

財団法人 服部植物研究所報告

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財 団 法 人
服 部 植 物 研 究 所

昭和 30 年 7 月

財団法人服部植物研究所寄附行為 (昭和 29 年 10 月 17 日改正)

第一章 総 則

第一条 この法人は、財団法人服部植物研究所と称する。

第二条 この法人は、事務所を宮崎県日南市大字本町 3888 番地に置く。

第二章 目的及び事業

第三条 この法人は、植物学特に蘚苔類の研究に従事し、もつて学术文化の発展に寄与することを目的とする。

第四条 この法人は、前条の目的を達成するために次の事業を行う。

- 一、蘚苔類の分類学的、生態学的及び生物地理学的研究
- 二、蘚苔類標本及び文献の収集整備
- 三、研究所報告その他の学術書の刊行
- 四、その他目的を達成するため必要な事業

第三章 資産及び会計

第五条 この法人の資産は次の通りとする。

- 一、この法人の設立当初服部新次の寄附にかかる別紙財産目録記載の財産
- 二、資産から生ずる果実
- 三、事業に伴う収入
- 四、寄附金品
- 五、その他の収入

第六条 この法人の資産を分けて基本財産及び運用財産の二種とする。

基本財産は、別紙財産目録のうち基本財産の部に記載する資産及び将来基本財産に編入される資産で構成する。

運用財産は、基本財産以外の資産とする。

但し、寄附金品であつて、寄附者の指定あるものは、その指定に従う。

第七条 この法人の基本財産のうち現金は、理事会の議決によつて確実な有価証券を購入するか、又は郵便貯金とし、若しくは確実な信託銀行に信託するか、あるいは定期預金として理事長が保管する。

第八条 基本財産は、消費し、又は担保に供してはならない。但し、この法人の事業遂行上やむを得ない理由があるときは、理事会の議決を経、且つ、文部大臣の承認を受けて、その一部を処分することができる。

第九条 この法人の事業遂行に要する費用は、資産から生ずる果実及び事業に伴う収入その他運用財産をもつて支弁する。

第十条 この法人の事業計画及びこれに伴う収支予算は、毎会計年度開始前理事長が編成し、理事会の議決を経て文部大臣に届出しなければならない。収支予算を変更したときも同様と

する。

第十一條 この法人の決算は、会計年度終了後二箇月以内に理事長が作成し、財産目録及び事業報告書並びに財産増減事由書とともに監事の意見をつけて、理事会の承認を受け文部大臣に報告しなければならない。

この法人の決算に剩余金があるときは、理事会の議決を経て、その一部若しくは全部を基本財産に編入し又は翌年度に繰越すものとする。

第十二条 収支予算で定めるものを除く外、新たに義務の負担をし、又は権利の放棄をしようとするときは、理事会の議決を経、且つ、文部大臣の承認を受けなければならない。

借入金（その会計年度内の収入をもつて償還する一時借入金を除く）についても同様とする。

第十三条 この法人の会計年度は、毎年四月一日に始まり翌年三月三十一日に終る。

第四章 役員及び職員

第十四条 この法人には、次の役員をおく。

理事五名以上七名以内（内理事長一名）

監事一名以上三名以内

第十五条 理事及び監事は、評議員会でこれを選任し、理事は、互選で理事長一名を定める。

第十六条 理事長は、この法人の事務を総理し、この法人を代表する。

理事長は、理事会の承認を受けて理事のなかから常務理事二名以内を置くことができる。

理事長に事故あるとき又は欠けたときは、理事長があらかじめ指名した常務理事又は理事がその職務を代行する。

常務理事は、理事長を補佐し、理事会の決議に基き日常の事務に従事する。

第十七条 理事は、理事会を組織し、この法人の業務を議決し執行する。

第十八条 監事は、民法五十九条の職務を行う。

第十九条 この法人の役員の任期は三年とする。

但し再任を妨げない。

補欠による役員の任期は、前任者の残任期間とする。

増員による役員の任期は、現任者の残任期間とする。

役員は、その任期満了後でも、後任者が、就任するまでは、なお、その職務を行ふ。

役員は、この法人の役員たるにふさわしくない行為のあつた場合、又は特別の事情ある場合には、その任期中といえども評議員会及び理事会の議決により、これを解任することができる。

第二十条 役員は、有給とすることができます。

第二十一条 この法人には、評議員若干名を

RESEARCHES ON THE BRACHYTHECIACEAE OF JAPAN AND ITS ADJACENT AREAS (I)

By Noriwo TAKAKI¹⁾

高木典雄：日本及び近接地域産ヒツジゴケ科蘚類の研究（其一）

Introduction

The areas under consideration cover Japan (Hokkaidō, Honshū, Shikoku and Kyūshū districts) and some of its adjacent areas such as Sakhalin, Korea, Ryūkyū Islands and Formosa. Other adjacent areas, such as the Kuriles, Bonins, Micronesia, Manchuria, etc. are omitted from this treatise on account of the scantiness of publications on the floras of these areas, and of materials gathered by the author. The majority of the materials have been gathered, of course, in Japan, and therefore the main stress has been put on it. On the areas such as Sakhalin, Korea, Ryūkyūs and Formosa, the investigation has been carried out mainly by examining the original specimens from these areas, and the author believes it very important for the recognition of the Japanese flora itself.

As to the conception of the *Brachytheciaceae*, differences both in wider or narrower, are seen among the various authors. A.J. Grout treated the *Brachytheciaceae* as a subfamily (*Brachytheciae*) of the *Hypnaceae*, in his "Moss Flora of North America", and the following genera are classed into this subfamily; *Bryhnia*, *Homalothecium*, *Camptothecium*, *Brachythecium*, *Cirriphyllum*, *Euryhynchium*, *Rhynchostegiella*, *Scelropodium* and *Pseudisothecium*. Grout's system is published again in the "List of Mosses of North America, North of Mexico (1950)" and it is used in "An Annotated List of British Mosses" by P. W. Richards & E. C. Wallace. The subfamily *Brachytheciae* adopted by Grout has much the same extent as the *Brachytheciaceae* used by Brotherus, Fleischer, Loeske, etc. In Japan, Brotherus' conception is generally adopted now, for example, in K. Sakurai's "Muscologia japonica (1954)", the most recent publication on the whole Japanese mosses.

The *Brachytheciaceae* has, in fact, much resemblance with the allied families, *Amblystegiaceae*, *Climaciaceae*, *Hypnaceae*, etc. It seems therefore preferable to use Grout's system from the standpoint of natural classification. Yet, in the present stage, many doubtful or little known species remain without re-examination in Japan. So, the author is obliged to use mainly Brotherus' system, and proposes to make some alteration according to the author's opinion.

The *Brachytheciaceae* is a large family of Musci, and numerous taxa are included in it. Among these taxa, we see also many common and familiar ones. Consequently those found in the present areas²⁾ have been dealt with by many authors at home and abroad. The studies on the mosses of this family, like-

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2) The term "present areas" in this monograph means the whole areas mentioned at the begining of this article.

wise on the other families, of the present areas, were started by foreign authors. During the middle to the last part of the nineteenth century, W. Mitten, O. S. Lindberg, Sande Lacoste and E. Bescherelle were the representative investigators. In the twentieth century, G. Paris, J. Cardot, V. F. Brotherus, I. Thériot, H. N. Dixon, H. Reimers, etc. described many species and varieties of this family one after the other. Among the foreign collectors Père Faurie stands foremost. He was an indefatigable collector, and made his utmost to collect tons of specimens of not only mosses but also other plants. He travelled from Sakhalin down to Formosa, Korea, and all over Japan (1885-1914). The numerous materials of Musci were sent mostly to J. Cardot, and partly to Brotherus and Paris by himself. Based on these materials, many new taxa have been described. For clarifying the floras of the present areas it seems indispensable to examine Faurie's original specimens. Among the foreign collectors in the first part of the nineteenth century, Savatier, Bisset, Wichura, etc. are also known. The first Japanese author who described some new species of this family in 1915 and 1916 is Sh. Okamura. After him, K. Sakurai, N. Ishiba, R. Toyama and A. Noguchi are known as the Japanese authors who worked on this family. By these successive publications, we have now a number of taxa of this family from the present areas. In Sakurai's "Muscologia japonica" 126 species, 30 varieties and 4 forms are recorded as the members of this family in Japan.

But among these members there are some questionable species which are supposed to have been established without making sufficient comparison with the type specimens, and many confusions are seen among the various authors on recognitions of the species. It seems impossible to expect further studies without readjusting these situations. Recently, many researchers appear in Japan and they have their numerous collections, but in which most specimens of this family are left generally without concrete determination. The author examined as many original specimens as possible, and found many species should be reduced as the synonymous. In this monograph the author has readjusted these questionable members and described one new genus, some new species, varieties and forms, to be added to this family. Besides, the author has tried to clarify the characters of each known species and to make a key including these known and unpublished species. Moreover, he has studied the range of distribution of each species, and considered the constitution of the present flora from the phytogeographical point of view.

As mentioned above, most of our species, varieties and forms have been described mainly by the foreign authors. So, many type specimens of them are preserved in both European and American herbaria. However, the isotypes of most of them fortunately remain in Japan. The duplicates of Faurie's collections, which include many original specimens, described by Brotherus, Cardot and Paris are kept in good condition in the Herbarium of Kyoto University. Numerous packets of Sasaoka's specimens collected by himself and by many of his friends, which also include numerous original specimens described by the authors at home and abroad, are preserved in the Herbarium of Tokyo National Science Museum. Sh. Okamura's collections which include some type specimens of this family described by himself, are kept in the Herbarium of Hattori Botanical Laboratory. For the examination of these original specimens mentioned above, the author was deeply

indebted to the curators of these Herbaria, Dr. S. Kitamura, Dr. M. Tagawa and others of Kyoto University, Dr. Y. Kobayashi of Tokyo National Science Museum and Dr. S. Hattori of Hattori Botanical Laboratory. In the personal relations, many Japanese bryologists, Drs. K. Sakurai and A. Noguchi at the top, and Messrs. T. Shin, K. Mayebara, T. Nakajima, K. Oti, K. Yamamoto, T. Magofuku, Y. Ikegami and others have been kind to lend or share their private original specimens described or collected by themselves. As to the other original specimens which have not been at the author's disposal in Japan, in spite of the utmost effort made, he is indebted to the curators of the following herbaria abroad, for the loan of some type specimens; of Brotherus' specimens, by the courtesy of Dr. R. Tuomikoski and Dr. H. Roivainen of the Botanical Institute of University of Helsinki and of Mitten's specimens also by the courtesy of Dr. D. P. Rogers of New York Botanical Garden.

Before proceeding further, the author should like to acknowledge the help and criticism by Dr. H. Ito of Tokyo University of Education. The author also would express his sincere thanks to Dr. K. Sakurai of Kyoritsu Pharmaceutical College, Dr. A. Noguchi of Kumamoto University and Dr. S. Hattori of Hattori Botanical Laboratory for their kind guidance and criticism in various phases of this study. Dr. Noguchi and Dr. Hattori spent a great deal of time in copying many literature and sharing their numerous materials complying with the author's wishes. Dr. Sakurai kindly allowed to examine many of his specimens. The author also desires to express his appreciation to Dr. Y. Horikawa of Hiroshima University, Prof M. Matsubara of Shinshū University, and Dr. M. Kumazawa and Dr. K. Tanaka of the author's own University for their continued encouragement and advice. For the examination of the original specimens, the author has again to thank all persons and institutions mentioned above, for their generous help throughout the work. Sincere thanks are also due to Drs. H. Persson, T. C. Frye, E. Whitehouse, H. Roivainen, F. Demaret and S. W. Greene, who forwarded many specimens of their countries for the comparison with our specimens. Finally the author wishes to acknowledge the invaluable cooperation of many friends who forwarded him numerous specimens of this family, whose name are cited in the description of each species in this monograph.

Taxonomic treatment

Brotherus enumerated the following 11 genera in Engler's "Pflanzenfamilien (1925)" from the present areas; they are *Camptothecium*, *Homalothecium*, *Pleuropus*, *Ishibaea*, *Brachythecium*, *Bryhnia*, *Myuroclada*, *Rhynchostegium*, *Oxyrhynchium*, *Eurhynchium*, *Scleropodium* (the last occurs in Korea only). In 1891, Mitten already reported *Cirriphyllum cameratum* (as *Hypnum*) from Japan, but this was not cited in the "Pflanzenfamilien." After Brotherus' publication, some genera have been added to the floras of these areas. Dixon reported *Rhynchostegiella* in 1932. K. Sakurai established a new genus *Kurohinehypnum* in 1950, and reported *Scorpiurium* (*S. circinatum*) as a new addition to this floral area in 1950. Thus, 15 genera have been known to occur in the present areas. As a result of examination of most specimens cited in the above publications, the author has arrived at the following conclusion.

The addition of *Scorpiurium* to the present areas is based on erroneous determination. The genus *Kurohimelhypnum* resembles very closely in many respects to the genus *Chrysohypnum*, and it seems necessary to transfer it to the family *Amblystegiaceae*. Moreover, the monotypic and endemic genus *Ishibaea* seems to be preferably classed in the *Leskeaceae*. The genus *Ishibaea* was established by Brotherus & Sh. Okamura based on the specimen from Mt. Shiromura (Middle Japan). It includes one single species *I. japonica*. R. Toyama had already pointed out that this species is conspecific with *Lescuraea julacea*, and cited the name *Ishibaea julacea* as a new combination. He recognized *Ishibaea* as a separate genus by reason of its having no paraphyllia in contrast to *Lescuraea* which has usually many. The author re-examined the original specimen of *Ishibaea japonica* and found that a few paraphyllia are seen but, indeed, not so many as in *Lescuraea*. On the other hand, the author has examined a great many specimens of *I. japonica*, gathered in different parts of Japan, and has convinced himself that paraphyllia occur in different degrees in different individuals. So the original specimen must have had the least number of paraphyllia. The author considers therefore, that *Ishibaea* is not a valid genus, and should be united with *Lescuraea*. *Lescuraea* has many kindred characters with *Brachytheciaceae*, and the two are closely related with each other. But the author's knowledge on *Lescuraea* is not quite sufficient. So, *Ishibaea* is omitted, for the present, from this monograph. Accordingly, *Scorpiurium*, *Kurohimelhypnum* and *Ishibaea* are excluded from this treatise. The genus *Oxyrhynchium* was established by Warnstorff, as separable from *Euryhynchium*, but it is so closely related to the latter, that it does not seem worthy of a proper genus and it is now treated generally as a synonym of *Euryhynchium*. The genus *Pseudisotheicum* established by A. J. Grout is added newly to this monograph based on the specimen from Formosa. Moreover, one new genus *Pseudopleuropus* by the author, is added to our previous knowledge.

In the present revision, 13 genera of this family are recognized as is shown in the following key.

1	{	Capsules cylindric, erect or very slightly curved, nearly symmetrical, segments usually shorter than the teeth, cilia rudimentary or wanting	2
	{	Capsules arcuate, inclined or horizontal (except in Sect. <i>Acuminata</i> of <i>Brachythecium</i>), segments well developed, as long as the teeth, cilia developed	4
2	{	Segments reduced (wanting in our species)	<i>Homalothecium</i>
	{	Segments present, usually filamentous or fragmentary	3
3	{	Paraphyllia lacking	<i>Pleuropus</i>
	{	Paraphyllia present	<i>Pseudopleuropus</i>
4	{	Leaves deeply and strongly plicate	<i>Camptotheicum</i>
	{	Leaves not or only little plicate	5
5	{	Branches julaceous; leaves usually obtuse, without long-acumen	6
	{	Branches divergent or somewhat terete-foliate; leaves usually lanceolate with long-acumen	7
6	{	Leaves orbicular to ovate, median leaf-cells quadrate or short-rhomoidal ..	<i>Myuroclada</i>
	{	Leaves oblong-ovate, median leaf-cells oblong-hexagonal	<i>Scleropodium</i>
7	{	Operculum usually conic to conic-rostrate	<i>Brachythecium</i>
	{	Operculum usually long-rostrate	8

8	{ Leaves with large area of rounded-quadrata and thick walled alar cells.. <i>Pseudisothecium</i>	
	{ Leaves with a little or not differentiated alar cells (in <i>Bryhnia</i> often forming hyaline and inflated clusters).....	9
9	{ Leaves papillose at back with projecting cell angles, alar strongly decurrent	<i>Bryhnia</i>
	{ Leaves almost smooth at back, alar not or hardly decurrent.....	10
10	{ Leaves very concave, spoon-shaped, abruptly filiform-acuminate	<i>Cirriphyllum</i>
	{ Leaves not so concave, gradually and slenderly acuminate	11
11	{ Costa ending in spine on back; dioicous in most cases	<i>Eurhynchium</i>
	{ Costa not ending in spine on back; autoicous in most cases	12
12	{ Plants medium to robust in size. seta smooth.....	<i>Rhynchosstegium</i>
	{ Plants very small. seta often rough.....	<i>Rhynchosstegiella</i>

***Homalothecium* Bryol. Eur. fasc. 46-47 (1851)**

The genus *Homalothecium* was established on the type species *H. sericeum* (L.) Bryol. Eur. which is unknown from the present areas. Concerning the present areas, it seems to be the first record of this genus, that *Hypnum macrostegium* was described by W. S. Sullivant and L. Lesquereux in 1859, based on a specimen from Shimoda (middle Japan). This species was, afterwards, united with *Homalothecium* by Paris in his Index (1895). In 1866-67, Sande Lacoste described *Homalothecium laevisetum* based on the material from Japan, without giving definite station. In 1891, W. Mitten described two new species of *Homalothecium* as *Hypnum tokiadense* and *H. sciureum*, both collected by Bisset in Japan. The former was based on the specimen from Mt. Nantaizan (Pref. Tochigi) and it was transferred to *Homalothecium* by Bescherelle in 1893. The latter, from Mt. Hakone (Pref. Kanagawa) was transferred to *Pleuropus* by R. Toyama in 1938. In the twentieth century, *H. triplicatum*, *H. laevisetum* var. *pilicuspis* (both from Japan) and var. *latifolium* (from Korea) were described by J. Cardot in 1911. In 1932, *H. perimbricatum* was reported by Dixon from Formosa as a new addition to these floras. From Japan, K. Sakurai described two new species *H. perpiliferum* and *H. excavatum* in 1936 and Dixon & Thériot also described *H. pilosissimum* in 1942. As stated above, up the present, 7 species and 2 varieties, in total, have been known from these areas.

As a result of the examination of these species and varieties, the author has come to the following conclusion. As was already suggested by J. Cardot in 1911, *tokiadense* seems to be synonymous with *laevisetum*. Furthermore, *pilosissimum* also seems to be conspecific with *laevisetum*, and *perpiliferum*, in the same way, with *Brachythecium helminthocladum*. Both *H. macrostegium* and *excavatum* may be transferred to *Pleuropus*. In the present revision of this genus 2 species and 4 varieties, including one new variety, are recognized.

The genus is related to *Pleuropus* so closely in its general appearance, that the two are often confused in generic conception. Concerning with the species from the present areas only, *Homalothecium* is distinguished from *Pleuropus* by the following points, besides that shown in the key, namely branches terete-foliate, not divergent-foliate, costa sometimes ending in spine on back and calyptra sparsely hairy.

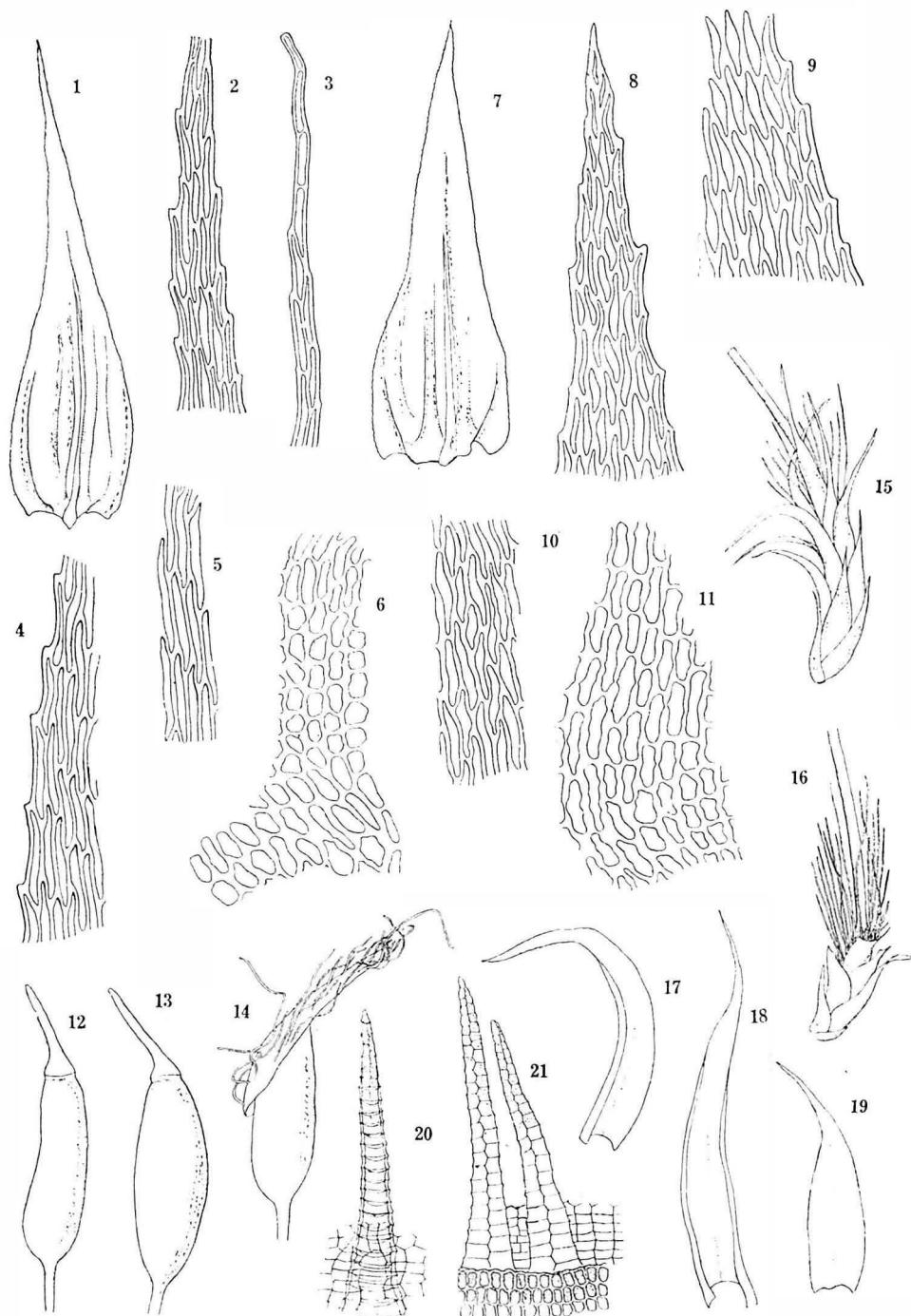


Fig. 1

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1. *Homalothecium laevisetum* S. Lac. (Fig. 1)

Homalothecium laevisetum S. Lac. in Miq. Ann. Musc. Bot. Lugd. Bat. **2**: 298, t.I (1866-67); Broth. in Engl. Pfl.-fam. **11**: 355 (1925); Sakurai in Bot. Mag. Tokyo, **46**: 744 (1932); Musc. Jap. 134 (1954).

Hypnum laevisetum (S. Lac.) Mitt. in Trans. Linn. Soc. Lond. ed. 2. Bot. **3**(3): 185 (1891); Borth. in Hedwigia **38**: 238 (1899).

Trachyodon tokiadensis C. Muell. in herb.

Hypnum tokiadense Mitt. l.c. 184 (1891); Broth. l.c. (1899).

Homalothecium tokiadense (Mitt.) Besch. in Ann. Sci. Nat. ser. 7, Bot. **17**: 372 (1893); Paris in Bull. Herb. Bois. ser. 2, 2: 931 (1902); Card. in Beih. Bot. Centbl. **17**: 33 (1904); Bull. Soc. Bot. Gen. ser. 2, **3**: n. 7 (1911); Broth. in Engl. Pfl.-fam. **11**: 355, f. 682 (1925); in Handel-Mazzetti, Symb. Sinic. **4**: 105 (1929); Reimers in Hedwigia **70**: 371 (1931); Reimers & Sakurai in Bot. Jahrb. **64**(5): 551 (1931); Dixon in Rev. Bryol. **4**(4): 156 (1932); Sakurai, Musc. Jap. 134, pl. 52-n (1954).

Homalothecium pilosissimum Dix. et Thér. in Trav. Bryol. **1**: 16 (1942). Syn. nov.

Musci Japonici Exsiccati ser. 2, n. 94 (1948), ser. 4, n. 185 (1951) labeled as *Homalothecium tokiadense* (Mitt.) Besch.

Plants in wide glossy yellow-green mats. Stems 5-10 cm long, creeping, closely applied to the substratum, often stoloniferous at the ends, slightly radiculose, sending up erect julaceous, densely foliate branches. Branches repeatedly and closely divide, branchlets as a rule crowded at their summits in dendroid form, 2-3 cm long, sometimes reaching 4 cm, straight or somewhat curved, obtuse or filiform at apex. Leaves densely appressed-imbricate when dry, divergent when moist, narrowly lanceolate, gradually narrowed to apex, longly acuminate, $2.5 \sim 3.0 \times 0.7 \sim 0.8$ mm, deeply and strongly plicate; margins minutely serrulate all around, reflexed below; costa extending 2/3 length of leaf, sinking in plication, usually ending in spine at back; median leaf-cells linear-vermicular, $48 \sim 52 \times 4 \sim 5 \mu$, basal and alar cells much shorter and broader, with sinuous, incrassate, strongly collenchymatous walls and forming an opaque and large cluster across the leaf base. Perichaetium ca 3 mm long, elongated lanceolate, entire or slightly serrulate at upper part, slightly costate, paraphyses numerous. Seta 0.7-1.0 cm long, smooth. Capsules erect, oblong-cylindric, $2.2 \sim 2.4 \times 0.8 \sim 0.9$ mm; operculum longly rostrate, ca 1.2 mm long; teeth of peristome linear-lanceolate $250 \sim 260 \mu$ long, pale yellow and minutely papillose half way up, brownish yellow and smooth in half below; segments and cilia wanting; basal membrane low, ca 65μ . Calyptra sparsely hairy.

Fig. 1. *Homalothecium laevisetum* S. Lac.

- 1, 7. Leaves, $\times 24$. 2, 3, 8. Apices of leaves, $\times 200$. 4, 9. Margins of leaves, $\times 290$.
 5, 10. Median leaf-cells, $\times 290$. 6, 11. Basal leaf-cells, $\times 290$. 12, 13. Capsules, $\times 12$.
 14. Capsule with calyptra, $\times 12$. 15, 16, 17, 18, 19. Perichaetial bracts, $\times 16$. 20, 21.
 Peristome teeth, $\times 155$.

Specim. exam.³⁾: **Hokkaidō**. Is. Rishiri: *U. F.* 3623. Prov. Sōya: Sarukotsu-mura *Nog.* 102. Prov. Kamikawa: Kamuikotan *U. F.* 300, 11068, Mt. Daisetsu *Nog.* 27627, 27654, Sōun-kyō *Nog.* 28118. Prov. Kushiro: Akkeshi *Nog.* 2196, Mt. Meakan *Nog.* 28076, Mt. Akan *U. F.* 10741. Prov. Ishikari: Jōzankei *Nog.* 27969, Mt. Moiwa *Nog.* 15630, Mt. Tarumai *U. F.* 9975, Sapporo *U. F.* 125, 9071, 9244, Ebetsu *U. F.* 117. Prov. Iburi: Muroran *U. F.* 12325. Prov. Oshima: Mori *U. F.* 3512, 10203, Hakodate *U. F.* 12595. **Honshū**. Pref. Aomori: Towada *U. F.* 14215, Kominato *U. F.* 64, Mt. Iwagi *U. F.* 84, Kanita *U. F.* 1951, Mt. Osorezan *U. F.* 2066, Yagen *Nog.* 21293. Pref. Akita: Senboku-gun *Nog.* 15930, Kakunodate *U. F.* 14396, Akita *U. F.* 1428, Kawabe-gun *Nog.* 15518. Pref. Yamagata: Mt. Kimpū *Nog.* 16320. Pref. Iwate: Matsuo-mura *Nog.* 25632, 25626, Mt. Hayachine *U. F.* 298, 14375. Pref. Miyagi: Is. Kinkwazan *Nog.* 1642. Pref. Saitama: Mt. Akasawa *Nog.* 4935, Mt. Bukō *Nag.* 3331. Pref. Yamanashi: Mt. Fuji, 1300 m *Tak.* 9172, 9197. Pref. Shizuoka: Mt. Fuji, Ōmiya-guchi, 1100 m *Tak.* 8904, Mt. Amagi *Tak.* 7876. Pref. Aichi: Mt. Danto *Tak.* 5056, 5186, 10692, 10723, Mt. Chausu *Tak.* 13055, Nanasato-mura *Tak.* 5638, Adera *Tak.* 5579, Kiyosaki *Tak.* 5160, Tomiyama-mura *Tak.* 14789. Pref. Nagano: Ōshika-mura *Tak.* 6633, 11972, 12145, Miwa-mura *Tak.* 9760, 11589, 11604, 11811, 11818, 11896, 14104, 14116, 14571, Mt. Senjō, 1540 m *Tak.* 9818, 14176, Kirigamine *Tak.* 6301, 8778, Mt. Shirouma, 800 m *Tak.* 6858, 9413, Mt. Tsubakuro *Nog.* 10725, Mt. Yatsu *Nog.* 10801. Pref. Gifu: Shirakawa-mura *Tak.* 9212, 9253. Pref. Mie: Mt. Ōdaigahara *Tak.* 4951, 5974, 5985, *Nog.* 9834, *Mag.* 2879, *Mizt.* 1365, Mt. Fujiwara *Tak.* 13483, *Nog.* 11814. Mt. Kunimi *Mag.* 934. Pref. Nara: Mt. Misen *Nak.* 2992. Pref. Shiga: Mt. Ryōzen *Nak.* 6244, Mt. Ibuki *U. F.* 549, *Nog.* 3112. Pref. Kyōto: Mt. Daihi *Nog.* 25416, *Nak.* 1406, Mt. Ashiu *Nog.* 25440, *Nak.* 5711. Pref. Ōsaka: Mt. Inunaki *Nak.* 3396, Mt. Nosemyōken *Nak.* 5493, Shimamoto-machi *Mizt.* 2599. Pref. Wakayama: Mt. Gomadan *Nak.* 669, Mt. Kōya *Nog.* 7619. Pref. Hyōgo: Mt. Asago *Nog.* 22565, Mt. Akanishi *Nog.* 19660, Mt. Funakoshi *Nog.* 25310, *Koyama* 270, *Nak.* 3472. Pref. Okayama: Atetsu-gun *Nog.* 22202, Tomoda-gun *Nog.* 24621. Pref. Hiroshima: Sandankyo *Nog.* 4816, 5838, 8855, 8958, Mt. Ege *Nog.* 1645, 5358, Mikoto-mura *Nog.* 4736, 4925, Kawanishi-mura *Nog.* 7510, Mt. Dōgo *Nog.* 10550, Koshi-mura *Nog.* 9887. Pref. Yamaguchi: Akiyoshi *Nog.* 1643, 1644, Iwakuni *Tak.* 6211. **Shikoku**. Pref. Ehime: Mt. Ishizuchi *Nog.* 12005. Pref. Tokushima: Mt. Dairiyūjiyama *Nog.* 4081, Mt. Tsurugi *U. F.* 125, 1257, 14505. **Kyūshū**. Pref. Fukuoka: Mt. Kosho *Nog.* 27243. Mt. Hikosan *Nog.* 26719, 24416, 27172. Pref. Ōita: Fukayabakei *Nog.* 18491, 18492, Mt. Yufu *Nog.* 20049, Mt. Sobo *Nog.* 2839, Mt. Nakamatono-hata *Nog.* 28191, 28221. Pref. Miyazaki: Mt. Sobo *Nog.* 26202, 26211, 2844, Mt. Osuzu *Nog.* 24248, Mt. Futakami *Nog.* 14897, Mt. Takakuma *Nog.* 9250. Pref. Kumamoto: Mt. Ichibusa *Nog.* 4339, 5569, 15247, *Tak.* 2155, *Mayeb.* 698, 701, 714, Watari-mura *Mayeb.* 1374, Kōnose-

3) The names of the collectors or the senders of specimens appearing frequently in this monograph are abbreviated as follows.

Nog.	A. Noguchi	Tat.	K. Tatebe
H. O.	H. Ochi	Mizt.	M. Mizutani
Sas.	H. Sasaoka	Tak.	N. Takaki
Hatt.	Herb. Hattori Bot. Laboratory (mainly collected by D. Shimizu).	Igi.	N. Igi
Nag.	I. Nagano	Toy.	R. Toyama
Mayeb.	K. Mayebara	As.	S. Asano
K. O.	K. Oti	Nak.	T. Nakajima
Sak.	K. Sakurai	Mag.	T. Magofuku
Yam.	K. Yamamoto	U. F.	U. Faurie
		Mizs.	U. Mizushima
		Ikeg.	Y. Ikegami
		Iwaz.	Z. Iwazuki

mura Nog. 18746, 3057, Mayeb. 1043, Mt. Shiraga Nog. 5207, Hagi-mura Tak. 2195, Mt. Ryūhō Tak. 1775, Kawaharu-mura Tak. 1774, Kudaragi-mura Tak. 3161, Yatake Nog. 2806, Aida-mura Nog. 15248, Mayeb. 419, Isshōchi-mura Nog. 13657, Mayeb. 334, Ōno-mura Tak. 3162, Mayeb. 1044, Nog. 18747, Gokanoshō Tak. 3159, Nihonsugi Tak. 2862, Ichibū-mura Mayeb. 2114, Hitoyoshi Mayeb. 1589. **Korea.** Mt. Kumugang U.F. 437. Ouensan U.F. 22. Is. Quelpart U.F. 234, 237, 278, 475, 535, 539, 694. Chollapukto Toy. 3311. Mt. Tokuyu Toy. 3313.

Range: Japan (Hokkaidō, Honshū, Shikoku, Kyūshū), Korea, Formosa and Yun-nan.

Hab.: Trunks of trees and rocks in shady places; common.

Many transitional forms are seen as regards robustness and glossiness of plant, form of leaf and leaf-cells and length of seta. After examining a large number of specimens of this species, the author is compelled to think the difference among them is very gradual. As mentioned above, the author agrees with Cardot's opinion that the two species *tokiadense* and *laevisetum* are conspecific. The author has not an opportunity to examine the original specimens of these 2 species, then, he made a careful comparison of the original descriptions and of numerous materials gathered in Japan. It is quite impossible to find any difference between the both species. Of *pilosissimum*, the author also could not see its original specimen. Dixon and Thériot stated in the original description of *pilosissimum* that "similar in habit and foliage to *H. laevisetum* Lac. and *H. tokiadense* Mitt., but differing from all the species in the dense, very long, white hairs covering the vaginule and calyptra." However, such a character is found in a greater or smaller degree in all the fertile specimens gathered in Japan, and the author was unable to find any specimens distinguished by this character.

It seems to be preferable that the extreme state in the variation of *laevisetum* is ranked as variety. On the direction of variation of leaf form, two courses may be considered; one course passed to v. *pilicuspis* by the elongation and narrowing of lamina and acumen, and the other to v. *latisolum* and v. *triplicatum* by decreasing the length of leaf and losing filamentous acumination.

1 a) var. *pilicuspis* Card. (Fig. 2)

H. laevisetum var. *pilicuspis* Card. in Bull. Soc. Bot. Gen. ser. 2, 3: n. 7 (1911); Sakurai, l.c. 134 (1954).

A beautiful variety. Comparing with the type, the following characters are remarkable. Plants more whitish green and highly glossy, forming a low and compact tuft. Branches short ca 1 cm long, more slender and densely crowded. Leaves very slender, attaining about 3 mm long, with long, filamentous and hyaline acumen, leaf-cells narrowly elongated $44\sim46\times4.0\sim4.5\mu$ at middle, and gradually more elongated towards apex. Capsules small 1.0~1.5 mm long, ovoid. Seta more slender and shorter 5~8 mm long.

Specim. exam.: **Honshū.** Pref. Nagano: Miwa-mura Tak. 11655, Koshibuyu Tak. 6700. Pref. Aichi: Mt. Mikuni Tak. 13625, Tsutsumiishi Tak. 7421. Pref. Mie: Mt. Ōdaigahara Tak. 14981. **Shikoku.** Pref. Ehime: Omogō Nog. 11087, Mt. Takanawa Nog. 15443. Pref. Tokushima: Mt. Tsurugi U.F. 1255, June 1900, original. **Kyūshū.** Pref. Ōita: Yabakei Nog. 749, Shin-yabakei Nog. 24522. Pref. Kumamoto: Mt. Ichibusa Nog. 5551, Aida-mura Nog. 13695, Mayeb. 107, 638, Mt. Fukaba Tak. 2511. Pref. Miyazaki: Mimata-mura Nog. 345.

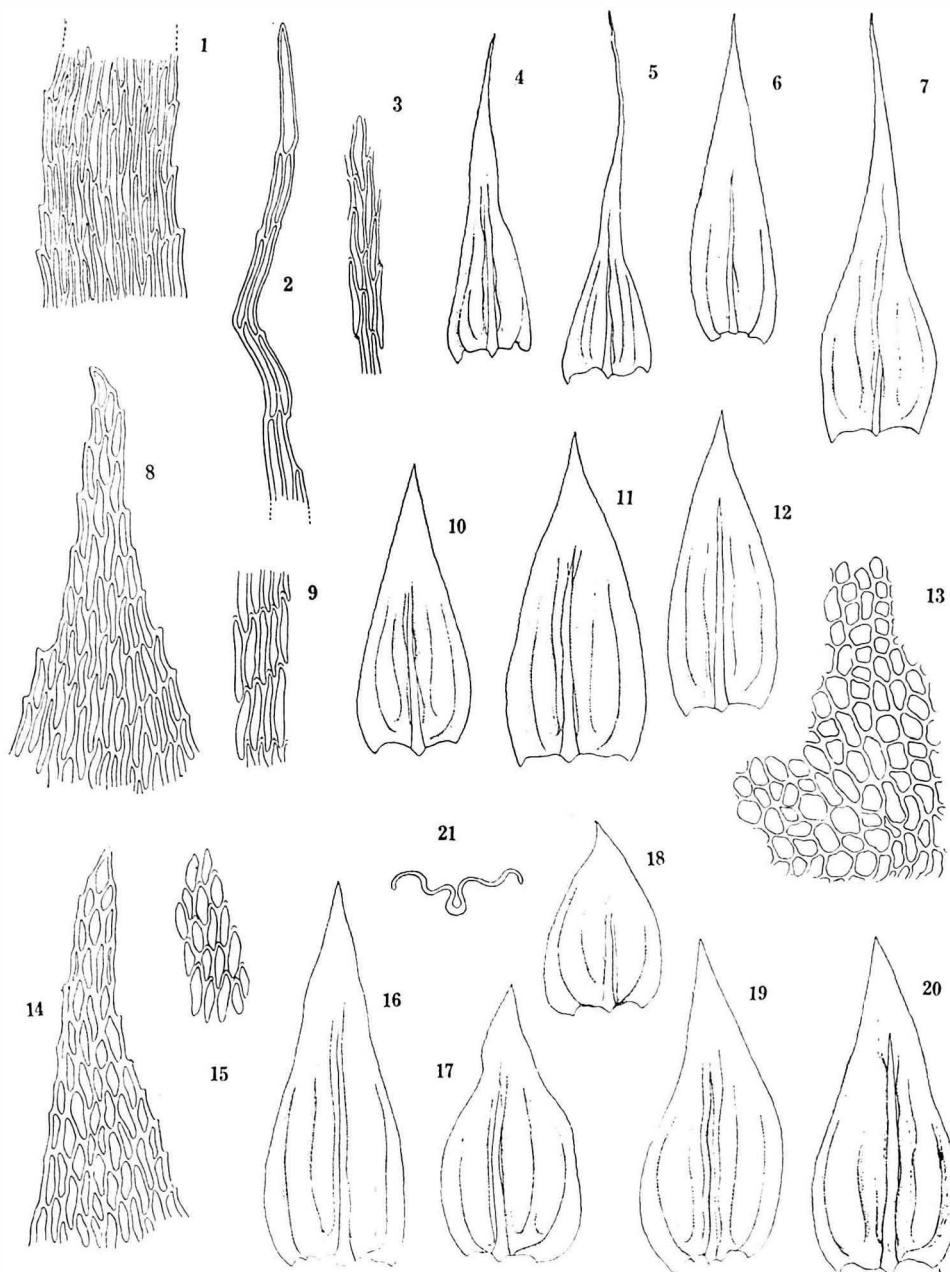


Fig. 2. *Homalothecium laevicatum* S. Lac. 1-7. var. *pilicuspis* Card. (from orig. specim.). 8-13. var. *latifolium* Card. (from orig. specim.). 14-21. var. *triplicatum* (Card.) Takaki (from orig. specim.).

1, 5, 6, 7, 10, 11, 12. Leaves, $\times 19$. 16, 17, 18, 19, 20. Leaves, $\times 35$. 1, 2, 8, 14. Apices of leaves, $\times 218$. 3, 9, 15. Median leaf-cells, $\times 218$. 13. Basal leaf-cells, $\times 218$. 21. Cross section of leaf, $\times 35$.

Range: Japan (Honshū, Shikoku and Kyūshū).

Hab.: Usually trunks of trees, sometimes on rocks in shady places.

1 b) var. *latifolium* Card. (Fig. 2)

Homalothecium laevisetum var. *latifolium* Card. I.c. (1911).

An examination of the original specimen has led the author to recognize that it closely resembles the type in habit, and no differences are found with the naked eye. But its leaf form is very remarkable as is shown in Fig. 2, which is drawn from the original specimen. All the leaves of this specimen have such a form, and not any typical form found in the type. Moreover leaf-cells are somewhat shorter and wider than those of the type. The author has not come across such specimens from Japan.

Specim. exam.: Korea. Pusan U. F. 250, May 17, 1906, original.

Range: Korea.

1 c) var. *triplicatum* (Card.) Takaki stat. nov. (Fig. 2)

Homalothecium triplicatum Card. I. c. (1911); Sakurai in Bot. Mag. Tokyo, 50: 372 (1936); Musc. Jap. 134 (1954). Syn. nov.

An examining of the original specimen, which is sterile, has revealed that it is very minute in size and forms a rather loose and low tuft. Branches reach 8 mm long in the utmost. Leaves ovate to oblong-ovate (lower ones wider), 1.3~1.5 × 0.5~0.57 mm, gradually tapering to a short acumen; median leaf-cells oblong to rhomboidal with somewhat thick walls 23~26 × 5.7~6.8/ μ . Cardot described this as a separate species, pointing out the short branches, deeply triplicated leaves, wider and shorter leaf cells, etc. Indeed these characters are conspicuous so far as in the original specimen. But, if one examines a number of specimens one will find many transitional forms of these characters, and it is quite impossible to find the distinction between *triplicatum* and *laevisetum*. The author considers it as a variety of *laevisetum*.

Specim. exam.: Hokkaidō. Hirafu U. F. 3838, Oct. 1907, -original. Prov. Kamikawa: Kamukotan Nog. 27959. Honshū. Pref. Nagano: Miwa-mura Tak. 11886, Shiroiwa Tak. 9766. Pref. Aichi: Mt. Ishimaki Nog. 8293. Pref. Shiga: Samegai Tak. 6223. Pref. Mie: Mt. Fujiwara Nog. 11802. Pref. Hiroshima: Kure, Haigamine Nog. 3628, Mt. Azuma Nog. 12112, Taishaku Nog. 4579, 4610. Pref. Tottori: Daisenji Nog. 2914, 4295. Shikoku. Pref. Tokushima: Mitsuishi Nog. 1603. Kyūshū. Pref. Kumamoto: Kōnose-mura Nog. 2541, 2549, 2613, Hitoyoshi Nog. 27096, Mt. Kimbō Tak. 219. Pref. Ōita: Kawanobori-mura Nog. 14070. Pref. Miyazaki: Mt. Sobo Nog. 3281, Nakagō-mura Nog. 5572.

Range: Japan (Hokkaidō, Honshū, Shikoku and Kyūshū).

Hab.: Trunks or rocks, mostly on calcareous rocks.

2. *Homalothecium perimbricatum* Broth. (Fig. 3)

Homalothecium perimbricatum Broth. in Erg. Exped. Handel-Mazzettis nach China 1914-1918 in Wien, 220 (1922); in Engler, Pfl.-fam. II: 355 (1925); Dixon in Rev. Bryol. 4: 156 (1932); Sasaoka in Jour. Jap. Bot. 10: 173 (1934).

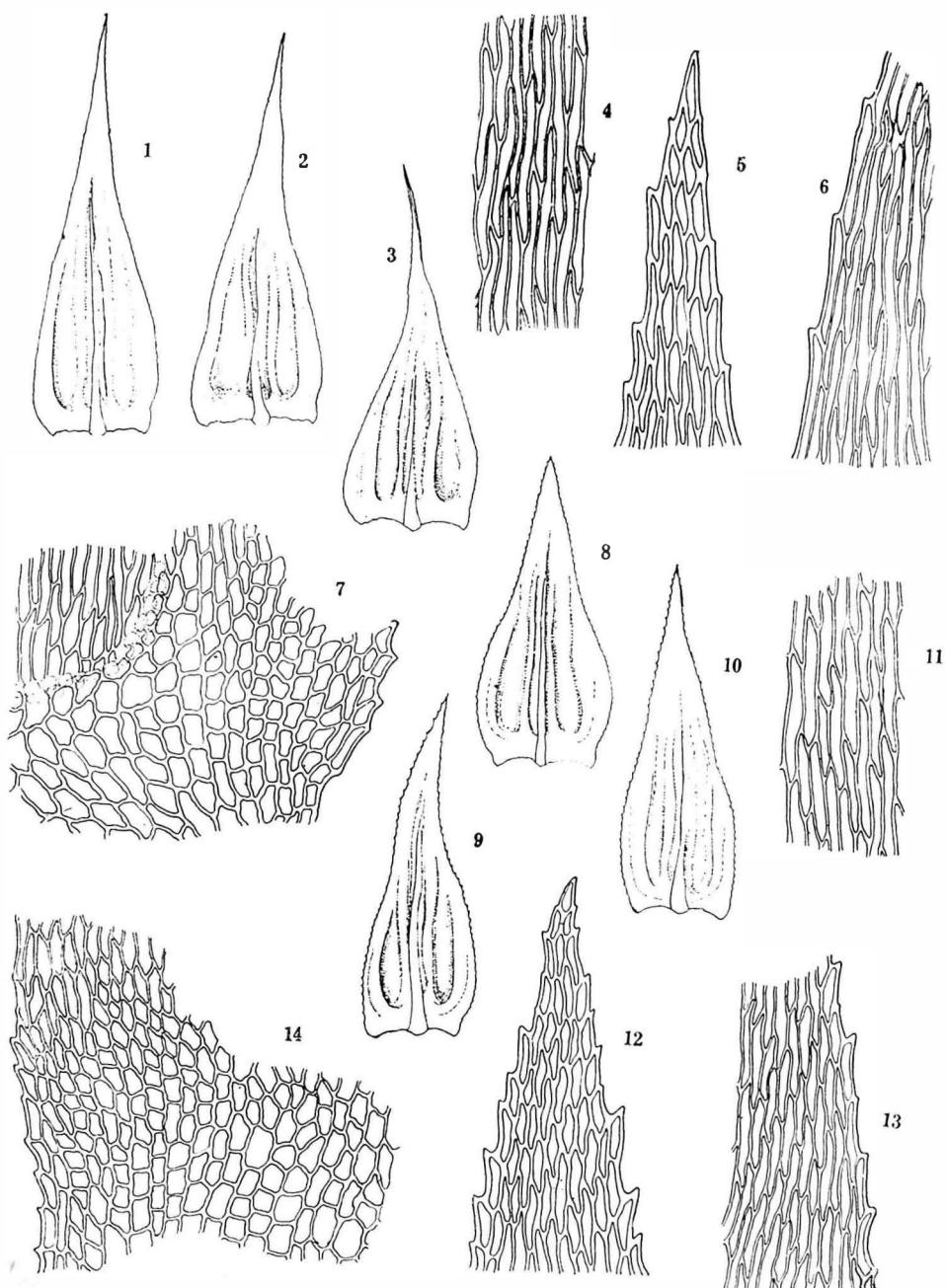


Fig. 3. 1-7. *Homalothecium perimbricatum* Broth. (from Nog. 6466). 8-14. var. *brevifolium* Takaki (from Tak. 16286).

1, 2, 3, 8, 9, 10. Leaves, $\times 24$. 5, 12. Apices of leaves, $\times 200$. 6, 13. Marginal parts of leaves, $(6) \times 290$, $(13) \times 200$. 4, 11. Median leaf-cells, $\times 290$. 7, 14. Basal angles of leaves, $\times 218$.

It resembles *H. laevisetum* in habit and no characters have been found to distinguish the both with the naked eye, except for the present species has a more golden glossy branches with more compact and rigid foliation. Branches slender, reaching about 2 cm long, densely terete-foliate. Leaves broadly deltoid-lanceolate gradually tapering to a short acumen, $2.0 \sim 2.3 \times 0.6 \sim 0.7$ mm, strongly plicate; costa extending $2/3 \sim 3/4$ length of leaf, sinking in plication; margins serrate all around; median leaf-cells narrowly linear $70 \sim 77 \times 5.0 \sim 4.5/\mu$, basal cells much shorter, broader and quadrate with equally incrassate walls. The characters of sporophyte unknown.

Specim. exam.: **Formosa**. Prov. Shinchiku: Mt. Sumahan *Sas.* 3845. Prov. Taichū: Itsugetsutan *Nog.* 6466, 6471, Tanbo *Nog.* 6940. Prov. Taitō: Chipon *Mag.* 1201.

Range: Yun-nan and Formosa.

Brotherus described this species based on the specimen from Yun-nan. Afterwards, Dixon reported this species from Formosa as a new addition to its flora based on Sasaoka's collection. The author has examined Sasaoka's specimen, on which the above diagnosis has been drawn. Brotherus stated that "Species distinctissima, *H. tokiodensi* (Mitt.) Besch. affinis, sed foliorum forma dignoscenda" and it is, indeed, true that these characters are conspicuous in the Formosan specimen, too. Moreover, the author is aware of other distinctive points, which are, the leaves with serration all around and quadrate basal leaf-cells with equally thickened walls. Until now any sporophyte has not been found of this species.

2 a) var. *brevifolium* Takaki var. nov. (Fig. 3)

A typo differt: folia e basi cordata late ovata vel oblongo-ovata sensim breviter attenuata, apice anguste acuta.

Specim. exam.: **Formosa**. Prov. Taichū: Rakuraku *Tak.* 16286 -Holotype, *Nog.* 6049 -Isotype, Aug. 21, 1932, leg. A. Noguchi.

Range: Formosa.

The relation between this new variety and its type is analogous with the relation of v. *latifolium* to its type.

Pleuropus Griff., Not. 468 et Ic. Pl. Asiat. 2, pl. 90 (1849).

In having the erect and cylindrical capsules, deeply plicated leaves and no cilia, it closely allied to *Homalothecium*. Brotherus states on the distinction of both genera in the "Pflanzenfamilien" that the inner peristome is attached to the outer in *Homalothecium* but is free in *Pleuropus*. In our *Homalothecium*, as has been mentioned, the inner peristome is wanting but represented by low membrane, so the distinction is more conspicuous in this feature. Moreover, in our *Pleuropus*, segments are filamentous or fragmental, membrane is papillose and usually higher than in *Homalothecium* and calyptra not hairy. On the *Pleuropus* of the present areas, R. Toyama already discussed in detail in 1938.

{ Costa extending into the apex.....	<i>P. sciureus</i>
{ Costa extending $2/3$ length of leaf	<i>P. milgheriensis</i>

1. *Pleuropus sciureus* (Mitt.) Toyama (Fig. 4)

Pleuropus sciureus (Mitt.) Toyama in Act. Phyt. Geob. 7: 104, f. 2, 3-15 (1938); Sakurai, Musc. Jap. 134 (1954).

Hypnum (Homalothecium) sciureum Mitt. in Trans. Linn. Soc. Lond. ser. 2, 3: 184 (1891).

Homalothecium sciureum (Mitt.) Besch. in Ann. Sc. Nat. 7: 372 (1893); Broth. in Engl. Pfl.-fam. 11: 355 (1925).

Ptychodium plicatum Card. in Beih. Bot. Centralbl. 19: 133 (1905).

Ptychodium perattenuatum Sh. Okam. in Jour. Coll. Sci. Imp. Univ. Tokyo, 38: 87, f. 36 (1916).

Brachythecium brevirameum Card. in Bull. Soc. Bot. Gen. ser. 2, 3 (1911); Broth. in Engler, Pfl.-fam. 11: 365 (1925). Syn. nov.

Musci Japonici Exsiccati ser. 6, n. 288 (1952), labeled as *Pleuropus fenestratus* Griff.

