

ON THE LOPHOZIA GROENLANDICA (NEES) MACOUN (HEPATICAE)
О LOPHOZIA GROENLANDICA (NEES) MACOUN (HEPATICAE)

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Abstract

Damsholt's (1994) conclusion on the identity of *Lophozia groenlandica* (Nees) Macoun with *L. wenzelii* (Nees) Steph. is discussed. It is considered to be erroneous. *Lophozia confertifolia* Schiffn. is a synonym of *L. groenlandica*. Included also a discussion on the differences between *L. groenlandica* and *L. ventricosa* (Dicks.) Dum.

Резюме

Обсуждается заключение Дамшольта (Damsholt, 1994) об идентичности *Lophozia groenlandica* (Nees) Macoun и *L. wenzelii* (Nees) Steph., и приводятся доводы о том, что оно ошибочно. *Lophozia confertifolia* Schiffn. отнесена в синонимы *L. groenlandica*. Рассматриваются также отличия между *L. groenlandica* и *L. ventricosa* (Dicks.) Dum.

Lophozia groenlandica (Nees) Macoun is a species, which was differently interpreted by hepaticologists. K. Müller (1954) and Schuster (1953) included it in *L. wenzelii* (Nees) Steph., but later Schuster (1969) found it to be a separate species, close to *L. wenzelii*. However, Schljakov (1975b) found that *L. groenlandica* sensu Schuster belongs to another species, *L. schusterana* Schljak. Recently Damsholt (1994) has typified *Jungermannia groenlandica* Nees and concluded that the lectotype belong to *L. wenzelii*. Though I agree with Damsholt's lectotypification, the arguments that it is *L. wenzelii* seems to me erroneous.

My contrarguments are as follow. Nees described *Jungermannia groenlandica* with leaves bi- or trilobed, lobes unequal, ventral margin of leaf strongly arched (in *Lophozia wenzelii* both margins are arched, cf. Schuster, 1969). The illustrations in Flora Danica (Steenstrup & Lange, 1858, tab. 2626), which has been reproduced by Damsholt (1994), do not confirm the close relation of *Jungermannia groenlandica* to *Lophozia wenzelii*, since in the former species leaves are widest below the middle and have angular sinus (in *L. wenzelii* – semilunate); also the shape of lobes (fig. 2626g) is different – their margins are convex (arched) on both sides, not only on one as in *L. wenzelii*.

Damsholt stated that *Lophozia groenlandica* does not belong to the sect. *Heteromorphae* Schust. because in this species there are no underleaves and leaves are non-polymorphous and bilobed (not 2-3(-4)-lobed). However, the revision of characters of sect. *Heteromorphae* (Schljakov, 1980) demonstrated that these characters are not of great taxonomic importance in this case, while the most important are: (1) broad ventral segment of stem, and this segment causes the occasional occurrence of underleaves in some populations of *L. groenlandica*; (2) direction of longitudinal cell rows in leaves, namely: median longitudinal rows follow to the sinus base from the middle of leaf base or, more often, closer to dorsal margin (Schljakov, 1974, 1980). At the same time in *Lophozia wenzelii* as well as the other species of the sect. *Lophozia* cell rows follow from base into lobes and its leaves are widest mainly at the middle or slightly above (in *L. groenlandica* leaves are widest below the middle). Differences of *L. groenlandica* and *L. wenzelii* are summarized in Table 1.

Lophozia groenlandica is a polymorphic species. In exposed sites occur phases with concave leaves, very often reddish, vinaceous or purplish; plants from swamps are loosely leaved, sometimes with trilobed leaves (*heteromorpha-*

