal Botanical Garden (Mtjb).
Marie-Victorin Herbarium, Montreal (Mt).
National Herbarium, Ottawa (Can).
Naturhistorisches Museum, Wien (W).
Herbarium Delessert and Herbarium Boissier, Genève (G).

*Sv. Bot. Tidskr.*, 50: 3
Material relating to certain groups has also been used from the following museums:

Tromsö Museum.
Herbarium of the University of Bergen.
The Leningrad Herbarium.

The material comprised altogether 5000 Scandinavian specimens and about 3500 other specimens. It must be mentioned that the study has been considerably retarded by the bad habit which most herbaria have of placing several collections from different localities on the same sheet. Often 2–5(–10) different collections are assembled together, with the result that the material cannot be sorted out either geographically or taxonomically. In critical species this should never be done.

I here extend my sincere thanks to the directors of the above-mentioned museums for their kindness in allowing me to have material on loan, as well as to Professor C. Skottsberg for translating the diagnoses into Latin and to Mrs. Maria Ferm for taking the photographs of the herbarium specimens.

*Cerastium alpinum* L.—Pl. I: 4, 5, 6; Figs. 1, 2, 3.—This plant and the part of the complex which has been more or less influenced by it is characterized by the hairs of the leaves which are thin-walled, air-filled and therefore shiny, lanate, multicellular, long and not viscose. They are very characteristic and plants with such hairs are considered to be genetically connected in one way or other with *C. alpinum*. Such hairs occur on specimens from Novaya Zemlya, Scandinavia, Spitsbergen, Greenland and Labrador to somewhat west of Hudson Bay and the Arctic American Archipelago and southwards from that line, while they are completely lacking in Yukon–Alaska, Chukchi Peninsula and northern Siberia to Yamal Penins. and south of that line. (Compare Fig. 4.)

Within the area where such characteristic shiny hairs which I shall call “alpinum hairs” occur, more or less typical *C. alpinum* also occurs (with the exception of the Arctic American Archipelago), while within the area where such hairs are missing no *C. alpinum* occurs. This I take to be a sign that these hairs are characteristic not only of *C. alpinum*, but also of the entities more or less influenced by that species.

The most differentiated group within this complex having *alpinum* hairs is that usually named *C. alpinum* var. *lanatum*, or rather a part of that group, with no glandular hairs, but with only lanate hairs even
on the pedicels. All other entities with lanate hairs may be suspected of having genes from this group and also from some other group.

Besides the lanate shiny *alpinum* hairs, *C. alpinum* is characterized by large flowers with petals much longer than the calyx and by the square base of the long calyx. All entities that lack *alpinum* hairs have, with the exception of *C. glabratum*, a semiglobular or paraboloid calyx, lacking distinct corners at the base.

Furthermore, *C. alpinum* is characterized by slightly scarious bracts and short, broad-leaved basal sterile shoots (Pl. I: 4), and has no long, narrow, more or less subterranean runners. If such runners do occur in plants with *alpinum* hairs it is a sign that genes from other entities in the complex are present.

The capsules are long and usually somewhat curved and the bracts are distinctly scarious-margined. *C. alpinum* is thus characterized by *lanate alpinum* hairs, square-based calyx and broad-leaved, short, basal shoots.

**Cerastium glabratum** Hartm.—Pl. I: 2, 3; Fig. 9a, b.—This species was recently treated by me in a separate paper (HULTÉN 1955). It has usually been taken as a variety of *C. alpinum*. Like that species, it has a square calyx or even a calyx with subcalcarate sepals and large flowers, but it differs markedly from *C. alpinum* in being completely glabrous and in possessing thin subterraneous runners. Further the upper leaves are more pointed, the upper internodes prolonged and the stem straight. The bracts are scarious-margined. In its pure state it is a very characteristic plant, which never can be mistaken for *C. alpinum* or for any other member of the complex. No trace of it is found in the Arctic and it is an endemic in Scandinavia, Finland, NW. Russia and Iceland, unless *C. glaberrimum* Lapeyrouse should prove to be identical with it.

**Cerastium arcticum** Lange.—Pl. II: 1–5; Fig. 14.—This species has been very much misunderstood. The reason for this is certainly that in most places it generally forms hybrids with other species, so frequently in fact that hybrids are far more common than the species itself. However, in one place—namely the Faeroe Islands—it is the only species of the group that is present, so there its characteristics and variation can be studied. In Scandinavia it is common on certain peaks of the Dovre mountains as well as on mountains in northern Norway, and the plants from these mountains agree exactly with those of the Faeroe Islands. In Iceland specimens

*Sv. Bot. Tidskr.* 50: 3
agreeing exactly with the above-mentioned occur, while the specimens from the Arctic have been exposed to gene-exchange with other species to such an extent that only very few specimens show even approximately the characteristics of pure *C. arcticum* such as they are known from the Faeroe Islands and the Dovre mountains.

*C. arcticum* is characterized by low, often dense caespitose growth, narrow subterranean runners, broad, short leaves of light-green or yellowish-green colour, the lowermost often reddish, ciliated by short, thick, few-celled ciliae with broad base, tapering to the apex, but completely lacking long villous white *alpinum* hairs. The sides of the lowermost leaves in particular are either nearly glabrous or provided with hairs similar to those of the margin. The flowers are large (up to 12 mm) and often only one flower is developed, while undeveloped buds are found below it. The form of the flower is semiglobular when in full anthesis, the calyx leaves are broad, strongly vaulted, more or less pubescent with broad shiny scarious margins somewhat ciliated near the base. The pedicels are setose—strongly so just below the calyx. Scariosous bracts are lacking. The capsules are short and broad, considerably exceeding the calyx (Gröntved 1942, Fig. 81, p. 220). In its pure form it is very distinct from *C. alpinum* and a very characteristic species. Its closest relative is *C. uniflorum* Clairv. (*C. glaciale* Gaud.) in the Alps, which differs, inter alia, in the finer, shorter pubescence of the leaves, still larger flowers, longer petals, and narrower scarious margins of the sepals.


—*C. Edmondstonii* has often been united with *C. arcticum* and is certainly closely related to it. It is a loosely tufted plant with dark, reddish-green foliage, the flowers are semiglobular and large as in *C. arcticum* but the short round leaves are covered on both sides with short thick viscid hairs (Fig. 21c). The stem also has short patent viscid hairs. It is an endemic of the Island of Unst in the Hebrides, where it covers acres, growing on serpentine.

*Cerastium Regelii* Østenf.—Pl. IV: 1–2; Fig. 24a–d.—Ever since it became established this species has been obscure. Østenfeld himself (1909, p. 10) realized its difference from *C. alpinum* but believed that intermediates were not known. His determinations in the herbaria show that he included several entities in his new species. Typical *C. Regelii* is, however, so different from *C. alpinum* and other main entities in the complex that no one can fail to identify it. It is
a low, often sterile cushion plant, occasionally completely glabrous, but usually with its small round fleshy yellowish-green leaves ciliated by a few coarse, greenish ciliae, but otherwise glabrous. In a high-arctic situation it usually does not flower but propagates by thin more or less subterranean runners, the leafy tips of which break off and form new cushions (Gelting 1934, p. 41). When it flowers it has short straight, in the upper part patent glandular, while in the lower glabrous, leafy stems with usually one single fairly large flower. The glandular calyx leaves are broad and blunt and in size only about one third of the large petals. The inner sepals are much more broadly scarious-marginated than the outer. From a cushion rise several such short flowering stems with large flowers and it must be a delightful plant when in flower. In no single case were ripe capsules observed. In more sheltered situations it develops from a densely packed cushion plant into dense tufts with larger, less fleshy rounded ciliated leaves. It is a high-arctic plant, especially common on Spitsbergen and northern Greenland.

_Cerastium jenisejense_ Hult.—Pl. IV: 3–5.—When Ostenfeld named _C. Regelii_ he included in that species a plant occurring in Siberia which Regel had named _C. alpinum_ s. _serpyllifolium_ and this was the reason why Ostenfeld chose the name _C. Regelii_ for the plant he wished to distinguish, the name _C. serpyllifolium_ already being occupied. This Siberian plant differs, however, so much from _C. Regelii_ that I must regard it as a separate species. It is a tall plant with long weak stems, having long thin basal branches with numerous internodes. Its pubescence agrees fairly well with that of _C. Beeringianum_, although it is more scattered and less coarse. The leaves are often acute or slightly so. In the herbaria it has been determined as _C. Beeringianum_ or as _C. Regelii_, and since it possesses characteristics of both these species I was at first inclined to regard it as the hybrid between _C. Beeringianum_ and _Regelii_. It occurs from northwestern Russia through Siberia to Alaska and seems, judging from the numerous collections, to be common along a large part of the Yenisey River.

_Cerastium Beeringianum_ Cham. & Schlecht.—Pl. V: 1–6; Fig. 27 a–f.—This plant is characterized by its loosely tufted or singular stems, which in large specimens are dichotomously branched, lacking runners, but with short basal shoots with normal leaves, narrow, abruptly pointed leaves, ciliated with fine bristles and
bristly or strigose on both sides. The stem is glandular from mixed, short or long, patent viscid to glandular hairs in its upper part, but has downward pointing fine stiff bristles on its lower internodes, the lowest internodes being glabrescent.

The downward pointing bristles are a very good characteristic of *C. Beeringianum*. The flowers are small. The petals are as long as the calyx or slightly longer. The calyx is semiglobular or paraboloid, and the sepals blunt and scarious-margin, the inner with very broad scarious margin, the outer with a fairly broad margin in the apex but very narrow at the base (contrary to *C. alpinum*, in which the scarious margin of the outer sepals is more even, being well developed at the base also). It is very common in Alaska but extends to Novaya Zemlya on the one hand and to Newfoundland on the other.

The flowering stems are sometimes similar to those of *C. Regelii*, but that species lacks the stiff retrorse bristles of the lower internodes and has a single large flower with a much smaller calyx of more rounded sepals.

**Cerastium aleuticum** Hult.—Pl. VI: 3, 4.—This plant is similar to *C. Beeringianum* but differs in its decumbent, caespitose growth, small delicate size, very narrow, strongly ciliated, more or less glabrescent leaves, less pronounced scarious margin of the calyx, lack of scarious margin on the bracts and densely packed marescent leaves at the base of the stem. It occurs in the mountains of the Aleutian Islands.

**Cerastium Fischerianum** Sér.—Pl. VI: 1, 2; Fig. 21 a.—This species, which has been frequently confused with *C. Beeringianum*, is a stout coarse yellowish-green plant with a semi-umbellately branched inflorescence, coarsely pubescent on stems and leaves from stiff more or less setose hairs. The leaves are large and usually broadest near the base. It is a very characteristic plant, occurring from Japan over the Kurile Islands to Alaska.

In the Kuriles it is the only species belonging to the complex treated in this paper. Closely related types, as yet unclear taxonomically, occur in Japan and in China.

_Sv. Bot. Tidskr_, 50: 3
The Conditions within Different Areas.

Scandinavia.

In Scandinavia *C. alpinum*, *C. arcticum* and *C. glabratum* are present in the mountainous regions of the Peninsula. All combinations between them also occur, a fact very clearly demonstrated by the very large herbarium material, about 5000 sheets, available.

These three species, although very different, are united by a long chain of intermediates.

Typical *C. alpinum* with evenly distributed pubescence of the leaves is common along the entire mountain chain. Ssp. *lanatum* with a brush of lanate entangled hairs at the tips of the leaves, especially in those of the basal shoots, also occurs along the entire mountain chain, although more rarely and besides also in some places in the lowlands.

*C. arcticum* is recognized by its low, caespitose growth, and narrow leaves, often nearly glabrous on the surface but ciliated with short, 3–4-celled ciliae thicker at the base. In its pure state it lacks the white shiny *alpinum* hairs in Scandinavia as well as in the Faeroe Isls. and in Iceland.

In Scandinavia pure *C. arcticum* is confined to a small area in southern Norway, where it has been extensively collected on Mt. Knutshō in the Dovre mountains. In the northern part of the Peninsula it occurs in a restricted area near Kvikkjøk in Lule Lappmark, and thence from Lake Torne Träsk northwards to about 70° N. It is confined to high altitudes, over 1000 m, at the very summits of the mountains. See Fig. 16.

Very numerous specimens having the general appearance of *C. arcticum* and usually determined as such or as *C. Edmondstonii* in herbaria differ in having few but distinct *alpinum* hairs, especially at the nodes and on the leaves at the end of the basal shoots. They are here called *C. arcticum* var. *alpinopilosum*. Sometimes they have small scarious margined bracts, which are lacking in *C. arcticum* sensu stricto. They occur at somewhat lower altitudes than the pure species and are more common. In my opinion they have genes from *C. alpinum* that give rise to the *alpinum* hairs and, in some cases, the scarious bracts. I keep them apart from the group named *C. alpinum × arcticum* as they are fairly easily distinguishable from that group, and the *alpinum* characters are usually not so striking. A careful examination under a good lens is necessary to establish the

*Sv. Bot. Tidskr.*, 50: 3
presence of the \textit{alpinum} hairs. They occupy a considerably larger area than \textit{C. arcticum}. (Compare Fig. 17.) It is especially remarkable that they go far to the south of the \textit{C. arcticum} centre in Lule Lappmark.

A large number of specimens show more clearly their hybrid origin from \textit{C. alpinum} and \textit{C. arcticum}. They have \textit{alpinum} hairs on the sides of the leaves, are often larger and have very distinct scarious-margined bracts, but they have the clear \textit{arcticum} ciliation, especially on the upper leaves. They are frequently rather broad-leaved and vigorous. Their distribution (Fig. 7) is essentially the same as that of \textit{C. arcticum} var. \textit{alpinopilosum}.

Numerous specimens occur having \textit{arcticum} ciliation of the upper leaves but with shiny rather glabrous leaves and large flowers with broad shiny scarious margins of the inner sepals, usually very distinct, small, scarious-tipped bracts and a bunch of undeveloped buds in the uppermost node. They clearly have genes of \textit{C. glabratum} and are here taken as \textit{C. arcticum} × \textit{glabratum}. They are not always so easily differentiated from the parent species. A small number have the general appearance of \textit{C. arcticum}, but shiny totally glabrous leaves lacking \textit{arcticum} ciliation. They too are regarded as belonging to this group. Such specimens also occur on Iceland. They do not appear to be merely glabrous forms of \textit{C. arcticum}.

\textit{C. arcticum} × \textit{glabratum} occurs where the areas of \textit{C. arcticum} (including var. \textit{alpinopilosum}) and \textit{C. glabratum} overlap (Fig. 23). Specimens of this group with a few \textit{alpinum} hairs are considered to be the hybrid \textit{C. arcticum} var. \textit{alpinopilosum} × \textit{glabratum}. The affinity between \textit{C. arcticum} and \textit{C. glabratum} is apparently greater than between \textit{C. arcticum} and \textit{C. alpinum} as numerous specimens belong to the \textit{C. arcticum} × \textit{glabratum} group.

\textit{C. glabratum} is a very characteristic species. It has recently been treated by the present author (Hultén 1955).

In its pure state it is a strictly upright plant with narrow, acute, completely glabrous, shiny leaves. It has a characteristically long calyx, square at the base, and long filiform glabrous runners. Like \textit{C. arcticum}, it has been collected very extensively on Mt. Knutshō in the Dovre mountains in southern Norway, but it also occurs, though rarely, in a few other localities there. From the Arctic Circle in Norway and Sweden northwards it is very common, especially northwards, where it occurs most abundantly in the meadows along the seashore. It has a light yellowish-green colour,
differing distinctly from the greyish green of *C. alpinum* and *C. arcticum*.

A very small-leaved form of *C. glabratum* occurs especially on serpentine or other ultrabasic rocks. It is named *C. glabratum* var. *microphyllum*.

Very many specimens of the *glabratum* type differ from typical *C. glabratum* in having a few hairs especially on the pedicels and on the margins of the leaves. They are here called *C. glabratum* var. *piliferum*. The hairs are supposed to be caused by genes either from *C. alpinum* or from *C. arcticum*. Most commonly *alpinum* hairs are clearly recognizable, but viscose hairs and short thick hairs sometimes occur. As sometimes only traces of hairs are present it is not always easy to determine their type, and hairy specimens of *glabratum* type are therefore united under the above-mentioned name. Such specimens occur within the area of *C. glabratum*.

A pilose *C. glabratum* type, growing on serpentine, was described by Rune as *C. alpinum* var. *serpentinicola*.

A number of specimens with a *glabratum* habit have not only the margins but also the sides of the leaves pilose with long shiny *alpinum* hairs. They represent the more or less intermediate hybrid *C. alpinum × glabratum*. The differentiation of this group from *C. alpinum* is sometimes rather obscure. The glabrate, acute yellowish-green leaves, the upright growth, the shiny scarious margin of the inner sepals and the fasciole of buds in the uppermost node are signs that genes from *C. glabratum* are present. Such plants occur within the area of *C. glabratum*, but it is very remarkable that they also are found in two cases outside that area (Fig. 8). The first case is the area on the frontier between Sweden and Norway in Härjedalen and Jämtland. No pure *C. glabratum* or even *C. glabratum* var. *piliferum* could be found in the rather rich herbarium material from this area, but numerous specimens show so clearly their content of *C. glabratum* genes that they must be regarded as *C. alpinum × glabratum*, although *C. alpinum* is the predominant component. The other case is still more noteworthy. At Valamo in Lake Ladoga three sheets were collected which, although they are profusely covered with *alpinum* hairs, show traces of *C. glabratum* in their large flowers, broadly scarious-margined inner sepals and fascicle of buds in the uppermost node. They are remotely isolated from the area of *C. glabratum* (compare Figs. 8 and 11).

*Sv. Bot. Tidskr.*, 50: 3
Already in 1862, Malmgren (p. 242) had recognized *C. alpinum*, *C. arcticum* and *C. Regelii* in Spitsbergen when he divided “*C. alpinum*” from the islands into three varieties, *α* foliis oblongis vel elliptico-lanceolatis, *β* caule 6–8 pollicari, *γ* latifolium, and *γ* caespitosum. Andersson & Hesselman (1900, p. 58) considered Malmgren’s *γ* caespitosum to be a glabrous form of “*C. Edmondstonii*” corresponding to the glabrous form [*C. glabratum*] of *C. alpinum* in Scandinavia. They consider the Spitsbergen *Cerastium* flora to consist of *C. alpinum*, *C. Edmondstonii* and *C. Edmondstonii var. caespitosum*. In *C. Edmondstonii* they include, for instance, the specimen which Sylvén later (1931, p. 173) determined as *C. alpinum × arcticum*. Asplund (1918) recognizes *C. alpinum*, *C. arcticum* and *C. Regelii* in Spitsbergen, and Tolmatchew (1930, p. 4) *C. alpinum*, *C. hyperboreum* and *C. Regelii* and hybrids, especially *C. alpinum × Regelii*, and lastly Scholander (1934, pp. 39–42) refers all that is not *C. Regelii*, to *C. alpinum*.

After a study of the ample material the present author came to the following conclusions.

The conditions are very complicated and reliable characteristics for the different taxa are very difficult to find. *C. Regelii* occurs in its pure form all over Spitsbergen and is especially common in the northern parts, where it predominates. All other specimens show intermediate or rather more or less recombined characteristics of the three species *C. alpinum* ssp. *lanatum*, *C. arcticum* and *C. Regelii*. These three species apparently have hybridized freely and produced second-generation hybrids and backcrosses.

No single specimen was found that could be classified as pure *C. alpinum* ssp. *lanatum*, while one or two specimens strongly approach this taxon. This naturally does not exclude the possibility that pure *C. alpinum* ssp. *lanatum* occurs in Spitsbergen, presumably in the southernmost part. When I refer a number of Spitsbergen specimens from the western coast to *C. arcticum* I must admit that most of them are somewhat more pubescent than that species. They have, however, so close a resemblance to *C. arcticum* that they may be named so. The bulk of the material shows *arcticum* characteristics combined with the lanate hairs of *alpinum* and are supposed to be a recombination about to be stabilized, originating from the hybrid *C. alpinum* ssp. *lanatum × arcticum*. They are divided into three
types: *C. arcticum* var. *procerum*, var. *vestitum* and var. *sordidum*, the latter probably also containing *C. Regelii* genes. Very obvious hybrids *C. arcticum* × *Regelii* are not infrequent.

**Beeren Island.**

As in Spitsbergen, no single specimen could be referred to reasonably pure *C. alpinum* ssp. *lanatum*. *C. arcticum* var. *vestitum* dominates the *Cerastium* flora but *C. arcticum* var. *sordidum* and *C. Regelii* are also present, as well as probable hybrids between *arcticum* and *Regelii*. The conditions are thus much the same as in Spitsbergen.

**Greenland.**

The conditions in Greenland are similar to those in Spitsbergen, but the proportions of the species are very different. *C. alpinum* ssp. *lanatum*, which was not represented in its pure form in Spitsbergen, is fairly common on the southwestern coast of Greenland, where in fact it seems to be the predominant form of the complex. Specimens with fine white entangled *alpinum* hairs, but lacking coarser hairs and lacking runners occur northwards to about 78° N. on the west coast and to about 74° on the east coast.

*C. arcticum* was described from Greenland, the specimens having been collected at Upernivik by Vahl. It agrees fairly well with the Icelandic and Scandinavian plant, although like the corresponding Spitsbergen plant, it is somewhat more pubescent. It occurs from the southern tip of Greenland north to about 76° N. on the west coast and to about 73° on the east coast, and a single specimen of reasonably pure *C. arcticum* has been found further north.

*C. Regelii* occurs in its pure form from about Scoresby Sound on the east coast northwards and along the north coast to the northwestern corner of Greenland. Apparent *C. Regelii* hybrids were also observed on the west coast but no specimens that could be classified as pure *C. Regelii* were seen.

As in Spitsbergen, the bulk of the material is referred to *C. arcticum* var. *procerum*, var. *vestitum* and var. *sordidum* being supposed to represent innumerable hybrid combinations between the three species *C. alpinum* ssp. *lanatum*, *C. arcticum* and *C. Regelii*.

**Franz Josef Land.**

A fairly uniform type of *C. arcticum* var. *sordidum* together with *C. Regelii* is the only species of the group present. No *C. alpinum*
was seen. The hybrid *C. arcticum* × *Regelii* is also present in the material.

**Jan Mayen.**

A very fine collection from this little island has been studied. Most of the material was collected by J. Lind, who kindly put it at my disposal.

*C. arcticum* var. *vestitum* is the predominant species of *Cerastium* found on the island. Very few specimens approaching *C. arcticum* are found. The type of *C. arcticum* var. *vestitum* is fairly uniform, being by no means as variable as the same type in Greenland. The material gives the impression that a recombination of the genome has taken place, with the result that an almost species-like hybrid has been formed. Only two specimens which could be referred to *C. alpinum* ssp. *lanatum* were seen. In one single specimen some influence from *C. Regelii* seems very probable but not quite certain.

**Novaya Zemlya.**

*C. alpinum* ssp. *lanatum*, which is rather common on the southern island but is disappearing on the northern, and *C. Regelii* dominate the *Cerastium* flora there. *C. arcticum* var. *vestitum* and var. *sordidum* occur, but are represented by only a few, strongly pubescent specimens.

On the southern island also *C. jenisejense* is present in a rather dwarfed form.

**Iceland.**

The conditions are very complicated in Iceland. *C. alpinum* ssp. *lanatum* is fairly common, and good *C. arcticum* occurs, but is rare. The presence of *C. glabratum* complicates the conditions. The species present are thus the same as in Scandinavia, with the exception of *C. alpinum* ssp. *alpinum* which is lacking in Iceland. Judging from the herbarium material, hybridization seems to have gone farther than in Scandinavia, several taxa often being present in each collection. Completely glabrous *C. glabratum* is rare, while *C. glabratum* var. *vestitum* and *C. alpinum* × *glabratum* occur more frequently. No doubt a field study of the group in Iceland would yield much of interest.

**Faeroe Islands.**

The only species belonging to the group seen from the Faeroes is *C. arcticum*. It varies very little, but mainly in its amount of pubes-
ence on the side of the leaves. In two cases I have noted very faint traces of *alpinum* hairs on specimens of *C. arcticum* from the islands, but so faint that I cannot be sure that they are due to any influence from *C. alpinum* (Fuglø, Aug. 7, 1897, Hartz & Östenf.; Bodø, Klaksvig, Simmons 550).

**Scotland.**

*C. alpinum* ssp. *lanatum* occurs, although apparently only in certain places. It seems to be lacking in the Hebrides and the Shetland Islands. *C. arcticum* occurs in the high mountains and the hybrid *C. alpinum × arcticum* is common. On the island of Unst, where neither *C. alpinum* nor *C. arcticum* is present, the endemic serpentine-type *C. Edmondstonii* abounds. It would be of interest if the variation of this plant at Unst could be investigated for the purpose of ascertaining the status of this taxon.

**Central Europe.**

The conditions are very complicated.

*C. alpinum* ssp. *lanatum* occurs on most mountains. *C. arcticum* is replaced by *C. uniflorum* and the somewhat less closely related *C. latifolium*, and by *C. pedunculare*. Plants similar to *C. alpinum* ssp. *alpinum* occur, but the variation is very wide.

A number of species now regarded as synonyms of *C. alpinum* have been described. Several of them, and doubtless several other types, are hybrids with other *Cerastium* species of the area. Recently such a species, *C. austroalpinum*, has been described (Kunz in Phyton 2, 1950, p. 99). It is said to be intermediate between *C. carinthiacum* and *C. uniflorum*.

In the Pyrenees most of the high-alpine specimens belong to one type, which is here taken as a subspecies, *squalidum*, of *C. alpinum*. At lower altitudes it transgresses into *C. alpinum* ssp. *lanatum*. In the eastern Pyrenees the peculiar plant described as *C. glaberrimum* Lapeyrouse also occurs. It is very similar to *C. glabratum* and may be identical with it, in which case the valid name of that plant would be *C. glaberrimum*.

The case is discussed in detail below.

**The Arctic American Archipelago.**

The conditions are complicated. *C. alpinum* ssp. *lanatum*, *C. arcticum* with the varieties *vestitum* and *sordidum*, *C. Beeringianum* and, *Sv. Bot. Tidskr.*, 50: 3
in the north, *C. Regelii* are present. It should be admitted that the variation of types is large, while the number of collections is comparatively small. The hybrid influence of *C. Regelii* in the north is evident. The part played by *C. Beeringianum* is somewhat obscure. Further study is necessary to permit a full interpretation of some of the types present.

**North-eastern America.**

*C. arcticum* is rarely found in an approximately pure form. It is best represented in the region around Port Burwell. Its var. *vestitum* is found in the northern part of the continent and in the entire archipelago, while var. *sordidum* has only very few stations on the mainland. *C. alpinum* ssp. *lanatum* usually with not very lanate leaves occurs in the east, often together with var. *strigosum*, which is somewhat intermediate between it and *C. Beeringianum*. The latter species is found in the western parts, while it is represented in the east by ssp. *terrae-novae*, a plant with the pubescence of *C. Beeringianum*, but caespitose growth like that of *C. arcticum*.

**Alaska, Yukon and North-eastern Asia.**

*C. alpinum* is completely lacking. *C. Beeringianum* is predominant. To the south the very different *C. Fischerianum* occurs, but there are also apparent hybrids between them. A large-flowered variety of *C. Beeringianum* might have arisen through introgression with the Siberian *C. jenisejense*, of which a single specimen is known to have been collected in the northern part. The endemic *C. aleuticum* is closely related to *C. Beeringianum*, and somewhat intermediate specimens also occur.

**The Rocky Mountains area.**

*C. Beeringianum* ssp. *Earlei* is the only plant belonging to the group that is present. It is, however, very variable and clearly it has connections with other species there. These details have not been closely studied.

**Arctic Siberia.**

*C. alpinum* is lacking. An arctic form of *C. Beeringianum* predominates in the north. Southwards it is replaced by the closely related *C. jenisejense*, which in certain respects resembles a tall *C. Regelii*.

*Sv. Bot. Tidskr.*, 50: 3
The Central Asiatic mountains.

Very few collections were seen. C. Beeringianum is, as far as is known, the only member of the group present, but no specimens of, for instance, C. tianshanicum Schischkin were seen. C. pumilum is also practically unknown to the author. Nothing can be said about the variation there.

Key to the species.

As the entire group forms an almost unbroken chain, or rather a network of forms, it is impossible to construct a key leading to all the types and hybrids dealt with.

A key to the recognized species is given here.

A. Leaves glabrous on the sides or nearly so, often ciliated at the margin.
B. Plant elongate with several flowers on elongated pedicels, entirely glabrous, calyx with a square base. Pl. I: 2, 3. C. glabratum (p. 441)
B. Plant lowgrowing, tufted or pulvinate, calyx semiglobular.
C. Plant pulvinate, often sterile in high-arctic places, propagating by the loss of the apex of the runners, leaves broad, short, more or less shiny and succulent, sepals obtuse, glandular, one third as long as the petals. Pl. IV: 1, 2. C. Regelii (p. 467)
C. Plant tufted, leaves oblong, not shiny and not succulent, sepals broadly scarious-margined, at least half as long as the petals, glabrous or setose. Pl. II: 1–5. C. arcticum (p. 447)
A. Leaves pubescent on the sides, also often ciliated on the margin, plant with or without runners.
D. At least the tips of the leaves of the sterile basal shoots with shiny, air-filled, multicellular, weak, often entangled (in hybrid combinations sometimes not very conspicuous) hairs, ("alpinum hairs"), often mingled with hairs of other types, glandular, viscos or setose. Scarious bracts or scarious margins of bracts obvious. Base of the calyx square. Pl. I: 4–6, III: 4, 5.
C. alpinum, its subdivisions and hybrids (p. 427)
D. No alpinum hairs (recognized by their lustre) present. Hairs stiffer, shorter, coarser 3- to few-celled, often thicker at the base, yellowish-green or light-brown, not completely air-filled (especially characteristic on the ciliation of the upper stem-leaves in some species). Base of the calyx usually more rounded.
E. Plant tall, coarse with thick stem, stem and pedicels yellow-hirsute, flowers subumbellate, pedicels reflexed in fruit. Pl. VI: 1, 2. C. Fischerianum (p. 486)
E. Plant not tall and coarse, with erect, prostrate or pulvinate, much thinner stem, pedicels not reflexed in fruit.
F. Plant comparatively tall, lax, delicate, weak, with long basal shoots ending in bud-like tufts of leaves, petals about twice as long as the sepals. Pl. IV: 3, 5. C. jenisejense (p. 473)

So. Bot. Tidskr., 50: 3
F. Plant more compact, more low-growing with rigid erect stem slightly matted or densely tufted with short flowering stems.
G. Plant with dichotomously branched cymes and long-pedicelled flowers, pedicels with short patent glandular or viscid hairs, leaves narrow with short, strigose pubescence, lower internodes with stiff, retrorse, hirsute hairs (the lowermost internodes often glabrescent), inner sepals with broader scarious-margin than the outer. Petals not much longer than the sepals. Bracts slightly scarious-margined. Pl. V, VI: 5.