A very variable plant. In wide patches, whitish green or yellowish green above, yellowish brown below. Stems creeping, closely applied to the substratum, reaching 5~6 cm long, often stoloniferous at the ends. Branches 1~2 cm long, rarely reaching 3 cm, erect or ascending, usually curved and more or less pointing one way, sometimes ending in flagella, densely and divergently foliate. Leaves lanceolate to ovate-lanceolate, gradually narrowed from just above the base, ending in slender point, 2~3×0.9~1.1 mm; margins finely denticulate all around, deeply plicate (but less than in *Homalothecium laevisetum*); costa extending to the apex; median leaf-cells linear-vermicular, 46~57×4.6~5.7/ μ , somewhat sinuous, slightly papillose by the projecting upper erds, basal cells much shorter and somewhat sinuous in the part near the costa, alar quadrate with incrassate walls. Perichaetium 3 cm long, inner oblong-lanceolate, finely denticulate above, slightly costate. Seta smooth, yellowish or reddish brown, varying in length, 1.5~2.5 cm long. Capsules redbrown, erect, long cylindric, 1.5~2.2×0.7~0.8 mm, often oblongovoid; teeth of peristome subulate-lanceolate, densely papillate in the upper half, 0.25~0.28 mm long, 0.06~0.065 mm wide at the base; segments shorter than the teeth, densely papillate, filamentous or fragile; basal membrane about one half in height of segment (rarely wanting); cilia wanting. Operculum long conical, 1.0~1.4 mm. Annulus consists of one or two rows of cells. Calyptro naked.

Specim. exam.: **Honshū**. Pref. Kanagawa: Mt. Myōjin Nog. 7575. Pref. Nagano: Southern Alps, Shiroiwa, 1150 m. Tak. 12174, Tsubameiwa Tak. 12055. Pref. Shizuoka: Misakubo Tak. 11382. Pref. Aichi: Taguchi Tak. 5237, 7717, 7726, 10901. Shinshiro Tak. 5251. Pref. Gifu: Yōrō Tak. 5277. Pref. Kyōto: Kibune Mizt. 1357. Pref. Mie: Minamimuro-gun, Tomari Nog. 9196, Watarai, Kanawa Mag. 228, Ujiyamada Mag. 2346, Mt. Fujiwara Tak. 13544, Ōsugidani Tak. 5938, Suzuka, Okisu Nog. 1470, Yamaguchi-mura Tak. 13936. Pref. Nara: Mt. Kasuga Mizt 3130, Murō Tak. 5394, Mt. Tōnomine Tagawa 7764. Pref. Shimane: Gakuenji Nog. 20037, 24061, Kiyozumidera Nog. 30387. Pref. Hiroshima: Taishaku Nog. 4702, Hiba-gun Nog. 24716. Pref. Yamaguchi: Akiyoshi Nog. 3765, 3846, Iwakuni Tak. 6201, 6207. **Shikoku**. Pref. Tokushima: Sanakōchi-mura Nog. 15202, 16454, Mt. Mitsuishi Nog. 1600. Pref. Ehime: Omogō Nog. 11023. Pref. Kōchi: Sugō-mura Nog. 5692, Kamibun-mura Nog. 12896, Mt. Yokogura Nog. 13935. **Kyūshū**. Pref. Fukuoka: Mt. Hikosan Nog. 24437, Kokura, Hiraodai Sugino 18. Pref. Kumamoto: Mt. Shakain Tak. 2347, Mt. Ryūhō Tak. 328, Mt. Onidake Tak. 3386, Mt. Yashiro Tak. 3164, Mt. Kunimi Tak. 3163, 3385, Kugino-mura Tak. 3160, 3383, Isshōchi-mura Nog. 25789, 26973, Mayeb. 20, 1356, 1358,

1421, 1594, Kōnose-mura Nog. 2538, 25946, Tak. 2298, Mayeb. 203, 551, 1264, Ōno-mura Mayeb. 401, 402, Nog. 18759, Mt. Shiraga Nog. 9398, Pref. Ōita: Usa Nog. 9078, Fukayabakei Nog. 22921, 18971, Kawanobori-mura Nog. 14079. Pref. Miyazaki: Mt. Aoidake Nog. 7787, Kitagō-mura Nog. 15510. Pref. Kagoshima: Kaseda-mura Sak. 2628, Hetsuka Nog. 8539, Sendai Nog. 19455, Mt. Shibi Nog. 18785. **Formosa.** Prov. Taichū: Taikwan Nog. 6993, Tataka Nog. 5987. Prov. Tainan: Mt. Kodama Nog. 5935. **Korea.** Quelpart U. F. 407, Sept. 1907, orig. specim. of *Brachythecium brevirameum*.

Range: Japan (Shikoku, Kyūshū and southern half of Honshū), Ryūkyūs, Formosa and Korea (Quelpart).

Hab.: Trunks of trees and rocks in shady places.

This species was described by W. Mitten based on a specimen collected by Bisset on Hakone pass (Pref. Kanagawa) in 1891. This is one of our common species, but has been referred to *fenestratus* for a long time in Japan. Such an error was pointed out by R. Toyama in reference to the length of costa.

Moreover, we have a little known species *Homalothecium macrostegium*⁴⁾. By the diagnosis of *macrostegium*, it has gradually longly acuminate, plicate and serrate leaves with an oblong-ovate base, almost percurrent costa, cylindric-oval capsule, longly beaked operculum and cilia "subnullis." Such characters are no more than that of *P. sciureus*. So, *macrostegium* seems to the author to be conspecific with *P. sciureus*. On this point, Mitten (1891) stated already that this may be a species of *sciureus*-group. But the author, yet, has not examined this original specimen which seems to be not preserved in Japan. So, the decision of the position of this species is deferred to the future investigation.

1 a) form. *pilifolius* Toyama (Fig. 4)

Pleuropus sciureus form. *pilifolius* Toyama, I.c. 105, f. 2-16 (1938); Sakurai, I.c. 134 (1954).

Leaves narrowly lanceolate, gradually narrowed to an extremely long and slender acumen. This is allied to *P. luzonensis* f. *gracilicaulis*, but differs by the costa extending to the apex. This form was described by R. Toyama based on the specimen from the Island of Yaku, southern Kyūshū.

Specim. exam.: **Honshū.** Pref. Nagano: Southern Alps, Koshibuyu Tak. 6673, Tsu-bameiwa Tak. 12001. Pref. Kyōto: Ōe-machi Nak. 4153. **Kyūshū.** Pref. Fukuoka: Tachibana-mura Nog. 23313. Pref. Kagoshima: Hetsuka Nog. 8773.

Range: Japan (Honshū and Kyūshū).

Hab.: On rocks; in the most northern station, it is found only on the calcareous rocks.

1 b) form. *filirameus* Takaki f. nov. (Fig. 4)

A typo differt: ramis gracilioribus apice capillare attenuatis, folia ramea minora.

Specim. exam.: **Kyūshū.** Pref. Kumamoto: Ashikita-gun, Tanoura-mura Tak. 2937 · Holotype, leg. II. Kaneda Dec. 28, 1935.

4) *Homalothecium macrostegium* (Sull. et Lesq.) Par. Index, 568 (1895); Broth. I.c. 355 (1925); Reimers & Sakurai in Bot. Jahrb. 64: 551 (1931); Musc. Jap. 134 (1954). = *Hypnum macrostegium* Sull. et Lesq. in Proc. Amer. Acad. 4: 230 (1859); Mitten in Trans. Linn. Soc. Lond. ser. 2, Bot. 3: 184 (1891).

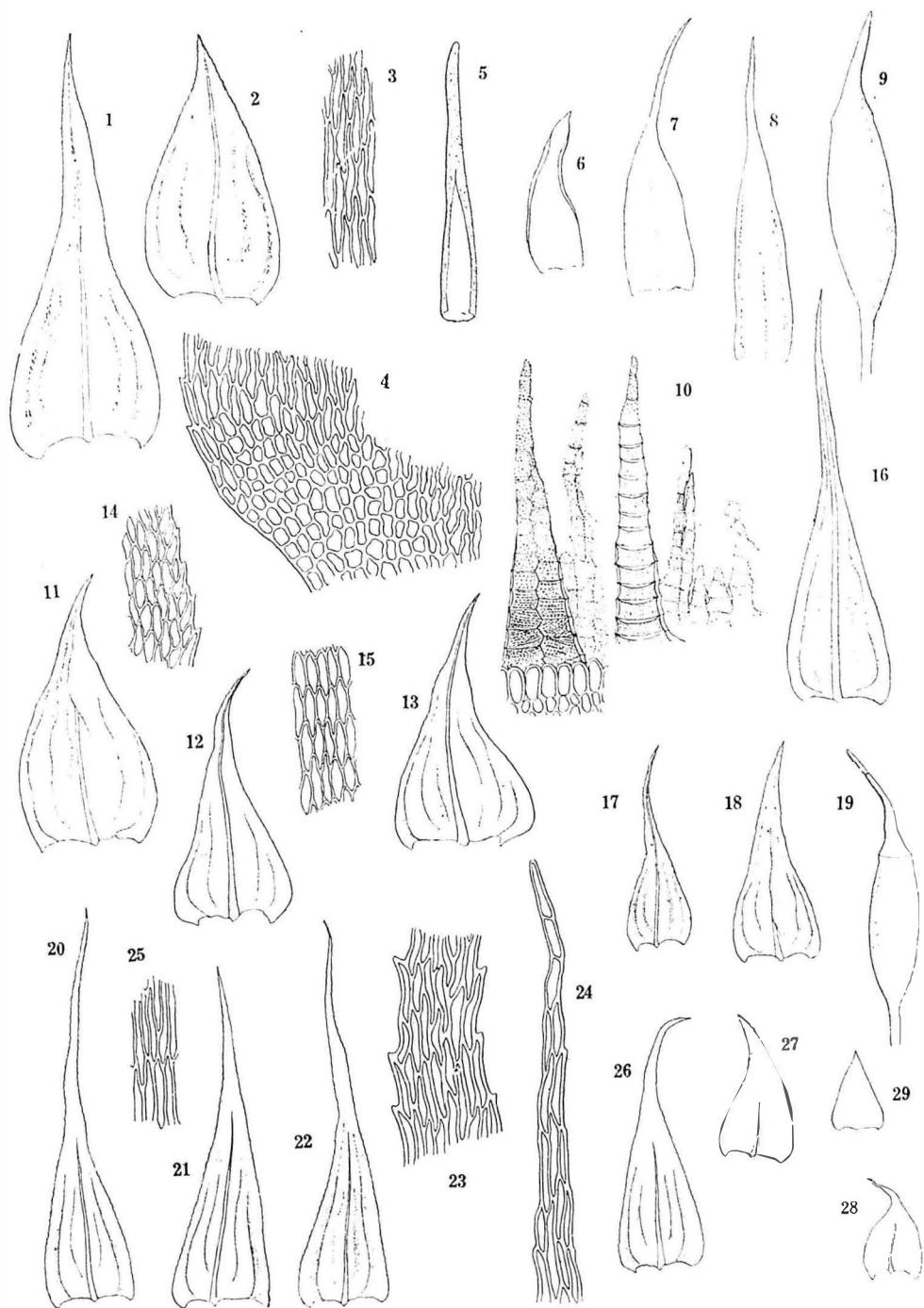


Fig. 4.

A very delicate one, but densely tufted. Both stems and branches end in flagella and loosely leaved. Leaves small in size, less than 1.6 mm in length. Capsules and seta also delicate.

1 c) var. *excavatus* (Dixon et Sakurai) Takaki stat. nov. (Fig. 4)

Homalothecium excavatum Dixon et Sakurai in Bot. Mag. Tokyo, 50: 621 (1936); Sakurai, Musc. Jap. 134, pl. 52-p (1954).

This is at first described as a member of *Homalothecium*. By the examination of the original specimen the author found that this species agrees with *Pleuropus sciureus* in habit, especially in its divergent foliation and in having the costa reaching apex and cluster of quadrate and incrassate alar cells. However, some noticeable characters are also observed. They are, strongly excavated leaves, cordate-triangular form of leaf (reaching 1.8~2.0 mm in length) and oblong-hexagonal to oblong-rhombooidal cells of the middle of leaf (32~34×6.4~6.8/ μ).

If a lot of materials are examined, we can find there are many intermediate forms between this original material and typical *sciureus* on the characters mentioned above. So the author considered that *excavatum* is an extreme form of *sciureus* and decided it as a variety of *sciureus*.

Specim. exam.: Honshū. Pref. Tottori: Tottori-shi H. O. 70. Pref. Shimane: Matsue-shi Nak. 2105. Kyūshū. Pref. Kumamoto: Minamata Sak. 7547, Kaneda 470, original specimen of *Homalothecium excavatum*.

Range: Japan (Honshū and Kyūshū).

2. *Pleuropus nilgheriensis* (Mont.) Toyama

Pleuropus nilgheriensis (Mont.) Toyama. l.c. 103, f. 2-1 (1938).

Isothecium nilgheriense Mont. in Ann. Sc. Nat. 17: 246 (1842).

Hypnum neilgheriense C. Muell., Syn. 2: 462 (1851).

Orthothecium neilgheriense Jaeg., Adbr. 2: 369 (1870-75).

Palamocladium neilgheriense C. Muell. in Flora 465 (1896); Paris, Index Bryol. 3: 349 (1905).

Pleuropus fenestratus Griff., Not. 468 et Icon. Plant. Asiat. 2: t. 90, f. 1 (1849); Fleischer, Musc. Fl. Buitenz. 4: 1547 (1922); Broth. in Engl. Pfl.-fam. 11: 357, f. 683 (1925); in Handel-Mazzetti, Symb. Sinic. 4: 105 (1929).

2 a) form. *luzonensis* (Broth.) Toyama (Fig. 4)

Pleuropus nilgheriensis form. *luzonensis* (Broth.) Toyama, l.c. f. 2-2 (1938); Sakurai, Musc. Jap. 134 (1954).

Fig. 4.

- | | |
|---|--|
| 1-10. <i>Pleuropus sciureus</i> (Mitt.) Toyama | 11-15. var. <i>excavatus</i> (Dix. et Sak.) Takaki (from orig. specim.). |
| 16. f. <i>pilifolius</i> Toyama | 17-19. f. <i>filirameus</i> Takaki (from Type-specim.). |
| 20-29. <i>P. nilgheriensis</i> (Mont.) Toyama var. <i>luzonensis</i> (Broth.) Toyama. | |
| 1, 2, 11, 12, 13, 16, 17, 18, 20, 21, 22. Leaves, ×19. | 3, 15, 25. Median leaf-cells, ×218. |
| 4. Basal angle of leaf, ×155. | 14. Marginal part of leaf, ×218. |
| 6, 7, 8, 26, 27, 28, 29. Perichaetial bracts, ×19. | 23, 24. Apical parts of leaves, ×218. |
| 9, 19. Capsules, ×12. | 5. Calyptra, ×12. |
| 10. Peristome teeth, ×155. | |

Pleuropus luzonensis Broth., Leaflets of Philipp. Bot. 657 (1909); Fleischer, I.c. 1543, f. 243 (1922); Broth. in Engl. Pfl.-fam. 11: 357 (1925); Bartram in Philipp. Jour. Sci. 68: 297, f. 378 (1939).

From the present areas this form only is known. Formerly this form was considered by some authors as a separate species. Afterwards R. Toyama decided to regard it as a form of *nilgheriensis*, following Dixon's opinion that "*nilgheriensis* is a very variable plant in leaf form, serration, etc., so *luzonensis* cannot be separated from it". The following diagnosis is based on the observation of Formosan materials and it is mostly agreeing with the descriptions of Fleischer and Bartram.

Resembling *P. sciureus* in habit, but usually more robust and rigid and more widely spreading foliate. Forming golden, somewhat glossy and dense tufts. Stems creeping, often stoloniferous at the ends, sending up erect densely foliate branches. Branches 2~3 cm long, curved, gradually attenuate, sometimes ending in flagella. Branch leaves dimorphous, lower leaves much smaller, cordate-ovate abruptly shortly acuminate 0.7~0.9 mm long, middle leaves 2.5~3.0×0.8~0.9 mm, from broadly ovate base upwards gradually narrowed to a very long slender apex, deeply plicate; margins serrulate all around; costa 2/3 length of leaf; median leaf-cells linear, somewhat fusiform, 42~46×4.6~5.0/ μ , somewhat papillate at ends of walls, base and alar cells as in *sciureus*. Formosan materials are all sterile. The following description on the sporogone is based on Bartram's "Philippine Mosses". Seta 10 to 12 mm long, smooth; capsule erect, ovoid-cylindric, urn 2 mm long; peristome teeth finely striolate, segments of endostome slender and fragile, from a basal membrane nearly half a height of teeth; calyptra naked.

Specim. exam.: Honshū. Pref. Fukui: Imate-gun, Mt. Gongen *Toyama* and *Hosoi* 411. Formosa. Prov. Taichū: Rakuraku *Nog.* 6939. Prov. Tainan: Niitakashita *Nog.* 6299, Mt. Arisan, Numanohira *Nog.* 6733, 6781.

Range: Java, Philippines, Formosa and Japan (Honshū).

As one of the features of *luzonensis*, Fleischer stated in his "Musc. Fl. Buitenz." that "Phyllodiöisch. ♂ Zwergpflanzen kaum 0.5 mm hoch, einfach bis reichlich verzweigt und stolonenartig, locker beblättert, bis über 10 mm lang, auf und zwischen den Laubblättern der ♀ Pflanzen nistend.—". Yet the author could not find such a male plant among the Formosan specimens.

Pseudopleuropus morrisonensis Takaki gen. et sp. nov. (Fig. 5)

Habitat in arborum truncis. Phyllodioicus. Planta mediocris, dense caespitosa, caespitus superne flavo-viridibus vel olivaceis, inferne fuscescentibus, nitidusculis, rigidulis. Caulis primarius repens, elongatus, 4~5 cm longus, hic illic fusco-radiculosus, saepe defoliatus, stoloniformiter prolongatus, irregulariter ramosus; sectione

Fig. 5. *Pseudopleuropus morrisonensis* Takaki

1. Plant, ×1.
2. Male plant on leaf, ×48.
3. Perigonial bract, ×155.
- 4, 5, 6, 7. Perichaetial bracts, ×19.
8. Paraphyllia, ×155.
- 9, 10, 11. Leaves, ×35.
12. Apical part of leaf, ×155.
13. Basal angle of leaf, ×155.
14. Median leaf-cells, ×290.
15. Upper leaf-cells, ×290.
16. Cross sections of leaves, ×60.
17. Cross section of stem, ×200.
- 18, 19, 20. Capsules, ×16.
21. Spore, ×580.
- 22, 23. Peristome teeth, ×134.

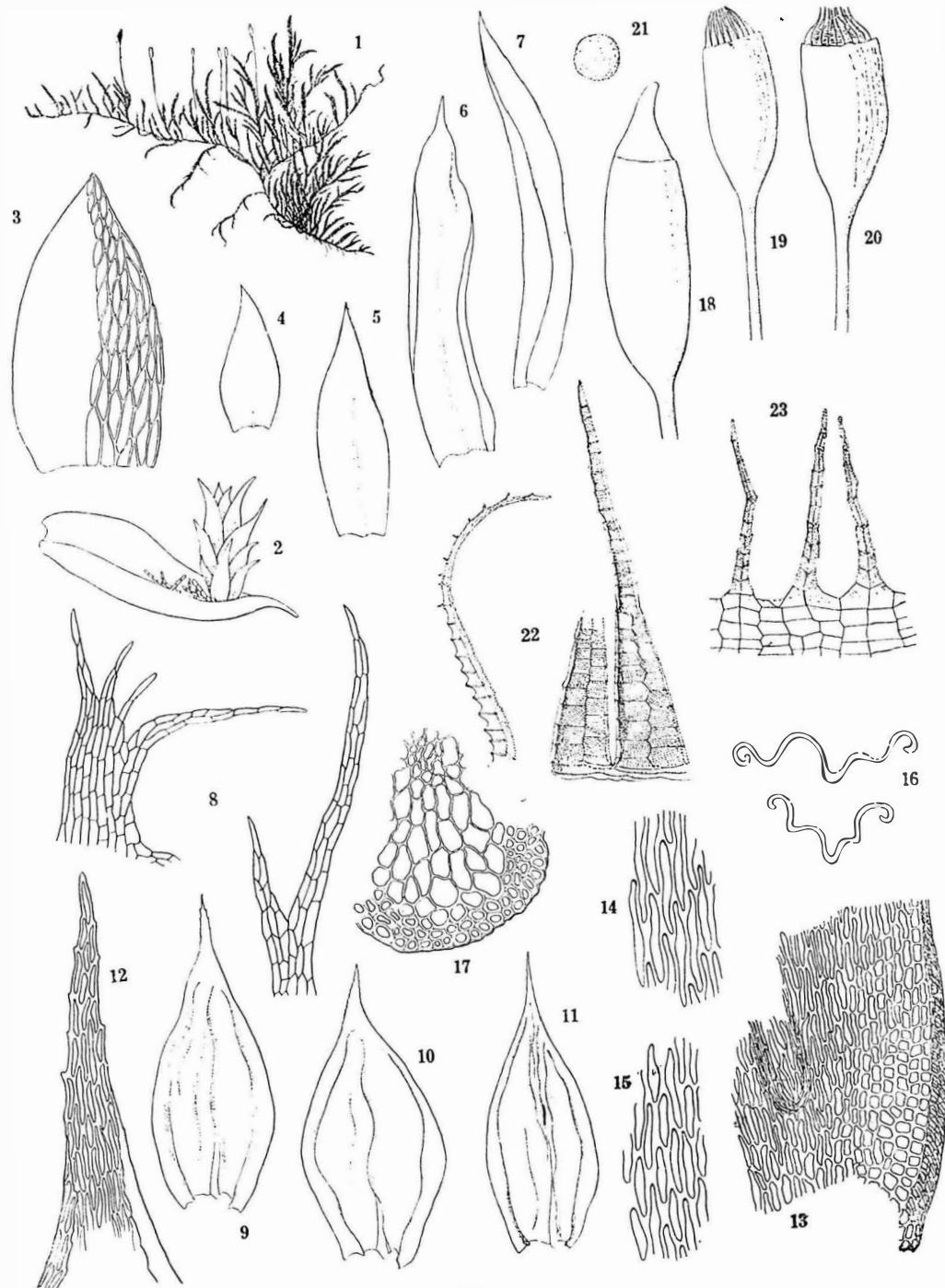


Fig. 5.

rotundus vel ellipticus 0.25 mm in diametro, fasciculo centrali arto, reti intermedio hyalino tenello, peripherico e cellulis luteis 3~4-seriatis valde incrassatis composito; ramis erectis vel adsendentibus ca 1~1.5 cm longis, cum folii ca 1 mm latis, simplicibus vel subfasciculatim ramulosis, omnino dense foliosis teretibus, attenuatis vel obtusis, dense paraphyllosus. Paraphyllia numerosa, plerumque simplicia vel furcata, 0.35 mm longa. Folia caulina et ramea sicca imbricato-adpressa, madida erecto-patentia, concava, breviter decurrentia, profunde triplicata, ad 1.1~1.3×0.5~0.57 mm, symmetrica, ovato-lanceolata, infra medium latissima, hyaline piliforme attenuata; marginibus integris vel summo apice serrulatis, basi late recurvis, ad apicem subplanis; nervo valido, ad ca 2/3 evanido; cellulism edianis linearis-rhomboideis, 46~52×4.3~4.8 μ , parietibus crassis plus minus sinuatis porosisque, superne papillose extantibus, alaribus numerosis seriatis rotundato-quadratis 13×13 μ , parietibus valde crassis. Planta mascula minutissima, epiphylla; folia perigonalia 5~7, intima ovato-lanceolata, 0.26 mm longa et 0.13 mm lata, concava, nervo nullo. Bractae perichaetii intimae multo majores, erectae anguste oblongae raptim in acumen subulatum constrictae, concavae, subintegerrimae, ad 2.9~0.66 mm longae; nervo indistincto. Seta ca 8~10 mm longa, stricta vel paulum flexuosa, rubra, laevissima. Theca erecta, oblonga vel oblongo-cylindrica, symmetrica, ca 1.5~2.0 mm longa et 0.64~0.75 mm crassa. Annulus nullus. Exostomii dentes basi connati, subulato-lanceolati, ca 0.41 mm longi et 0.074 mm lati, hyaline limbati, dorso e basi ad medium fusci et traversum striatuli, apice hyalini et papillosi, ventro dense et alte lamellosi; cilia nulla; prosessus subulatus, minutissime papillosus, carinatus, 0.2~0.22 mm longus. Operculum conicum, apiculatum, ca 0.74 mm longum et 0.55 mm in diam. Sporae olivaceae, minute papillosae, ca 23 μ magnae. Calyptra ignota. Planta monotypica.

Hab.: On the bark of branches of *Rhododendron pseudo-chrysanthum* Hayata in alpine region.

Specim. exam.: **Formosa.** Prov. Tainan: Mt. Morrison (also known as Mt. Niitaka), near the summit, Tak. 16285 -Holotype, Nog. 6537 -Isotype, Aug. 20, 1932, leg. A. Noguchi.

Range: endemic to Formosa.

This characteristic specimen was collected by Dr. A. Noguchi near the summit of Mt. Morrison (3950 m alt.), the highest mountain of Formosa. He had the kindness to forward this attractive material to the author and entrusted also to examine it. This specimen is, indeed, an interest one, not only in its structural detail but also in its habit. In its external appearance, this species much resembles *Okamuraea* except in the erect and symmetrical capsules. But by a careful examination, we can find this is more closely allied to *Pleuropus*, especially in the characters of peristome. However, this has the branches with numerous paraphyilia, which present a most striking character of this specimen. If we do not notice this marked character we will consider this as a member of *Pleuropus*. In the *Brachytheciaceae* generally no paraphyilia, with a few exceptions, are seen. By the presence of paraphyllia, this may seem as a member of *Leskeaceae*. But, except this point, it agrees well with *Pleuropus* in many characters. On this reason the author establishes a new genus *Pseudopleuropus* as a member of the *Brachytheciaceae*.

Camptothecium Bryol. Eur. fasc. 52-54 (1853).

Plants are usually glossy yellow-green. In having deeply plicate leaves, very long and narrow median leaf-cells and usually quadrate and thick walled, differentiated alar cells, it resembles *Homalothecium* and *Pleurozus*, but differs in the following features of sporophyte; seta smooth or rough, capsules oblong-cylindric, more or less curved, especially when dry, peristome perfect, operculum conical-rostellate.

The known species of this genus in the present areas are very few. It seems to the author that one of the reason of this fewness is based on the insufficiency of searching in the northern part of the present areas. Some of the circumboreal common species, e.g. *C. nitens* (*Tomentypnum nitens*), which was reported already by Lindberg from Amur district (1872), are expected to be found in future in the present areas. Up to the present, merely two species *C. auriculatum* and *C. subauriculatum* are known. After examining many specimens of these species the author is compelled to think the difference between them is very slight. So he concluded both are of conspecific.

1. ***Camptothecium auriculatum*** (Lindb.) Broth. (Fig. 6)

Camptothecium auriculatum (Lindb.) Broth. in Engl. Pfl.-fam. 11: 353 (1925); Sakurai, Musc. Jap. 133 (1954).

Hypnum (Brachythecium) auriculatum Lindb. in Act. Soc. Sci. Fennicae 10: 250 (1872).

Brachythecium subauriculatum Card. in Bull. Soc. Bot. Gen. ser. 2, 3: n. 7 (1911).
Syn. nov.

Camptothecium subauriculatum (Card.) Broth., l.c. 353 (1925); Sakurai, l.c. 133 (1954).
Syn. nov.

Brachythecium scabripes Dix. et Thér. in Rev. Bryol. ser. 4 (1932); Sakurai, l.c. 136 (1954). Syn. nov.

Plants medium in size, brownish or yellowish green, sometimes golden yellow, more or less glossy, forming intricate and dense tufts. Stems creeping, flexuose, 5~8 cm long, radiculose, sending up erect branches. Branches 1~1.5 cm, arcuate, secund and divergent, often somewhat complanately foliate. Stem leaves variable in form, from cordate or deltoid-ovate base, narrow rapidly into a long acumen, and markedly auriculate at angles, but occasionally from ovate-lanceolate and not so auriculate base narrow gradually to a long acumen; margins serrate all around, strongly and irregularly plicate both in moist and dry conditions, apex usually falcate, costa extending 2/3 length of leaf and not ending in spine at back; median leaf-cells narrowly linear, somewhat rough, $64\sim 80 \times 5.7\sim 6.4 \mu$, basal cells near the costa much larger, sinuous and incrassate, collenchymatous at extreme base, alar cells rounded hexagonal to oblong-rhomboïd, not sinuous and radially areolate. Branch leaves usually more slender, narrowly lanceolate and more falcate than the stem leaves, less auriculate at angles. Seta about 13 mm long, dark brown, very rough throughout. Capsules reddish brown, oblong-ovoid to shortly cylindric, about 1.5~0.8 mm, arcuate, asymmetric and inclined. Operculum conic-apiculate, 1.1 mm long. Peristome normal as in *Brachythecium*. Dioicous.

Specim. exam.: **Hokkaidō**. Is. Rishiri; Mt. Rishiri, 200 m *Iwaz. Tak.* 15156, 15155, 15169, Yamunai valley *Hatt.* 22010, 21994. Is. Rebun: Kabuka *Iwaz. Tak.* 15121, Momoiwa,

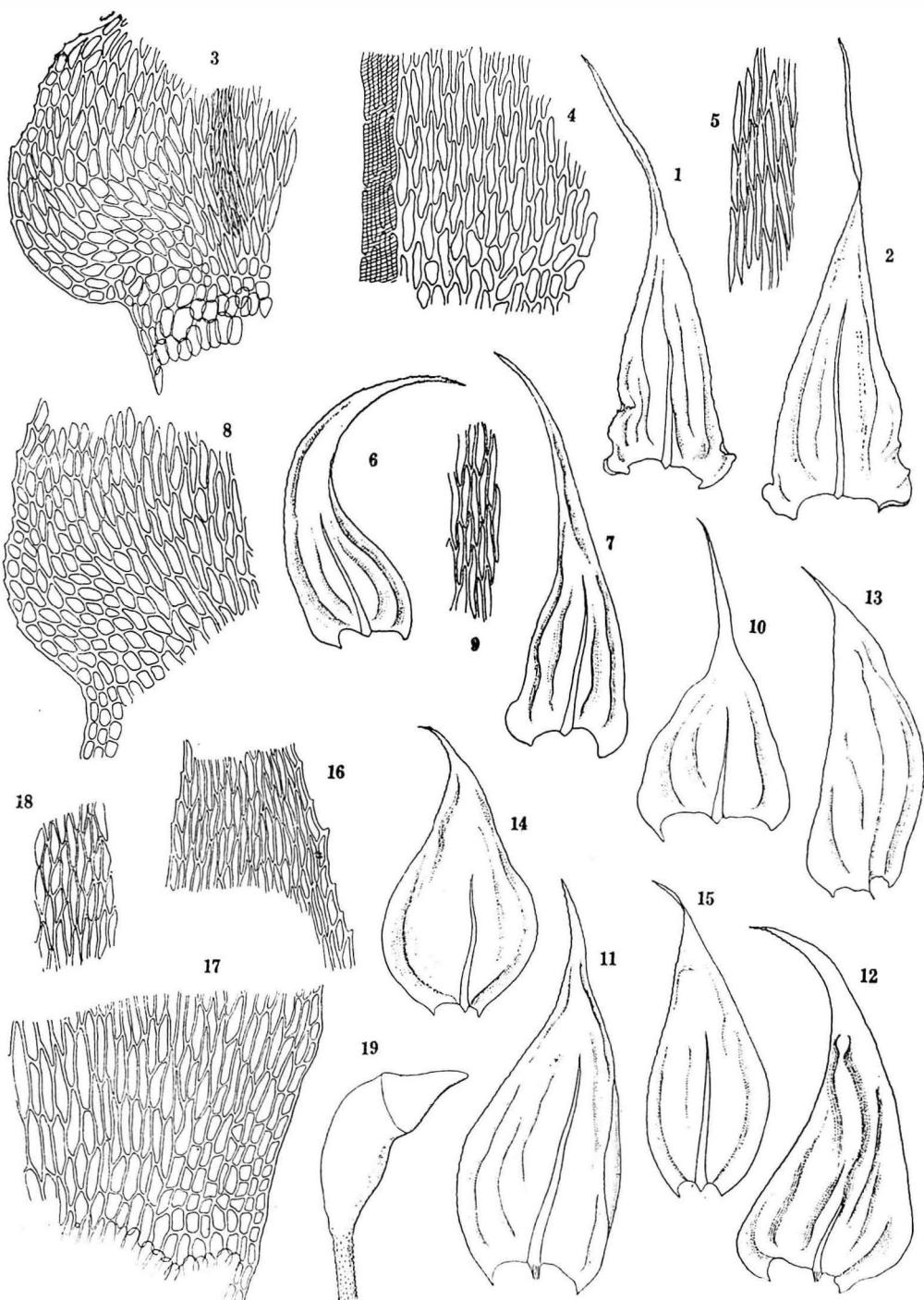


Fig. 6

Iwaz. *Tak.* 15136. Prov. Kushiro: Mt. Meakan *Nog.* 27015. **Honshū.** Pref. Aomori: Mt. Osorezan *U.F.* 2107, 2035, Oct. 1902, original specimen of *C. subauriculatum*. Pref. Yamanashi: Mt. Fuji, Yoshidaguchi 2400 m *Tak.* 9078. Pref. Nagano: Northern Alps, Mt. Karamatsu 1300 m *Tak.* 10248. **Formosa.** Prov. Taichū: Mt. Kiraishū *Shimada* 1336, Mar. 6, 1918, original specimen of *Brachythecium scabripes*, leg. Shimada.

Range: Sakhalin, Japan (Hokkaidō, Northern Honshū and subalpine region of mountainous districts of middle Honshū) and Formosa.

Hab.: On humus in shady places.

This species was described by Lindberg based on the specimen collected by Glehn in Sakhalin. We are now unable to see the original specimen in Japan. However, the author gathered some specimens which have the characters perfectly agreeing with the original description, in northern and middle Japan.

Further we have another species *C. subauriculatum* described (as *Hypnum*) by Cardot, based on the syntype specimens from the following stations; Hirafu (Hokkaidō), Kominato, Tsuruga, Osorezan and Ubayu—all Honshū. Among them, the author examined the specimen from Osorezan and illustrated. The most striking character of *C. auriculatum* is the strongly auriculate leaves, as is well expressed in its specific name. By the author's observation this feature seems to be not constant. We can find many transitional forms from the markedly auriculate to not at all auriculate leaves, even on the same plant. On the other hand, distinctly auriculate leaves are seen even in the original specimen of *C. subauriculatum*. So the author decided *C. subauriculatum* as a synonym of *C. auriculatum*.

Moreover, this species often resembles *Bryhnia trichomitria*. Among Faurie's collections, we find some specimens of *B. trichomitria* which is determined as *C. subauriculatum* by Cardot. Regarding this point the author will discuss in the article of *Bryhnia* in this monograph.

The species *Brachythecium scabripes* Dix. et Thér. was described, based on two syntype specimens collected in Formosa (Mt. Kiraishū) and Honshū (Pref. Mie: Tomoda-mura). An examination of these specimens has revealed that the both are different species and the former is identical with *C. auriculatum* and the latter seems to be nothing but a form of *Bryhnia novae-angliae*.

Myuroclada Besch. in Ann. Sci. Nat. 379 (1893).

Very distinct and monotypic genus of this family. It resembles *Scleropodium* in habit, especially in the julaceous foliation, but differs by the smooth seta, in-crassate and rhomboidal leaf-cells, etc. On the other hand, this genus is related to *Eurhynchium* in the long-rostrate operculum, rhomboidal leaf-cells, etc. Moreover, the following are characteristic to this genus; leaf form widely ovate and very

Fig. 6. *Camptothecium auriculatum* (Lindb.) Broth.

1, 2, 7, 10, 11, 12. Stem leaves, $\times 19$. 6, 13, 14, 15. Branch leaves, $\times 19$. 3, 8. Basal angles of stem leaves, $\times 155$. 17. The same of branch leaves, $\times 155$. 4. Basal leaf-cells, $\times 155$. 5, 9, 18. Median leaf-cells, $\times 155$. 16. Upper leaf-cells, $\times 155$. 19. Capsule, $\times 12$. 1-5, from *Tak.* 15121. 6-9, from orig. specim. of *C. subauriculatum*, *U.F.* 2107. 10-19, from orig. specim. of *C. subauriculatum*, *U.F.* 2035.

concave, and peristome teeth and segments much longer and slenderly acuminate, and cilia rudimental.

A number of authors already have discussed in detail on this marked genus. Among them, Lindberg, Bescherelle and Cardot made discussion in much detail on the generic conception. Lindberg combined this species with *Myurella* separating from *Hypnum*, but Bescherelle afterwards established a separate genus *Myuroclada*. Cardot also established a genus *Achrolepis* which was formerly treated as a subgenus of *Myurella* by Lindberg.

1. *Myuroclada concinna* (Wils.) Besch. (Fig. 7)

Myuroclada concinna (Wils.) Besch., l.c. (1893); Sh. Okamura in Jour. Coll. Sci. Imp. Univ. Tokyo, **36**: 45 (1915), **38**: 90 (1916); Broth. in Engl. Pil.-fam. **11**: 370, f. 692 (1925); in Handel-Mazzettii, Symb. Sinic. **4**: 108 (1929); Reimers & Sakurai in Bot. Jahrb. **64**: 552 (1931); Dixon in Hongkong Nat. Suppl. n. 2, 25 (1933); Potier d. Varde in Rev. Bryol. **10**: 142 (1937); Horikawa in Asahina, Nippon Inkwashokubutsu Dukan 967, t. 466 (1939); Tujibe in Jour. Jap. Bot. **21**: 61 (1947); Sakurai, Musc. Jap. 140, pl. 58-O (1954).

Hypnum concinnum Wils., in Hook. Lond. Jour. Bot. **7**: 277 (1848); C. Muell., Syn. **2**: 374 (1850); Lindb. et Arn. in Kongl. Sv. Vet. Akad. Handl. **23**: 129 (1890); Broth. in Hedwigia **38**: 242 (1899).

Hypnum Maximoviczii Borszezow in Maxim. Prim. Fl. Amur. 467 (1859).

Myurella (Subg. *Achrolepis*) *concinna* Lindb. in Act. Soc. Sci. Fenn. **10**: 275 (1872).

Achrolepis concinna Card. in Beih. Bot. Cent. **17**: 34 (1904); Musci Japonici Exsiccatai, ser. 7, n. 329 (1953).

Plants pale green or yellowish green, glossy, densely tufted. Stems creeping, radiculose, often stoloniferous at ends. Branches densely imbricate, terete-foliate, simple or irregularly branched, reaching 3~4 cm long, curved, apex varies obtuse to flagelliform. Leaves markedly orbicular with a short apiculus, strongly excavate; costa short, 1/3~1/2 as long as leaf, stout at base, upwards rapidly weakens, not ending in spine on back; margins almost entire, minutely serrulate above; median leaf-cells incrassate, rhomboidal, smooth, 21~23×6.8~9.2 μ , towards margins smaller, basal cells much larger, alar differentiated, small, quadrate and numerous. Perichaetium 3 mm long, leaves sheathing at base with spreading points, inner leaves long-filiform, acuminate from an oblong base, nearly entire, minutely serrulate above, loosely areolate, faintly costate, margins undulate. Seta 1.5~2.5 cm reddish brown, smooth. Capsules reddish brown, about 2.6×1.0 mm, oblong-cylindric, nearly symmetric, slightly arcuate, suberect; annulus none. Teeth of peristome subulate-lanceolate reaching 0.75 mm in length, 0.14 mm in width at base,

Fig. 7.

- 1-10. *Myuroclada concinna* (Wils.) Besch.
- 11-15. *Scleropodium brachyphyllum* Card. (from orig. specim.).
- 17-26. *Sc. coreense* Card. (from orig. specim.).
- 1, 12, 13, 18, 19, 20, 21. Branch leaves, (1)×19, (the others)×35. 11. Stem leaves, ×24.
- 2, 14, 23. Apical parts of leaves, (2)×218, (14, 23)×155. 15, 22. Basal angles of leaves, ×155. 3, 16, 24, 25. Median leaf-cells, (3)×218, (the others)×155. 26. Marginal part of leaf, ×155. 4, 5, 6, 7. Perichaetal bracts, ×19. 17. Branch, ×12. 8. Capsule, ×12. 9. Young sporogone with calyptra, ×12. 10. Peristome teeth, ×74.

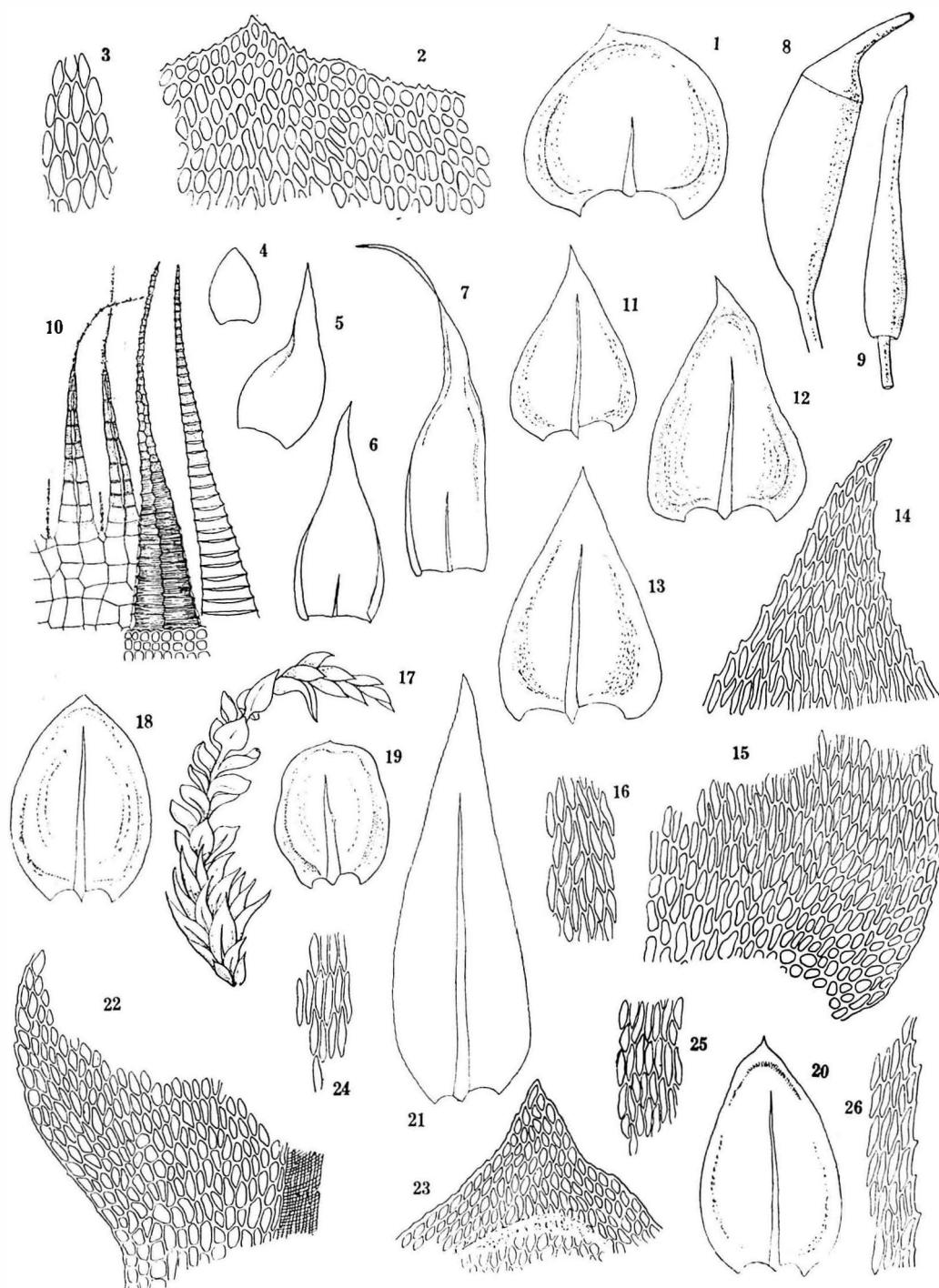


Fig. 7.

densely papillose in the upper half; segments as long as the teeth, well developed, nodulose upper 1/3, narrowly linear, longly filiform, pointed, narrowly split along the keel; cilia short, rudimental, nodulose, 0.12 mm, papillate; basal membrane 0.2 mm in height, smooth. Calyptra naked.

Specim. exam.: **Hokkaidō**. Prov. Sōya: Nakatombetsu *H. O.* 1395. Prov. Abashiri: Abashiri *Nog.* 12567, *U. F.* 14569, Kitami-shi *Nog.* 30194, Mt. Shari *H. O.* 1313, Mt. Pin-neshiri *H.O.* 1434. Prov. Kamikawa: Kamuikotan *Nog.* 30155, 30139, *U. F.* 11085, Furano-machi *H. O.* 1088, Asahigawa *Nog.* 3718, Sōunkyō *Nog.* 27597, Kamikawa *U. F.* 11093. Prov. Kushiro: Mt. Meakan *Nog.* 28093, Mt. Oakan *H. O.* 1226, 1228. Prov. Hidaka: Mom-betsu *U. F.* 9139, 14584, 14583, 14603, Piratori *U. F.* 12486. Prov. Ishikari: Jōzankei *Nog.* 27967, Sapporo *U. F.* 9001, 9045, 9055, Mt. Tarumai *U. F.* 10004. Prov. Shiribeshi: Mt. Raiden *U. F.* 9802, Otaru *U. F.* 3755. Prov. Oshima: Hakodate *U. F.* 9116. Is. Rebun: Momoiwa *Iwaz. Tak.* 15138, *U. F.* 9509, Hatt. 21953, 21641, Noshappu *Hatt.* 21589, Uennai *Hatt.* 21782, Kabuka *Hatt.* 21657. **Honshū**. Pref. Aomori: Shimokita, Okuuchi *Nog.* 21446, Tanabe *Nog.* 21020, 21259, Yagen *Nog.* 20983, Sai *Nog.* 21276, Asamushi *U. F.* 12035, Kuroishi *U. F.* 10, Kominato *U. F.* 43, Shichinohe *U. F.* 5. Pref. Akita: Honjō-machi *Nog.* 26578, Akita-shi *U. F.* 14829. Pref. Yamagata: Yamadera-mura *Igura* 203, Higashimurayama *Nog.* 16301, Yatagawa-mura *H. O.* 1627, 1676, 1682. Pref. Iwate: Kotsunagi *U. F.* 15055, Morioka *U. F.* 299. Pref. Miyagi: Aoso *Nog.* 5446, Matsushima *Nog.* 5430, Mt. Takadate *Nog.* 1784. Pref. Gumma: Mt. Sarabuse *Nog.* 25203, Ozegahara *H. O.* 279. Pref. Saitama: Mt. Mitsu-mine *Tak.* 4528, 4529. Pref. Tokyō: Mt. Sōgatake *Tak.* 1911, Mt. Kariyose *Tak.* 1912, Oku-tama *Tak.* 1913, Mt. Takao *Tak.* 1005, Kobotoke-pass *Nog.* 19969. Pref. Chiba: Mt. Kiyo-zumi *Tak.* 1203. Pref. Shizuoka: Mt. Fuji *U. F.* 342. Pref. Nagano: Mt. Shirouma *Tak.* 6859, Southern Alps, Koshibuyu *Tak.* 652, 6623, Sugadaira *Tak.* 713, Kirigamine *Tak.* 6405, 6505, Mt. Togakushi *Tak.* 12254, Mt. Kisoontake, 1250 m *Tak.* 13829. Pref. Aichi: Mt. Mikuni *Tak.* 13645, Tomiyama-mura *Tak.* 14839, 14842, Taguchi-machi *Tak.* 7742, Mt. Hōrai-ji *Tak.* 4265, Mt. Danto *Tak.* 5076, Miwa-mura *Tak.* 2430. Pref. Yamanashi: Shōsenkyo *Tak.* 1081. Pref. Gifu: Shirakawa-mura *Tak.* 9229, Yōrō *Tak.* 5276. Pref. Kyōto: Mt. Ashiu *Tak.* 10755, Mt. Kurama *Nog.* 27762, *Tak.* 622, 1308. Pref. Mie: Mt. Ōdaigahara *Tak.* 14974, Akame *Tak.* 5453, Ōsugidani *Tak.* 5971, Mt. Fujiwara *Nog.* 7561, Kawakami-Hachiman *Mag.* 2219, Miyamoto-mura *Mag.* 6. Pref. Shiga: Mt. Ibuki *Nog.* 3142, 16397. Pref. Hyōgo: Tomisu-mura *Nog.* 19833, 21719, Mt. Akanishi *Nog.* 19260. Pref. Nara: Murōji *Tak.* 5428. Pref. Wakayama: Wakayama-shi *Nog.* 9123. Pref. Okayama: Atetsu-gun *Nog.* 19747. Pref. Hiroshima: Mt. Azuma *Nog.* 12082, Mt. Kammuri *Nog.* 7356, Mukaibara *Nog.* 4089, Mt. Dōgo *Nog.* 10579, Taishaku *Nog.* 4630, 9697, Is. Miyajima *Nog.* 1980. Pref. Shimane: Mt. Sambe *Nog.* 12312, Gakuenji *Nog.* 30111, Hikawa-gun *Nog.* 28973. Pref. Tottori: Wakazakura-machi *H. O.* 893, Mt. Naki *H. O.* 1536. **Shikoku**. Pref. Ehime: Tochihara *Nog.* 11074. **Kyūshū**. Pref. Fukuoka: Mt. Kosho *Nog.* 27241. Pref. Saga: Saga-shi *Nog.* Pref. Kumamoto: Mt. Fukaba *Tak.* 104, 2534, 2596, Mt. Kunimi *Tak.* 3222, Gokanoshō *Tak.* 3223, Gōshi-mura *Tak.* 3221. Pref. Ōita: Yufuin-mura *Nog.* 13997, 13999, 16646, Mt. Kujū *Nog.* 2443, Mt. Jinkakuji *Nog.* 19183, Shin-yabakei *Nog.* 16132b, Kaku-mura *Nog.* 19688, Inoseto *Nog.* 28462. Pref. Kagoshima: Is. Yakushima *Nog.* 14314. **Korea**. Seoul *U. F.* 104, Syou Ouen *U. F.* 118, Tjyang Tjeng *U. F.* 847, Pusan *U. F.* 274, Cholla-pukto *Tog.* 3310. Is. Ullung *Tog.* 3772.

Range: Sakhalin, Japan (Hokkaidō, Honshū, Shikoku and Kyūshū). Korea, Manchuria, China and Amur Province, Soviet Russia.

Hab.: Shaded banks or thm soil on rocks.

1 a) var. *gracilis* Card.

Myuroclada concinna var. *gracilis* Card. in Bull. Soc. Bot. Gen. ser. 2, 3: n. 7 (1911); Sakurai, l.c. 140 (1954).

A more delicate plant. Both stems and branches are very slender ending in flagelliform. Branches few and short about 1~1.5 cm long, about 1 mm thick in its extreme state and less imbricate than in the type. Leaves and leaf-cells also smaller. Such a delicate and slender form is sometimes seen even in the type at the terminal parts of its tufts. The original specimen of this variety consists of such a slender form all over the tufts. But the author has a few materials which agree perfectly with this original specimen. Nevertheless, there is no essential distinctions between the type and variety.

Specim. exam.: Honshū. Pref. Nagano: Mt. Asamayama U.F. 105, July 20, 1897, original. Shikoku. Pref. Ehime: Saijō-shi K.O. 6253. Korea. Mt. Kumgang U.F. 452, 455.

Range: Japan (Honshū, Shikoku) and Korea.

Scleropodium Bryol. Eur. fasc. 45-46 (1853).

As the members of this genus in the present areas, the two species *S. brachyphyllum* and *S. coreense* are known from Korea only. An examination of the original specimens has revealed that they are both sterile and any characters of sporogone cannot be seen. We can hardly induce the general characters of the genus from these specimens only. As the generic characters of this genus, A. J. Grout states in his "Moss flora of North America" that "Closely allied to *Brachythecium* and included in it by some authors; differing slightly in the general habit and in the julaceous branches with concave, often obtuse leaves; leaf-cells very long and narrow, 10~20:1. Stem leaves abruptly and slenderly acuminate in most species. Seta rough; capsule as in *Brachythecium*." On these generic characters the two Korean species agree almost with that, except the form of leaf cells. There are some doubts as to placing these species in *Scleropodium*. But the author is not sure of it, until the more sufficient materials are at his disposal.

{Leaves triangular-ovate, less concave *S. brachyphyllum*
 {Leaves oblong-ovate, less plicate, strongly concave *S. coreense*

1. *Scleropodium brachyphyllum* Card. (Fig. 7)

Scleropodium brachyphyllum Card. in Bull. Soc. Bot. Gen. ser. 2, 4: (1912); Broth. l.c. 371 (1925).

Resembling *S. caespitosum* in habit and size. Plants golden or yellowish green, forming dense tufts. Stems creeping, sending up erect and numerous branches. Branches 5~7 mm long, obtuse or attenuate at the tip, curved, julaceous with densely imbricate leaves. Leaves of the same branch almost similar in form except in size (on this point, *caespitosum* has the leaves which markedly vary in form even in the same branch.), triangular-ovate, shortly acuminate, about 1.4~1.5 mm long, 0.94 mm wide, minutely serrate all round, long and irregularly plicate; costa

2/3 length of leaf, stout, gradually weakens, sometimes forked in its terminal, ending in spine on back; middle leaf-cells oblong-rhomboidal, $41\sim43\times8\sim10/\mu$, slightly roughened at the ends of walls, apical cells somewhat differentiated, rhomboidal, becoming fusiform-hexagonal towards base, extreme basal cells incrassate, oblong, alar cells much shorter, incrassate and quadrate. Stem leaves smaller than the branch leaves, about 1 mm long, $0.7\sim0.75$ mm wide.

Specim. exam.: **Korea.** Pusan U. F. 367, May 1906, original.
Range: Korea.

2. *Scleropodium coreense* Card. (Fig. 7)

Scleropodium coreense Card. I.c. (1912); Broth. I.c. 371 (1925).