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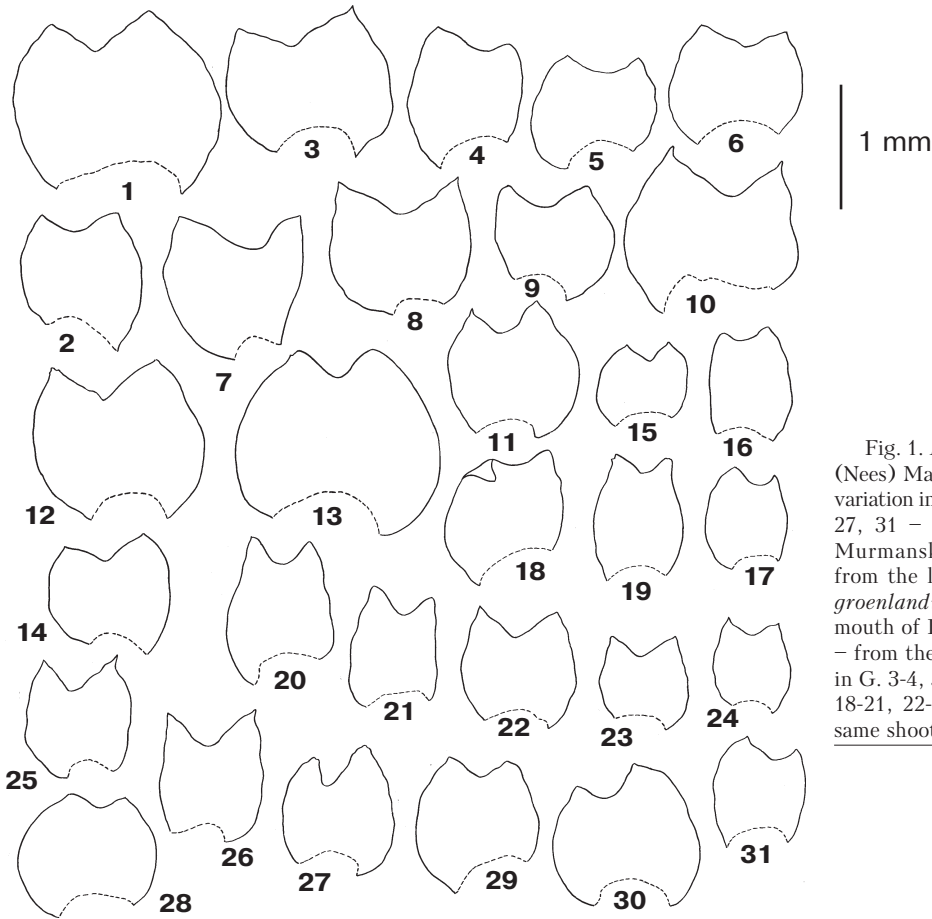


Fig. 1. *Lophozia groenlandica* (Nees) Macoun. Leaves showing variation in shape. 1-11, 15-17, 22-27, 31 – from specimens from Murmansk Province; 12-14 – from the lectotype of *Lophozia groenlandica*; 18-21 – from the mouth of Indigirka River; 28-30 – from the Schiffner Herbarium in G. 3-4, 5-6, 7-9, 12-13, 15-17, 18-21, 22-24, 29-30 – from the same shoots.

like phase, Figs. 1, 2). In forests and humid (but not swampy) woodless sites the most frequent is *Lophozia ventricosa*-like phase, differing from *L. ventricosa* in oil-bodies uniformly granular,

while in the latter oil-bodies are biconcentric, with distinctly refractive central globule. I agree with the K. Müller's (1954) conception of oil bodies of *Lophozia ventricosa* against the al-

Table 1. Differences between *Lophozia groenlandica* (Nees) Macoun and *L. wenzelii* (Nees) Steph.

Character	<i>Lophozia groenlandica</i>	<i>Lophozia wenzelii</i>
Leaf shape	Asymmetric, with larger ventral lobe, widest near or slightly below the middle	Nearly symmetric, widest near or above the middle
Sinus	Nearly rectangular, wide acutangular or obtusangular with rounded base, 1/6 to 2/5 (1/2 and more) of leaf length	“Broad (width ca. 0.5-0.66 leaf width; ca. 0.7-0.9 leaf length), shallowly crescentic, descending only to 0.15-0.2(0.25)”(Schuster, 1969)
Leaf margin	Ventral strongly arched, with postical part (postical leaf base) distinctly turned down (Fig. 1)	Both margins nearly equally arched, postical leaf base hardly curved
Direction of the longitudinal cell rows in leaves	From the middle of leaf base at least in 2-3 cell rows to the sinus (Fig. 2, 5)	From the middle of the base into lobes (Schljakov, 1980, Fig. 23, 4)
Underleaves or under-leaf-like structures	Sometimes present (Figs 2, 4; 3,4)	Absent

