

VOLUME VI

December 25th, 1916



臺灣植物圖譜

臺灣植物誌料

第六卷

Icones Plantarum Formosanmarum

nec non et

Contributiones ad Floram Formosanam

or

Icones of the Plants of Formosa, and Materials for a Flora of the
Island, based on a Study of the Collections of the Botanical
Survey of the Government of Formosa

By

Bunzō Hayata, *Rigakuhakushi*

VOLUME VI

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TAIHOKU

NOTICE



- I. Dicotyledons—Polypetalous: Ranunculaceæ—Rosaceæ. Published September 10th, 1911.
- II. 1. Conspectus of the Flora of Formosa, Saxifrageæ—Dipsaceæ.
2. New or Noteworthy Plants of Formosa. Published October 15th, 1912.
- III. 1. Contributions to the Flora of Formosa, I.
2. On the Systematic Position of *Mitrastemon*, as a Genus representing a special Tribus of the Rafflesiaceæ. Published December 25th, 1914.
- IV. Contributions to the Flora of Formosa, II. Published November 25th, 1914.
- V. Contributions to the Flora of Formosa, III. Published November 25th, 1915.
- VI. Contributions to the Flora of Formosa, IV. Published November 25th, 1916.
- VII. Will be issued in September 1917.
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ICONES PLANTARUM FORMOSANARUM

NEC NON ET

**CONTRIBUTIONES AD FLORAM
FORMOSANAM**

VI

AUCTORE

Bunzo Hayata

TO HIS EXCELLENCY BARON TEIBI ANDO,
GOVERNOR GENERAL OF FORMOSA.

SIR,

I have the honour to submit to your Excellency the sixth volume of the *Icones Plantarum Formosanarum, nec non et Contributiones ad Floram Formosanam* by BUNZŌ HAYATA, D. Sc.

HIROSHI SHIMOMURA,
CIVIL GOVERNOR OF FORMOSA.

September 1, 1916, Taihoku.

INTRODUCTION.

As was announced in the introduction of third volume of this work, the present volume is principally devoted to the fourth part of those studies which have for the most part been upon new material, collected since 1912.

The volume contains studies on 212 species and 6 varieties ranging from the Berberideæ down to the Polypodiaceæ. All the species of phanerogamous plants are here arranged, as in the preceding volumes, after the system of BENTHAM and HOOKER; while those of vascular cryptogams are arranged after the system of ENGLER and PRANTL. Of the species and varieties mentioned in this work, 126 are proposed as new species and 6 are regarded as new varieties of known species, while 86 are identified with species which were already known as from Formosa or from other countries. One genus, *Parasitipomaea*, is proposed as a new, while 9 genera are mentioned as new to the flora of the island. The latter genera are as follows:

<i>Nuphar</i>	<i>Gardneria</i>	<i>Myrmechis</i>
<i>Picrasma</i>	<i>Acanthephippium</i>	<i>Gymnadenia</i>
<i>Gerbera</i>	<i>Vrydagzamia</i>	<i>Woodsia</i>

Species,* genera* and families* now to be added to the flora of Formosa number as many as 121 species and 10 genera. Thus, up to the present date, the total number of species of the flora, so far as known, is 3446 species belonging to 954 genera and 160 families.

Finally, I avail myself of this opportunity to tender my hearty thanks to the officials of the Government of Formosa, to whom I am much indebted for help in the collection of material and in the publication of this work.

B. HAYATA.

December 1916, Taihoku and Tōkyō.

* It should be understood that plants outside of the island are not counted in this number, although they are mentioned in this volume.

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Contributions to the Flora of Formosa.**IV.**

Berberideae.

Mahonia NUTT.