Plants small and slender, yellowish green, not glossy. Stems creeping often leafless when old, loosely foliate, distantly sending up the erect branches. Branches short 5 mm long, somewhat loosely and spreadingly foliate when dry, not so imbricate as in *brachyphyllum*. Branch leaves markedly polymorphous, basal ones widely elliptical or suborbicular, obtuse or shortly apiculate, about 0.8×0.57 mm, middle ones more orbicular and strongly concave, cymbiform, shortly apiculate, often smaller in size than the basal ones, terminal ones much longer 1.7×0.54 mm, broadly lanceolate, tapering or suddenly acuminate. In all kinds of leaves, costa stout $1/2\sim3/4$ length of leaf, often shortly branching in the middle; margins faintly serrulate or almost entire; median leaf-cells fusiform-hexagonal about $50\times6/\mu$, somewhat roughened at ends of walls, towards apex gradually shorter, basal cells much larger, not incrassate, alar almost not differentiated.

Specim. exam.: **Korea.** Ouen-san U. F. 597, July 2, 1906, original.
Range: Korea.

BEITRAG ZUR KENNTNIS DER BRYOPHYTENFLORA VON
FORMOSA UND DEN BENACHBARTEN INSELN
BOTEL TOBAGO UND KWASHYOTO

Von Theodor HERZOG¹⁾ und Akira NOGUCHI²⁾

Th. Herzog, 野口 彰：台灣，紅頭嶼及び火燒島の蘚苔類

1. Einleitung

Während des Jahres 1946/47, in dem Herr Prof. Dr. G. H. Schwabe an der neugegründeten Universität Taipeh wirkte, hat dieser unermüdliche Forscher, der mir früher schon wiederholt interessante Bryophytensammlungen aus Chile zur Bearbeitung überlassen hatte, auch hier seine Aufmerksamkeit den Moosen zugewandt und mir die von ihm gesammelten sehr inhaltsreichen Convolute unter vielfachen Mühen auf Umwegen zukommen lassen. Seine Bemühungen um die Erweiterung unserer Kenntnisse von der Moosflora Formosas erstreckten sich dabei auch auf die benachbarten Inseln Botel Tobago und Kwashyoto, die bisher fast so gut wie bryologisches Neuland waren und nur in einer Publikation von Herrn Prof. A. Noguchi berücksichtigt worden waren. Prof. Schwabes Funde bedeuten daher einen wertvollen Zuwachs für ihre Moosflora. Die so aussichtsreich begonnene Sammelarbeit fand aber durch politische Einmischungen ein jahes Ende. Herrn Prof. Schwabe, der als Deutscher durch ein alliiertes Flugzeug überraschend in ein Interniertenlager abtransportiert wurde, gelang es nur mit Hilfe eines befreundeten Herrn in Shanghai die kostbaren Sammlungen zu retten. Sie gingen bestimmungsgemäss zur ersten Durchsicht und Auswertung an den bekannten Diatomeenforscher G. Krasske in Kassel (unterdessen gestorben), wo leider anscheinend wichtige Etiketten mit Nummern und Fundortsangaben verloren gingen. Dieser Ausfall betrifft allerdings glücklicherweise fast nur Aufsammlungen aus dem Monat August 1947, die ausschliesslich aus Gebirgsgegenden im westlichen Mitteltaiwan und zwar vorwiegend in der Nähe von Kaminoshima stammen, also von der Hauptinsel Formosa, während die Funde von Botel Tobago und Kwashyoto genau festgelegt sind.

Herr Dr. S. Hattori hat sich hilfreich beteiligt, indem er die Bestimmung mehrerer thalloser Lebermoose übernahm und die *Plagiochila*-arten revidierte. Seine Beiträge sind jeweils durch den Zusatz det. Hattori gekennzeichnet. Ihm sei hierfür bestens gedankt, ebenso wie für das Entgegenkommen bei der Reproduktion der Textfiguren und die redaktionellen Arbeiten, die durch die grosse Entfernung und die damit verbundenen postalischen Hemmnisse eischtweit und verzögert wurden.

Naturgemäß konnte trotz aller Sorgfalt bei der Aufpräparierung des Rohmaterials nicht vermieden werden, dass vielleicht sehr spärliche Beimischungen übersehen wurden. Aus der relativ hohen Zahl der für das Gebiet neuen Arten und novae species kann immerhin geschlossen werden, dass dieses Inselgebiet trotz

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wiederholter Besüche und reicher vorhandener Sammlungen erst sehr lückenhaft bekannt ist. (Th. Herzog)

2. Artenlisten und Diagnosen

Die für Formosa und die benachbarten Inseln neuen Arten sind mit *, die neuen Gattungen mit ** gekennzeichnet.

I. Hepaticae

Anthocerotaceae

* *Anthoceros (Aspiromitus) vesiculosus* Aust. -Botel Tobago: Orangenpflanzung, (leg. Prof. G. H. Schwabe) no. 88.

Anthoceros (Aspiromitus) miyabeanus (Steph.) Steph. -Botel Tobago: Bewässerungsgräben bei Iranomilku, no. 68. (det. S. Hattori)

Megaceros tosanus Steph. -Botel Tobago: loco incerto, no. 119. (det. Hattori)

Marchantiaceae

Marchantia cuneiloba Steph. -Kwashyoto: Kleines Tal an der N. küste, no. 65; Botel Tobago: Südtal der Insel, no. 74 u. 82. (det. Hattori) -Nach seiner Ansicht hat die Art nächste Beziehungen zu *M. geminata* R. Bl. N. Die Art ist gut characterisiert durch die fiederig-geschlitzten Anhängsel der Bauchschuppen.

Marchantia tosana Steph. -Botel Tobago: Bachthal bei Iranomilku, 120 m, no. 105; ibidem, Erdblößen im Kammhöhe 400 m, no. 110. (det. Hattori) -Nach seiner Ansicht hat die Art nächste Beziehungen zu *M. emarginata* R. Bl. N.

Conocephalum conicum (L.) Dum. -Botel Tobago: Am Wasserfall, no. 84; -Eine ungewöhnlich schmale Form mit dünnem, ungefeldertem Thallus. (det. Hattori)

Dumontiera hirsuta Sw. -Botel Tobago: Wasserfall, no. 85; Hohlweg bei Iranomilku, no. 87.

Riccardiaceae

Riccardia submultifida Horikawa. -Botel Tobago: Bachthal, 100~200 m, no. 119 u. 120; auf Rinde, no. 114. (det. Hattori)

Metzgeriaceae

* *Metzgeria lindbergii* Schiffn. -Formosa: Urai, an Citrusstämmen, 340 m, E. hang und an verschiedenen unbezeichneten Fundorten als Beimischung. -Botel Tobago: Auf Ästchen mit *Leucophanes* spec., sine no. (det. Hattori)

Metzgeria subhamata Hattori, n. sp. (Fig. 1, a~d)

Dioica (flor. fem. haud visa), muscis consociata, e sordide viridi lurida, medioris minor. Frons ad 20 mm longa, furcata, ramis adventivis posticis rariss, furcis 4~8 mm longis, 0.7~1 mm latis, planula vel rarius margine parum decurvata, apice fere obtusa. Costa tenuis, ventre nuda vel sparsim setulosa, cellulis corticalibus 4 (postice et antice 2), cellulis centralibus multo minoribus, 10~11, pachydermibus. Alae 12~15 cellulas latae, postice hic illic sparsim setulosae, marginibus setulosis vel nudis, setis haud geminatis, 150~200 μ longis, saepe subhamatis. Cellulæ alarum subaequimagnaæ, marginales 20~40 \times 20~25 μ , mediae 32~46 \times 28~32 μ , internæ 36~50 \times 32~36 μ , parietibus tenuibus, trigonis minutis, acutis, cuticula levi. Rami masculi pro planta majores, nudi.

Formosa: Im Gebirge, an Bäumen, 1400~1500 m, leg. Prof. G. H. Schwabe, no. 101-typus.

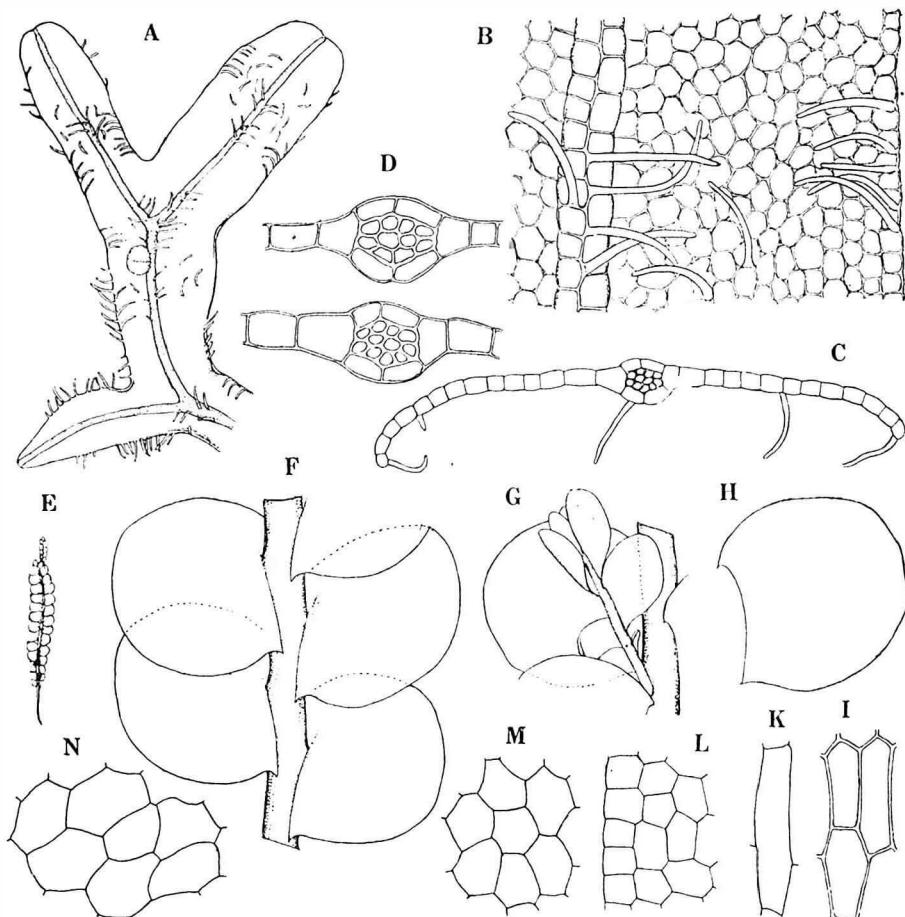


Fig. 1. a~d. *Metzgeria subhamata* Hatt., n. sp. a. Part of thallus with antheridium, ventral view, $\times 15$. b. Portion of a, magnified, $\times 140$. c. Cross section of thallus, $\times 70$. d. Cross sections of midrib, $\times 210$. e~n. *Plectocolea sordida* Hatt., n. sp. e. Plant, $\times 1$. f. Part of stem, dorsal view, $\times 15$. g. Do. with innovation, ventral v., $\times 15$. h. Leaf, $\times 15$. i. Cells from stem cortex, $\times 145$. k. Cell from inner portion of stem, $\times 145$. l. Cells from leaf margin, $\times 145$. m. Cells from leaf middle, $\times 145$. n. Cells from leaf base, $\times 145$. All figures were drawn by S. Hattori from the type specimens.

Pallaviciniaceae

* *Pallavicinia levieri* Schiffn. -Botel Tobago: Kamm, 380~400 m, no. 113; Hangwald, 150~380 m, no. 116.

** *Makednothallus isoblastus* Herz., n. sp. (Fig. 2)

Dioicus videtur (σ haud visus); gregarius vel caespitosus, rigidulus, majusculus, obscure viridis, nigricans. E caule rhizomato scapos erectos, superne parce flabelatos, ad 2.5 cm longos emittens. Thallus in lobos angulo acuto profunde divisos

uni- vel bifurcatus; frondis lobi 2 mm lati, leviter undulati, costa bene delimitata, sat angusta, dorso subplana, ventre prominente, in alas sat praerupte transiente, fasciculo centrali simplici, alis ca 14~16 cellulas ubique fere aequalibus, sat laxis,

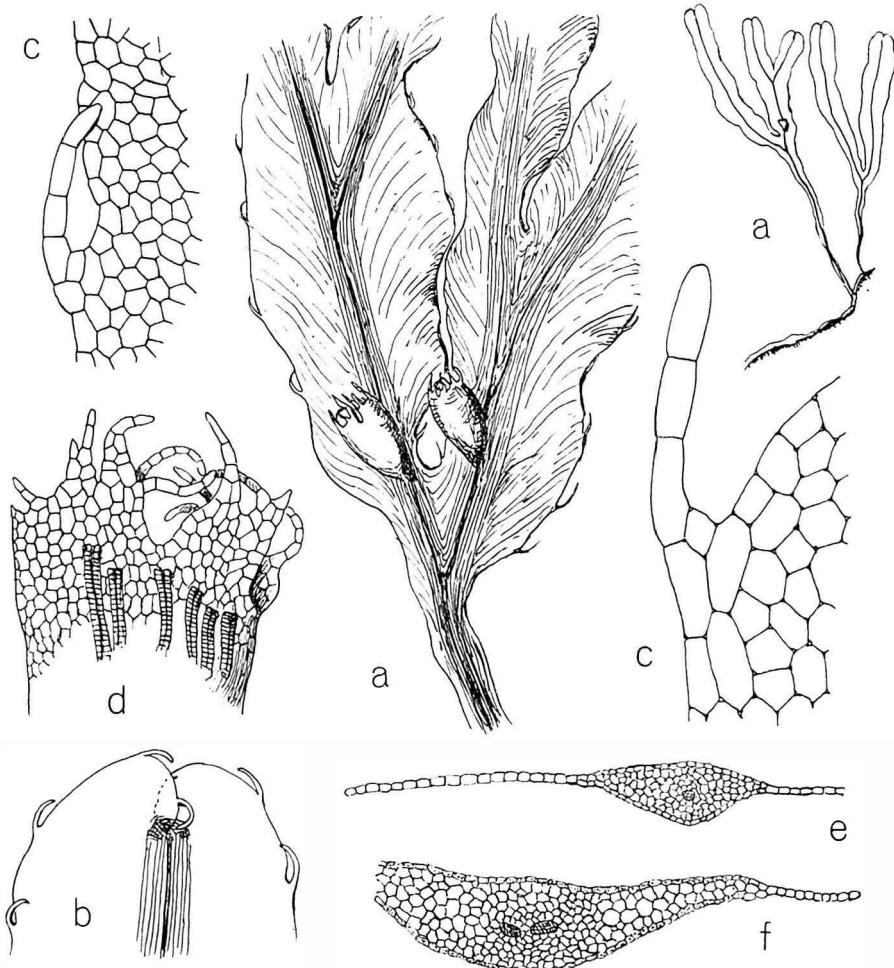


Fig. 2. a~e. *Makednothallus isoblastus* Herz., n. sp. a. Habitus, $\times 2.5$; Thallus-teil, $\times 12$. b. Thallusscheitel, $\times 22$. c. Randdornen, $\times 80$. d. Mündung des Involucrums, $\times 44$. e. Thallusquerschnitt, $\times 36$. f. *Makednothallus zollingeri*, Thallusquerschnitt, $\times 36$.

$50 \times 50 \sim 50 \times 60 \mu$ metentibus, indistincte oblique seriatis, sat validis, trigonis subnullis, margine longe spinosis vel potius ciliiferis, ciliis leviter hamatis, inflexis, ca 4 cellulas longis. Involucra ♀ supra bifurcationem thalli disposita, substipitata, anguste cupulata, ad 1 mm longa, ore irregulariter et longiuscule spinoso-laciñiata, laciñiis strictis vel hamatis (perianthium nondum evolutum, forsitan ob fecundationem deficientem?).

Formosa: Daiton, Schlucht an senkrechter Wand aus lockerem Konglomerat, 500 m, leg. G. H. Schwabe, 11. 1. 1947, no. 22.

Dem *Makednothallus zollingeri* durch die Ausbildung der Randzilien näher als dem *M. decipiens*. Der wesentliche Unterschied gegenüber dem im indomalayischen Archipel wohl weiter verbreiteten *M. zollingeri* besteht in den relativ breiteren Flügeln und den deutlich grösseren Flügelzellen, die sich scharf von der Rippe abheben, während bei *M. zollingeri* die Rippe, allmählich sich verflachend, unmerklich in die schmäleren und kleinzelligeren Flügel übergeht, so dass die Zellen zum Flügelrand hin ganz allmählich an Grösse abnehmen. Die Randzone der Rippe bildet hier also einen gleitenden Übergang zu den Flügeln. Dadurch entsteht bei *M. zollingeri* ein Zellmosaik der Thallusoberfläche, in dem die Zellumina von innen nach aussen ganz allmählich kleiner werden und die Rippengrenze undeutlich wird. Die Masse der Flügelzellen bei *M. zollingeri* betragen ca $30 \times 30 \sim 27 \times 36 \mu$, bei *M. isoblastus* $50 \times 50 \sim 50 \times 60 \mu$.

Jungermanniaceae

* *Plectocolea comata* (Nees) Hatt. -Formosa: Daiton, an Erdblössen, no. 28 pp.
(det. Hattori)

Plectocolea setulosa Herz., n. sp. (Fig. 3)

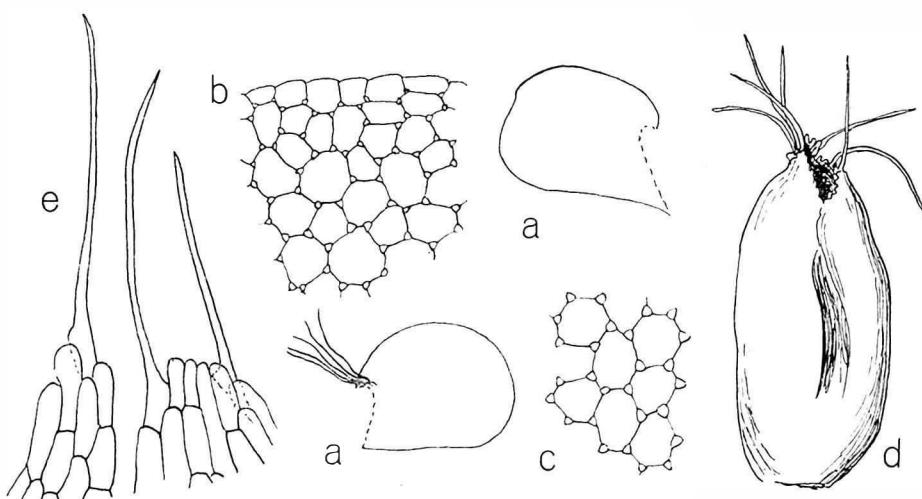


Fig. 3. *Plectocolea setulosa* Herz., n. sp. a. Blätter, $\times 22$. b. Blattzellnetz am Rand, $\times 180$. c. Zellnetz der Blattmitte, $\times 180$. d. Perianth. $\times 44$. e. Perianthmündung, $\times 160$.

Dioica videtur (σ haud visa); minor, caespitosa, subgrisea, terricola. Caulis ad 10 mm longus, rhizoidibus longis, pallide purpurascensibus arcte repens, varie ramosus, sub flore innovatus, floribus saepius repetitis, cum foliis ca 1.5 mm latus. Folia caulinata sat densa, complanata, subrecte patula, e basi late inserta subovata, truncato-rotundata, integerrima, ca 1000 μ longa, 600 μ lata, cellulis ubique pellucidis, superis diametro ca 30 μ , mediis ad 40 μ vel 40 \times 45 μ metientibus, basalibus vix majoribus, trigonis ubique majusculis, cuticula papillosa. Involucalia distincte majora, cyatho-patula, subrotunda, margine leviter undulata. Perianthia parva, foliis involucralibus occulta, cylindrica, sub ore parum plicata, cellulis ubique elongato-linearibus, limpidis, laevissimis, ore ipso angustato, setoso-ciliato, ciliis ad

300 μ longis, e cellula singula longissima exstructis.

Kwashyoto: Erdhang in feucht-schattiger Bachrinne, leg. G. H. Schwabe, 30. 5. 1947, no. 63.

Die neue Art ist besonders durch das auffallend kleine, von den Involucralblättern völlig eingehüllte Perianth mit langen, borstenartigen Wimpern an der Mündung charakterisiert.

Plectocolea sordida Hattori, n. sp. (Fig. 1, e~n)

Sterilis, aquatica ?, major, habitu *Chiloscypho* simillima, sordide viridis, aetate brunnescens. Caulis strictus, pauciramosus sed saepicule postice innovatus, 2~3 cm longus, diametro 0.3 mm, cum foliis 3 mm latis, cellulis corticalibus 100~160 μ longis, 30 μ latis, parietibus validis, trigonis nullis, cuticula striolatim verrucosa, cellulis internis pallidis, subdupo longioribus, parietibus tenerrimis, radicellis parvis, hyalinis. Folia caulina late oblique inserta, vix decurrentia, parum imbricata, raro contigua, plano-disticha, rotunda, 1.6 mm longa, 1.7 mm lata, apice late rotundata vel subtruncata. Cellulae obscurae, marginales quadratae, 24~32 \times 24 μ , mediae 40~55 \times 35 μ , basales 55~80 (~100) \times 40 μ , parietibus tenerrimis, trigonis nullis, cuticula minutissime sariolatim~punctatim verrucosa vel sublevi. Amphigastria nulla.

Formosa: Taipeh ?, Prof. G. H. Schwabe, no. 3.

Plagiochilaceae

* **Plagiochila blepharophora** (Nees) Ldbg. -Botel Tobago: Nur in kriechenden Sprossen vorhanden, no. 119 pp.

Plagiochila minutistipula Herz., n. sp. (Fig. 4, a~e)

Dioica, mediocris, depresso-caespitosa, tenella, glauco-viridis, corticola, monticola. Caulis 3~4 cm longus, cum foliis 3.5~4 mm latus, subsimplex, vel sub flore fasciculato-ramosus. Folia caulina variabilia, disticho-complanata, sub angulo ca 50° patula, subcontigua vel leviter tegentia, 2~2.3 mm longa, 0.9~1.2 mm lata, nunc latiora, breviora, nunc (bene evoluta) longiora, oblonga, margine antico e basi vix decurrente substricto vel leviter arcuato, subintegerrimo vel sub apice unispinoso, postico e basi breviter replicata, cauli haud incumbente leviter arcuato, 5~7-spinoso, spinis patulis, pungentibus, apice quam basi duplo angustiore bispinosa, spinis distincte majoribus, laciiformibus, porrectis vel leviter hamatis, saepius divergentibus; cellulae hexagonae, superae diametro 27~30 μ , basales 36 \times 50 μ metentes, parietibus ubique tenerrimis, trigonis nullis. Amphigastria caulina rudimentaria, minutissima, brevissime piliformi-digitata, ad 250 μ longa. Involucrum terminale vel fasciculato-innovatum, foliis parum majoribus, tamen latioribus, ditius spinosis, spinis basalibus retrospectantibus. Perianthium immersum, late infundibulatum, exalatum, ore amplio longe spinoso, spinis aciculiformibus, strictis. Cetera nulla.

Formosa: Im Gebirge des westlichen Mitteltaiwan, "Zeltplatz," 1200 m, leg. G. H. Schwabe, 20/30. 8. 1947, sine no.

Die zierliche Art, die durch ihr Zellnetz und die zurückgeschlagene ventrale Blattbasis an eine "Cucullate" ohne Wassersack erinnert, ist durch die stets vorhandenen, winzigen, mehrzipfligen Amphigastrien und das breite, ins Involucrum trotz wenig vergrößerter Hüllblätter eingesenkte Perianth mit nadelförmiger Mundbewehrung ausgezeichnet.

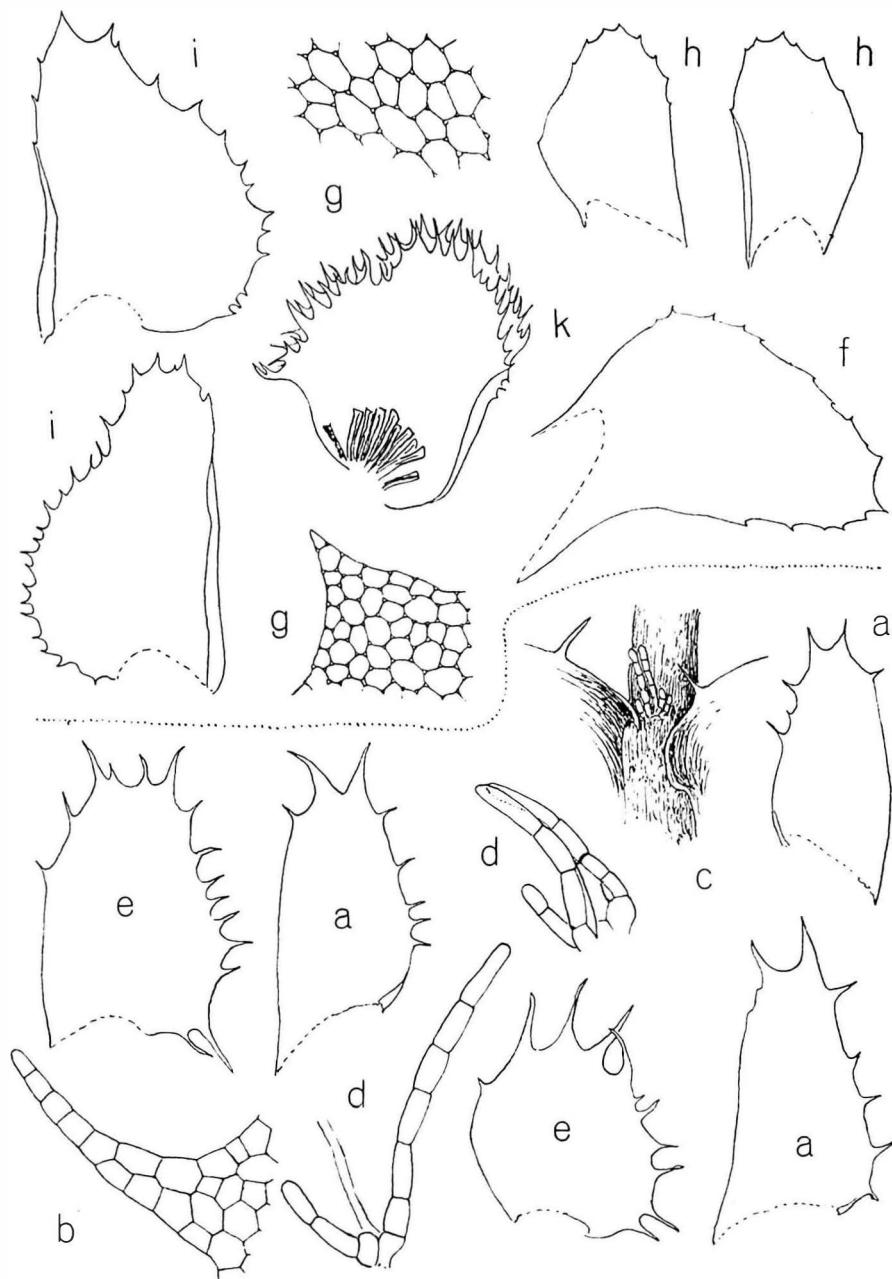


Fig. 4. a~e. *Plagiochila minutistipula* Herz., n. sp. a. Stengelblätter, $\times 18$. b. Zellnetz eines Blattzahnes, $\times 160$. c. Stengelstück mit Amphigastrium, $\times 18$. d. 2 Amphigastrien, $\times 160$. e. Involucralblätter, $\times 18$. f~k. *Plagiochila multipinnula* Herz. et Hatt., n.sp. f. Stengelblatt, $\times 22$. g. Zellen eines B. randzahnes, $\times 160$; Basalzellen, $\times 160$. h. Astblätter, $\times 22$. i. Involucralblätter, $\times 22$. k. Perianth, $\times 22$.

***Plagiochila multipinnula* Herz. et Hattori, n. sp. (Fig. 4, f~k)**

Dioica; majuscula, attamen tenerrima, rigidula, expansa, flavovirens, saxicola. Caulis secundarius ad 8 cm longus, cum foliis ad 3.5 mm latus, complanato-foliosus, fragilis, aetate nigricans, optime bipinnatus, pinnis primariis ad 2.5 cm longis, remotis, pinnulis crebris, ad 10 mm longis, subremotis, nec pinnis nec pinnulis inter se tegentibus, pinnis cum foliis 2 mm latis, pinnulis 1 mm latis. Folia caulina contigua, sub anguio ca 50° oblique patula, e basi antice longe decurrente ovato-trigona, vix 2 mm longa, 1.3 mm lata, margine antico e cnemide decurrente sinuato, dein substricto, e medio ad apicem breviter pauciserrato, dentibus latiusculis, acutis.

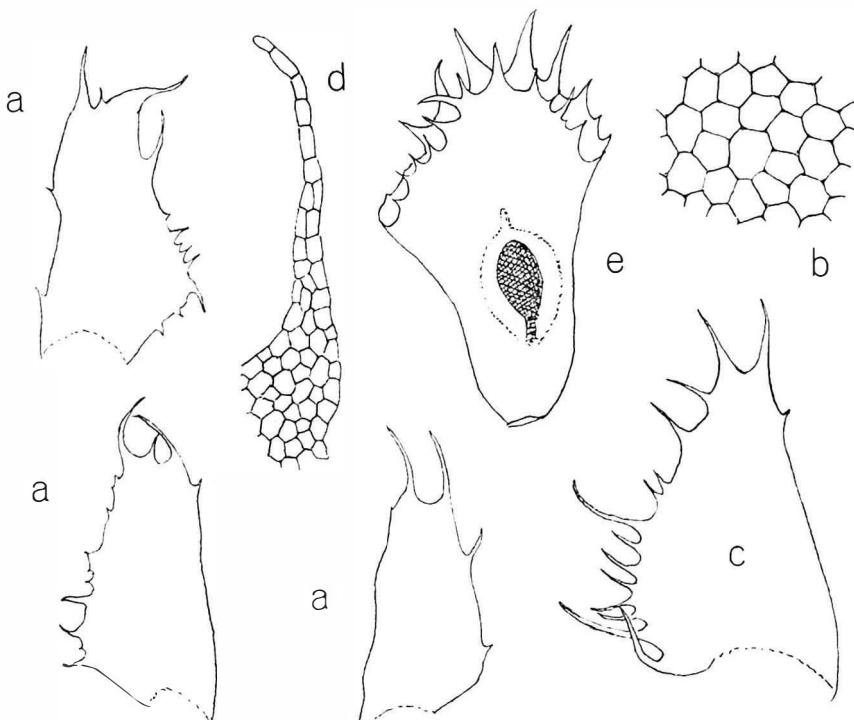


Fig. 5. ***Plagiochila subacanthophylla* Herz., n. sp.** a. Stengelblätter, $\times 18$. b. Zellen der Blattmitte, $\times 180$. c. Involucralblatt, $\times 18$. d. Zahn von der Blattspitze, $\times 80$. e. Perianth, $\times 18$.

postico e basi replicata, parum ampliata arcuato, basi ipsa breviter decurrente excepta ubique fere breviter serrato, dentibus obliquis 9~10, apice obtusiusculo, parum validius paucidentato; ramalia (pinnarum) rectangulari-ovata, haud decurrentia, ca 1.1 mm longa, 0.7~0.8 mm lata, utroque margine superne apiceque obtuso breviter paucidentato; cellulae hexagonae, superae diametro 20~25 μ , basales 27 \times 45 μ metientes, ubique trigonis parvis. Involucra in pinnis et pinnulis terminalia, uno latere innovata, foliis quam caulina parum majoribus, haud decurrentibus, basi dilatato-ampliatis, margine postico a basi crebrius et grossius serrato, dentibus saepius subspinosis. Perianthium immersum, late compresso-campanulatum, anguste alatum, ala superne paucidentata, ore amplo rotundato, dense breviterque spinoso,

spinis strictiusculis. Cetera nulla.

Formosa: Daiton (erloschener Vulkan), an einem Geröllblock in einer Fels-schlucht, leg. G. H. Schwabe, 11. 1. 1947, no. 22.

Im Habitus durch die reichliche und ausgebreitete doppelte Fiederung, die ein schleierzartes Astnetz bildet, auffallend, und durch die Form der Stengel- und Astblätter sowie die kurzdornige Bewehrung der breiten Perianthmündung charak-terisiert.

Sie lässt sich weder in der Gruppe der *Ampliatae* noch *Patulae* (im Sinne Stephanis) eindeutig unterbringen.

***Plagiochila subacanthophylla* Herz., n. sp. (Fig. 5)**

Mediocris, caespitosa, obscure viridissima. Caulis ad 4 cm longus, cum foliis 4.5 mm latus, optime complanatus, sat dense pinnato-ramosus, ramis ad 1 cm longis, obtusis, dite floriferis. Folia caulina contigua, angulo ca 56° patula, basi vix ampliata, cauli parum incumbentia, 2.5 mm longa, 1 mm lata, oblongo-trigona, margine antico e basi parum decurrente substricto, subintegerrimo, margine postico parum curvato, remote paucispinoso, apice angustata, longe bilaciata, laciniis sinu obtuso divisis, setoso-elongatis; cellulae hexagonae, medianae diametro ca 30 μ , basales parum majores, trigonis nullis, chlorophyllosae, laciniarum ultimae uni-seriatae, 50~60 μ longae, quam maxime 20 μ latae. Involucralia parum majora, 2.5 mm longa, 1.5 mm lata, longissime bilaciata, margine postico basin versus ampilato, ca 10-spinoso, spinis basalibus majoribus, saepius hamatis. Perianthium terminale, emersum, elongate compresso-infundibulatum, labiis profunde divisis, grosse laciniatis, laciniis setoso-acuminatis. Cetera nulla.

Formosa: Im Gebirge des westlichen Mitteltaiwan, leg. G. H. Schwabe, 8. 1947, sine no.

Der *P. acanthophylla* Gott. nahestehend, vielleicht nur eine geographische Rasse derselben.

***Plagiochila tobagensis* Herz. et Hattori, n. sp. (Fig. 6)**

Pro genere mediocris, laxe caespitosa, tenella glaucescens, sicca nitidula, corticola. Caulis secundarius ad 5 cm longus, cum foliis ca 4~4.5 mm latus, complanatus, subsimplex vel sub involucro nunc uno latere innovatus vel subfasciculatus. Folia caulina recte patula, contigua, et forma et dentibus valde variabilia, nunc ovato-trigona, 2.5 mm longa, 1.5 mm lata, margine postico et apice sat crebre (8~9) grosse spinoso-dentato, nunc subrectangulata, truncata, 2 mm longa, 1 mm lata, apice tantum breviuscule dentata, dentibus 6~8 late triangulatis et utroque margine integerrimo, omnia basi postica cucullatim auriculata, auriculo crassiuscule fusiformi, *integerrimo*, cauli parallelo; cellulae superae diametro 30~36 μ , trigonis nullis, basales 36×55~45×70 μ metientes, trigonis parvis, sat pellucidae, parce chlorophyllosae. Amphigastria nulla. Falia involucralia distincte majora, late ovato-rectangulata, circumcirca fere dite spinoso-dentata, dentibus strictis vel hamatis, auriculo ciliato; amphigastrium florale inconspicuum, ad 500 μ longum, e basi elliptica longe setosum. Perianthium (juvenile) late campanulatum, compressum, ore dense breviterque spinoso, dorso dentato-alatum. Cetera nulla.

Botel Tabago: Auf Baumwurzeln, 100~120 m, leg. G. H. Schwabe, 5. 6. 1947, no. 120.

Die neue Art steht der *P. miokensis* Steph. sehr nahe und unterscheidet sich

fast nur durch die wesentlich grösseren Blattzellen. Dieselben werden für *P. miokensis* von Stephani mit $27 \times 27 \mu$ (obere B. zellen) angegeben, bei unserer Art von Botel Tobago messen sie oben im Durchschnitt $30 \sim 36 \mu$, an der Basis bis $45 \times$

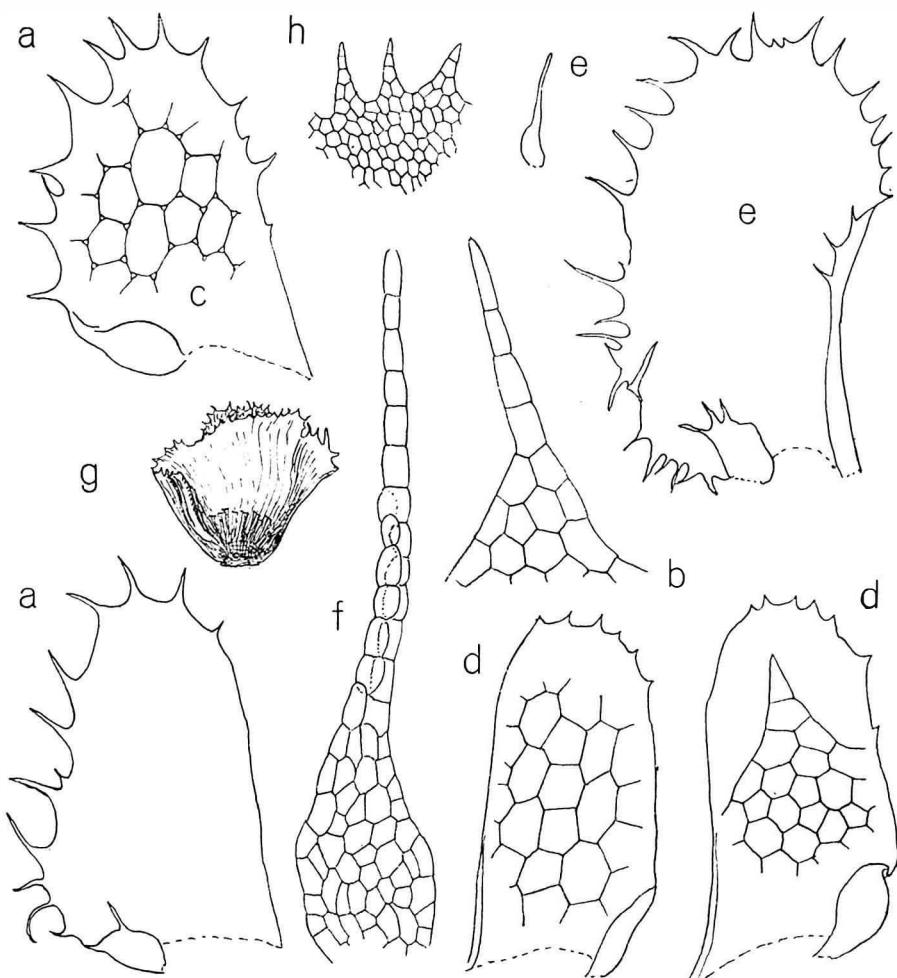


Fig. 6. *Plagiochila tobagensis* Herz. et Hatt., n. sp. a. Stengelblätter, $\times 22$. b. Zellen des Blattrandes, $\times 160$. c. Basalzellen, $\times 160$. (a~c, no. 126) -fo. *brevidens*. d. Stengelblätter, $\times 22$; Zellen, $\times 160$. e. Involucralblatt und I. amphigastrium, $\times 22$. f. Involucralamphigastrium, $\times 160$. g. Perianth, $\times 12$. h. Zähne der Perianthmündung, $\times 80$. (d~h, no. 78)

70μ . Übereinstimmend ist der *glatte*, aufgeblasene Wassersack und das Fehlen von wohlentwickelten Amphigastrien, die sonst bei den meisten *Cucullatae* vorkommen. Für *P. miokensis* werden zwar "amphigastria rudimentaria" angegeben. Bei *P. tobagensis* tritt ein Amphigastrium erst im Involucralkreis auf. Bei beiden ist ein gezähnter Perianthflügel zu beobachten. Diese Übereinstimmungen machen eine nahe Verwandtschaft wahrscheinlich.

** *Clasmatocolea innovata* Herz., n. sp. (Fig. 7)

Dioica (σ haud visa); caespitosa, depressa, brunnea, terricola, hygrophila. Caulis vix 10 mm longus, rhizoidibus fasciculatis, pallidis, longis arcte repens, hic illic, praesertim sub flore fasciculato-ramosus, flagellis microphyllis, brevibus obviis. Folia caulinaria contigua vel subremota, subpiana vel apice reclinata, late inserta, subrotunda, integerrima, diametro ca 1 mm; cellulae laxae, hexagonae, margine diametro ca

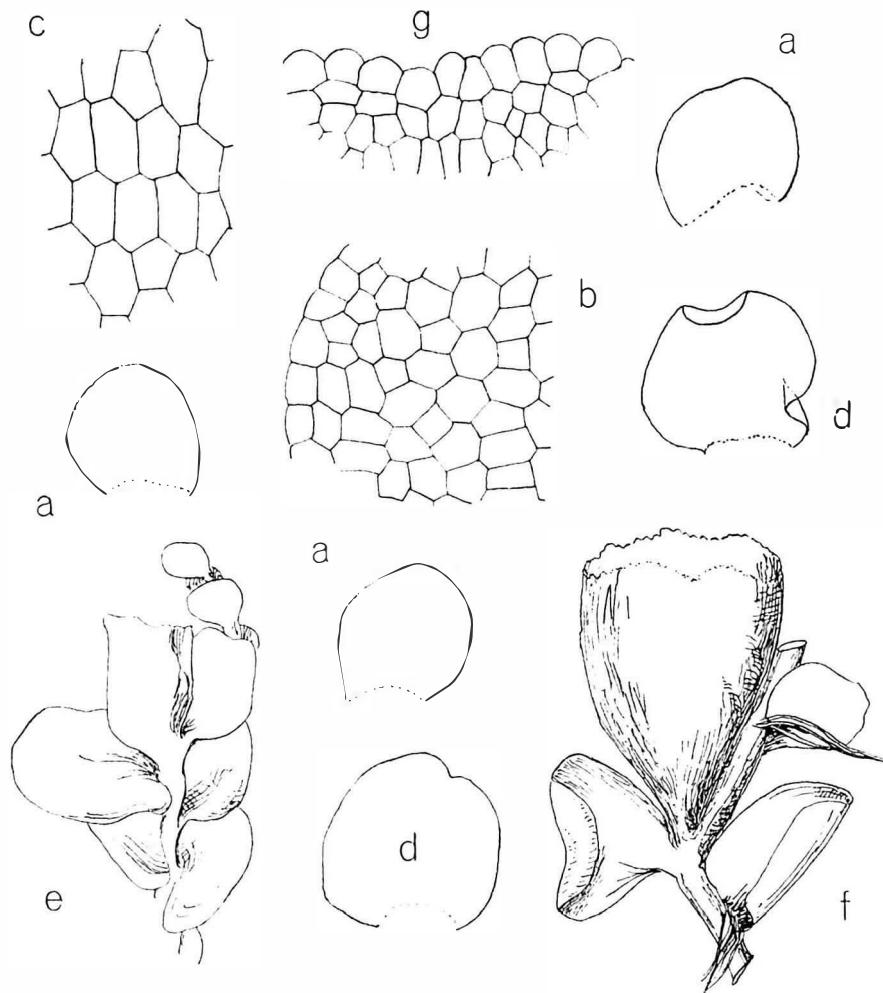


Fig. 7. *Clasmatocolea innovata* Herz., n. sp. a. Blätter, $\times 18$. b. Blattzellen oben und am Rand, $\times 180$. c. Basale Blattzellen, $\times 180$. d. Involucralblätter, $\times 18$. e. Stengel mit Perianth und Innovation, $\times 18$. f. Perianth und Innovation, $\times 36$. g. Perianthmündung, $\times 180$.

30μ , medianae $35 \times 50 \sim 60 \mu$ metientes, basales parum maiores, leptodermes, trigonis nullis, laevissimae, pellucidae. Amphigastria nulla. Involucrum uno vel utroque latere innovatum, late apertum, foliis semiamplectantibus, subrotundis, diametro

ad 1.3 mm, apice leviter retusis vel reclinatis, cellulis medianis 60~80 μ longis, 36~40 μ latis. Perianthium exsertum, breviter obovatum, 1 mm longum, 0.8 mm latum, campanulatum, juvenile subglobosum, obtuse pluriplicatum, archegoniis numerosis (ad 20), adultum indistincte plicatum vel irregulariter impressum, ore truncato, subrepando, celluloso-crenulato.

Formosa: Karobetsu, am Bachrand, 100 m, leg. G. H. Schwabe, 2. 1. 1947, no. 20.

Die neue Art zeichnet sich gegenüber den andern, wenigen Arten der Gattung, die sich nach Stephanis Diagnose durch das *Fehlen* von Übergipfelungen des Perianthes auszeichnet, gerade durch das regelmässige Auftreten von öfters sogar beidseitigen Innovationen aus, ist ferner von der wohl ähnlichen, amphigastrienslosen *C. japonica* Steph. (msc.) durch den dioecischen Blütenstand unterschieden. Eigenartig scheint auch die durch papulos vortretende Zellen zierlich gekerbte Perianthmündung zu sein.

Lophocoleaceae

Heteroscyphus argutus (Nees) Schiffn. var. ***brevidens*** Schiffn. -Botel Tobago: Auf Rinde, no. 119 pp.

Heteroscyphus saccogynoides Herz., n. sp. (Fig. 8)

Dioicus; gracilis, minor, laxe caespitosus, viridis, nigricans, terricolus, hygrophilus. Caulis paucos centimetros longus, arcte repens, debilis, filiformis, parum ramosus, cum foliis 1.4 mm latus. Folia caulina subopposita, planissime disticha, contigua vel parum tegentia, longitudinaliter fere late inserta, subquadrato-rotundata, subtruncata, 600~700 μ longa et lata, integerrima; cellulae hexagonae, superae diametro ca 25 μ , medianae et basales ca 40 μ , leptodermes, trigonis nullis, reti cellularum sat aequali, opaco, densissime minutim punctulato-asperulo. Amphigastria caulina minuta, remota, libera, ad basin fere bifida, lacinii linearibus, subulatis ad 300 μ longis, porrectis, sinu intermedio lunato, margine basali breviter unispinoso, dente recte patulo. Involucralia in ramulo brevissimo fere sessilia, lateralia, repetita, quasi penicillato-spinulosa. Folia involucralia ad 4/5 bifida, lacinii lanceolatis, grosse dentatis et basi appendiculatis, appendiculis filiformibus, interdum furcatis. Perianthium (juvenile) trilobatum, lobis profunde divisis, bifidis et irregulariter spinoso-dentatis. Androecia ignota.

Kwashyoto: In feucht-schattiger Bachrinne, leg. G. H. Schwabe, no. 62; Botel Tobago: Beim Wasserfall, 100 m, leg. G. H. Schwabe, 3. 6. 1947, no. 80.

Die neue Art dürfte sich verwandtschaftlich eng an *Heteroscyphus argutus* anschliessen, unterscheidet sich aber durch völlig ganzrandige Blätter und die fein papillöse Cuticula.

Heteroscyphus zollingeri (G.) Schiffn. fo. ***pluridentata*** Herz. -Differt dentibus apicalibus copiosis. -Formosa: sine no. -Botel Tobago: Kamm, 380~400 m, no. 113.

Heteroscyphus bescherellei (St.) Hatt. -Formosa: Daiton (fo. *tenella*), sine no. -Botel Tobago: Wasserfall, 100 m, no. 80 und 85 (ster.), no. 119 pp., ♂.

* ***Chiloscyphus aselliformis*** Nees var. ***neesii*** Schiffn. -Formosa: loco incerto, sine no. (äußerst spärlich, unter Abfällen).

Calypogeiaeae

* ***Calypogeia fissa*** (L.) Raddi -Formosa: Daiton, auf Erde, spärlich zwischen andern Moosen. Eine schmächtige Form mit schmäleren, fast drei-eckigen Blättern

und 1-zelligen Blattzipfeln.

Lepidoziaceae

* *Bazzania tridens* Nees -Botel Tobago: Hangwald, 150~380 m, no. 116, Formosa: loco incerto. Die vorliegenden Exemplare scheinen sich nur durch die hyalinen Amphigastrien zu unterscheiden.

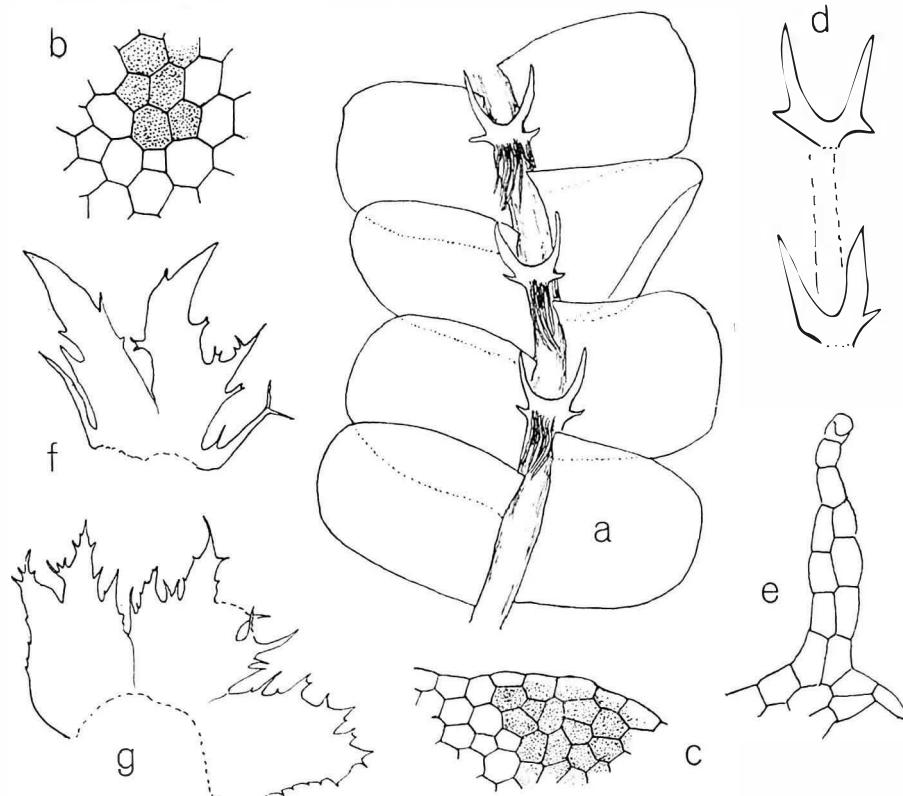


Fig. 8. *Heteroscyphus saccogynoides* Herz., n. sp. a. Stengelstück, $\times 36$. b. Blattzellnetz, Mitte, $\times 160$. c. Blattzellen des Randes, $\times 160$. d. Stengelamphigastrien in Abstand, $\times 44$. e. Amphigastriumzipfel, $\times 160$. f. Involucralblatt, $\times 36$. g. Junges Perianth, $\times 80$.

Bazzania aequitexta Herz., n. sp. (Fig. 9)

Sterilis; major, sat robusta, caespitosa, late expansa, obscure viridis, leviter vernicosa. Caulis 3~5 cm longus, furcatus, flagellis numerosis, ad 2 cm longis, capillaceis, cum foliis 3 mm latus. Folia caulina opposita, leviter imbricata, plane disticha, ad 1.5 mm longa, supra basin 0.5 mm lata, e basi subovata leviter falcato-oblonga, margine antico basi arcuato, utrinque sensim angustata, apice 200~260 μ lato, tridentata, dentibus validis, porrectis vel leviter divergentibus, triangulatis, acutis vel apiculatis, dente mediano vulgo majore; cellulae ubique fere aequales, densissimae, diametro 20~25 vel 20~27 μ metentes, leptodermes, trigonis validis, hic illic confluentibus, chlorophylloso-opacae, basales paucae 36×40 μ metentes, minus opacae, trigonis similibus, aream propriam haud sistentes. Amphigastria libera, parva, caulis latitudinem vix superantia, 180~200 μ longa, 250~300 μ lata,

transverse inserta, appressa, apice late truncato irregulariter plurifissa et margine basali denticulata, reti cellularum foliari simillimo, densissimo, obscurō, id est chlorophylloso-opaco.

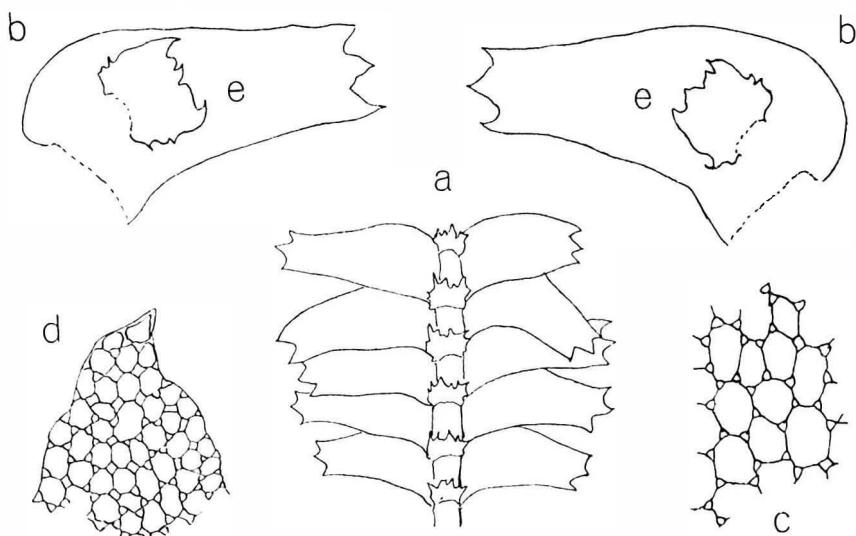


Fig. 9. *Bazzania aquitexta* Herz., n. sp. a. Stengelstück, $\times 22$. b. Stengelblätter, $\times 22$. c. Basalzellen, $\times 160$. d. Mittelzahn, $\times 160$. e. Stengelamphigastrien, $\times 22$.

Formosa: Im Gebirge des westlichen Mitteltaiwan anscheinend häufig, sine no.; Botel Tobago: loco incerto parcissime, leg. G. H. Schwabe, 1947.

Charakteristisch durch das dichte, fast im ganzen Blatt gleichartige Zellnetz und die kleinen, völlig unverbundenen und bis zu 1 Drittel geschlitzten, dicht chlorophyllösen und kleinzelligen Amphigastrien.