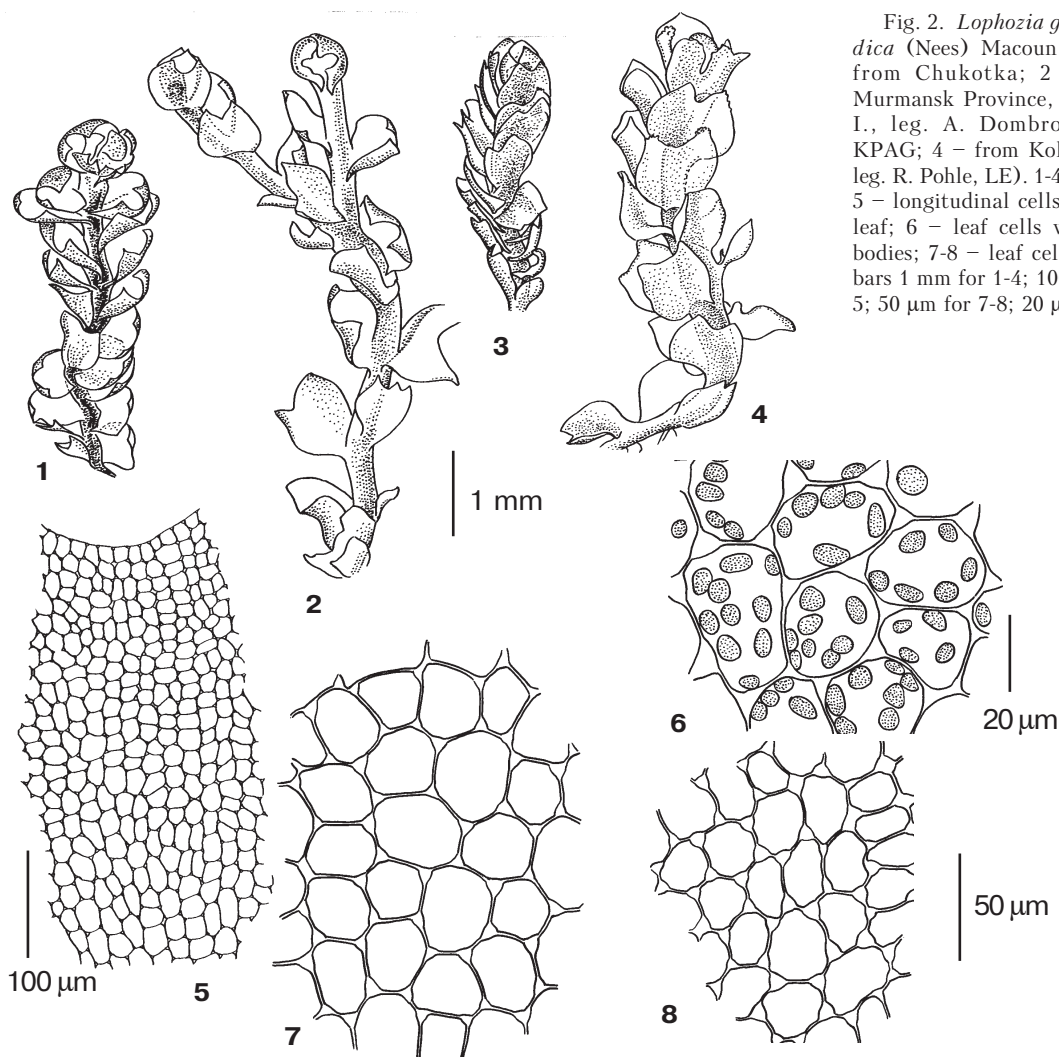


Fig. 2. *Lophozia groenlandica* (Nees) Macoun. (1-3 - from Chukotka; 2 - from Murmansk Province, Kharlov I., leg. A. Dombrovskaya, KPAG; 4 - from Kolguev I., leg. R. Pohle, LE). 1-4 - habit; 5 - longitudinal cells rows in leaf; 6 - leaf cells with oil-bodies; 7-8 - leaf cells. Scale bars 1 mm for 1-4; 100 µm for 5; 50 µm for 7-8; 20 µm for 6.

ternative interpretation of Buch (1933b). Buch has described *L. silvicola* Buch as a new species, which differs from *L. ventricosa* in biconcentric (not uniformly granular) oil-bodies. However Müller (l.c.: 649) came to the conclusion that *L. silvicola* is just the real *L. ventricosa*. He stated that specimens of *L. ventricosa* sent to him by Buch belong to a different species and that Buch agreed with him in this point. So the conception of Buch (1933b), repeated by Saukel (1985) and Schuster (1969) can not be accepted.