*C. Beeringianum* (p. 476)

G. Inflorescence usually with only one well-developed flower, lateral flowers short pedicelled, mostly remaining as buds, pedicels lanate or hirsute, lower internodes lacking retrorse setose hairs. Scarious-margined bracts lacking.
H. Plant small, matted with narrow leaves, acute sepals and pedicels with soft hairs. Pl. VI: 3, 4.  *C. aleuticum* (p. 485)

H. Plant larger, tufted usually with broader leaves, flowers larger, semi-globular, pedicels hirsute or glandular.
I. Leaves rounded, purple-tinged, the surface covered with characteristic short thick patent glands. Pl. II: 7, Fig. 21 c.

*C. Edmondstonii* (p. 466)


---


A. Plant low-growing, few-flowered, leaves rounded, pedicels with dense fine, patent viscid pubescence.  
ssp. *squalidum*

A. Plant taller, leaves elongated or lanceolate, pedicels lanate or more or less viscid.

B. Tips of the basal shoots with a brush of lanate white entangled hairs.

C. Pubescence of leaves long, entangled, lanate.

D. Lanate hairs fine, soft, no hairs with broad base in the margin of the leaves.  
ssp. *lanatum*

D. Lanate hairs coarser, hairs with broad base occur in the margin of the leaves.  
var. *robustum*

C. Pubescence of leaves shorter, more strigose, leaves short and narrow.

B. Pubescence of the leaves evenly distributed.  
var. *strigosum*  
ssp. *alpinum*

---

**Ssp. alpinum.** Pl. I: 4; Fig. 2.

*C. mutabile γ alpicola* GRENIER, Monogr. Cerastio (1841) p. 71 (pro parte).  

28–563373  
_Sv. Bot. Tidskr., 50: 3_
Fig. 1. *Cerastium alpinum* ssp. *lanatum*. a, Sweden, the same specimen as Pl. I: 6. b, Sweden, the same specimen as Pl. I: 5. c, "Donné par M. Lamarck." a, b, enlarged about 3 times, c about 7 times.

**Scandinavia and Finland.** Very common in the mountains. See Fig. 6.

**The Central European Mountains.** Numerous forms, uncertain whether fully identical with the Scandinavian plants.

**Ssp. lanatum** (LAM.) ASCHERS. & GRAEBNER,


**Jan Mayen.** Foothills of Mt Beerenberg, Drew 44 (O); same, Grönberget, Lid (O).

*Su. Bot. Tidskr.*, 50: 3
Iceland. Numerous specimens from the following localities: Reikjavik, Reijafjord, Osabakki, Ulfarsa, Lambatangi, Adalvik, Prestbakki, Raundhraun, Brekktjell, Tell, Solheimar, Havnafjord, Seydisfjord, Kirkjerbol, Brufjord Avnkelsgerdi, Os, Hof Vopnafjord, Modruvellir, Modrufellshavn, Hamundalstadir, Dyrefjord, Isafjord, Patreksfjord, Stykkisholm, Stadastadir, Uxavatn, Berufjord, Vallunes, Havnefjord, Helgavatn.

Scotland. Ben Lawers (numerous collectors); Lochnagar Matthews (C); Mt Clovae, 1842 Babington (U).

Fennoscandia. Very numerous collections from Norway, Sweden and Finland. They are plotted on the special map of distribution for Fennoscandia (Fig. 5).

Estonia. Laaksberg (E. of Reval), 1912 Olivecrona (U), do., 1922 Lundström (S); Harjumaa SW. of Kose, 1938 Norrman (S); above Kose, 1923 Sterner (S).

Arctic Russia. Kolgujev, 1902 Pohle (C, L). — There are several reports of *C. alpinum* from the Arctic coast of Russia (Kanin, Timan Mts, the Polar Urals, Vaigatch), but no specimens were found in the material available.

Novaya Zemlya. Beluchaja Guba, Feilden (C), do., Hwass (S), do., Enander (S); Rogatschew Bay, Kjellman & Lundström (S, U); Karmakula, 1895 Ekstam (S, U); Gribovaja Bay, 1895 Ekstam (S), do., 1921 Lynge (O, U); Matotchkin Shar, 1895 Ekstam (S, U, C), do., Belucha, 1921 Lynge (O).

Arctic E. America. Ellesmereland, Hayes Sound, Lastraea Valley, Simmons 855 (O); Bathurst Inlet, Anderson 600 (Can); Thelon Game Sanctuary, Tener 201 (Can); Melville Penins., Ross Bay, Boivin 1497; Baffin Land, Lake Hbr., Malte 118747, 125733 (Can); Forbisher Bay, Boivin 3797 (S, U); Nettilling Lake 66° 40' N, 70° W, Soper 125667 (Can).

N. and E. Labrador Penins. Fort Chimo, Ney & Courtright (Can, pro parte); Kogaluk R., Lac Annaktolik, Rousseau 505 (Mtjb); Port de
Fig. 3. *Cerastium alpinum*. Specimen in the herbarium of LINNÆUS in the Linnean Society, London. Natural size.

Payne Bay, Rousseau 1411 (Mtjb); Payne R., Rousseau 928, 1120, 1190, 11995 (Mtjb); Korok R., Col de Saglek, Rousseau 983, 1054 (Mtjb); Riv. aux Mélèzes, Dutilly 14530 (Mt); Saglek Bay, Woodworth 215 (O). Nachvak, 1893 Low (Can); Hebron, Wynne-Edwards 7635 (Can); Okak, Cutthroat Tickle, Wynne-Edwards 7463 (Can); Nain, Seward (Mt), do., Wynne-Edwards 7563 (Can); Mollie T. Lake 55° 03’ N., 67° 10’ W., Harper 3756 (Can); Goose Bay, Baldwin et alii 675 (Mtjb, S); Indian Harbour, Abbe & Hogg 298 (G, Can); do., Wetmore (Can); Battle Harbour, Bishop 303 (Can), do., “CSW” (Mt); Blanc Sablon, Fern. & Wieg. 3392 (GH, pro parte), do., Brunel 103 (Mt); Saguenay Co, Net I., Lewis 132085 (Can).

**Newfoundland.** Pistolet Bay, Fernald et alii 28204 (GH, C); Boat Harbour, Fernald et alii 28205 (U); Big Brook, Fernald et alii 28203 (GH, Can); St Anthony, Abbe 296 (Can).

**Hudson Bay.** Charlton I., 1887 Macoun (Can); Solomans Temple I., Baldwin 1710 (Can); South Twin I., 1887 Macoun (C); Bear L., Baldwin 1718 (GH); Fort Georges, Dutilly & Lepage 12602 (GH, Mt); Salmon R., *Sv. Bot. Tidkr.*, 50: 3
Fig. 4. Total area of *Cerastium alpinum* ssp. *lanatum*. Dotted line surrounds area where "*alpinum* hairs" occur.

Baldwin et alii 677 (Can); Cape Jones, Johansen 101 (Can), do., Baldwin et alii 676 (Can); Bear I., Baldwin 1718 (Can); Lake R., 54° 23’ N., Smith (Can); Port Harrison, Baldwin et alii 678 (Can); Cape Smith, Polunin 1367 (Can, pro parte).

**W. Greenland.** Inarsert in sinu Ilua, Sylov (C); Nenortalik I., Vahl (C); Friedrichsthal, 1883 Berlin (S); Ikigart, Petersen (S); Sardlok, Jessen (Mt); Ivigtut, 1883 Berlin (S); Igalik Fjord, Petersen (O); Julianehaab, Vahl (C), do., Deichmann (C) do., Meldorf (C), do., Lagerkranz (S); Neria, Eugenius (Can, S, O, Mt, GH); Nordre Sermilik, Jessen (C); Arsku distr., Deichmann (O); Ilakortok, Vahl (C); Kingua, Jensen (C), do., Holst (C), do.,

*Sv. Bot. Tidsskr.*, 50: 3
Fig. 5. Geographical area of *Cerastium alpinum* ssp. *lanatum* in Fennoscandia. Line surrounds area where specimens with lanate (not glutinose) pedicels occur (*C. alpinum* ssp. *lanatum var. villosum), + specimens with lanate pedicels.

Kornerup (S, U); Narsolik, Holst (C); Tasiusak, Warming & Holm (C), do., Hartz (C), do., Kruuse (C); Kvanersok, Hartz (C); Evighedsfjord 65° 50’ N., Kerb (S); Isortok, Vahl (C), do., Hansen (C); Gothaab, Vahl (C), do., Lyng (C), do., Petersen (C); Söndre Strömsfjord, Erlandson 2327 (C), do., Böcher 137 (C); Holstenborg, Holböll (C), do., Vahl (C), do., Sewoll & Weed (GH); Søkkertoppen, Lytzen (U); Nordre Strømsfjord, Nordmann (C, O), do., Kornerup (C, O); Ivnarsulik 68° N., Kruuse (Mt); Auleitsvik fjord, Berggren (S, U), do., Kornerup (C); Kakatsiak 65° 37’, Hansen (C); Jakobshavn, Olsen (G); Egedesminde, Sewoll & Weed (GH); Ikamiut, Berlin (S); Sofiehamn, Berlin (S); Kangatsiak 68° 20’, Kruuse (Mt); Christianshaab, Warming & Holm (C); Seqineqaraajugtoq, Grøntved (C); *Sv. Bot. Tidskr.*, 50: 3
Fig. 6. Geographical area of *Cerastium alpinum* ssp. *alpinum* in Fennoscandia.

Disko, Lyall (S), do., Porsild (C, GH, Can), do., Pedersen (U), do., Smith (C), do., Grøntved (C), do., Soper (Can), do., Lagerkranz (S, U), do., Sewall & Weed (GH); Umanak, Vanhöffen (C, O), do., Enander (S); Kangek, Björling (S); Nuqusuak Penins., Cornell party (U); Maneetsok, Björling (U); Pröven, Holm (C, S), do., Ussing (C), do., Dodge (Can), do., Whymper Exp. (C); Svartenhuk, Steenstrup (U); Uperniviks isström, Ryders exp. (C); Robertson Bay 77° 53' N., Nutt (Can).

**E. Greenland.** Lindenow Fjord, Christensen (C, O), do., Devold & Scholander (O); Tiningnertok 60° 34', Grøntved (C), do., Bögvad (C); Aluk 60° 08' N., Bögvad (C); Igutsat Fjord, Bögvad (C); Ig尔斯uit 60° 21', Bögvad (C); Augpilagtok, Bögvad (C); Nanortalik, Bögvad (C); Pamiagdluk, Bögvad (C); Nanusek, Devold (O); Kangerdlugluk, Bögvad (C); Torgilsbu, Aaseth (O); Nunat, Bögvad (O); Agnatfjord, Bögvad (C); Nukarfik, Bögvad (C).
vad (C); Eskimåneset, Gröntved (C), do., Devold & Scholander (O); Krumpen Fjord, Bögvad (C); Tasiussak, Bögvad (C), do., Rüttel (C); Dr Maries Dal, Gröntved (C), do., Björlykke (O); Kap Dan, Bögvad (C); Sermilik, Bögvad (C); Nordlys Øer, Bögvad (C); Tingmiormiut, Björlykke (O); Akorniarmiut, Björlykke (O); Tingmiormiut, Björlykke (O); Umivik, Nordenskiöld's nunatak, Björlykke (O); Amagsalik, Kruuse (C), do., Bartlett (Can), do., Bögvad (C), do., Lagerkranz (S); Kungmiut 65° 52' N., Bögvad (C), Kungarsuak Kruuse (C); Ikersausek Jörgensen (C); Lakefjord Bögvad (C); Kangerdlugsuak, Böcher (C); Kap Ravn, Böcher (C); Cape Isminger 68° 10' (C); Scoresby Sound, Tågefjorden, Hartz (C); Valrosbugt, Rosenkrantz (C); N. of Jameson R., Sörensen (C); Liverpool Land, Pedersen (O, pro parte), Liverpool Coast, Sörensen (C); Kjerrulf Fjord, Dusén (Mt); Kung Oskars hamn, Berlin (S, U); Moskuskosefjorden, Seidenfaden (C), do., Vaage (O); Ymer I., Blomsterbukta, Vaage (O).

**Ssp. squalidum** (Ramond) nov. comb.


The Pyrenees. Numerous localities in the high mountains of the Pyrenees.

**Var. robustum** nov. var.

Cum *C. alpino* subspec. *lanato* comparandum, sed robustius; lana ad marginum foliorum pilis basi dilatatis mixta.

**Baffin I.** Frobisher Bay, Boivin 3547 (Mt).

**W. Greenland.** Nenortalik, Vahl (C); Godthaab, Vahl (C); Holsteinburg, Enander (S) (type of var. *robustum*); Disco, Porsild (C, Can); Godhavn, Ekman (S); Umanak, Vahl (C), do., Rink (C); Pröven, Sörensen (C); McCormick Bay, Nygaard (O).

**E. Greenland.** Augpilagtok 60° 07', Bögvad (C); Fugniarmiut 62° 40', Bögvad (C); Amagsalik, Lagerkranz (S); do., Bartlett (Can); Sarkarmiut 66° 18', Bögvad (C); Lakefjord, Bögvad (C); Sermilik, Kruuse (C); Liverpool Land, Sörensen (C); Jameson Land, Pedersen (O, GH); Kung Oskars hamn, Berlin (S); Suess Land, Sörensen (C); Strindberg Peninsula, Sörensen (C); Muskox Fjord, Povelsen (C); Ymer I., Dusén Fjord, Povelsen (C); Ymer I., Röda Berget, Sörensen (C); Ymer I., S. coast, Sörensen (C, S, Can).

*C. alpinum* var. *robustum* seems to me to be a recombination of the hybrid *C. alpinum × arcticum* which is more *C. alpinum*-like than the rest. *C. alpinum* var. *robustum*, *C. arcticum* var. *procerum*, *C. arc-

*Sv. Bot. Tidskr., 50: 3*
ticum var. vestitum and C. arcticum var. sordidum form a chain which may be suspected of consisting entirely of recombination types of the hybrid C. alpinum ssp. lanatum × arcticum, in the case of var. sordidum with genes of C. Regelii also present.

Var. strigosum nov. var. Pl. III: 5.

Caules plerumque dichotomi, folia parva angusta, lana alba parce pilosa. Pedicellus pilis patentibus ± glutinosus ornatus. Forma inter C. alpinum et C. Beeringianum inserenda.

Arctic America. W. Side of Bathurst Inlet, Keisall & McEwen (Can); Southampton I., Boivin (O); Digges I., Bell (G); Baffin I., Lake Harbour, Malte (Can, C, S, H, GH); Forbish Bay, Wynne-Edwards (Can); Fort Chimo, Dutilly & Lepage (Mt); Lac Tashwak, Rousseau (Mtjb); Lac Mangewac, Rousseau (Mtjb); Riv. aux Mélèzes, Dutilly & Lepage (Can); Riv. Payne 72° 7', Rousseau (Mtjb), do., 71° 21', Rousseau (Mtjb), do., 71° 23', Rousseau (Mtjb); Baie Payne, Rousseau (Mtjb); 45 mi de la Baie Korok, Rousseau (Mtjb); 32 mi de la Baie Korok, Rousseau (Mtjb); 74 mi de la Baie Korok, Rousseau (Mtjb); Leaf Bay, S. and of Ungava Bay, Carroll (Can); embouchure de la Korok, Rousseau (Mtjb): Iles Naujats (Ungava Bay), Rousseau (Mtjb).

W. Labrador. Adloylik Fjord, Rousseau (Mtjb, H); Komaktorvik Fjord, Wynne-Edwards (Can); Saglek Bay, Woodworth (C); Saglek, Rousseau (Mtjb); Ryans Bay, Woodworth (GH); Nachvak Bay, Woodworth (G); Rowsell Harbour, Abbe & Odell (Can, GH); Tikkersuk, Sewall (GH); Hebron, Polumin (Can), Cape Mugford, Potter & Brierly (GH, L); Okkak, Wynne Edwards (Can); Nain, Sewall (C, S, GH); Ice Tickle, Sewall & Weed (GH); Hoffenthal, Ubrecht (U); Hopedale, Sewall & Weed (G); Rugged I, 55° N., Wenner (S); Battle Harbour, Bishop (GH, S), do., Williamson (Mt), do., Townsend (GH), do., Gardner (GH); Battle L, Ekblaw (GH); Great Harbour, Bryant (GH); Indian Harbour, Wetmore (GH); Blanc Sablon, Lewis (Can); Net I, Abbe (GH); St Augustin, Sutherland (Can); Mollie T. Lake, Harper (Can).

Newfoundland. Fishing Head, St Anthony, Abbe 296 (GH); Pistolet Bay, Fernald et ali 28204 pro parte (GH).

Hudson Bay area. Poste de Povognituk, Rousseau (Mtjb); Port Harrison, Taylor (Mtjb); Boat Opening 55° 40', Dutilly & Lepage (Mt); Limestone I. 55° 30', Johansen (Can); Richmond Gulf, Dutilly & Lepage (GH); Great Whale R., Low (Can), do., Dutilly & Lepage (GH); Loan Island 53° 53', Dutilly & Lepage (GH); South Twin I., Porsild (Can); Charlton I., Porsild (Can, GH, S); Bear L, Coates (Can); Cape Henrietta Maria, Watson (Can); Churchill, Bell (Can); Eskimo Point, Birchet-Smith (C); Mouth of Chesterfield Inlet, Tyrrell (Can); Chesterfield, Gardner (GH); Chesterfield Inlet, Dutilly (Mt); do., Malte (Can, C, GH, S); Wager Inlet, Macoun (GH); Baker Lake, Bangsted (C); W. Branch of Telon R., Perrill (Can); Lower Thelon R., Lawson (Can).

There can be very little doubt about what Linnaeus meant by his *Cerastium alpinum*. It was naturally the plant that is so common in the Scandinavian mountains which has ever since born that name. He also included under it the plant that is named here ssp. *lanatum*. This also occurs in the Scandinavian mountains, although much less frequently. When the latter is distinguished as a separate taxon the common Scandinavian plant remains as *C. alpinum*. A representation of this plant is found in Pl. I: 4 and Fig. 2. In Fig. 3 *C. alpinum* in the Linnean herbarium in London is shown.

If hybrid forms are excluded *C. alpinum* sensu stricto is a moderately variable plant, the characteristics of which were given above. Its area is, however, not easy to state. It does not seem to be present in the British Isles where only ssp. *lanatum* is said to occur (Moss 1920, p. 46). In the Central European mountains very similar types are found, but the variation is very wide, probably partly due to extensive hybridization, and it was not possible to state with certainty that a plant fully identical with the Scandinavian occurs there. Most of the specimens should more or less definitely be referred to ssp. *lanatum*, others probably to ssp. *squalidum*. The latter type I have distinguished as a subspecies since, apart from ssp. *lanatum* and *C. glaberrimum*, it seems to be the only type of the group occurring in the Pyrenees. Its low growth, dark-green foliage, dense round basal leaves, broad rounded cauline leaves and the fine short and dense, strongly viscid pubescence of the stems and pedicels—which, according to Ramond, makes the whole plant yellowish viscid—separates it rather markedly from both *C. alpinum* ssp. *alpinum* and ssp. *lanatum*. However, according to Ramond, in lower altitudes it merges into ssp. *lanatum*.

*C. alpinum* is a rather rare plant in the Alps, and the material available to me has been small. A comprehensive study with access to a large amount of material supplemented by field studies will be necessary to clear up the question of the taxa belonging to *C. alpinum* taken in a very wide sense in the Alps and in the Balkans.

The most widely distributed subdivision of *C. alpinum* is ssp. *lanatum* (Fig. 4). A specimen in Hb. Geneva labelled "donné par M. Lamarck" which may be regarded as authentic shows a sterile shoot with rather rounded leaves, pubescent from dense very fine long white woolly entangled hairs, especially towards the tip (Fig. 1c). As shown here, ssp. *lanatum* is a very variable plant with this characteristic pubescence. Extremely woolly forms (*C. bombycinum*
Schur.) occur as well as somewhat sparsely pubescent ones which, however, have the characteristic pubescence at the tip of at least the basal leaves. The latter type prevails in America. Many specimens also have viscid hairs on the pedicels, but specimens with completely lanate pedicels occur. They are considered to correspond to *C. villosum* Baumg. They can be named *C. alpinum* ssp. *lanatum* var. *villosum* (Baumg.) Aschers. & Graebn., Synops. Mitteleurop. Fl. 5: 1 p. 619.

While the distribution of these different types is as yet obscure in most parts of the area covered by ssp. *lanatum* they prove to have a characteristic distribution in Scandinavia. Var. *villosum* is confined to an area from the Arctic Circle to approximately 70° N. This must certainly have a historical reason. Specimens seen are marked on the map Fig. 5.

Other types referable to ssp. *lanatum* occur in Scandinavia, especially on serpentine. One of them was described by Kotilainen & Seivala as *C. alpinum* var. *Nordhagenii* (Nytt Mag. f. Bot. 3, 1954, p. 145, Pl. 1).

As I said above when dealing with the conditions within different areas, *C. alpinum* ssp. *lanatum* is hardly to be found in a pure form in Spitsbergen, although specimens approaching it do occur there. Andersson & Hesselman (1900, p. 58) mention specimens which they refer to *C. alpinum*. They all clearly show characteristics of *C. arcticum* too. Tolmatchew (1930, p. 5) realizes that *C. alpinum* ssp. *lanatum* is rare in Spitsbergen and says that it is absent in the east. Lastly, Scholander (1934, p. 41) says that on “the few occasions on which typical *C. alpinum* was found [in Spitsbergen], it was always in talus or under stones”. In Greenland the conditions are different, ssp. *lanatum* is rather common, especially to the south. Although Scholander’s statement (1934, p. 41) that on the east coast of Greenland, *C. alpinum* occurs almost exclusively south of 73° N., where all transitions to *C. hyperboreum* (that is *C. arcticum* var. *vestitum*) start to occur, is exaggerated. Several *C. arcticum* specimens are represented in the herbaria from the area south of 73° N.

In America no typical *C. alpinum* occurs; all material must be referred to ssp. *lanatum* even if some of them have a rather scanty pubescence. An attempt to distinguish the American population as a separate entity failed. However, part of the material has, besides lanate hairs, more or less strigose ones like *C. Beeringianum*. They are here described as var. *strigosum*.

*Sv. Bot. Tidskr., 50: 3*
Besides the areas marked on the map, *C. alpinum* has been reported from several other districts. Reports from the Urals are, according to Tolmatchew and Fl. SSSR, erroneous. The plant occurring there is named *Cerastium Gorodkovianum* Schischkin in Fl. SSSR.

*C. alpinum* is also reported from north-western Spain. Reports from Central and South Asia and from China should be referred to other species.

It has been considered unnecessary to enumerate all the Scandinavian specimens seen, as a map is given on which all localities are marked, and as the specimens in the herbaria of Stockholm, Uppsala, Lund, Copenhagen, Oslo and Helsingfors are provided with labels of determination.

Illustrations:


Maps:

- N.W. Europe: Hultén 1950 map 687 (includes *C. glabralum*).

*Cerastium alpinum × arcticum.*


Scandinavia. See Fig. 7 (about 100 specimens examined). The southernmost dot at Lake Ladoga represents two collections, viz. Pyhäsaari July 8th, 1859 Backman (H) and Walamo “kalt berg på en av de mindre holmarna norr om klostret 1877 Neiglick” (H).

Scotland. Ben Lawers 7–800 m, Ostenfeld (C); Baariach Mts, Aberdeen, Druce (L).

Iceland. About 15 specimens seen from all parts of Iceland.

*Sv. Bot. Tidskr., 50: 3*
The specimens are often rather intermediate between the two parent species with the few-celled thick ciliae of *C. arcticum*, and (clearly noticeable) lanate, shiny, long *alpinum* hairs. The flowers are larger and flatter than in *C. alpinum* and runners are usually present. The very isolated localities on Lake Ladoga, where no *C. arcticum* is known to grow, have such obvious traces of *C. arcticum* that they must be referred to the above hybrid.

*Cerastium alpinum × Beeringianum* ssp. *terrae-novae*.

**Labrador.** Blanch Sablon, Fern. & Wieg. 3392 (GH, Mt).

*Sv. Bot. Tidskr., 50: 3*
Fig. 8. Geographical area of *Cerastium alpinum × glabratum* in Fennoscandia.

**Newfoundland.** Quirpon Harbour, Fernald & Long 28207 (GH, C); Sacred Island, Fernald & Long 28208 (GH); Broad Harbour, Fernald, Wieg. & Long 28205 (GH); Ha-ha Bay, Fernald & Long 28210 (GH, Mt); Big Broak, Wieg., Gilbert & Hotchkiss 28201, 28203 (GH); Pistolet Bay, Burnt Cape, Fernald & Long 28209 (GH).

Similar to *C. Beeringianum* ssp. *terrae-novae*, but with very noticeable *alpinum* hairs.

**Cerastium alpinum × glabratum.**


*Sv. Bot. Tidskr.*, 50: 3
Fennoscandia. See map Fig. 8. The southernmost localities in Norway are Gausdal, Berggren (S); Gaustafjeld (C) and Sætersdalen, Valle, Røskenland (O).

Iceland. Several localities (Thingvellir, Vifilsfell, Reykholt, Vallanes, Reykafjordur, Hornafjörd, Tráðarheidi, Ulfsvatn, Kjálhraun).

Those specimens which can be said to be fairly intermediate between the two species and which show strong characteristics of both are referred to this hybrid.


A. Completely glabrous.  
B. Plant erect, tall, leaves acute.  
C. Pubescent at least at the base of the leaves or at the pedicels (often slightly so).

A. Pubescent at least at the base of the leaves or at the pedicels (often slightly so).
B. Plant dwarfed, leaves blunt (serpentine form).  
C. Plant dwarfed, peduncles with short scattered glandular or viscid pubescence, leaves small, slightly pubescent.

**Var. glabratum.**


Fennoscandia. Very common in the northwest, after a gap in the area between approximately 65° N. reappearing in Norway at about 62° N. See map Fig. 11. The southernmost dot in Finland represents Salla, Vahtikkoelovaara, 1901 Axelson & Borg (H).

N. Russia. Archangelsk, insula Glauchowski in flumine Dwina extra stationem ferream, Enander (S).

Iceland. Skagafjord, Miklavatn 3–400 m, July 2, 1930 Sørensen (O); Blikalón, Aug. 17, 1934 Steindorson (C).

**Var. microphyllum** (Norm.) Hult. in Arch. Soc. Vanamo 9: suppl. (1955) p. 68, Fig. 1 e, f.

Fennoscandia. See map Fig. 12.

Fennoscandia. Common in the areas where C. glabratum occurs but also occurring somewhat outside that area. See map Fig. 13.

Iceland. Skagafjord, Miklavatn, July 2, 1930 Sørensen (C, O); Siglu-fjord, Lagerkranz (S); Grimstunga Hede, Grönlund (S).


C. alpinum var. serpentinicola Rune in Acta Phytogeogr. Suec. 31 (1953) p. 53, Fig. 34.

Scandinavia. Sweden: Tärna, S. Storfjället, Rune (S); Vilhelmina, Graipesvare, Rune (U, S, type of var. serpentinicola). Norway: Hattfjelldal, Krutå, Rune (S).

The characteristics of typical C. glabratum were discussed above on p. 414.

The name of this species is rather uncertain. No doubt C. glabratum var. glabratum is essentially what Hartman meant by his C. glabratum although he also included slightly pubescent types (here called C. glabratum var. piliferum) as his description runs (translated from the Swedish): “The plant nearly glabrous ...” Later he says “usually glabrous”.

Hartman described C. glabratum in 1820. However, already in 1813 a glabrous Cerastium was described from the eastern Pyrenees by Lapeyrouse (Hist. Abrégée des Pl. des Pyrénées p. 265). His description is short and inadequate, and specimens are very rarely found in herbaria. The Botanical Laboratory at Toulouse where Sv. Bot. Tidskr., 50: 3
Lapeyrouse’s plants are preserved, has kindly sent me an authentic specimen (Canigou, Cambres d’Azès) for examination. Besides this I have found one specimen in the Paris herbarium (Val de Eyne), one in the Oslo herbarium collected by M. N. Blytt (Valle d’Eynés) and one in the Vienna herbarium collected by Rechinger fil. (Canigou, Pic Barbet). The type specimen had the note “*Cerastium glaucum* Gren.” by D. Clos. It does not, however, belong to that species (now called *Moenchia mantica* L.) which has quite different sepals. It must be admitted that the material of this rare plant now
in my hands very closely resembles the Scandinavian *C. glabratum*. The specimens are completely glabrous, the petals, usually badly damaged, are bifurcated at the apex, the young capsules are spherical, but ripe capsules of the same type as those of *C. glabratum* are present in the Paris material. Young capsules of *C. glabratum* were also found to be spherical. It seems not only possible but probable that *C. glabratum* Hartman is identical with *C. glaberrimum* Lapeyrouse. However, the peculiar distribution of the species if the two are united—Fennoscandia, Iceland, the eastern Pyrenees—makes me hesitate to suggest this. It might therefore be best to await for *Sv. Bot. Tidskr.,* 50: 3.
more complete material of *C. glaberrimum* before making this identification.

More or less glabrous forms of *C. alpinum* have repeatedly been reported from the Central European mountains and from the Balkans. They have, however, nothing to do with *C. glabratum*. "*C. alpinum* var. *glabra* Retz." (Zafer, Fl. Polska 2, 1921, p. 220) for instance from the Polish Carpathians is a *C. alpinum* form.

In Arch. Soc. Vanamo 9: suppl. pp. 62–69 I have ventured to divide *C. glabratum* into four entities, which are repeated here. Var. *microphyllum* consists of glabrous but microphyllous specimens growing on serpentine rocks (Hultén loc. cit., Fig. 1e, f).

*Sv. Bot. Tidskr., 50: 3*
Var. *piliferum* comprises those specimens which have a few *alpium* hairs on leaves and stems.