* *Lepidozia gonyotricha* Sande -Formosa: Daiton, spärlich zwischen anderen Erdmoosen, no. 22 und 23 pp., ♂.

* *Lepidozia wallichiana* Gott. -Botel Tobago: An Baumfarn, 300~400 m, spärlich, no. 116 pp. und 117.

Trichocoleaceae

Trichocolea pluma Mont. -Formosa: Im Gebirge des westlichen Mitteltaiwan, ohne Fundortsangabe.

Radulaceae

* *Radula apiculata* Sde. Lac. -Botel Tobago: Kamm, 380~400 m, an Borke, no. 115.

Radula lindbergiana Gott. -Botel Tobago: Hangwald, 150~380 m, no. 116 pp., Bachthal, 100~120 m, no. 120 pp.

Frullaniaceae

Jubula hutchinsiae subsp. *javanica* (St.) Verd. fo. *integerrima* -Botel Tabago: Gipfelregion, 460 m, no. 126 pp.

Frullania squarrosa (Rw. Bl. N.) Dum. -Formosa: Taipeh, Strauch beim Wasserreservoir, no. 9; Karobetsu, 300 m, no. 13 und 15. (det. Hattori)

Frullania tamsuina St. -Botel Tobago: An *Clerodendron* des Talwaldes, no. 98; Kwashyoto: Nähe des Strandes, an Feldumfassungsmauern, no. 57. (det. Hattori)

* *Frullania moniliata* subsp. *breviramea* (St.) Verd. -Formosa: Daiton, an Stein, 600 m, no. 39. (det Hattori)

* *Frullania alstoni* Verd. (=Fr. aoshimensis Horikawa ?) -Botel Tobago: Kamm, 380~400 m, an Borken, no. 115. -Eine Form mit sehr regelmässig gefiedertem Stengel.

Lejeuneaceae

* *Archilejeunea mariana* (G.) St. -Formosa: Urai, an Citrusstämmen; Botel Tobago: Hangwald 150~380 m, no. 116, 300~400 m, auf Rinde, no. 114 und 115; Kwashyoto: Bachrinne, no. 62. -Diese Art scheint sehr verbreitet zu sein.

Leucolejeunea xanthocarpa (L. et L.) Evans. -Formosa: Taipeh, Wasserreservoir.

Lopholejeunea schwabei Herz., n. sp. (Fig. 10, a~e)

Sterilis; sat robusta, stratificata, nigricans, subvernícosa, corticola. Caulis ad 2 cm longus, cum foliis ad 1200 μ latus, stricte elongatus, vix ramosus. Folia cauliná recte patula, concaviuscula, laxe imbricata, lata basi inserta, dorso caulem parum tegentia, 800 μ longa, 600 μ lata, ovato-rotundata, subfalcata, integerrima, margine circumcirca angustissime reflexa, margine antico e basi truncata alte arcuato, postico absque lobulo aequaliter arcuato; cellulae superae 18×27 vel 25×25 μ , basales 32×40 μ metientes, trigonis et nodulis intermediis ubique validis; lobulus folio subtriplo brevior, ovatus, angustatus, inflatus, subsaccatus, apice oblique truncatus ibique margine anguste applanato, angulo obtuso, carina valde arcuata, sinu profundo in marginem folii excurrente. Amphigastria cauliná magna, caule sextuplo latiora, anguste sinuatim inserta, oblata, transverse elliptica, 600 μ lata, 400 μ longa, planissima. Cetera nulla.

Botel Tobago: Gipfelregion, 450 m, im dichten Wald, anf Rinde, leg. G. H. Schwabe, 5. 6. 1947, no. 126.

Der *L. eulopha* in Gesamterscheinung und Zellgrösse sehr ähnlich, aber nicht nur durch die im allgemeinen kleineren Amphigastrien, sondern auch durch die subfalcat-rotunden Blätter mit rings schmal eingeschlagenem Rand und die stark verdickten Zellecken wohl verschieden; vielleicht in ihren weiteren Formenkreis gehörig. Die völlige Sterilität lässt kein sicheres Urteil gewinnen.

Lopholejeunea mitis Herz., n. sp. (Fig. 10, f~k)

Monoica; inter minores gentis, appressa, viridissima, corticola. Caulis ad 10 mm longus, cum foliis ad 900 μ latus, dite ramosus, ramis ♂ copiosis, arcte repens. Folia cauliná lata basi inserta, recte patula, contigua vel leviter imbricata, planissima, elliptica, obtusata, integerrima, 420 μ longa, ad 400 μ lata; cellulae ubique fere aequales, hexagonae, diametro ca 17 μ , parietibus tenuissimis, trigonis nullis, chlorophyllosae; lobulus folio subquadruplo vel triplo brevior, subovatus, in situ basi inflatus, apice attenuatus, in plano breviter rubrectangulatus, angulo obtuso, carina vix arcuata, substricta in folii marginem excurrente, saepius obsoletus. Amphigastria cauliná parva, remota, leviter sinuatim inserta, rotundato-reniformia, oblata, 200 μ longa, 350 μ lata. Involucrum terminale, foliis oblongo-spathulatis,

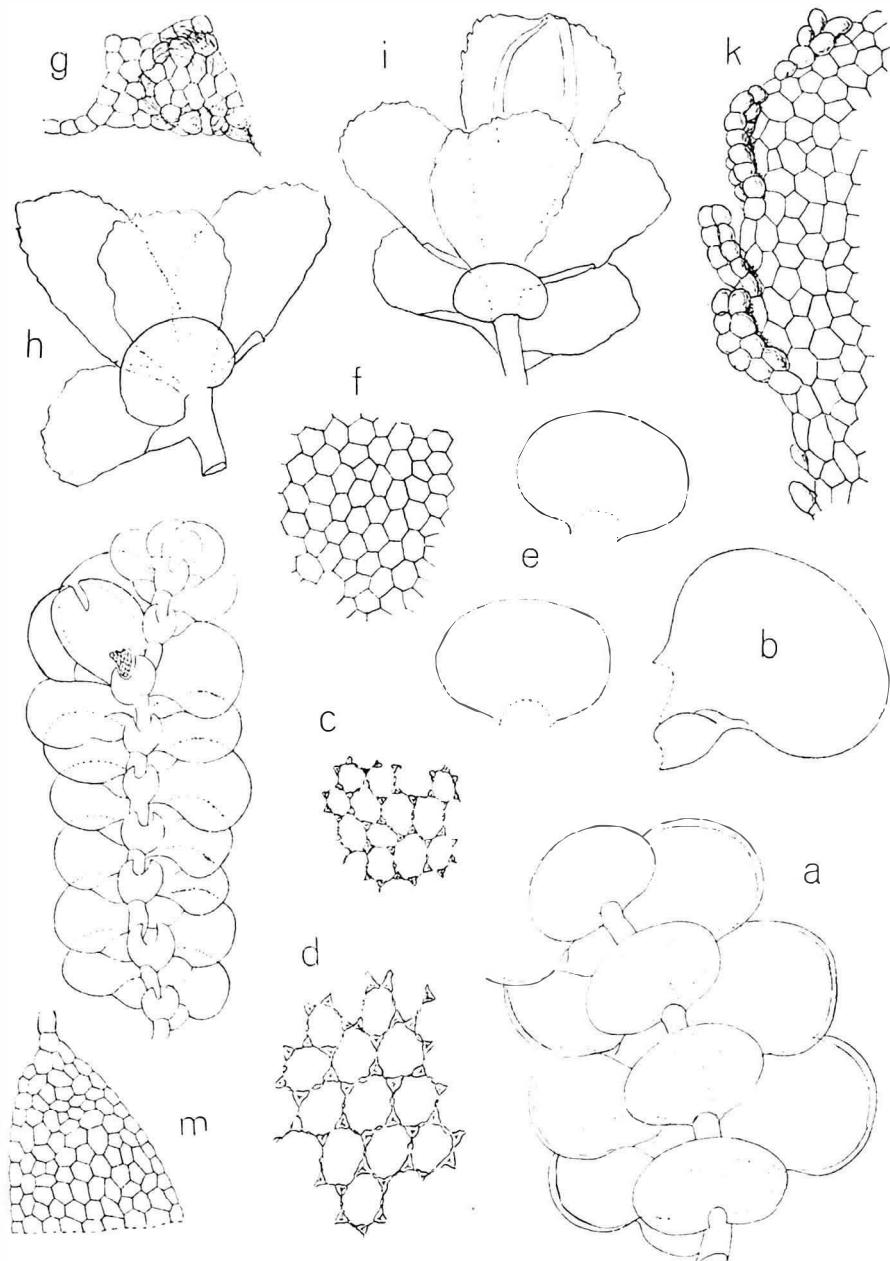


Fig. 10. a~e. *Lopholejeunea schwabeana* Herz., n. sp. a. Stengelstück, $\times 18$. b. Stengelblatt, $\times 36$. c. Blattzellnetz oben, $\times 180$. d. Basales Blattzellnetz, $\times 180$. e. Stengelamphigastrien, $\times 36$. f~k. *Lopholejeunea mitis* Herz., n. sp. f. Blattzellnetz, $\times 180$. g. Lobulus, $\times 180$. h. Involucrum, $\times 36$. i. Perianth, $\times 36$. k. Zotten der Perianthkante, $\times 180$. l~m. *Cheilolejeunea subrotunda* Herz., n. sp. l. Habitus, $\times 36$. m. Lobulus, $\times 180$.

subtruncatis, superne irregulariter crenato-dentatis, quasi erosio, lobulo 4-plo breviore, angustissime linearis, haud soluto; amphigastrium florale subaequilongum, spathulato-subrotundum, ubique fere margine erosulo. Perianthium alte emersum, aeguste obcordatum, carinis lateralibus anguste vel vix alatis, villis brevibus, e seriebus 2 cellularum exstructis, ad 5 cellulas longis, obtusis parce denticulatis. Androecia creberrima, elongata, terminalia vel intermedia, diandra.

Botel Tobago: Auf Baunwurzel in schattigem Bachbett, leg. G. H. Schwabe, 2. 6. 1947, no. 72, mit *Cheilolejeunea subrotunda*, n. sp.

Characteristisch sind für die neue Art ihr zarter Wuchs, Kleinheit aller Teile, die kleinen, sehr dünnen Blattzellen, die ausgefressen gezähnten Involucralblätter und das merkwürdig sparsam bewehrte Perianth, dessen Flügelkanten nicht geschart sind, sondern kurze Zotten, ähnlich den Drüsenhaaren der Compositen, tragen. Eine bemerkenswerte neue Art!

***Brachiolejeunea sandvicensis* (G.) Evans** -Formosa: Taipeh, Strauch beim Wasserreservoir, no. 8, Urai, in Citruspflanzung an Steinen, Osthang 270 m, no. 2; Shinko, an der Borke eines grossen *Artocarpus integrifolius* am Dorfrand, no. 52; Botel Tobago: Ausgang des Tales, an Stein, ca 50 m, no. 95. -Wohl allgemein an Rinde verbreitet.

** ***Priono (?)-lejeunea unguis* Herz., n. sp. (Fig. 11, a~g)**

Dioica videtur (φ tantum visa); gracillima, filiformis, aliis hepaticis irrepens, plane intricata, viridula. Caulis a basi divisus, ramis longissimis, parallelis, 500 μ iatis, insuper breviter pinnulatis, pinnulis floriferis. Folia caulina oblique patula, contigua, 250 μ longa, 230 μ lata, planiuscula, e basi late inserta subovata, in apiculum leviter plano-hamatum desinentia quasi unguis, margine antico indistincte repando vel erosulo, ceterum integerrima; cellulae marginales ca 12 μ longae et latae, medianae diametro 16~18 μ , basales 25 μ longae, 20 μ latae, hexagonae, trigonis nullis; lobulus folio subtriplo brevior, ovatus, apice truncato, angulo mamiliiformi, sub apice leviter constrictus, carina oblique ascendente, leviter arcuata vel indistincte papulosa, levi sinu in folii marginem excurrente. Amphigastria caulina remota, transverse inserta, caule subtriplo latiora, ad medium bifida, lobis porrectis, anguste triangulatis, breviter apiculatis, sinu acuto; amphigastria ramulina angustiora, caule vix duplo latiora, infra medium bifida, laciniis anguste lanceolatis, subulatis, hic illic margine angulatis. Folia involucralia anguste elliptica, majora, apiculata, subrepanda, lobulo 2/3 folii aequante, infra medium soluto, latiuscula rectangulari, truncato, angulo apiculato; amphigastrium ad medium bifidum, laciniis breviter subulatis, margine subdentatis.

Formosa: loco incerto, sine no.; Botel Tobago: Kamm, 380~400 m, an Borke, leg. G. H. Schwabe, 5. 6. 1947, no. 115-Typus.

Diese sterile *Lejeunea* ist trotz ihres charakteristischen Habitus gattungsmässig nicht sicher einzureihen, aber sicher verschieden von allen bisher beschriebenen und abgebildeten Lejeuneen. Die meisten Gattungen sind wegen der Kombination ihrer Merkmale in Blattform, Zellnetz und Amphigastrien ausgeschieden. Am ehesten erinnert unsre Art, auch im Habitus, an die südamerikanische *Prionolejeunea fabroniae-folia* Spr., steht aber in der Gattung durch die nur angedeutete Randzähnelung der Blätter isoliert. Erst die Auffindung der Perianthien kann die Frage der Gattungszugehörigkeit entscheiden.

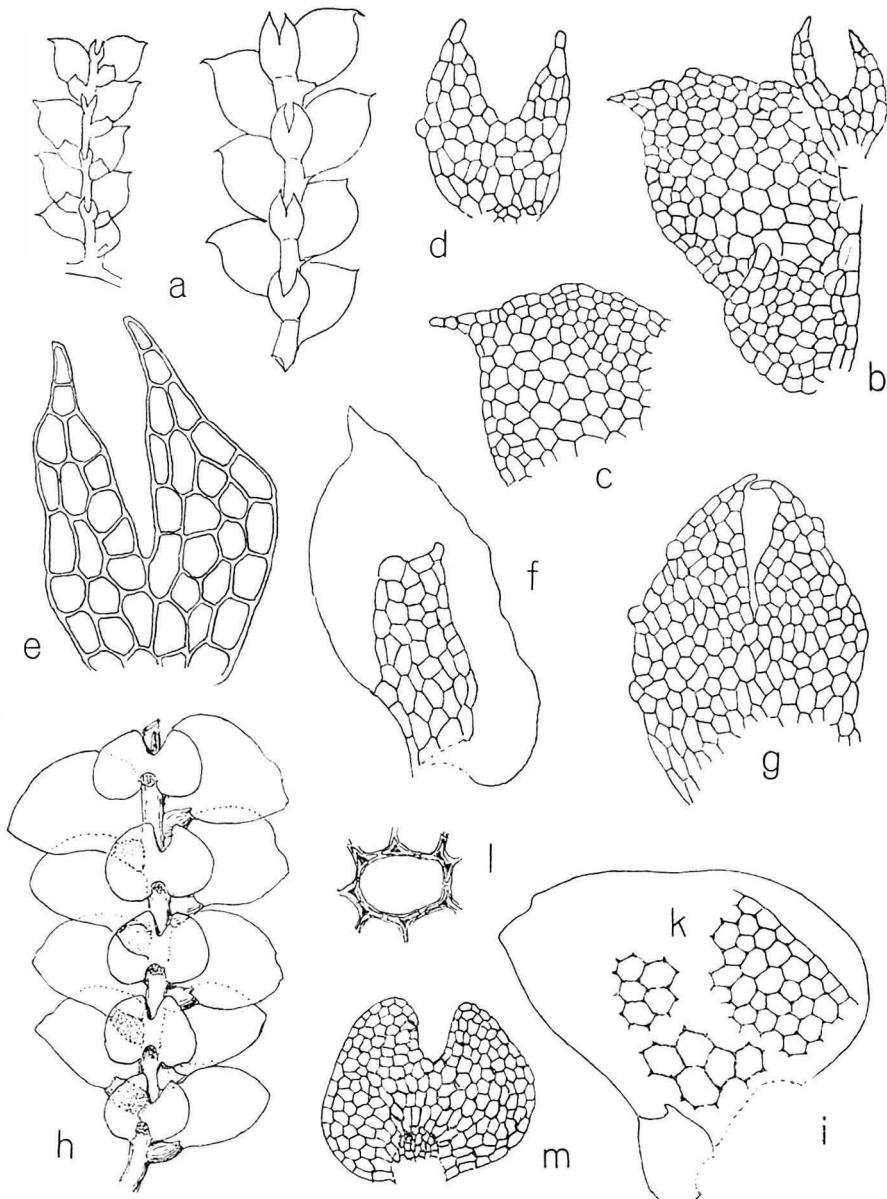


Fig. 11. a~g. *Prionolejeunea (?) unguis* Herz., n. sp. a. Stengelstücke, $\times 36$ und $\times 44$. b. Stengelblatt und Amphigastrium, $\times 160$. c. Blattspitze, $\times 160$. d. Stengelamphigastrium, $\times 160$. e. St. amphigastrium, $\times 360$. f. Involucralblatt, $\times 180$. g. Involucralamphigastrium, $\times 160$. h~m. *Ceratolejeunea exocellata* Herz., n. sp. h. Stengelstück, $\times 36$. i. Stengelblatt, $\times 90$. k. Blattzellnetze, $\times 180$. l. Zelle der Blattbasis, $\times 360$. m. Stengelamphigastrium, $\times 90$.

Drepanolejeunea dactylophora Spruce -Formosa: loco incerto; Botel Tobago: Auf *Hymenophyllum*.

* *Drepanolejeunea filicuspes* St. -Botel Tobago: An Borke, 380~400 m, sehr spärlich zwischen *Archilejeunea mariana*, *Microlejeunea sundaica*, *Pycnolejeunea ceylanica* und *Frullania alstoni*, no. 115 pp.

* *Drepanolejeunea ternatensis* (G.) var. *lancispina* Herz. (= *D. tenuis* var. *unidentata* Horikawa) -Botel Tobago: An Borke zwischen andern Hepaticae, no. 115 pp.

* *Leptolejeunea epiphylla* (Mitt.) -Botel Tobago: Farnblätter in Bachtal, 150 m, no. 118 pp.

* *Leptolejeunea radiata* (Mitt.) -Botel Tobago: Farnblätter in Bachtal, 150 m, no. 118.

Leptolejeunea subacuta St. -Botel Tobago: Auf *Hymenophyllum*, forma ad *L. subrotundifoliam* Herz. vergens. -Formosa: Daiton, auf *Makednothallus isoblastus* Herz.

** *Ceratolejeunea exocellata* Herz., n. sp. (Fig. 11, h~m)

Sterilis (frustulum unicum oppetebat, tamen certe diversum, species propria); brunnea. Caulis ca 15 mm longus, simplex, cum foliis ad 1000 μ latus. Folia caulinia leviter imbricata, late falcato-ovata, late inserta, margine antico e basi alte arcuata ad apicem parce eroso-denticulatum regulariter curvato, integerrimo, apice late triangulato, margine postico absque lobulo ad apicem leviter sinuato dein ad apicem recurrente, ca 500 μ longa, 400 μ lata; cellulae marginales 12 \times 18 μ metientes, medianae optime hexagonae, diametro 20~22 μ , basales ad 25 \times 30 μ metientes, trigonis modicis, breviter trabeculatis, ocellis omnino nullis; lobulus folio quadruplo brevior, ovatus, apice quam basi duplo angustior, emarginatus, angulo apiculato, carina e basi valde arcuata oblique ascendentе, sinu levi in folii marginem excurrente. Amphigastria approximata, magna, caule quintuplo latiora, 300 μ lata, 250 μ longa, reniformi- vel orbiculari-cordata, sinuatim inserta, ad medium biloba, lobis late triangulatis, obtusis, subconniventibus, sinu sat angusto, attamen obtuso. Cetera desunt.

Botel Tobago: loco incerto, leg. G. H. Schwabe, 1947.

Durch Blatt- und Amphigastrienform sowie das völlige Fehlen von Ocellen auch ohne Perianth gut characterisierte Art! Auch gut von der annamitischen, ocellenlosen *C. emarginata* St. verschieden.

** *Taxilejeunea luzonensis* St. (Fig. 12) -Formosa: Im Gebirge, loco incerto.

Taxilejeunea subcompressiuscula Herz., n. sp. ad interim. -Differt a *T. compressiuscula* (Lindb.) St. inflorescencia dioica et magnitudine. An der Typuspflanze von *T. compressiuscula* Lindb. konnte die Angabe "autoica" nicht sicher nachgewiesen werden. Von H. Eifrig als *T. compressiuscula* bestimmte Pflanzen sind aber auch grösstenteils diöcisch und mit meiner interimistischen *T. subcompressiuscula* wohl identisch. -Formosa: Bianitzu, 1400~1500 m, an Bäumen, leg. G. H. Schwabe, 8. 1947.

Pycnolejeunea ceylanica (G.) -Botel Tobago: Kamm, 300~400 m, an Borke, no. 115 pp.

Pycnolejeunea imbricata (Nees) -Botel Tobago: 300~400 m, an Borke, mit voriger Art, no. 114 und 115. -Die vorliegende Form erinnert durch Gestalt und Grösse des Lobulus sowie den kräftigen Eckdorn an *P. okamurana* St. Dooh

scheint diese Art in den Formenkreis von *P. imbricata* zu gehören.

** *Cheilolejeunea subrotunda* Herz., n. sp. (Fig. 10, l~m)

Dioica; parva, appressa, dilute flavo-virens, corticola. Caulis 1 cm vix superans, cum foliis nec 1 mm latus, parum ramosus, rhizodium fasciculis affixus, complanatus. Folia caulinca ca 420 μ longa, 400 μ lata, late inserta, imbricata, subfalcato-rotunda, planissima, integerrima; cellulæ optime hexagonae, ubique fere aequales,

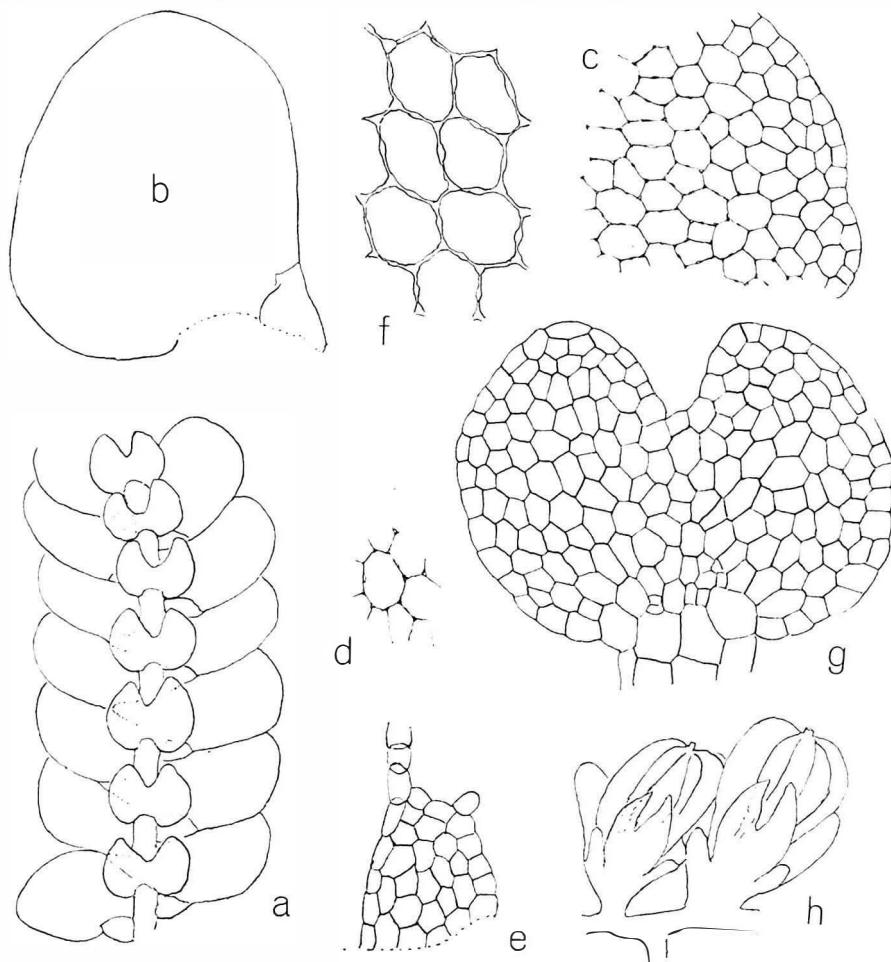


Fig. 12. *Texilejeunea luzonensis* St. a. Stengelstück, $\times 36$. b. Stengelblatt, $\times 90$. c. Blattrand, $\times 180$. d. Basale Blattzellen, $\times 180$. e. Lobulus, $\times 180$. f. Blattzellen, $\times 360$. g. Stengelamphigastrium, $\times 180$. h. Perianthien, $\times 36$.

diametro ca 18 μ , marginales tantum distincte minores, diametro 10 μ , subquadratae, omnes parietibus validis, strictis, trigonis nullis, angulo chlorophylloso subopacae; lobulus folio duplo brevior, in situ ovato-trigonus, valde inflatus, apice oblique truncatus, angulo obtuso, carina oblique ascendentе, parum arcuata, sinu sat aperto in folii marginem excurrente. Amphigastria caulinca majuscula, caule 3~4-plo

latiora, leviter sinuatim inserta, vix decurrentia, subrotunda, ad medium biloba, lobis porrectis vel parum divergentibus, basi 9 cellulas latis, obtusis, sinu acuto, angusto vel ampliore. Involucra uno latere innovata, foliis quam caulina parum majora, obovato-subrotunda, lobulo vix dimidium folium aequante, haud soluto, angulo obtuso; amphigastrium florale subaequilongum, spathulato-obovatum, ad 1/3 bilobum, lobis porrectis, obtusis, sinu angusto, acuto. Perianthium (subdeletum) complanatum, obcordatum, rostro brevi (?).

Botel Tobago: Baumwurzel in schattigem Bachbett, leg. G. H. Schwabe, 2. 6. 1947, no. 72 pp.

Eine unbedingt sichere Zugehörigkeit zu *Cheilolejeunea* kann nicht gewährleistet werden, da die distale Stellung der Lobuluspapille nicht beobachtet werden konnte. Der allgemeine Habitus, Form und Abplattung des Perianthes, Zellnetz und Amphigastrien erinnern aber am meisten an andre *Cheilolejeunea*-arten.

** *Rectolejeunea barbata* Herz., n. sp. (Fig. 13, a~f)

Monoica: gracillima, tenerrima, viridula, corticola, aliis hepaticis intermixta. Caulis ad 8 mm longus, cum foliis ad 600 μ latus, irregulariter ramosus. Folia caulina sat plane patentia vel parum convexa, sat late inserta, angulo subrecto patula, contigua vel parum tegentia, late ovata, integerrima, margine antico basi valde arcuato, apice rotundato, margine postico substricto, ca 400 μ longa, 300 μ lata; cellulae marginales 10 \times 20 μ metientes, oblatae, medianae optime hexagonae, diametro ca 20~22 μ , parietibus teneris, trigonis nullis, basales 25 \times 40 μ metientes, trigonis et nodulis intermediis minutis; lobulus 1/3 folii aequans, late patens, subrectangularius, recte truncatus, angulo vix apiculato, papilla proximali, carina subrecte patula, parum arcuata, laevissima, subrecte in folii marginem excurrente. Amphigastria caulina remota, caule vix latiora, sinuatim inserta, 200~250 μ longa, infra medium bifida, laciniis porrectis vel parum conniventibus, subulatis, sinu angusto, obtusiusculo, basi rhizodium fasciculo quasi barbata. Involucrum terminale, uno latere innovatum, foliis involucralibus 3/4 perianthii aequantibus, obtusis, oblongis, lobulis 1/3 folii aequantibus, ad medium solutis, ligulatis, acutis; amphigastrium foliis subaequilongum, oblongum, lobulis parum connatum, ad medium bifidum, laciniis anguste lanceolatis, sinu acuto. Perianthium ca 400 μ longum, 380 μ latum, truncato-obcordatum, complanatum, plicis ventralibus brevissimis, dorsali subnulla, rostro brevi, debili. Androecia lateralia, breviter stipitata, ca 4-juga, monandria.

Formosa: loco incerto, leg. G. H. Schwabe, 1947, no.?

Nach dem Bau des Perianthes am ehesten zu *Rectolejeunea* zu ziehen. Der Speciesnamen wurde nach den auffallenden, in der Insertionsbucht der Amphigastrien entspringenden Rhizoidbüscheln gewählt.

Rectolejeunea obliqua Herz., n. sp. (Fig. 13, g~o)

Dioica videtur (σ haud visa); gracillima, tenerrima, viridula, corticola, aliis hepaticis intermixta. Caulis ca 8 mm longus, irregulariter et parum ramosus, cum foliis ca 400 μ latus. Folia caulina oblique patula, parum tegentia, late elliptica, latiuscule inserta, margine antico basi haud ampliato, apice rotundata, margine postico substricto, 240 μ longa, 180 μ lata; cellulae marginales 12 \times 20 μ metientes, oblatae, medianae et basales optime hexagonae, diametro 20 μ , parietibus validis, strictis, trigonis nullis; lobulus 1/3 folii aequans, oblique ascendens, ovatus, inflatus, recte truncatus, angulo obtusiusculo, carina vix arcuata, recte in folii

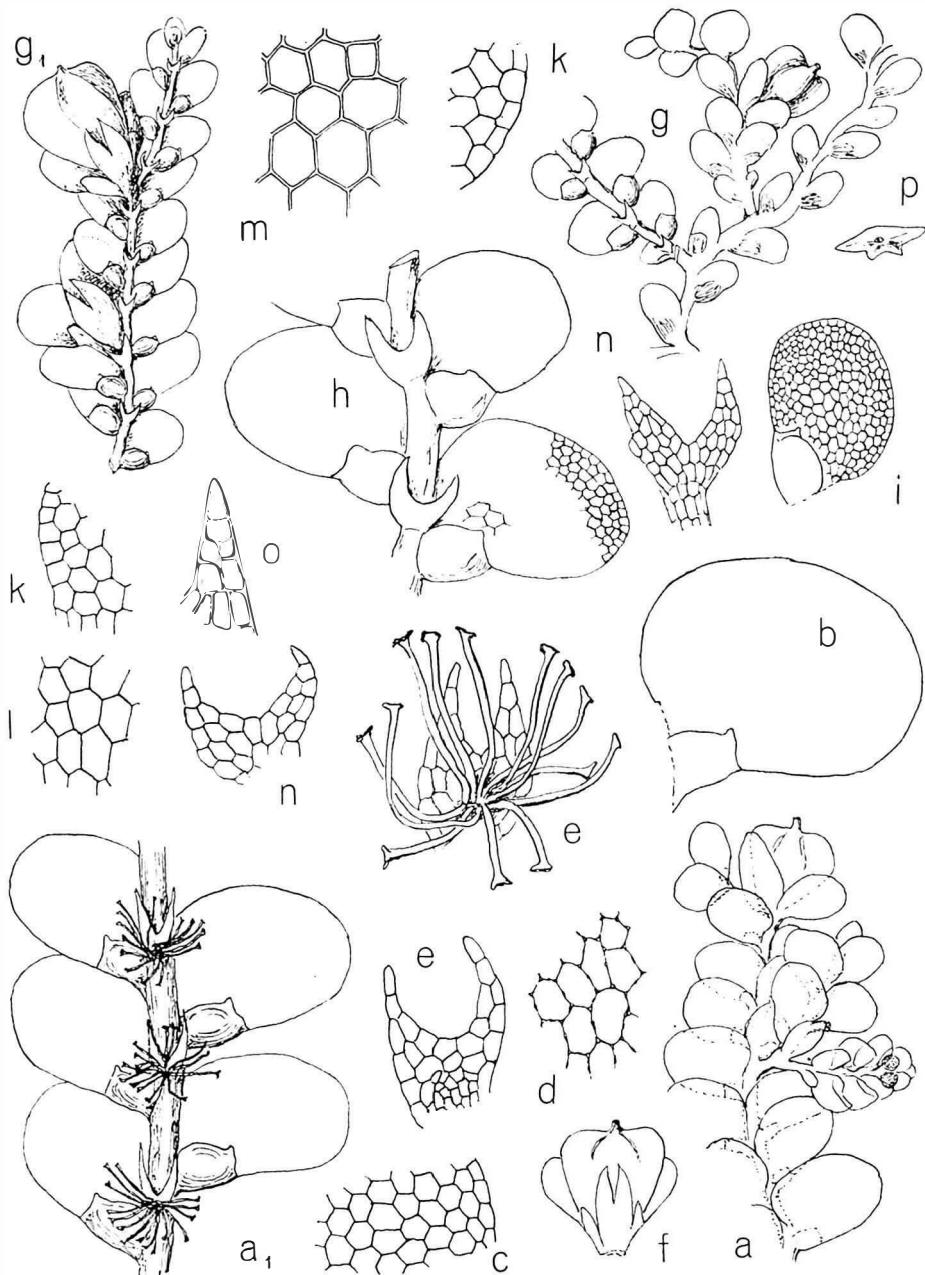


Fig. 13. a~f. *Rectolejeunea barbata* Herz., n. sp. a. und a₁. Habitus, $\times 36$ und Stengelstück, $\times 90$. b. Stengelblatt, $\times 150$. c. Blattzellnetz am Rand, $\times 180$. d. Basalzellen, $\times 180$. e. Stengelamphigastrien, $\times 180$. f. Perianth, $\times 36$. g~o. *Rectolejeunea obliqua* Herz., n. sp. g. Habitus (no. 108), $\times 36$; g₁. Habitus (no. 112-Typus), $\times 36$. h. Stengelstück (no. 108), $\times 36$. i. Stengelblatt, $\times 90$. k. Zellnetz am Blattrand, $\times 180$. l. Basalzellen, $\times 180$. m. Zellen der Blattmitte, $\times 360$. n. Stengelamphigastrien, $\times 180$. o. Amphigastriumzipfel, $\times 360$.

marginem excurrente. Amphigastria parva, remota, caule vix duplo latiora, transverse inserta, infra medium bifida, laciniis divergentibus, anguste lanceolatis, basi ad 4 cellulas latis, in unam cellulam acutissimam vel 2 superpositas exeuntibus, sinu latiusculo obtuso. Involucra uno latere innovata, hic illic 2 seriata, foliis involucralibus quam caulinis parum longioribus, oblongis, obtusis, lobulis duplo brevioribus, breviter solutis, ligulatis, obtusis; amphigastrium involucrale 3/4 foliorum aequans, oblongum, ad medium bifidum, laciniis lanceolatis, acutis, porrectis, sinu angusto, acuto, liberum. Perianthium truncato-obcordatum, complanatum, rostro brevi, ad 500 μ latum, 450 μ longum.

Botel Tobago: loco incerto, leg. G. H. Schwabe, 5. 6. 1947, no. 112 pp.

Der vorigen Art nahestehend, aber verschieden durch die schiefe Stellung der Stengelblätter, Amphigastrienform und wahrscheinlich den diözischen Blütenstand, der jedoch wegen der Spärlichkeit des Materials nicht feststeht.

Ebenfalls von Botel Tobago stammende Exemplare (no. 108), können nicht mit Sicherheit zugerechnet werden, stimmen aber in Amphigastrien und Perianth überein. (Fig. 13, g, h)

* *Lejeunea flava* Sw. -Formosa: Urai, an Citrusstämmen, no. 1; im Gebirge des westlichen Mitteltaiwan, an Bäumen, 1400~1500 m. sine no.

Lejeunea proliferans Herz., n. sp. (Fig. 15, a~d)

Sterilis; gracillima, tenerrima, viridula, corticola, aliis hepaticis intermixta. Caulis filiformis, vix ramosus, ad 5 mm longus, cum foliis ca 400 μ latus. Folia caulinia subremota, ca 200 μ longa, 130 μ lata, planissima, antice caulem vix tegentia, falcato-ovata vel paulum oblongo-ovata, integerrima vel indistincte papulosa, saepius e margine lobos sat magnos, irregulares, fragiles (propagula?) emittentia, inde deformia; cellulae medianae hexagonae, diametro ca 22~27 μ , marginales vix minores, basales indistincte majores, tenerrimae, pellucidae, trigonis nullis; lobulus e basi retusa oblique patens, folio subduplo brevior, latiuscule ovatus, sat inflatus, subrecte truncatus, angulo subobtuso, carina valde arcuata, leviter papulosa, sinu subrecto vel ampliore in folii marginem excurrente, cellulis distincte minoribus. Amphigastria caulinia remota, minuta, caule vix latiora, transverse inserta, infra medium bifida, laciniis porrectis, anguste lanceo'atis, basi 2 cellulas latis, in cellulas 2 superpositas exeuntibus, sinu angusto, acuto. Cetera desunt.

Botel Tobago: leg. G. H. Schwabe, 4. 6. 1947, no. 90 pp.

Einmal durch die winzigen Amphigastrien, sodann durch Blatt- und Lobulusform, das relativ weite Blattzellnetz und das häufige Auftreten von grossen Brutlappen ausgezeichnet.

Es kann sich ebensowohl um eine *Rectolejeunea* handeln, doch kann ohne Perianth nichts darüber gesagt werden.

* *Lejeunea subigiensis* St. -Formosa: Karobetsu, no. 17 pp.; Botel Tobago: Hangwald, 150~380 m, an Baumwurzel, no. 116; Kwashyoto: Feuchte Bachrinne, an Baumwurzel no. 62.

* *Lejeunea wightii* (Ldbg., ms.) St. (Fig. 14, a~g) -Formosa: an Citrusstämmen, no. 1 pp.; Botel Tobago: Gipfelregion, dichte Waldbestände, 460 m, no. 126.

Microlejeunea punctiformis (Tayl.) Spr. -Formosa: Urai, an Citrusstämmen, zwischen *Lej. flava*, no. 1 pp.

Microlejeunea ramulosa Herz., n. sp. (Fig. 15, e~h)

Monoica; gracillima, tenera, attamen pro genere rigidula, caespitulosa, intricata, prostrata, viridula, corticola. Caulis filiformis, elongatus, iteratim dite ramulosus, ad 10 mm longus, cum foliis 400 μ latus, arrhizus. Folia caulina contigua vel subremota, sub angulo acuto oblique patula, planissima, 200 μ longa, 150 μ lata, anguste trigono-ovata, integerrima, apice late angustato, obtusiusculo, reti cellularum sat denso, cellulis parvis, hexagonis, marginalibus diametro ca 10 μ , medianis 11~12 \times

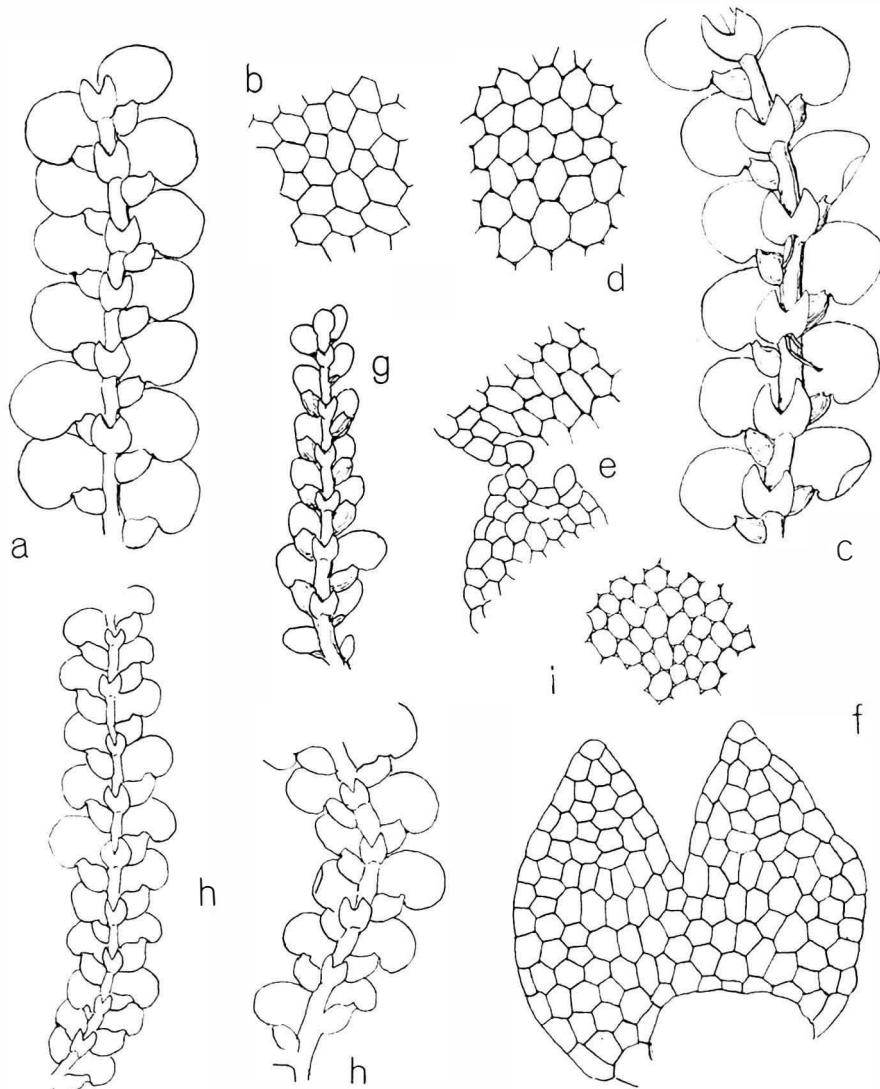


Fig. 14. a~g. *Lejeunea wightii* (Lindb.) a. Typus! Habitus, $\times 36$. b. Blattzellen von a, $\times 180$. c~g, aus Botel Tobago. c. Stengelstück, $\times 36$. d. Blattzellnetz, $\times 180$. e. Lobulus, $\times 180$. f. St. amphigastrium, $\times 180$. g. Ästchen, $\times 36$. h~i. *Lejeunea curviloba* St. Typus! h und h₁. Habitus, $\times 36$. i. Blattzellnetz, $\times 180$.

15~16 μ metentibus, basalibus parum majoribus, parietibus ubique sat validis, strictis, trigonis nullis; lobulus folio subdupo brevior, ovatus, apice quam basi dimidio angustiore, emarginato, breviter apiculato, papilla proximali, sub apice parum constricto, carina laevissima, oblique ascendentem, sinu levi in marginem folii excurrente. Amphigastria caulina remota, minuta, caule parum latiora, ca 70~80 μ longa et lata, transverse inserta, subrotunda, ad medium bifida, laciniis conniventibus, basi 3~4 cellulas latis, acutis, sinu latiusculo, sublunato. Involucra in ramulis terminalia, uno latere innovata, foliis anguste oblongis, obtusiusculis, lobulis 2/3 brevioribus, profunde solutis, anguste lanceolatis, acutissimis; amphigastrium in-

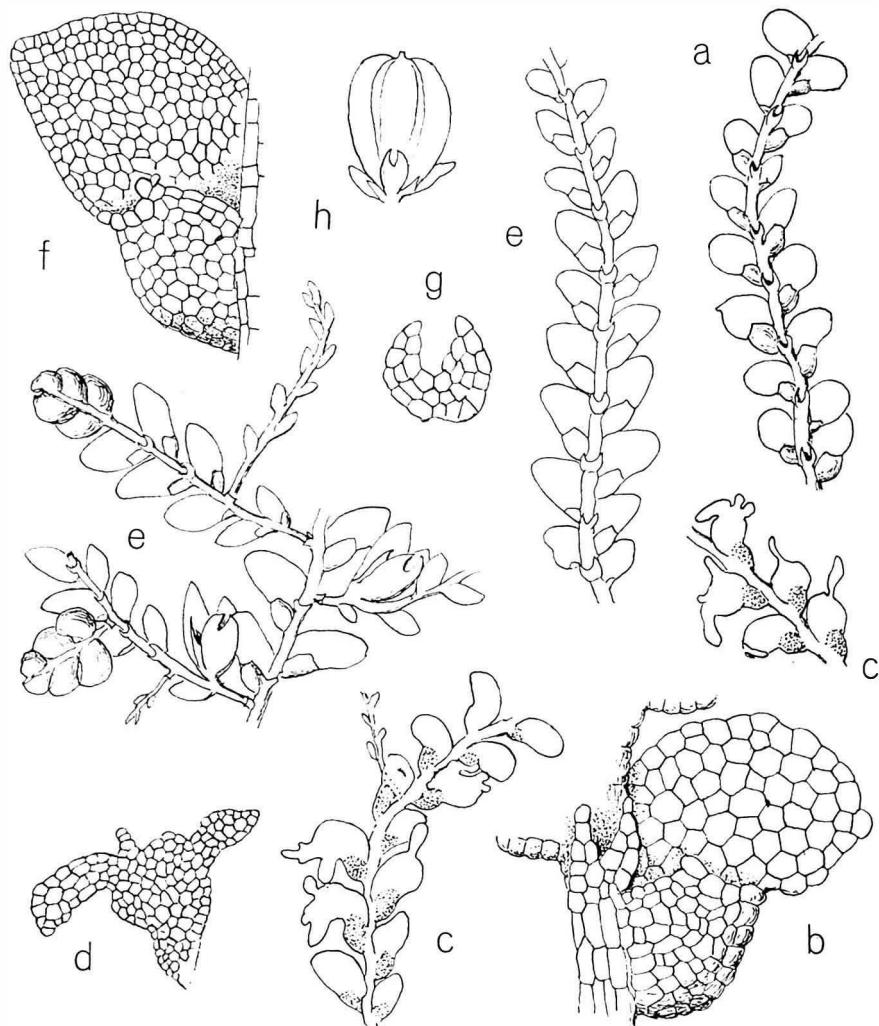


Fig. 15. a~d. *Lejeunea proliferans* Herz., n. sp. a. Stengelstück, $\times 36$. b. Stengelblatt mit Amphigastrium, $\times 180$. c. Stengelblätter mit Brutlappen, $\times 60$. d. Blatt mit Brutlappen, $\times 90$. e~h. *Microlejeunea ramulosa* Herz., n. sp. e. Habitusbilder, $\times 36$. f. Stengelblatt, $\times 180$. g. Stengelamphigastrium, $\times 180$. h. Perianth, $\times 24$.

volucrale foliis parum brevius, basi brevissime cum lobulis conjunctum, ellipticum, ad 1/3 bifidum, laciinis leviter conniventibus, acutis. Perianthium alte emersum, involucrum triplo superans, obovatum, apice leviter emarginatum, regulariter 5-carinatum, carinis ad basin fere decurrentibus, rostro brevi. Androecia in ramulis propriis terminalia, ca 3-juga.

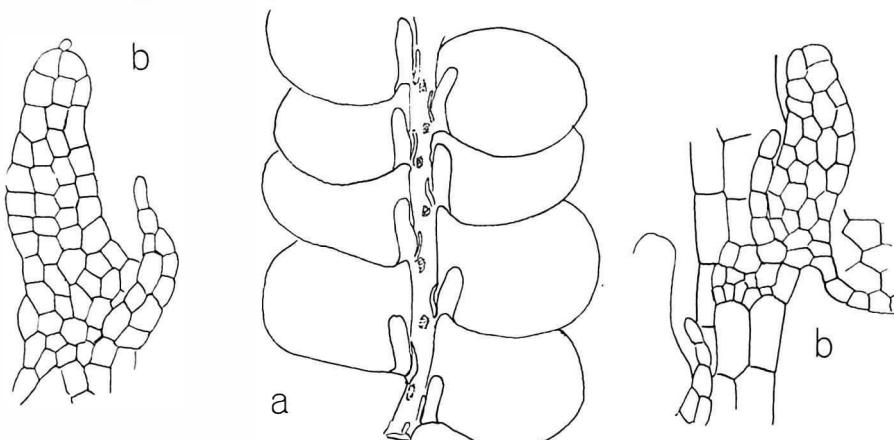


Fig. 16. *Cololejeunea schwabei* Herz., n.sp. a. Stengelstück, $\times 44$. b. Lobulus und Stylus, $\times 160$.

Formosa: loco incerto, leg. G. H. Schwabe, no.?, 1947,

Nach der Tracht einer zarten *Eulejeunea* ähnlich, aber nach dem engen Zellnetz und dem relativ grossen, tief und regelmässig 5-kieligen Perianth besser zu *Microlejeunea* passend. In der Blattform und -stellung an *Lejeunea lepida* erinnernd. Die Form der Amphigastrien ist aber sehr characteristisch.

* *Microlejeunea sundaica* St. -Formosa: Im Gebirge, sine no.; Botel Tobago: Hangwald, 200~400 m, no. 108 pp., Kamm, an Borke, no. 115 pp., Bachthal, 120 m, an Borke, no. 123 pp.

* *Cololejeunea raduliloba* St. -Formosa: Taipeh, Strauch am Wasserwerk, no. 9 pp.

Cololejeunea schwabei Herz., n. sp. (Fig. 16)

Sterilis; laxa caespitosa (?), prostrata, pro genere majuscula (surculi pauci mutilati oppetebant), viridis. Caulis cum foliis 900 μ latus, complanatus, vix ramosus. Folia caulina late ovato-rotundata, planissima, ca 450 μ longa, 400~420 μ lata, integerrima; cellulae sat laxae, chlorophyllosae, hexagonae, marginales ca 18~20 μ , medianae 22~28 μ metentes, basales vix majores, parietibus tenuibus, trigonis nullis; lobulus cauli parallelus, eique subappressus, ligulatus, obtusiusculus, planissimus, integerrimus, 200~250 μ longus, basi 3~4 cellulas latus, apice 2~3 cellulas latus, papilla coronatus, carina sinuata, brevissima (ca 50 μ), stylo magno, 4~6 cellulas longo, basi 1~2 cellulas lato, cauli parallelo et incumbente, e lobuli basi nascente eamque saepius tegente. Cetera desunt.

Formosa: loco incerto, leg. G. H. Schwabe, 1947.

Der *Physocolea longilobula* Horikawa ähnlich und zweifellos nahestehend, aber deutlich verschieden. Der Lobulus ist nämlich bei der neuen Art völlig unversehrt, einfach, während Horikawas Art nach Beschreibung und Abbildung einen Seiten-

zahn erkennen lässt.

** *Lasiolejeunea yulensis* (St.) Benedix -Botel Tobago: Auf *Hymenophyllum*, spärlichst.

Taeniolejeunea peraffinis (Schiffn.) Zwick. fo. *corticola* Benedix -Differt a typo dente lobulari angulari robustiore, saepius erecto, vitta ocellorum angustiore. -Botel Tobago: Am Kamm, ca 460 m, auf Borke, no. 123 pp.

* *Diplasiolejeunea pellucida* (Meissn.) -Formosa: Urai, an altem *Citrus*stamm, zwischen Algenflocken -wohl an thermalem Wasser ?, E. hang, 270 m, no. 1 pp.

II. Musci

Fissidentaceae

* *Fissidens splachnobryoides* Broth. fo. *subbrachyneuron* (Thér. et Pot. d. I. V.) Herz. -Botel Tobago: 1 Stengel zwischen *Heteroscyphus saccogynoides*.

Fissidens (Reticularia) gemmaceus Herz. et Potier d. I. V., n. sp. (Fig. 17)

Rhizautoicus, protonemate (an secundario?) persistente. Plantulae (gametophyta) gemmiformes, exilissimae, quam maxime ♀ 500 μ longae, ♂ 100~200 μ longae, adultae parce rhizoidiferae, paucifoiae: Plantulae ♀ folia vulgo 2-juga, archegoniis paucis (vulgo 4) sat brevibus (50 μ) et insuete crassis, ore sat amplio, paraphysis 0; plantulae masculae folia 1~2-juga, antheridiis paucissimis. Plantulae femineae folia inferiora minima, subexplicata, perichaetalia (jugum secundum) fissidentoidea, parte vaginali sat magna, semiaperta, lamina dorsali ut et processu apicali ± evolutis, quam maxime 450 μ longa, 180 μ lata, limbata, subintegerrima, lamina vaginali 2/3 folii aequante, apiculatim terminata, processu apicali latiusculo, obtusiusculo vel mucronato, nervo debili, longe infra apicem evanido; cellulae laxissimae, pellucidae, irregulariter hexagonae, marginales 16 \times 20 μ metientes, mediande 30~36 μ longae, 25~28 μ latae, basales 15 \times 30~18 \times 36 μ metientes, parietibus tenuibus, parum flexuosis, laevissimae; plantulae masculae folia irregularia, deformia, vix equitantia, subaperta, perigonialia margine ± sinuatim lobulata, infima male evoluta. Surculi typice foliiferae omnino deficientes (an semper ?). Vaginula sat crassa; seta raro 2 mm superans, pallide luteola, pro minutie sat carnosula, 50~80 μ crassa, erecta, sensim in thecam transiens. Theca matura cum operculo ad 700 μ longa, deoperculata (sicca) 500 μ longa, 200 μ crassa, leptoderma, cellulis laxiusculis luteolis exstructa, supra basin stomatibus rudimentariis vel nullis praedita, anulo nullo; operculum alte conicum, breviter rostratum, 250 μ longum, unistratosum, margine ostiali celluloso-crenato, dein cellulis laxis, irregularibus, attamen longitudinaliter seriatis, collenchyticis, trigonis validis, brunneis memorabilibus, ad 1/3 operculi longitudinem pertinentibus exstructum, rostro e cellulis elongatis, pallide luteolis, exincrassatis texto. Peristomium fissidentoideum normale; dentibus 16. 200 μ longis, siccis antenniformi-divaricatis, amoene expansis, aurantiacis, humectatis raptim immersis, infra medium 2-cruribus, cruribus spiraliter incrassatis, dimidio inferiore lamellatis, dorso minutissime asperulis nec striolatis, lamellis introrsum cristatim prominentibus, optime pectinatim incisis. Sporae minimae, 7~10 μ , laevissimae. Calyptra parva, longe adhaerens, anguste conica, mitraeformis, 230 μ longa, operculum tantum tegens, structura laxissima, cellulis subrugidis indistincte angulata vel plicatula (ex Potier), archegonio grosso, brunneo terminata.