Jungermannia ventricosa Dicks. was described from woods of Britain ("Brittania, in sylvis"). However among the specimens named *L. ventricosa* from the Great Britain in BM, plants with the characters of Buch's "*L. ven-*

triosa" were collected mostly in non-forest habitats.

Once in the South-Western part of Murmansk Province I have found the mixed collection of *L. groenlandica* and *L. ventricosa*. The comparison of plants from this collection is given in Table 2. Many other observations of living collection in Murmansk Province just confirm the stability of combinations of characters of these species.

The shape of leaves of *Lophozia groenlandica* is not constant (Fig. 1). Leaves are widest usually below or at the middle, but some are widest above (Fig. 1, 7-8). Lobes are either obtuse, or acutish to shortly pointed. Although as a rule leaves are broader than long, occasionally plants with narrower leaves occur. In

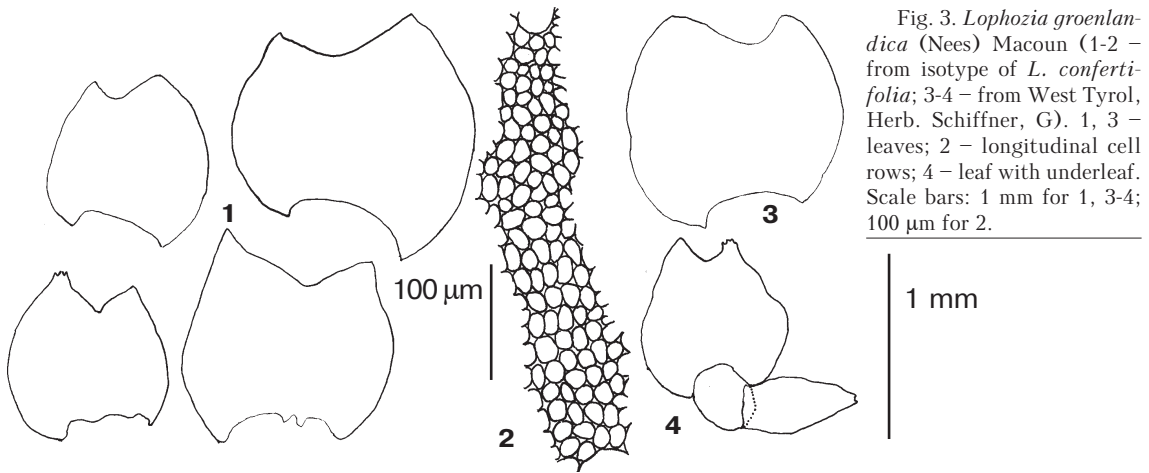


Fig. 3. *Lophozia groenlandica* (Nees) Macoun (1-2 – from isotype of *L. confertifolia*; 3-4 – from West Tyrol, Herb. Schiffner, G). 1, 3 – leaves; 2 – longitudinal cell rows; 4 – leaf with underleaf. Scale bars: 1 mm for 1, 3-4; 100 μ m for 2.

specimens from the dry polygonal Arctic bog of the delta of Indigirka River in Yakutia I found upper leaves normal for the species (cf. Fig. 1, 18), while lower leaves are narrower (Fig. 1, 19-21). Areolation is variable and the following patterns can be recognized: mod. *leptoderma*, nearly without trigones; mod. *mesoderma*, with clear but not bulging trigones (Fig. 2, 6) and mod. *pachyderma*, with bulging trigones (Fig. 2, 7).

Another problematical species presenting a point of disagreement among hepaticologists is *L. confertifolia* Schiffn. Buch (1933b), Müller (1954) and Saukel (1985) interpreted it to be conspecific with *L. wenzelii*, and Schuster (1969) considered it as "a concept (rather than a species) that appears to involve

the mod. *densifolia* of both *L. ventricosa* and *L. wenzelii*". I found the isotype of this species identical with *L. groenlandica*: it has leaves as a rule widest at or slightly below the middle; with larger ventral lobe, having strongly arched ventral margin, proximal part of which (postical leaf base) distinctly turned down (Fig. 3, 1); the direction of cell rows in leaf is similar to that of *L. groenlandica*, from base to sinus (Fig. 3, 2).