Var. *serpentinicola* is another serpentine type characterized by dwarfed growth, small narrow, slightly pubescent leaves, and peduncles with short scattered glandular or viscid pubescence. It is probably of hybrid origin.

Illustrations:

VAHL, Icones plant. ... Fl. Danicae VI (1792) Pl. 979.
STURM, Deutschlands Flora 1: 15, H. 64 (1834) unnumbered plate.
Svensk Botanik 11 (1843) ed. WAHLENBERG & WAHLBERG Pl. 745, Fig. 2.
Sv. Bot. Tidskr., 50: 3
THE CERASTIUM ALPINUM COMPLEX

Reichenbach, Icones Fl. German et Helvet. VI (1844) Pl. 232, Fig. 4977.
Marret, Icones fl. alp. plant. 2: 6 (1911–24) Pl. 170, Fig. 2 (apparently var. piliferum).
Lagerberg, Vilda växter i Norden 2, ed. 2 (1947) colour plate 282.

Maps:
Benum, Floran i Troms Fylke, map 240.
(Both include the varieties and hybrids as well.)


A. Leaves almost glabrous or slightly hirsute on the surface, ciliated at the margin from short 3–few-celled hairs, thicker at the base but lacking alpinum hairs. Pl. II: 1–5. var. arcticum
A. Alpinum hairs present.
B. Only traces of alpinum hairs present on the leaves and on the stems. var. alpinopilosum
B. Leaves strongly pubescent from more or less lanate hairs usually coarser than alpinum hairs, often ciliated from hairs broader at the base.
C. Plant with long erect stem, not so densely tufted. Pl. III: 1. var. procerum
C. Plant low-growing, densely tufted.
D. Yellowish-green, pubescence whitish or light-coloured, calyx lobes obtuse with broad scarious margins, usually only one long-pedicelled flower developed. Pl. III: 2. var. vestitum
D. Dark-green, pubescence sordid, calyx lobes dark-coloured, more or less acute, inflorescence branched with thick branches. Pl. III: 3; II: 6. var. sordidum

Var. arcticum.


Iceland. Esja, Kjellberg (S); Hornsjördur Bergárdalur, Oskarsson (S); Hálskovi, Gröntved (C); Svineskard, Grönlund (C); Vallanes, Jonsson (C);
Sv. Bot. Tidskr., 50: 3
Eyjorbakki Kovi, Grøntved (C); Stødervorskard, Jónsson (C); Stryturs kraterrand, Ramose (U); Steinadalshedi, Jonsson (C); Gláma, Jónsson (C); Höltievíárurheidi, Kjellberg (S); Gøngudalur, Jónsson (C); Langanes, Jónsson (O).

**Faeroe Is.** Numerous specimens from Suderö, Vaagö, Strömö, Österö, Kalsö, Bordö, Kunö, Svinö, Viderö, Fuglö. The single species of the *C. alpinum* group present on Faeroe Is.

**Scotland.** Ben Nevis, Lid (O, also var. *alpinopilosum*); Ben Lawers, Lid (O, also var. *alpinopilosum*), do., comm. Bennet (S); Inverness, Duix (?)(C, var. *alpinopilosum*); W. Ross, Applecross, Lyning & Grière (C).

**Fennoscandia.**

S. Norway: Galdhøpiggen, Dahl (O); Lauvhø i Gokkerdal, Dahl (O); Gjevillflyene at Gjevillvasshytten, Dahl (O); Lesja: Grønhø, Kjølen i Slaadal, Dahl (O); Horungen, Dahl (O); Dovre, Kongsvoll and Mt Knutshø, very numerous specimens and collectors (S, O, C); Dovre, Blytt, Fries, Herb. Norm. IX, No. 38 (S); Nystudalen, Moe (O); Nystuhø, Guldberg (O), do., Nannfeldt (U); Kvaerbekk, Nannfeldt (U); Vålåsjøhø, Nannfeldt (U); Sisselhø, Nyhuus (O); Øvre Sprenbekken, Holmboe & Lid (O); Blåhø, Lid (O); Kvikne, Bjørntangen, Lid (O); Skarbøåken at Drivstuen, Möller (S); Storbøåkt at Storli, Dahl (O); Gloppen, Langvand, Dahl (O), do., Svartekari, Dahl (O); Tyrikvamfjellet, Lid (O); Brattfonnfjellet, Lid (O); Digerkampen, Lid (O); Nordre prgd., Nordre Herdal, Dahl (O); Gjerfaadal and Gruvedalen in Grønliskaret, Dahl (O); Saatbakkollen between Indre- and Sundalen, Dahl (O); Gjeithetta and Svartøhatta in Svartaadal, Dahl (O); Rinnhatten, Dahl (O); Slettaadal, Dahl (O); Foldalen, Mellemfjeld, Dahl (O); Surnadal, Millamfjellet, Rauls (O).

N. Norway: Kvæfjord, Austurfjorden Storelovatn, Reiersen (O); Lavangen, Spanstind, Normman (U); Salangen, Rundfjeld, Fridtzh (O); Bardu, Jernaowe, Notø (O); Maalselv, Baatkjerpen, Holmboe (O, U); Isdalstind, Norman (O, S, U, L); Likkavare, Norman (O, L); Kirkestind, Notø (O, U, L); Sarvesvalka, Notø (L); Moskogaissa, Normman (S); Rismaalrand (O); Maskenestind (O); Tromsø, Blytt (O); Lynen between Raigaissa and Hittamborpe (O); between Skibotten and Reisen, Jørgensen (O); Gulusjaure, Haglund & Kjellsrøm (U, L), do., Resvoll Holmen (O), do., Notø (O); Nordreisa, Nyholmen, Peters & Selander (S, L); Javreøeva, Selander (S); Skjervøy, Meijland (O); Gkatkoase, Meijland (O); Sogggum, Meijland (O); Sikkaavare, Fridtzh (O); Anasbarrevarre, Fridtzh (O); Fatavare, Meijland (O); Kvenangen Rattavarre, Notø (L); Runejorddal, Elvebakken, Notø (O); Rultovare, Notø (O); Stjernø Antonfjeld, Dahl (O); Talvik Vassbottenfjeld, Jørgensen (O).

Sweden: Njunnats at Tarrajock, Widmark (S); between Valli and Ruodnas, Hb. Cederstråle (S); Keskevarg at Vuolla Puollare, Selander & Dahlbeck (S); Hurriivare, Tengvall (S); Viriyaure, Vestgren (S); Lulletjorro, Samuelson & Zander (S); do., Smith (U), do., Asplund (U); Kopparåsen, Henriksen (S); Pelta, Smith (U); Moskana, Smith (U).

Finland: Enonteki, Mt Jekkätsch, Montell (Mt).


*So. Bot. Tidskr.*, 50: 3
Fig. 14. *Cerastium arcticum*. a, b, Type collection from Upernivik, Greenland, the same as Pl. II: 3. c, d, Norway, Dovre, the same as Pl. II: 1. e, f, Faeroe Is., Strömø, the same as Pl. II: 4, 5. All enlarged somewhat less than 3 times.

do., Danielssen (O); Advent Bay øvre Kvislådal, Lid (O); Cape Thordsen, Gyllencreutz (U); do., Thorén (U, *C. arcticum*, det. ASPLUND); Fuglehuken Mikaelsen (O); Norre Norskôen, Thorén (S).

**Arctic America.** Baffin I. Clyde, Polunin 618 (Can); Jaksut Inlet, Clark Hr. 62° 12' N., 64° 23' W., Wynne-Edwards (Can); Mill I., O'Bryan (Can); Eric Cove, Johansen (O); Labrador, Port Burwell, Porsild (Can); Bawdoin Harbour, Potter & Brierly (Mtjb); Grenfell Tickle, Potter & Brierly (GH); Nain, Fords Harbour, Bell (Can, var. *alpinopilosum*).

**W. Greenland.** Neria, Eugenius (S, GH, H); Igaliko, Berlin (S); Kangerglu 61° 04' N., Eberlin (C); Ivigtut, Böcher (C); Kuânit 62° 13' N., Porsild (C); Julianehaab, Wahl (C), do., Berlin (S, L, U); Fredrikshaab, Kolderup Rosenvinge (C), Egedesminde, Simmons (O, G, H); Disco, Opgik, Pedersen (C); Godhavn, Berlin (S, C); Svartenhuk Penins., Porsild (C); Kekertavsuak 72° 12', Ryder's Expedition (C); Upernivik, J. Vahl, "*C. arcticum* L.f. (Fl. Dan. tab. ined.), *C. latifolium* BLYTT etc., non Alp. Eur. austr.)" (U), type collection of *C. arcticum* Lange. (Specimens almost certainly from the same collection are found in S. labelled "*Cerastium arcticum* Lange, Grönland, J. Vahl", and in C. labelled "Grönland leg. Wormskjold", neither having an original label.) Parker Snow Bay 76° 07' N., Bartlett (Can).

**E. Greenland.** Nunatak N. for Prins Christians Sound, Sylov (O); Christian 4:des Ö, Kapingasak, Sylov (C); Lindenow fjord, Bögvad 279

*Sv. Bot. Tidskr., 50: 3*
(C); Takisok I. 61° 36’ N., Bögvad (O); Skjoldungen 63° 15’, Bögvad (C); Jackson I., Sörensen 4292a (GH); Ymer I. Kapp Humboldt, Vaage.

Var. *alpinopilosum* nov. var.

*C. arctico* persimile sed caules foliisque lana alba parce instructa.

**Scandinavia.** See map Fig. 17. The southernmost locality in Norway is Odda, near Folgefonna, Selland (O); the southernmost localities in Sweden are Vilhelmina, S. Gardfjällen, Rune, and Arefjällen, Skalmodal, Rune.

*Sv. Bot. Tidskr.*, 50: 3
Scotland. Ben Lawers 3200 f., Lid (O); Ben More, Macnab 1833 (S).
Iceland. Several localities in S., E. and N. Iceland.

Var. procerum (Lange) nov. comb. Pl. III: 1.
C. alpinum × procerum Lange in Meddel. om Grønl. 3, forts. (1887) p. 245.

Spitsbergen. Tempelbay, Nathorst (S); Longyearbyen, Lagerkranz (S); Green Harbour, Asplund (U, C, L, S); Kingsbay, Gois (S); Wijde Bay, Lid (O); L. O. Smiths Observatorium, Andrée (S).

W. Greenland. Sydprøven, Dahl (O); Ny Herrenhut 64° 10′, Lyng (GH, H); Godthaab Fjord, Nygaard (O); S. Strømfjord, Böcher (C); Holsteinborg, Vahl (C, var. procerum Lange, det. Lange); N. Strømfjord, Vahl

So. Bot. Tidskr., 50: 3
Fig. 17. Geographical area of *Cerastium arcticum* var. *alpinopilosum* in Fennoscandia.

(U): Ikamiut, Berlin (S); Egesminde, Björling (S), do., Gröntved (C), do., Falk (C); Querquartat 70° 79', Porsild (C, GH, H, Mt); Christianshaab, Warming & Holm (S, U); Jakobshavn, Yahl (C, var. *procerum* det. LANGE); Claushavn, Berggren (S, U); Godhavn, Fries (U), do., Berlin (S), do., Kleist (S, U, L), do., Ekman (S); Disco, Porsild (C, Can, S, GH, H), do., Pedersen (C), do., Nygaard (Mt), do., Gröntved (C), do., Valiquette (Mt), do., Lagerkranz (S), do., Erlandson (S); Ingnerit Fjord, Porsild (C, GH, H, O); Nugsuak Penins., Porsild (C, GH, H); Cape Shackleton, Björling (S, U); Tasiusak, Wulff (C); Holms I., Björling (S); Carey I. 77° 37', Salomonsen (C); Whale Sd, Netiuleme, Wetherill (L); Etah, McMillan (Can), do., Ekblaw (GH, H), do., Robinson (GH, H), do., Valiquette (Mt); Melville Bay, Thorn I., Langberg & Rasmussen (C); Foulke Fjord, Simmons (GH, H, O).

*So. Bot. Tidskr.*, 50: 3
Fig. 18. Vegetation with *Cerastium arcticum* var. *vestitum*. Wijde Bay, Spitsbergen. Photo G. Wängsjo.

**E. Greenland.** Anarkat 61° 17', Bögvad (C); Storftjord radio, Scholander (O); Torsukalik 65° 48', Bögvad (C); Dronning Marie dalen, Björlykke (O); Tasiussak 65° 37', Kruuse (C), do., Bögvad (C), do., Rüttel (C); Cape Inninger 68° 10' (C); Kapp Herschel, Vaage (O); Cape Brewster, Hartz; Kap Dalton, Böcher (O); Scoresby sound 70° 20', Lagerkranz (S), do., Sörensen (Mt, C); Cape Warming, Kruuse (C); Gåslandet, Hartz (C), do., Sörensen (C); Kung Oskars Fjord, Hauken & Sulebak (O); Muskoxefjord, Gredin (U, S); Geographical Society L, Vaage (O); Cape Hedlund, Seidenfaden (C); Cape Franklin, Seidenfaden (C); Bottom of Franz Joseph’s Fjord, Seidenfaden (C); Traill I., Sörensen (GH); Hold with Hope, Seidenfaden (C); Andrée Land 73° 18’, Seidenfaden (C); Ymer I., Povelsen (C), do., Vaage (O); Moskusoksefjord, Seidenfaden (C), do., Vaage (O); Antarctic-hamm, Aandstad (O); Loch Fynes 73° 55’, Seidenfaden (C); Granitdalen, Seidenfaden (C); Clavering I., Sörensen (C), do., Vaage (O).

Lange describes *C. alpinum γ procerum* as follows: “Caules robusti et elati, ramis elongatis cymoso-divaricatis, pedunculis 1–2’ longis ceterum ut α [C. alpinum β lanatum].”

**Var. vestitum** nov. var. Pl. III: 2.

*C. arctico* simile sed densius caespitosum; caulis pilis patentibus viscosis dense vestitus; folia praecipue versus apicem dense lanata.

Sv. Bot. Tidskr., 50: 3
Fig. 19. *Cerastium arcticum* var. *vestitum*. Wijde Bay, Spitsbergen. Photo G. Wångsjö.


**Iceland.** Solheimar, Jónsson (C); Krakatindshraun, Jónson (C); Faskrúðsfjördur, Mörner (U); Seydisfjördur, Strömfelt (S); Vallanes, Jónsson (C); Eskifjärdur, Strömfelt (S); Reykjavik, Krabbe (C, S), do., Warming & Holm (C); Tingvalla, Jessen (C); Fell, Böving & Harder (C); Breidabolsstadir, Omang (O); Skeid, Löwe (S); Ísafjarðardjúp, Stefánsson (C); Nordfjord Rydr (L); Akureyri, Lagerkranz (S, U); Dysefjord, Ostenfeld (C).

**Jan Mayen.** Numerous collections from different places by Dusén (S), Gredin (U), Kruuse & Hartz (C), Ostenfeld (C), Gandrup (G), Danielsson (O, U), Lid (O), Rygg (O), Aandstad (O), Vaage (O), Kjellesdal (O).

**Beeren Island.** Several collections.

**Spitsbergen.** Very numerous collections from all parts of Spitsbergen.

**Novaya Zemlya.** S. of Archangel Mt., Lyngseidet, Pearson-Feilden (S); Karmakulski, Alm (S), do., Ekstam (S, transition to *C. alpinum* ssp. *lanatum*).

**Arctic America.** Melville I., Winter Harbour, McMillan (Can), do., Linddon Gulf, Jenness (Can); King William Land, Lindström (O), do., Rasmussen (C); Adelaide Penins. 67° 55’ N., 98° 40’ W., Lawson (Can); Prince of Wales I., Fortier (Can); Cornwallis I., Michéa (Can); Melville

*Sv. Bot. Tidskr., 50: 3*
Fig. 20. Total area of *Cerastium arcticum* var. *vestitum*.

Penins., Repulse Bay, Olsen (G); Igloolik “Fury & Hecla” (S), do., Parry (C); Fern I., Parry (C); Island of Naerlo Nakto, Parry (G); Duckett Cove, Parry (C); Beechy Island, Lyall (S), do., Pullen (S); Wellington Channel, Lyall (S); Isthme de Boothia, Lavardière (Mt); Northumberland Sound, Lyall (S); Vansittart I., Freuchen (C, Can); Southampton I., Coral Hbr, Boivin (Mt, S, U), do., Pady (Mtjb); Southampton I., Malte (Can, GH, C); Coats I., Porsild (Can); Chesterfield Inlet, Savill & Watts (S); Fullerton, Borden (Can); Baker Lake, Porsild (Can); Churchill, Macoun (Can, GH, C), do., Ritchie (Hb Winnipeg), do., Beckett (Hb Winnipeg); Cape Henrietta Maria, Spreadborough (Can); Manitounok I., Dutilly & Lepage (GH); Great Whale R. Bow (Can); Smith L, Malte (Can), GH, S, C), do., Polunin

*Sv. Bot. Tidskr., 50: 3*
(Can); Cape Smith, Polunin (G); Nottingham I., Johansen (C); Digges I., Bell (GH), do., Baldwin (GH, Can); Salisbury I., Manning (Can), do., Burwash (Can); Wolstenholme, Malte (Can, GH); Eric Cove, Johansen (C); Quatrième Chûté de la Kogaluk, Rousseau (Mtjb); Diana Bay, Carroll (Can); Poste de Payne Bay, Rousseau (Mtjb, S); Baie Payne, Rousseau (Mtjb); Baie Kayak, Rousseau (Mtjb); Baffin I. Kekerten I., Soper (Can, C, S); Pangnirtung, Malte (GH, Can, S), do., Soper (Can, C), do., Turner (GH); Hoffman Cove long. 67° 25' W., Bartlett (Mt); Koukdjuak R., Soper (Can); Blacklead I., Soper (Can); Eclipse Sound, Tyrrell (Can), do., Freuchen (C, Can), Pond Inlet, Joy (Can); Netilling Lake, Soper (Can); Forbisher Bay, Wynne-Edwards (Can), do., Thacker (Can); Ashe Inlet, Tyrrell (Can); Cape Dorset, Burwash (Can), do., Soper (Can); Clyde I., Button Point, Mathiasen (C); Bylot I.; Ponds Inlet, Mathiasen (C); Arctic Bay, Malte (GH).

Ellesmereland. Alert, Gadbois & Laverdière (S); Seagull Rock, Simmons (O); Fram Harbour, Simmons (O, H, C, GH); Harbour Fjord, Simmons (O, S, U); Cocked Hat Island, Simmons (O); Cape Hallowell 70° 8' N., Freuchen (C); Clarence Head, Wetherill (GH); Grinnell Land, Lady Franklin Bay, Greely (GH); Craig Harbour, Fiedler (Can), do., Mackenzie (GH), do., Soper (C), do., Kearney (Can, S), do., Malte (Can, GH, C); Brevoort I., Fosheim (O).

W. Labrador Coast. Lady Job's Harbour, Wynne-Edwards (Can, S); Bowdoin Harbour, Potter & Brierly (GH); Port Burwell, Macoun (GH, Can), do., Malte (Can, GH), do., Borden (Can), do., Soper (Can), do., Robinson (GH); Eclipse Harbour, Forbes (GH); Greenfell Tickle, Potter & Brierly (GH, Mtjb); Kangalaksiovik, Bryant (GH), do., Abbe (Can, S); Nashvak, Palmer (GH); Precipice Mt, Abbe. (GH, Can); Kaumajet Mts., Wenner (S); Razorbacck Harbour, Abbe (GH); Ryans Bay, Woodworth (U, GH); Bishop's Mitre, Abbe (GH); Rama, Sornborger (GH); Hebron, Forbes (GH), do., Soper (Can); Turnavik, Porsild (Can); Port Mauvers, Potter & Brierly (GH); Hoffenthal, Hohenacker (U); Greedy I., Bryant (GH); Indian Harbour, Waghorne (Can); Battle I., Potter & Brierly (GH); Blanc Sablon, Fernald & Long (GH).

Central and S. Labrador. Knob Lake area, Burnt Creek, Hustich (Can); Mingan Is., Ile Saint-Charles, Marie Victorin & Rolland-Germain 25546 (Mt, GH) and 21633 (Mt, GH, S).

Greenland. Very numerous specimens with innumerable forms from all parts of both West and East Greenland (see map Fig. 20).

Var. sordidum nov. var. Pl. III: 3, Fig. 21 b.

Inflorescentia ramosa, ramis incrassatis divergentibus, glutinosis; folia sordide viridia griseolanata; sepala acuta, hirsuta, glutinosa, atroviolacea, margine anguste scarioso; petala quam sepala paulum longiora.

C. hyperboreum Tollm. pro parte.

Spitsbergen. Sydkap, Keilhau (10); Hornsund, Heintz (O); Bellsund, Van Keulen Bay, Lyng (O); Recherche Bay, Lyng (O); Davis dal, Lid Sv. Bot. Tidskr., 50: 3
Fig. 21. a, Cerastium Fischerianum, Aleutian Islands, Atka, Hultén 6970. b, C. arcticum var. sordidum. c, C. Edmundstonii, Unst, the same specimens as Pl. II: 7. All enlarged somewhat less than 3 times.

(O); Van Mijen Bay, Lyne (O), do., several places, Lagerkranz (S; type of C. hyperboreum Tolm.); Lomseberget, Lid (O); Advent Bay, Jörgensen (O); Kapp Boheman, Lid (O); Longyeardalen, Lagerkranz (S, O); De Geers dal, Lid (O), do., Hadae (O); Tornedalen, Lid (O); Sassenbay, Resvoll-Dieset (O, C, S), do., Lundström (S); Diabasalen, Hadae (O); Englishbay, Resvoll-Dieset (O); Pyramidberget, Lagerkranz (S, O); Flowerdalen, Hadae (O); Kap Boheman, Hansson (S), do., Högbom (S); Dickson Bay, Lid (O); Kapp Smith, Lid (O); Prince Charles Foreland, Resvoll-Dieset (O); Ny-London, Mikaelson (O); New London, Lagerkranz (S); Wijde Bay, Lid (O), do., Hög (O); Andrébrae, Isachsen (O); Murchison fjord, Scholander (O, S); Lomfjord, Scholander (S); Sjuöarna, Phipps I., Dahl (O); Barentsöya, Dahl (O); Stans Foreland, Kvalpynten, Keilhau (O); Kong Karls Land, Dahl (O).

Franz Josef Land. Bellöya, Eirahamn, Hanssen (O); Camp Ziegler, Hansen (O); Kapp Forbes, Hansen (O, C); Kapp Nansen, Hansen (O), do., Malmberg (O).

Novaya Zemlya. Gribovii, Lynge (O).

Arctic America. King William I., Gjöa Harbour, Larsen (Can); Prince Patrick I., Mould Bay, MacDonald (Can), do., Handley (S); Melville I., Winter Harbour, McMillan (Can); NW. Victoria I., Richard Collinson Inlet, Jenness (Can); SW. Victoria Land, Porsild (Can); Banks Land, near NE. Corner, Porsild (Can), do., De Salis Bay, Porsild (Can), do., Cape Crozier, Manning & Macpherson (Can); Ischsen Land, Heywood (Can), do., Taylor (Can); Fury & Heckla Strait, Igloolik I., Freuchen (C); Vansittart I., Danske Óen, Freuchen (C); Southampton I., Duke of York Bay, Mathiasen (C); Chesterfield Inlet, Savile & Watts (Mt); Lower Kazan R., Qarlortoq, Birket-Smith (C); Cape Henrietta Maria, Watson (Can); Nottingham I., Bell (U); Baffin I., Arctic Bay, Malté (L); Eclipse Sound, Malté (Can, GH); Cumberland, Gran (O); Cape Dorset, Burwash (Can); Lake Harbour, Malté (Can); Resolution I., Wynne-Edwards (Can); N. Devon, Dundas Harbour, Malté (Can); Ellesmereland, Harbour Fjord, Simmons (O, C, L); Craig Harbour, Soper (Can); Grant Land, McGregor (C); Slidre Fjord, Tener (Can); Clarence Head, Cook (GH); Alert, Gadbois & Laveridère (Mtjb);
Cape Belknap, Bruggeman (S); Parr Inlet, Mac Donald (Can); Seagull Rock, Simmons (S); Cornvallis I., Michéa (Mtjb), do., Collins (Can).

**W. Greenland.** Nordfjord, Povelsen (C); Myrsuaq 70° 44', Porsild (Can); Upernivik, Ekman (S); Melville Bay, Kuvdlorsuak 74° 36', Johansen (C); Thule, Freuchen (C); Washington Land, 70° 47', Koch (C, M1); Murchison Sound, Nygaard (C, GH); McCormick Bay, Meehan (Can); North Star Bay, Ekblaw (GH); Etah, Ekblaw (GH); Anoritok 77° 30', Ekblaw (GH); Saunders I., Ekblaw (GH); Parker Snow Bay, Borden (Can); Netiuleme, Wetherill (GH); Netlik Bay, Hay's Arct. Exp. (GH); Ingerfield Gulf, Cape Acland, Wetherill (GH); Carey I., Wetherill (GH); Fan Glacier, Wetherill (G); Ingerfield Land, Russell Bay, Nygaard (C); Pandora Harbour, Bartlett (Can); Navy Cliff Land, Freuchen (C); John Murray I. 82° 45', Wulff (Can).

_Sv. Bot. Tidskr., 50: 3_
E. Greenland. Cape Dalton, Böcher (C); Cape Stewart, Sørensen (C); Cape Hooker, Sørensen (C); Cape Hope, Sørensen (C); Jameson Land, Pedersen (C); Scoresby sound, Sydkap-Øen, Sørensen (C); Canning Land, Sørensen (C); Hold With Hope, Sørensen (C); Suss Land, Kempe Fjord, Seidenfaden (Can); Scoresby sound, Danish Settlement, Sørensen (C); 72° 12', 72° 14', Schwarzenbach (C); Cape Seaforth, Kruuse (C); Gauss Penins., Sørensen (C); Holland L., Sørensen (C); Moskusoksefjord, Povelsen (U); Danmarks Havn, Lundager (C); Kaiser Franz Josephs Fjord “Germania” (S); Grant Fjord, Bartlett (Can); Clavering L., Seidenfaden (C); Cape Borlace Warren, Hartz (C), do., 74° 18', Seidenfaden (C); Kuhn L., Sørensen (C, Can); Home Foreland, Sørensen (Mt); St Koldewey L., Sørensen (C); Danmarkshavn, Sørensen (C); Skærfjord, Sørensen 77° 40' (C); Cape Bismark 76° 45', Koefoed (C); Sabine L., Hartz (C), do., “Germania” (U); Norske I., Seidenfaden (C, Can); 80° 10', Koch (C); Adam Bjerrings Land, Freuchen (C).

As *C. arcticum* has been the subject of much speculation and has been very differently evaluated by different authors since its discovery up to the present time, it might be valuable to give a review of these speculations.

In Scandinavia neither Linnaeus nor Wahlenberg (1812) distinguished *C. arcticum*, but included it in *C. alpinum*. It was first recognized as different from that species by Smith (Engl. Bot., 1798, No. 477), who identified the Scottish plant with *C. latifolium* L. In Scandinavia it was first distinguished by Lindblom (1837–38, p. 334), who also identified it with *C. latifolium* L. At the same time Lindblom distinguished two variations of his *C. latifolium*, viz. *a. pulvinatum* and *b. laxum*, the latter doubtless being the hybrid *C. alpinum × arcticum*.

The next step towards a better understanding of the plant was made by Sowerby (Engl. Bot. 1864, p. 87), who describes it as *C. latifolium* var. *β compactum* and he also realized that that plant was the *C. latifolium* of Scandinavian authors. In 1878 Stein (1878, pp. 22, 26) suggested that our plant was identical to *C. uniflorum* Clairv., a plant which it actually resembles more than *C. latifolium*, and which is its closest relative. Strangely enough this proposition was not taken up by later authors. Hooker, Stud. Fl. ed. 3 (1884) p. 60 named our plant *C. alpinum* var. *Smithii* (incl. *C. Edmondstonii*).

The first to recognize our plant as a separate species was Lange (1880, p. 7), and the new species was illustrated in Flora Danica, Fasc. 50, Tab. 2863. The type specimens came from Upernivik in W. Greenland and had been collected by Vahl. A specimen out of
this collection is preserved in the Uppsala herbarium. Lange considers that his *C. arcticum* is probably the same as that described as *C. alpinum* d. uniflorum by Durand (1856, p. 189). Ley (1887, p. 373) sent specimens from Snowdon through Bennett to Lange who identified them with his *C. arcticum* (1887, p. 374).

Williams, who examined authentic material of Lange's *C. arcticum* came to the conclusion that it is a hybrid between two forms of *C. alpinum* (1898: 2, p. 386). Marshall opposes this view (1898, p. 440) and considers it to be a distinct species different from *C. latifolium*. To this criticism Williams replies that he now considers the plant to be a form of *C. latifolium* "with smaller seeds, for which the varietal name Smithii Syme may be retained" (1898: 2, p. 493).

In Murbeck's excellent treatment of the genus *Cerastium* (1898, p. 246) Murbeck & Ostenfeld identify our plant with *C. latifolium* ß Edmondstonii Wats. as Marshall actually had also done (1898, p. 440). Edmondstonii being (as a varietal name) older than *arcticum* (as a specific name) Murbeck & Ostenfeld, against the present rules of nomenclature, consider it to have priority and create the specific name *C. Edmondstonii* (1898, p. 247), although Murbeck regards the older name *C. arcticum* and his new *C. Edmondstonii* as synonyms.

Andersson & Hesselman (1900, p. 60) illustrate a specimen of "*C. edmondstonii*" from Norra Norsköen, Spitsbergen, stating that it coincides fairly closely with specimens from Iceland. Hegi (1912, p. 368) still refers *C. latifolium* to "Südliches Scandinavien", while Ascherson & Graebner (1919), realizing that the Scandinavian plant differs from *C. latifolium*, refer it to *C. Edmondstonii*. Asplund (1918, p. 27) refers both Spitsbergen and Greenland specimens to *C. arcticum*. Druce in Moss (1920, p. 47) regards our plant as *C. arcticum* Lange and gives a map of its area in the British Isles (Map 20). He redescribes the species and cites it as "*C. arcticum* Lange Fl. Dan. 1, 7, t 2963 (1880) tab. emend.''. He excludes the seeds illustrated in Fl. Danica from the characteristics of that species. Its distribution is given as Scotland [Zetland, forma nigrescens = *C. Edmondstonii*], Faeroes, Scandinavia, Spitzbergen, Greenland.