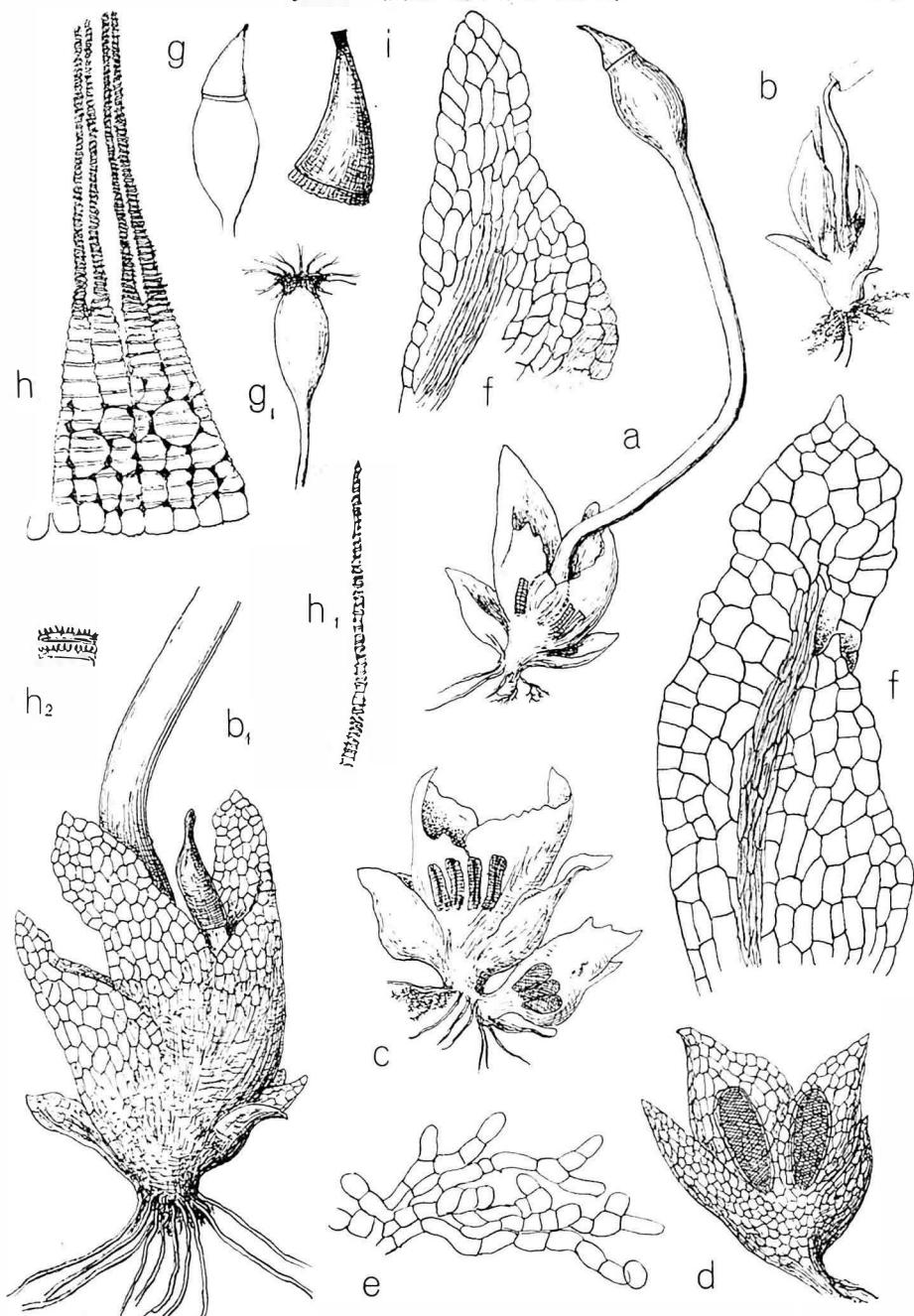


Fig. 17. *Fissidens gemmaceus* Herz. et P.d.I.V., n. sp. a. Fertiles Pflänzchen, $\times 36$. b und b₁. Pflänzchen, mit 2 Sporogonen, $\times 60$ und $\times 90$. c. ♀ und ♂ Pflänzchen, $\times 90$. d. ♂ Pflänzchen, $\times 180$. e. Protonemafäden, $\times 180$. f. 2 entwickelte Perichaetialblätter, $\times 180$. g. Bedeckelte Kapsel, $\times 36$; g₁. geöffnete Kapsel, $\times 36$. h. Peristom mit darauf projiziertem Deckelgewebe, $\times 180$; h₁. Peristomzahnchenkeln, $\times 360$; h₂. Peristomlamellen, $\times 360$. i. Haube auf Deckel, \times ca 70.

Formosa: Karobetsu, auf Erde, 250 m, zwischen *Isopterygium minutirameum*, leg. G. H. Schwabe, 29. 11. 1946, no. 17 pp.

Durch ihre Winzigkeit, das stets vorhandene Protonema, die knospenförmige Ausbildung des Gametophyten und das Fehlen von Sprossen mit typischen, flach zweizeilig angeordneten *Fissidens*-Blättern sehr eigenmäßig, nimmt diese Art in der Gattung eine sehr isolierte Stellung ein. Auch der Bau der Archegonien und

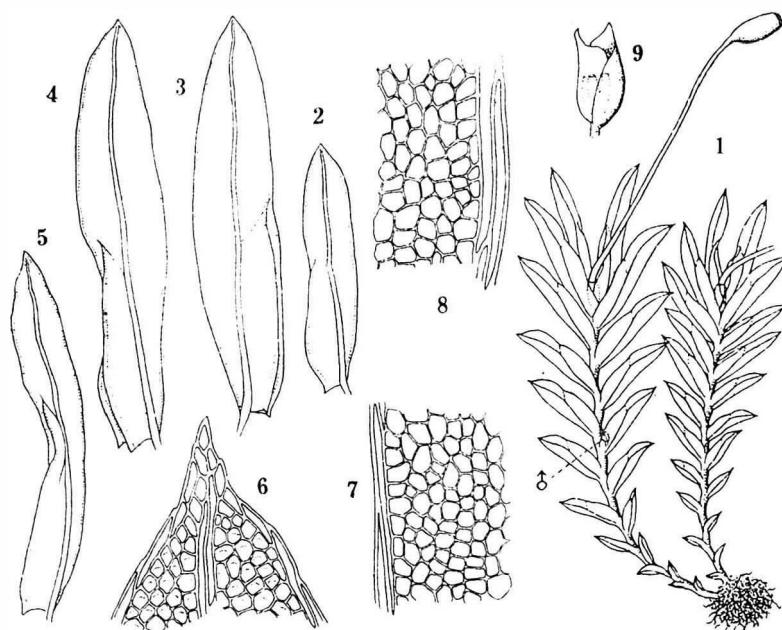


Fig. 18. *Fissidens taiwanensis* Herz. et Nog., n. sp. 1. Habitusbild, $\times 9$. 2, 3, 4. Blätter, $\times 28$. 5. Hülleblatt, $\times 28$. 6. Blattspitze, $\times 294$. 7. Zellnetz der Blattmitte, $\times 294$. 8. Zellnetz der Blattscheide, $\times 294$. 9. Männliche Infloreszenz, $\times 43$. (Noguchi del.)

das Fehlen von Paraphysen ist bemerkenswert. Ihre phylogenetische und taxonomische Deutung ist freilich zweifelhaft. Die zunächst auffallende Struktur des Deckels habe ich fast übereinstimmend bei einer *Semilimbidium*-Art aus Formosa beobachtet. Vielleicht ist sie weiter verbreitet. Es dürfte sich lohnen, der Anatomie des Kapseldeckels ganz allgemein mehr Aufmerksamkeit zu schenken. Wahrscheinlich liefert sie taxonomisch wertvolle Merkmale.

Ob nicht identisch mit *F. protonemaecola* Sak. (A. Noguchi)

Fissidens (Bryoidium) taiwanensis Herz. et Nog., n. sp. (Fig. 18)

Autoicus. Planta atro-viridis. Caulis simplex, ca 5 mm longus, cum foliis ad 3 mm latus, laxe foliosus. Folia erecto-patentia, ad ca 10-juga, inferiora valde minora, superiora sensim majora, ad 2 mm longa et 0.4 mm lata, linearis-lingulata, medio latissima, apice obtusa vel subacuta, sicca parum constricta, lamina vera ad medium folii producta oblique truncata, lamina dorsali inferne sensim angustata ad basin costae enata, costa pellucida, breviter excurrente, superne ± flexuosa, marginibus integris, anguste limbata, limbo hyalino e cellulis linearibus uniseriatis ventre

inferne ad 4~5-seriatis composito, cellulis laminalibus mamillatis, pellucidis, parietibus tenuissimis, medianis hexagonis vel quadrato-hexagonis, 6~9/ μ in diam., superioribus et inferioribus aequalibus. Bractae parichaetii haud diversae. Seta terminalis basi geniculata, 4~5 mm longa. Theca inclinata, oblonga, sine operculo, 0.65~0.7 \times 0.35~0.4 mm. Peristomii dentes linear-lanceolati, profunde fissi, ca 0.25 mm longi, rufescens-fusci, superne lutescentes, spiraliter incrassati et papillosi, inferne striolati. Planta mascula minutissima, ca 0.35 mm alta, parce foliata, caulinis oriunda, bractea latissime ovata, cymbiformis, ecostata, paraphysibus nullis; antheridia pauca.

Formosa: Gebirgsgegend im westlichen Mitteltaiwan, Zeltplatz, 1200 m, leg. G. H. Schwabe, 8. 1947.

Die vorliegende Art ist in ihrem Habitus *F. schmidtii* nahestehend, aber ihre Blätter sind völlig glatt. Von *F. zollingeri* ist sie ebenso durch ihre kleinen Blattzellen gut unterschieden.

* *Fissidens elmeri* Broth. -Formosa: Taipeh, no.? (det. Noguchi)

Fissidens (Semilimbidium) schwabei Nog., n. sp. (Fig. 19)

Planta minutissima, lutescenti-viridis. Caulis ad 1.5 mm longus, cum foliis ca 2 mm latus, densiuscule foliosus, saepe basi innovationibus subramosus. Folia ad 8-juga, erecto-patentia, linear-lingulata, apice acuta, medio latissima, ad 1.5 \times 0.3 mm, lamina vera ad medium folii producta oblique truncata, anguste limbata, limbo hyalino, e cellulis linearibus 2- inferne 3~4-seriatis composito, lamina dorsali inferne sensim angustata sed basi rotundata, costa valida breviter excurrente, marginibus serrulatis, elimbatis, cellulis laminalibus pellucidis, quadrato-hexagonis, minute sed distincte uni-raro 2-papillatis, parietibus valde tenuibus, medianis 9~12/ μ in diam., superioribus et inferioribus aequalibus, cellulis veris laevibus, 10~13/ μ in diam. Bractae perichaetii haud diversae. Seta solitaria raro 2-aggregata, terminalis, curvata, lutescens, ad 2.5 mm longa. Theca suberecta, ovata, sine operculo ca 0.4 \times 0.25 mm. Peristomii dentes ad medium fissi, ca 0.2 mm longi, papillosi. Operculum recte et longe rostratum, ca 0.45 mm longum. Planta mascula ignota.

Formosa: Karobetsu, leg. G. H. Schwabe, no. 66.

Im Zellnetz ist die vorliegende Art *F. ceylonensis* nahestehend, hat aber kürzere Kapseln und schmälere Blätter, deren Rückenflügel allmählich zum Blattgrund hinabläuft. Sie ähnelt auch *F. sakourae* in der Blattform, aber das Zellnetz ist verschieden. Verglichen mit *F. zippelianus* unterscheidet sie sich durch geringere Grösse, papillöse Zellen und den bis zum Blattgrund herablaufenden Rückenflügel.

Fissidens sakourae Broth. et Par. -Formosa: Daiton, an Stein, Karobetsu, no. 20. -Botel Tobago: Südtal beim Wasserfall, no. 80 u. 86. -Kwashyoto: Feuchtschattige Bachrinne, no. 62. (det. Noguchi)

* *Fissidens nobilis* Griff. -Botel Tobago: in Kamnnähe, 380~400 m, no. 113.

Ditrichaceae

* *Ditrichum flexifolium* (Hook.) Hpe. -Formosa: Taipeh, Wasserwerkhügel, auf ziemlich junger Erdwand, no. 11. (det. Noguchi)

Dicranaceae

Trematodon drepanellus Besch. -Botel Tobago: Erdblösser in Kamnnähe, 400

m, no. 110.

Trematodon flaccidisetus Card. -Botel Tobago: Steile Erdwand am Quertal-Eingang, no. 13; -Kwashyoto: An Sickerwand, Nähe Strand, no. 64. (det. Noguchi)

* *Trematodon paucifolius* C. M. -Botel Tobago: Quertal-Eingang, no. 13/b. (det. Noguchi)

Dicranella coarctata (C. M.) Br. jav. -Kwashyoto: Sonniger Niederwald, auf Erde und Steinen, no. 59. (det. Noguchi)

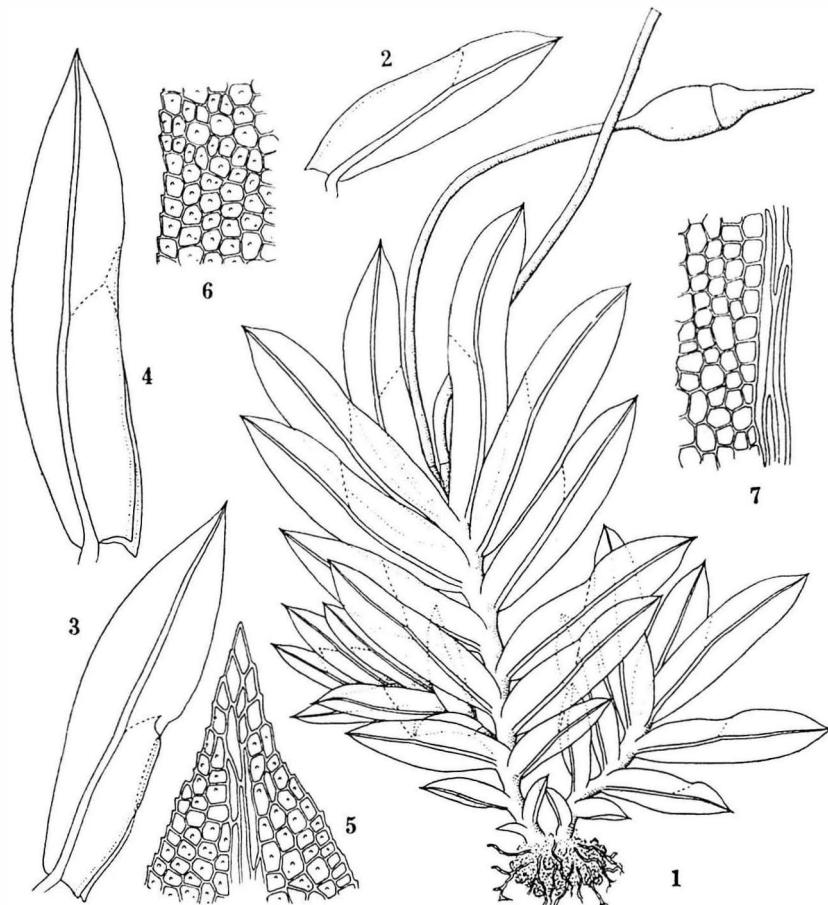


Fig. 19. *Fissidens schwabei* Nog., n. sp. 1. Habitusbild, $\times 28$. 2, 3, 4. Blätter, $\times 43$. 5. Blattspitze, $\times 294$. 6. Zellnetz der Blattmitte, $\times 294$. 7. Zellnetz der Blattscheide, $\times 294$. (Noguchi del.)

Leucobryaceae

Leucobryum bowringii Mitt. -Botel Tobago: Gipfelregion, 460 m, lichte Waldbestände, no. 126. (det. Noguchi)

Exodictyon blumi (C. M.) Fl. -Botel Tobago: Hangwald, 150~300 m, no. 116. (det. Noguchi)

* *Leucophanes octoblepharoides* Brid. -Botel Tobago: loco incerto no. 107 und 120 pp.

Calymperaceae

* *Calymperes tenerum* C. M. -Botel Tobago: Hangwald bis 100 m, ziemlich trocken, ohne Bodenmoose, no. 90. (det. Noguchi)

* *Calymperes tahitense* (Sull.) Mitt. -Botel Tobago: Iranomilku, an Baumstamm, no. 70; Bachtal, 100~120 m, no. 120. (det. Noguchi)

* *Calymperes tuberculosum* Dix. -Botel Tobago: Bachtal, 100~120 m., no. 120 pp. (det. Noguchi)

Calymperes serratum A. Br. -Botel Tobago: in Kamnnähe, 480 m, no. 126 pp.

Trichostomaceae

Hymenostylium formosicum Broth. et Yas. -Formosa: Felswand mit reichlich Tropfwasser, 300 m, im westlichen Mitteltaiwan, sine no.

Hymenostomum edentulum (Mitt.) Besch. -Formosa: Shinko, strandnah in Höhlungen von Ryukyu-Limestone-Blöcken, no. 54. -Botel Tobago: Grenzmoos gegen See, 3 m auf Riff bei Iranomilku, no. 89. (det. Noguchi)

* *Hymenostomum latifolium* Nog. -Formosa: Daiton, no. 32. -Botel Tobago: no. 95 pp. (det. Noguchi)

* *Hymenostomum malayense* Fleisch. -Botel Tobago: Erdhang im Südtal, no. 76. (det. Noguchi)

Weisia platyphylla Broth. -Formosa: Shinko, no.? (det. Noguchi)

* *Hyophila involuta* (Hook.) Jaeg. -Formosa: Taipeh, Wasserwerkmauer, no. 12, Karobetsu, auf Erde am Bach, no. 20, Shinko, Fischereihafen, an Geröllblöcken, no. 51. -Kwashyoto: An Hausmauern, gemein, no. 66. (det. Noguchi)

Barbula indica Brid. -Formosa: Karobetsu, an Bach, 100 m, no. 20. (det. Noguchi)

* *Barbula consanguinea* (Thw. et Mitt.) Jaeg. -Botel Tobago: Bachtal, 100~150 m, an faulem Holz, no. 106. (det. Noguchi)

Hydrogonium subpellucidum (Mitt.) Hilp. var. *hyaloloma* Herz., n. var. (Fig. 20) -Differt a typo foliorum margine inferne cellulis majoribus hyalinis limbato. -Formosa: Felswand mit reichlich Sickerwasser, 300 m, im westlichen Mitteltaiwan, ohne no.

Hydrogonium subcomosum (Broth.) Chen -Botel Tobago: Im Sicker- und Spritzwasser eines Baches 50~100 m, no. 124/b. (det. Noguchi)

* *Hydrogonium pseudo-ehrenbergii* (Fl.) Chen -Formosa: Shinko, auf oft überfluteten Steinen beim Wasserfall, massenhaft, no. 67. (det. Noguchi)

Hydrogonium anceps (Card.) Herz. et Nog., comb. nov. Syn. *Barbula* (?) *anceps* Card. in Beih. Bot. Centr. 19: 102 (1905). -Formosa: loco incerto. (det. Noguchi)

Splachnaceae

Gymnostomiella longinervis Broth. -Formosa: Felswand mit reichlich Sickerwasser, im westlichen Mitteltaiwan, 300 m, mit *Hymenostylium formosicum* und *Hydrogonium subpellucidum* var., ohne no.

Funariaceae

Funaria hygrometrica L. -Formosa: Gebirge im westlichen Mitteltaiwan, Tigerkopf bei Siedelung, 1000 m., ohne no.

Bryaceae

Brachymenium exile (Dz. et Mlk.) Br. jav. -Kwashyoto: Feldumfassungsmauern in Strandnähe, no. 56 und 58. (det. Noguchi)

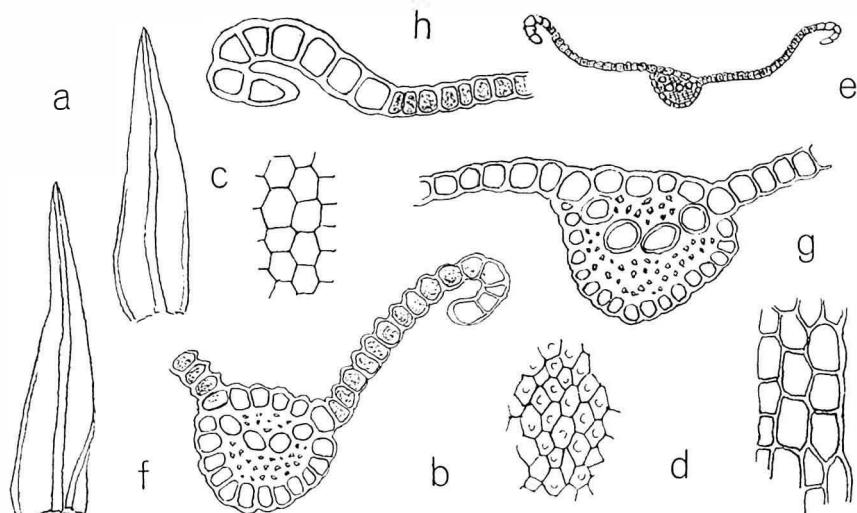


Fig. 20. **Hydrogonium subpellucidum** var. **hyaloloma** Herz., n. var. a. Blätter, $\times 36$. b. Zellnetz der Blattspitze, $\times 360$. c. Basale Zellen der Blattmitte, $\times 360$. d. Zellen des hyalinen Randsaumes, $\times 360$. e. Blattquerschnitt unterhalb der Blattmitte, $\times 90$. f. Blattquerschnitt über der Mitte, $\times 360$. g. und h. Querschnittsteile des Blattes unterhalb der Mitte, $\times 360$.

* **Bryum cellulare** Hook. -Formosa: Shinko, auf stark überflutetem Bachufer, no. 67. (det. Noguchi)

Bryum coronatum Schwgr. var. **macrostomum** Herz., n. var. -Differt a typo capsula deoperculata macrostoma. -An spec. propria? -Formosa: Flussbett, ziemlich sonnig, auf trockenem Kies, sine no.

Bryum japonense (Besch.) Broth. -Botel Tobago: loco incerto. (det. Noguchi)

Bryum ramosum (Hook.) Mitt. -Formosa: Karobetsu, 250 m, no. 17. (det. Noguchi)

Mniaceae

Mnium maximowiczii Ldbg. -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, no. 51?

Mnium spathulatum Mitt. -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, no. 51?.

Mnium succulentum var. **integrum** Nog. -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, sine no. -Botel Tobago: Hangwald, tiefshattig an Holz, no. 109. (det. Noguchi) -Wahrscheinlich ist **Mnium dilatatum** Mitt. mit dieser Pflanze

identisch. (Herzog)

Rhizogoniaceae

Rhizogonium spiniforme (L.) Bruch -Formosa: Gebirgsgegend im westlichen Mitteltaiwan.

Bartramiaceae

* **Philonotis glomerata** (Wils.) Mitt. -Formosa: loco incerto. (det. Noguchi)

* **Philonotis mollis** (Dz. et Mlk.) Bryol. jav. -Kwashyoto: An gut belichteter Sickerwand, no. 64. -Mit einigem Zweifel zu dieser Art gestellt. Verglichen mit javanischen Exemplaren sind die Formosapflanzen durch etwas kürzere Blattspitzen und dichtes Zellnetz unterschieden. Immerhin passen Blattform und leicht zurückgerollter Blattrand gut zu der Art. (det. Noguchi)

Philonotis turneriana (Schwgr.) Mitt. -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, Tigerkopf, 1000 m, sine no. (det. Noguchi)

Philonotis vitrea Herz. et Nog., n. sp. (Fig. 21: 1~5)

Sterilis. Planta gracilis, lutescenti-viridis, mollis, haud nitida. Caulis ad 1 cm longus, ± flexuosus, apice ± hamulatus. Folia caulina sicca adpressa haud secunda, madida erecto-patentia, oblongo-lingulata, supra basin latissima, ± carinata, 0.8~1 × 0.25~0.35 mm, marginibus ± revolutis vel planis, celluloso-crenatis, apice serulatis, dentibus apice prominente unipapillatis, costa lutescenti, infra apicem folii evanida dorso celluloso-crenata, basi 35~42 μ lata, cellulis laxis, apice mamilloso-exstante, parietibus tenuibus, juxtagostalibus rectangularibus 30~35 × 13~17 μ, marginalibus sensim minoribus, subquadratis, 13~16 μ in diam., apicalibus linearibus, parietibus crassioribus, 20~30 × 3~4 μ, basilaribus juxtagostalibus laxis, rectangularibus, 25~35 × 15~20 μ, alaribus 2~3 seriatis subquadratis vel breviter rectangularibus minoribus, 10~20 μ in diam.

Botel Tobago: Im Sicker- und Spritzwasser des Baches, 80~100 m, leg. G. H. Schwabe, 5. 6. 1947, no. 124/b.

Diese neue Art ist nahe mit *Ph. laxissima* verwandt, jedoch in folgenden Punkten verschieden: 1) die Blätter sind schmäler und haben weniger zurückgerollte Ränder, 2) die Zellen der Blattspitze sind linear oder schmal hexagonal, statt nahezu quadratisch wie bei *Ph. laxissima*. Ausserdem erhalten die Blätter durch die den Rand besetzenden, fast perlenartigen Mamillen ein sehr charakteristisches Aussehen. Auch die Zartheit aller Teile ist sehr bemerkenswert.

Ptychomitriaceae

** **Glyphomitrium calycinum** (Mitt.) Card. -Formosa: Karobetsu, Waldweg, 250 m, no. 18. Bisher nur aus Ceylon bekannt. (det. Noguchi) -Die Art zeichnet sich durch mehrzellige Sporen aus. (Herzog)

Orthotrichaceae

* **Macromitrium angustifolium** Doz. et Mlk. -Botel Tobago: Gipfelregion, 460 m, epiphytisch, no. 126. (det. Noguchi) -Bei diesen Exemplaren fehlen die Peristomzähne vollständig. Doch findet man dies auch bei Pflanzen von andern Fundorten. (Noguchi)

Macromitrium gymnostomum Sull. et Lesq. -Formosa: Taipeh, Wasserwerk-

mauer, no. 12. (det. Noguchi)

Macromitrium incurvum (Ldb.) Par. -Formosa: An Borke von Bäumen beim Wassereservoir, no. 9 und 10; -Shinko, an der Borke eines grossen *Artocarpus integrifolius*-Stammes, no. 52. -Kwashyoto: Am Strand 3~15 cm über der Wasserlinie, massenhaft, no. 57. (det. Noguchi)

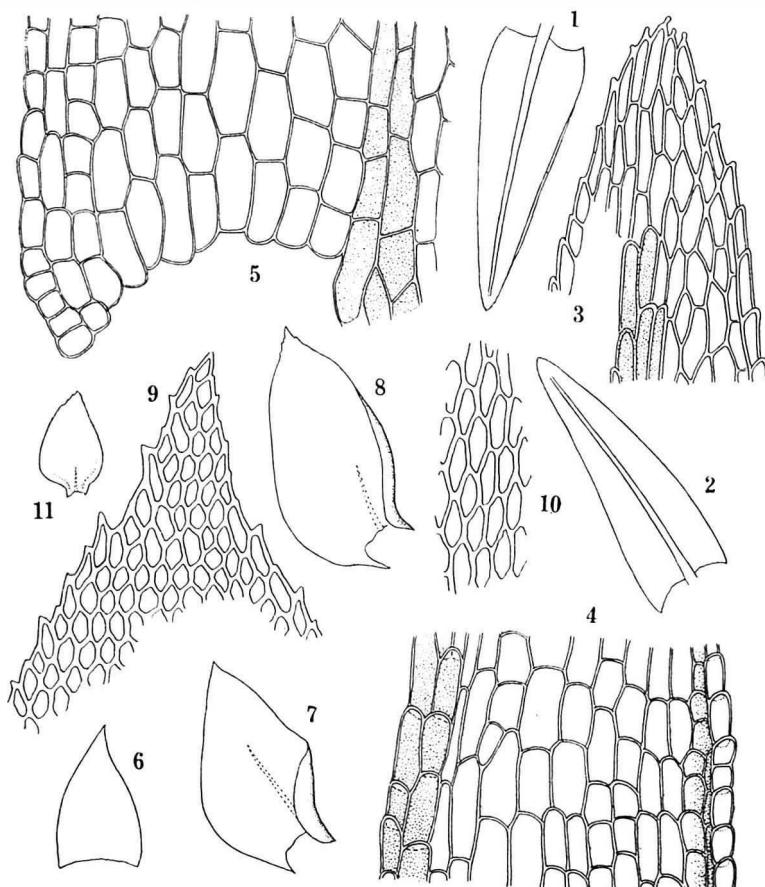


Fig. 21. *Philonotis vitrea* Herz. et Nog., n. sp. (1~5) und *Homaliodendron pygmaeum* Herz. et Nog., n. sp. (6~11). 1, 2. Blätter, $\times 43$. 3. Blattspitze, $\times 294$. 4. Zellnetz der Blattmitte, von der Dorsalseite, $\times 294$. 5. Blattbasis, $\times 294$. 6. Untere Stengelblatt, $\times 28$. 7, 8. Stengelblätter, $\times 28$. 9. Blattspitze, $\times 294$. 10. Zellnetz der Blattmitte, $\times 294$. 11. Astblatt, $\times 28$. (Noguchi del.)

Rhacopilaceae

Rhacopilum aristatum Mitt. -Botel Tobago: Hauptbestände am Wasserfall im Südtal, no. 86 daselbst an Felswand, no. 102. -Formosa: Im Gebirge, ohne Fundortsangabe, eine breitblättrige Form.

Trachypodaceae

Duthiella robusta Nog. -Formosa: Gebirgsgegend im westlichen Mitteltaiwan,

ohne genaue Fundortsnotiz.

Pterobryaceae

Endotrichella elegans (Dz. et Mlkb.) Fl. -Formosa: Gebirgsgegend im westlichen Mitteltaiwan. (det. Noguchi)

Meteoriaceae

Meteoriump miquelianum (C. M.) Fl. -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, Tigerkopf, 1000 m. (det. Noguchi)

Papillaria cuspidifera (Tayl.) Jaeg. -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, Tigerkopf, 1000 m, trocken. (det. Noguchi)

Chrysocladium retrorsum (Mitt.) Fl. -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, Tigerkopf, 1000 m, (spärliche Beimengung) (det. Noguchi)

Pseudobarbella assimilis (Card.) Nog. -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, ohne genaue Fundortsangabe. (det. Noguchi)

Meteoriopsis ancistrodes (Ren. et Card.) Broth. -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, 1400~1500 m., oberhalb Kaminoshima.

Meteoriopsis reclinata (C. M.) Fl. -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, ohne nähere Fundortsangabe. (det. Noguchi)

Floribundaria floribunda (Doz. et Mlkb.) Fl. -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, Zeltplatz, 1200 m, mit *Claopodium assurgens* und *Homaliodendron pygmaeum* n. sp. (det. Noguchi)

Neckeraceae

* **Calyptothecium caudatum** Bartr. -Formosa: Gebirgsgegend des westlichen Mitteltaiwan, ohne genaue Fundortsangabe. (det. Noguchi)

Calyptothecium robustum Broth. -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, ohne genaue Fundortsangabe.

Neckera formosana Nog. -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, Bianitzu, 1400~1500 m., no.?, (det. Noguchi)

Neckeropsis lepineana Mont. -Botel Tobago: Iranomilku, an Baumwurzel, no. 69.

Neckeropsis nitidula (Mitt.) Fl. -Botel Tobago: Südtal, nahe dem Wasserfall, no. 83 und 97. (det. Noguchi)

Himantocladium loriforme (Br. jav.) Fl. -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, anscheinend häufig, ohne genaue Fundortsnotiz.

Himantocladium cyclophyllum (C. M.) Fl. -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, ohne genaue Fundortnotiz.

* **Himantocladium plumula** (Nees) Fl. -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, ohne genaue Fundortsnotiz.

Homaliodendron exiguum (Br. jav.) Fl. -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, Bianitzu, 1400~1500 m. -Botel Tobago: 70 m., no. 96.

Homaliodendron flabellatum (Dicks.) Fl. -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, ohne genaue Fundortsangabe.

Homaliodendron microdendron (Mont.) Fl. -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, Zeltplatz, 1200 m, no. 51?. -Botel Tobago: Hangwald, 150~380 m, no. 116.

***Homaliodendron pygmaeum* Herz. et Nog., n. sp. (Fig. 21: 6~11)**

Planta minuta, flabellata, opaca. Caulis primarius repens. Caules secundarii ca 1 cm longi, stipite ca 3 mm longo, foliis minutis, adpressis, ovatis, ecostatis, dein pinnatim ramosi, complanate et densiuscule foliosi, ramis ad 5 mm longis superioribus brevioribus, plerumque simplicibus, densiuscule et haud complante foliosis. Folia caulina fragilia, asymmetrica, ovata, acuta, basi cordata, leviter concava, eplicata, costa tenui pellucida, ad medium folii evanida, marginibus uno latere inferne incurvis, superne inaequaliter dentatis sed dentibus unicellulatis compositis, cellulis hexagonis, parietibus potius tenuibus haud porosis, medianis oblongo-hexagonis, $17\sim22\times6.5\sim8.5 \mu$ in diam. superioribus brevioribus hexagonis, $10\sim13\times4.5\sim6.5 \mu$, marginalibus minoribus, basilaribus internis elongato-rectangularibus, $17\sim30\times4\sim6.5 \mu$. Folia ramea fragilia, foliis caulinis multo minora, symmetrica, e basi constricta ovata, apice acuta, cymbiformia, superne serrulata, costa valde tenui vel nulla.

Formosa: Gebirgsgegend im westlichen Mitteltaiwan, Zeltplatz, 1200 m, leg. G. H. Schwabe, 8. 1947, no. 100.

Dieses Moos mag nach seiner Verzweigung und den verflachten Stengelblättern mit scharf gezähnten Rändern bei *Homaliodendron* eingereiht werden. Mit andern ähnlichen Arten wie *H. exiguum* verglichen ist diese neue Art durch ihren matteten Glanz, die kaum verflachten Astblätter, allgemeine Brüchigkeit der Blätter und den Habitus eines Zwergbäumchens bemerkenswert.

***Homalia targioniana* Gough** -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, Bianitzu, 1400~1500 m. -Botel Tobago: Kamm, 380~400 m, an Borke, no. 115.

* ***Thamnium sandei* Besch.** -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, Zeltplatz, 1200 m.

Hookeriaceae

***Distichophyllum jungermannioides* C. M.** -Botel Tobago: in Kamnnähe, 460 m, mit *Calymperes serratum*, no. 126 pp.

***Distichophyllum mittenii* Bryol. jav.** -Formosa: Gebirgsgegend in westlichen Mitteltaiwan, Zeltplatz, 1200 m. (det. Noguchi)

***Hookeria nipponensis* (Besch.) Broth.** -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, Zeltplatz, 1200 m, sine no.

***Callicostella papillata* (Mont.) Jaeg. var. *longifolia* Fl.** -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, Zeltplatz, 1200 m, -Botel Tobago: Bachtal, 100~120 m, no. 119.

Hypopterygiaceae

** ***Dendrocyathophorum intermedium* (Mitt.) Herz., n. comb.** -Syn. *Cyathophorella intermedia* Mitt. Formosa: Gebirgsgegend im westlichen Mitteltaiwan, sehr spärlich, als Beimischung, sine no.

***Lopidium nazeense* Thér.** -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, Zeltplatz, 1200 m.

Fabroniaceae

***Schwetschkea laxa* (Wils.) Jaeg.** -Formosa: Taipeh, an Gartenmauern, no. 4.

Leskeaceae

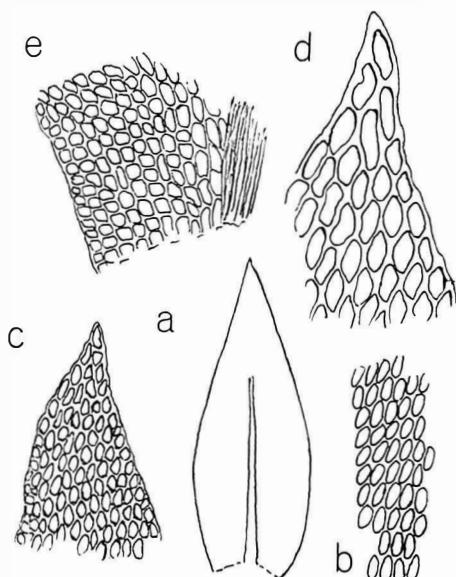


Fig. 22. *Rhegmatodon schwabei* Herz., n. sp.
n. sp. a. Blatt, $\times 36$. b. Zellnetz der Blattmitte, $\times 180$. c. Blattspitze, $\times 18$. d. Zellen der Blattspitze, $\times 360$. e. Alarzellen, $\times 180$.

et marginem versus abbreviatae, ubique valde incrassatae.

Formosa: Gebirgsgegend im westlichen Mitteltaiwan, "Tigerkopf", bei der Siedlung, an Baumborke in trockener Lage, 1000 m, leg. G. H. Schwabe, 8. 1947.

Die neue Art steht dem chinesischen *Rh. handelii* Broth. nahe, unterscheidet sich jedoch durch die schmalen Blätter sofort.

Pseudoleskeopsis orbiculata (Mitt.) Broth. -Formosa: Karobetsu, no. 20. (det. Noguchi)

Thuidiaceae

* *Haplohyumenium filiforme* (Thw. et Mitt.) Broth. -Formosa: Karobetsu, an Waldweg, no. 19. -Botel Tobago: An verschiedenen Stellen, an Borke, stellenweise gemein, no. 90, 92, 103, 115.

Haplohyumenium submicrophyllum (Card.) Broth. -Botel Tobago: An *Clerodendron* im Talwald, no. 98. (det. Noguchi)

* *Claopodium aciculum* Broth. var. *brevifolium* Card. -Botel Tobago: loco incerto. (det. Noguchi)

Claopodium assurgens (Sull. et Lesq.) Card. -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, Zeltplatz, 1200 m; Karobetsu, 300 m, no. 16. -Botel Tobago: In Kammnähe, 460 m, no. 126 pp.

Claopodium prionophyllum (C. M.) Broth. -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, Zeltplatz, 1200 m, c. fr.; Daiton, Geröllblock in einer Schlucht,

Rhegmatodon schwabei Herz., n. sp.
(Fig. 22)

Sterilis; caulis primarius arcte repens, filiformis, attamen tenax, corticolus, ramis secundariis ad 1 cm longis, tenuibus, curvatum ascendentibus, caudato-attenuatis, opacis, viridibus, demum nigricantibus, cum foliis vix 1 mm latis. Folia conferta, sicca dense appressa, humida rigidule erecto-patula, e basi parum angustata elliptico-lanceolata, acutissima, integerrima, marginibus sub apice angustissime reclinatis ibique supra cellularum pilos indistincte crenulatis, nervo e basi latiuscula sensim angustato, supra medium evanido; cellulae pellucidae, laevissimae, amoene fuscescentes, basales mediae anguste rectangulares, 20μ longae, 10μ latae, alares male delimitatae numerosae, subquadratae, 12μ diametro, dein superne quadrato-rhombeae, indistincte oblique seriatae, 13μ longae, 11μ latae, parietibus parum flexuosis, medianae elongate ellipticae, 20μ longae, 10μ latae, apice ipso

500 m, no. 24 pp.

Haplocladium capillatum (Mitt.) Broth. -Formosa: Auf *Cycas*, no. 7. (det. Noguchi)

Haplocladium microphyllum var. *latifolium* (Lac.) Thér. -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, Zeltplatz, 1200 m, no. 6 pp. (det. Noguchi)

* **Haplocladium minutifolium** Thér. -Formosa: Karobetsu, 300 m, no. 15, 79. (det. Noguchi)

Herpetineuron toccae (Sull.) Card. -Kwashyoto: Feldumfassungsmauern in Strandnähe, no. 57.

** **Pelekium bifarium** (Bryol. jav.) Fl. -Botel Tobago: Bachtal bei Iranomilku, an faulem Holz, no. 104. (det. Noguchi)

* **Pelekium velatum** Mitt. -Botel Tabago: Bachtal, 100~120 m., no. 120.

Thuidium cymbifolium (Doz. et Mlk.) Br. jav. -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, Zeltplatz, 1200 m. (det. Noguchi)

Thuidium glaucinum (Mitt.) Mitt. -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, Zeltplatz, 1200 m. (det. Noguchi)

Thuidium lejeuneoides Nog. -Botel Tobago: An mehreren Stellen im Südtal, nahe Wasserfall, oft reine Überzüge, no. 81, 84. (det. Noguchi)

Thuidium tamariscellum (C. M.) Br. jav. -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, Zeltplatz, 1200 m, sine no. (det. Noguchi)

Amblystegiaceae

Campylium enerve Herz. et Nog., n. sp. (Fig. 23: 1~6)

Planta gracilis, sordide viridis, opaca. Caulis elongatus, repens, flexuosus, apice flagelliformiter attenuatus, hic illic fasciculatim radiculosus, laxe foliosus, subpinnatim ramosus, ramis simplicibus, densiuscule et ± complanate foliosis, ad 5 mm longis, cum foliis ca 1.8 mm latis. Folia caulina sicca patentia incurva, e basi ovata in acumen linear-lanceolatum saepe semitortum attenuata, 0.9×0.3 mm, costa nulla, marginibus distincte serrulatis, cellulis linearibus, parietibus tenuibus, medianis 75~85×4.5~6 μ, apicalibus subaequalibus, basilaribus medianis brevioribus, 20~30×5~6.5 μ, alaribus haud diversis. Folia ramea oblonga in acumen linear-lanceolatum saepe semitortum attenuata, 1.2×0.26 mm.

Formosa: Gebirgsgegend im westlichen Mitteltaiwan, Zeltplatz, 1200 m, leg. G. H. Schwabe, 8. 1947, no. 51. pp. ?

Die Art steht *C. serratifolium*³⁾ aus Formosa nahe, aber die viel längeren Astblätter mit schmal länglicher Basis dürfen sie ausreichend von dieser unterscheiden.

Brachytheciaceae

Pleuropus sciureus (Mitt.) Jaeg. -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, Zeltplatz, 1200 m. (det. Noguchi) -Ob nicht identisch mit *Pleuropus senestratus* (Griff.)? (Herzog)

** **Ishibaia japonica** Broth. et Okam. -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, Tigerkopf, 1000 m, als spärliche Beimengung zwischen anderen Moosen.

* **Oxyrrhynchium hians** (Hedw.) Loesk. -Botel Tobago: Südtal, nahe Wasser-

3) **Campylium serratifolium** (Card.) Herz. et Nog., comb. nov. Syn. *Ectropothecium* (?) *serratifolium* Card. in Beih. Bot. Centr. 19: 145 (1905).

fall, Hauptbestände mit *Thuidium lejeuneoides*, *Dumortiera hirsuta* und *Conocephalum conicum*. (det. Noguchi)

* *Rhynchostegium inclinatum* (Mitt.) Jaeg. -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, Bianitzu, 1400~1500 m, an Baumwurzeln, c. fr.! (det. Noguchi)

Entodontaceae

Entodon bandongiae (C. M.) Jaeg. -Formosa: Gebirgsgegend im westlichen

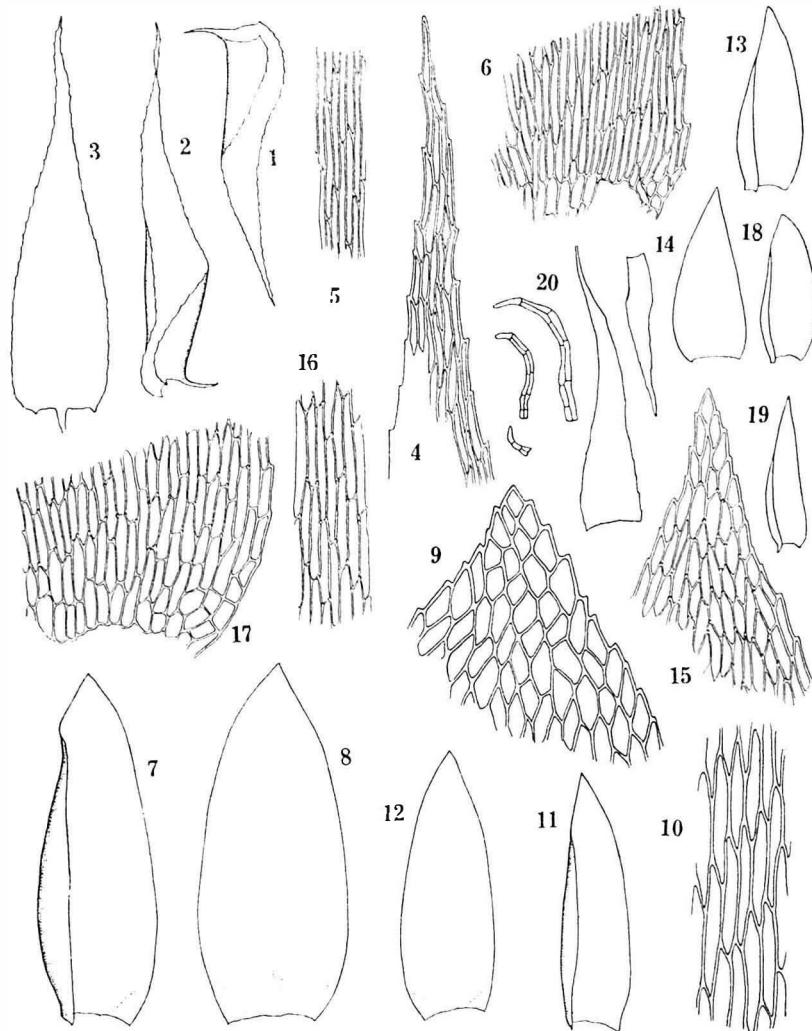


Fig. 23. *Campylium enerve* Herz. et Nog., n. sp. (1~6), *Entodon eurhynchoides* Herz. et Nog., n. sp. (7~12) und *Taxiphyllum formosanum* Herz. et Nog., n. sp. (13~20) 1. Strobiloblast, $\times 43$. 2, 3. Stielblätter, $\times 43$. 4. Blattspitze, $\times 156$. 5. Zellnetz der Blattmitte, $\times 156$. 6. Blattbasis, $\times 156$. 7, 8. Stielblätter, $\times 43$. 9. Blattspitze, $\times 294$. 10. Zellnetz der Blattmitte, $\times 294$. 11, 12. Stielblätter, $\times 43$. 13, 14. Stielblätter, $\times 43$. 15. Blattspitze, $\times 294$. 16. Zellnetz der Blattmitte, $\times 294$. 17. Blattbasis, $\times 294$. 18, 19. Stielblätter, $\times 43$. 20. Paraphyllien, $\times 105$. (Noguchi del.)

Mitteltaiwan, Bianitzu, 1400~1500 m, an Bäumen, no 51 ?.

***Entodon eurhynchioides* Herz. et Nog., n. sp. (Fig. 23: 7~12)**

Planta sordide viridis, superne lutescenti-viridis. Caulis elongatus, repens, laxe foliosus, cum foliis ad 1.8 mm latus, complanate foliosus, superne attenuatus, laxe ramosus, ramis simplicibus, ad 1.5 cm longis. Folia caulina sicca ± homomalla, dorsalia lingulata plana, apice subobtusa, ca 1.2×0.45 mm, lateralia ovato-lingulata, apice acuta, sicca haud constricta, costa bifurcata, valde tenui et brevi saepe nulla, marginibus superne serrulatis, cellulis medianis linearibus, parietibus tenuibus, $43 \sim 50 \times 5 \sim 6.5 \mu$, superioribus laxis, oblongis vel oblongo-hexagonis, $17 \sim 22 \times 8.5 \sim 11 \mu$, alaribus numerosis, quadratis vel subquadratis $15 \sim 20 \mu$ in diam. Folia superiora et ramea multo minora.

Formosa: Gebirgsgegend im westlichen Mitteltaiwan, Zeltplatz, 1200 m, leg. G. H. Schwabe, 8. 1947, no. 51 ?

Obwohl das Material steril ist, dürften die entfernte Beblätterung und die verschmälerten Äste mit winzigen Blättchen die Art charakterisieren.

Sematophyllaceae

** ***Clastobryella tsunodae* Broth. et Yas.** -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, no. 51 pp ?.

* ***Trichosteleum hamatum* (Doz. et Mlk.) Jaeg.** -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, Zeltplatz, 1200 m. -Botel Tobago: Bachtal, auf faulem Holz, no. 120. (det. Noguchi)

* ***Acroporium oxyporum* (Doz. et Mlk.) Fl.** -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, Zeltplatz, 1200 m. (det. Noguchi)

** ***Raphidostichum piliferum* (Broth.) Broth.** -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, loco incerto. -Botel Tobago: In Kammnähe, 460 m. (det. Noguchi)

***Sematophyllum tristiculum* (Mitt.) Fl.** -Formosa: Urai, in *Citrus*-pflanzung, an Borke, no. 1 pp. (det. Noguchi)

* ***Glossadelphus zollingeri* (C. M.) Fl.** -Botel Tobago: Im Sicker- und Spritzwasser eines Baches, 80~100 m, no. 124. (det. Noguchi)

** ***Taxithelium batanense* Bartr.** -Botel Tobago: Hangwald, 150~380 m, no. 116, am Kamm, 380~400 m, no. 114. (det. Noguchi)

***Taxithelium instratum* (Brid.) Broth.** -Botel Tobago: Hangwald, an Borke, no. 108; Bachtal, 120~150 m, an faulem Holz, no. 119.

Hypnaceae

***Hypnum plumaeforme* Wils.** -Formosa: Taipeh, unter Gartensträuchern, no. 5. (det. Noguchi)

-var. ***minus*** Broth. -Formosa: Taipeh. (det. Noguchi)

* ***Ectropothecium buitenzorgii* (Bel.) Jaeg.** -Formosa: Gebirgsgegend im Westlichen Mitteltaiwan, Zeltplatz, 1200 m. -Botel Tobago: In Kammnähe, 460 m, in dichtem Wald, no. 126.

* ***Ectropothecium moritzii* (C. M.) Jaeg.** -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, Zeltplatz, 1200 m. (det. Noguchi)

* ***Ectropothecium monumentorum* (Duby) Jaeg.** -Kwashyoto: Kleine Bachrinne

am Steilhang, no. 61. (det. Noguchi)

* *Ectropothecium perminutum* Broth.? -Botel Tobago: Bachtal bei Iranomilku, no. 106. dasselbst an Steinen, no. 100, auf Sand, im Sicker- und Spritzwasser eines Baches, 80~100 m, no. 122. (det. Noguchi)

Ectropothecium planulum Card. -Formosa: Daiton, an Geröll im Bachbett, no. 38. -Botel Tobago: Südtal, in der Nähe des Wasserfalls, no. 82, 86. (det. Noguchi)

** *Trachythecium micropyxis* (Broth.) Bartr. -Botel Tobago: Bachtal, no. 120. (det. Noguchi)

Trachythecium verrucosum (Hpe.) var. *binervulum* Herz., n. var. -Differt a typo nervulis binis distinctis. -Botel Tobago: Südtal in der Nähe des Wasserfalls, no. 79 und 81. -Kwashyoto: ohne Fundortsnotiz.

* *Isopterygium minutifolium* Card. et Thér. -Formosa: Gebirgsgegend im westlichen Mitteltaiwan, Zeltplatz, 1200 m, auf faulem Holz. (det. Noguchi)

* *Isopterygium minutirameum* (C. M.) Jaeg. -Formosa: Karobetsu, 250 m, no. 17. (det. Noguchi)

Isopterygium textori (Lac.) Mitt. -Formosa: Karobetsu, no. 16. (det. Noguchi)

* *Vesicularia montagnei* (Bel.) Fl. -Formosa: Karobetsu, 300 m, no. 14. (det. Noguchi)

Vesicularia shimadae Okam. -Botel Tobago: Bachtal, 120~150 m, no. 119. (det. Noguchi)

Taxiphyllum formosanum Herz. et Nog., n. sp. (Fig. 23: 13~20)

Planta inferne pallide fusca, superne lutescenti-viridis, nitidiuscula. Caulis ad 3 cm longus, densiuscule et complanate foliosus, cum foliis ca 1 mm latus, subpinnatim ramosus, paraphyllis paucis, filiformibus vel linear-lanceolatis, 0.08~0.3 mm longis, ramis simplicibus 3~6 mm longis, densiuscule et complanate foliosis, cum foliis ca 0.7 mm latus. Folia caulina dimorpha, dorsalia ovato-lingulata apice obtusa, leviter concava, ad 0.5×0.23 mm, lateralia oblongo-ovata acuta, superne saepe incurva, concava, costa nulla, marginibus serrulatis, cellulis medianis linearibus, parietibus tenuibus, praecipue ad extremitates cellularum papillosis, 38~43×3.5~4 μ , apicalibus brevioribus elongato-hexagonis, parietibus tenuibus, praecipue ad extremitates cellularum papillosis, 15~20×4~6 μ , basilaribus medianis rectangularibus vel elongato-hexagonis, 12~20×4.5~6.5 μ , alaribus haud diversis sed cellulis brevioribus rectangularibus vel elongato-hexagonis.

Botel Tobago: Bachtal, 100~120 m, Beginn der vollen Waldentwicklung, no. 125, leg. G. H. Schwabe, 5. 6. 1947.

A REVISION OF THE JAPANESE SPECIES OF THE SCAPANIACEAE. III

By Tairoku AMAKAWA and Sinske HATTORI

尾川大録、服部新佐：日本蘚ヒシャクゴケ科の再検討（其三）¹⁾

Gen. *Macrodiplophyllum* (Buch) Perss.