Saukel (1985) wrote that Buch (1933a) has proved identity of *L. confertifolia* and *L. wenzelii* experimentally. However, Buch made this conclusion only on the basis of habits of *L. confertifolia* and *L. wenzelii* mod. *densifolia*. Therefore this is not a very good argument.

Table 2. Differences between *Lophozia groenlandica* (Nees) Macoun and *L. ventricosa* (Dicks.) Dum., from plants of mixed collection

Character	<i>Lophozia ventricosa</i>	<i>Lophozia groenlandica</i>
Oil-bodies	Biconcentric	Homogeneous, uniformly minutely granular
Direction of the longitudinal cell rows in leaves	From the middle of leaf base into lobes (see Schljakov, 1980, Fig. 23, 3)	From the middle of leaf base in (1-)-2-3 rows to the sinus base
Leaf shape	Equal or longer than broad	Shorter than broad
Postical base	Hardly curved	Distinctly turned down
Postical end of the insertion line	Scarcely curved backward	Weakly but appreciably arched
Coloration in pigmented leaves	Proximal part colored, distal colorless	Distal part colored, downward gradually colorless
Gemmae	Usually subsquare and polygonal	Usually rounded- and elongate-triangular and polygonal (Schljakov, 1970, Fig. 2, 9); abundant when present

The synonymy of *Lophozia groenlandica* is as follow:

Lophozia groenlandica (Nees) Macoun, Cat. Canad. Pl. 7: 19. 1902. – *Jungermannia groenlandica* Nees in Gott. et al., Syn. Hep.: 114. 1844. LECTOTYPE: S. Groenland, Frederiksdal (Narksak). Leg. J. Vahl, Sept. 1829 No 234 "a" (STR!)

Lophozia confertifolia Schiffn., Oesterr. Bot. Zeitschr. 55: 47. 1905. ISOTYPE: V. Schiffner: Hepaticae europaeae exicatae, 176. Tyrol, Am Glungezer bei Hall, oberhalb der Schafhuette auf alpinem Humus und auf erdbedeckten Steinen, 230 m, 4.IX.1903, leg. V. Schiffner et H. F. V. Handel-Mazzetti (H!).

Lophozia ventricosa auct. pl., non (Dicks.) Dum.; Buch, Ann. Bryol. 6: 127. 1933.

(?) *Lophozia murmanica* Kaal. in Bryhn, Rep. 2nd Norw. Arct. exped. "Fram" 2, 11(1): 34. 1906. TYPE: Lapponiae murmanicae, Litsa, leg. Brothnerus, August 1887 (not seen)¹.

(?) *Lophozia heteromorpha* Schust. et Damsh. in Schust., Hep. Anthoc. North Amer. 2: 507. 1969. TYPE: Northwest Greenland, Hackluyt I. in Smith Sound, 77° 24' N – 72° 31' W. G. Seidedfaden 85 (not seen)².

Lophozia groenlandica is a widespread circumpolar species, known from the high Arctic southwards to the hemiboreal zone, and in mountain region of the temperate latitude, including Alps. It is the most common species of the genus *Lophozia* s. str. in Ural and Altai Mts. It is

frequent in South Finland (among 15 specimens identified by Buch as *L. ventricosa* and 10 - as *L. silvicola*, 8 and 5 correspondingly belong to *L. groenlandica*). It is likely that wide distribution of *Lophozia groenlandica* in Finland caused the Buch's misunderstanding of this material. In comparison with *L. ventricosa*, *L. groenlandica* has more northern distribution – the former species is rare in Arctic, but in Central Europe is widespread from plains to mountains, in Alps to 3000 m (Müller, 1954).

Selected specimens examined of *L. groenlandica* (from KPAG): FINLAND: Hepaticae exs. S. O. Lindberg (ed. by S. Piippo), 265, 266, 267 (all as *L. ventricosa*); CZECH REPUBLIC: Bryophyta Chechoslov. exs. 260 (as *L. ventricosa*); Sweden, Södermanland, Arnell 20.VII.1944 (as *L. wenzelii*).