In Rhodora 22 Fernald and Wiegand treated the boreal American *Cerastia* of the section Orthodon (1920, pp. 169–179). They write (p. 175): "The name *C. arcticum* Lange originally covered a mixture, part of it generally conceded to be a hybrid. The true species involved was the present plant. Many authors are inclined to drop
the name *C. arcticum* or to restrict it to a hybrid, but we follow Druce in Moss, Cambr. Brit. Fl. III 47 (1920).” In the area they include “perhaps arctic America” and refer doubtfully two collections to it, viz. Melville I., Parry’s 1st Voy. 1819–20 and Point Barrow, Alaska, Murdock.

Tolmatchev (1930, p. 3) considers that *C. arcticum* is absent from Spitsbergen. Peculiarity enough, he considers that species to be characterized by no or practically no scarious margin to the sepals, while it has in fact rather broadly scarious margined sepals.

As late as in 1934 Scholander (1934, p. 41) regarded *C. arcticum* in Greenland as a variety within the form-series of *C. alpinum*, a view accepted by Polunin (1954, p. 89), where he refers all Greenland material of the group to *C. alpinum*, thus coming back to the view of the 18th century.

After having studied the large amount of material represented in the museums mentioned in the introduction the present author came to the following conclusions:

In Scandinavia, Scotland, the Faeroe Islands and Iceland a plant is present which is completely identical in all these regions. Its characteristics were given in this paper on p. 415. It has never been given a species name of its own based on material from any of these places.

The plant from W. Greenland described as *C. arcticum* Lange is not fully identical with that plant as is the case with all specimens from the Arctic (Spitsbergen, Greenland, Arctic America), but the differences are so small, mostly a somewhat denser pubescence in the Arctic plant, that I must regard them as belonging to the same species, which I consequently name *C. arcticum* Lange.

The name *C. Edmondstonii* Murr. & Ostenf. must be discarded because the authors themselves say that it is a new name for the older *C. arcticum* Lange. They also include in their *C. Edmondstonii* another plant, *C. latifolium* ß *Edmondstonii* Wats. In my opinion it is so different that it is best regarded as a separate species in which case the name *C. Edmondstonii* should be reserved for that plant. If, as might be advocated, it is regarded merely as a serpentine variety of the first mentioned plant, its specific name must however be *C. arcticum* as that is the older of the two names. To regard it merely as a form of *C. arcticum*, as Druce does (f. nigrescens Druce in Moss, Cambr. Fl. 3, p. 48) seems impossible to me (compare Pl. II: 7 and Fig. 21c).

*Sv. Bot. Tidskr.*, 50: 3
However, only a small fraction of the material centring around C. arcticum can clearly be referred to that species. Most specimens differ more or less markedly from it. The problem might best be studied in Scandinavia on account of the abundant material and the comparatively detailed knowledge that we have of the Scandinavian mountain flora. C. arcticum has, as stated above, very characteristic, thick, short few-celled hairs and lacks alpinum hairs, and it is a low tufted plant with runners. It is quite obvious that very numerous types occur which show different combinations of the characteristics of C. arcticum and C. alpinum. Such types are especially numerous and especially arcticum-like in areas close to those where pure C. arcticum occurs. This must be interpreted as implying that C. alpinum and C. arcticum cross and that the hybrids back-cross with the parent species. To bring some order into this multitude of types I have divided the intermediate forms into two groups. The first has obvious characteristics from both parent species, usually pubescence and taller growth from C. alpinum, and large flowers with rounded base, broad and strongly scarious-margined sepals, runners and short, at the base thicker, hairs on the margin of the upper leaves in particular from C. arcticum. This group I have regarded as C. alpinum × arcticum. The second group has the general appearance of C. arcticum but clear traces of alpinum hairs. They are called C. arcticum var. alpinopilosum. As will be seen from the Scandinavian maps of these types and of C. arcticum (Figs. 7, 16, 17) the last-mentioned has a gap in its area between 63 and 67 degrees of latitude while in the northern part of this gap between 65° and 67° both C. alpinum × arcticum and C. arcticum var. alpinopilosum occur. In southern Norway C. arcticum var. alpinopilosum was seen from Odda in Hardanger, nearly two degrees latitude south of the southernmost C. arcticum. The influence of C. arcticum thus goes considerably outside the areas where the pure species are known to occur.

These same groups can be distinguished in the material from Scotland and Iceland, while in the Faeroe material only very faint traces of alpinum hairs could be suspected to be present in two specimens.

The conditions are not the same in the Arctic. There are numerous different forms occurring there, which I have ventured to divide into four types, namely C. arcticum var. arcticum, C. arcticum var. procerum, C. arcticum var. vestitum and C. arcticum var. sordidum.

_Sv. Bot. Tidskr., 50: 3_
These variations are referred to *C. arcticum* and not to *C. alpinum* since, with the exception of var. *procerum*, they have the caespitose low growth of *C. arcticum* and they all have runners, the rounded base of the calyx and often shorter, stiffer hairs mingling with the lanate *alpinum* ones, all these being *arcticum* characteristics. In the Arctic no *C. alpinum* of the Scandinavian type occurs, but only ssp. *lanatum*. The difference in the population *might* be due to this fact, and to the presence in Greenland of yet another species, *C. Regelii*. To var. *procerum* are referred specimens showing the erect growth of *C. alpinum*, but with obvious *arcticum* characteristics, to var. *vestitum* the great bulk of material with low, densely caespitose growth, with both coarse and lanate hairs, yellowish-green foliage and flowers and calyx like *C. arcticum*, while lastly to var. *sordidum* are referred specimens with dark green foliage, greyish lanate hairs, dark-coloured triangular calyx leaves and, for the most part, petals only just exceeding the calyx in length.

An attempt to differentiate this ample material into more numerous groups failed after weeks of work, as the groups became too arbitrarily demarcated one from the other. Moreover the delimitation between var. *vestitum* and var. *sordidum* is sometimes somewhat obscure.

The interpretation of these conditions unparalleled in my taxonomical experience, seems to me to be that *C. alpinum* ssp. *lanatum* and *C. arcticum*, and in the northern part *C. Regelii*, through hybridization and subsequent back-crossing—intrusive hybridization—form hybrid swarms, and have become so mixed that practically all specimens are mixtures. Through recombinations new taxonomical units are constantly being formed. They are not intermediates but display re-combinations of the characteristics that mark their parents. Var. *sordidum* occurs practically within the same area as *C. Regelii*, and it must be suspected of containing *Regelii* genes, especially as it bears some resemblance (calyx) to those specimens which quite obviously are the hybrid *C. arcticum* (incl. var. *vestitum*) × *Regelii*.

Arctic specimens referred to *C. alpinum* ssp. *lanatum* and to *C. arcticum* respectively can also be suspected in most cases of possessing genes from the other species, even if the respective type is very clearly predominant.

*C. arcticum* as considered here is one of the northernmost plants in the world. It occurs in the extreme north of Greenland and on

*Sv. Bot. Tidskr., 50: 3*
the northernmost islands in the American Archipelago. Ripe capsules (especially of var. *vestitum*) are often seen even in the northernmost specimens. It flowers early, considerably earlier than other species. Compare Andersson & Hesselman (1900, p. 63).

Illustrations:

Fl. Danica fasc. 50, tab. 2863.
Warming, Bot. of the Faeroes, 1901, p. 60.
Gröntved 1942, p. 220.

Maps:

The British Isles: Moss 1920, p. 47.
Iceland: Gröntved 1942, p. 221.
NW. Europe: Hultén 1950, map 688.
Lule Lappmark: Selander 1950, map 232.
Alaska: The plant mapped as *C. arcticum* in Hultén 1944, map 522, is here referred to *C. Beeringianum*.

In all these maps the hybrid forms are also included.

*Cerastium arcticum* × *glabratum*.


Fennoscandia. See map Fig. 23.
Iceland. Several localities (Thordalsheide, Homafjordur, Hjalpleisa, Vididalur, Trollafoss, Hofnarfell, Litli Langidalur, Krykii ved Svinavatn).

Very glabrous specimens possessing *arcticum* hairs are referred to this group. A few specimens are rather *C. arcticum*-like, but are almost completely glabrous. Such specimens are especially common in Iceland but occur also in Scandinavia.

*Cerastium arcticum* × *Regelii*.

*C. alpinum* × *Regelii* Tollm. in Skr. Svalb. og Ishavet 34, 1930, p. 8, fig. 2. — "Intermediary forms between *C. alpinum* and *C. Regelii*" Gelting in Meddel. Grönl. 101: 2 (1934) p. 44.


Spitsbergen. Sørkapplandet Kistefjell, Lid (O); Björnbeinflyan, Lid (O); Sydkapplandet, Hansen & Storstad (S); Hornsund, Malmgren (S), do., Tornøe (O), do., Gåsehamna, Tornøe (O); Recherche Bay, Lid, do., Lynge Sv. Bot. Tidskr., 50: 3
(O); Van Mijen Fjord, Berggren, do., Lagerkranz (S), do., Lid (O), do., Lyng (O); Van Keulen Bay, Andersson & Hesselman 168, 636 (S), do., Lyng (O); Axelöya, Tornoe (O); Adriabukta, Tornoe (O); Vårsolbukta, Hadaë (O); Mitterhuenken, Lyng (O); Kap Staratschin, Kjellman (U, C); Kapp Boheman, Lid (O); Dickson Bay, Lid (O), do., Dahl (O); Cape Thordsen, Gyllencreutz (U); Store Gåsöy, Tornoe (O); Green Harbour, Lid (O), do., Wirén (U); Gipsbay, Asplund (U); Sassenalen, Lundström (S); Sassen Bay, Rustad (O), do., Resvoll-Dieset (O); Advent Bay, Kjellman (S), do., Danielsson (S), do., Lagerkranz (S), do., Mikaelson (O), do., Ekstam (S), do., Resvoll-Dieset (O), do., Resvoll-Dieset (O), do., Fries (U, S), do., Högbon (S): Hjorthamn, Lagerkranz (S), do., Thor (O); Longyearadaln, Lagerkranz (S, O); Longyearbyen, Scholander (O, S); Adventpynten, Lagerkranz (S, O); Gåsöarne, Björling (S); Colby, Resvoll-Dieset (O), do., Asplund (S), do., Ekstam (S); Kingsbay, Lid (O), do., Dahl (O), do., Lagerkranz (S); Wijde Bay,
Novaya Zemlya. Matotchkin Shar, Belucha Bay, Feilden (C); Nordre Gaaseberget, Lyngne (O, pro parte).

Franz Josef Land. Cape Grant, Fischer (C), do., Cape Neale, Fischer (C).

Arctic America. Banks I., NW. Coast, Bernard I., Porsild (Can), do., Mercy Bay, Manning (Can), do., NE.-Corner, Porsild (Can); Victoria Land, Head of Minto Inlet, Porsild (Can); Prince Patrik I., Mould Bay, MacDonald (Can); Cape Lambert, Destaffany (C); Baker Lake Birket, Smith (C); Ellesmereland, Slidre Fjord, Troelsen (Can), do., Ravine Creek, MacDonald (Can), do., Cape Sheridan, Kelsall (Can), do., Goose Fjord, Simmons (O), do., Cape Rutherford, Simmons (O), do., Fort Conger, Hansen (C), do., Fram Harbour, Voliquette (Mt); Cornwallis I., Resolute Bay, Ritchie (Can), do., Warren, Wilson (Mtjb); Sommerset I., Port Leopold, Malte (Can); Baffin I., Arctic Bay, Polunin (Can, GH).

E. Greenland. Cape Stewart, Sorensen (C); Hurry Inlet, Sorensen (C), do., Bøgved (O); Fleming Inlet, Kruuse (C); Liverpool Land 70° 25', Pedersen (Mt); Myggbugtka, Aandstad (O, S); Holland I., Sorensen (C); Cape Tobin, Sorensen (C); Jackson I., Sorensen (C); Hold With Hope, Hartz (C), do., Sorensen (C); Clavering I., Eskimones, Sorensen (C, Mt); St. Koldeway I., Sorensen (C).

N. Greenland. Low Point 83° 6' N., Wulff (G, Mt).

More or less intermediate between the parent species. C. Regelii is characterized by its often almost glabrous runners and densely tufted growth. The leaves have scattered pubescence and the flowers have long petals compared with the calyx. When this taxon is called C. arcticum × Regelii it is left undecided which one of the arcticum varieties distinguished above is the one component in the hybrid.

Andersson & Hesselman (1900, p. 58) had already realized that there are intermediate forms between “C. Edmondstonii” and “C. alpinum γ caespitosum”, that is, between C. arcticum and C. Regelii. Ostenfeld denied the existence of such intermediate forms (1909, p. 11).


Shetland Islands. Unst, serpentine hills, Beeby (S, H, L), do., Balta sound, Beeby (L), do., S. Ekman (S).

There has been much discussion about this plant. Its round leaves and sepals, its characteristic pubescence (Fig. 21c) and its dark colour make it very distinct from C. arcticum. On the other hand it is apparently a serpentine type and it hardly differs more from C. arcticum than the very peculiar serpentine forms of C. alpinum differ from that species. It might therefore also be taken for a very remarkable variety of C. arcticum. Compare also pp. 415, 461 above.


Beeren I. Sørhavnen, July 23, 1868 Fries; Beeren I., Andersson & Hesselman 637 (S), do., Cape Forbes, Lid (O), do., Cape Levin, Lid, pro parte (O).

W. Spitsbergen. S. Cape, Sept. 1927, Keilhau (O); Sörkapplandet, Fyrlandet, Aug. 19, 1920, Raunkiervfelt (O), do., Steinbruvatnet, Aug. 13, 1920 Raunkiervfelt (O); Davidsonham, July 29, 1936 Dahl (O); Kvalhovden, July 30, 1936 Dahl (O); Hornsund, Aug. 18, 1928 Tornør (O), do., Goës Bay, Aug. 22, 1899 Birula (C); do.; Traupynnten, July 20, 1949 Heintz (O); Belsund, van Mijen Bay, Lyng (O), do., July 18 and 21, 1920, Lid (O), do., Van Keulen Bay, Andersson & Hesselman 177, 177b (S), do., July 19, 1926 Lyng (O), do., Axelöya, Aug. 16, 1928 Forhoye (O); do., Recherche Bay, Aug. 25, 1920 Lid (O), do., July 16, 1926 Lyng (O); Calypsobergen, July 3, 1936 Dahl (O); Kapp Wærn Aug. 14, 1949 Mikaelsen (O);

Sv. Bot. Tidskr., 50: 3
Fig. 24. *Cerastium Regelii* from Spitsbergen.  
*a*, The same specimen as Pl. IV: 1.  
*b, d*, Completely glabrous specimens.  
*c*, Specimen with ciliated leaves. All enlarged about 3 times.

Cape Linné, July 9, 1933 Hagen (O), Linné valley, July 11, 1933 Hagen (O); "Linnévattnet", Sept. 1, 1928 Tornoe (O), do., July 13, 1933 Hagen (O); Isfjord fyr og Radio, July 8, 1933 Hagen (O); Braganza distr., Aug. 1916 Lundström (S); Sveagruvan, 1922 Hemming (S), do., July 8, 17 and 19, 1925 Lagerkranz (S); Green Harbour, Barensbay, Aug. 5, 1925, Meyer (O), do., Aug. 31, 1920 Lid (O); Van Mijen Bay, July 8, 15 and 19, 1925 Lagerkranz (S), do., Aug. 9 and 16 1926 Lynge (O); Sassenbay, July 31, 1896 Jorgensen (O, C); Pyramidberget, Aug. 19, 1932, Lagerkranz (S, O); De Geer valley, July 20, 1939, Hadaæ (O); Tempelbay, July 22, 1882 Nat-horst (S); Gipsbay, Aug. 7, 1924 Lid (O); Advent Bay, Goës (O), do., July 21, 1896 Jorgensen (G), do., July 27, 29, 1926 Lagerkranz (S); Advent City, Aug. 4, 1949 Mikaelson (O, C); Danielsson (S, pro parte) Hotelneset, Iversen (O); Longyearbyen, Lagerkranz (S), do., June 21 and 31 and Aug. 23, 1931 Scholander (O, S); Longyeardalen, Aug. 6, 1949 Mikaelson (O); Dickson Bay, Aug. 8, 11, and 26, 1924 Lid (O), do., July 8 and 9, 1936 Dahl (O); Colbay, Aug. 6, 1908 Resvoll-Dieset (O, C); Billenbay, Aug. 8,  
*Sc. Bot. Tidsskr.*, 50: 3
Fig. 25. Total area of Cerastium Regelii.

1928 Fornoe (O); Sarsøya, Aug. 2, 1949 Mikelsen (O); Prince Charles Foreland, June 3, Andersson & Hesselman (S); Kingsbay, Aug. 1861 Goës (S), do., Aug. 6, 1932 Lagerkranz (S, O), do., Ny Ålesund, Aug. 28, 1920 Lid (O), do., July 3–4, 1936 Dahl (O); do., Ny London, July 29, 1949 Mikelsen (O); Crossbay, Aug. 1861 Goës (S), do., July 26, 1902 Resvoll Holmsen (O), do., July 31, 1923 Iversen (O), do., Aug. 27, 1906 Resvoll-Dieset (O); Foul Bay, Aug. 30, 1872 Kjellman (S); Andréébæren, July 31, 1925 Isachsen (O); Norsköerne, Aug. 23, 1907 Resvoll-Dieset (O); Wijde Bay, Aug. 2, 1899 Wulff (S), do., Aug. 4, 1899 (C), do., Aug. 20, 1924 Lid (O), do., Aug. 24, 1936 Dahl (O); Lovén’s Berg, Aug. 10, 1861, Malmgren (S); Velkomstpynten, Aug. 25, 1936 Dahl (O); Lommedal, Sept. 10, 1868

_Sv. Bot. Tidskr., 50: 3_
Fries (S), do., Aug. 13 and 14, 1931 Scholander (O, S); Lomfjordbotten, Aug. 13, 1931 Scholander (O); Sorgfjord, Aug. 16, 1931 Scholander (O, S); Hinlopenstredet, Cape Sparre, Forsiusfjället, Ripdalen, Rundhaugen, Ismaasfjellet, July and Aug. 1931 Scholander (O, S).

**NE. Spitsbergen.** Murchison Bay, July 22–30, 1931 Scholander (O, S); Lady Franklin Fjord, July 11 and 13, 1931 Scholander (O, S); Brandevijnebay, July 27, 1861 Malmgren (S, O), do., July 8, 1931 Scholander (O, S).

**Edge I.** Aug. 6 and 9, 1936 Dahl (O); Halvmåneøya, Aug. 25, Sept. 1, 1946 and Aug. 26, 1951 Lønø (O); Zieglerøya, Aug. 20, 1951 Lønø (O).


**Kung Karls Land.** Hårfagrehaugen, Aug. 11, 1936 Dahl (O); Kung Karls L, Sjögrens berg, Andersson & Hesselman 408, 423, 521, 522 (S); Swedish Foreland, Cape Weissenfels, Andersson & Hesselman, 432 (S, C); Kongsøya, Retziusfjellet, Aug. 27, 1930 Hansen (O).

**Franz Josef Archipelago.** Cape Flora, Fischer (C); Vinndalen, E. of Cape Flora, Aug. 12, 1930 Hansen (O); Cape Forbes, Aug. 1, 1930 (O), Camp Ziegler, Aug. 15, 1930 (O); Belloya, Eira havn, Aug. 17, 1930 Hansen (O); Cape Nansen, Aug. 21, 1930 Hansen.

**Waigatch.** Warnek Bay, Aug. 11 and 15, 1902 Ekstam (S, O), do., Aug. 20, 1907 Ekstam (C), do., Sept. 2, 1922 Tolmatchew (O); Dolgoi Bay, 1897 Feilden (C).

**Novaya Zemlya.** Kostin Schar, 1870 Middendorff; Beluchi Bay, July 28, 1897 Feilden (C), do., Aug. 4–6, 1905 Ekstam (S), do., July 21, 1911 Enander (S), do., Hwass (S pro parte); Cape Gussinoin, June 24, 1875 Kjellman & Lundström (S); Karmakuli Bay, 1879 Göbel (C), do., Ekstam (S); Besimjannaja Bay, Aug. 12, 1897 Feilden (C); Grebovi Fjord, Sept. 2, 1921 Lyng (O, S); Matotchkin Shar, 1871 Aagaard (O), do., July 27, 1924 Tolmatchev (S); do., July 18, 1924 Tolmatchev (S), do., Gubnia Bay, July 30, 1897 Feilden (C), do., Funkstation, July 13, 1927 Kasavsky (C), do., Pomorskaia, July 8, 1921 Lyng (O), do., W. of Tretjakof glacier, July 12, 1921 Lyng (O), do., E. of Cape Jouravlev, July 14, 1921 Lyng (O); do., Chalkinin valley, July 13, 1921 Lyng (O), do., Karamyndingen, July 20, 1921 Lyng (O); Krestovaja Bay, July 27, 1921 Lyng (O); Machigin Bay, Aug. 24, 1921 Lyng (O); Berkh L, Aug. 18, 1921 Lyng (O); Archangel Bay, Aug. 12, 1921 Lyng (O); 74° 21' N. lat. E. Coast, Aug. 6, 1897 Feilden (C); Ziwolka Fjord, Kara Sea 74° 24', Aug. 7, 1897 Feilden (C); 76° 30' N. × 61° 25' E., July 12, 1869 Heiberg (O).

Novaya Zemlya, situation unknown: Propastshajcha Guba, Aug. 15, 1913 Skribova (S).

**Eurasian Arctic Coast.** Kanin Nos, July 13, 1903 Poppius (H); The Polar Urals: Upper Sob R., top of Rai-iz, Aug. 4, 1924 Gorodkov (S); Jalmal, Aug. 4, 1878 Kjellman (S, U pro parte); Gyda Tundra, NE. coast of Juratskaja Bay, Aug. 15, 1926 Tolmatchew (S); Minin I., Aug. 11, 1878 Kjellman (U, S, C); Cape Tscheljuskin, Aug. 19–20, 1878 Kjellman (S); Maudhavn, Aug. 15, 1919 Sverdrup (O); E. Taimyr, lower Jamu-Tarida

*Sv. Bot. Tidskr.*, 50: 3
74° 27', Tolmatchew (S, C); Preobraschenie I., Aug. 24, 1878 Kjellman (U, S).

**Arctic America.** Banks I., NW. Coast, Bernard I., Porsild 17748 (Can) do., 50 mi S. of Mercy Bay, Porsild 17737, 17738. Melville I., Winter Hbr., June 28, 1909 McMillan (Can); King William I., Gjoa Hbr., July 31, 1904 Lindström (C, O, original of Ostenfeldt's figure), do., 68° 47’ N. lat. 97° 40’ W. long., Woodruff 163 (Mt). Prince of Wales I., Allen Lake, Aug. 22, 1947 Fortier (Can); Boothia Penins., Agnew R., Aug. 15, 1947 Fortier (Can); Somerset I., Port Leopold, Malte (Can, C, GH, H); Isachsen I., Heywood 6 (Can); Cornwallis I., Resolute Bay, Collins 146, 152f, 200 (Can); Devon I., Dundas Hbr., Polunin (G, H, Can); Ellesmereland, Alert, April 14th, 1920 Hansen (C), do., Shift Rudder Bay, Feilden (U), do., Aug. 4, 1952 Gadois & Lavergierre (Mt), do., Cape Richardson, April 24, 1920 Hansen (C), do., Goose Fjord, Aug. 23, 1901 Simmons pro parte (O); do., Parr Inlet 82° 30’ N., 62° 18’ W., Bruggeman 251 (S), do., Braskerud plain, June 10, 1899 Simmons (O), do., Harbour Fjord, Aug. 1, 1900 Simmons (O, S); do., Pim I. 78° 4’ N., 74° 50’ W., Simms (O), do., Cape Rutherford, Aug. 21, 1898 Simmons (O); Hayes Sound, Walrus I., Aug. 1875 “H.M.S. Alert & Discovery 1875–76”, Hart (?) (U).

**N. Greenland.** Low Point 83° 6', Wulff (C); Sommardalen, Wulff (Can); Lemning Fjord 82° 53’, Wulff (C); Dragon Point 82° 17’, Wulff (C); John Murrey I. 82° 45’, Wulff (C); Gunnar Andersson Valley 82° 28’, Wulff (C, S, GH, Mtjb); Peary Land, Independence Bay 81° 50’, Freuchen (C).

**E. Greenland.** Mallenmutsfjeldet 80° 10’, Koch (C); Brönlunds Grav 79° 8’, Koch (C); Skærjfjord E. of Cape Amelie, Sörensen 1661 (C, S); Germania Land, Danmarkshavn, Lundager (C), do., Sörensen 1655 (C); Koldeway I., Sörensen 1656, 1668 (C); Hochstetter Foreland, Sörensen 1664, 1665, 1666, 1667 (C); Pendulum I., July 7, 1899 Dusén (S); Sabineöja, July 14, 1900 Kruuse (C), do., Aandstad (O); Kuku I., Cape Maurer, Sörensen 1653, 1663 (C), do., between Cape Maurer and Bastian Bay, Sörensen 1657 (C, G), do., Cape Hamburg, Sörensen 1659 (C, Can), do., Seidenfaden 1658 (C); Wollastone Foreland, Landingsdalen Vaage (O); Kapp Wynn 74° 29’, July 20, 1930 Vaage (O); Mt Herschel 74° 15’, July 7 and 30, 1928 Vaage (O); Clavering I., Sörensen 4327, 4327b, 4329, 4330 (C); 4328 (G, C, H), do., Grønne Dal, Seidenfaden 764 (C); Hold with Hope, Hartz (C), do., Aug. 13, 1932 Aandstad (O), do., Sörensen 5419, 5427, 5444a and b (C), do., Seidenfaden (C); Myggbukta, Vaage (O); Eirik Raudes Land, Aug. 8, 1932, Bonetkel I. Aandstad (O), do., Antarctic havn 71° 58’, Aug. 2, 1932 Aandstad (O), do., Aug. 11, 1930 Vaage (O); Jackson I., Sörensen 4292b pro parte, 4326 (C, S, Can); Holland I., Sörensen 5313 (C); Loch Fine Bund 73° 41’, Seidenfaden (C); Cape Seaforth, Kruuse 675 pro parte (C); Liverpool Land, Cape Hope, Sörensen 181 (C); Jameson Land, Cape Stewart 70° 30’, Sörensen 163a (C); Hurry Inlet, Bogvad 1238 (C).

**Ostenfeldt** included several taxa under *C. Regelii*, as is evident from his labels of determination. Which of them should bear the name *C. Regelii* is disputable. As Ostenfeldt merely proposes a new

*Sv. Bot. Tidskr., 50: 3*
name, one of the synonyms quoted by him must be meant. From the text it seems evident that what he intended was to give *C. alpinum γ caespitosum* Malmgr. a new name. This is the arctic plant for which, in order not to create further confusion, I have retained the name *C. Regelii*, although it is not Regel’s plant, cited by Ostenfeld as *C. alpinum δ serpyllifolia*. E. Regel, however, gives as a synonym *C. serpyllifolium* M. v. Bieb., a plant described by De Candolle in Prodromus 1, p. 417 and said to grow “in Siberia”. Regel describes it as having “Cauliculi ascendentes spithamaei et ultra, paucifolii”, thus as being 17.5 cm or higher. He cannot therefore have had *C. Regelii* in mind. This is also clear from the specimens cited: Jablonoi Chrebet, at Lena R., at Nichne Kolymsk, in Chukch Land, at Kotzebue Sound, and at Novaya Zemlya. Most of these specimens were undoubtedly *C. jenisejense*. Ostenfeld’s last synonym “C. vulgatum θ grandiflorum lus. 2 Fenzl. in Ledebour, Fl. Ross. I, 1842” p. 411 also refers to *C. jenisejense* as is evident from the quotation of the specimens.

The first (and only) one to distinguish *C. Regelii* correctly is Gelting (1934, pp. 39–45), although he did not realize Ostenfeld’s false synonyms. Gelting was also the first to point out the characteristic vegetative propagation of the species through buds at the ends of the branches falling off and rooting.

In all the material I have not seen a single ripe capsule on the plant, although it is clear that hybrids with other species occur. *C. Regelii* as determined here is rather a vegetatively multiplying clone, and it might be questioned whether its peculiar distribution is not the result of dispersal through ice within one of the two basins in the Polar Sea.

Gelting also gives a map of the distribution, but the dot at Disko in W. Greenland is certainly incorrect. It was not based on a specimen but on a report of *C. alpinum f. caespitosum* by Hartz.

*C. Regelii* has repeatedly been reported from Scandinavia. Anderson & Hesselman, for instance, mistook forms of *C. arcticum* or *C. glabratum* from Dovre for “*C. Edmondstonii* var. *caespitosum*”.

*C. Regelii* is one of the most common plants in NE. Spitsbergen, especially on the otherwise very sterile limestones, and acc. to Wulff it is very common in northern Greenland, and apparently also in E. Greenland. It seems to be less common in the Arctic American Archipelago. Pictures of it are found in Ostenfeld (loc. cit.), in Scholander (1943, p. 43) and in Gelting (1934, p. 40).

Sv. Bot. Tidskr., 50: 3
C. Regelii as determined above is a very characteristic, easily recognizable plant, but many types occur that approach it, though they have characteristics alien to it, characters found in other members of the C. alpinum complex. Scholander (1934, pp. 43, 44) had already realized this, and admits that there are "transitional forms" between it and "C. alpinum" in Spitsbergen, which he regards not as hybrids but "due to a convergence or a genetic connection".

Some of these types are closely related to C. Regelii while others are closer to other species occurring in the same area. They are here treated under the species to which they are most closely related. One such type closest to C. Regelii is the following:

**Cerastium Regelii** var. *hirsutum* nov. var.

C. Regelii similis sed differt: caulibus nec non laminis foliorum setosis.

**Vaiigatch.** Cape Greben, Ekstam (S), do., Kjellman & Lundström (S), Jugor Schar, Ekstam (S).

**Novaya Zemlya.** Belushi Bay, Enander (S), do., Ekstam (S). Mejdu-scharskij I. 70° 59', Holm (C); Rogatchev Bay, Kjellman & Lundström (S); Karmakuli, Hvass (S), do., Alm (S), do., Ekstam (S); Matochkin Shar, Kjellman & Lundström (S), do., Ekstam (S); Maschigin Bay, Lynge (O); Admiralty Penins., Lynge (O); Nordre Korsø, Lynge (S); Lichutin L, Lynge (O); Törnesset, Lynge (O): (C. Regelii confirm. Östenf.); Sölvbugten, Lynge (O).