1. *Macrodiplophyllum plicatum* (Lindb.) Perss. (Text-fig. XV)

Macrodiplophyllum plicatum Perss., Svensk Bot. Tidskr. **43**: 507-510, f. 3 (1949); Hatt., Bryologist **55**: 148 (1952); Journ. Hattori Bot. Lab. **5**: 79, pl. 7, *II* (1951); **8**: 23 (1952); **10**: 69 (1953); Kamim., Contr. Hepat. Fl. Shikoku **64**, pl. 3 (1952). (Exsicc.) Hatt., Hepat. Jap. **5**: 226-228 (1952).

Diplophyllum plicatum Lindb., Acta Soc. Sci. Fenn. **10**: 235 (1872); Steph., Bull. Herb. Boiss. **5**: 78 (1897); Inoue, Bot. Mag. Tokyo **12**: 74 (1898); **15**: 180 (1901); Yoshin., Bot. Mag. Tokyo **20**: 52 (1906); Steph., Spec. Hepat. **4**: 114 (1910); K. Müll. in Rabenh., Krypt.-Fl. **6-2**: 358 (1914); Arnell, Archiv f. Bot. **15-5**: 30 (1917); Hedwigia **67**: 111 (1927); Buch, Soc. Sci. Fenn., Comm. Biol. **3-1**: 29, f. 5 (1928); Horik., Bot. Mag. Tokyo **68**: 710 (1934); **69**: 215 (1935); Journ. Jap. Bot. **12**: 22 (1936); Ihsiba in Yadu, Nikko no Shokubutsu to Dobutsu **189** (1936); Frye & Clark, Hepat. N. America **4**: 573 (1946).

Scapania spatulatifolia Warnst., Hedwigia **57**: 67, f. 8 (1916); **63**: 96 (1921), nec Steph.
Scapania nippensis Warnst., Hedwigia **63**: 96 (1921).

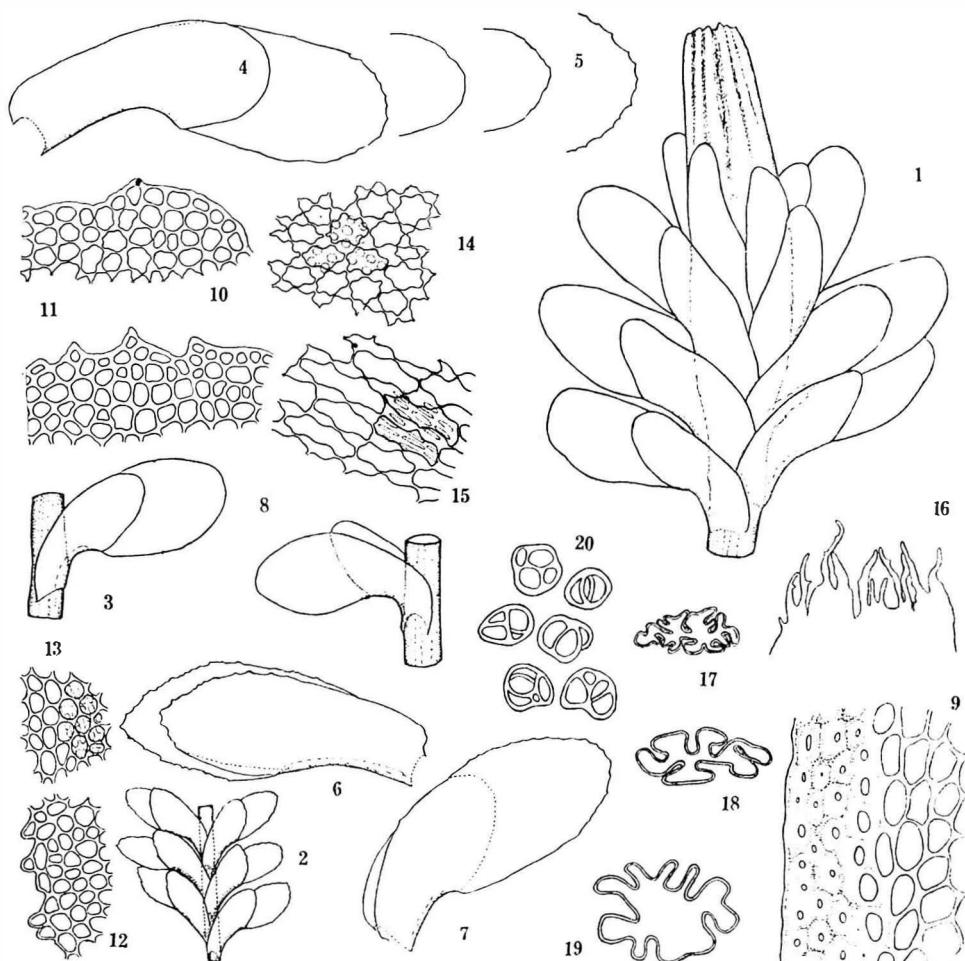
Diplophyllum longilobum Steph., Spec. Hepat. **6**: 500 (1924).

Diplophyllum oblongilobum Steph.; K. Müll., Bull. Herb. Boiss. **2**: 37 (1903).

Japanese name: Futaе-urokogoke (Yasuda 1911).

Plant 2-7 cm long, 2-5 mm wide, robust, green to brown, in loose patches. Stem 0.2-0.6 mm thick, rigid, simple or sparingly branched, with occasional innovations beneath the perianth, ascending to erect: in cross section the cortex clearly differentiated from the interior region; cortical cells in 3-4 layers, radially compressed, 3-5 μ , brown, with strongly thickened walls; interior cells 20 μ , white, thin-walled. Rhizoids few, long. Leaves contiguous to distant, transversely inserted or nearly so, decurrent on both sides. Commissure 0.4 the length of the ventral lobe, not keeled and amplexicaul near the base, little curved dorsally. Dorsal lobe appressed to the stem, 2/3 the ventral in size, width 0.4 the length, arching almost to the farther edge of the stem, spatulate, apex rounded, margin somewhat denticulate towards the tip, nearly entire towards the base. Ventral lobe widely to horizontally spreading, spatulate, slightly falcate, 1.4-3.5 mm long, 0.5-1.7 mm wide, narrower near base, apex rounded, margin nearly entire or somewhat denticulate towards the tip. Cells along the leaf margin 10-12 μ , walls thickened, of the leaf middle 20-30 \times 17-26 μ , trigones large to somewhat bulging, of the leaf base 40-80 \times 20 μ , walls trabeculate. Cuticle minutely verrucose. Gemmae brown, somewhat cubical, 2-4 celled, 20-26 \times 17-20 μ . Plants unisexual. Male inflorescence terminal or farther down; bracts up to 30 pairs, imbricate, ventricose at base. Perianth 2/5-1/2 emergent, cylindrical, 5 mm long and 1.2 mm wide, not or moderately compressed dorsiventrally, deeply plicate to the base with

1) 本研究は文部省補助金に負ふ。



Text-fig. XV. *Macrodiplophyllum plicatum* (Lindb.) Perss.

1. Part of female plant with perianth, dorsal view, $\times 10$. 2. Part of plant, $\times 12$. 3. Leaf, dorsal v., $\times 10$. 4. Do., $\times 24$. 5. Apices of the ventral (right) and dorsal (left two) lobes, $\times 30$. 6. Leaf, dorsal v., $\times 30$. 7. Do., ventral v., $\times 30$. 8. Do., $\times 10$. 9. Part of cross section of stem, $\times 285$. 10, 11. Cells from leaf apex, $\times 180$. 12. Do., $\times 145$. 13. Cells from leaf middle, $\times 145$. 14. Do., $\times 180$. 15. Cells from leaf base, $\times 180$. 16. Part of perianth mouth, $\times 40$. 17. Cross section of perianth, at apex, $\times 16$. 18, 19. Do., at middle, $\times 16$. 20. Gemmae, $\times 285$. Figs. 1, 3, 8, 9, 16-19 were drawn from the specimen, T. Sasaki 760; figs. 2, 6, 7, 12, 13 from U. Faure 1795-isotype of *D. longilobum* St.; Figs. 10, 11, 14, 15 from U.F. 78; Fig. 20 from N. Takaki 9737; Figs. 4, 5 from Y. Ikegami 3170. Figs. 1, 3, 8, 9, 16-20 were drawn by T. Amakawa, the others by S. Hattori.

about 16 folds, mouth from half to nearly as wide as the perianth, irregularly lacinate, the lacinia branched and more or less contorted.

Hab. Raw humus, bases of trees or rock-crevices at the alpine or subalpine region; not uncommon.

Type locality: Sakhalin.

Examinations. **Hokkaidō:** Mt. Daisetsu, *T. Sasaki* 760, 773, *Noguchi*, Mt. Ashibetsu, *T.S.* 550. **Honshū:** Iwate: Mt. Hayachine, *A. Muto*; Yamagata: Mt. Gassan, *T. Suzuki* 32, Mt. Asahi, *S. Hattori* 820-825; Fukushima: Mt. Iide, *K. Sakurai* 242, 2985, Oze, *K. S.* 91; Niigata: Mt. Myōkō, *Y. Ikegami* 17889; Tochigi: Nikkō, *I. Furusawa* 3822-3823; Gumma: Mt. Shibutsu, *S. H.* 481, 490-497; Saitama: Chichibu, *M. Omura* 42; Nagano: Mt. Norikura, *U. Faurie* 1795 -isotype of *Diplophyllum longilobum* in Herb. Kyōto Univ., Mt. Senjō, *N. Takaki* 9939, 9979; Mt. Eboshi, *T. Kuno* 2, Mt. Noguchi-gorō, *T. K.* 6, Mt. Tsubakuro, *S. H.* 1150, 1152-1154, Mt. Ōtenjō, *S. H.* 1156; Shizuoka: Mt. Fuji, *N. T.* 9991; Yamanashi: *M. Oki* 148.

Range: Japan (Hokkaidō, Honshū, Shikoku), Korea, Sakhalin, Kurils, Siberia, N. America.

The present species may be regarded as a Pacific Coast Element. Like *Scapania bolanderi*, it is distributed from the Pacific coast of North America through Alaska to the Japanese Archipelago. *Diplophyllum longilobum* is nothing but a dwarf form of the present species.

2. *Macrodiplophyllum microdontum* (Mitt.) Perss. (Text-fig. XVI)

Macrodiplophyllum microdontum Perss., Sv. Bot. Tidsk. 43: 507-510, f. 3 (1949); Hatt., Journ. Jap. Bot. 27: 316 & 318 (1952).

Martinellia microdonta Mitt., Trans. Linn. Soc. London 2, 3: 196 (1890).

Scapania microdonta K. Müll., Nova Acta Acad. Caes. Leop.-Carol. 83: 262, pl. 37a (1905); Steph., Spec. Hepat. 4: 147 (1910).

Diplophyllum microdontum Buch, Soc. Sci. Fenn., Comm. Biol. 3-1: 31, f. 6 (1928); Frye & Clark, Hepat. N. Amer., Pt. 5; 951, with figs. (1947).

Japan. name: *Sasaki-kooigoke* (nov.)

Plants 3-4 cm long, 4 mm wide, robust, olive to brown, in loose patches. Stem 0.4-0.5 mm thick, rigid, simple or seldom branched, erect; in cross section the cortex clearly differentiated from the interior region; cortical cells in 2-3 layers, with thickened walls; interior cells larger, 17 μ , white, thin-walled. Rhizoids scarce. Leaves contiguous to imbricate up the shoot, nearly transversely inserted. Commissure 0.4 the length of the ventral lobe, moderately to semicircularly concave dorsally, in cross section rounded where leaf sheathes the stem. Dorsal lobe not decurrent, appressed to the stem, oblong, apex rounded to obtuse, usually without a distinct point, about 3/5 the ventral in size, width 0.6-0.7 the length, arching beyond the stem 1/3-1/2 the stem width, denticulate throughout, the teeth spinulose, mostly 1-celled, the cell twice as long as wide. Ventral lobe slightly decurrent, nearly horizontally spreading, obovate-oblong, 2.3 mm long, 1.5 mm wide, apex rounded to obtuse, usually without a distinct point, margin denticulate except near commissure, the teeth spinulose, 1- or rarely 2-celled, the cell or the end cell of the teeth nearly twice as long as wide. Cells along the leaf margin 12-17 μ , walls thickened, of the middle 20-22 μ , walls thin. Trigones large, more or less bulging, of the base 30-50 \times 17-20 μ , walls thin but partly thick through confluent trigones. Cuticle densely and coarsely papillose. Gemmae brown, almost tetrahedral, 26-30 μ ,

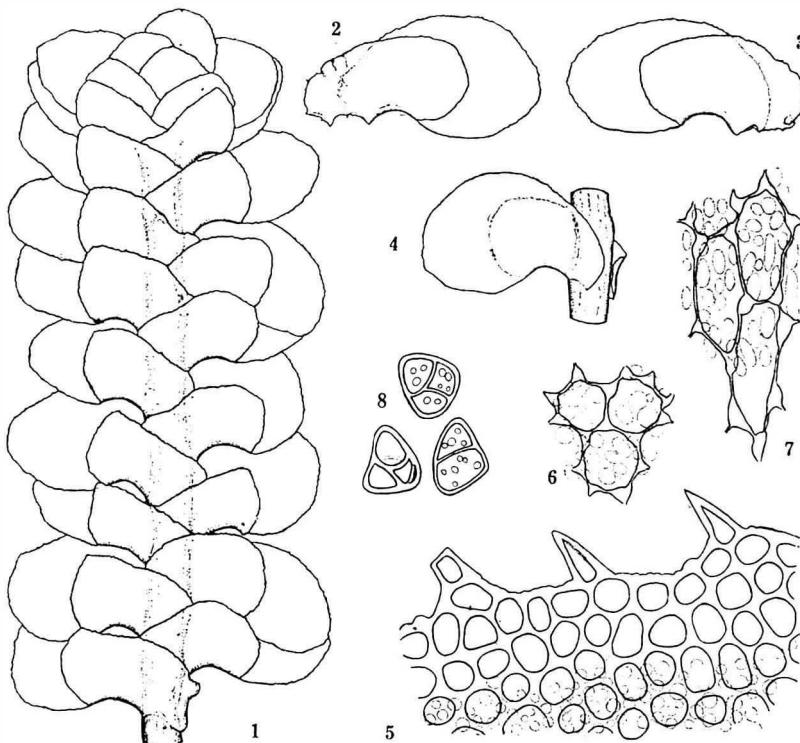
2-4-celled. Perianth absent. (Description based on specimen, *T. Sasaki 5944*.)

Hab. On humus covered rocks at the alpine region; in our area only known on Mt. Tottabetsu in Hokkaidō.

Type loc. Plover Bay (Bering Strait).

Examination. **Hokkaidō:** summit of Mt. Tottabetsu, ca 1900 m. alt., the Hidaka mountain range, *T. Sasaki 5944*, Aug. 1954.

Range: Eastern Siberia (Plover Bay, Amuri), Alaska (St. Lawrence I.) **New to Japan** (Hokkaidō)!



Text-fig. XVI. *Macrodiplophyllum microdontum* (Mitt.) Press.

1. Upper part of sterile shoot, $\times 10$. 2-3. Leaves, dorsal view, $\times 10$. 4. Do., ventral v., $\times 10$. 5. Cells along leaf margin, $\times 285$. 6. Cells from leaf middle, $\times 285$. 7. Cells from leaf base, $\times 285$. 8. Gemmae, $\times 285$. All drawn by T. Amakawa from the specimen, *T. Sasaki 5944*.

Stephani (1910) recorded the occurrence of this species in Japan without citing the definite locality. However, Buch (1928) rejected Japan from the geographical area of it. Afterward, S. Hattori (1952) examined a specimen which Stephani (1910) referred to the present species, and proved it to belong into *Scapania parvitexta* Steph. or its allies. Accordingly, the authors have been very sceptical as to the occurrence of this species in the Japanese territory. Recently, however, they discovered this species among hepaticae which Mr. T. Sasaki collected last summer on Mt. Tottabetsu, the Hidaka mountain range, Hokkaidō. Thus the present species

extends the southernmost limit of its geographical area to Hokkaidō, about $42^{\circ} 35'$ N. Lat. It is rare and restricted, compared to the closely related *M. plicatum*. But, as the latter species, it may be regarded as a member of the Northern Pacific element.

Gen. *Diplophyllum* Dum.

1. *Diplophyllum albicans* (L.) Dum. (Text-fig. XVII, 1-11)

Diplophyllum albicans Dum. Rec. d'Obs. 16 (1835); Mitt., Trans. Linn. Soc. London 2, 3: 196 (1891); Besch., Rev. Bryol. 21-2: 26 (1894); Steph., Bull. Herb. Boiss. 5: 78 (1897); Nakanishiki, Bot. Mag. Tokyo 19: 266 (1905); Steph., Spec. Hepat. 4: 114 (1910); K. Müll. in Rabenh., Krypt.-Fl. 6-2: 353, f. 104, 105 (1914); Arnell, Archiv f. Bot. 15-5: 30 (1917); Buch, Soc. Sci. Fenn., Comm. Biol. 3-1: 21, f. 3 (1928); Horik., Journ. Sci. Hiroshima Univ. B, 2, 2: 217 (1934); Ihsiba. 1. c. 189 (1936); Horik. in Asahina, Nippon Inkwasyokubutu Dukan 845, pl. 405, 4-8 (1939); Journ. Jap. Bot. 15: 396 (1936); Hatt., Bull. Tokyo Sci. Mus. 11: 67 (1944); Journ. Hattori Bot. Lab. 4: 49 (1950); 5: 78 (1951); 8: 23 (1952); 10: 69 (1953); Horik. Hikobia 1: 23, 56 (1951); Frye & Clark, Hepat. N. America 4: 585 (1946); Oti, Shizen to Jimmon 1: 65 (1950); Kamim., 1. c. 62 (1952). (Exsicc.) Hatt., Hepat. Jap. 3: 114 (1950).

Jungermannia albicans L., Spec. Pl. 1131 (1753).

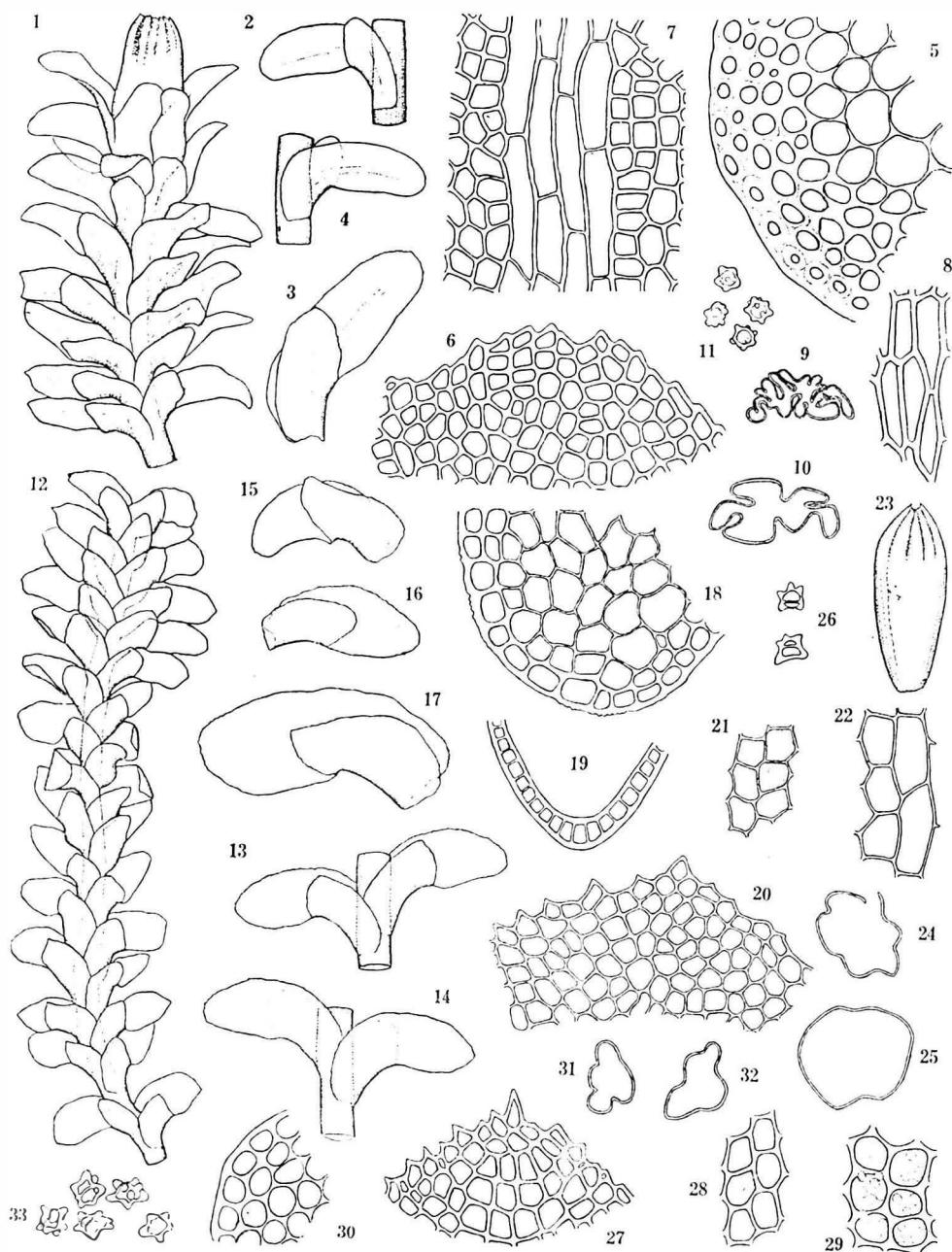
Scapania albicans Mitt.; Sde. Lac. in Miquel, Prol. Fl. Jap. 188 & 391 (1867).

Japanese name: Shiro-futae-urokogoke (Yasuda 1911); Shiro-koogoke (Ihsiba 1930).

Plant 1-4 cm long, 2-3 mm wide, golden yellow to dark green or occasionally brownish, in mats. Stem 0.17-0.25 mm thick, stout, simple or furcately branched, subfloral innovations present, ascending: in cross section the cortex clearly differentiated from the interior region; cortical cells in 2-4 layers, 5-10 μ , brownish, with thickened walls; interior cells 17-26 μ , thin-walled. Rhizoids rather few. Leaves approximate, not or little larger up the shoot, transversely inserted, semiamplexicaul, not decurrent, with a furcate vein-like median region, one fork of which passing into each lobe. Commissure about 0.3 the length of the ventral lobe, not keeled near the base, slightly concave dorsally, one cell thick dorsiventrally, in cross section rounded. Dorsal lobe elliptic to ligulate, appressed to the stem, 1/2-2/3 the ventral in size, width 0.4 the length, arching to the middle or up to the farther edge of the stem, apex subacute to obtuse, commonly with (or without) a point, margin usually denticulate towards the tip. Ventral lobe widely to horizontally spreading, somewhat arcuate, elliptic to ligulate, 1.2 mm long, 0.66 mm wide, apex subacute to obtuse with or without a point, margin denticulate towards the tip. Cells along the leaf margin 8 μ , of the leaf middle outside the vein-like region 12-17 μ , of the vein-like region 40-60 \times 17 μ in 3-6 cells wide, of the leaf base 37 \times 7 μ , walls somewhat equally thickened, trigones indistinct. Cuticle nearly smooth. Gemmae on the tip of the ventral lobes, one-celled, 14 μ , somewhat stellate in profile through the projection of their 5-6 angles. Plants unisexual. Male inflorescence terminal; bracts 4-8 pairs, ventricose at base. Female bracts larger than the stem leaves. Perianth 1/2-2/3 emergent, ovate, 2 mm long and 0.8 mm wide, slightly dorsiventrally compressed, 3/5 the width of the perianth, shortly lobed and denticulate.

Hab. Soil or rocks; not uncommon in alpine and subalpine regions, yet descending ca. 600 m. alt. in M. Japan (the lowest is 400 m. in Ashiu Woods in Kyōto).

Type locality: European.



Text-fig. XVII.

Examinations. **Honshū.** Akita: Mt. Chōkai, *G. Koie* 79; Yamagata: Mt. Asahi, *S. Hattori* 817-189, 828-835; Fukushima: Mt. Azuma, *S. Asano* 75, Mt. Hiuchi, *S. H.* 483-487; Tochigi: Nikkō, *U. Faurie* 174, *K. Sakurai* 257; Gumma: Hatomachi Pass, *S.H.* 480; Tokyō: *S. H.* 3039, 9211, 9220; Nagano: Mt. Tsubakuro, *S. H.* 1147-1148, Mt. Jōnen, *S. H.* 1149-1151; Mie: *K. Okada* 31; Kyōto: Ashio, *T. Nakajima*. **Shikoku.** Ehime: Omogō, *S. H.* 5807, 5466, 5496, 5538; Mt. Ishizuchi, *S. H.* 5602, 5624, 5648-5649, 5659, 5666, 5688, 5690. **Kyūshū.** Ōita: Mt. Yufu, *T. Ono* 267; Miyazaki: Mt. Osuzu, *T. Amakawa* 790, Mt. Okue, *T. A.* 1085; Kagoshima: Isl. Yakushima, *K. Mayebara* 3029, *S. H.* 7499, 7552, 7643, 7761.

Range: Japan (Hokkaidō, Honshū, Shikoku, Kyūshū), Formosa, Siberia, N. America, Europe.

2. *Diplophyllum taxifolium* (Wahl.) Dum. (Text-fig. XVIII, 12-26)

Diplophyllum taxifolium Dum., Rec. d'Obs. 16 (1835); Steph., Bull. Herb. Boiss. 5: 78 (1897); Spec. Hepat. 4: 113 (1910); K. Müll. in Rabenh., Krypt.-Fl. 6-2: 359, f. 106 (1914); Arnell, l. c. 15-5: 30 (1917); Buch, l. c. 3-1: 23, f. 4 (1928); Horik., Journ. Sci. Hiroshima Univ. B, 2, 2: 218 (1934); Bot. Mag. Tokyo 48: 600 (1934); 50: 203 (1936); Journ. Jap. Bot. 12: 22 (1936); Frye & Clark, l. c. 4: 583 (1946); Hatt., Journ. Hattori Bot. Lab. 4: 49 (1950); 5: 78 (1951); 8: 23 (1952); 10: 69 (1953); Oti, l. c. 1: 65 (1953); Kamim. l. c. 63, f. 16 (1952).

Jungermannia taxifolia Wahl., Fl. Lapp. 389 (1812).

Diplophyllum albicans var. *taxifolium* Lindb., Acta Soc. Sci. Fenn. 10: 236 (1872).

Japanese name: Hosoba-futae-urokogoke (Yasuda 1911); Hoso-kooigoke (Ihsiba 1930).

Plant 1-2 cm long, 1.7 mm wide, light green to brownish, in mats. Stem 0.2-0.25 mm thick, simple or sparingly branched, with occasional innovations beneath the perianth, ascending: in cross section the cortex differentiated from the interior region; cortical cells in 1-3 layers, 8-10 μ , brown, with thickened walls; interior cells 14 μ , white, thin-walled. Rhizoids scarce. Leaves approximate to

Text-fig. XVII.

Diplophyllum albicans (L.) Dum. (1-11)

1. Part of female plant with perianth, dorsal view, $\times 10$.
2. Leaf, dorsal view, $\times 16$.
3. Do., $\times 25$.
4. Do., ventral v., $\times 16$.
5. Part of cross section of stem, $\times 285$.
6. Cells from leaf apex, $\times 285$.
7. Cells from leaf middle, $\times 285$.
8. Cells from leaf base, $\times 285$.
9. Cross section of perianth, at apex, $\times 16$.
10. Do., at middle, $\times 16$.
11. Gemmae, $\times 285$.

Diplophyllum taxifolium (Wahl.) Dum. (12-26)

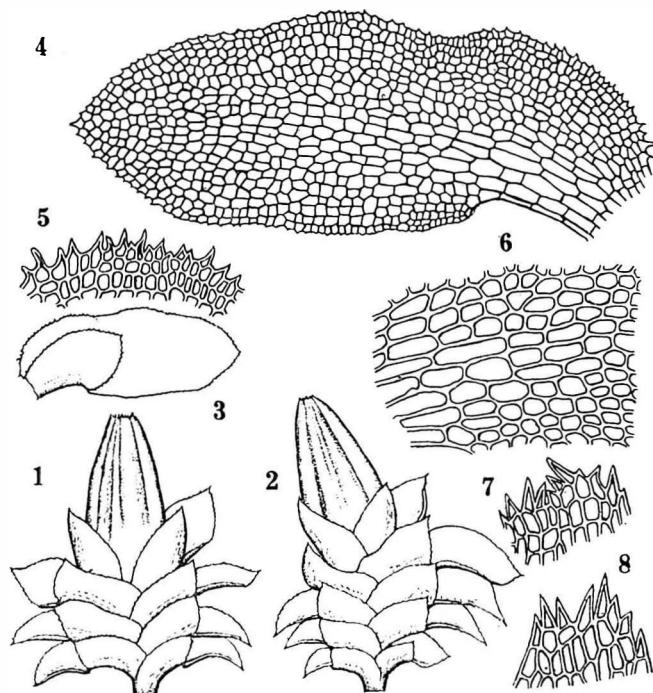
12. Part of male plant, dorsal view, $\times 16$.
13. Part of stem, dorsal v., $\times 25$.
14. Do., ventral v., $\times 25$.
- 15-17. Leaves, $\times 25$.
18. Part of cross section of stem, $\times 285$.
19. Cross section of keel of leaf, $\times 150$.
20. Cells from leaf apex, $\times 285$.
21. Cells from leaf middle, $\times 285$.
22. Cells from leaf base, $\times 285$.
23. Perianth, $\times 10$.
24. Cross section of perianth, at apex, $\times 16$.
25. Do., at middle, $\times 16$.
26. Gemmae, $\times 285$.

Diplophyllum serrulatum (K.M.) Steph. (27-33)

27. Cells from leaf apex, $\times 285$.
- 28, 29. Cells from leaf middle, $\times 285$.
30. Part of cross section of stem, $\times 285$.
31. Cross section of perianth, at apex, $\times 16$.
32. Do., at middle, $\times 16$.
33. Gemmae, $\times 285$.

Figs. 1-11 were drawn from the specimen, *K. Mayebara* 3029; figs. 12-26 from S. Hattori's collection at Mt. Ontake; figs. 27, 28 from *T. Amakawa* 750; fig. 29 from *T. A.* 749; figs. 30-32 from *K. Okada* 7; fig. 33 from *T. A.* 692. All drawn by T. Amakawa.

more or less imbricate, not or little larger up the shoot, transversely inserted, semiamplexicaul, not decurrent. Commissure 0.3–0.4 the length of the ventral lobe, slightly concave dorsally, one cell thick dorsiventrally, in cross section angle



Text-fig. XVIII. *Diplophyllum serrulatum* (K. Müll.) Steph.

1, 2. Apices of stem with perianth, dorsal view, $\times 14$. 3. Leaf, $\times 45$. 4. Do., $\times 120$. 5. Cells from basal margin of the ventral lobe of leaf, $\times 170$. 6. Cells from base of the ventral lobe, $\times 170$. 7-8. Parts of mouth of perianth, $\times 170$. The figures were drawn by S. Hattori from the specimen determined by Stephani as *Diplophyllum sendaicum* Steph.

rounded. Dorsal lobe ligulate, appressed to the stem, $2/3$ – $3/4$ the ventral in size, width half the length, arching to $2/3$ of the stem, apex acute with a point or obtuse, margin weakly denticulate. Ventral lobe widely to horizontally spreading, ligulate, somewhat falcate, 0.8–1.2 mm long, 0.3–0.5 mm wide, apex obtuse, margin denticulate to crenulate. Cells along the leaf margin 8 – 10μ , of the leaf middle 12 – 17 \times 8 – 14μ , of the leaf base 17 – 50 \times 8 – 14μ , walls rather thin, trigones indistinct. Cuticle minutely verrucose. Gemmae rather abundant at the apex of the upper leaves, 14μ , colorless, roundish stellate showing 5–6 obtuse angles in profile. Plants unisexual. Male inflorescence below the tip; bracts in 6–8 (or more) pairs, strongly ventricose at base. Perianth $1/2$ – $3/4$ emergent, oval-oblong, 2.3–2.6 mm long and 1 mm wide, not compressed dorsiventrally, 6 or more plicate above, contracted to mouth; mouth $1/8$ – $1/4$ the width of the perianth, denticulate to crenulate.

Hab. Wet rocks or soil; not uncommon in the alpine and subalpine regions.

Type locality: Lapland (?)

Examinations. **Hokkaidō**: Mt. Ashibetsu, *T. Sasaki* 551, 558. **Honshū**. Aomori: Yagen, *Z. Nakajima* 52, 57, 67; Yamagata: Mt. Asahi, *S. Hattori* 826, 827, 837; Fukushima: Mt. Hiuchi, *S. H.* 1563-1568; Niigata: *Y. Ikegami* 5320; Gunma: Hatomachi Pass, *S. H.* 1556, 1557, Mt. Shibutsu, *S. H.* 683, 1558-1562, Mt. Akagi, *K. Tsunoda* 66; Ishikawa: Mt. Hakusan, *Y. I.* 8998; Nagano: Mt. Tsubakuro, *S. H.* 1166, 1499, Mt. Jōnen, *S. H.* 1167, 1168, Mt. Ontake, *S. H.* **Shikoku**. Ehime: Mt. Ishizuchi, *S. H.* 5047, 5097, 5205, 5672, 5691, *K. Oti* 2779, *M. Tokui* 1143. **Kyūshū**. Kumamoto: Mt. Ichifusa, *K. Mayebara* 2359, 2478; Miyazaki: Mt. Ōkue, *T. Anakawa* 1094; Kagoshima: Isl. Yakushima, *S. H.* 7608.

Range: Japan (Hokkaidō, Honshū, Shikoku, Kyūshū), Isl. Quelpart, Korea, Sakhalin, Siberia, Europe, N. America.

3. *Diplophyllum serrulatum* (K. Müll.) Steph. (Text-fig. XVII, 27-33, XVIII)

Diplophyllum serrulatum Steph., Spec. Hepat. 4: 112 (1910); Horik., Journ. Sci. Hiroshima Univ. B, 2, 2: 218 (1934); Bot. Mag. Tokyo 48: 455 (1934); in Asahina, l. c. 845, pl. 405, 1-3 (1939); Hikobia 1: 23 & 56 (1951); Hatt., Bull. Tokyo Sci. Mus. 11: 67 (1944); Journ. Hattori Bot. Lab. 5: 78, pl. 4, 4-7 (1951); Oti, l. c. 65 (1950). (Exsicc.) Hatt., Hepat. Jap. 4: 158 (1951).

Diplophylla serrulata K. Müll., Bull. Herb. Boiss. 3: 34 (1903); Yoshin., l. c. 17: 300 (1903).

Diplophyllum sendaicum Steph., Spec. Hepat. 6: 500 (1924) -syn. nov.

Japanese name: Nokogiri-futae-urokogoke (Yasuda 1911); Nokogiri-kooigoke (Ihsiba 1930).

Plant about 1 cm long, 1.1 mm wide, yellowish green to yellowish brown, in depressed mats. Stem 0.17 mm thick, simple or branched, ascending: in cross section the cortex differentiated from the interior region; cortical cells in 2 layers, 8-10 μ , with thickened walls; interior cells rather larger than cortical ones, thin-walled. Rhizoids scattered, not so numerous. Leaves approximate, not or little longer up the shoot, transversely inserted, semiamplexicaul, not decurrent. Commissure 0.25 the length of the ventral lobe, slightly concave dorsally, one cell thick dorsiventrally, in cross section rounded, not keeled near the base. Dorsal lobe elliptic to ligulate, appressed to the stem, 1/2 the ventral in size, width half the length, arching to the middle or up to the farther edge of the stem, apex subacute, margin densely serrulate throughout. Ventral lobe ligulate, slightly falcate, widely to horizontally spreading, 1 mm long, 0.45 mm wide, apex subacute usually with an acute apical tooth, margin densely serrulate throughout. Cells along the leaf margin 8 μ , of the leaf middle 17-26 \times 12 μ , of the leaf base 26-60 \times 14 μ , walls thin to rather thickened, trigones indistinct. Cuticle weakly to moderately verrucose. Gemmae at the apex of the upper leaves, 14 μ , 1-2 celled, more or less stellate through many projections in profile. Plants bisexual. Male inflorescence beneath the perianth or mostly on long branches; bracts several pairs; antheridia one per bract. Perianth terminal, oval-oblong, 1.5 mm long and 0.6 mm wide, not dorsiventrally compressed, plicate, contracted to the mouth; mouth 1/8-1/4 the width of the perianth, spinulose-denticulate. Spores 12-13 μ , yellowish to reddish brown, irregularly reticulate. Elaters ca. 150 μ long, 6 μ thick, brown.

Hab. On banks; common at low elevation (50-500 m. alt.), rarely ascending to ca. 1000 m. in S. Japan.

Type locality: Kochi (Prov. Tosa): Ogawa (*T. Yoshinaga*, June 1900).

Examinations. **Honshū.** Fukushima: *T. Higuchi* 34; Tokyō: *S. Hattori* 3745; Aichi: Mt. Kōbō, Ōta 419, determined by Stephani as *Diplophyllum sendaicum*; Mie: *K. Okada* 10, 11, 15, Suzuka Pass, *K. Sakurai* 163; Wakayama: *K. O.* 9; Nara: *K.O.* 1-3, 13; Ōsaka: *K. O.* 4-8; Hyōgo: *E. Tatebe* 64; Okayama: *T. Amakawa* 107. **Shikoku.** Ehime: *M. Tokui* 756, 763, *S. H.* 5529; Kōchi: Mt. Yokogura, *S. H.* 4101, 4113, 4116, 4129, Mt. Hōnokawa, *T. Yoshinaga* 4709. **Kyūshū.** Ōita: Mt. Katamuki, *A. Noguchi*; Kumamoto: *K. Mayebara* 655, 1237, 1254, 1478, 1479; Miyazaki: *T. A.* 146, 738, Mt. Osuzu, *T. A.* 746, 749, 750. Range: Japan (Honshū, Shikoku, Kyūshū), Formosa, Isl. Quelpart.

The northernmost locality the authors could confirm is Fukushima, Lat. $37^{\circ} 45' N$. *D. sendaicum* was recorded by Stephani from only one locality, that is Sendai, Lat. $38^{\circ} 15' N$. The authors have not seen the original, but found a specimen collected in the Province of Mikawa and determined as *D. sendaicum* by Stephani. This specimen, however, is identical with *D. serrulatum*.

4. *Diplophyllum obtusifolium* (Hook.) Dum. (Text-fig. XIX, 1-14)

Diplophyllum obtusifolium Dum., Rec. d'Obs. 16 (1835); Steph. Bull. Herb. Boiss. 5: 78 (1897); Spec. Hepat. 4: 114 (1910); K. Müll. in Rabenh., Krypt.-Fl. 6-2: 362, f. 107 (1914); Buch. 1. c. 3-1: 26, f. 4 (1928); Horik., Journ. Sci. Hiroshima Univ. B, 2, 2: 219 (1931); Ihsiba 1. c. 189 (1936); Frye & Clark, 1. c. 4: 581 (1946); Hatt., Bull. Yamagata Agr. Coll. 1: 42 (1949); Journ. Hattori Bot. Lab. 5: 78 (1951); 8: 23 (1952).

Jungermannia obtusifolia Hook., Brit. Jungerm. pl. 26 (1812).

Japanese name: Maruba-futae-urokogoke (Yasuda 1911); Maruba-kooigoke (Ihsiba 1930).

Plant about 1 cm long, 2 mm wide, pale green, in mats. Stem 0.2-0.25 mm thick, simple or branched, prostrate with ascending apex: in cross section the cortex is clearly differentiated from the interior region; cortical cells in 1-2 layers, 8μ , with thickened walls; interior cells 20μ , thin-walled. Rhizoids numerous to the tip of the stem. Leaves approximate to somewhat imbricate, gradually larger up the shoot, transversely inserted, semiamplexicaul, not decurrent. Commissure about 0.3 the length of the ventral lobe, not keeled near the base, slightly concave dorsally, one cell thick dorsiventrally, in cross section rounded. Dorsal lobe oblong-obovate, appressed to the stem, $1/2$ - $3/5$ the ventral in size, width, 0.5-0.6 the length, arching to middle or up to the farther edge of the stem, apex obtuse, margin

Text-fig. XIX.

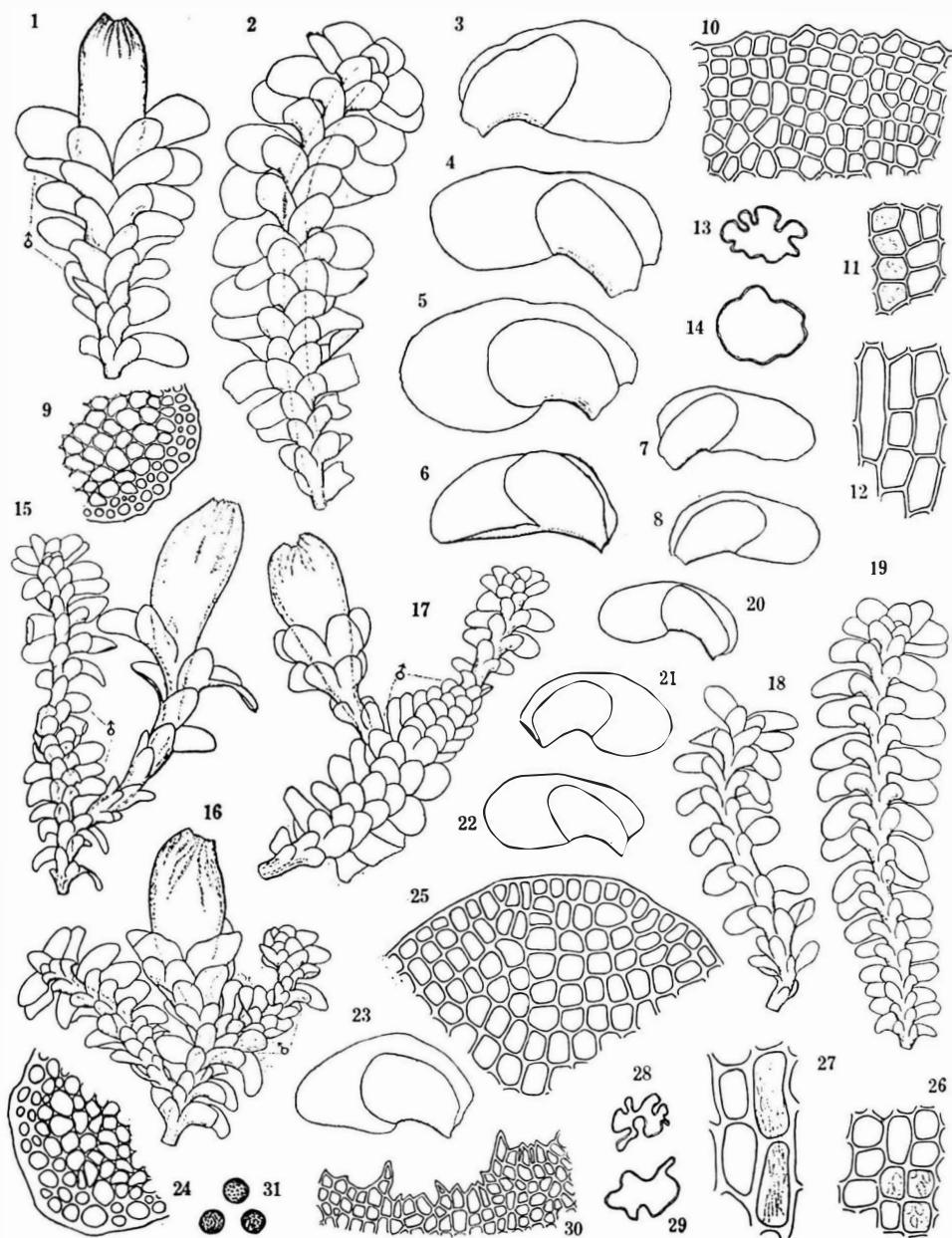
Diplophyllum obtusifolium (Hook.) Dum. (1-14)

1. Part of fertile plant with perianth, dorsal view, $\times 10$.
2. Part of sterile plant, dorsal v., $\times 10$.
- 3-8. Leaves, $\times 25$.
9. Part of cross section of stem, $\times 285$.
10. Cells from leaf apex, $\times 285$.
11. Cells from leaf middle, $\times 285$.
12. Cells from leaf base, $\times 285$.
13. Cross section of perianth, at apex, $\times 16$.
14. Do., at middle, $\times 16$.

Diplophyllum andrewsii Evs. (15-31)

- 15-17. Parts of fertile plants, dorsal view, $\times 10$.
- 18-19. Parts of sterile plants, dorsal v., $\times 10$.
- 20-23. Leaves, $\times 25$.
24. Part of cross section of stem, $\times 285$.
25. Cells from leaf apex, $\times 285$.
26. Cells from leaf middle, $\times 285$.
27. Cells from leaf base, $\times 285$.
28. Cross section of perianth, at apex, $\times 16$.
29. Do., at middle, $\times 16$.
30. Part of perianth mouth, $\times 150$.
31. Spores, $\times 400$.

Figs. 1-14 were drawn from the specimen, *Igi* 2198; figs. 17, 23 from *T. Sasaki* 4255; fig. 19 from *K. Mayebara* 2940; the others from *K. Oti* 3601. All drawn by T. Amakawa.



Text-fig. XIX.

minutely denticulate but almost entire towards base. Ventral lobe widely spreading, obovate-ligulate, somewhat falcate, 0.8–1.2 mm long, 0.5–0.8 mm wide, widest at (or above) the middle, apex obtuse to rounded, margin denticulate towards the tip. Cells along the margin of dorsal lobe 8–10 μ , of the middle 12–17 μ , of the base 17–50 \times 8–12 μ , walls thin to somewhat thickened, trigones wanting. Cuticle minutely verrucose, at base striate-verruculose. Plants unisexual. Male bracts just below the female ones or occasionally terminal on the separate branch; bracts 2–5 pairs, ventricose at base. Perianth terminal, 2/3 or more emergent, oval-oblong, 1.7 mm long and 0.7 mm wide, not or slightly compressed dorsiventrally, 4–8 plicate above, contracted to the mouth, mouth 1/2–2/5 the width of the perianth, shortly 5–8 lobed, dentate.

Hab. Soil or loamy banks; in the montane regions of Middle to North-West Japan. Rare.
Type locality: England.

Examinations. **Honshū.** Yamagata: Ubayu, *U. Faurie* 1439; Mt. Asahi, *S. Hattori* 999; Gumma: Mt. Shibutsu, *U. Mizushima* 5617; Tottori: Mt. Daisen, *Ch. Igi* 2198.

Range: Japan (Honshū, ?Shikoku, ?Kyūshū), ?Formosa, Europe, N. America.

The authors are not sure of the occurrence of the present species in Shikoku and Kyūshū and in Formosa. It seems to be probable that *D. andrewsii* has been misidentified to the present species.

5. *Diplophyllum andrewsii* Evans (Text-fig. XIX, 15–31)

Diplophyllum andrewsii Evans. Bryologist 25: 28, pl. 1, 1–11 (1922); Frye & Clark, Hepat. N. America 4: 571, f. 1–12 (1946).

Japanese name: Maruba-kooigokemodoki (nov.).

Plant 0.3–0.8 mm long, 1.5 mm wide, pale green to yellowish brown, in mats. Stem 0.2 mm thick, frequently branched, prostrate with ascending apex: in cross section the cortex differentiated from the interior region; cortical cells in 1–2 layers, 10–16 μ , walls thick; interior cells 20 μ , walls thin. Rhizoids rather numerous, long, colorless. Leaves approximate to somewhat imbricate, transversely inserted, semiamplexicaul, not decurrent. Commissure about 0.4 the length of the ventral lobe, nearly straight to slightly concave, one cell thick dorsiventrally, in cross section angular. Dorsal lobe oval to obovate, 1/2–3/4 the ventral in size, width 1/2 the length, arching to middle of the stem, apex rounded, margin entire. Ventral lobe obovate-oblong, slightly falcate, 0.7–1 mm long, 0.3–0.5 mm wide, apex rounded, margin entire. Cells along the leaf margin 7–10 μ (rarely 12 μ), of the leaf middle 14–26 \times 10–14 μ , of the leaf base 25–50 \times 7–12 μ , walls rather thick, trigones indistinct or rarely so large that cell cavities are almost rounded. Cuticle smooth or occasionally weakly verrucose and at leaf base more or less striolate. Gemmae unknown. Plants bisexual. Male inflorescence terminal, but mostly turning to intercalary through continued growth of the tip; bracts 3–5 pairs, ventricose at base. Perianth on more or less elongate branches arising below the male inflorescence, 2/3–3/4 emergent, elliptic to obovate, 2–3 mm long and 1 mm wide, more or less irregularly plicate at the upper part, gradually contracted to the mouth, mouth 1/4–1/2 the width of the perianth, sharply and irregularly toothed, the tooth 1–2-celled, rarely 3- or 4-celled. Spores 8 μ , reddish brown, irregularly reticulate.

The leaves of female branch larger up to the bracts; bracts similar to, but larger than the leaves.

Hab. Soil bank; in the montane region, rather rare.

Type locality: Near Bee-tree Creek in Buncombe County, North Carolina, N. America.

Examinations. **Hokkaidō**: Mt. Daisetsu, *T. Sasaki* 4255. **Honshū**: Nagano: Mt. Ontake, *T. Kodama* 3915; Ōsaka: *T. K.* 2198. **Shikoku**: Ehime: Mt. Ohgi, *K. Oti* 2578, 3601. **Kyūshū**: Kumamoto: *K. Mayebara* 1747, 2628, 2810, 2629, 2733, 2923; Miyazaki: Shiiba, *T. Amakawa* 489; Kagoshima: Isl. Yakushima, *K.M.* 2946.

Range: N. America. **New to Japan** (Hokkaidō, Honshū, Shikoku, Kyūshū)!

Drs. M. Fulford (Cincinnati Univ.) and R. M. Schuster (Duke Univ.) sent the authentic specimens to the authors. The former writes, "It is very rare in this country and known from a few places: One place in Kentucky (my specimen) which you will see; the places cited by Dr. Evans in the original paper; and the localities in North Carolina mentioned by Dr. Blomquist in his paper on the hepaticae of North Carolina." The present authors sent recently some specimens to Dr. Schuster for verification. His remarks on the Japanese specimens are thought to be worthy to cite: "I find only a few slight differences. Your plants tend to have the lobes of the perianth running out into 1-2-celled teeth (often 4-5-celled teeth in *D. andrewsii* from N. America); your plants have the cells sometimes slightly smaller on the leaf-margins (7-8 μ). These are not sufficient to separate the species however." The authors quite agree with his opinion. In the Japanese plants also the marginal cells of leaves occasionally reach 10-12 μ , and the teeth of perianth-mouths to 3-4 cells long. Further, the Japanese plants tend to have somewhat thicker cell walls and trigones. Thus, permitting such differences, the authors wish to identify the Japanese plants with North American *D. andrewsii* in respect of specific category.

The present species may be separable with difficulty from *D. obtusifolium*, but for perianths and male bracts. It seems possibly to be necessary to re-examine the Japanese and Formosan collections which have been referred to *D. obtusifolium*. Under the microscope, however, the present species is clearly distinct from the latter by its entire leaf-margins and perianths on more or less elongate branches arising below the male inflorescence.

Additions and corrections

Scapania bolanderi var. *nipponica* Amak. et Hatt. var. nov. (Text-fig. XX, 1-5)

Dioica, olivacea. Caulis fere erectus, 1-2 cm longus, 0.25 mm in diametro, cum foliis 1.3-1.7 mm latus, pauciramosus. Folia caulinata parum imbricata, oblique patula, 1/4-1/6 biloba: lobus posticus obovatus, 1-1.2 mm longus, medio 0.85 mm latus, convexus, valde recurvus, basi longe decurrentes, apice late obtusus, ubique dense dentatus, dentibus 1-5 cellulas longis, basi 1-3 cellulas latis; lobus anticus subcordatus vel ovato-rectangulatus, 0.9 mm longus, 7 mm latus, convexulus, apice subacutus, margine dentatus, dentibus basalibus simplicibus, i.e. non furcatis, carina brevi, 0.17-0.25 mm longa. Cellulae apicales 12-14 μ , mediae 14-20 μ , basales 26×14 μ . Perianthia late campanulata, 1.5 mm longa, 1.2 mm lata, compressa, recurvata, ore late truncata plurilobato, lobis irregulariter spiniferis.

Hab. Decayed wood; alpine or subalpine.

Examinations. **Honshū.** Nara: Mt. Ōdaigahara, 1600 m., *T. Kodama* 4634-type! in Herb. Hattori Bot. Lab.; Nagano: Mt. Ontake, *T. Nakajima*.

Like var. *americana* Frye et Clark (=*Sc. americana* K. Müll.), the present variety is separated from the type by having no antleroid teeth at the base of dorsal lobe of leaf. But the present variety is smaller and more coarsely dentate than in var. *americana*.

Scapania kamimurae Amak. et Hatt., spec. nov. (Text-fig. XX, 6-17)

Scapania umbrosa [non (Schrad.) Dum.] Kamim., Contr. Hepat. Fl. Shikoku 69, f. 18 (1952).

Japanese name: Kamimura-hishakugoke (nov.)