Lophozia groenlandica occurs on rocks, on soil in dry and moist, sometimes swampy tundras and in forests on decaying wood and on tree roots. *Lophozia ventricosa* in northern parts of Kola Peninsula grows nearly exclusively on roots and decaying wood.

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LITERATURE CITED

- BUCH, H. 1933a. Experimental-systmatische Untersuchungen über die *Lophozia ventricosa*-Gruppe. – *Ann. Bryol.* **6**: 7-14.
- BUCH, H. 1933b. *Lophozia silvicola* Buch sp. nov. – *Ann. Bryol.* **6**: 125-129.
- DAMSHOLT, K. 1994. On the identity of *Jungermannia groenlandica* Nees. – *J. Hattori Bot. Lab.* **75**: 173-178.
- MÜLLER, K. 1954. Die Lebermoose Europas (L. Rabenhorst's Kryptogamen-Flora 3d ed., Bd. 6).
- SAUKEL, J. 1985. Zum Merkmalbestand einiger mitteleuropaischer Arten der Lebermoosgattung *Lophozia* (Dum.) Dum. (Sektion *Lophozia*) – *Stafia* **14**: 149-185.
- SCHIFFNER, V. 1905. Eine neue europäische Art der Gattung *Lophozia* – *Oesterr. Bot. Zeitschr.* **55**: 47-50.
- [SCHLJAKOV, R. N.] ШЛЯКОВ, Р. Н. 1970. Новая секция рода *Lophozia* Dum. emend. Loeske. – [New section of the genus *Lophozia* Dum. emend. Loeske] *Новосту сущ. низш. раст. [Novosti Sist. Nizsh. Rast.]* **7**: 324-333.
- [SCHLJAKOV, R. N.] ШЛЯКОВ, Р. Н. 1973. Систематические заметки по семейству Lophoziaceae Cavers. – [Taxonomic notes on the family Lophoziaceae Cavers] *Новосту сущ. низш. раст. [Novosti Sist. Nizsh. Rast.]* **10**: 287-302.
- [SCHLJAKOV, R. N.] ШЛЯКОВ, Р. Н. 1974. Важнейшие систематические признаки рода *Lopho-*

¹ – Although I have not seen the type of *L. murmanica*, I have seen specimens from Kharlov I., the place very close to the type locality in Litsa, as well as numerous collections from many other places in Murmansk Province. They agree with the description of *L. murmanica* and fit my concept of *L. groenlandica* (cf. Fig. 1).

² – Although I have not seen the type of *L. heteromorpha*, I have studied specimens kindly sent to me by Dr. K. Damsholt and found no characters which disagrees with *L. groenlandica*. The presence of underleaves I don't consider as a specific character, since in some collections with bilobed leaves I found underleaves (cf. Figs. 2, 4 and 3, 4).

- zia Dum. s. str. (листочкелыные печеночники). – [Significant taxonomic characters in the genus *Lophozia* s. str. (leafy Hepaticae)] *Бот. Журн. [Bot. Zhurn.]* **59**(10): 1465-1471.
- [SCHLJAKOV, R. N.] ШЛЯКОВ, Р. Н. 1975b. Дополнения к флоре печеночников Советской Арктики. – [Additions to the liverwort flora of the Soviet Arctic] *Новости сист. низш. раст. [Novosti Sist. Nizsh. Rast.]* **12**: 318-323.
- [SCHLJAKOV, R. N.] ШЛЯКОВ, Р. Н. 1980. Печеночные мхи Севера СССР. Вып. 3. Печеночники: лофозиевые, мезоптихиевые. – [Liverworts and hornworts of the North of the USSR. 3. Lophoziaceae – Mesoptychiaceae] *Л., Наука [Leningrad, Nauka]*, 188.
- SCHUSTER, R. M. 1953. Boreal Hepaticae, a manual of the liverworts of Minnesota and adjacent region. – *Amer. Midl. Nat.* **49**(2): 257-684.
- SCHUSTER, R. M. 1969. The Hepaticae and Anthocerotae of North America East of the hundredth meridian. **2**. NY-London, Columbia Univ. Press XII+1062.
- STEENSTRUP, J. & J. LANGE 1858. Flora Danica 15 (44) *Haunia*: 1-21 (tabs. 2581-2640).