Var. *hirsutum*, which resembles a large C. Regelii, is apparently closely related to that species, but the type of the pubescence indicates that it also has genes from C. Beeringianum. Together with C. *jenisejense* and the plants here called C. Beeringianum × Regelii it forms one of the connecting links between those species.


Perenne, rhizoma tenui; caules tenues, (10–)20–30 cm longi, patente- vel retrorso-pilosi, ramis basalibus sterilibus aliquot incrassatis. Folia elliptica, circiter 1 cm longa et 4 mm lata, acuta vel acutiuscula, sessilia, axillis gemmiferis; lamina margine et in nervo mediano pilosa, caeterum glabrescentia vel parce pilosa, pilis brevibus. Flores 2–6, laxe cymosi; pedicellus circiter 1 cm longus, breviter patente glandulosopubescens, bracteis minimis ovatis, anguste scariso-marginatis instructus; calyx semiglobularis vel paraboloides sepals ovato-lanceolatus acutis, circiter 4 mm longis, glandulosopilosis, scariso-marginatis; petala alba, ealyeem duplo longiora, apice bifida. Species inter C. *Regelli* et C. *Beeringianum* inserenda.

_Sv. Bot. Tidskr., 50: 3_
Fig. 26. Total area of *Cerastium jenisejense*.


**Northern Europe.** Karelia, Kenozero, Tschernetsoff R., July 5, 1899 Cajander & Lindroth (H); Kola penins., Orlow, Aug. 5, 1899 Kihlman (H, *C. Regelii* det. Kotilainen, consentio G. Marklund); Ponoj, Renvall (H); Bolschezemliski Tundra, Jaschinoj R., Tolmatchew (L, S, C); Zapetschoriski 1. in ostia fl. Petchora contra pagum Kuja lat. 76° 37′, long. 53° 3′, Aug. 8–10, 1912 Enander (S); Lobatskij, Aug. 22, 1891 Kihlman (H); Great Samoyede Tundra, Pai-jer Pohle (H).

**Novaya Zemlya.** Vaigatch, Aug. 27, 1902 Ekstam (S, O), do., Kerttselli (S), do., Feilden (C), do., Kjellman & Lundström (S), do., sin. Ljamtschina, Aug. 19, 1902 Ekstam (S); Jugor Shar, Aagaard (O), do., Holm (C); Kostin Shar, Pearson (O); Maljy Karmakuly, Hwass (S), do., Aug. 17, *Sv. Bot. Tidskr.*, 50: 3
1921 Nazarov (S); Grebovaja, Lynde (C); Pomorskaya, Lynde (O, C); Matotschkin Shar, Tolmatchev (O, S), do., Pearson (O), do., Lynde (O), do., Hwass (S).

**Arctic Siberia.** Synja R., 1926 Sotchava (C); Obdorsk 66° 1/2′ N., lat. 66° 1/2′ E. long., Aug. 2-14, 1881 Hage (?) (C); Jalmal, Kjellman (U); mouth of Yenisei R., Aug. 24, 1875 Lundström (C); Ustj Yeniseisk 69° 39′, Aug. 4, 1926 Tolmatchev (S); Nikandrovski Ostrov, 1876 Brenner (S, U); Malo Brichovski Ostrov, 1876 Brenner (S); Dudina, 1875 Lundström (L), do., 1876 Brenner (S), do., 1914 Enander (S), do., 1915 Vuorentaus (H), do., 1932 Tolmatchev 90 and 276 (L, S); 12 verst above Dudina, July 28, 1876 Brenner (S); 15 verst above Dudina, July 27, 1876 Brenner (S); E. Taimyr, Jamu-Nery, Tolmatchev (L, S); Lena R., Kumach-Sur, Nilsson-Ehle (S), do., Bulun July 5, 1898 Nilsson-Ehle (S); do., Bulchur, Sept. 19, 1898 Nilsson-Ehle (S), do., Ajakit, July 6, 1898 Nilsson-Ehle (S); Tiksi Bay, Gorodkov & Tichomirov (L, S); Penshina, Gorodkov & Tichomirov (L, S).

**Central Siberia.** Yenisej, Jakovieva, Aug. 27, 1875 Lundström (S); Chantaika 68° 25′, Aug. 18, 1914 Enander (S); S. Palovinka, Sept. 16, 1876 Brenner (S); 9 verst above Plachino, 1876 Brenner (S) (C. Regelii det. Ostenf., C. Fischerianum det. Tolm.); Patopovskoje, 1876 Arnell (S); opposite Igarskoje, July 21, 1876 Brenner (S); Tatjanova, Sept. 28, 1876 Brenner (S); Kureikaj, 1931 Balabajev (L, S); Turuchansk, Tolmatchev & Rubin (L, S); Lower Tunguska, Rubin & Maskilj (L, S); Monastir, 1914 Enander (S); Novo Seljskoje, 1876 Brenner (S); Lebjedeva, 1876 Brenner (S); Yeniseisk, 1876 Brenner (S); Mattskova, 1876 Arnell (S); between Viljui and Olenek, 1854 Maak (L, S); Natara, June 22, 1898 Nilsson-Ehle (S); Upper Jana R., Tomponsk rajon, Jarovoi 124 (L, S); upper Kalar R. (Vitim-Olekma distr.), Savitch (L, S); mouth of Utchur R. in Aldan R., Melvil (L, S); in alpibus Sajanensibus, Stubendorff (S).

**Alaska.** Upper Kurupa R., Hodgdon 8535, 8702 (S).

For a discussion on the identity see p. 416 above.

The illustrated specimen Pl. IV: 3 from Lower Yenisey, Nikandrovski Ostrov, collected by Arnell is the type.

This is the plant reported as *C. Beeringianum* in Fl. SSSR, while the latter species is reported as *C. Bialynickii*. *C. jenisejense* is apparently a plant of the taiga belt, barely reaching into the Arctic.

Some specimens from Novaya Zemlya here referred to *C. jenisejense* are somewhat doubtful. At first I classified them as *C. Beeringianum × Regeli*. The basal shoots are few and short, but otherwise they do not differ from *C. jenisejense*.

In Alaska *C. Beeringianum* var. *grandiflorum* might be expected to be the hybrid *C. Beeringianum × jenisejense*. On the western border two or three doubtful specimens were seen which show characteristics of *C. alpinum* and *C. glabratum* and may be their respective hybrids. The material is too small for a definite statement.

Sv. Bot. Tidskr., 50: 3
Regel (Acta Fl. Ross. 2: 3, 1916, p. 1401) reports "Cerastium Fischerianum" from several places in northern Russia (Kola Penins., Charlovka and Ponoj collected by himself, Kanin Nos, Kolgujev, Petchora, Ussa R., Mt. Jegenni Pai collected by Pohle). Some at least of these reports should be referred to C. jenisejense.

Maps: Hultén 1950, map 695 sub C. Regelii.

7. Cerastium Beeringianum Cham. & Schl. in Linnaea 1 (1826) p. 62.

A. Plant greyish-green, erect or essentially so, seeds small.
B. Petals about double as long as the sepals, flowers large.
   var. grandiflorum
B. Petals only slightly longer than the sepals, flowers small.
C. Glands of the pedicels long, retrorse hairs at the lower internodes conspicuous.
   D. Leaves evenly hirsute on both sides.
   ssp. Beeringianum
   D. Leaves more or less glabrous.
   var. glabratum
C. Glands of the pedicels very fine and short, retrorse hairs at the lower internodes indistinct, leaves more or less glabrous on the surface.
   ssp. Earlei
A. Plant purplish or fulvous, strongly matted, more or less decumbent, seeds larger, about 1.3 mm.
   ssp. terrae-novae

Ssp. Beeringianum. Pl. V: 4, 5, 6, VI: 5, Fig. 27.


Kanin Penins. Krinka, July 14, 1903 Poppius (H, somewhat doubtful).
Novaya Zemlya. Karmakuly, Ekstam (S) (somewhat doubtful).
Arctic Siberia. Jalmal, Aug. 4, 1878 Kjellman (S); Gyda Tundra, Cape Leskin, Tolmatchev (S); Dicksons Hbr., 1878 Kjellman (S); Dudino, 1876 Brenner (S); Taimyr, Jamu Tarida, Tolmatchew (S); Cape Cheljuskin, Aug. 19-20, 1878 Kjellman (S, U, strongly pubescent var.); Maudhavn, Sverdrup (O); Preobrachenie L., Aug. 24, 1878 Kjellman (S, U); Wrangel L., 1881 Muir (G); Aion L., Sverdrup (S); Irkajpi, Sept. 12-15, 1878 Kjellman (S, U); Pitlekaj, Sept. 28, 1879 Kjellman (S, U).
Kamtchatka. Tigil-Sedanka, 1909 Bezais (S); Kresti, Malaise (S); Klutchi, Malaise (S); Klutchenskaja, Ploskaja, 1909 Protopopov (S); Kro-

Su. Bot. Tidskr., 50: 3
noki Pass, 1909 Komarov (S); Ganala, 1909 Komarov (S); Lake Natchika, 1908 Komarov (S); Korjaka, 1908 Komarov (S); Korjatskaja voleano, 1908 Komarov (S); Majak, Perfiljev (S).


Alaska:

E. Pacific Coast Distr. Windham Bay, Culbertson (S); Sitka, Mertens (S, U, GH); Juneau, Cooley (Can), Anderson (S, GH); Glacier Bay, Kincaid (S); Disenchantment Bay, Funston (S); Egg I., Funston (C).

Central Pacific Coast distr. Miles Canyon (Can); Eureka Lodge, Scamman (GH).

Alaska Range distr. Head of Chitina R., Laing (Can); Nabesna Road, Dutilly, Lepage & O’Neill (Can); Castner Glacier, Porsild (GH, Can); McCallum, Anderson (S); Rapids Lodge, Scamman (GH); Slana-Tok Highway, Anderson (Can, S); Healy, Anderson (S); Cantwell, Porsild (S), do., Palmer (Mt); McKinley Park, Scamman (GH, S), do., Mexia (GH, S), do., Nelson (GH).

Western Pacific Coast distr. Port Vita, Eyerdam (S); Old Harbour, Eyerdam (S, C); Olga Bay, Looff (M, GH); Karluk, Kincaid (S); Sturgeon R., Cov. & Kearn. (Can); Kukak Bay, Cov. & Kearn. (GH); Fox Bay, Scamman (GH, S); do., Nelson (GH), Mt.

Fig. 27. Cerastium Beeringianum. a, b, From authentic specimen from Kotzebue Sound, Alaska. c, d, Other collection from Kotzebue Sound, Alaska. e, f, Siberia, Dickson Hbr. (C. Bialynickii), the same as Pl. VI: 5. All enlarged about 2 times.
Fig. 28. Total area of Cerastium Beeringianum with subspecies. Dots, ssp. Beeringiana; open rings, ssp. Earlei; crosses, ssp. terrae-novae.

Martel (S); Chignik, Norberg (S); Unga I., Kincaid (S); Shumagin Is., Harrington (S); King Cove, Eyerdam (S).

Aleutian Islands. Ikatan Penins., Murie (GH); False Pass, Eyerdam (S); Akutan, Norberg (S, Can); Unalaska, Van Dyke (GH), do., Hultén (S), do., Eyerdam (S), do., Anderson (S); Umnak I., Hultén (S); Amlia I., Eyerdam (S, C, Can); Atka I., Hultén (S), do., Eyerdam (S); Amchitka I., Hultén (S); Attu I., van Schaak (S).

Upper Yukon R. distr. S. end of Lake Kluane, Anderson (Can, S); Ranch Creek, Gorman (S, Can); above Ft Selkirk, Schwatka (GH); Klotassin area, Cairnes (Can); Canol Road, Macmillan R., Porsild & Breitung (Can), do., 60° 31'-38' N., Porsild (Can), do., Rose Lapie R. Pass, Porsild & Breitung (Can), do., Mile 132, Porsild & Breitung (Can); Rose R. Valley, Porsild & Breitung (Can); Mt Sheldon, Porsild & Breitung (S); Mac Millan Pass, Porsild & Breitung (Can, S).

Central Yukon R. distr. Franklin, Andersson & Gasser (S); Dawson, Sv. Bot. Tidskr., 50: 3
Calder & Billard (Mt, H); 57 miles from Dawson, 60 Mile Road, Calder & Billard (Mt); Bonanza Creek, Eastwood (GH); Klondike R., Macoun (Can); Mayo, Anderson (S), do., Bostok (Can); Keno, Gillet & Calder (S); McQueston Area, Campbell (Can); Eagle Summit, Scamman (GH); Eagle Camp, Scamman (S); Eagle Creek, Anderson (Can); Miller House, Scamman (GH, S); Fairbanks, Scamman (GH, S); Wiseman, Jordal (S); Kokrines Mt, Porsild (GH).

_**Lower Yukon R. distr.**_ McGrath, Scamman (GH).

_**Bering Sea distr.**_ Nunivak I., Anderson (S), do., Moberg (S); Nelson I., Geist (S); St Michael, Anderson (S); St Paul I., Macoun (Can, S, GH, H), do., Kincaid (S), do., Johnston (G, Mt), do., Haley (M); St George I., Kincaid (S), do., Préfontaine (Mtjb); St Matthew I., Anderson (S); Punuk I., Geist (S, Can); Gambell, Anderson (S).

_**Bering Strait distr.**_ Nome, Scamman (GH); Teller, Blaisdell (GH), do., Anderson (S); Port Clarence, Kjellman (U), do., Walpole (C); Tin City, Mirow (C, S); Kotzebue Sound (GH, scripsit Chamisso, part of the type); Kotzebue, Anderson (S); Kotzebue Sd, “Fischer” (S), do., Eschscholtz (GH), do., Muir (GH); Kivalina, Anderson (S); Kewalik R., Porsild (Can); Kobuk R., Palmer (G); Deering, Anderson (S); Buckland R., Porsild (Can); Cape Thompson, Muir (GH).

_**Arctic Coast distr.**_ Umiat, Scholander (Mt); Lake Peters, Spetzman (Can, S); Upper Kurupa R. (several localities), Hodgdon (S); Cape Lisburne, Anderson (S); Point Lay, Anderson (S); Point Hope, Anderson (S); Wainwright, Anderson (S); Point Barrow, Murdoch (GH), do., Anderson (S), do., Polunin (S); Collinson Pt, Johansen (S); Camden Bay, Johansen (Can); Arey I., Polunin (S, U); Sadlerochit R., Spetzman (S, Can); Barter I., Spetzman (S), do., Polunin (U); King Point, Lindström (Can, C, S); Herschel I., Stringer (Can).

_**Arctic and Boreal America W. of Yukon.**_ S. of Hudson Hope, Matthews 8 A (Can); Mt Selwyn, Raup 4117 (Can). Bolstad Creek, Porsild 8295 (Can); Mackenzie R. delta, Porsild 2202 (Can); Richardson Mts, Porsild 6658, 6788 (Can); Liverpool Bay, Porsild 2874 (Can); Cape Dalhousie, Porsild 7445; Cape Bathurst, Johansen 514 (C); Coppermine R., Findley 63; Coppermine R., Bloody Falls, Findley 204 (S); Inman R., near Cape Lambert, Destaffany (Can, S); Minto Inlet, 1852 Anderson (S); Bernard Harbour, Johansen 322 (C, Can, GH, dwarfed form); Dolphin & Union Str., Young Pt, Johansen 494a (C), do., Pihumalerksiaik I., Cockburn Pt, Johansen 494 (C); Banks I., Cape Crozier Manning, Macpherson & Porsild 151 (Can), do., Cape Kellet, Porsild 17575 (Can), do., Castel Bay Manning, Sparrow & Porsild 172; Indian Lake, Soddy 3372 (Mt); Port Radium, Eldorado Mine, Cody 2788 (Mt), do., Soddy 17140 (Can); Goldfields, Lake Athabasca, Carrol (Can); Mistake Bay, Porsild 5663 (Can); Istmme de Boothia, Laverdiere (Mtjb); Southampton I., Coral Hbr., Boivin 1874 (U), do., Duke of York Bay, 1821 Parry (C); Somerset I., Malte (L); Cape Wolstenholme, Bell (U); Prince George Sound, July 17, 1897 Bell (Can); Baffin I., Kondjuak R., Soper (Can); Riv. Payne, Rousseau 1176 (Mtjb); Post of Payne Bay, Rousseau 1270 (Mtjb); Riv. George, 57° 30’, Rousseau

_Sv. Bot. Tidskr., 50: 3_
806 (Mtjb); Labrador, Red Bay, 1923 Huntsman (GH, not in map, situation unknown); Port Harrison, Beckett (C).


A map of the Siberian distribution is given by Tolmatchew loc. cit. p. 83 (sub C. Bialynickii). He there enumerates several localities represented in Russian herbaria from where I have seen no representatives. The most important of them are lower Lena R. and the New Siberian Islands. Soczawa reports C. Bialynickii from the Anabar Tundra and Gorodkof from Cape Schmidt in Chukchi Peninsula.


Siberia. Konyam Bay, Kjellman (U); St Lawrence Bay, Krause (U), do., Kjellman (U), Anadyr Bay, Johelson (S); 1½, verst S. of Pallan, Savtchenko (S).

Alaska:

Eastern Pacific Coast distr. Juneau, Cooley (GH), do., Kincaid (S), do., Anderson (S); Disenchantment Bay, Funston (GH, C, Can).

Alaska Range distr. Rapids, Scamman (GH); McKinley Park, Nelson (GH).

Western Pacific Coast distr. Port Hobron, Eyerdam (S); Karluk, Rutter 216 (GH); Squaw Hbr., Jones (S).

Aleutian Islands. False Pass, Eyerdam (S); Akutan, van Dyke (GH), do., Rudd (S); Unalaska, Mertens (GH), do., Eyerdam (S); Carlisle I., Hultén (S), do., Eyerdam (S).

Central Yukon R. distr. Eagle Camp, Scamman (GH); White Mts, Gjarevoll (Can); Kokrines Mts, Porsild (Can).

Lower Yukon R. distr. Anvik, Chapman (GH); Takotna, Anderson & Gasser (S, Can); Ophir, Scamman 1847 (GH).

Bering Sea distr. Nushagak, Stoney (U); St Michael, Anderson (S); St Paul I., Elliott (GH), do., Gov & Kearn. (S), do., Kincaid (S), do., Hultén (S), do., Anderson (S); St Lawrence I., Kjellman (S), do., Geist (S).

Bering Strait distr. Golovin, Anderson (S); Nome, Jones (S), do., Anderson (S), do., Scamman (GH); Teller, Scamman (GH), do., Anderson (S); Port Clarence, Scamman (GH); Wales, Anderson (S); Little Diomedes I., Porsild 1689 (Can, GH, Mt, S); Kotzebue, Scamman (GH). Kivalina, Anderson (S).

Sv. Bot. Tidskr., 50: 3
Arctic Coast distr. Pt Hope, Anderson (S); Lake Peters, Spetzman (S)

Ssp. Beeringianum var. glabratum nov. var.

C. Beeringiano similis sed differt foliis glabriusculis.

Arctic America. Cape Krusenstern, Cox 751 (Can); Southampton L., Coral Hbr., Cody 1528, 1874 (Mt, GH); Prince Charles L., 68° 21' N. lat., 76° 20' W. long., Baldwin 1902, 1934, 1953 (Can, GH); Prince Patrik L., Mould Bay, MacDonald 96 (Can) (type of var. glabratum); Ranken Inlet, Macoun (C); Baffin I., W. Coast, Taverner Bay, Manning 27 (Can), do., Hantzsch R. distr., Manning 207 (Can), do., Camp; Kungavik, Soper (Can).

Ssp. Earlei (Rydb.) Hult. in Fl. Alaska & Yukon 4 (1944) p. 666.


British Columbia. Upper Loop Creek near Glacier, 1914 Holway (GH); near Lilloot, Macoun (GH); Frazer R., Yellow Head Pass, Spreadborough (Can); Mt Siften, Rogers Pass, 1907 Butters & Holway (GH); E. Summit of Kootenay Pass, Dawson (Can); Selkirk Mts, Rogers Pass, Kicking Horse R. and summit of Selkirk Mts, 1890 Macoun (Can); Near Glacier, 1913 Butters (GH); Waterton Lake, 1895 Macoun (Can).

Alberta. Bow River Pass, Macoun (GH, Can); Lake Louis, 1904 Macoun (Can, type of var. capillare Fern. & Wieg.), do., Brown (GH), do., 1922 Hunneweer (GH); Banff, Macoun (Can), do., Sanson (Can), do., 1905 Clark (GH), do., Skottsberg (U); Laggan, 1913 Malte (Can); Maligne Lake, Brown (GH), do., Scamman 2627 (GH); Medicine Lake, Scamman 2523 (GH); Elbow R., Macoun (Can); Crow Nest Lake, Macoun (Can).

Idaho. Custer co., Wild Horse Creek, Cronquist 3257 (GH), do., White Cloud Range, Hitchcock & Muhlick 10871, do., Lost R. Mt, Hitchcock & Muhlick 11209.

Montana. McDougall's Peak, McDougall 874 (Can); Mt Stanton,Williams (GH); Glacier Nat. Park, Avalanche Lake, Jones (GH), do., Grinnel Glacier, Jones (GH); Carbon co., Custer National Forest, Williams 3709 (GH).

Wyoming. Sublette co., Payson 2960 (GH); Big Horn Mts, Buffum (GH); Union Pass, Nelson (GH).

Utah. Uintah Mts, Payson (S, GH); Summit co., Bear R. and Dyer Mine, Godding (GH); Grand co., Gold Mt, Bassett Maguire et alii (GH); Iron Co., Brian Head Peak, Bassett Maguire (GH); Pinte Co., Bassett Maguire (GH); Belenap Peak, Rydberg & Carlton (Can); Mt Barette, Rydberg & Carlton (Can); N. Utah, Watson (GH); Beaver Co., Bassett Maguire (GH).

_Sv. Bot. Tidsskr., 50: 3_
Colorado. Clear Creek Co., Stevens Gulch, Weber (Mt); Clear Creek, 1861 Parry (GH); lat. 39°-41°, Parry (Can); Mt Evans (GH); Gunnison Watershed, Baker 745 (GH); San Juan Mts, Rossbach & Hodgdon (GH); Near La Plata, Jones (photograph in S, type of C. Earlei Rydb.); La Plata Mts, Baker & Tracy (GH); Rocky Mts, Nat. Park, Kiener (O); Cameron Pass, Crandall (GH).

Arizona. Mt Agassiz, Lemmon (GH); San Francisco Mts, Kearn. & Peebles (GH), do., McDougall (GH).

California. Tuolumne co., Parker Pass, Scharsmith (GH), do., Virginia Canyon, Scharsmith (Can, S); Mono co., Deep Creek, Kellogg (GH).


NW. America. Great Bear Lake, McTavish Arm, Porsild 5345 (Can, Mt), do., Cape McDonnell, Porsild 520 (Can, L); Lake Athabasca, Sand Pt, Raup & Abbe 4493 (G, Can, S); Kazan R., Porsild 6028 (Can).


S. Labrador. Indian Harbour, Bawdoin Coll. Exp. to Labrador 1891 (GH); Forteau, Fern. & Wieg. 3388 (G); Blane Sablon, Fern. & Wieg. 3389 (S), do., Brunel (Mt); Archipel du Vieux-Fort, St John 90817 (GH, Can); St Augustin, Lewis (Can); Greenly Isl., Lewis (Can); Wolf Bay, Lewis (Can); Archipel Washicoutai, St John 90819 (GH, Can); Pointe aux Eskimaux, St John 90818 (GH).

Newfoundland. Green I., Griscom 28289 (GH); Bonne Bay, Fern. & Long 1685 (S, Mt sub *C. terrae-novae*); Flower Cove, Fern. et alii 26672, 26673, 28217 (GH, C, S); Boat Hbr., Fern. et alii 28221, 28222 (GH); Big Brook, Fern. & Long 28223 (GH, S, C); St John Bay, Fern. et alii 1684, 28215, 28216, 28226 (GH); Highlands of St John, Wieg., Gilbert & Hotchkiss, 28214 (GH, S, C), 28224, 28225, 28225 (GH), do., Tuomikoski 336 (Can); Ingornachoix Bay, Fern. et alii 1683 (GH, S, Mt), 3391 (GH); Bay of Islands, Blomidon Mt, Fern. & Wiegand 3390 (Mt, C, O, type number of *C. terrae-novae*); Bay of Islands, North Arm, Long & Fogg 2621 C and 264. (U, both sub *C. terrae-novae*); Humber distr., Rouleau 1984 (Mt sub *C. terrae-novae*).

Quebec. Rimouski co., St Fabien, Fern. & Collins 1032, do., Champlain 684 (Mt); Bic, Fern. & Collins 556, 1032, 1033 (GH, Mt), do., Forbes (S), do., Rousseau 26581 (Mt, GH, S), do., Lepage (Mt), do., Porsild (Can), do., Champlain (Mt), do., Scoggan (Can); Matane co., Mt Blane, Pierce & Hodge 11 A (GH); Mt Logan, Fern. & Pease 25062, 25063, 25064 (GH, Mt); Fernald Pass, Fernald & Smith 25743 (GH, Mt); Mt Mattaouisse, Dodge *Sv. Bot. Tidskr.*, 50: 3
et alii 25741, 25743 (GH); between Mt Logan and Pembroke, Griscom & Pease 25745 (Can); W. of Marsouin R., Fern. & Pease 25067 (GH); Cape Rosier, Pease 20195 (GH); Gaspé co., Christie, Fernald & Pease 25065 (GH: Mt, Can); Tourelle, Collins & Fern. 73 (Can, GH, Mt, C); W. of Marten R., Fern. & Pease 25066 (Mt, GH, Can, C); Martre R., Scoggan (Can); Ruisseau Sorel, Scoggan (Can); Cap Bon Ami, Scoggan (Can); Ha-Ha Bay, Scoggan (Can); Bonaventure L., Fern. & Collins 1034 (Can, GH); Cap Blanc, Williams, Collins & Fern. (GH, Mt, Can); Percé, les Murailles, Fern. & Collins 1035 (Can, Mt, GH, C); Tabletop Mts, Fern. Dodge & Smith 25742 (GH, Mt, Can), do., Scoggan (Can); Mt St Pierre, Rune (S), do., Marie-Vict., Roll.-Germ. & Dominique 49064 (Mt, GH); St Anne des Monts, Macoun (Can).

*C. Beeringianum* was described from specimens collected in the Eschscholtz Bay, and Cape of Good Hope in Kotzebue Sound, N. Alaska. It is a very characteristic plant with a dichotomously branched stem, rather narrow, more or less obtuse leaves, covered with short stiff hairs on both sides. The pedicels have patent viscid unequally long hairs and the lower internodes of the stem very characteristic downward-turned stiff hairs. The sepals are obtuse, the inner more scarious-margined than the outer ones. The petals are only slightly longer than the sepals. The flowers are small and have a more or less hemispherical base.

Even within the main species, as it is regarded here, there is considerable variation. Arctic specimens are short and rigid and very densely hirsute, high-arctic ones, such as those from Cape Chelyuskin, even pulvinate, while more southerly specimens like those from central and southern Alaska and from Kamtchatka are taller and have thinner and larger, less pubescent, leaves. These variations have partially given rise to the confusion in the taxonomy of the group. Russian authors have taken *C. jenisejense* to be the true *C. Beeringianum*, and when Tolmachev realized that there were two entities with close relationships to *C. Beeringianum* in Siberia he took that plant to be *C. Beeringianum* and described the true *C. Beeringianum* as a new species under the name *C. Bialynickii*. Schischkin in Flora SSSR follows his conception. When I wrote my Flora of Alaska and Yukon I had a very scanty material of the Siberian plant at my disposal and did not fully realize that Tolmachev's *C. Bialynickii* is merely the arctic form of *C. Beeringianum*.

However, *C. Beeringianum* also occurs in Central Asia. I have seen several specimens from one collection by Turczaninov from Irkutsk that agree very closely with *C. Beeringianum*, a fact already

*Sv. Bot. Tidskr., 50: 3*
realized by the writer of the label on a specimen in the Stockholm herbarium. For lack of material the question of its variations and distribution must be left open. It might, of course, be a geographical race of C. Beeringianum.

There are, however, several other closely related plants, occupying more or less distinct geographical areas, and so closely related to this arctic plant that they might be taken as varieties or subspecies of it. In Alaska a plant occurs mixed with typical C. Beeringianum which has much larger flowers, with petals considerably longer than the calyx and, usually, larger and more acute leaves. I take it as a variety of C. Beeringianum, var. grandiflorum. PULUNIN gave it a specific name, C. Scammaniae, but it seems impossible to keep it distinct from C. Beeringianum, and I must regard it as a variety, possibly of hybrid origin, C. jenisejense being assumed the other component of the hybrid.

A plant very closely related to C. Beeringianum occurs in the Rocky Mts. It has been described by Rydberg as C. Earlei. It differs in having more glabrous leaves, very short and fine viscid pubescence on the pedicels, and less distinct downward-turned hairs, or none at all, on the lower internodes of the stem.

It is often distinctly caespitose and in Colorado grows at an altitude up to about 3500 m. It is, however, so closely related to C. Beeringianum that the distinction is somewhat fluent. In Alberta and Saskatchewan it merges into C. Beeringianum. It is a very variable plant and probably forms hybrids with other Cerastium species in the Rocky Mts. According to Fernald, C. pilosum Greene, C. variabile Leslie & Godd. and C. buffumae A. Nels. are synonyms of it. I have not seen any authentic material of these species and cannot express any opinion on them. Compare also Hultén, Fl. Alaska and Yukon 4 (1944) p. 666.

In northernmost America very glabrous specimens similar to C. Beeringianum occur. They are here segregated as var. glabratum. Probably they have had some gene-exchange with C. Regelii.