Dioica, e fusco-olivacei rufescens. Caulis ascendens, ca. 10 mm longus, simplex: stratum corticale 1-2 cellulas crassum, cellulis incrassatis, parum miroribus. Folia caulina contigua vel parum imbricata, oblique patula, 2/3-1/2 inaequaliter biloba; lobus posticus oblongus vel ligulatus, 0.82 mm longus, medio 0.46 mm latus, apice late triangulatus acutus, margine integerrimus vel sensim supernem denticulatus raro dentatus, basi haud decurrentes; lobus anticus ovalis, 0.5 mm longus, medio 0.4 mm latus, acutus, subintegerrimus, caulem vix tegens; carina 0.26-0.33 mm longa. Cellulae marginales 10-15 μ , mediae 20-26 \times 14-17 μ , basales 34 \times 17 μ , trigonis distinctis et saepe nodulosis, cuticula levi. Perianthia 1.3 mm longa, 1 mm lata, vix compressa, superne irregulariter parvifllicata, apice truncato, dentato.

Hab. Rocks (preferably on granitic one), in montane areas.

Examinations. **Honshū.** Yamagata: Mt. Asahi, ca. 800 m., *S. Hattori* 1022-type, in Harb. Nat. Sci. Mus. Tokyo, 1023. **Shikoku.** Kochi: Kadoya, *M. Kamimura* 1243, -reported as *Scapania umbrosa*, in Herb. M. Kamimura.

M. Kamimura (1952) reported the occurrence of *Sc. umbrosa* in Kochi Prefecture in Shikoku. But it seems difficult that such a subalpine~subarctic species should occur in the southern lowland of Shikoku. By Mr. Kamimura's courtesy the authors were able to examine his material, and found that it does not belong to *Sc. umbrosa*, but represents the present new species, which one of the authors also collected on Mt. Asahi, N. Honshū in 1941. The present species is distinct from *Sc. umbrosa* by the dentate margin of perianth-mouth. The stem-structure and hardly decurrent ventral leaf-lobe of the present species point that it may be put in Sect. *Curtæ*, and its near ally seems to be *Sc. mucronata*.

Scapania curta (Mart.) Dum. (Text-fig. XX, 18-23)

Scapania curta Dum., Rec. d'Obs. 14 (1835); Buch. Soc. Sci. Fenn., Comm. Biol. 3-1: 57, f. 12 (1928); Frye & Clark, Hepat. N. America 4: 601, f. 1-10 (1946).

Jungermannia curta Mart., Fl. Crypt. Erlangensis 148 (1817).

Scapania nana Amak. et Hatt., Journ. Hattori Bot. Lab. 9: 57, f. 6, 1-10 (1953), =*Sc. pusilla* Amak. et Hatt., l. c. 10: 69 (1953), nom. nud., -syn. nov.

Type locality: European.

Hab. On rocks (usually on granitic and volcanic ones); alpine and subalpine; not uncommon.

Examinations. Amakawa & Hattori, l. c. (Additions) **Hokkaidō:** Mt. Daisetsu, *T. Sasaki* 4231. **Honshū.** Yamagata: Mt. Asahi, *S. Hattori* 1004; Gumma: Hatomachi Pass, *S.H.* 681; Nagano: Mt. Jōnen, *S. H.* 1276, Mt. Tsubakuro, *S. H.* 1409; Mt. Ontake, *S. H.*

Range: Europe, Siberia²⁾, Asia³⁾, Africa, Canary Is., Greenland, N. America. **New to the flora of Japan** (Hokkaidō, Honshū).

The authors described a new species, *Scapania nana*, based on the material collected on Mt. Hiuchi, M. Japan, and remarked, "The present species is closely related to *Scapania curta*, but ventral lobes of leaves are usually obovate, keel short and stout, cells smaller and trigones not so large as in *S. curta*, and the mouth of perianth usually irregularly angular." Afterwards, they received many European and N. American collections of *S. curta*. As a result of careful comparison with the type, *S. nana* proved to be included within the specific category of *S. curta* which is polymorphous and widely distributed but not so far recorded from Japan. The type specimen of *S. nana*, particularly its perianths are more or less atypical and not in good condition. The authors found six collections (see, Examinations) referable to *S. curta*. Those collections are from N. Japan, and their perianth-mouth shows denticulation.

Species not available

Diplophyllum japonicum Steph. in Bescherelle, Rev. Bryol. 22-2: 26 (1894), nom. nud.

Bescherelle (1894) reported the present species only citing its locality, as follows: *Diplophyllum japonicum* St. n. sp. -Nippon, Montagne de Hakkoda, n. 830 e p. No bryologists have touched this nomen nudum species thenceforth, and the authors have not been able to find any key to reveal the features of *D. japonicum*, as they could not locate the material.

Scapania ciliata Sde. Lac. in Miquel, Ann. Mus. Bot. Lugd.-Bat. 3: 209 (1867) & Prol. Fl. Jap. 373, 391 (1867); Mitt., Trans. Linn. Soc. London 2, 3: 195 (1891) as a syn. of *Martinella gracilis*; Steph., Bull. Herb. Boiss. 5: 82, 84 (1897) with note; K. Müll., Nova Acta Acad. Caes. Leop.-Carol. 83: 141, 142 (1905) as a syn. of *S. levieri*.

The authors have not seen the original collection. Except by Miquel (1867) no diagnoses have been given for this, and Miquel's diagnose is too brief and lacks the detailed locality. Mitten (1891) regards the present species as synonymous with *Martinella gracilis*, but Stephani (1897) does not consider so, and K. Müller (1905) thinks that it may be identical with *S. levieri*, citing a collection "Japan, Kattasan, Hayachine (Makino)!" and he doubts if or not Stephani (1897) examined the type specimen. Thus, the settlement of the problem depends on locating the type.

The species rejected from Japan

Scapania paucidens Steph., Spec. Hepat. 6: 504 (1924).

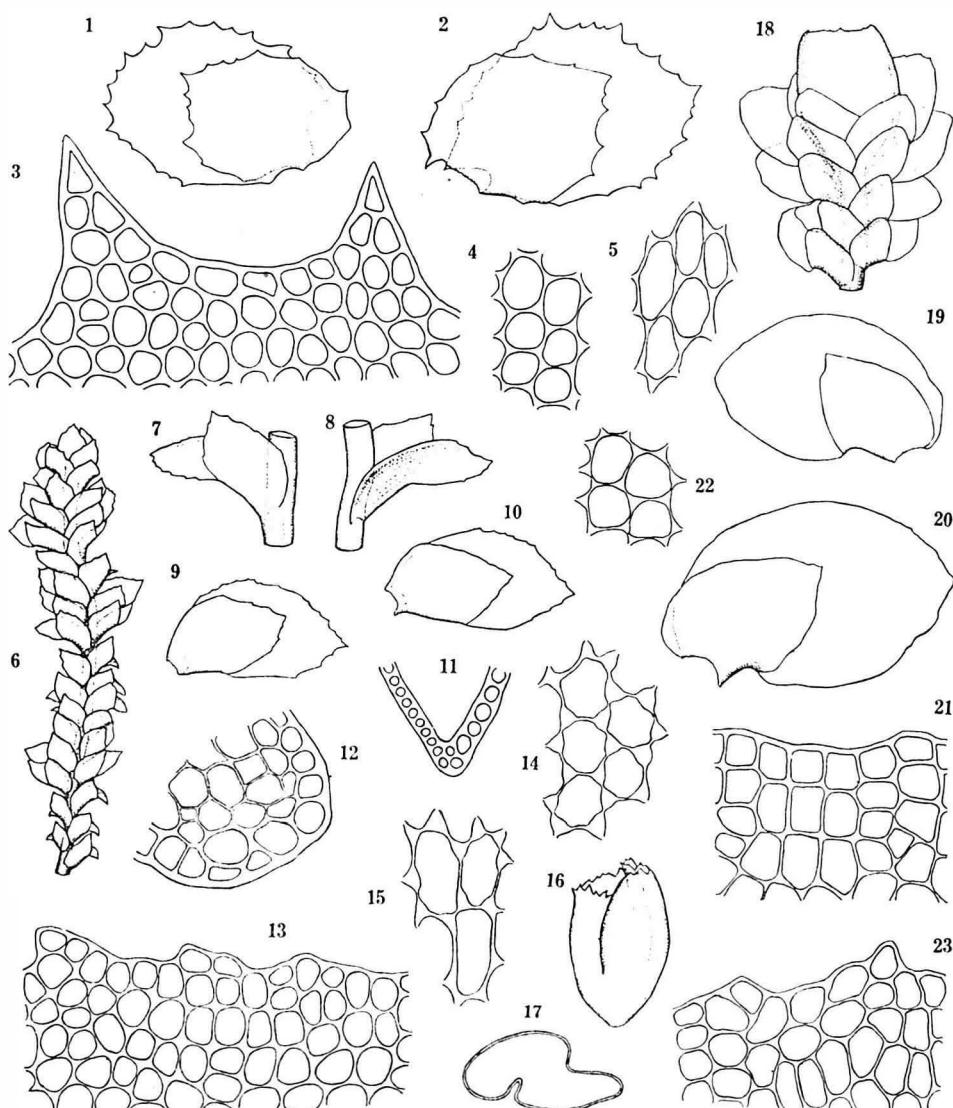
In the original description Stephani cited "Japonia: Molokai (Faurie legit)." Hattori found the isotype of the present species in Herb. Kyoto University, which was labelled "Molokai, Kamolo (Faurie no. 516, 1910-)." Molokai does not belong

2) Arnell reported from Lena *Martinella curta* var. *viridissima* K. Müll. and *M. rosacea* (Cord.) Lindb., both synonymous with *S. curta*. Arkiv f. Bot. 13-2: 18 (1913).

3) Reimers reported from Asia minor (Pontus). Notizbl. Bot. Gart. u. Mus. Berlin-Dahlem 10 (91): 32 (1927).

to the Japanese Archipelago, but to the Islands of Hawaii. Thus the present species should be rejected from the flora of Japan.

Scapania javanica Gott., Nat. Tijdsch. v. Nederl.-Indie 4: 574, 575 (1853); Sde. Lac. in Miq., Ann. Mus. Bot. Lugd.-Bat. 1: 298 (1863-64); Miq., Prol. Fl. Jap. 391 (1867); Steph., Bull. Herb. Boiss. 5: 82 (1897); Schiffn., Conspectus 220 (1898); Steph., Spec. Hepat. 4: 141 (1910); Ihsiba in Yadu, Nikko no Shokubutsu to Dobotsu 191 (1936). Syn. *Martinella javanica* Mitt., Trans. Linn. Soc. London 2, 3: 195 (1891).



Text-fig. XX.

Sande Lacoste (1863-64) recorded the present species from Japan, and Miquel (1867), Mitten (1891) and Stephani (1897) followed him. However, K. Müller (1905) did not confirm the occurrence of the present species in Japan, and Stephani (1910) and Warnstorff (1921) did not cite Japan as the locality. Ihsiba (1936), based on Stephani's identification, recorded *S. javanica* from Nikkō (M. Japan), but it is considered to be incorrect. Hattori (1944) proposed two varieties (var. *nipponica* and var. *osumiensis*) of *S. javanica* from S. Japan. Afterward, however, he transferred them to *S. stephani* and *S. ligulata* respectively. The authors hesitate to recognize the occurrence of *S. javanica* in Japan as yet.

Scapania levieri K. Müll. in Nova Acta Acad. Caes. Leop.-Carol. 83: 140, pl. 14b (1905); Yoshinaga in Bot. Mag. Tokyo 20: 54 (1906); Steph., Spec. Hepat. 4: 139 (1910); Nicholson in Mazzetti, Symb. Sinic. 5: 29 (1930); Hatt. in Journ. Hattori Bot. Lab. 4: 53 (1950).

The geographical area of the present species is Sikkim Himalaya-Yunnan-Szechwan-Hunan. In 1906 Yoshinaga, based on the identification by Stephani, reported the occurrence of this species in Japan. Recently Hattori (1950, 1952) regarded *S. levieri* as synonymous with *S. spinosa*. However, the authors do not confirm the occurrence of *S. levieri* in Japan; Yoshinaga's report (1906) was due to the erroneous identification by Stephani who mistook a form of *S. spinosa* for *S. levieri*. The two species are very closely allied with one another. As Hattori regarded already, they may possibly fall into the same specific category. The authors, however, deal with them as a vicarious species at present, and reserve the conclusion on the relationship of the two, until they will finish the examinations of ample materials of Himalayan *S. levieri*.

Key to genera, sections and species

- | | |
|---|---|
| 1 | Perianth with a contracted plicate mouth; leaf-lobes narrowly oblong-ovate, commissure is not keeled below, forming a sheath around the stem 2 |
| | Perianth with a wide, strongly flattened mouth lacking plicae; leaf-lobes varying from ovate(-oblong) to roundish, commissure keeled throughout.....(Gen. <i>Scapania</i>) 8 |

Text-fig. XX.

Scapania bolanderi var. *nipponica* A. et H. (1-5)

1, 2. Leaves, dorsal view, $\times 25$. 3. Cells along leaf margin, $\times 285$. 4. Cells from leaf middle, $\times 285$. 5. Cells from leaf base, $\times 285$.

Scapania kamimurae A. et H. (6-17)

6. Part of sterile plant, $\times 10$. 7. Leaf, dorsal v., $\times 16$. 8. Do., ventral v., $\times 16$. 9, 10. Leaves, dorsal v., $\times 25$. 11. Cross section of keel of leaf, $\times 150$. 12. Part of cross section of stem, $\times 285$. 13. Cells along leaf margin, $\times 285$. 14. Cells from leaf middle, $\times 285$. 15. Cells from leaf base, $\times 285$. 16. Perianth, $\times 16$. 17. Cross section of perianth, $\times 25$.

Scapania curta (Mart.) Dum, a form (18-23)

18. Parts of female plant, $\times 10$. 19, 20. Leaves, $\times 25$. 21. Cells along leaf margin, $\times 285$. 22. Cells from leaf middle, $\times 285$. 23. Cells from perianth mouth, $\times 285$.

Figs. 1-17 were drawn from each types, and figs. 18-23 from S. Hattori's collection from Mt. Ontake. All drawn by T. Amakawa.

- 2 { Plant robust; leaf-cells larger, mostly pronounced collenchymatous; gemmae 2-4 celled (Gen. *Macrodiplophyllum*) 7
 2 { Plant not robust; leaf cells smaller and less collenchymatous (often lacking trigones); gemmae 1-2 celled (Gen. *Diplophyllum*) 3
- 3 { Leaf-lobes with a distinct median vein *D. albicans*
 3 { Leaf-lobes lacking such a vein 4
- 4 { Leaves distinctly serrulate throughout *D. serrulatum*
 4 { Leaves denticulate to entire 5
- 5 { Dioicous; leaf-lobes somewhat acute or apiculate; gemmae abundant *D. taxifolium*
 5 { Monoicous or paroicous; leaf-lobes broadly rounded at apex; gemmae unseen 6
- 6 { Leaves usually denticulate toward tip; male bracts just below the female one or rarely terminal on a separate branch *D. obtusifolium*
 6 { Leaves entire throughout; female inflorescence on a more or less elongate branch arising just below the male inflorescence (occasionally the female branch becoming detached, thus apparently unisexual); plants small, stems 3-8 mm long *D. andrewsii*
- 7 { Leaf margin nearly entire or somewhat dentate toward tip, end cell of the leaf teeth almost as long as wide, cuticle very minutely papillose *M. plicatum*
 7 { Leaf margin denticulate except near sinus, end cells of the teeth about twice as long as wide, spinose, cuticle densely and coarsely papillose *M. microdontum*
- 8 { Leaves bilobed to the base (Subgen. *Protoscapania*) *Scapania ornithopodioides*
 8 { Leaf-keel longer than 1/6 the length of the ventral leaf-lobe (Subgen. *Euscapania*) 9
- 9 { Leaves ciliate to dentate towards base 10
 9 { Leaves entire to denticulate toward tip 19
- 10 { Base of the dorsal lobe strongly ciliate-dentate, teeth often with antleroid branching..
 10 { Base of the dorsal lobe not ciliate-dentate, teeth simple (without antleroid branching) 13
- 11 { Antleroid teeth easily seen 12
 11 { Antleroid teeth unseen *S. bolanderi* var. *nipponica*
- 12 { Plant large, 5-10 cm long; leaves 2-3 mm long, rather regularly ciliate-dentate; apical leaf-cells 20-26 μ *S. bolanderi* var. *major*
 12 { Plant not so large, 1-5 cm long; leaves 1.5-1.8 mm long, coarsely ciliate-dentate; apical leaf-cells 12-17 μ *S. bolanderi* var. *bolanderi*
- 13 { Dorsal leaf-lobe decurrent; cuticle distinctly verrucose (leaf-margin densely ciliate, teeth mostly one-celled and longly spinose); gemmae 2-celled (Sect. *Aequilobae*) *S. spinosa*
 13 { Dorsal leaf-lobe decurrent; cuticle verruculose; gemmae one-celled, cinnamon brown..
 13 { Dorsal leaf-lobe not decurrent; cuticle smooth to faintly verrucose; gemmae one-celled, green or occasionally reddish (Sect. *Nemorosae*) *S. ampliata*
 14 { Wing of leaf-keel conspicuously developed *S. okamurana*
 14 { Wing of leaf-keel absent or not conspicuous 15
- 15 { Ventral leaf-lobe broadly ligulate, marginal teeth triangular, leaf-cells larger; plant larger *S. ligulata*
 15 { Ventral leaf-lobe obovate-oblong, marginal teeth acute, leaf-cells smaller; plant smaller. 16

- 16 { At higher places, mostly alpine or subalpine; leaves wider, antical lobes comparatively large, cells usually 8-10 μ along the margin 17
 16 { At lower places; leaves narrower, antical lobe comparatively small, cells 8-12 μ or occasionally 17 μ along the margin 18
- 17 { Plant small (about 1 cm long or less); leaves denticulate, cuticle nearly smooth *S. parvidens*
 17 { Plant not so small; leaves dentate to ciliate-dentate, cuticle usually verrucose *S. parvifertu*
- 18 { Ventral leaf-lobe obovate-oblong, minutely to coarsely dentate, cells 8-12 μ along the margin, 14-17 μ in the middle; perianth-mouth not lobed *S. stephanii*
 18 { Ventral leaf-lobe narrower, less dentate to nearly entire, cells larger, 10-17 μ along the margin, 18-24 \times 12-15 μ in the middle; perianth-mouth lobed *S. integerrima*
- 19 { Ventral leaf-lobe long decurrent, cells not collenchymatous without or with small trigones; cortical cells of stem in 2-4 layers; gemmae 2-celled..(Sect. *undulatae*) ..20
 19 { Ventral leaf-lobe not decurrent, cells collenchymatous or nearly so with developed trigones; cortical cells of stem in 1-2 layers; gemmae 1-(2) celled 22
- 20 { Keel of leaf straight or weakly curved 21
 20 { Keel of leaf semicircularly arched *S. paludosa*
- 21 { Dorsal leaf-lobe 3/4 (or more) the ventral in length; plant pale green .. *S. subalpina*
 21 { Dorsal leaf-lobe about half the ventral in length; plant mostly reddish and not pale green *S. undulata*
- 22 { Width of the ventral lobe of leaf 0.45-0.8 the length 23
 22 { Width of the ventral lobe of leaf 0.85-1.35 the length.....(Sect. *Irriguae*) 27
- 23 { Plant small, less than about 6 mm long; on decaying wood; leaf-cells conspicuously papillose(Sect. *Apiculatae*) *S. apiculata*
 23 { Plant 4-15 mm long; on soil or rocks.....(Sect. *Curtiae*) 24
- 24 { Plant narrower (1.15 mm wide); trigones of leaf-cells large and often nodulose 25
 24 { Plant wider (2-3 mm wide); trigones of leaf-cells smaller 26
- 25 { Leaf-margin entire, dorsal lobe with piliferous apex *S. mucronata*
 25 { Leaf-margin dentate, dorsal lobe mostly pointed, but lacking such a piliferous apex *S. kamimurae*
- 26 { Ventral leaf-lobe oblong, width half the length *S. diplophyloides*
 26 { Ventral leaf-lobe obovate, width 2/3 the length *S. curta*
- 27 { Ventral leaf-lobe roundish, keel semicircularly arched *S. paludicola*
 27 { Ventral leaf-lobe ovate, keel less strongly curved *S. irrigua*

Summary

The authors recognize 27 species and 2 varieties of the *Scapaniaceae* in Japan, which comprise 3 genera, 2 subgenera and 8 sections, as follows:

Gen. *Diplophyllum*.....*D. albicans*, *D. taxifolium*, *D. serrulatum*, *D. obtusifolium*, *D. andrewsii*

Gen. *Macrodiplophyllum*.....*M. plicatum*, *M. microdontum*

Gen. *Scapania* ·Subgen. *Euscapania*

- Sect. *Apiculatae*.....*S. apiculata*
Sect. *Curtae*.....*S. curta*, *S. diplophyilloides*, *S. mucronata*, *S. kamimuriae*
Sect. *Irriguae*.....*S. irrigua*, *S. paludicola*
Sect. *Undulatae*.....*S. undulata*, *S. subalpina*, *S. paludososa*
Sect. *Nemorosae*.....*S. ampliata*
Sect. *Stephaniae*.....*S. stephani*, *S. integerrima*, *S. ligulata*, *S. parvitexta*,
S. parvidens, *S. okamurae*
Sect. *Aequilobae*.....*S. spinosa*
Sect. *Gracilidae*.....*S. bolanderi* (var. *bolanderi*, var. *major* and var. *nipponica*)
Gen. *Scapania* -Subgen. *Protoscapania*.....*S. ornithopodioides*
Species to be excluded from the flora of Japan: *Scapania paucidens*, *S. levieri*,
and possibly *S. javanica*.
Species not available for the present study: *Diplophyllum japonicum* (nom.
nud.) and *Scapania ciliata*.

Acknowledgements

The authors wish to express their deep gratitudes to all persons and institutions who have helped them in various way. Messrs. N. Takaki, Y. Ikegami, T. Sasaki, K. Okada, K. Mayebara, Y. Kuwahara, and other persons offered their collections for the present study⁴⁾. Drs. R. M. Schuster, M. Fulford, C. E. B. Bonner, H. Buch and others forwarded many specimens for comparative study. The herbaria of Kyoto University and of National Science Museum, Tokyo, cooperated with the authors in the loan of the collections.

4) Most specimens examined are deposited in the herbarium of Hattori Botanical Laboratory, and some others in the herbaria of Kyoto University (Faurie collection) and National Science Museum, Tokyo (a portion of Hattori collection). The duplicate specimens are in the private herbaria of T. Amakawa and many others.

MARCHANTIALES OF JAPAN. IV¹⁾

By Sinske HATTORI and Daisuke SHIMIZU

服部新佐、清水大典：日本のゼニゴケ類（其四）¹⁾

17. *Athalamia pusilla* (Steph.) Kashyap, Liverw. W. Himalayas & Panjab Pl. 1: 87, pl. 18: 1-6 (1929); Hatt. in Journ. Hattori Bot. Lab. 12: 53 (1954). Syn. *Gollaniella pusilla* Steph. in Hedw. 64: 74 (1905); Kashyap in New Phytol. 14: 14, fig. 7 (1915); Shim. & Hatt., 1. c. 9: 36 (1953). Text-fig. XVIII.

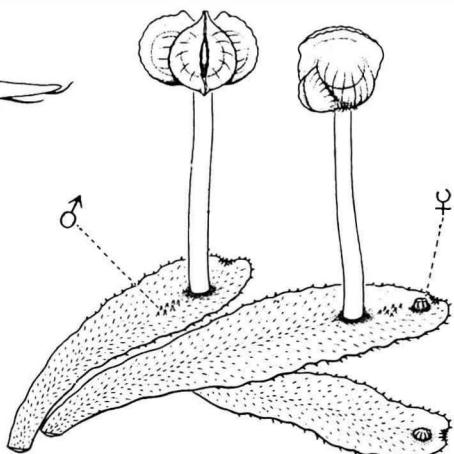
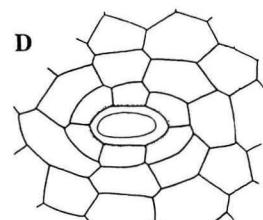
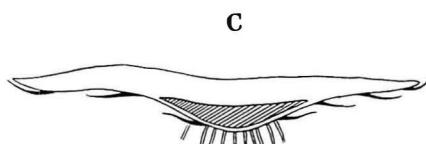
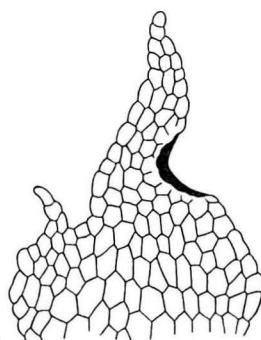
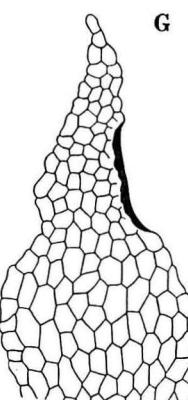
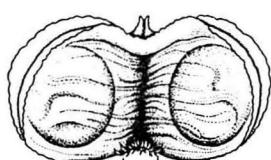
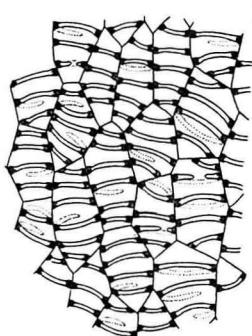
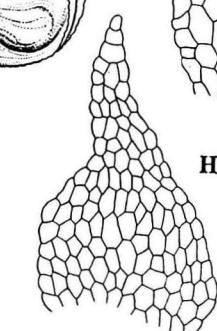
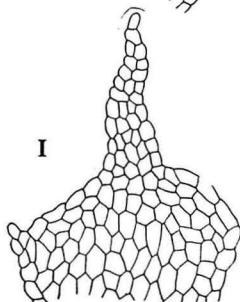
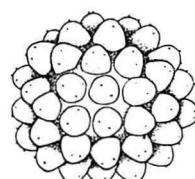
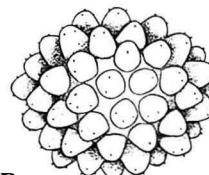
Monoecious; thalli more or less thick, greenish, sometimes slightly purplish along margin, vein convex beneath, 5~10 mm long, 1.5~2 mm wide, only once or hardly forked, slightly notched at apex. Ventral scales in 5~7 (~9) irregular longitudinal rows, occasionally with 1~3 teeth (of 1~3 cells) at margin, purplish, ovate in outline, appendages 1, lanceolate to ovate-lanceolate, tapering, slightly purplish or rarely almost hyaline, forming a cluster at thallus apex, appendages of the outermost scales reaching or more frequently emerging a little beyond thallus margin. Pores slightly elevated, bordered by 5-6 cells, the radial walls of the cells not thickened. Epidermal cells thin-walled, trigones lacking. Antheridial receptacle not well differentiated, without surrounding bractlets, antheridia dorsal, median, in an elongate group near the female one or on a separate branch. Female receptacle pale to whitish green, 1~2 mm wide, 1~1.3 mm thick, stalked; stalk pallid, without rhizoid furrow, 3~5~6.5 mm long, naked, bractlets restricted to tip, appressed to the disk, hyaline, lanceolate to oblong-lanceolate, with an apical and 2~5~7 lateral teeth; lobes 1~3, weakly tuberculate, 2-lipped, directed upward slightly. Sporangia 1~3 per receptacle, brown, opening by several splits from the tip backward; thickenings within the wall cell annular to semiannular. Spores dark brown, 45~52 (~60) μ in diameter, densely warty, warts large, 7~8 (~9) through a diameter, minutely or indistinctly punctulate. Elaters brown, 140~160 ~200~240 μ , ca 8 μ thick, with (2~)3 spirals in the middle.

Examination. India: Mussoorie, Arniagadh botan. Garden, earthy banks, 5500 ft., September 10, 1900, Coll. W. Gollani, -type in Conserv. Genève.

Kashyap (1915, 1929) described and discussed this long missing species in detail. But his figures are not so detailed. The illustration presented here by the authors is based on the type specimens deposited in the Conservateur, Genève. The narrow thallus, which seldom forks, the ventral scales dispersed up to the thallus margin, and the non stellate pores of thallus seem to be distinct features of the present species. As to the habitat and range Kashyap (1929) states, "Hab. Moist and shady places. Distr. Common in the Outer and the Kumaon Himalayas, 6000 to 10,000 feet." He also noted on the pore of thallus, "The cells bounding the pores are usually thin-walled. Sometimes, however, the radial walls of the cells are slightly thickened."

18. *Athalamia chinensis* (Steph.) Hatt. in Journ. Hattori Bot. Lab. 12: 54 (1954). Syn. *Cleva chinensis* Steph., Sp. Hep. 6: 4 (1917). Text-fig. XIX.

1) 本研究は文部省補助金に負ふ。

B**K****L****M****P**

Text-fig. XVIII.

Monoeious; thalli more or less thin, pale green, slightly purple along margin, 5~10 mm long, 2~3 mm wide, 1~2 times dichotomous, vein slightly convex beneath. Upper surface showing small polygonal areas. Ventral scales in 2~4 irregular longitudinal rows on vein, ovate to elliptical, often with a tooth at margin, slightly purple; appendages 1, lanceolate to ovate-lanceolate, tapering. Dorsal epidermal cells rather weakly thickened, trigones small. Pores simple, slightly elevated, surrounded by 5 cells, those cells with distinctly thickened radial and inner walls (stellate). Antheridial receptacle not clearly differentiated, median, dorsal, without surrounding bractlets, near the female receptacle or on a separate branch. Female receptacle terminal, usually soon becoming dorsal, pale green, 1.5~3 mm wide, 1.5~2 mm thick, stalked; stalk pallid, 1~4 mm long, without rhizoid furrow, naked, bractlets restricted to tip, appressed to the disk, hyaline, lanceolate, with 4~6~8 teeth; lobes 1~2 (~3), horizontally directed, weakly tuberculate. Sporangia 1~2 (~3) per receptacle, dark brown, splitting open by rents from the tip backward; its wall 1 cell thick, wall cells with semi- to complete annular thickenings. Spores dark brown, 56~66~70/ μ in diameter, densely warty, warts 8~9 through a diameter, minutely or indistinctly punctulate. Elaters pale brown, 140~160~200/ μ long, 8~10/ μ thick, with 2~3 spirals in the middle.

Examination. China: Schensi in catena Lao-y-san, ann. 1850, Giraldi leg., -type in Conserv. Genève.

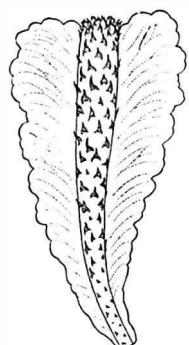
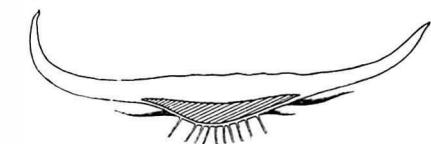
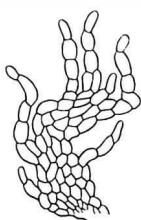
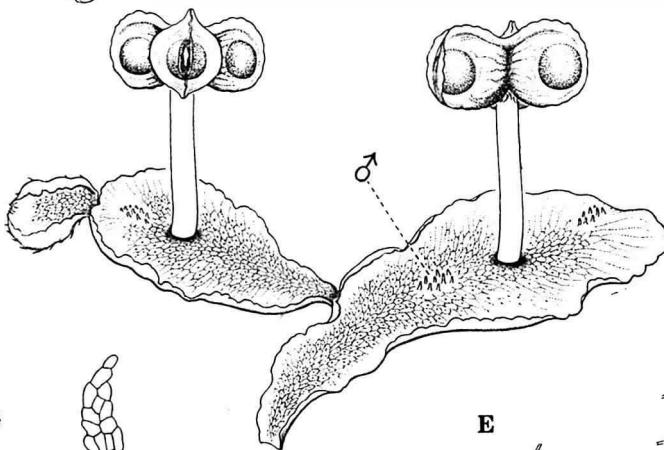
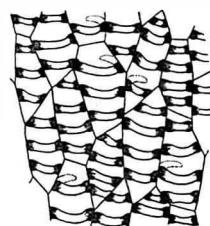
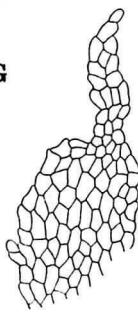
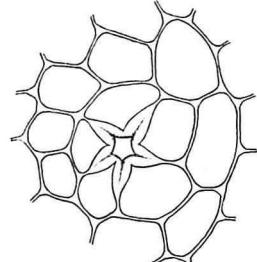
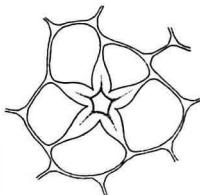
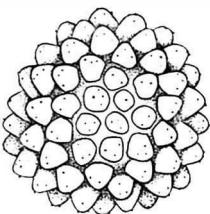
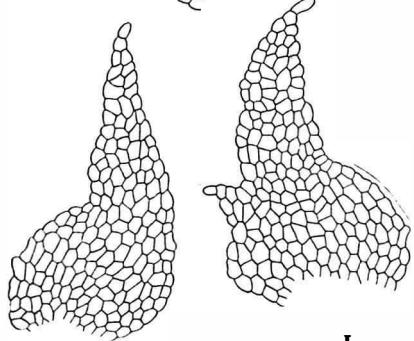
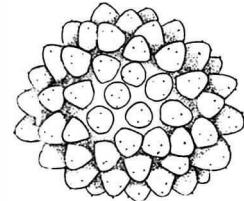
Except the original diagnose and unpublished icones by Stephani, no descriptions of the present species have been seen. The above illustration is based on the type specimen in the Conservateur, Genève. The present species seems to be related to *A. nana*. However, the stellate pores of thallus are distinctive.

19. *Athalamia nana* (Shim. et Hatt.) Hatt. in Journ. Hattori Bot. Lab. **12**: 56 (1954). Syn. *Gollaniella nana* Shim. et Hatt., l. c. **9**: 34, text-figs. 3 & 5 (1953). Text-fig. XX.

Monoeious; non aromatic in fresh condition, thalli thin, not firm in texture, pale green to green, sometimes slightly purplish along margin, 5~8~10~16 mm long, 3~5 mm wide, 1~3 times dichotomously branched, often deeply notched at apex, upper surface clearly showing small polygonal areas corresponding with the air chambers beneath it, vein slightly convex ventrally. Ventral tissue as 1/3 (~1/2) as thick and 1/4~1/5 as wide as thallus. Ventral scales in 3~4 irregular longitudinal rows, hyaline, rarely more or less purplish, elliptical or almost lunate, appendages 1(~2), hyaline, lanceolate, tapering into a tooth, oil cells lacking. Dorsal epidermis unistratose, its cells thin-walled, containing few chloroplasts, trigones minute or almost unseen. Air chambers in 2~3 layers. Pores slightly elevated, surrounded by 5~9 cells, the radial walls of them more or less thickened, but never stellate, or rarely not thickened. Antheridial receptacle not well

Text-fig. XVIII. *Athalamia pusilla* (Steph.) Kashyap

A. Plant with female and male receptacles, $\times 6$. B. Thallus, ventral view, showing scales, $\times 12$. C. Cross section of thallus, $\times 33$. D-E. Pores, $\times 190$. F-I. Ventral scales, $\times 48$. J. Female receptacle, $\times 12$. K-M. Bractlets on tip of stalk, $\times 33$. N. Thickening in wall of sporangium, $\times 190$. O-P. Spores, $\times 365$. Q-R. Elaters, $\times 190$. The figures were all drawn by D. Shimizu from the type specimen.

B**J****K****G****E****F****N****L****H****I**

Text-fig. XIX.

differentiated, oblong in outline, without surrounding bractlets, anterior to the female receptacle or on a separate branch. Female receptacle terminal, soon becoming dorsal by successive elongating of thallus apex, shortly stalked so that often apparently sessile, pale to whitish green, 2~4.5 mm wide, 1~2 (~2.5) mm thick; stalk pallid, 0.5~1~2 mm long, more or less sulcate, without rhizoid furrow, naked, bracts restricted to tip, appressed to the disk, hyaline, lanceolate to oblong, with an apical and (1~)2~4(~5) lateral teeth; lobes 1~3 (~4), weakly tuberculate, 2-lipped, directed slightly upward. Sporangia 1~3(~4) per receptacle, dark brown, dehiscing by splitting from the tip back into 6~7 irregular valves; walls 1 cell thick, its cells with annular or semiannular thickenings. Spores brown to dark brown, 45~55~60 μ in diameter, densely warty, warts 8~10~12 through a diameter, minutely or indistinctly punctulate, or rarely smooth. Elaters brownish yellow to brown, 80~120~230 μ long, 8~12 μ thick, with 2~4 spirals in the middle. Oil cells smaller than the ordinary cells, rare, scattered in epidermis and ventral tissue; oil-bodies rounded, grayish, 16~20 μ in diameter, formed of many globules of heterogenous size, often clustered around a central homogeneous sphere.

Examinations. Crevices of limestone cliffs facing west along streams, and calcareous soil including humus on cliff side, 1730 m. alt., coniferous forest of the Jūmonji pass, Chichibu Mts., Saitama Prefecture, ca 36°E. Lat., 138°40' N. Long., August 31, 1953, Coll. D. Shimizu, nos. 52765-6, 52773, 55677-8, in Herb. Hattori Bot. Labor. Also the type specimen collected in the same locality (Shim. & Hatt., 1. c.).

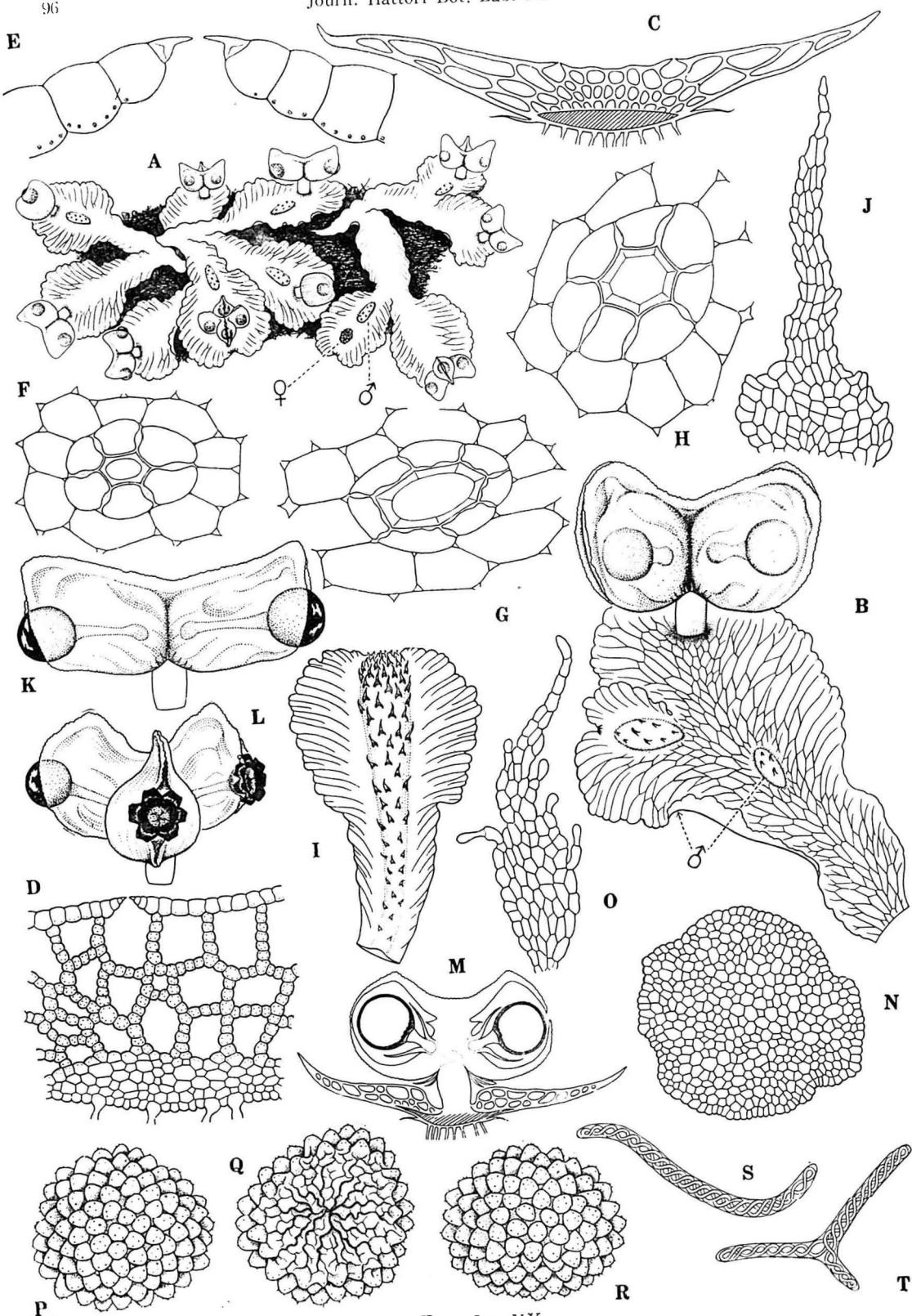
In summer of 1953, D. Shimizu, one of the authors, rediscovered this plant about 2 km. to the west of the type locality. It is larger than the type and appears at first sight to be a distinct species. The text-figure is based on this specimen. The present species is closely related to *A. glauco-virens*. In spring, the latter plant under cultivation has turned quite similar to the present species. So the differences of the two plants may possibly be ecological. Further, the present species is related to the Chinese *A. chinensis*, as pointed out above.

20. *Athalamia glauco-virens* Shim. et Hatt. in Journ. Hattori Bot. Lab. 12: 56, text-figs. 10, 11a-h (1954). Syn. *A. glauco-virens* fo. *subsessilis* Shim. et Hatt., 1. c. 58, text-figs. 11i-n, 12.

Fo. *subsessilis* was proposed, emphasizing its shorter stalk of the female receptacle (apparently subsessile) and smaller spores (32~45~54 μ in diameter). The authors recently examined the plant cultivated in pot. The statistical dimensions of the stalk and the spore are: stalk.....(1~)3~4 (~6) mm in length; spore.....40~44~48 (~56) μ in diameter. Thus, as it is clear that such dimensions vary under the influences of the environmental conditions and soils on which the plant is cultivated, the authors propose to abandon the name, "fo. *subsessilis*".

Text-fig. XIX. *Athalamia chinensis* (Steph.) Hatt.

A. Plant with 2 female and 3 male receptacles, $\times 6$. B. Thallus, ventral view, showing scales on vein, $\times 6$. C. Cross section of thallus, $\times 33$. D-E. Pores, $\times 190$. F-I. Ventral scales, $\times 33$. J. Bractlets on stalk tip of female receptacle, $\times 33$. K. Thickenings in wall of sporangium, $\times 190$. L-M. Spores, $\times 360$. N-O. Elaters, $\times 190$. The figures were all drawn by D. Shimizu from the type specimen.



Text-fig. XX.

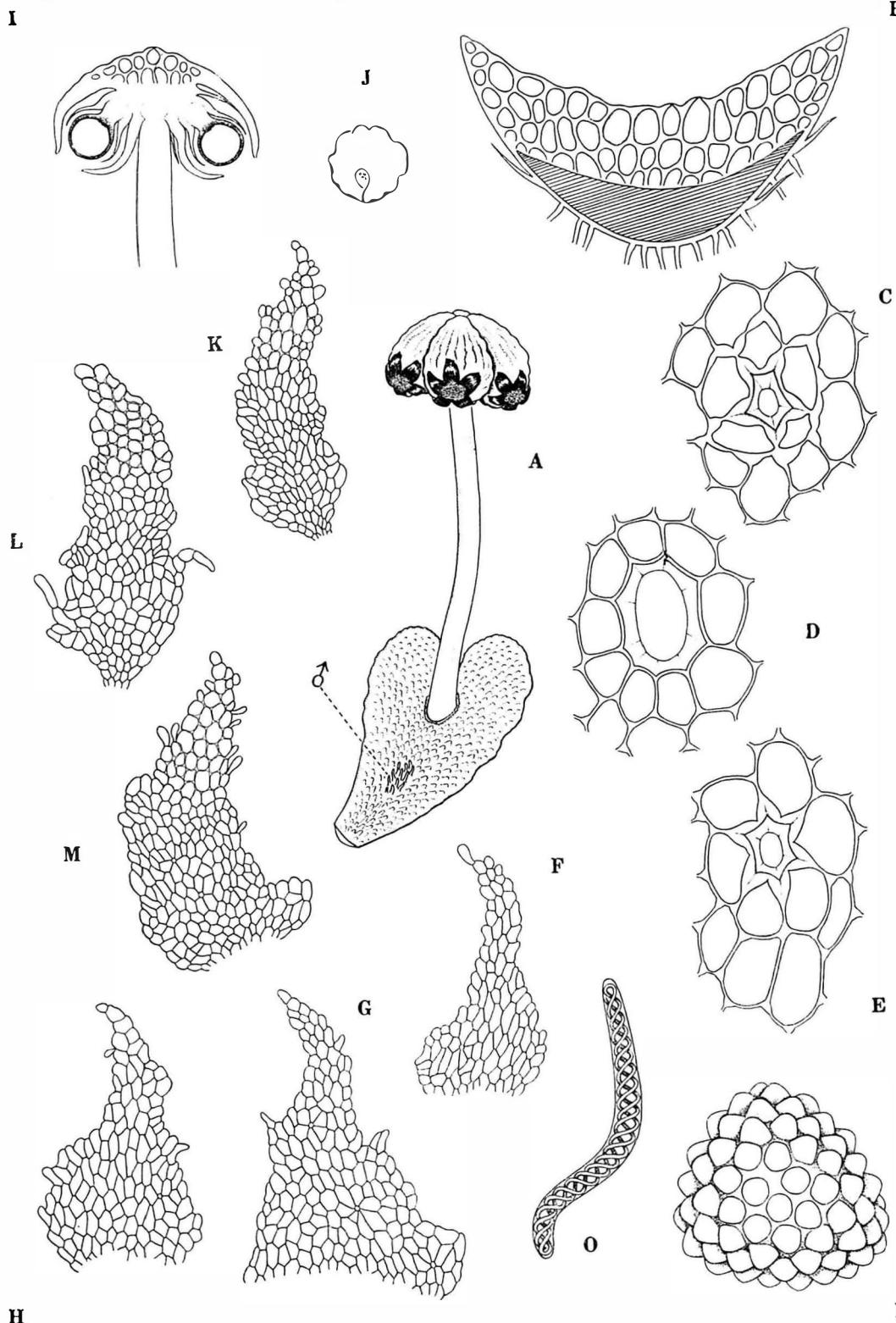
21. *Sauteria alpina* Nees, Naturg. Europ. Leberm. 4: 143 (1838); Shim. & Hatt. in Journ. Hattori Bot. Lab. 12: 62, text-fig. 13 (1954). Text-fig. XXI

Monoecious, not aromatic in fresh condition, thalli more or less thick, not so firm in texture, pale to whitish green, 7~12~18 mm long, 2~4~5 mm wide, not or rarely once dichotomous, upper surface showing small polygonal areas coinciding with air chambers beneath them, vein convex ventrally. Ventral tissue ca 1/3 as thick and 2/3 as wide as thallus. Dorsal epidermal cells containing few chloroplasts, walls slightly thickened, trigones small. Air chambers in 2~3 layers, without supplementary partitions. Pores elevated, surrounded by 5~6~8 cells, the radial walls of those cells distinctly thickened (stellate), the thickenings ovate-lanceolate, or rarely the walls not so thickened (non stellate). Ventral scales in 4~6 (~8) irregular longitudinal rows, usually pallid, ovate to elliptical, appendaged; appendages one, lanceolate to ovate-lanceolate, acute, with hyaline papillae at margin; scales sometimes lacking appendages, then narrower and longer, oblong to almost lanceolate in shape. Female and male organs in separate groups or the latter just below the former. Male receptacle not well differentiated (not forming real receptacle), dorsal, near female receptacle, or on a separate dichotomous branch, or on a small ventral branch; antheridia aggregate in 3~4 irregular rows. Female receptacle terminal on deep notch of thallus apex, often turning to locate at the fork of the two lobes which have successively elongated; stalk almost pallid, 2.5~8~12 mm long, sulcate, with 1 rhizoid furrow, naked, bractlets restricted to tip, appressed to the disk, small, hyaline, lanceolate, the cells of the proximal half of bractlets smaller (but firmer in texture) than those of the distal half; disk convex, pale to whitish green, 2.5~3~4 mm wide, 2~3 mm thick, rounded, tuberculate, with air chambers and pores, deeply 2~4~6-lobed, the lobes extending outward at 40~45 degrees with the stalk; involucres ovate, 2-lipped. Sporangia 1~3~5 per receptacle, dark brown, opening by 4~5 (~6) splits from the tip backward, thickenings in the wall cell annular to semiannular or apparently spiral. Spores dark brown, 60~70/ μ in diameter, densely warty, warts 9~10 through a diameter. Elaters brownish yellow, 120~200~240/ μ long, 12~16~20(~24)/ μ thick, with 3~4 (~5) spirals in the middle. Oil cells rare, scattered in ventral tissue, ventral scales and bractlets.

Examinations. Moist surfaces or crevices of andesite cliffs and ledges, and on loamy banks of 'alpine garden', from the height of 1,000 m to the summit of Mt. Rishiri, Island of Rishiri, Hokkaidō, ca 45°10' N. Lat., 142°10' E. Long., July 22 & 25, 1954, Coll. D. Shimizu, nos. 53472~3, 53513, 53658, 53661, in Hattori Bot. Labor.

Text-fig. XX. *Athalamia nana* (Shim. et Hatt.) Hatt.

A. Fertile plant with female and male receptacles, $\times 3$. B. Portion of (A), magnified, $\times 6$. C. Cross section of thallus, $\times 33$. D. Portion of (C), magnified, $\times 95$. E. Vertical section of pore, $\times 190$. F-H. Pores, $\times 190$. I. Thallus. ventral view, showing scales on vein, $\times 6$. J. Ventral scale, $\times 48$. K-L. Female receptacles, $\times 6$. M. Longitudinal section of female receptacle, $\times 6$. N. Cross section of stalk of female receptacle, $\times 48$. O. Bractlets on stalk of female receptacle, $\times 33$. P-R. Spores, $\times 365$. S-T. Elaters, $\times 190$. The figures were all drawn by D. Shimizu from specimen no. 55678 collected at the Jūmonji pass, Chichibu Mts., Aug. 1953.



Text-fig. XXI.

The authors (1954) illustrated this species based on the European material. In last summer D. Shimizu, one of the authors, collected this species on the Island of Rishiri, which is situated near the northernmost extremity of the Japanese territory. The above illustration is based on this material. Although the Rishiri plant shows slight differences from the European form, it is sure to belong to the same taxon as the latter. Last year, a little while before the discovery of the present species on Rishiri, the authors published a variety of it, "var. *japonica*" (Shim. & Hatt., l. c. 64), which was collected on the summit area of the Yatsu mountains, Middle Japan. However, they consider at present "var. *japonica*" as a distinct species, rather than a variety of the present species, as stated below.

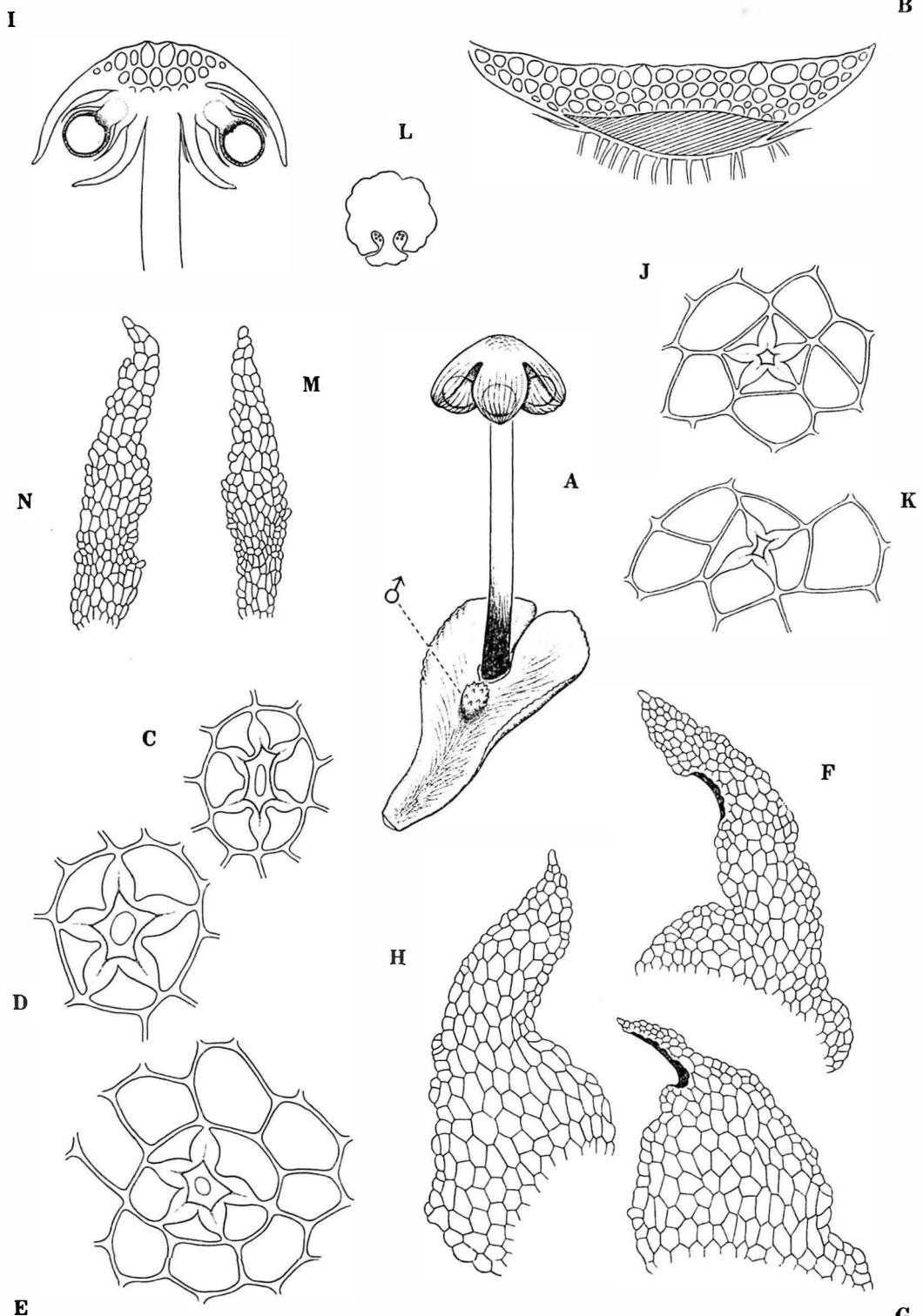
Thus, for the present species, the Island of Rishiri is the only known station in Japan. Its geographical range is Europe (from Norway and Finland on the north and Jugoslavia on the south), Greenland, N. America (Lat. 40°~80° N.) to Siberia (Lat. 60°~75° N.), and also it has been recorded only once from India (Kashmir, 13,000 ft.) and N. W. Yunnan (28° 15', on granite, 3,600~4,150 m.). K. Müller (1953) cites the chromosome number of this species $n=36$. It is worth while to note here that Dr. S. Tatuno of the Hiroshima University recently proved the chromosome number of *Sauteria japonica* (Shim. et Hatt.) Hatt. (= *Sauchia japonica* Shim. et Hatt.) to be $n=36$.