Mahonia oiwakensis HAYATA sp. nov. Arborescens circ. 10 m. alta. Rami recti teretes apicem versus 1 cm. in diametro sectionis, cortice cinereo suberiformi, cicatricibus foliorum elevatis linearibus transverse dispositis. Folia versus apicem ramulorum approximativissime disposita radiatim divaricata pinnata in ambitu obovato-oblancheolata vel oblanceolata 25-40 cm. longa 10-20 cm. lata subsessilia supra medio latissima inferiore in ambitu gradatim usque ad basin attenuata, pinnis 12-14-jugis oppositis vel superiore subalternis, jugis inferioribus quam iis superioribus remotioribus, pinnis infimis ovatis 1½-2½ cm. longis 7-15 mm. latis margine 1-2-aristato-dentatis, pinnis superioribus gradatim majoribus angustioribus longioribus; pinnis longissimis lanceolatis 8-10 cm. longis 14-20 mm. latis apice acuminatissimis basi cordato-rotundatis plus minus obliquis sessilibus margine tenuiter leviterque 1-3 dentibus instructis, dentibus interdum ad aristam ½ mm. longam reductis, aristis ascendentibus, coriaceis supra nitidis subtus pallidis, costa supra tenuiter impressa subtus elevata, nervis lateralibus supra haud distinctis vel vix elevatis subtus tenuiter elevatis, 5-nerviis utroque glabris; nodis jugarum leviter tumidis articulatis, rhachibus supra subtusque planis latere profunde sulcatis; jugis inferioribus a se 2½-4 cm. remotis; rhachibus ad basin subito valde dilatatis 8-10 mm. latis; pinna terminalis quam pinnis lateralibus longior longissima linearis vel lineari-lanceolata integra vel dentibus 1-2 instructa. Racemi floriferi non visi; fructiferi ad apicem ramorum dense congesti erecti recti 9 cm. longi, bracteis oblongo-triangularibus 3½ mm. longis 2 mm. latis apice acutis basi leviter ventricosis patentissimis, pedicellis brevissimis 2 mm. longis. Bacca purpureo-nigricans glaucescens conico-ovoidea 9 mm. longa 6 mm. lata apice oblique acuta breve attenuata reliquis stigmatibus apiculata 2-sperma. Semina ellipsoidea 4½ mm. longa 2½ mm. lata utrinque obtusa, testa nigricanti.

HAB. Musha Oiwake, leg. B. HAYATA, Mai. 1916 ; Gokwanzan, leg. U. MORI, Feb. 1910.

Near *M. lomariifolia* TAK., but differs from it in the much narrower leaflets which are less spinous at the margin and have the less elevated veinlets.

Nymphaeaceae.

Nuphar SM.

Nuphar Shimadai HAYATA sp. nov. (Pl. I.) Herba aquatica; rhizoma crassum repens subteres 1 cm. in diametro sectionis sursum radiferum, radicibus teretibus incrassatis 3 mm. in diametro sectionis. Folia circum rhizoma spiraliter disposita longe petiolata, lamina in ambitu oblonga vel ovata (ab apicem laminae usque ad apicem auriculae) 8-10 cm. longa 7-8 cm. lata apice perfecte rotundata basi sagittato-cordata (lobis cordis subtriangularibus 3-4 cm. longis apice obtusissimis) margine subintegra supra in exsicco minute muricato-scabriuscula glabra subtus versus medium paucis versus marginem densissime hirsuta, costis supra haud visis subtus leviter elevatis, venis lateralibus radiatim divaricatis supra haud subtus distincte visis tenuissimis, subcoriacea, petiolis 15-30 cm. longis basi dilatatis. Scapus 25-40 cm. longus teres 3-3½ mm. in diametro sectionis erectus. Flores flavi solitarii terminales. Sepala 5 obovata vel spathulato-obovata plus minus inaequalia majora 2 cm. longa 13 mm. lata apice late rotundata vel emarginata basi angustata ad insertionem 3 mm. lata vel latiora, exteriora minora plus crassa interiora majora tenuissime membranacea. Petala ∞ breviora staminodiiformia 6 mm. longa 2½-3 mm. lata dorso complanata obovato-quadrangulariformia apice truncate vel emarginata. Stamina ∞ cum antheris 1 cm. longa, filamentis dorso complanatis 8 mm. longis 1 mm. latis glabris, antheris quadrangulari-formibus 2½ mm. longis 1½ mm. latis apice truncatis, loculis 2 linearibus mtrorsis a se ⅔ mm. distantibus. Ovarium semi-rotundato-coniforme 3-4 mm. longum 7 mm. latum glabrum apice ad stylum 1-2 mm. longum abeuns, stylo apice 10-fido, segmentis 2 mm. longis exteriore recurvis apice acutis facie interiore prominente 1-carinatis ad carinas stigmatosis. Bacca late globosa 17 mm. longa 20 mm. lata apice stigmatate coronata. Semina globoso-ovoidea 4 mm. longa 3 mm. lata apice obtusa basi rotundata, testa crustacean fusco-castanea; albumen osseum sucineum semi-pellucidum. Embryo teres centralis.

HAB. Shiuchikucho : Shimpo, leg. Y. SHIMADA, Dec. 1915. (Fl. et fr.)

Very near *Nuphar nipponicum* MAKIO, but differs from it in having more rounded leaves which are much hirsute on the under surface.

Violaceae.

Viola LINN.