In Eastern America, in Southern Labrador, W. Newfoundland and on Gaspé Penins.—and rarely westwards—a plant occurs which in technical characteristics is very similar to C. Beeringianum and was mostly determined as such, for instance, by Fernald, but differs rather distinctly in general appearance. As always within this Cerastium group there is considerable variation, but the eastern population has a markedly caespitose growth, fuscous or yellowish

_Sv. Bot. Tidskr., 50: 3_
foliage, numerous pairs of leaves, broader and thinner leaves, larger flowers and larger seeds. One type in this series of variations is *C. terrae-novae* Fern. & Wieg., distinguished especially by its seeds with loose testa. This seems to be a serpentine or limestone form of the population. On examining the seeds of numerous specimens I found them to be rather variable but distinctly larger than in *C. Beeringianum*, about 1–1.3 mm in diam. (In unripe herbarium specimens larger through pressure.) It is very difficult to compare the seeds, as the ripeness plays an important part and seed characters are difficult to use taxonomically since often only a few specimens have ripe seeds. I can see no possibility of separating the specimens picked out by Fernald & Wiegang as *C. terrae-novae* from the rest, and I therefore include the entire population in that entity.


**C. Beeringianum × Fischerianum.**

Alaska. Disenchantment Bay, Funston 7797 (Can); Kodiak I., Red R., Looff 34 (G); Umnak I., Nikolski, Hultén 5722 pro parte; St Paul I., Anderson 4022 (S, L), do., Johnston (Mt), do., Hultén 7324, 7398 (S).

Kamtchatka. Toporkof I., Hultén (S).

Coarser than *C. Beeringianum*. Pedicels with setose pubescence.

8. Cerastium aleuticum Hult. in Sv. Bot. Tidskr. 30 (1936) p. 520, Fig. 3 a, b. Tab. nostra VI: 3, 4.

Alaska Western Pacific Coast distr. Popof I., July 13, 1899 Kincaid (S).

Aleutian Islands. Unalaska I., Hultén (S); Umnak I., Nikolski, Hultén (S); Atka I., Hultén 6554 (S, type of *C. aleuticum*), do., West (S), do., Eyerdam (S); Adak I., Jordal (S); Amchitka I., Tatewaki (S); Kiska I., Murie (S), do., Hutchison (S); Attu I., Jordal & Miller (Can).

Bering Sea distr. St Paul I., Macoun (Can).
C. aleuticum is clearly closely related to C. Beeringianum. It differs from that plant in its low growth, long-ciliated leaves, glabrous except on the median nerve, patent soft, not viscose, indument of the stems and pedicels in lanceolate sepals and in lacking scarious margins on the bracts. It is an alpine plant with the base of the stems covered by the previous years' leaves.

A map of the area is given by Hultén in Fl. Aleut. Is. (1937) p. 363.


British Columbia. Queen Charlotte Is., Skiddgate, Newcombe (Can).

Alaska:

Eastern Pacific Coast distr. Juneau, Hultén (S); Sitka, Mertens (U); Disenchantment Bay, Funston (Can).

Western Pacific Coast distr. Kodiak, Alitok, Looff (S); Popof I., Saunders (US); Unna I., Evans (US).

Aleutian Islands. Akutan I., Rudd (Univ. of Wash.); Unalaska, Choris, Mertens, Harrington, Cov. & Kearn., Townsend, Trelease, Jepson, Flett, Hollik, Van Dyke, Haley, Eyerdam, Hultén; Unmak I., Hultén (S); Carlisle I., Hultén (S), do., Eyerdam (S); Seguam I., Bank (Can); Amlia I., Eyerdam (S); Atka I., Van Dyke, Tatewaki, Eyerdam, Hultén, West; Adak I., Jordal (Can); Kanaga I., Steenis (S); Ogluiga I., Scheffer (S); Kavalga I., Murie (S); Amchitka I., Dall (G), do., Hultén (S); Little Sitkin I., Murie (S); Kiska I., Dall (G); Attu I., Tatewaki (S), do., Hardy (S).

Commander Is. Bering I., Macoun (Can), do., Kjellman (S, U), do., Grebnizki (S), do., Laing (Can); Copper I., Dobrotvorski (S).

Kamchatka. “Kamtschatka, Merk”, type of C. Fischerianum (G).

Kurile Islands. Shinshir I., Bergman (S); Urup I., Bergman (S); Yeterofu I., Shana, Bergman (S).

Hokkaido. Rebunshiri, Faurie (G); Riishiri, Faurie (G); Otaru, Faurie (G); Hakodate, Faurie (G); Mt Fukuyama, Faurie (G).

Honshu. Aomori, Faurie (G).

Udsk distr. Great Schantar I., Netchajev (S).

Besides from the above stations C. Fischerianum is reported from northern Kiushiu, from Saghalin, Korea and Ussuri, from which places no specimens have been available.

_Sv. Bot. Tidskr., 50: 3_

*C. Fischerianum* is a very characteristic plant. The type specimen is depicted in Hultén, Fl. Kamtch. 4 (1930) p. 249. It has been much misunderstood. Compare Hultén loc. cit. p. 248. Although it is widely different from *C. Beeringianum*, specimens more or less intermediate between them occur. Quite obvious specimens of this kind which must be regarded as the hybrid between them are enumerated under the heading *C. Beeringianum × Fischerianum*.


*Sv. Bot. Tidskr., 50: 3*
Conclusions.

As will be seen from the above observations, the *Cerastium* group treated here consists of very different types which can never be considered to belong to one species, but are connected by more or less intermediate forms. *C. alpinum* and *C. arcticum* are the species that seem to possess the most pronounced ability to exchange genes with other species of the genus.

In Scandinavia *C. alpinum* forms other hybrids also, although these are to a large extent sterile. *C. alpinum × vulgare* was recognized by Murbeck (Bot. Not. 1898, p. 250), *C. alpinum × fontanum scandicum* (= *C. caespitosum* ssp. *alpestre*) is known from Sweden, Norway, Finland and Iceland (Grimsey, Davidsson), *C. arcticum × fontanum* [ssp. *scandicum*] was described by Sylvén (1931, p. 161), and *C. glabratum × fontanum scandicum* is also represented (Hultén 1955, p. 68). In Central Europe *C. alpinum* ssp. *lanatum* crosses with *C. latifolium* (*C. tatrense* Zap., Zafier, Fl. Polska 2, 1921, p. 219), Ascherson & Graebner (1919, p. 622) mention "*C. arvense × alpinum*", "*C. arvense × lanatum*" and "*C. lanatum × strictum*" (= *C. Brueggerianum*).

*C. arvense* reaches far to the north at the mouth of the Yenisey and occurs also in Labrador and Newfoundland. In both these regions specimens were seen that must be interpreted as *C. arvense* hybrids with the narrow leaves, short pubescence and axillary fascicles of shoots characteristic of that species [*C. arvense × Beeringianum* ssp. *terrae-novae*, Newfoundland, Humber distr. N. Arm., Rouleau 905, 1485 (Mt)]. The list could be made longer, but this may suffice to exemplify the complex hybridity between the group treated above and still other *Cerastium* species.

It must have been these conditions, that made Grenier, the author of the antiquated monograph on *Cerastium*, to unite *C. arvense*, *alpinum*, *rigidum*, *Fischerianum*, *Beeringianum*, *glaberrimum*, *glabratum* and several other taxa, now regarded as distinct species, under the name *Cerastium mutabile* Grenier.

It seems to me that the conditions found in Scandinavia, Iceland, Spitsbergen, Greenland and the Arctic American Archipelago are best interpreted as representing an extensive hybridization and subsequent back-crossing between *C. alpinum* ssp. *lanatum*, *C. arcticum*, *C. Regelii*, *C. Beeringianum* and *C. glabratum*; a process that is known as introgressive hybridization.

*Sv. Bot. Tidskr., 50: 3*
I am fully aware that it is almost impossible to classify each specimen exactly, as is the case in the genus *Salix*, but an attempt has been made to group the different forms and study their variation and properties, so that with the knowledge of them thus acquired they can be reasonably placed taxonomically.

It might have been desirable to state the type of the F₁ hybrids and thus to distinguish them from the back-crosses. In certain cases this has seemed possible, but the results are too uncertain for publication. Artificial crossing will easily reveal them.

It is natural that in a mixture as has been described in this paper, there should be specimens with genes from three or more species. I have tried to overcome the difficulties involved in naming such groups by giving them varietal names.

The above conditions may have originated during a period when the species involved in the introgressive hybridization occupied small areas. The types formed through almost complete gene-exchange must have spread during times of less extensive glaciation, as the climate gradually ameliorated. It should be remembered that *C. arcticum* ripens its seeds very rapidly even in the most arctic regions, and that *C. Regelii* through its vegetative propagation has a means of surviving the most severe conditions.

Edgar Anderson, who has been especially interested in the problem of introgressive hybridization, has assembled the experiences concerning this phenomenon in his book "Introgressive hybridization" (Anderson 1949), in which there is also a list of the corresponding literature. Clausen (1951) treated such complex hybridity from a physiologic-genetic point of view.

Anderson considers that disturbed habitats are essential for introgressive hybridization, as the innumerible segregates must have different ecological requirements (1949, pp. 12-18) and some of them must be favoured by the local conditions (Anderson & Stebbins 1953, p. 380). The Arctic regions certainly offer such conditions with solifluction and large areas of open and more or less moving soil. He also proposes the use of special techniques for studying introgression (Anderson 1949, pp. 81-101). As the aim of this paper is primarily taxonomical, no attempt has been made to study the populations by these methods, but it might be of interest to apply such methods of study to the Spitsbergen or Greenland Cerastia.

The chromosome numbers of most of the species treated in this paper are known.
The investigations in this respect are summarized by Söllner (1950, 1952, 1953a and b, 1954) and quotations and details can be found there. A review of the determinations of chromosome numbers now available is given below.

*Cerastium alpinum* and ssp. *lanatum*. 2n = 36 (Avers, Sennaud); 2n = 54 (W. and SW. Greenland, Böcher & Larsen); 2n = 56 (Greenland 70° 47’ N., Böcher & Larsen); 2n = 72 (Sweden, Abisko, Löwe & Löwe; Scotland, Invernesshire, Breth; France, Massif Central, Söller; the Pyrenees, Söller; W. and SW. Greenland, Böcher & Larsen; E. Greenland, Amagersalik, Böcher); 2n = 108 Greenland, Sörensen & Westergaard; Peary Land, Holmen; about 108 (Chesterfield Inlet, Savile); 2n = 144 (Sweden, Abisko, Brett).

*C. arcticum*. 2n = 108 (Snowden, Brett). Some specimens had higher numbers and also irregular meiosis.

*C. Edmondstonii*. 2n = 108 (Unst, Söllner).

*C. Regelii*. 2n = 72 (Spitsbergen, Isfjorden, Flovik, Hereditas 26, 1940, p. 433).

*C. uniflorum*. 2n = 36 (Switzerland, Austria, Favarger & Söllner).

*C. latifolium*. 2n = 36 (Switzerland, Favarger & Söllner).

*C. austroalpinum*. 2n = 36 (Söllner).

*C. Beeringianum*. 2n = 72 (Yukon, Dawson, Söllner).

*C. arvense*. 2n = 72 (Rohweder).

The most common chromosome numbers are thus apparently for *C. alpinum*, *C. Regelii* and *C. Beeringianum* 72, for *C. arcticum* and *C. Edmondstonii* 108.

Further studies, especially of the hybrid populations in Spitsbergen and Greenland, will prove of great interest, but the specimens used for cytological study must be carefully chosen from a taxonomical point of view, and the specimens preserved for later taxonomical study. Also the more easily accessible populations in Scandinavia should provide an interesting object for such a study.

Speculations have been made on the age and history of the species treated here. Andersson & Hesselman (1900, p. 63) consider that, to judge from its wide area, *C. alpinum* [ssp. *lanatum*] is pre-glacial, and that *C. arcticum* ("Edmondstonii") has become differentiated from it during the latter part of the glacial period, while the differentiation of "*C. alpinum*" var. *caespitosum*, that is, *C. Regelii*, took place at the end of the glacial period. They thus unite *C. Regelii* and *C. glabratum*, as is clear from the text. There is no doubt that *C. alpinum* is an old type, certainly pre-glacial. *C. arcticum*, with its two separated areas in the Scandinavian mountains and its widely dispersed distribution, must also be a very old type, related not so

*Sv. Bot. Tidskr., 50: 3*

*Sv. Bot. Tidskr., 50: 3*

*Sv. Bot. Tidskr.*, 50: 3
1. *C. arcticum* var. *procerum* teste *Lange*, Holsteinborg, 1832 Vahl (C); 2. *C. arcticum* var. *vestitum*, type specimen, Spitsbergen, Kung Karls Land, Andersson & Hesselman (S); 3. *C. arcticum* var. *sordidum*, type specimen, Spitsbergen, Advent Bay, Point Lagerkranz (S); 4. *C. alpinum* var. *robustum*, type specimen, Holsteinborg, Enander (S); 5. *C. alpinum* var. *strigosum*, type specimen, Chesterfield Inlet, NW. Hudson Bay, Malte (S); 6. *C. Beeringianum* var. *glabratum*, type specimen, Prince Patrik I., Mould Bay, MacDonald 96 (Can). Somewhat less than half natural size.

*Sv. Bot. Tidskr.*, 50; 3
1. *C. Regelii*, Spitsbergen, Van Mijens Fjord, Braganzabukten, Sveagruvan, July 19, 1925 J. Lagerkranz (S); 2. Same place, Geikies morän, July 8, 1925 J. Lagerkranz (S); 3. *C. Jenisejense*, Yenisey, Nikandrovski ostrov, Aug. 20, 1876 H. W. Arnell (S); 4, 5. Taimyr Land, Jamu-Tarrida, July 15, 1928 Tolmatchev (S). Somewhat less than half natural size.

*Sv. Bot. Tidskr., 50: 3*

*Sp. Bot. Tidskr.*, 50: 3
1. 2. *C. Fischerianum*; 1. Alaska, Aleutian Islands, Carlisle Is., July 15, 1932 E. Hultén (S); 2. Alaska, Aleutian Islands, Atka, July 29, 1932 E. Hultén (S); 3, 4. *C. aleuticum*, Alaska, Aleutian Islands, Unalaska, Aug. 2, 1932 E. Hultén (S); 5. *C. Bialynickii* Tolmachev, Arctic Siberia, Dickson's harrn, Aug. 6-10, 1878 Kjellman (S); 6. *C. terrae novae*, type number, W. Newfoundland, Bay of Islands, Blomidon Mt., Fernald & Wiegand 3390 (C). Somewhat less than half natural size.

*Sv. Bot. Tidskr., 50: 3*
much to *C. alpinum* as to *C. uniflorum* and *C. latifolium* in the Central European mountains.

Finally, *C. Regelii*, being specially adapted to high-arctic conditions through its extensive vegetative propagation, has probably survived the glacial period north of the ice sheets.

Concerning *C. alpinum*, Söllner (1954, p. 234) believes that this arctic alpine species has its origin in the mountains of Central or Southern Europe. His reason for this is its stability with regard to chromosome number in that region, compared with the instability in this respect prevailing among the races of high polyploidy in the North.

This reasoning seems hardly well-founded. It is based on a lack of taxonomical knowledge of the group. *C. alpinum* ssp. *lanatum* apparently has the same chromosome number in the North as in Central Europe. The aberrations in chromosome numbers are caused by *C. arcticum* or by hybrids with that species, *C. Regelii* and possibly other species.

**Summary.**

Evidence has been brought to light through the above taxonomical account that the *Cerastium alpinum* group forms a chain of species connected not only by hybrids but also by hybrid swarms, dominating the *Cerastium* flora primarily in Spitsbergen, Greenland and the Arctic American Archipelago, but also in the mountains of Scandinavia and Iceland.

Within the area of *C. alpinum* ssp. *lanatum*, and also somewhat outside it, hybrid swarms with *C. arcticum*, *C. glabratum*, *C. Beeringianum* and *C. Regelii* as the other component occur where the areas of two or more of these species overlap. New species about to come into being through a recombination of the genes of these species are developing in different places.

The small areas to which the plants must have been restricted in Spitsbergen and Greenland during the glacial period account for the almost complete hybridization that has taken place between the *Cerastium* species present there.

Through *C. Beeringianum* the chain stretches to Alaska, Eastern Asia and Japan, where *C. Beeringianum*, *C. aleuticum* and *C. Fischelianum* form a series. In E. America *C. Beeringianum* ssp. *terranovae* can be suspected to be a recombination type, uniting the properties of *C. Beeringianum*, *C. arcticum* and *C. alpinum* ssp.
lanatum and formed through isolation in a small area, and introgressive hybridization during the glacial period.

C. jenisejense seems to be transgressing into C. Beeringianum (var. grandiflorum in Alaska) and into C. Regelii (Novaya Zemlya). It is intermediate between C. Regelii and C. Beeringianum and may be expected to have formed during or just after the glacial period as a recombination type of this hybrid. In the very limited area where it overlaps the distribution of C. alpinum and C. glabratum, traces of hybrids with these species have been observed.

In Scandinavia the bicentric area of C. arcticum and C. glabratum indicates that they survived at least the last glaciation, and that the hybridization so clearly demonstrated in the ample material examined has taken place since the last glaciation. It is, moreover, by no means so extensive as that in Spitsbergen and Greenland.

The peculiar amphi-atlantic area of the three species C. alpinum, C. arcticum and C. Regelii makes it probable that they have at least the latter part of their history more or less in common. To enable us to form any opinion about that history a wealth of facts must be assembled and compiled, taxonomical, phytogeographical and cytogenetical, covering not only these species, but many others besides. We are far from being able to assess this history today with any reasonable degree of certainty.

REFERENCES.

Sv. Bot. Tidskr., 50: 3
THE CERASTIUM ALPINUM COMPLEX 493


GRENIER, C., 1841: Monographie de Cerastio. — Vesontione. 95 pp., 9 tab.


Sv. Bot. Tidsskr., 50: 3


Sv. Bot. Tidskr., 50: 3


STUDIES IN
THE LICHEN FAMILY COLLEMATACEAE. II.

ON THE COLLEMA FLORA OF THE MAINLAND
OF GREECE.

BY

GUNNAR DEGELIUS.

When two years ago I published my studies on the genus *Collema*
in Europe (Degelius 1954), the Balkan Peninsula—except the coast
of Yugoslavia—was very incompletely known as to the lichens
in question. This was true not least of Greece, in spite of the fact
that one could expect a rich and interesting flora of this kind there.
Only seven species were verified by me (by studies in herbaria), viz.,
tenax, fragile, crispum (v. Metzleri), cristatum, subsfurum, nigrescens,
and ryssoleum, each from a single locality, and one species only,
*C. cristatum* (v. marginale), from the mainland of Greece (Olympos,
collected in 1927 by Handel-Mazzetti). (The samples of the other
species derive from the island of Kerkyra = Corfu or from the island
of Amorgos among the Kyklades, that of one species from the island
of Kefallonia; most of them were collected by K. Rechinger in 1912
and his son, K. H. Rechinger, in 1932.) In the literature one finds
some further species mentioned from Greece—at least (with the now
valid names) limosum, polycarpon, callopismum, lunaeforme, auriculatum,
undulatum, multipartitum (cf. below), flaccidum, and furfuraceum,
two of which (*limosum*, *undulatum*) are only reported from
the islands (the others are mentioned also from various parts of the
mainland). However, literature statements concerning *Collema*
species must be considered carefully; many such statements prove to
be incorrect (e.g., that of *C. multipartitum* mentioned above which
in reality is to be referred to *C. fragile*, at least in part).

*Sw. Bot. Tidskr.,* 50: 3
The most important papers before 1954, i.e. those containing the largest number of species, are: Harmaud & Maire 1909 (seven spp., according to modern limitation, collected by Maire and others in various districts) and Szatala 1941 (seven or eight spp., collected by Szatala at Athos); from the islands of the Aegean Sea: Szatala 1943 (seven spp. except old statements, collected by Rechinger fil.) and Cengia-Sambo 1927 (six spp., all from Rhodos = Rhodes, collected by Senni). Some statements can be found also in other papers treating the lichen flora of Greece, e.g., Bory 1832, 1838, Unger 1862, Koerber 1868 (islands of the west coast), Steiner 1894a and b, 1898, 1914 (Kerkyra), 1916 (Kreta = Crete), 1917, Zahlbruckner 1906 (Kreta), 1907 (islands), Hayek 1928, Servit 1935, Szatala 1940, Politis 1953, Diannelidis 1955.

The collectors also are rather few. Some have already been mentioned. Others (some of them quoted above as authors) are, for instance, Bory, Bretzel, Diannelidis, Ginzberger, Halácsy, Hartl, Th. Just, Nider, Politis, Schieffner, Schulz-Korth, Unger. Few of them are Greeks, and the herbaria of Greece contain very little of Collema.

In 1955, I had the opportunity of visiting Greece and of completing in some measure, by my own studies in the field, our knowledge of the Collema flora there. In connection with my further studies in the Collemataceae, I made a five-week journey to the western parts of the Balkan Peninsula (Greece, Yugoslavia). I spent three weeks in Greece (24/8–13/9). My route in that country was: Athenai—Morea—Athenai—Epiros—Thessalia—Makedonia. I could only use train and bus, and therefore the number of localities investigated was limited. As will be seen from Fig. 1, 20 localities or small areas were studied, situated in different parts of the mainland, from Morea (Peloponnesos) in the south to Makedonia in the north. (The islands were not visited.) All localities are in the calcareous areas but here and there siliceous rock also occurs together with the calcareous one. The localities or small areas investigated are as follows (numbers refer to Fig. 1; altitude figures = above sea-level; unless otherwise stated, the rock is limestone):

1. Kalamata (= Kalamai), a sea town, at the outlet of the river Nedhon. Collema habitats studied: stone walls along the river, ruins in the town, and steep dusty rocks by the road near the castle. The Collema vegetation in some places rather rich (but the species few).

2. Kardamili, a sea village SE. of Kalamata. Collema habitats studied:
conglomerate rocks (limestone) in an open olive grove near the shore (and the church) and an exposed stone wall close to the former (near the water). A rich Collema vegetation. The extremely rare *C. confertum* was found here. From this place, a two-day mule expedition was started, straight across the wild Taygetos Mts. to Goranoi.

STUDIES IN THE LICHEN FAMILY COLLEMATACEAE. II

499

c. 450 m. Collema habitats studied: rocks and stone walls in the village as well as an open olive grove. A rich Collema vegetation, also on Olea. 10 species. (Especially common on Olea in this district were, among the other lichens, Parmelia glutinosa and P. tiliacea, in some places also P. caperata.) Also at the small villages Trockona (c. 670 m) and Kapiola (c. 925 m, in the lowest part of the Abies cephalonica belt) collections were made.

4-5. “San Dimitri”, some chalets in the Pinus Heldreichii (=leucodermis) forest (belt), c. 1500 m (according to aneroid measurement). Just below, Abies cephalonica is common; on that tree here and there a rather rich Collema vegetation.\(^1\) From here I started for the highest peak in this mountain chain, Hagios Elias (= Ayios Ilias), 2404 m, N. of “San Dimitri”. On a southward slope, I found the tree limit (Pinus Heldreichii) at a level of c. 1700 m (on some other slopes it lay evidently higher). In the alpine belt (regio alpina), the Collema vegetation is sparse (the lichen vegetation, on the whole, not rich). Also siliceous rock occurs here and there. At c. 2200 m I had to turn back because of the approaching dark.

6. Goranoi (= Gorani), a village on the E. side of the Taygetos Mts. (in Lakonia), situated on terraces in a river valley (N. side), c. 600 (?) m. Collema habitats especially studied: trunks of various trees in and near the village. The Collema vegetation rather rich on some trees. Also at the village Koumoustas (between “San Dimitri” and Goranoi, in Lakonia), some Collema samples were collected.

7. Nauplion, a small sea town, on the Gulf of Argolis. Collema habitats especially studied: steep rocks by the seaside road (rather rich Collema vegetation).

8. Hagia Moni (= Ayia Moni), a nunnery SE. of Nauplion. Collema habitats studied: steep or flat open rocks outside the nunnery (rather rich Collema vegetation).

9. Tolon, a village and seaside resort near Asine. Collema habitats studied: + open and rather steep rocks above the shore, in part with Agave, etc. The Collema vegetation poor.

10. Athenai (= Athens): The Akropolis and the hill of the Areopagos. Collema habitats studied: in the former place, + naked soil and somewhat moss-covered ruins; in the latter place, rocks with garigue or + open forest of Pinus halepensis and Cupressus. On the Areopagos in part a rather rich Collema vegetation though few species.

11. Mt. Hymettos and Kaisariani Monastery (c. 450 m) with surroundings. Collema habitats studied: calcareous soil and rocks along the road from Athenai to the monastery and on the lower slopes of the mountain (with low macchia and garigue). The Collema vegetation often very rich (also on soil). On siliceous rocks near the monastery, C. ryssoleum.

12. Mt. Pentelikon: Summit (1109 m), ridge, and W. side, above the (not natural) tree limit (Pinus halepensis). A rich phrygana vegetation

---

\(^1\) The species common on Abies are, among others, Alectoria jubata, Anaptychia ciliaris, Cetraria chlorophylla, C. glauca (often c. ap.), Lobaria pulmonaria, Nephroma lusitanicum, Parmelia furfuracea, P. saxatilis v. contorta (Bory) ZAHLBR. (described from the Taygetos Mts.), P. tubulosa (often c. ap.), Physcia venusta, Usnea sp. One also finds Evernia illyrica (sparse), Parmeliella atlantica, P. plumbea, etc.

Sv. Bot. Tidskr., 50: 3
(predominant plant: Genista acanthoclada). Calcareous as well as siliceous rock. (Starting point: village Penteli.) Collema habitats studied: calcareous rocks and soil, further low shrubs of Quercus cocciifera at the summit. The Collema vegetation, on the whole, not very rich.

13. Mt. Parnes: S. side, near the hotel, c. 1200 m. Collema habitats studied: weathered rocks, in Abies cephalonica forest, and trunks of the same tree. The Collema vegetation very rich, especially on rocks. 10 species.

14. Ioannina (= Janina), a lake town in a broad valley, c. 510 m. Collema habitats studied: stone walls in and near the town (the Collema vegetation here and there rather rich).

15. Perama, a village near Ioannina, at the N. end of the lake, c. 510–525 m. Collema habitats studied: open and often steep rocks (the Collema vegetation ± rich).

16. Metsovon, a village in the Pindos Mts., situated on terraces in a deep river valley (N. side), c. 920 m. Calcareous and (schist) siliceous rock. Collema habitats especially studied: open or somewhat shady limestone rocks on the steep slope to N., S. of the river, for the most part with Abies cephalonica–Fagus forest, further the trunks of the same trees, c. 900–1000 m. The Collema vegetation rich on bark (especially of old Fagus trees) as well as on rock. 13 C. species. C. parvum c. ap. (and Lecanephebe Meylanii) found here (see below).

17. Litokhoron, a village at the E. foot of Mt. Olympos, c. 6 km from the sea, c. 275 m above sea-level. Collema habitats studied: a deep ravine and open rocks just N. of the village, further a Quercus pubescens grove c. 2 km N. (NNW.) of the village. The Collema vegetation in part rather rich on rock and bark. From here I started a three-day mule expedition to the high altitudes of the mountain.

18–19. Mt. Olympos, the highest mountain of Greece and the second of the Balkan Peninsula. The highest top is Mitka, 2918 m. Collections were made in several places on the small road and path, respectively, from Litokhoron along the Enipeos Valley— with the monastery Hagios Dionysios (= Ayios Dionisios = Aj. Zionisios) and the small sawmill place Prioni (the latter c. 1000–1050 m)—to Katafeion, a cabin c. 2100 m (according to aneroid measurement) in the belt of Pinus Heldreichii (= leucodermis), and further to the summit of Skala (one of the highest tops, 2866 m). According to my measurements, the tree limit (P. Heldreichii) is above Katafeion at a level of c. 2300 to 2400 m (exposition to E. and SE.). There was very little snow at this time (10–12/9). Collema habitats studied: Rocks of different kinds concerning sun exposition, etc., from c. 700 m (in the Pinus nigra

---

1 These trunks have a rich lichen vegetation, similar to that in Taygetos. Common to rather common are, e.g., Aleoria implexa, A. jubata, Anaphlychia ciliaris, Evernia prunastri (also f. Herinit), Lobaria amplissima, L. pulmonaria, Nephroma lusitanicum, Parmelia furfuracea, P. saxatilis v. contorta, P. sulcata, P. tubulosa, Parmeliella plumbea (P. atlantica more sparse), Physcia venusta, Usnea sp. Also here Evernia illyrica (rather sparse).

2 On the map by Kurz (1923) called "Vallée de St.-Denys" (i.e., the valley of Hagios Dionysios). Also called Mavrolongo Valley, but this name has been used in different senses (see Kurz l.c., p. 202).

Sv. Bot. Tidskr., 50: 3
v. pallasiana belt) to 2866 m (summit of Skala, alpine belt); further trunks of Fagus, Juglans, and Quercus at various levels. The Collema vegetation often rich to rather rich on rock (and bark) except in the alpine belt where the specimens are sparse and small (on the summit of Skala I collected, however, five spp.: tenax, polycarpon, cristatum, tunaeforine, undulatum). (Also the other lichen vegetation is sparse in the alpine belt.) Altogether 15 Collema species were found on Mt. Olympos (+ Litokhoron). Concerning the topographical details here, see Kurz 1923 (with two maps one of which in scale 1:20,000); for the botanical details (different belts, etc.), see especially Hayek 1928 and Diapulis 1936a, b where also some lichens are treated (yet no Collema spp.). (See also Rikli 1946, pp. 622-625.)

20. Mt. Khortiatis: Just above the village Kh. (E. of Thessaloniki), c. 650 m and a bit upwards. Collema habitats studied: rocks (with varying exposition) on a slope to N. covered with Quercetum cocciferae and schibljak. A rich Collema vegetation (common and prominent also Lecanora calcarea, L. crassa, L. muralis, L. radiosa, and Peltigera rufescens).

Localities 1—9 are in Morea, 10—13 in Attika, 14—16 in Epiros, 17—19 in Thessalia (Thessaly), and 20 in Makedonia. With respect to Collema, the most interesting localities are: Kardamili (2), Exokhorion (3), Mt. Parnes (13), Metsovon (16), and Mt. Olympos with Litokhoron (17—19).

Some general remarks on the Collema vegetation and flora of Greece, especially the mainland, will be given here. The Collema vegetation is usually rich on naked calcareous rock, not rarely predominant (as often is the case in calcareous areas), except at very high altitudes (in the alpine belt; see under locs. 4—5, 18—19, above); it belongs to the federation Collemation tunaeformis (see Degelius 1954, p. 127). In some places, the Collema vegetation is abundant also on calcareous soil and on bark. The most common Collemata are (as in other parts of the Mediterranean area): on calcareous rock, C. cristatum and C. polycarpon v. corcyrense; on calcareous soil, C. tenax; on bark, C. furfuraceum; C. crispum = cheileum is common in most areas on calcareous rock and soil.