22. *Sauteria yatsensis* Hatt., nom. nov. Syn. *Sauteria alpina* var. *japonica* Shim. et Hatt. in Journ. Hattori Bot. Lab. 12: 64, text-figs. 11o-p, 14, 15a-h (1954); not *Sauteria japonica* (Shim. et Hatt.) Hatt., l. c. 62 = *Sauchia japonica* Shim. et Hatt., l. c. 9: 32, text-figs. 2, 3g-j (1953). Hab. In crevices and on moist surfaces of agglomerate cliff, ca. 2,500 m. alt., Mt. Yatsu, Nagano Prefecture, Coll. D. Shimizu, no. 52828 -type. Range: known from the type locality only.

Since the discovery of *Sauteria alpina* on the Island of Rishiri, the authors have regarded "var. *japonica*" as a distinct species rather than a variety of *S. alpina*, as mentioned above. They already regarded this as a "local species in Japan (tentatively named, *S. alpina* var. *japonica*)" (Shim. & Hatt., l. c. 12: 60). At the time of the publication of "var. *japonica*" they pointed out the following characters as distinguishing the variety from *S. alpina*: (1) non convex disk of female receptacle lacking pores, (2) its lobes extending outward at 65~75 degrees with the stalk, and (3) the radial walls of cells around the pore of thallus not so thickened (often thin and indistinct)—never stellate. Furthermore, slight differences such as the shape of the ventral scales and more or less larger spores will be noted. The present species seems to be more closely related to (or probably conspecific with) the Indian *S. spongiosa* (Kashyap) Hatt., l. c. 12: 62 [= *Sauchia*

Text-fig. XXI. *Sauteria alpina* N.

- A. Plant with female and male receptacles, $\times 6$. B. Cross section of thallus, $\times 18$. C-E. Pores, $\times 190$. F-H. Ventral scales, $\times 33$. I. Longitudinal section of female receptacle showing two sporophytes, $\times 12$. J. Cross section of stalk of female receptacle, $\times 18$. K-M. Bractlets on stalk tip of female receptacle, $\times 33$. N. Spore, $\times 480$. O. Elaters, $\times 190$. The figures were all drawn by D. Shimizu from the specimen collected on Mt. Rishiri, Hokkaidō.



Text-fig. XXII.

spongiosa Kashyap, Liverw. W. Himalayas & Panjab Pl. 1: 82, pl. 17. 1929] and also to *Sauteria japonica* (Shim. et Hatt., l. c.) The latter species was collected on the same mountain as the present species. The distinctions of these three species are shown in the following key.

- | | | |
|---|---|----------------------|
| 1 | Male receptacle on the different branches from or sometimes just below the female receptacle | <i>S. yatsuensis</i> |
| | Male receptacle on small ventral branches..... | 2 |
| 2 | Air chambers in 2 or rarely 3 layers; midrib prominent below, rather suddenly passing into lamina; ventral scales tapering into lanceolate appendage; spores without wing, densely warty..... | <i>S. japonica</i> |
| | Air chambers in one layer; midrib gradually passing into margin; ventral scales acuminate; spores winged..... | <i>S. spongiosa</i> |

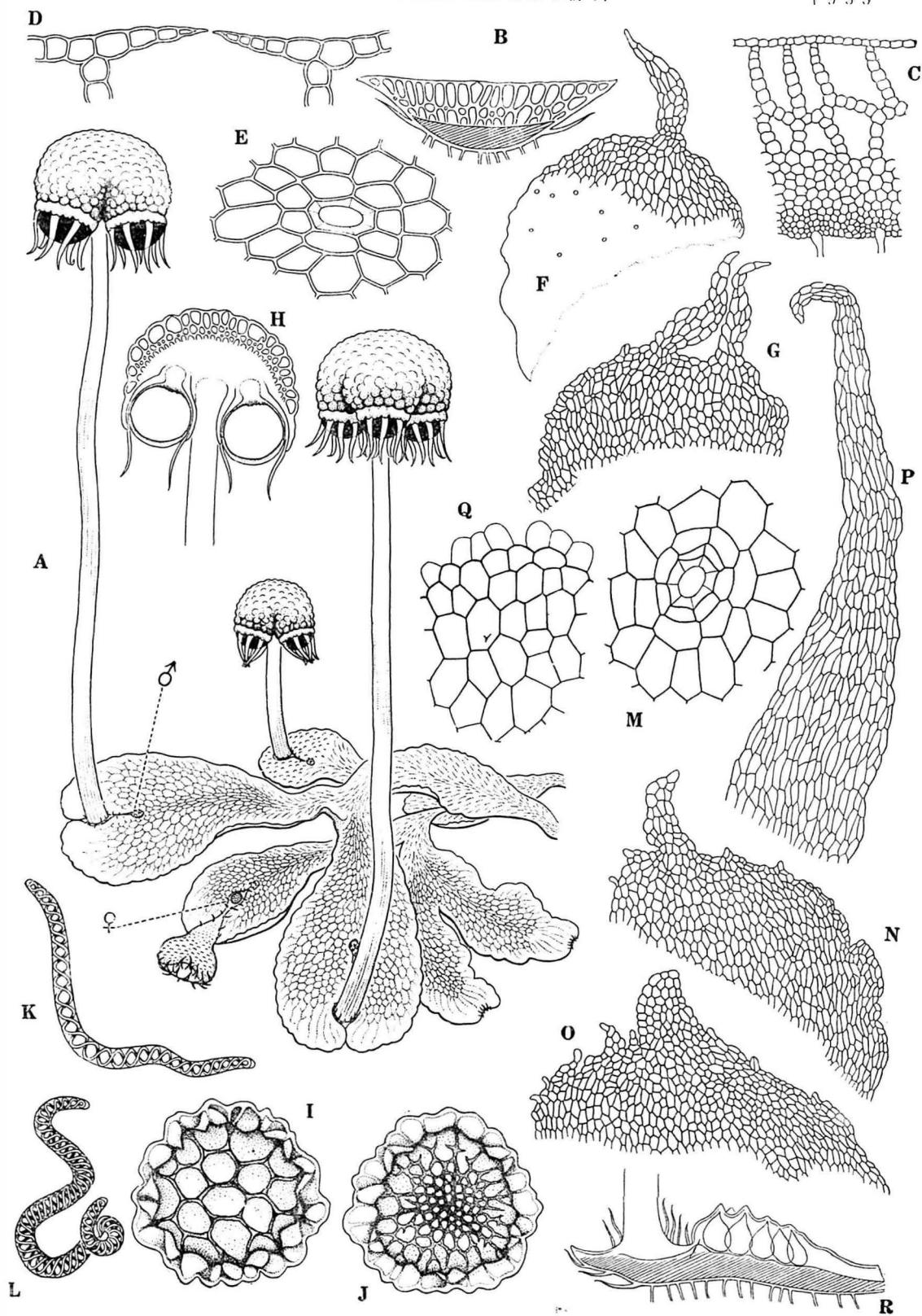
The Indian *S. spongiosa* is known only by literature, and a comparative study based on its original material is much desired.

23. *Peltolepis quadrata* (Sauter) K. Müll. in Hedwigia 79: 75 (1940); Shim. & Hatt. in Journ. Hattori Bot. Lab. 12: 68, text-fig. 15 (1954). Text-fig. XXII.

Monoeious; not aromatic in fresh condition, thalli somewhat thick, not so firm in texture, pale green, more or less purplish along margin, 8~15 mm long, 2.5~4 mm wide, 1~2 (~3) times dichotomously branched, deeply notched or lobed at apex, upper surface showing small polygonal areas, one over each air chamber, vein convex ventrally. Ventral tissue ca 1/2 as thick and 3/5 as wide as thallus. Ventral scales in 4~6 (~8) irregular longitudinal rows, elliptical, purplish, appendiculate, appendages large, one, oblong-lanceolate, usually acute at apex. Dorsal epidermal cells thick-walled, trigones mostly indistinct, containing few chloroplasts. Air chambers in 2~3 layers; pores slightly elevated, bordered by 4~5~6 cells, radial walls of those cells thickened, the thickenings ovate-lanceolate in surface view, thus pores stellate. Antheridial receptacle dorsal, below the female one, oval in outline, elevated, with small purplish marginal bractlets. Female receptacle terminal, stalked, in a deep apical notch of thallus (one or both lobes of it occasionally successively elongating, thus the receptacle apparently lateral or in the fork of the lobes); stalk pallid to ± greenish, purplish below, 2~4~6 mm long, weakly sulcate, with 2 rhizoid furrows, naked, bractlets restricted to tip, appressed to the disk, pallid to purplish, lanceolate; disk pale green, often slightly purplish, more or less tuberculate, 2~4~6-lobed; involucres ovate in outline, 2-lipped, extending outward at 45~50 degrees with the stalk. Sporangia 1~4 per receptacle, dark brown, opened by 4~6 irregular splits from the tip backward, the wall cell

Text-fig. XXII. *Peltolepis quadrata* (Sauter) K. Müll.

A. Plant with female and male receptacle, ×6. B. Cross section of thallus, ×18. C-E. Pores of thallus, ×190. F-H. Ventral scales, ×33. I. Longitudinal section of female receptacle, ×20. J-K. Pores of female receptacle, ×135. L. Cross section of female receptacle, ×18. M-N. Bractlets on stalk tip of female receptacle, ×33. The figures were all drawn by D. Shimizu from specimens collected in the Rishiri islet, Hokkaidō.



Text-fig. XXIII.

with annular or semi-annular thickenings. Oil cells scarcely scattered only in epidermis.

Examinations. Crevices of andesite cliffs, and on loamy soil on the cliff side, occurring together with *Sauteria alpina* and *Preissia quadrata*, in 'alpine garden', 1600~1710 m. alt., summit area of the Island of Rishiri, Hokkaidō, 45°10' N. Lat., 142°10' E. Long., July 22, 1954, Coll. D. Shimizu, nos. 53472, 55652, in Hattori Bot. Labor.

Since "var. *japonica*" Shim. et Hatt. (l. c. 69) has proved to be a valid species, as mentioned below, the Island of Rishiri is the only known locality for the present species. On this island *Sauteria alpina* and *Asterella ludwigii* (var. *ludwigii*) also occur, but nowhere else in the Japanese territory. It may be a fact of great interest from the phytogeographical point of view that such rare species disjunctively occur here in a very limited area. They may be essentially an Arctic-alpine relic, and show that this small island belongs to the holarctic zone rather than to the floral region of Japan proper, so far as Marchantiales is concerned.

The Island of Rishiri lies on the northernmost border of the Japanese territory. Mt. Rishiri is a conide towering to a height of 1710 m. above the sea; it is indeed the island itself. The upper portion is very steep, being a combination of bluffs, ravines, and rocky ledges. The rocks consist nearly all of andesite.

24. *Peltolepis japonica* (Shim. et Hatt.) Hatt., comb. nov. Syn. *P. quadrata* var. *japonica* Shim. et Hatt. in Journ. Hattori Bot. Lab. 12: 69, text-figs. 11q-r, 15i-p, 17 (1954). Hab. Among crevices or on surface of conglomerate cliff along stream, 2250~2450 m. alt., Mt. Yatsu, Nagano Prefecture, August 1953, Coll. D. Shimizu, no. 52826-type. Range: known only from the type locality.

When the authors published this plant, they described, as a variety of *Peltolepis quadrata*, "Differt a typo thallis minoribus, minus validis, receptaculo feminei plano, disco centrali vix diffinito, non prominente, lobis haud decurvis (sub angulo 75°~85° patentibus)", and remarked, "it may be regarded as a local species representing the European type in the Far East". Dr. S. Tatuno of the Hiroshima University recently observed that the chromosome number of this plant is $n=18$ which is diploid of $n=9$ for *P. quadrata*. Here the authors propose to deal with it as a proper species rather than to regard it as a variety. The distinctions from *P. quadrata* are its small size, not so firm texture, shape of ventral scales, larger spores, particularly its female receptacle which is flattish above and never convex in the center and lacks pores, and finally its chromosome number ($n=18$).

Text-fig. XXIII. *Asterella ludwigii* (Schwaegr.) Limpr. (A-L)

- A. Plant, with female and male receptacles, $\times 6$. B. Cross section of thallus, $\times 18$. C. Portion of (B), magnified, $\times 48$. D. Vertical section of pore, $\times 135$. E. Pore, $\times 190$. F-G. Ventral scales, $\times 33$. H. Longitudinal section of female receptacle, $\times 12$. I-J. Spores, $\times 365$. K-L. Elaters, $\times 190$. —var. *kitadakensis* Shim. et Hatt. (M-R) M. Pore, $\times 190$. N-O. Ventral scales, $\times 30$. P. Portion of splitted pseudoperianth, $\times 30$. Q. Portion of sporangium wall (marginal portion of lid), surface view, $\times 135$. R. Longitudinal section of antheridial cushion, showing antheridia, $\times 12$. The figures were all drawn by D. Shimizu from specimens: *A. ludwigii*—collected in the Rishiri islet; *A. ludwigii* var. *kitadakensis*—collected on Mt. Kitadake (type).

25. *Asterella ludwigii* (Schwaegr.) Limpr. in Cohn, Krypt.-Fl. v. Schlesien 1: 340 (1876); Frye & Clark, Hepat. of N. Amer. 1: 73, with 4 figs. (1937); K. Müll. in Rabenh., Krypt.-Fl. Bd. 6, Ed. 3, Lief. 3: 356, fig. 69 (1952); Schuster in Amer. Midl. Naturalist 49-2: 612, pl. 81 (1953). Syn. *Marchantia ludwigii* Schwaegr., Hist. Mus. Hep. Prodr. 33 (1814). *Fimbriaria pilosa* Tayl. in Trans. Linn. Soc. 17: 386, pl. 13: 3 (1837); Steph. in Bull. Herb. Boiss. 5: 78 (1897). Text-fig. XXIII, A-L.

Monoeious; thalli non aromatic in fresh condition, more or less thick, pale green, frequently purplish along margin and beneath, 8~12~16 mm long, 1.5~3~4 (~5) mm wide, 2~3 times dichotomously branched. Vein constituting a rounded ventral keel. Ventral tissue ca 1/3 the cross section in the median region of the thallus. Ventral scales in 2 longitudinal rows, widely elliptical, rarely oblong, purple, appendiculate; appendages 1 (~2), purplish, lanceolate. Dorsal epidermal cells averaging 30~40~55/ μ × 20~25~35/ μ , walls rather thick, trigones lacking. Air chambers in 2~3 layers, without supplementary partition. Pores scarcely elevated, surrounded by 6~8~9 radial rows of 1~2 cells each. Antheridial disk not well differentiated, median, dorsal, anterior to the female receptacle or on a separate branch; antheridia in an oval cluster. Female receptacle stalked, terminal in a deep apical notch or the fork between two lobes, one or both lobes often elongating; stalk mostly pallid, 4~7~10 (~27) mm long, naked, bractlets restricted to the base in a loose cluster, purplish, lanceolate; disk hemisphaeric, 1.6~2.5 (~3.5) mm in diameter, 1.6~2 mm in thickness, with low tubercles; lobes indistinct, 2~4, extending downward. Involucrum narrow, slightly undulate; pseudo-perianth hyaline, 6~7-cleft, the segments soon becoming free, narrowly lanceolate. Sporangia 1~3 (~4) per receptacle. Elaters brownish yellow, 200~240~280/ μ long, 8~12/ μ thick, with 2~3 spirals in the middle. Spores brownish yellow, 58~64/ μ in diameter (incl. wing); wing margin undulate, 8~12/ μ wide; outer face rather regularly reticulate, mesh 6~8~14/ μ wide; inner face like the outer but the reticulation far irregular. Oil cells smaller than the adjacent cells, scattered in epidermis, walls of air chambers, ventral tissue and ventral scales.

Examinations. Crevices of an andesite cliffs facing south, and on loamy soil of 'alpine garden' on cliff side, ca. 1000 m. alt., the Island of Rishiri, Hokkaidō, 45° 10' E. Lat., 142° 10' E. Long., July 25, 1954, Coll. D. Shimizu, nos. 53644, 53647, 53649, 53650, 53655, 53643, 53653, in Herb. Hattori Bot. Laboratory.

Range: Europe (from Finland through Italy to Spain, north to Czechoslovakia and Jugoslavia), Kanary I. (?), Greenland, N. America (from Alaska to U.S.A.: from New York to California), Siberia (Yenisei, ca. 70°), Japan (ca. 45°).

Stephani (1897) recorded the occurrence of the present species (as *Fimbriaria pilosa* Tayl.) on the Island of Rebun which was the only known station of this species in Japan. Since the present species has not been rediscovered in the Japanese territory up to these years, the authors were not sure on the validity of Stephani's record. Recently, however, they had an opportunity of examining Stephani's material kept in Conservateur, Genève. Unfortunately the material is so old and rather poor that they could not study it in detail, although they did not find any essential characters which do not belong to the present species. In summer of last year, D. Shimizu, one of the authors, intensively searched for this species on the Island of Rebun where Père Faurie collected it in May, 1893, and

sent it to Stephani for identification. However, D. Shimizu found there nothing but *Conocephalum conicum*, *C. supradecompositum*, *Reboudia hemisphaerica* and *Marchantia paleacea*, all of which belong to Marchantiales. The former two species are common, and he supposed that *Asterella ludwigii* might have been extinct on this island, overgrown by them and other plants which grows more rapidly than *Asterella*. Then, he visited the Island of Rishiri lying only about 10 km. to the southwest of Rebun and where Mt. Rishiri attains to a height of 1710 m. above the sea, while the highest point of Rebun is only 490 m. His collecting trip there was the most satisfying one, finding not only *Asterella ludwigii* but also such interesting members of Marchantiales as *Peltolepis quadrata* and *Sauteria alpina* together with common *Preissia quadrata*, at an altitude of about 1000 m. up to the summit.

In summer of the year before last, D. Shimizu had collected a plant closely allied to the present species on the summit of Kitadake (ca. 3100 m.), Southern Japanese Alps, Middle Japan. As a result of the comparative study of the two, the authors propose to regard this plant as a variety, whose taxonomic details will be dealt in the following paper.

The authors wish to express their deep appreciations to Dr. C.E.B. Bonner who has helped them in sending many type specimens in Stephani Herb., Conserv. Genève. To Messrs. N. Takaki and Z. Iwatsuki they also wish to acknowledge the generous assistance during the collecting trip in the Southern Japanese Alps.

第4報には疑問種 *Athalamia pusilla* 及び *A. chinensis* の type 標本に基く図説、先に発表した *A. nana*, *A. glauco-virens*, *Sauteria alpina* var. *japonica* 及び *Peltolepis quadrata* var. *japonica* に関する其後の知見、昨夏北海道の利尻島に発見した *Sauteria alpina*, *Peltolepis quadrata* 及び *Asterella ludwigii* を報告した。次に利尻島及び礼文島のゼニゴケ類フロラその他歐文欄に關聯した事項に就き簡単に補足説明し、終りに日本に初めて知られた種の和文記載を掲げる。

第一に北海道利尻島のゼニゴケ類に就いて述べねばならない。同島は北海道北端に近い火山島で第四紀安山岩から成り、1710 m の高度に屹立するコニーデ型の利尻富士とその裾野から成る。凡そ 1000 m より頂上にかけて険峻な安山岩壁や壁下の礫土、お花畠などに *Preissia quadrata*, *Peltolepis quadrata*, *Sauteria alpina* 及び *Asterella ludwigii* が生育する。この4種のうち最初の1種以外は我国には他に見られない北方要素に属する。ただ長野県ハケ岳には *Peltolepis* 及び *Sauteria* の近縁種 (*P. japonica* 及び *S. yatsuenensis*) があり、又南北アルプスに *Asterella ludwigii* の変種と思はれるものを見出すのみである。その他の高山には北海道大雪山や夕張岳などでさえ筆者等の調査に抱はらず未発見である。

利尻島に近く礼文島があり、第三紀火山岩及び水成岩より成るが、この島は低平で最高点 490 m に過ぎない。昨夏利尻島と共に綿密な調査を行つたが、ゼニゴケ類ではジャゴケ、ヒメジャゴケ、チンガサゼニゴケ、*Marchantia paleacea* 及び *Riccia* sp. (不完全標本) のみで、前2者が優勢であり、前記利尻島上部の4種は全く見出しが出来なかつた。この事は礼文島が遙かに低く、かかる種が他種に圧倒されず生残る環境がなくなつた為であらう。ジャゴケ、ヒメジャゴケ、チンガサゼニゴケなどは勿論利尻島にも産するが低地に限られる。以上の事実から利尻島上部のゼニゴケ類に関する限り、我国フロラに属せず寧ろ holarctic (欧州ではアルプス以北) に属すると結論せざるを得ないが、之は氷河期の寒帶フロラが利尻島上部に現在迄よく遺存するものと考える。

之と関聯して長野県八ヶ岳上部のゼニゴケ類フロラに触れたい。前報に於いて同所から *Sauteria alpina* var. *japonica* と *Peltolepis quadrata* var. *japonica* を報告したが、このうち前者は寧ろヒマラヤの *S. spongiosa* に近い独立種、後者も同様單型属 *Peltolepis* の第2種として扱ふのが妥当と考えるに至つたので、本報では前者を *S. yatsuensis*、後者を *P. japonica* と呼ぶこととした。八ヶ岳上部も北方～高地系の遺存種が著しく、極めて特殊なフロラを持つが、利尻島とは明瞭な差が認められる。即ち *Sauteria*, *Peltolepis* 両属は利尻島と八ヶ岳上部にしか発見されてゐないが、利尻島の種が現在欧洲アルプスなどに産する種と全く同一なのに対し、八ヶ岳のものは近縁乍ら別種と見る可きものである。例えば *P. quadrata* の染色体は $n=9$ であるが、八ヶ岳の *P. japonica* は $n=18$ であり、胞子の直径などでなく形質の差が認められる。

Asterella 属は筆者等の研究に依り多くの種が我が國より報告されたが、欧米～シベリアとの共通種は全くなく、却つてヒマラヤなどに近縁種が求められるものであつた。今回報告する *A. ludwigii* は欧米との共通種であり、我が國では北部～高山に限られる。古く Stephani が礼文島(?)より記録したのみであつたが、利尻島以外に南アルプス北岳(清水採, var. *kitadakensis*)と仮称、詳細は後報にゆづる)、北アルプス(高木典雄採)などにも産する。

19. チチヅゼニゴケ (*Athalamia nana*) 今回基本種の原産地から約2 km 西方、ほぼ同一高度の石炭岩地帯で得た本種は原記載文に照して多小の異同が認められたので、記載を追加する。葉状体は淡緑色、体の長さ 8~16 mm, 幅 3~5 mm, 又状分枝は 1~3, 気室は (2)~3 層、中央は小形、翼部大形、気室孔は少しく突出、孔辺細胞は 1 列、(5)~6~9 個、膜は放射方向に弱く肥厚、表皮細胞は薄膜、角隅は小三角形、基礎組織の細胞中に小形細胞を挟む、腹鱗片は不規則 3~4 列、淡紫紅色、附屬物は 1~(2), 無色、雌器托は直徑 2~4.5 mm, 高さ 1~2~(2.5) mm, 瓢状、(1)~2~3~(4) 包膜より成り、熟すればやや斜上向に 2 層状に開口、雌器托柄は長さ 0.5~1~2 mm, 表面の稜条は不規則 4, 柄上部雌器托に接する部分に卵形～披針形 ((1)~2~4~(5) 刺毛を有する) の鱗片を生ずる。胞子囊は 1 雌器托上に 1~2~(4) 個、暗褐色、熟すれば包膜外に超出、表面に疣状突起 (1 直径線上に 10~11~12 個) を生じ、表面に微小な脣様突起を少しく散布、彈糸は褐色、長さ 120~230 μ , 太さ 8~11 μ , 3~4 らせん糸を具へる。雄器は葉状体中肋上、雌花の後部に接し又は雌花の無い葉状体の頂部に隨円状に隆起、不規則な列をなす。油細胞は表皮、基礎組織中に稀、雌器托に生じ、油体は直徑 16~20 μ 。

埼玉県秩父郡火滝村、十文字峠、白岩沢、海拔 1730 m、山稜、稜線直下より北向に流下する小流畔の西向石炭岩崖の岩隙～岩棚、崖下等の裸岩、又は僅かに堆積した腐殖質土上等に小群生し、附近にミヤマカラマツ、ホソバトリカブト、シモツケソウ、カメバヒキオコシ、ウワバミソウ、アカソ、イワハタザオ、ツルテンダ、ホラシノブ等から成る小群落が発達する。

21. チンチョウゴケ (*Sauteria alpina*) 雌雄同株、葉状体は厚くやや硬く、淡緑色～白緑色、体の長さ 7~12~18 mm, 幅 2~4~5 mm, 又状分枝は 0~1, 先端は浅く切込み、中肋部の厚さは体の $1/3$, 幅は $2/3$ を占め、腹面はレンズ状にゆるく突出、気室は 2~3 層、中形、気室孔は高く突出、孔辺細胞は 5~6~8 個、1 列、放射方向の細胞膜は著しく肥厚(星状肥厚)、稀に弱く肥厚、表皮細胞は弱く 1 様に肥厚、角隅は小三角形、葉鱗粒を乏しく含む、腹鱗片は不規則に 4~6~7~(8) 列、広披針形～広隋円形、無色、附屬物は 1、披針形、無色、縁辺に乳頭状单細胞を生じ、葉状体頂部に生ずる鱗片は背面に乏しく超出する。雌器托は葉状体の頂端に生じ(葉状体先端の切れ込みの 2 裂片はその後も更に伸長をつづけることあり)、淡緑色～白緑色、直徑 2.5~3~4 mm, 高さ 2~3 mm、ほぼ円形、上面中央部は盛上り、気室と気室孔を具へる。雌器托柄は殆ど無色、長さ 2.5~8~12 mm、表面に生ずる稜条はやや深く、仮根溝は 1、上部雌器托に接する部分に無色、披針形～隨円形の鱗片(萼状に密着)があり、鱗片上半部の細胞は下部のものに比してやや大形、縁辺に乳頭状单細胞を生ずる。包膜は 1 雌器托上に 2~4~6 個、卵形、開口部は 2 層状。胞子囊は 1 雌器托上に 1~3~5 個、暗褐色、熟すると斜下向、包膜外に超出、4~5~(6) 片、花弁状に裂開する。胞子囊の壁細胞には環状～半環状～らせん状の肥厚帶を具へ、胞子囊柄は短かく、雌器托柄に対して約 40~45 度の角度で下向きに生ずる。胞子は暗褐色、直徑 60~70 μ 、表面に乳頭状突起 (1 直径線上に 9~10 個) を生じ、彈糸は淡黄褐色、長さ 120~200~240 μ 、太さ 12~16~20~(24) μ 、3~4~(5) らせん糸を具へる。雄器は葉状

体の頂部、背面中肋上に雌花に接し、又は腹面より生ずる小葉状短枝の背面か、雌花の無い葉状体の背面中肋上に不規則 3~4列、かたまつて生ずる。油細胞は基礎組織中、腹鱗片、雌器托柄上端に生ずる鱗片等に生ずる。

北海道、利尻島利尻山、海拔 1000~1710 m、山頂直下に発達する安山岩崖の湿った岩隙~岩面に単一に着生するか、山頂附近の安山岩壁の間隙、ハイ松~ミヤマハンノキをまじへる草本群落中に雨水によつて浸蝕形成されたローム質土崖面に *Peltolepis quadrata* (稀)、*Preissia quadrata* 等と混生、附近的岩隙にチシマイワブキ、ダイモンジソウ、イワギキヨウ、ホソバイワベンケイ、チシマアマナ、エゾヤマズキショウマ、ヤマハナソウ、等、崖下にチシマフウロ、キバナノコマノツメ、エゾツツジ、シリトリウチソウ、ウコンウツギ等から成る草本群落が発達する。

23. リシリゼニゴケ (新称) (*Peltolepis quadrata*) 雌雄同株、葉状体は厚くやや硬い、淡緑色、縁辺は淡紫褐色に染まり、腹面は淡緑色、体の長さ 8~15 mm、巾 2.5~4 mm、又状分枝は 1~2~(3)、先端は浅く切れ込み、中肋部の厚さは体の $\frac{1}{2}$ 、巾は $\frac{3}{5}$ を占め、腹面にレンズ状にゆるく突出、気室は 2~3 層、中形、気室孔は突出、孔辺細胞は 4~5~6 個、1 列、膜は放射方向に著しく肥厚 (星状肥厚)、表皮細胞は肥厚、角隅は殆ど不明瞭、葉鱗粒を含む、腹鱗片は不規則 4~6~7~(8) 列、隋円形、淡紫紅色、附属物は 1、広披針形~舌形、淡紫紅色~無色、油細胞を欠く。雌器托は葉状体の頂部に生ずるが、先端の切れ込みの 2 裂片は時にその後も伸長をつづけることあり、托は淡緑色、直徑 2~3~5 mm、高さ 2 mm、ほぼ円形、上面中央部は盛り上り、時に淡紫紅色、小形の気室と気室孔を具へ、孔辺細胞は 4~5~(6) 個、膜は放射方向に肥厚 (星状肥厚)。雌器托柄は淡緑色、下部は紫褐色、長さ 2~4~6 mm、表面の稜条は浅く、仮根薄は 2、上部雌器托に接する部分に淡紫色~無色、披針形の鱗片 (萼状に密着) あり。包膜は 1 雌器托上に 2~4~6 個、卵形、開口部は 2 脊状。胞子囊は 1 雌器托上に 1~4 個、暗褐色、熟すれば斜下向、包膜外に超出、先端より 4~6 片、花弁状に裂開する。壁細胞には環状~半環状の肥厚帶を具へ、胞子囊柄は頸かく、雌器托柄に対し約 45~50 度の角度で生ずる。雄器は雌花にやや接し、後方に隆起した托状部に群生、托状部は大形、淡紫褐色の小鱗片にかこまれる。油細胞は表皮に接する同化組織中に少く分布する。

北海道、利尻島利尻山、海拔 1680~1710 m、山頂に近い安山岩崖の岩隙、又はハイ松~シヤマハンノキを混じへた草本群落中に雨水によつて浸蝕形成されたローム質土崖面に *Sauteria alpina*、*Preissia quadrata* 等と混生、附近的岩隙にチシマイワブキ、チシマアマナ、ホソバイワベンケイ、イワウメ、エゾツツジ等、崖下にチシマフウロ、ハクサンイチゲ、キバナノコマノツメ、エゾイブキトラノオ、エゾヤマズキショウマ、シリトリウチソウ、ゴヨウイチゴ、ウコンウツギ等から成る草本群落が発達する。

25. サイハイゴケ (*Asterella ludwigii*) 雌雄同株、葉状体はやや厚く軟か、淡緑色、縁は時に淡紫褐色に染まり、体の長さ 8~12~16 mm、巾 1.5~3~4~(5) mm、又状分枝は 2~3、先端は浅く切れ込み中肋部の厚さは体の $\frac{1}{3}$ 、巾は $\frac{1}{2}$ を占め、腹面はレンズ状に突出、気室は 2~3 層、中形、気室孔はほとんど突出せず、孔辺細胞は 6~8~9 個、1~2 列、表皮細胞は肥厚、角隅は無い。腹鱗片は 2 列、広隋円形~隋円形、紅紫色、附属物は 1~(2)、淡紅紫色、披針形、葉状体頂端に生ずる鱗片は背面に少く超出来る。雌器托は葉状体の頂端に生じ (先端の 2 裂片は時にその後も伸長をつづけることあり)、淡緑色~淡紫褐色、直徑 1.6~2.5~(3.5) mm、高さ 1.6~2 mm、やや円く、潛水帽状を呈し、表面は疣状に少く突出、気室と気室孔を具へる。雌器托柄は淡色、下部淡紫褐色、長さ 4~7~10~(27) mm、表面の棱条は殆ど不明瞭、仮根薄は 1、基部に淡紫紅色、やや大形披針形の鱗片を生ずる。包膜は 1 雌器托上に 2~4 個、花被は 6~7 個の裂片に分かれ、無色、披針形。胞子囊は 1 雌器托上に 1~3~(4) 個、胞子は淡黄褐色、直徑 58~64 μ 、表面にやや不規則、大形の高い網状隆起 (1 直径線上 4~(5) 個) を生じ、1 個の網目の直徑は 6~8~14 μ 、翼は膜質、不規則に波曲、巾 8~12 μ 。彈糸は淡黃褐色、長さ 200~240~280 μ 、太さ 8~12 μ 、2~3 らせん糸を具へる。雄器は雌花の後方に接し、時に雌花の無い別枝葉状体の頂端、背面中肋上に生じ、不規則隋円状に隆起する。油細胞は表皮、同化組織、腹鱗片等に散布。生時葉状体は無臭。

北海道、利尻島利尻山、海拔 1000 m、山頂稜線から南向に発達する安山岩の断崖下部岩隙、又は崖下溪側の安山岩礫を混じへた、ローム質土斜面等に生じ、附近にアラシグサ、エゾブキ、ミソガワソウ、ハナウド、エゾボオフウ等の大型草本群落が発達する。

昭和 29 年度事業報告

研究題目

1. *Ptychomitrium* 属の研究(野口 彰)一終了。
2. 東亜産 Fabroniaceae ソノグラン(野口)一継続。
3. 日本及び周辺地域 Brachytheciaceae の研究(高木典雄)一継続。
4. アジア産ゼニゴケ類の研究(服部新佐, 清水大典)一継続。
5. 日本産 Scapaniaceae の再検討(服部, 尾川大鏡)一終了。
6. 着生鮮苔類の生態学的研究(服部, 野口)一継続。
7. 木曾御嶽の鮮苔類群落調査(野口, 高木, 服部)一継続。
8. 富士山の鮮苔類垂直分布(高木)一終了。
9. 北海道苔類フローラの研究(服部)一継続。
10. 日本着生鮮苔類フローラの研究(服部, 岩月善之助)一継続。
11. 日本産苔類の油体研究(服部)一継続。
12. 奥日向植物調査(平田正一)一終了。

事業項目

1. 服部植物研究所報告 第 11 号及び第 12 号刊行(服部新佐編集)。
2. 日本苔類標本第 6 集発行(服部編集)。
3. 日本産鮮苔類標本 6,172 点, 外国産鮮苔類標本 2,420 点を蒐集整理した。他に整理中のもの約 3,000 点あり、主なるコレクションは故 Grout ed., Mosses of North America, Verdoorn ed., Hep. Select. et Critic, Schiffner, Iterum Indicum, など。
4. 単行本 34 点, 定期刊行物 750 点, 拡刷 64 点を得取、整理した。主なる文献は Hedwigia (Ed. 37-81), Blumea (全巻), Farlowia (〃), Lejeunea (〃) など。
5. 鮮苔類標本の同定その他の依頼に応じ、又研究者の要請に依り文献、標本の貸出などの便宜を計つた。
6. 2 階建、延 30 坪の資料室 1 棟を建造した。

役員及び職員

1. 昭和 29 年 4 月 19 日の理事会及び同月 10 日の評議員会に於いて、昭和 29~32 年度の理事 5 名(内、理事長 1 名), 監事 2 名, 評議員 15 名を選任した。これらの氏名は研究所報告第 11 号表紙 II 参照。
2. 評議員小玉定一氏死亡のため、10 月 17 日の理事会に於いて岩月善之助氏を評議員に選任した。
3. 事務員 3 名退職、書記 1 名、嘱託 1 名、事務員 2 名採用。3 月末現在に於いて、所長(理事長), 所員 3 名(但し全員兼任), 書記 1 名、主事 1 名、嘱託 5 名(但し 4 名兼任), 事務員 2 名、計 13 名(内、兼任 7 名)である。

理事会

- 昭 29.4.17. (1) 互選に依り理事長 1 名を選出、(2) 評議員 15 名選任。
- 昭 29.10.17. (1) 予算変更、(2) 改正寄附行為作成、(3) 評議員 1 名補充。
- 昭 30.2.6. (1) 次年度収支予算編成、(2) 杉風倒木処分計画。

評議員会

- 昭 29.4.10. (1) 前年度事業報告書、収支決算書の承認、(2) 理事 5 名、監事 2 名選任。
- 昭 29.10.17. (1) 改正寄附行為の決定。
- 昭 30.2.6. (1) 次年度収支予算案の審議、(2) 杉風倒木処分の決定。

許可、認可及び承認事項

- 昭 29.4.24. 民間学術研究機関補助金の交付申請。第 1~2/4 半期分 25 万円(7.31), 第 3~4/4 半期分 25 万円(12.3)の交付を受けた。

昭 29.12.12. 寄附行為の変更認可申請、一申請書の通り認可を受けた。

昭 30.2.7. 基本財産の一部(杉風倒木)処分承認申請、一申請書の通り承認を受けた。

昭和 29 年度収支決算書

I. 収入の部		円
経常収入		1,754,825. ¹¹
基本財産収入		1,242,314
普通財産収入		317,341. ¹¹
事業収入		85,874
雑収入		109,295
臨時収入		1,151,080. ⁶⁶
補助金		500,000
寄附金		50,000
報酬		378,080. ⁶⁶
会員費		223,000
		2,905,906
II. 支出の部		
人件費		796,548
職員手当及び謝		569,458
旅費		22,200
勤務費		181,400
被服費		14,000
福利厚生費		9,490
賃借料		122,611
会員費		2,500
旅費		2,905
被服費		12,808
賃借料		17,533
会員費		13,846
旅費		61,120
被服費		2,970
賃借料		8,929
会員費		865,157
旅費		160,345
被服費		39,600
賃借料		322,341
会員費		2,754
旅費		323,784
被服費		5,170
賃借料		5,230
会員費		1,253
旅費		4,650
被服費		391,144
賃借料		600
会員費		21,561
旅費		180
被服費		368,803
賃借料		730,446
会員費		16,046
旅費		600,355
被服費		114,045
		2,905,906
合計		財産目録
資産総額		32,471,562. ¹¹ ⁶⁶
A. 基本財産		計 25,541,960.円 ⁷⁷
1.	土地及び山林。(土地) 地目原野, 18 町 3 及 3 畠、計 733,200 円。(山林) 杉植林, 本数 5,265 本、石数 16,654 石 5, 合計 23,319,000 円	
2.	建物。延坪 66 坪, 1,336,080 円	
3.	預貯金及び有価証券 153,680.円 ⁷⁷	
B. 運用財産		計 6,929,601.円 ⁷⁹
1.	現金及び預貯金。計 423,042 円	
2.	有価証券。計 3,159,750 円	
3.	備品。計 892,213.円 ⁸⁹	
4.	その他の資産。計 2,438,550 円	
5.	未収金、仮払金。計 16,046 円	
C. 借入財産及び負債		無し

本邦産ゼニゴケ目植物数種の染色体

辰野誠次¹⁾

Seizi TATUNO: Chromosomen bei einigen Arten von
Marchantiales aus Japan

先に筆者は本邦産ゼニゴケ目の *Riccia*-、*Reboulia*- 及び *Marchantiaceae* の数種について細胞学的研究の結果を報告した (Tatuno 1941)。近時服部・清水両氏に依り本邦産ゼニゴケ目の分類学的研究が進み、上記3科のみならず、その他の科のものも本邦に見出され、その中には多くの新しい種も発見された。筆者は両氏の厚意により、これらの細胞学的研究をおこなうことが出来たので、ここにその結果の一部を報告する。この機会に貴重な材料を恵与された両氏の厚意に対し感謝の意を表する。

本報告では *Targionia*-、*Sauteria*-、*Reboulia*- 及び *Marchantiaceae* の 15 種の染色体数及びその核型について観察した。その結果は Tabelle 1 に示す如くである。尙表巾^{*}印を付した 4 種の染色体は、筆者に依つて本邦・琉球又は朝鮮産材料に就き、報告されたものであるが、本報告では更にそれらの本邦産材料により、特にその核型を再検討した。その他の 11 種は何れも今般新たに染色体数及び核型が明かにされたものである。図みに Tabelle 1 中、核型について、特に *H* 及び *h* で示された染色体は異質染色体 (Heterochromosomen) であつて、*H* は一核板中最大、*h* は最小の *m* 染色体で異常凝縮を示すものである。

Targioniaceae: ハマグリゼニゴケ (*Targionia hypophylla*)。本種の染色体数は歐州産のもので Lorbeer (Müller 1940) による、朝鮮産のもので筆者 (1947) が *n*=9 と報告している。今般観察した本邦産のものもこれと同様 *n*=9 であり、その核型 *K*=4*V*+4*J*+*m(h)* で、最小の *m* は異質染色体 *h* である (Fig. 1)。

Sauteriaceae: グンバイゼニゴケ (*Athalamia glauco-virens*)。*n*=9, *K*=4*V*+4*J*+*m(h)* (Fig. 2)。尙 Lorbeer (1934) は先に歐州産の *Cleva hyalina* で *n*=9 と算定しているが、最近服部氏はこれを *Athalamia hyalina* (Sommerf.) Hatt. としたので (Shimizu and Hattori 1954), 是等 *Athalamia* の兩種は同一の染色体数を有するわけである。

ヤツガタケゼニゴケ (*Peltolepsis quadrata* var. *japonica*=*P. japonica*) は *n*=18, *K*=8*V*+8*J*+2*m(h*₁*+h*₂*)* である。Fig. 3 に示す如く、2 個の *m* は異質染色体であるが、その大きさに多少相違があるので、大きい方を *h*₁、小さい方を *h*₂ で示して両者を区別する。尙先に Lorbeer (1934) は歐州産の *P. quadrata* (Sauter) K. Müll. (L. 氏は *P. grandis* Lindb. として報告) は *n*=9 としているから、その変種である本邦産のものは二倍性である。尚清水・服部 (1954) によると、本二倍性変種は基本種にくらべ種々な形質即ち葉状体・雌器托柄の長さ、胞子の大きさ、彈糸の長さ及巾等が大きく、所謂巨大形を示し、倍数性の要素を具備している。又筆者 (1941) は先に日本産ケゼニゴケ (*Dumontiera hirsuta*) の倍数性 (*n*=9, 18, 27) について、一倍体は石灰岩、二三倍体はそのほか多くの異つた種類の岩石上に生育し、倍数体は新しい生態的要素に適応する能力を得たことを報告したが、本 *Peltolepis* の倍数性に於ても、清水・服部 (1954) によると、歐州産の基本種が前種と同様石灰岩に、本邦産の二倍体が集塊岩に見られるので、ケゼニゴケの場合の如く倍数性に於て新しい適応性が見られるのではないか。

タカネゼニゴケ (*Sauteria japonica*=*Saucchia japonica*)。*n*=36, *K*=16*V*+16*J*+4*m* (2*h*₁+2*h*₂) (Fig. 4) 本種の染色体数 36 は本報告の多くの種の染色体数 *n*=9 の 4 倍に当る。又核型から云つても 4 組からなるから、恐らく本種は四倍性と思われる。尙本種の *n*

1) 広島大学理学部植物学教室

Tabelle 1. ゼニゴケ目 15 種の染色体
(Chromosomen der 15 Arten von Marchantiales)

植物名 (Pflanzennname)	雌雄性 (Geschlecht)	染色体数(n) (Chromo-somenzahl)	核型 (Karyotypus)	产地 (Fundort)
Fam. Targioniaceae * <i>Targionia hypophylla</i> L. (ハマグリゼニゴケ)	♀	9	$4V+4J+m(h)$	埼玉県秩父郡大滝村柄本
Fam. Sauteriaceae <i>Athalamia glauco-virens</i> Shim. et Hatt. (グンバイゼニゴケ)	♀	9	$4V+4J+m(h)$	埼玉県秩父郡大滝村上中尾
<i>Peltolepis quadrata</i> var. <i>japonica</i> Shim. et Hatt. (ヤツガタケゼニゴケ)	♀	18	$8V+8J+2m$ (h_1+h_2)	山梨県北巨摩郡清里村八ヶ岳
<i>Sauteria japonica</i> (Shim. et Hatt.) Hatt. (タカネゼニゴケ)	♀	36	$16V+16J+4m$ ($2h_1+2h_2$)	長野県八ヶ岳
Fam. Rebouliaceae <i>Asterella crassa</i> Shim. et Hatt. (アツバサイハイゴケ)	♀	9	$4V+4J+m(h)$	埼玉県秩父郡横瀬村武甲山
<i>A. chichibuensis</i> Shim. et Hatt. (チチブサイハイゴケ)	♀	9	$V(H)+3V+4J+m(h)$	埼玉県秩父郡大滝村落合
<i>A. umbelliformis</i> Shim. et Hatt. (シユガササイハイゴケ)	♀	9	$V(H)+3V+4J+m(h)$	埼玉県秩父郡大滝村穴子峠
<i>A. sanoana</i> Shim. et Hatt. (サノサイハイゴケ)	♀	9	$V(H)+3V+4J+m(h)$	長野県南佐久郡北柏木村御座山
<i>A. pusilla</i> Shim. et Hatt. (ヒメサイハイゴケ)	♀	9	$V(H)+3V+3J+J'+m(h)$	埼玉県秩父郡大滝村十文字峠
<i>Mannia barbifrons</i> Shim. et Hatt. (ヒゲゼニゴケ)	♀	9	$V(H)+3V+4J+m(h)$	埼玉県秩父郡大滝村上中尾
<i>M. brachypoda</i> Shim. et Hatt. (トモトゼニゴケ)	♀	9	$V(H)+3V+4J+m(h)$	埼玉県秩父郡大滝村柄本
<i>M. levigata</i> Shim. et Hatt. (ウルシゼニゴケ)	♀	9	$V(H)+3V+4J+m(h)$	埼玉県秩父郡大滝村上中尾
* <i>Plagiochasma intermedium</i> Lindb. et Gott. (ミカンゴケ)	♀	9	$V(H)+3V+3J+J'+m(h)$	埼玉県秩父郡大滝村上中尾
Fam. Marchantiaceae ** <i>Monosolenium tenerum</i> Griff. (ヤハラゼニゴケ)	♀	9	$V(H)+3V+4J+m(h)$	宮崎県日南市飫肥本町
* <i>Preissia quadrata</i> (Scop.) Nees (アカゼニゴケ)	♀	9	$V(H)+3V+4J+m(h)$	埼玉県秩父郡横瀬村武甲山

* 既報種 (Arten, die die Chromosomen schon untersucht worden sind.).

** 既報では *Dumortieropsis liukiuensis* Horikawa とす (Diese Art ist in früheren Abhandlung als *Dumortieropsis liukiuensis* Horikawa angegeben worden.) (Tatuno 1941).

=36 は *S. alpina*, *Nardia insecta* などと共に既知の苔類の染色体中最高の染色体数である。

Rebouliaceae: Tabelle 1 に示す如く, *Asterella* 属 5 種: アツバサイハイゴケ (*A. crassa*) (Fig. 5), チチブサイハイゴケ (*A. chichibuensis*) (Fig. 7), シユガササイハイゴケ (*A. umbelliformis*) (Fig. 6), サノサイハイゴケ (*A. sanoana*) (Fig. 8), ヒメサイハイゴケ



Fig. 1-15, ゼニゴケ目 15 種の染色体 (Chromosomen der 15 Arten von Marchantiales): 1, ハマグリゼニゴケ (*Targionia hypophylla*) $n=9$. 2, ゲンバイゼニゴケ (*Athalamia glauco-virens*) $n=9$. 3, ヤツガタケゼニゴケ (*Peltolepis quadrata* var. *japonica*) $n=18$. 4, タカネゼニゴケ (*Sauteria japonica*) $n=36$. 5, アツバサイハイゴケ (*Asterella crassa*) $n=9$. 6, シユガササイハイゴケ (*Asterella umbelliformis*) $n=9$. 7, チヂブサイハイゴケ (*Asterella chichibuensis*) $n=9$. 8, サノサイハイゴケ (*Asterella sanoana*) $n=9$. 9, ヒメテイハイゴケ (*Asterella pusilla*) $n=9$. 10, トチモトゼニゴケ (*Mannia brachypoda*) $n=9$. 11, ヒゲゼニゴケ (*Mannia barbifrons*) $n=9$. 12, ウルシゼニゴケ (*Mannia levigata*) $n=9$. 13, ミカンゴケ (*Plagiochasma intermedium*) $n=9$. 14, ヤハラゼニゴケ (*Monoselenium tenerum*) $n=9$. 15, アカゼニゴケ (*Preissia quadrata*) $n=9$. $\times 3600$.

ケ (*A. pusilla*) (Fig. 9), *Mannia* 属の 3 種: ヒゲゼニゴケ (*M. barbifrons*) (Fig. 11), トチモトゼニゴケ (*M. brachypoda*) (Fig. 10), ウルシゼニゴケ (*M. levigata*) (Fig. 12) は $n=9$ で、何れも新たに観察されたものである。それら 9 個の染色体中最小の m は何れも h である。又アツバサイハイゴケ以外では最大の染色体が H である。尚ヒメサイハイゴケの 1 個の J 字形染色体には附随体 (t) が見られる。

ミカンゴケ (*Plagiochasma intermediate*) の染色体数については先に筆者 (1941) は上佐佐川産のもので $n=9$ と報告したが、本研究の秩父産のものもこれと同様である。又核型は今般初めて明かにされたもので、 $K=V(H)+3V+3J+J+m(h)$ で H , h 及び附随体染色体 (t) がそれぞれ 1 個見られる。

Marchantiaceae: ヤハラゼニゴケ (*Monoselenium tenerum*) は $n=9$, $K=V(H)+3V+4J+m(h)$ で、これは先に筆者 (1941) が琉球産のもので報告したが (*Dumontieropsis linkinensis* Horikawa として報告)、本邦産のものもこれと同様である。

アカゼニゴケ (*Preissia quadrata*) は先に筆者 (1941) が長野県燕岳産 (*P. commutata* Nees として報告) で $n=9$, $K=V(H)+3V+4J+m(h)$ と報告したが、本研究の秩父武甲山のものでも同様な結果を得た。

以上観察された 15 種のうち 10 種に見られた H の異常凝縮は体止核において仁の表面に附着するから所謂仁染色体 (SAT-Chromosomen) である。又 15 種の凡てに見られる h の異常凝縮は体止核でその一部が仁内に入り小仁を作るから所謂小仁染色体 (Nukleolinus-Chromosomen) (Tatuno 1954) である。尚是等異質染色体その他の詳細については他の機会に報告する所である。

Résumé

In dieser Abhandlung wurden die Chromosomen bei 15 Arten von Marchantiales aus Japan mitgeteilt. Die Chromosomenzahlen und Karyotypen bei untersuchten Pflanzen sind in der Tabelle 1 angegeben.

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置く。

評議員は、理事会でこれを選出し、理事長がこれを任命する。

評議員には、第十九条を準用する。この場合において同条中（役員）とあるのは、（評議員）と読み替えるものとする。

第二十二条 評議員は、評議員会を組織し、この寄附行為に定める事項の外、理事会の諮問に応ずる。

第二十三条 この法人の事務を処理するため、書記等の職員を置く。

職員は、理事長が任免する。

職員は、有給とする。

第五章 会議

第二十四条 理事会は、毎年二回理事長が召集する。但し、理事長が必要と認めたとき、又は理事現在数の三分の一以上から会議の目的事項を示して請求のあつたときは、臨時理事会を召集しなければならない。

会議の議長は理事長とする。

第二十五条 理事会は、理事の三分の二以上出席しなければ議事を開き議決することができない。但し当該議事につき書面をもつてあらかじめ意思を表示した者は、出席者とみなす。

理事会の議事は、この寄附行為に別段の定めがある場合を除くほか、出席理事の過半数をもつて決し、可否同数のときは議長の決するところによる。

第二十六条 次に掲げる事項については、理事会において、あらかじめ評議員会の意見を聞かなければならぬ。

一、予算及び決算についての事項

二、基本財産の処分についての事項

三、その他この法人の業務に関する重要事項で理事長において必要と認めた事項

第二十四条及び前条は、評議員会にこれを準用する。この場合において、第二十四条及び前条中（理事会）及び（理事）とあるのは、（評議員会）及び（評議員）と読み替えるものとする。

第二十七条 すべての会議には、議事録を作成し、議長及び出席者代表二名が署名押印の上、これを保存する。

第六章 寄附行為の変更並びに解散

第二十八条 この寄附行為は、理事現在数及び評議員現在数おのおの三分の二以上の同意を経、且つ、文部大臣の認可を受けなければ変更することができない。

第二十九条 この法人の解散は、理事現在数及び評議員現在数おのおの四分の三以上の同意を経、且つ文部大臣の許可を受けなければならぬ。

第三十条 この法人の解散に伴う残余財産は、理事全員の同意を経、且つ、文部大臣の許可を受けて、この法人の目的に類似の目的を有する公益事業に寄附するものとする。

第七章 補則

第三十一条 この寄附行為施行についての細則は理事会の議決を経て別に定める。

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