
To prepare an up-to-date arrangement of Japanese Nephroma species it is, first of all, important to settle whether Nephroma tropicum (Müll. Arg.) Zahlbr. is a mere synonym of N. helveticum Ach. or it should be accepted as an autonomous species.

Occasionally in the study of Kamtchatka lichens Du Rietz1) mentioned seven Nephroma species from northern hemisphere and treated N. tropicum Müll. Arg. as well as N. saxicolum B. de Lesd. as synonyms of N. helveticum Ach. In his Nephroma-Studien Gyelnik2) enumerated 18 species (including N. arcticum, N. expallidum, N. lucitanicum, N. parile, N. helveticum and N. resupinatum, all enumerated by Du Rietz). In the supplementary paper of Gyelnik3) the species number of the genus Nephroma was augmented to 45, besides numerous varieties and forms. A few years later Gyelnik4) discussed about the resemblance of N. helveticum Ach. with N. tropicum (Müll. Arg.) A. Zahlbr. and N. denticulatum (Vain.) Gyel. and on the basis of rather unimportant properties accepted the autonomy of N. tropicum.

Zahlbruckner5) differentiated principally N. tropicum from N. helveticum. But his actual determination of specimens was not always constant. Inumaru6) in his study on Japanese Nephroma-species essentially followed Gyelnik’s system and established several new species, most of which became untenable under recent interpretation. In 1960 Wetmore7) assigned, in his elaborate paper, N.

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1) Arkiv für Bot., 22 A: 5. 1929.
3) Nephromae novae et criticae in Annales de Cryptogamie Exotique, 4: 121—149. 1931.
tropicum as a synonym of N. helveticum Ach.

To settle this problem it is necessary to examine carefully the type specimen of N. tropicum Müll. Arg.. By courtesy of Dr. Baehni (Genève) I have had a chance to examine several specimens of Nephrium tropicum identified by Müller Arg. himself. One of them has a label “Nephrium tropicum Müll. Arg”. L. B. n. 559, Toowoomba, Queensland: Hartmann. F. v. Müller 1882. No doubt this is one of the various specimens, which was examined by Müller Arg. when he established N. tropicum. By further examination of the other 4 specimens together with 3 incomplete and doubtful ones I could grasp the real habit of N. tropicum. A specimen labelled “China, prope Hupeh: 8 Aug. Henry” is identical with a Japanese specimen Lichenes Yatabeiani no. 214 collected in Nikko and identified as N. tropicum by Müller Arg.

On the other hand Dr. M. Hale was kind enough to send me 20 specimens of Nephroma helveticum preserved in U. S. National Museum on loan. They were all examined by Wetmore and 3 of them labelled by Wetmore as N. helveticum var. sipeanum (Gycel.) Wetmore correspond very well N. tropicum Müll. Arg.. Wetmore distinguished his var. sipeanum from type species by “the thicker thallus, longer, rounded isidia and teeth, and by the tendency for longer, more constant tomentum”.

I think no. 14 Nephrium helveticum Ach. in the Tuckerman’s Lichenes Americae Septentrionalis Exsiccati, which I possess, may be referred to N. tropicum Müll. Arg.. To distinguish N. helveticum v. helveticum from N. tropicum one must carefully examine the form and size of marginal teeth and size of

![Fig. 1.](image)

spores. Contrary to *N. helveticum* v. *helveticum* the margin of *N. tropicum* is not bordered with sharp serration (0.6–1.0 mm long, ±0.1 mm wide), but rimmed with obtuse indentation (0.6–1.0 mm long, ±0.3 mm wide), broader than the irregular marginal teeth of the former.

The thickness of the thallus furnishes also a key to distinguish *N. tropicum*, *N. helveticum* and its forma *caespitosum* (see below). Lichen fragments are, at first, mollified by dipping into water and after removal of excess water, held between elder-pith and cut. The sections are soaked in G.A.W. under cover glass and measured.

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\begin{align*}
N. tropicum & \quad \text{Wetmore} & \quad \text{Asahina} \\
& \quad 0.25–0.29 \text{mm} & \quad \text{up to } 0.20 \text{mm} \\
& \quad (\text{under } v. \text{ sipeanum}) & \\
N. helveticum v. helv. & \quad 0.10–0.16 \text{mm} & \quad 0.15–0.20 \text{mm} \\
N. helv. f. caespitosum & \quad \text{—} & \quad 0.10–0.12 \text{mm}
\end{align*}
\]

Among 20 specimens identified by Wetmore as *N. helveticum*, excluding 3 specimens of var. *sipeanum* (=tropicum), there are 7 specimens belonging to *N. helveticum* f. *caespitosum*. This is perhaps the reason why Wetmore’s measurement of *N. helveticum* v. *helveticum* gave lower value than mine.

Finally the dimension of spores indicates a difference between them. The measurement of spores should be done with a large number of preferably isolated ones or those located in well squeezed asci. I could only confirm the old data of Zahlbruckner: *tropicum* 20–24×5.5–6μ and *helveticum* 14–18×6–7μ.