During my journey I collected altogether 22 of the 35 European species. Two other species from Greece have been mentioned in the literature, viz., the small-sized rare C. callopismum (Athos and Rhodos; see the following list) and C. limosum (Rhodos, see the list). C. crispum with v. crenulatum from Rhodos, quoted by Cengia-Sambo (1927), is crispum = cheileum and not crispum = bachmanianum as it has been interpreted by Szatala (1943) since he lists it together with C. cheileum. C. sublimosum, described from Kreta by Steiner
GUNNAR DEGELIUS

(1916), is a dubious species (see Degelius 1954, p. 461). Among Collema species hitherto unknown to Greece are the Mediterranean euthallinum, leptogioides and italicum; these species are to be searched for in this country (perhaps, however, italicum has a more western distribution).

The most interesting species that I found was C. confertum; this is one of the rarest Collema known, previously collected in two localities in the world (one in southern Germany, one in Yugoslavia, see Degelius 1954, p. 220). Another interesting find was fertile C. parvum (however, a single and very young apothecium, see the list).

The Collema flora of Greece is, on the whole, similar to that of the other parts of the Mediterranean area in Europe, and the different phytogeographical elements are also represented here. The largest group comprises those species which have a more or less marked southern distribution in Europe. Among the 11 species belonging here, the most extreme southern of them are especially to be mentioned, i.e., the Mediterranean ones, mostly occurring at lower levels: polycarpon v. coreyrense which is common, further multipunctatum, Latzelli, and ryssoleum; fragile can also be quoted here. The other southern species are: limosum, conglomeratum, confertum, callopis­mum, crispum, auriculatum, multipartitum. To the Ubiquitous Group may be referred: tenax, occultatum, cristatum, tumaeforme, flaccidum, and—approaching the northern species (cf. Degelius 1954, p. 112) —polycarpon v. polycarpon, parvum, and undulatum. The remaining species are more or less oceanic (suboceanic) and, therefore, to be found especially in the mountain forests: subfurvum, subnigrescens, nigrescens, furfuraceum, and fasciculare.

In the Mediterranean belt (= Olea or olive belt = Macchia belt), up to c. 400 to > 600 m (different in different parts of the country), 15 species of those I found occur; in the forest belts of the moun­tains (in this case one has to treat the different forest belts as a unit; upper limit very varying) 18 species; and in the alpine belt 6 species. The last mentioned are: tenax, polycarpon (also v. coreyrense though rare here), crispum, cristatum, tumaeforme, and undulatum.

1 This characteristic species is previously known only from the surroundings of Dubrovnik (= Ragusa) in Dalmatia (Yugoslavia) where I refound it in 1955 (Lapad Peninsula: Gorica, c. 90 m, rather common, c. ap.). I also collected it in a new locality, about 60 km S. of Dubrovnik, viz., just outside the town of Kotor (= Cattaro) in the southernmost part of Dalmatia (calcar. steep near the fjord, E. side, c. 50 m, sparsely c. ap.).

Sv. Bot. Tidskr., 50: 3
Saxicolous (obligately or facultatively) are 13 species (most of them on calcareous rock), corticolous 9 species, terricolous 4 species (on calcareous soil), and muscicolous 1 species (C. auricula-turn).

The other genera of Collemataceae s. str. seem to be more sparsely represented than Collema. Most common species are evidently Leptogium lichenoides and L. plicatile (both in many locs. up to > 1000 m). Among other species collected are: Dendriseocaulon dendroides (Taygetos Mts.: near "San Dimitri", some locs., on Abies, + Lobaria amplissima but not growing on that lichen; Mt. Parnes, Abies; Litokhoron, Quercus pubescens), Leptogium diffractum (Mt. Parnes), L. ruginosum (Taygetos Mts.: Exokhorion, Olea), L. saturninum (Taygetos Mts.: near "San Dimitri", Abies; Pindos Mts.: Metsovion, Juglans; Mt. Olympos: below Katakion, Fagus), L. Schraderi (at least Mt. Hyetemos: slope above Kaisariani Monastery, c. ap.), L. sinuatum (Mt. Hyetemos; Pindos Mts.: Metsovion; Mt. Olympos), L. subtortulosum or a closely related new species (Mt. Parnes; Mt. Olympos: near Hagios Dionysios; in both locs. c. ap.), L. tetrtiusculum (Mt. Olympos: near Hagios Dionysios, Quercus), Physma omphalarioides (Taygetos Mts.: Exokhorion, Olea, Kousounta, Platanus, and Goranoi, Quercus cerris). Among the other Collemataceae, a very interesting find is to be noted, viz., that of Lecanephebe Meylanii (Pindos Mts.: Metsovion, S. of the river, slope to N., ± exposed calcar. rocks in Abies–Fagus forest, c. 1000 m, c. ap.); this lichen is previously found only in Switzerland and Norway (see Degelius 1955, p. 46, and literature cited there).

My collections of Collemataceae are kept in my own herbarium, duplicates in Herb. Göteb., Herb. Upsal., etc.

List of Species.

(Unless otherwise stated, the samples are c. ap. and collected on calcareous rock or soil.)

The Tenax Group.

Collema tenax (Sw.) Ach., em. Degel. (= C. pulposum Ach., nomen illeg.). — Morea. Kalamata: some locs. in the town and near the castle, on rocks, stone walls and ruins, sparse and usually in small specimens (some of them ster.) [at least in the main v. vulgare (Schaer.) Degel. f. vulgare]. Taygetos Mts.: Trockona, c. 670 m (v. tenax, v. vulg. f. vulg.); Kapiola, in the lowest part of the Abies belt, c. 925 m, sparse and ster. (v. vulg. f. vulg.); Goranoi, stone wall in the village, c. 600 (?) m, small specimens (v. vulg. f. vulg.). Nauplion: seaside road, sparse (v. vulg. f. vulg.). Tolon: exposed rocks (v. vulg. f. vulg.). — Attika, Athenai: Akropolis, near the Parthenon [v. ceranoides (Borr.) Degel., ster., and v. tenax]; hill Sv. Bot. Tidskr., 50: 3
of the Areopagos, sparse, ster. (v. ceran.). Kaisariani: by the road between the town and K. Monastery, c. 425 m, common (v. ceran., ster., and v. lenax); near K. Monastery, exposed rock, c. 450 m (v. vulg. f. vulg.). Mt. Pentelikon: ridge, exposed rocks, c. 1050 m [v. vulg. f. vulg. and f. papulosum (SCHAER.) DEGEL.]; summit, 1109 m, sparse (v. vulg. f. vulg.). Mt. Parnes: S. side, on the ground in Abies forest, c. 1200 m (v. vulg. f. vulg. and f. papul., the latter ster.); the same loc., on rock, together with Lept. diffusum, very sparse [v. crustaceum (KREMPHEL.) DEGEL.]. — Epirros. Perama: exposed rocks, c. 525 m (v. vulg. f. vulg.). Pindos Mts.: Metsovon, S. of the river, stone wall c. 900 m (v. crust.), on the ground in Abies–Fagus forest, c. 1000 m (v. lenax), and on ± exposed rocks on slope to N., c. 925 to c. 1000 m (v. ceran., v. vulg. f. vulg. and f. papul., all ster.). — Thessalia. Litokhoron: near the ravine, exposed rocks, c. 250 m (v. vulg. f. vulg. and f. papul., the latter ster.). Mt. Olympus: near summit of Skala, alpine belt, c. 2700 m, and summit of do., 2866 m, rocks, small and ster. specimens (v. vulg. f. papul.). — This species is common to rather common, the most common one on (calcareous) soil. Sometimes it is, however, sparse in the localities. It is distributed from the lowlands (the Mediterranean belt) high up in the mountains (the alpine belt). Most common type is v. vulgare f. vulgare. — I have previously verified this species from Kerkýra = Corfu (DEGELIUS 1954, p. 183) but not from the mainland of Greece (however, it has been mentioned from there in the literature—several localities).

[Collema limosum (Ach.) Ach. — Unknown from the mainland but quoted from the isl. of Rhodos (GENGIA-SAMBO 1927, s.n. C. viscosum).]

Collema conglomeratum Hoffm. — Morea. Taygetos Mts.: Exokhorion, on Olea in Olea grove, c. 450 m, not very abundant. — New to Greece.

Collema confertum Arn. — Morea. Kardamili: stone wall quite near the shore (at the church), on some surfaces rather abundant. It occurs here on conglomerate (limestone, with small stones). Spores rather sparsely developed, submuriform, 20–22(24) × 10–13 μ. — New to Greece. The most interesting find on this journey. The species is earlier known from only two localities in the world (see above, p. 502).

Collema polycarpon Hoffm. — Morea. Kardamili: conglomerate rocks near the shore, in Olea grove [v. coregrense (ARN.) HARM.]. Taygetos Mts.: Exokhorion, stone walls, c. 450 m, common (v. corc.); near Hagios Elias, W. side, alpine belt, exposed rock, c. 2150 m (v. corc.), and steep rocks, c. 2200 m (v. corc. f. isidiatum DEGEL., very small and ster. specimens); between “San Dimitri” and Koumoustia, Abies forest, c. 1250 m, ster. (v. corc.). Nauplion: steep rocks by the seaside road, common (v. corc.). Hagia Moni: outside the nunmery, exposed rocks (v. corc. f. isid., c. ap.). Tolon: exposed rocks near the shore, sparse, ster. (v. corc.). — Attika. Athenai: hill of the Areopagos, common on rocks in Pinus halepensis forest (v. corc.). Mt. Parnes: S. side, rocks in Abies forest, c. 1200 m (v. corc. and v. polyc.). — Epirros. Ioannina: stone wall in the town, c. 510 m, sparse, ster. (v. corc.). Perama: exposed rocks, c. 525 m, common (v. corc., also f. isid., both types c. ap.). Pindos Mts.: Metsovon, S. of the river, stone wall, c. 900 m, sparse, ster. (v. corc.). — Thessalia. Litokhoron: exposed rocks.

Sv. Bot. Tidskr., 50: 3
N. of the village, c. 250 m, common (v. corc.). Mt. Olympos: near Hagios Dionysios, rock in *Pinus nigra* forest, c. 700 m (v. corc.); Katafeion, rocks in *Pinus Heldreichii* forest, several places, c. 2100 m (v. polyc.); summit of Skala, alpine belt, 2866 m, sparse and ster. (v. polyc.).— *Makedonia.* Mt. Khortiatis: above village Kh., ± exposed rocks, c. 650 m (v. corc. and v. polyc.). — The two types of this species have different distribution areas also in Greece. The main type (v. polycarpum) is restricted to the mountains and is, on the whole, not very common. Var. *coreyrense* is common at lower levels, especially in the Mediterranean belt; in the mountains it is much more sparse (the altitude figure 2200 m, from the alpine belt of the Taygetos Mts., is a record on the whole). It is very seldom that the two types occur together in the same locality (see above). Both varieties grow directly on stone. — Var. *coreyrense* was described by *Arnold* from Kerkyra = Corfu (see Degelius 1954, p. 225); by most later authors it has probably been confused with *C. tenax.*

### The Callopismuin Group.

*Collema callopismum* Mass. — Mentioned from two Greek areas: Athos (Szatala 1941) and Rhodos (Cengia-Sambo 1927, Szatala 1943).

### The Occultatum Group.

*Collema occultatum* Bagl. — *Morea.* Taygetos Mts.: Koumoustas, on *Platanus,* c. 950 m, together with *C. furfuraceum,* very sparse. — Epiros. Pindos Mts.: Metsovon, S. of the river, slope to N., on *Abies cephalonica* in *Abies–Fagus* forest, c. 1000 m, together with *C. nigrescens,* very sparse (v. occult.). — *Thessalia.* Mt. Olympos: near Hagios Dionysios, on *Juglans* in mixed forest, c. 1050 m, rather sparse (v. occult.). — New to Greece.

*Collema multipunctatum* Degel. — *Morea.* Taygetos Mts.: Exokhori, on *Olea,* c. 450 m, many specimens. — This Mediterranean species is new to Greece.

### The Leptogioides Group.

*Collema fragile* Tayl. — *Morea.* Hagia Moni: just outside the nunnery, on exposed rock. Tolon: exposed rocks near the shore. — *Attika.* Mt. Parnes: S. side, rocks in *Abies* forest, c. 1200 m, rather common. — Epiros. Perama: exposed rocks, c. 525 m. — *Makedonia.* Mt. Khortiatis: above village Kh., ± exposed rocks, c. 650 m. — Only rather small to small and ster. specimens. I never saw as large specimens as in, e.g., Italy.

— The species belongs to the lowlands (the Mediterranean belt) and the lower mountains. — I have previously verified this species from Kerkyra = Corfu (Degelius 1954, p. 273) but not from the mainland of Greece. The sample from Kerkyra was called by Steiner (1914) *C. multipartitum.*

1 I found *C. fragile* also in Montenegro (Cetinje: near the monastery, rock, c. 700 m, rather sparse, ster.), new to Yugoslavia.
Collema parvum Degel. — Epiros. Pindos Mts.: Metsovon, S. of the river, slope to N., ± exposed rocks in Abies–Fagus forest, c. 1000 m, in some places abundant, one specimen with a very young apothecium (!). — Thessalia. Mt. Olympos: near Hagios Dionysios, rocks in Pinus nigra forest, c. 1000 m, in some places abundant; Prioni, somewhat shady rocks in Fagus–Juglans–Pinus forest, c. 1050 m. — All specimens but one are sterile (apothecia never found before). — This species is restricted to the mountains and seems to be not very common. New to Greece.

The Crispum Group.

Collema crispum (Huds.) G. H. Web. [= C. cheileum (Ach.) Ach., nomen illeg.]. — Morea. Kalamata: N. side of the river, stone wall, small specimens, ster. Kardamili: conglomerate rocks near the shore (in Olea grove), in some places abundant, ster.; stone wall close by (at the church) [v. Metzleri (Arn.) Degel.]. Taygetos Mts.: Exokhorion, stone wall in the village, c. 450 m, ster.; Trockona, on the ground among mosses, c. 670 m; Kapiola, on naked rock, c. 925 m; near Hagios Elias, W. side, steep rocks in the alpine belt (on naked stone), c. 2200 m, small and ster. specimens; “San Dimitri”, by the path to Goranoi, Abies–Pinus Heldreichii forest, c. 1500 m, on naked stone; Goranoi, stone wall in the village, c. 600 (?) m. Nauplion: steep rocks by the seaside road, on naked stone (also v. Metz.). Tolon: exposed rocks near the shore, on naked stone, sparse and ster. — Attika. Athenai: Akropolis, near the Parthenon, on soil; hill of the Areopagos, rock in Pinus halepensis forest (v. Metz.). Kaisariani: by the road between the town and the monastery, naked soil, some places, c. 425–450 m. Mt. Pentelikon: ridge, exposed rocks (also on soil), c. 1050 m, small and ster. specimens. Mt. Parnes: S. side, rocks in Abies forest, c. 1200 m. — Epiros. Ioannina: stone walls in the N. part of the town, c. 510 m (also v. Metz.). Perama: exposed rocks, c. 525 m, on naked stone (also v. Metz.). Pindos Mts.: Metsovon, S. of the river, stone wall c. 900 m and ± exposed rocks on slope to N. c. 1000 m, on naked stone, c. ap. or ster.—Makedonia. Mt. Khortiatis: above village Kh., ± exposed rocks, c. 650 m (also v. Metz.). — Unless otherwise stated, the samples belong to the main type (v. crispum).

— This species occurs in the lowlands (the Mediterranean belt) and the lower mountains where it is common (especially the main type). Sometimes it is, however, sparse in the localities. Only once it has been found in the true alpine belt (Taygetos). — I have previously verified this species (v. Metzleri) from Kerkyra = Corfu (Degelius 1954, p. 297) but not from the mainland of Greece (however, it has been mentioned from there in the literature—a few localities).

The Cristatum Group.

Collema cristatum (L.) G. H. Web. [= C. multifidum (Scop.) Rabenh., nomen illeg.; C. granuliferum Nyl.]. — Morea. Kalamata: N. side of the river, stone wall (v. cristatum), and near the castle, abundant on dusty

Sv. Bot. Tidskr., 50: 3
rocks by the road (v. crist. and v. marginale (Huds.) Degel. subf. papulosum (Ach.) Degel., the latter ster.). Kardamili: conglomerate rocks near the shore, in Olea grove (interm. type). Taygetos Ms.: Exokhori, on stone walls (v. crist. common and v. marg. subf. marg.) as well as on Olea (v. marg. subf. papul.); Kapiola, sparse in the lowest part of the Abies belt, c. 925 m, ster. (v. marg. subf. papul.); near Hagios Elias, W. side, alpine belt, c. 2100 m, very small and ster. specimens; between “San Dimitri” and Koumousta, Abies–Pinus Heldreichii forest, c. 1200 to 1300 m, on rocks (v. marg. subf. marg.) and mossy trunk of Abies cephal. (subf. papul.). Nauplion: steep rocks by the seaside road, ster. (v. marg. subf. papul.). Hagia Moni: exposed rocks outside the nunnery (v. crist. and v. marg. subf. papul.), the latter ster.). Tolon: exposed rock near the shore, small and ster. specimens (interm. type). — Attika. Kaisariani: below the monastery, exposed rocks, c. 450 m, common (v. crist. and v. marg. subf. papul., the latter ster.). Mt. Hymettos: slope above Kaisariani Monastery, exposed rocks, c. 600 m, common (v. crist. and v. marg., also subf. papul., last mentioned ster.). Mt. Pentelikon: ridge, exposed rocks c. 1050 m, and summit 1109 m, ster. (v. crist. and v. marg. subf. marg. + subf. papul.). Mt. Parnes: S. side, rocks in Abies forest, c. 1200 m, common (v. crist. and v. marg. subf. papul., last mentioned ster.). — Epiros. Ioannina: stone wall in the town, c. 510 m, ster. (v. marg. subf. papul.). Perama: exposed rocks, c. 525 m, common (different types). Pindos Ms.: Metsovon, N. of the river, slope to S., c. 900 m, sparse and ster. (v. crist.); do., S. of the river, slope to N., ± exposed rocks (partly in Abies–Fagus forest), c. 925–1000 m, common (especially v. crist.; also v. marg. subf. papul., ster.). — Thessalia. Litokhoron: N. of the village, c. 250–275 m, common on ± exposed rocks (v. crist. and v. marg. subf. marg. + subf. papul., last mentioned ster.). Mt. Olympos: near Hagios Dionysios, rocks in Pinus nigra forest, c. 700–1000 m, common (v. crist. and v. marg. subf. marg.): Prioni, rocks in Fagus–Juglans–Pinus forest, c. 1050 m, common (v. crist. and v. marg. subf. marg. + subf. papul.); below Katafeion, rock in Fagus forest, c. 1400 m (v. marg. subf. marg. + subf. papul., the latter ster.); Katafeion, rock in Pinus Heldreichii forest, c. 2100 m (v. crist.); summit of Skala, alpine belt, 2866 m, very small and ster. specimens (v. crist.). — Macedonia. Mt. Khandia: above village Kh., ± exposed rocks, c. 650 m, common (v. crist. and v. marg.). — This species is common, the most common Collema on calcareous rock. It is distributed from the lowlands (the Mediterranean belt) up into the alpine belt; at very high levels, it is, however, not well-developed (very small and sterile specimens). It often occurs abundantly in the localities. Both the varieties are frequent. — I have previously verified this species from Olympos (v. marginale) and also from the isl. of Amorgos (see Degelius 1954, p. 329). In the literature, it has been mentioned from several other localities.

**Collema tunaeforme** (Ach.) Ach., em. Degel. [= C. furvum (Ach.) DC.]. — Epiros. Pindos Ms.: Metsovon, N. of the river, slope to S., exposed rock, c. 900 m, sparse and ster.; do., S. of the river, slope to N., ± exposed rocks (partly in Abies–Fagus forest), c. 1000 m, in some places

---

33 - 563373  
*Sv. Bot. Tidskr.*, 50: 3
abundant, ster. — Thessalia. Mt. Olympos: near Hagios Dionysios, several locs. on rocks in *Pinus nigra* forest, c. 700–1000 m, in some places rather abundant; do., on a *Juglans* in mixed forest, c. 1050 m, rather abundant but ± small specimens; Prioni, rocks in *Fagus–Juglans–Pinus* forest, c. 1050 m; below Katafeion, rock in *Fagus* forest, c. 1400 m, very small and ster. specimens; near summit of Skala, alpine belt, c. 2700 m, rock, sparse and ster.; summit of Skala, 2866 m, rock, very small and ster. specimens. — Makedonia. Mt. Khortiatis: above village Kh., ± exposed rocks, c. 650 m, common, sparsely c. ap. — As seen from the above, I found this species only in the north part of Greece. It seems to be restricted to the mountains there, the lower as well as the very high ones, and is not rare. In some places the specimens are rather well-developed and c. ap. — In the literature it has been mentioned from a few localities, also on the mainland, but the determinations must be considered to be not quite certain.

*Collema auriculatum* Hoffm. (= *C. granosum* Rabenh., nomen illeg.).

— Morea. Taygetos Mts.: Kapiola, large boulder in the lowest part of the *Abies* belt, c. 925 m, small though typical specimens; between “San Dimitri” and Koumousta, on mossy *Abies cephalonica* in *Abies–Pinus Heldreichii* forest, c. 1250 m, sparse. — Attika. Mt. Parnes: S. side, on the ground in *Abies* forest, c. 1200 m, in some places abundant. — Thessalia. Mt. Olympos: near Hagios Dionysios, rock in the *Pinus nigra* belt, c. 700 m, sparse, small though typical specimens; Prioni, rock in *Fagus–Juglans–Pinus* forest, c. 1050 m, very sparse, small though typical specimens; below Katafeion, on mossy trunks of *Fagus* and on mossy rocks in *Fagus* forest, c. 1400 m, ± small specimens. — This species seems to be rather rare, and the specimens are often small. It occurs on mossy substrata (in contrast to *C. tunaeforme*), in ± moist localities in mountain forests. Only seen sterile. — In the literature, the species has been quoted from several localities, most of them on the mainland.

*Collema Latzelli* Zahlbr. — Attika. Mt. Parnes: S. side, rocks in *Abies* forest, c. 1200 m, common, very sparsely c. ap. — Perhaps sterile specimens from the following localities belong here: Morea: Tolon, exposed rocks near the shore, and Thessalia: Mt. Olympos, near Hagios Dionysios, rock in the *Pinus nigra* belt, c. 700 m. — This Mediterranean species is new to Greece.

*Collema undulatum* Flot. — Epiros. Pindos Mts.: Metsovon, S. of the river, slope to N., ± exposed rocks in *Abies–Fagus* forest, c. 1000 m, on naked stone (v. *undulatum*). — Thessalia. Mt. Olympos: Prioni, rocks in *Fagus–Juglans–Pinus* forest, c. 1050 m, on naked stone (v. *undul.*); below Katafeion, rock in *Fagus* forest, c. 1400 m, sparse on naked stone, small specimens (v. *undul.*); Katafeion, rock in *Pinus Heldreichii* forest, c. 2100 m, sparse on naked surface, small and ster. specimens (v. *granulosum* Degel.); near summit of Skala, alpine belt, c. 2700 m, on naked rock, rather well-developed though ster. specimens (v. *granul.*); summit of Skala, 2866 m, on earth on rock, very sparse, dwarfed and ster. specimens (v. *granul.*). — As seen from the above, I found this species only in the north part of Greece where it seems to be restricted to the mountains (also growing in the alpine

*Sv. Bot. Tidskr.*, 50: 3
belt). It is hardly rare but often sparse in the localities. New to the mainland of Greece (previously mentioned from the isl. of Euboia, 1100 m, see Szatala 1943).

The Multipartitium Group.

Collema multipartitum Sm. — Thessalia. Mt. Olympos: near Hagios Dionysios, rock in Pinus nigra forest, c. 1000 m, not very abundant, small though typical specimens. — Evidently a rarity in Greece. According to Szatala (1941), the species has been collected at Athos. Concerning a statement from Kerkyra = Corfu, see under C. fragile (above).

The Flaccidum Group.

Collema flaccidum (Ach.) Ach. (= C. rupestre Rabenh.). — Morea. Taygetos Mts.: below (W. of) “San Dimitri”, on Abies cephalonica in the Abies belt, c. 1000 m. — Epiros. Pindos Mts.: Metsovon, S. of the river, on trunk of Juglans and on stone wall, c. 900 m; do., slope to N., on trunks of Fagus in Abies–Fagus forest, c. 1000 m, rather common. — Thessalia. Mt. Olympos: near Hagios Dionysios, base of a Fagus in grove of the same, c. 1000 m, abundant. — All localities are in the forest belts of the mountains. Probably the species is not rare. I saw only sterile specimens. — There are some literature statements, also from the mainland, but perhaps they in part refer to C. subfurvum.

Collema subfurvum (Müll. Arg.) Degel. — Morea. Taygetos Mts.: Exokhorion, on Olea in Olea grove, c. 450 m, sparse; Goranoi, on Quercus cerris by the road near the village, c. 600 (?) m, sparse. — Epiros. Pindos Mts.: Metsovon, S. of the river, slope to N., trunk of Abies cephalonica in Abies–Fagus forest, c. 1000 m, sparse. — Thessalia. Litokhoron: c. 2 km N. of the village, trunks of Quercus pubescens, c. 300 m. — The distribution of this oceanic species in Greece is similar to that of C. flaccidum. However, it was in part collected at lower levels. Usually it is sparse in the localities. I saw only sterile specimens. — I have previously quoted this species from the isl. of Kefallonia (Degelius 1954, p. 405) but not from the mainland of Greece. See under C. flaccidum.

The Nigrescens Group.

Collema subnigrescens Degel. — Morea. Taygetos Mts.: Exokhorion, trunks of Olea in Olea grove, c. 450 m, sparse and small specimens; Koumoustia, trunks of Juglans and Platanus, c. 950 m, rather small specimens; Goranoi, trunks of various trees (Acer monspessulanum, Olea, Quercus cerris), c. 600 (?) m, in part small specimens. — Thessalia. Litokhoron: c. 2 km N. of the village, trunks of Quercus pubescens, c. 300 m, sparse and small specimens. Mt. Olympos: near Hagios Dionysios, trunk of Juglans in mixed forest, c. 1050 m, ± ster. — All localities are in the lower parts of the mountains (in the Mediterranean belt and the lower forest belts). The lichen
is never abundant, and the specimens are usually ± small. It occurs together with other Collema species. — This ± oceanic species is new to Greece. See also under the closely related C. nigrescens (below).

**Collema nigrescens** (Huds.) DC. (= C. vespertilio Hoffm., nomen illeg.). — Morea. Taygetos Mts.: Exokhoriion, trunks of Olea in Olea grove, c. 450 m, dwarfed and ster. specimens (with isidia); near "San Dimitri", by the path to Goranoi, trunks of Abies cephalonica in Abies–Pinus Heldreichii forest, c. 1600 m, ± isidiate specimens (some are only sparsely c. ap.); between "San Dimitri" and Koumousta, trunks of Abies cephal., c. 1250 m, sparse, some specimens strongly isidiate. — Attika. Mt. Parnes: S. side, trunks of Abies cephal. in forest of the same, c. 1200 m, sparse and ster. — Epiros. Pindos Mts.: Metsovon, S. of the river, slope to N., trunks of Abies cephal. and Fagus in forest of the same trees, c. 1000 m, common, specimens on Abies ± strongly isidiate and only sparsely c. ap. — Thessalia. Mt. Olympos: below Katafeion, trunks of Fagus in forest of the same, c. 1400 m. — To judge from the above, this species has a wider distribution than the closely related C. subnigrescens, also vertically. Like the species mentioned, it is restricted to the mountains, but it reaches higher levels (occurs also in the upper forest belts). See also under C. fasciculare. — I have previously verified this oceanic species from Kerkyra = Corfu (Degelius 1954, p. 436) but not from the mainland of Greece. There are many literature statements of "C. nigrescens" or "C. vespertilio" from Greece (mainland as well as the islands) but several of them are probably to be referred to C. subnigrescens or C. furfuraceum.

**Collema ryssoleum** (Tuck.) Schneid. (= C. meridionale Hue). — Attika. Kaisariani: monastery, ± shady siliceous rocks, c. 500 m. — I have previously verified this Mediterranean species from the isl. of Amorgos (Degelius 1954, p. 442, see also Szatala 1943) but not from the mainland. However, a statement on "Synechoblastus nigrescens" from Liapokhori, on sandstone (Steiner 1898), probably refers to C. ryssoleum.

**Collema furfuraceum** (Arn.) DR., em. Degel. — Morea. Taygetos Mts.: Exokhoriion, on Olea in Olea grove, c. 450 m, rather abundant; below (W. of) "San Dimitri", trunk of Abies cephalonica in the Abies belt, c. 1300 m; near "San Dimitri", by the path to Goranoi, trunks of Abies cephal. in Abies–Pinus Heldreichii forest, c. 1600 m; Koumousta, trunks of Juglans and Platanus, c. 950 m; Goranoi, trunk of Acer monspessulanum in the village, sparse, and an old trunk of Quercus cerris by the road near the village, c. 600 (?) m. Hagia Moni: just outside the nunnery, trunk of Quercus ilex, small specimens. — Attika. Kaisariani: monastery, ± shady siliceous rock, c. 500 m, sparse with C. ryssoleum. Mt. Pentelikon: summit, on Quercus cocifera in low shrubs of that species, c. 1100 m, ± small specimens. Mt. Parnes: S. side, trunks of Abies cephal. in forest of the same, c. 1200 m. — Epiros. Pindos Mts.: Metsovon, S. of the river, slope to N., trunks of Fagus in Abies–Fagus forest, c. 1000 m, common. — Thessalia. Litokhoron: c. 2 km N. of the village, trunks of Quercus pubescens, c. 300 m, common, sparsely c. ap. (!). Mt. Olympos: near Hagios Dionysios, trunk of Quercus, c. 900 m, and do. of Juglans in mixed forest, c. 1050 m. — This species—phytogeographically related to the oceanic ones—is, on the whole, common. 

*Sv. Bot. Tidskr.*, 50: 3
to rather common in Greece, the most common *Collema* on bark (as in most other parts of the Mediterranean area). It is especially distributed in the mountains where it occurs from the Mediterranean belt up into the upper forest belts. The specimens are usually well-developed though not very large, very seldom c. ap. (see above). — There are some literature statements on this species, from the mainland as well as from the islands (substrata also *Cupressus, Morus nigra*, etc.). See also under *C. nigrescens*.

**The Fasciculare Group.**

*Collema fasciculare* (L.) G. H. Web. [= *C. ascaridosporum* (Mass.) Degel.]. — Morea. Taygetos Mts.: Exokhorion, on *Olea* in *Olea* grove, c. 450 m; below (W. of) “San Dimitri”, trunk of *Abies cephalonica* in *Abies–Pinus Heldreichii* forest, c. 1000 m; near “San Dimitri”, by the path to Goranoi, trunk of *Abies cephalal.* in *Abies–Pinus Heldreichii* forest, c. 1600 m. — Attika. Mt. Parnes: S. side, trunks of *Abies cephalal.* in forest of the same, c. 1200 m. — Epiros. Pindos Mts.: Metsovon, S. of the river, slope to N., trunks of *Abies cephalal.* and *Fagus* in forest of the same trees, c. 1000 m, rather common on *Fagus.* — This oceanic species has a similar distribution here as *C. nigrescens* (often growing together) but it seems to be somewhat rarer. Often it is sparse in the localities. — The species is new to Greece.


**LITERATURE CITED.**


——, 1838: Cryptogames, etc. in: Chaubard & Bory de Saint-Vincent, Nouvelle flore du Péloponnèse et des Cyclades. — Paris.


Sw. Bot. Tidskr., 50: 3


RIKLI, M., 1946: Das Pflanzenkleid der Mittelmeerländer. II. — Bern.


SZATALA, Ö., 1940: Contributions à la connaissance de la flore lichénologique de la péninsule des Balkans et de l'Asie mineure. — Borbásia 2. Budapest.


— —, 1907: Aufzählung der von Dr. H. Bretzl in Griechenland gesammelten Flechten. — Hedwigia 47. Dresden.

Sv. Bot. Tidskr., 50: 3
ZINGERIA BIEBERSTEINIANA (CLAUS) P. SMIRN.—ONE MORE GRASS SPECIES WITH THE CHROMOSOME NUMBER $2n=8$.

BY

S. O. BJÖRKMAN.

Studying the genus Agrostis L. the author has paid special attention to the chromosome numbers occurring in the genus. The basic chromosome number is 7, and species deviating in that respect can already on a morphological basis be separated from the genus.

The sect. Airagrostis was established by GRISEBACH (1853) and based on the Caucasian annual Agrostis trichoclada GRISEB. (i.e. A. biebersteiniana CLAUS), which remained the only member of the section until ASCHERSON & GRAEBNER (1899) included four West-Mediterranean species, viz. A. nebulosa BOISS. & REUT., A. truncatula PARL., A. elegans THORE, and A. juressi LINK. Morphological characters in the floret reveal these four species as belonging to at least two different groups of Agrostis, neither of them related to A. biebersteiniana. SCHISCHKIN (1934, p. 173) and GROSSHEIM (1939, p. 181) both listed a second species beside A. biebersteiniana under Airagrostis, viz. A. pisidica BOISS. (syn. Milium trichopodium BOISS.). For fully satisfactory reasons SMIRNOW (1946, pp. 67 sq.) separated them from Agrostis and referred them to a new genus Zingeria P. SMIRN. s.n. Z. biebersteiniana (CLAUS) P. SMIRN. and Z. trichopoda (BOISS.) P. SMIRN., resp. HACKEL (in litt., cf. GRECESCU 1898, p. 603), expressing his opinion on Roumanian material of the latter, attributed only a varietal rank to it, viz. A. biebersteiniana var. densior. SCHISCHKIN (op.cit.), and GROSSHEIM (op.cit.) distinguished the two species on the basis of biometrical—much overlapping—characters. Comparing available herbarium material, I have found no possibilities to uphold them as different taxa on
that basis, nor on any other. An inclusion of Z. *trichopoda* into Z. *biebersteiniana* will therefore be necessary.

From the seed-exchange 1955/1956 seeds of Z. *biebersteiniana* were obtained from the Botanic Garden, Univ. of Bucarest, s.n. *Agrostis densior* Hackel, and of the following provenience: Roumania, Pitești, Pădurea Cotmeana (leg. I. Serbanescu). Chromosome countings from root-tips of the reared plants gave 2n = 8 with all chromosomes of the long festucoid type (cf. Fig. 1). The statement

![Image](image_url)


2n = 14 for *Agrostis biebersteiniana* Claus given by Sokolovskaya (1938, pp. 453, 460) must then be doubted, all the more so because of her interpretation of *Airagrostis*, in which were included, not only *A. elegans* and *A. nebulosa* (according to Ascherson & Graebner?), but also *Agrostis interrupta* L. (i.e. *Apera interrupta* [L.] PB.).

The somatic number 8, which is the lowest number known in the grass family, has earlier been reported by Litardière (1948, p. 1071, and 1949, p. 1786) for *Airopsis tenella* (Cav.) Coss. & DR., *Periballia laevis* (Brot.) A. & G., and *Holcus gayanus* Boiss.; by Tutin (1950, p. 347) for *Milium scabrum* Merlet; and by Hedberg (1952, p. 258) for *Agrostis chionogeiton* Pilger (incl. A. *oreades* Peter) and an undescribed species (Hedberg no. 908). The three species from Hedberg's African collections will be transferred to a new genus *Keniochloa* by Dr. A. Melderis (cf. Hedberg l.c.). The present author has found the same peculiar characters, which are *Sv. Bot. Tidskr.*, 50: 3
met with in the dorsal lemmatal epidermis of Zingeria, regularly occurring also in the Keniochloa species. These characters, together with other spikelet qualities which they have in common, indicate a very close relationship between the two genera, and the chromosome number gives further support to this assumption. Evidently these genera will form the kernel of a new festucoid tribe or perhaps of a taxon of higher level.

The studies of the lemmatal epidermis will be accounted for in a coming paper.

Institute of Systematic Botany, University of Uppsala, August 1956.

REFERENCES.


Grecescu, D., 1898: Conspectul florei Romaniei. — Bucarest.


Hedberg, O., 1952: Cytological studies in East African mountain grasses. — Hereditas 38, pp. 256–266.


—, 1949: Nombres chromosomiques dans le genre Holcus L. — Ibid. 228, pp. 1786–1787.


A New Species of Cheilolejeunia from Samoa.

*Cheilolejeunia upoluensis* S. Arn. nov. spec.

Samoa, Upolu, Tanumalala, 200 m alt., on rhizomes of *Pyrrosia*, leg. H. S. Mc Kee, n. 3011. Type specimen in National Herbarium of New South Wales, Sydney.

Fig. 1. *Cheilolejeunia upoluensis* S. Arn. a. Leaves and amphigastrium in ventral view. b. Marginal cells from a lobe. c. Shoot with perianth in ventral view.

*Svensk Botanisk Tidskrift*, 50: 3

Monoicous, pale green, up to 1 1/3 cm long. Stem 30 μ in diameter, irregularly branched. Leaves approximate–patent, ovate, slightly convex, apex obtuse, dorsal margin arched. Lobulus subrectangular, keel slightly concave–straight–sometimes slightly convex. Marginal cells 10 × 10–12 × 12 μ, basal cells 10–14 × 20–24 μ, walls ± thin, trigones lacking. Amphigastria rather large, subcircular, incised to 1/2–1/3, incision sharp. Perianth longly pyriform–oblung, with 5 sharp and thin plicae, apex rounded, rostrum 40 μ long. Bracts of the same size as the leaves, with apex rounded, lobulus sublanceolate, larger than in the leaves. Bracteole almost as long as the perianth, ligulate, incised to 1/3. Androecia in short branches, bracts in 3–4 pairs.

**Gotländska växtfynd 1955.**


_Equisetum × trachyodon._ SV om Nasume myr, Tofta sn; inäga 1 km NV om Ölback, Endre sn; stora grustaget i Rävhagen, Visby, bland huvudarterna. — På Ölbacksslokalen förekommer en form med grenig stjälk (fig.1). — Holmberg (1922) upptar hybriden från 5 socknar och Visby. Hylander (1953): »Gtl. flerst.»


_Sv. Bot. Tidskr., 50: 3_
Fig. 1. *Equisetum × trachyodon*, form med grenig stjälk. Gotland, Endre sn, Ölbäck, 11.XII. 1955.

*Lemna gibba* L. (ster.). Dalhemsån vid sågen 1,7 km SV om Dalhems kyrka. — *Hultén* (1950) upptar 4 lokaler på Gotland.


*Ulmus carpini/olia Gled. f. suberosa* (Moench) Rehd. Ett tiotal halvstora buskar i kärrmark 700 m NV om »K« i Klinte, Follingbo sn; 300 m NV om Källunge kyrka på bågge sidor om landsvägen vid ån. — *Eisen och Stuxberg* (1869): »flerestädes».

*Sv. Bot. Tidskr.*, 50: 3
Fig. 2. Plantago lanceolata, form med grenigt ax. Gotland, Visby, A 7:s kasernområde, 1.IX. 1955.

Rumex maritimus L. Lokal som Lemna gibba i ett stort och kraftigt exemplar!


So. Bot. Tidskr., 50: 3

Reseda luteola L. Blåhålls fiskeläge, Tofta sn; Visby, bortom Kungs­
ladugården och Norderport. — Eisen och Stuxberg (1869): «sälls.».

Salvia pratensis L. 400 m NV om vägskälet vid Dyple, Tofta sn, intill
vägen; Mafrids, Västergarns sn.

Plantago lanceolata L. form med grenigt ax (fig. 2). Intill en körväg på
A7:s kasernområde, Visby. Ett stort och kraftigt exemplar med omkring
60 ax bland likstora tuvor av normal P. lanceolata. På exemplaret före­
kom ogrenade ax och ax med en till nio smågrenar, alla utgående från
samma höjd vid axets bas. Det som förutom förgreningen gav plantan ett
egendomligt utseende var, att ståndarsträngarna var mycket långa och
delvis sittande, vilket kom de utvuxna axen att se lurliga ut. Förutom detta
praktexemplar anträffades i gräsmattor inom kasernområdet ett litet
exemplar med ett grenigt ax och en vivipar form med en groddplanta i
axet. Vid en röjning i skogen 200 m V om »H» i St. Homa, Stenkumla
sn, hittades, även här bland normal P. lanceolata, en form med gre­
nigt ax, som emellertid var ganska olik den ovan beskrivna. Axen var
små och nästan runda, och smågrenarna, som utgick från samma höjd vid
axets bas, var endast några millimeter långa.

Carduus acanthoides L. Blåhålls fiskeläge och Marsängen, Tofta sn;
A7:s kasernområde, Visby; Roma kungsgård, Roma sn; Endre kyrka. —
Eisen och Stuxberg (1869): »der och hvar ymnigt».


LITTERATUR.

Eisen, Gustaf, och Stuxberg, Anton, 1869: Gotlands fanerogamer och
thallogamer. — Uppsala.


Hultén, Eric, 1950: Atlas över växternas utbredning i Norden. — Stock­
holm.


——, 1955: Förteckning över Nordens växter. — Lunds Botaniska För­
enig, Lund.


Visby i maj 1956.

Ingvar Nordin.

Några notiser om Taxus baccata L.

På Idskär, omkring 4 km öster om Husarö i Ljusterö sn, Stockholms
skärgård, förekommer idegranen ganska rikligt. Jag har tidigare gjort en
snabbspetskattning av antalet individ och kom då till över 200. Sistidna
sommar besökte jag åter skäret och företog då en något noggrannare in­
ventering. Härvid räknades 196 ex. med höjd intill 1 m, 161 ex. med höjd
Sv. Bot. Tidskr., 50: 3
1–2 m och 46 ex. med höjd över 2 m, sammanlagt alltså 403 ex. Det är tro­
ligt, att jag förbisett åtskilliga åtskilliga små individ; även större sådana kunna ha
undgått uppmärksamheten. Min tid var begränsad. Beståndet kan emel­
lertid med stöd av den utförda räkningen sägas omfatta ett halvt tusental
individ.
Åtskilliga av exemplaren ha toppskador. Idegranen råkar ju lätt ut för
sådana. En icke obetydlig del av de låga toppplösa exemplaren har långa,
kraftiga, om och ibland skamfilade grenar och en däremot svarande ålder.
Ett stort antal toppskador äro färskare och torde ha samband med förra
sommarens svåra torka. Idegranen tycks på denna lokal, där den för övrigt
uppenbarligen trivs, ha svårt att utveckla sig till ett kraftigt träd. Endast
eft tio total exemplar äro någorlunda grova.
Idskär är obebott och användes ej för kreatursbete. Skäret besökes en­
dast tillfälligt, mest av fiskare. Idegranen kan därför utveckla sig där utan
nämnvärd kulturpåverkan.
På en av de strax väster om skäret belägna Idskärskobbarna finns något
tio total idegranar, varav några väl utvecklade.
Från de omgivande skären har arten också antecknats. Följande antal
individ har observerats: Tippen 10, Fåröjorna 1 + 11, Ramsen 22, Galg­
holmen 30, Mörkobben 0 och Brännskär 29.

Arvid Hedelius.

En lokal för Hippophaë rhamnoides L. inom Möja socken.

Vid en under sommaren 1956 företagen exkursion till några mindre öar
norr om Möja i Stockholms skärgård fann jag ett bestånd av havtorn på
Svedjeholmen (Svidjeholmen) nära dess sydligaste udde. Det utgöres av
några frodiga meterhöga buskar, kring vilka åtskilliga friska skott skjuta
upp. Något tiotal döda buskar stå därintill. Troligen har beståndet farit illa
av torkan under föregående sommar.
Enligt uppgift i »Stockholmstraktens växter» är Nickö strax norr om
Ljusterö den sydligaste kända Hippophaë-lokalen. Arten har emellertid av
Erik Löwenhamn påträffats på Korsgrunden i Gälnan, 10 km sydligare
än Nickö. Lokalen på Svedjeholmen ligger ytterligare 1 km längre söderut
och är mig vetterligt den enda kända lokalen inom Möja socken.

Arvid Hedelius.

Sv. Bot. Tidskr., 50: 3

Farmakognosien är ett avsnitt av läkemedelsläran (farmakologien), och den har till huvudsaklig uppgift att intressera sig för beredandet och att möjliggöra kontrollerandet av de växt- och djurdroger, vilka utpekats som medicinsek verksamma av läkemedelsläran (farmakodynamiken) och som skola beredas till lämpliga läkemedelsformer av dess farmacevtiska (farmaci). Växt- och djurdrogerna äro dels farmakognostiskt beredda växt- och djurdelar i ett visst utvecklingsstadium (t.ex. örter; skalade eller oskalade rötter, rotstockar och barkar; blad, blommar, frukter och frön eller delar av sådana organ; hårbildningar etc.), dels produkter, som ha erhållits ur växter och djur genom tappning, utsmältning, extraktion, destillation etc. (t.ex. balsamer, hartser, eteriska oljer, mjölksaffdroger, garvämnesextrakt, fetter o. a.). Den förra drogkategorien benämnes här nedan organdroger, den senare naturprodukter.

Eftersom farmakognosiens droger numera så gott som uteslutande hämtas från växtvärlden, är det fr.a. botaniken, som utgör det vetenskapliga underlaget för farmakognosien.

Den för forskning i farmakognosi erforderliga bakgrunden utgöres fr.a. av den rena botanikens utredningar av förekomsten, utvecklingen, utseendet och släktsskapsförhållandena betr. de växter, från vilka drogerna skola ha hämtats eller av vilka dessas förväxlingar ha erhållits. Visst har det hänt, att även farmakognöster ha gjort beaktansvärda insatser också på dessa områden, men deras intresse måste dock vara inriktat fr.a. på vederbörande växtdelars makro- och mikromorfologi. På dessa områden måste farmakognosten icke blott taga befattning med sådana växter, som sedan de inordnats i vederbörande växtsystem, ej väkt den rent botaniska morfologiens, särskilt mikromorfologiens intresse, utan även för växter, där sådant intresse funnits, kanske söka rätt på t.o.m. utförligare karaktärer än dem, som intresserat den rent botaniskt verkande morfologen, ty under det att denne kanske intresserat sig mer för de principer och funktioner, betr. vilka de olika organen äro byggda, måste farmakognosten tänka på att de morfologiska strukturerna må kunna utnyttjas diagnostiskt.

Det är ju naturligt, att den farmakognostiska forskningen i morfologi fr.a. gäller de ovannämnda organdrogerna. En sådan drog utgöres emeller-tid av en större eller mindre del av vederbörande moderväxt (se exemplet här ovan), och för farmaci gäller det att kunna skilja den från växtdelar.
av varje annan systematisk enhet. Eftersom många objekt från närbesläktade växter (t.ex. olika umbelliferrötter, olika Ipecacuanha-rötter, olika kinabarkar, olika Brassica-frön) kunna förete mycket likartade strukturer, måste en drogs och en med den likartad växtbeteckning morfologiska karaktärer mycket noggrant utredas. Här inkräktar farmakognosten visserligen i viss mån på systematikerns verksamhetsområde, men under det att denne i allmänhet kan nöja sig med den totala makromorfologiska byggnaden för att kunna konstatera skillnaderna, måste farmakognosten tillgripa även den mikromorfologiska strukturen, eftersom differentieringsmöjligheten måste kunna utnyttjas även för sådana små parti som dem, vilka föreligger i en pulveriserad drog. Hos denna är den topografi, som annars kanske hade kunnat tjäna till vägledning, i lägre eller högre grad sönderriven.

Drogerna ur den andra av de ovannämnda drogkategorierna, »naturprodukterna« (se exemplen här ovan!), sakna organiserad struktur med undantag av strukturen hos de föroreningar från vederbörende moderväxt, de möjliga kunna innehålla (t.ex. opium), och därför måste oftast andra karaktärer än de ovan åsyftade användas till dessa drogers identifierande. Ofta torde det härut vara tillräckligt med form, färg, lukt och smak samt konsistens och andra fysikaliska data, men ofta måste tillgripas även reaktioner, grundade på vederbörende drogs kemiska natur. Själva utredandet av denna natur tillkommer givetvis ej med nödvändighet farmakognosien, men denna måste beakta de rön, den kemiska (biokemiska) forskningen gjort betr. drogerna och som kunna ha farmakognostisk betydelse. Här må framhållas, att detsamma gäller även betr. organdrogernas kemiska natur, ty identifierandet av mången sådan drog kan ävenledes stödjas av en kemisk reaktion.


Sv. Bot. Tidskr., 50: 3

Redogörelserna för drogernas makro- och mikromorfologi belysas rikligt av instruktiva bilder, de flesta tecknade av de olika upplagornas bearbetare. För flera droger anges makrotusendet även i inciderat (hackat) skick, och av de mikromorfologiska, visande både snitt- och pulverutseende, äro många snittbilder tecknade i svart-blått-rött.

Kring varje monografi-stomme ha grupperats upplysningar om andra förhållanden. Främst att nämna äro de kemiska (om droginnehållsämnen och kemiska reaktioner). Som ovan nämtes kunna kemiska reaktioner vara av värde vid identifierandet, men kännedomen om den kemiska naturen över huvud taget (innehållsämnen) kan ha betydelse även vid drogens beredande och vid dess handhavande för farmacevtiskt bruk i övrigt. Det ligger kanske närmast till hands, att just farmakognosien lämnar dessa upplysningar.

Liksom vanligtvis sker i läroböcker i farmakognosi, ha även här meddelats orienterande informationer om drogens i fråga medicinska verkan. Visserligen ligger utnyttjandet av den terapevtiska användbarheten ej inom farmacevtens verksamhetsområde, men det är ganska naturligt, att han intresserar sig även för drogens medicinska egenskaper, i all synnerhet som han givits en god kännedom om dess innehållsämnen, och det ju är dessa, som betinga det medicinska värdet.


och därmed givetvis även en botaniskt-morfologisk — har använts vid anordnandet av huvudgrupperna (tallofyter med alger, svampar och lavar; pteridofyter; fröväxter) men i viss utsträckning också inom de undergrupper, i vilka fröväxternas droger indelats. Fröväxtdrogerna äro till antalet de ojämförligt flesta, och de ha uppdelsats allt efter den farmakognostiskt-makromorfologiska karaktären i 15 undergrupper (t.ex. rotstock-rotdroger, bladdroger, frukt-frödroger, stärkelsesorter, hartser [inkl. baldamer], mjölkasfodroger o.a.), men inom mången sådan undergrupp ha likheter eller olikheter mellan drogerna, sammanhängande med modernväxternas släktsskapsförhållanden, använts antingen till sammanfattning av vissa droger eller till motsatsförhållanden. För särskiljande av olika hartsstyper inom hartsgruppen ha anlagts fr.a. kemiska synpunkter.

Mången undergrupp bland fröväxtdrogerna har inletts med en orienterande redogörelse för de botaniska förhållanden (vid stärkelsesorter även kemiska), som stå i samband med vederbörande drogtyps tillkomst och natur.

Anordnandet av drogerna är alltså i viss mån ett morfologiskt analys-schema, användbart för hel drog. Emellertid ges i »Anhang II» även ett enbart mikromorfologiskt schema, avsett att användas vid analys av de viktigare vegetabiliska drogpulvren.

»Anhang I» (s. 390–394) är en förteckning över några homeopatiskt ofta använda växtdelar (ca 100 st.).

Läroboken inledes med en översikt över drogkännedomens historia och avslutas med en litteraturförteckning.


Gösta Edman.


Stora skador drabba växter av olika slag genom svampar som infektera deras rötter. De gröna växternas rötter omgivas alltid av mikroorganismer, som på olika sätt kunna ingripa i dessa växters utveckling. Denna del av biologien har egendomligt nog icke blivit föremål för mera intensiva studier förrän under de senaste årtiondena. Då det gäller en skada av mykologisk natur har man tidigare ofta nöjt sig med att konstatera närvaron av en viss svamp. Förf. framhåller, att man även bör studera de ekologiska betingelserna som skapar förutsättningarna för svampens utveckling, då

Sv. Bot. Tidskr., 50: 3
dessa ofta äro av lika stor betydelse som att svampen finns närvarande. På samma sätt är införandet av en ny organism i en population i ett tidigare jämviktsförhållande oftast utsiktslös och effekten därav endast kortvarig. Förf. är själv en ledande forskare på den mikrobiologiska ekologiens område speciellt vad de rotinfekterande svamparnas beteendess känna. Han ger i flera kapitel en utförlig beskrivning av olika markorganismer men alltid med tyngdpunkten lagd vid deras ekologiska krav och förhållande till varandra och högre växter. Han påvisar det ofruktbara i att söka fastställa olika svampars »aktivitet» i jorden samt att kvantitativt uppskatta en svamppopulation i marken. Om betingelserna bli oacceptabla för svamparna, inträder ofta en stark sporbildning. Vid prov enligt gängse laboratoriemetodik får man därför, t. ex. på agarplattor, ofta ett stort antal kolonier, vilka icke står i någon relation till svampens aktivitet i marken. En riktigare uppfattning ger direkt mikroskopisk undersökning, och förf. refererar olika metoder som användas vid dessa svåra undersökningar.


Förf.s inordnande av mykorrhizasvamparna och rhizosfärsvamparna liksom marksvamparna överhuvud taget i problemkomplexet parasitism/saprophytism hjuder visserligen i flera fall på väl djärva aspekter men utgör samtidigt en mycket fascinerande lösning för både växtpatologer, mikrobiologer och ekologer. Förf. påvisar, hur mycket forskare på dessa olika områden ha gemensamt, och framhåller nödvändigheten av att t. ex. mikrobiologerna även lägga ekologiska synpunkter på sina forskningsobjekt. Denna moderna syn har också alltmer gjort sig gällande inom t. ex. amerikansk skogspatologi och givit många värdefulla resultat. Även i England är detta fallet, där förf.s kollega Rishbeth genom denna grundinställning lyckats lösa många problem rörande den praktiskt mycket viktiga rotrötesvampen Fomes annosus i barträd, som andra, mindre ekologiskt inställda forskare icke kunnat klara upp. Han har sålunda t. ex. visat, att svampen genom sina sporer kommer in genom tallstubbarn omedelbart efter avverkningen, innan ännu andra mikroorganismer hunnit infinna sig. I en population av andra marksvampar synes svampen däremot icke kunna hävda sig.

Förf. påvisar vilket vidsträckt forskningsområde, som här öppnar sig för ekologer, som vilja arbeta med svampar, och ger slutligen också en översikt över olika bekämpningsmetoder, som användas mot skadliga markorganismer.

Erik Björkman.

Sv. Bot. Tidskr., 50: 3
Till författare i Svensk Botanisk Tidskrift.

Enligt styrelsens beslut (den 19 november 1948) får avhandling, för att intagas i tidskriften, i regel leka överskrida 3 ark (= 48 trycksidor). Uppnar den mer än 3 ark, kan tidskriften leke åtåga sig omkostnaderna för den överskjutande delen, såvida styrelsen leke efter särskild prövning bestämmer annorlunda.

Korrigeringskostnad, som överstiger 10 % av sättningskostnaden, betalas av vederbörande författare, likså extra kostnad för sättning av svårläsligt manuskript. Detta bör därför vara maskinskrevet.

Av större uppsatser och avhandlingar lämnas kostnadsfritt 100 separat med omslag utan tryck; för tryck på omslag debiteras 12 kr. Extra separat kunna beställas mot särskild avgift. Av smärre uppsatser och meddelanden, liksom av recensioner, lämnas särtryck endast efter överenskommelse.

För utformning av text gäller följande:

Avhandlingar av mera allmänt vetenskapligt innehåll böra publiceras på engelska, franska eller tyska; i varje fall skola de förses med en sammanfattning på något av dessa språk. Manuskript på främmande språk skall vara granskat av sakkunnig språkman, vars namn meddelas redaktören.

Koncentration i utformningen av all text eftersträvas, och, där så kan ske utan olägenhet för läsaren, användas förkortningar (t. ex. frekvens- och lokaluppgifter i artlistor). Noter under texten torde undvikas.

Tabeller förses med kort rubrik och numreras med romerska siffror.

Erforderliga bibliografiska uppgifter om citerade arbeten sammanföras i en till avhandlingen bifogad litteraturförteckning, där de ordnas alfabetiskt efter författarnamn och uppställas enligt följande exemplet:


Citeras två eller flera avhandlingar av samma författare och med samma tryckår, betecknas de med a, b, c etc. Dessa beteckningar införas omedelbart efter tryckåret; i texten enligt exemplet: (RAUNKJER 1912 a, s. 45), i litteraturförteckningen:

RAUNKJER, C., 1912 a: — —.

Med avseende på stilblandningar gäller:

1. Personnamn, även auktornsam, sättas med KAPITÄLER (understrykas i manuskriptet med två streck).

2. Latiniska växtnamn i text och figurförklaringar sättas med kursiv stil (understrykas med ett streck).

Text, som skall spärras, understrykas med en bruten linje (———).

Illustrationer bifogas manuskriptet i sådant skick, att de omedelbart kunna kliehersas. Retusch betalas ej av tidskriften, ej heller montering av planscher eller sammanställning av textfigurer, som omfatta flera små bilder.

För kliehering avsedda fotografier utföras i svart-vitt på blankt papper.

Figurer i texten numreras med arabiska siffror och förses med kort förklaring. Sammanföra flera bilder under samma figurnummer, betecknas de enskilda bilderna med bokstäver, ej med siffror.

Planscher numreras med romerska siffror (en nummerföljd för varje uppsats). Omfatta de flera figurer, numreras dessa med arabiska siffror (en nummerföljd för varje plansch).

I tidskriftens ärenden träffas redaktören efter överenskommelse, måndagar och tisdagar kl. 14—15 på Riksmuseets Botaniska Avdelning (tel. 32 12 19, växel).

Manuskript, korrektur och skrivelser angående uppsatser sändas till redaktören under adress: Riksmuseets Botaniska Avdelning, Stockholm 50.

Direkt förbindelse mellan författaren och tryckeriet får icke äga rum.

Redaktionen.
**INNEHÄLLSFÖRTECKNING**

**Avhandlingar.**

<table>
<thead>
<tr>
<th>Namn</th>
<th>Titel</th>
<th>Sida</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hultén, Eric</td>
<td>The Cerastium alpinum Complex. A Case of World-wide Introggressive Hybridization (Summary, p. 491)</td>
<td>411</td>
</tr>
<tr>
<td>Degelius, Gunnar</td>
<td>Studies in the Lichen Family Collemataceae. II. On the Collema Flora of the Mainland of Greece</td>
<td>496</td>
</tr>
<tr>
<td>Björkman, S. O.</td>
<td>Zingeria biebersteiniana (Claus) P. Smirn. – One more Grass Species with the Chromosome Number 2n = 8</td>
<td>513</td>
</tr>
</tbody>
</table>

**Smärre uppsatser och meddelanden.**

<table>
<thead>
<tr>
<th>Namn</th>
<th>Titel</th>
<th>Sida</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arnell, Sigfrid</td>
<td>A New Species of Cheilolejeunia from Samoa</td>
<td>516</td>
</tr>
<tr>
<td>Nordin, Ingvar</td>
<td>Gotländska växtfynd 1955 (Plant finds from Gotland in 1955)</td>
<td>517</td>
</tr>
<tr>
<td>Hedelius, Arvid</td>
<td>Några notiser om Taxus baccata L. (Some notes on Taxus baccata L.)</td>
<td>520</td>
</tr>
<tr>
<td>——,</td>
<td>En lokal för Hippophaë rhamnoides L. inom Möja socken (A new locality for Hippophaë rhamnoides L. in the Stockholm Archipelago)</td>
<td>521</td>
</tr>
</tbody>
</table>

**Recensioner.**

<table>
<thead>
<tr>
<th>Namn</th>
<th>Titel</th>
<th>Sida</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lehrbuch der Pharmakognosie für Hochschulen. 8. Auflage (Rec. av Gösta Edman)</td>
<td>522</td>
<td></td>
</tr>
<tr>
<td>Garrett, S. D.</td>
<td>Biology of Root-infecting Fungi (Rec. av Erik Björkman)</td>
<td>525</td>
</tr>
</tbody>
</table>

---

Svenska Botaniska Föreningen

Tryckt den 15 okt. 1956

Uppsala 1956. Almqvist & Wiksells Boktryckeri AB 568873