Micrography of the contents of almost all *Nephrorn* species was studied by
Wetmore carefully. Here I confine myself to the chemism of *N. helveticum* and *N. tropicum*, and between them I could not find any qualitative difference.

When a small fragment of *N. helveticum* or *N. tropicum* was boiled with benzene and the benzene solution was evaporated, there remains a viscous varnish like substance, which is recrystallized under cover glass from G. E. solution as well as from G.A.Am. solution. From the former solvent we obtain besides oily particles radiating clusters of needles or long narrow plates; from the latter solvent long, thin needles often branched at several points (Wetmore, Pl. I. c) and after sometime thin colorless square plates (Wetmore, Pl. II. c).

Sect. Nephroma


I have examined 8 specimens from my herbarium. Except one from Takanosawa (Saghalien), growing localities are all alpine regions of Hokkaido and middle Hondo. Among 4 specimens from Faurie collection, no. 6701 (Komagatake 1905) bore rounded squamules and was referred to *N. tatranum* Gyeln. by Inumaru.

Sect. Nephromium

○ Lower surface tomentose.

2. *Nephroma resupinatum* (L.) Ach.


There are 37 specimens in my herbarium, distributed in the mountainous districts of Hondo and Shikoku. I have examined also 12 specimens from Faurie collection, in which the westernmost locality was Mt. Daisen, Prov. Hoki; no specimen from Kiusiu was found.


*Nephroma Asahinae* A. Zahlbr. (Feddes Repert. 33: 35. 1933)
*N. sodide-luteum* Inumaru pr. p. 1. c.
*N. tomentellum* Inumaru 1. c.

I have examined 25 specimens in my herbarium, their growing localities extending from northern Hondo to Kiusiu. Also I could pick up from Faurie collection 8 specimens recognized as N. tropicum, two of which (811 and 711) were identified as N. helveticum by Hue as well as by Inumaru and one (904) as N. tropicum eventually N. Asahinae A. Zahlbr. by the latter author. The remaining 5 Hawaiian specimens (773, 302, 574, 1080 and a specimen from Honolulu without number) were named as N. tomentellum by Inumaru.


N. resupinatum (L.) Ach. f. helveticum Rbnh.

There are 41 specimens of N. helveticum f. helveticum in my herbarium, their localities extending from Hokkaido to Shikoku through main island of Japan. Among the collection of Faurie there are a few specimens from Kiusiu.

f. caespitosum Asahina form. nov.

N. denticulatum (non Gyel.) Inumaru 1. c.


Thallus minor, semper isidiatus, isidiis squamulosis, praesertim in margine loborum caespitoso congestis. (cf. Fig. 1. d.)
Among 27 specimens of Faurie's collection, which may be referred to \textit{N. helveticum} Ach., about one half consists of this form "caespitosum". They were named by Inumaru as \textit{N. denticulatum} (Vain.) Gye. The specimen no. 3585 Myadzu (Oct. 1901) was incorrectly identified by Inumaru as \textit{N. Murayamanum} Nyl. (Lich. Jap. p. 32). \textit{N. Murayamanum} Nyl. has colorless medulla\textsuperscript{8}) and as I could confirm by the fragmental piece of the "Vega collection", it should be very probably referred to \textit{f. caespitosum} Asahina. Inumaru laid much weight on the yellow medulla of no. 3585. But the medullary layer of \textit{f. caespitosum} As. is colored naturally more or less yellowish, but the nature of the pigment is, except \textit{K}—, yet unknown. Faurie specimen no. 3585 possessed by chance a conspicuous yellow medulla.

○ ○ Lower surface usually etomentose.

On account of scarcity of examined specimens in this group I follow at present the treatment of Wetmore.

5. **


Medulla colorless, \textit{P}—.

There are 8 specimens collected in Hondo, Shikoku and Kiusiu.

\textit{f. squamigerum} (Inumaru) Asahina

\textit{N. squamigerum} Inumaru 1. c.

Thallus isidiatus, isidiis squamulosis. Medulla \textit{P}—.

There are 4 specimens collected in northern Hondo.

\textit{f. flavoreagens} Asahina form. nov.

Medulla \textit{P}+flavente.

There are 6 specimens from central Hondo and Shikoku.

6. **


\textit{N. lucitanicum} auct.

Thallus squamuloso isidiatus subtus glaber, medulla flava, \textit{K}+ sanguineorubra.

There are two specimens from central Hondo.

7. **

\textbf{Nephroma parile} Ach.


There are 4 specimens from central Hondo.

Medullary reaction revealed some heterogeneity: 1...\textit{K}+, \textit{P}+; 2...\textit{K}—, \textit{P}+; 1...\textit{K}—, \textit{P}—.

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\textsuperscript{8)} Annales Musei Nationalis Hungarici. 1935, p. 16.