Viola Tayemonii HAYATA sp. nov. Caulis cum flore terminali circ. 8 cm. longus simplex haud ramosus glaber erectus. Folia radicalia ignota. Folia caulina 2 alternatim sita glabra petiolata late reniformia 18 mm. lata 8 mm. longa apice late rotundata vel plus minus acuta basi profunde reniformia margine serrulata, (serrulis ascendentibus recurvis latere inferiore 2 mm. longis latere superiore $\frac{1}{3}$ mm. longis apice glanduliferis, glandulis rubris), utraque pagine atro-viridissima, supra venis venulis decoloratis distincte visis, supra hirsuta subtus glabra, petiolis 1-1½ cm. longis glabris, stipulis lineari-oblongis glabris supra hirsutis subtus glabris 4-6 mm. longis 1½-2 mm. latis. Flores flavi terminales pedunculati, pedunculis 3 cm. longis glabris erectis. Sepala oblongo-lineararia 4½ mm. longa 1¼ mm. lata apice obtusa integra margine ciliolata pagine utraque subglabra ; petala et stamina ignota.

HAB. Taihasenzan, ad 11000 ped. alt., leg. Tayemon Ito, Jun. 1915.

Near *Viola biflora* LINN. var. *crassifolia* MAKINO, but differs from it in having much smaller leaves and flowers.

Viola senzanensis HAYATA sp. nov. Rhizoma erectum. Folia omnia radicalia longe petiolata utraque glabra triangulari-cordata 8 mm. longa 10 mm. lata apice triangulari-obtusa basi reniforme cordata margine remote serrulata, (serrulis a se 2 mm. remotis brevissimis latere superiore $\frac{1}{4}$ mm. longis latere inferiore 2 mm. longis apice callo uno rubro instructis), supra viridia venis venulis haud visis, petiolis 2-3 cm. longis glabris, stipulis lineari-lanceolatis 2-3 mm. longis 1 mm. latis paucissime laciniato-serratis vel integris. Scapus 3 cm. longus glaber medio bracteis singulis vel duabus instructus, bracteis linearibus 2 mm. longis acuminatis. Flores 7 mm. longi. Sepala lineari-lanceolata. Antherae lineari-oblongae 1 mm. longae $\frac{2}{3}$ mm. latae sessiles, appendiculis connectivorum ovatis 1½ mm. longis 1 mm. latis apice obtusis basi subtruncatis rutescentibus membranaceis. Caeterum ignoti.

HAB. Taihasenzan, ad 11000 ped. alt., leg. TAYEMON ITO, Jan. 1915.

Remarkable for the very small leaves.

Ternstroemiaceae.

Adinandra JACK.

Adinandra lasiostyla HAYATA Mater. Fl. Formos. p. 42. Descriptio aucta:—Flores axillares solitarii, pedicellis 1 cm. longis villosis basi bracteis 2 instructis, bracteis minutis caducis oblongo-triangularibus 1½ mm. longis ¾ mm. latis apice obtusis extus pilosis intus glabris. Sepala 5 rotundato-ovata 4½ mm. longa 4 mm. lata apice obtusissima basi haud vel vix contracta margine dense ciliolata dorso prope medium pilosa crassiuscula versus marginem glabra intus glabra imbricata. Petala 5 imbricata ovato-rotundata 4 mm. longa totiusque lata apice triangulari-obtusa basi plus minus contracta margine crenulato-denticulata dorso medio crassiuscula pilosa versus marginem tenuia glabra intus toto glabra. Stamina circ. 20, filamentis ½ mm. longis glabris complanatis antheris lineari-lanceolatis 2 mm. longis ½ mm. latis apice acuminatis basi obtusi, extus plus dense intus minus dense pilosis, pilis 1 mm. longis ascendente-erectis, loculis 2 introrsum dehiscentibus. Ovarium pilosum cum stylo conico-columniforme cum stylo 3 mm. longum ¾ mm. latum basi densissime sursum sparse pilosum, stylo 1½ mm. longo glabro apice brevissime 3-lobato.

HAB. Arisan, ad 2500 m. alt., leg. U. FAURIE, Junio 1914, (No. 1055).

This form is distinguishable from the type in having quite glabrous styles. It may be questioned, however, that this form is a male one of the original.

Geraniaceae.

Impatiens LINN.

Impatiens Tayemonii HAYATA sp. nov. Caulis erectus rectus glaber 40 cm. altus. Folia alterna membranacea oblonga circ. 10 cm. longa 4¼ cm. lata apice acuminata basi cuneato-obtusa margine serrata, serris ascendentibus 3-4 mm. latis totiusque longis apice truncatis et emarguatis ad centrum apiculatis, apiculis ½ mm, longis erectis rectis, venis lateralibus ad apicem serrularum haud attingentibus, utraque glabra, petiolis 1-2 mm. longis, stipulis nullis. Flores majuscule flavi ad axillas foliorum superiorum solitarii, pedunculis

gracilibus 2½ cm. longis versus apicem 1-bracteatis, bracteis minutis. Sepala 3; lateralia 2 ovato-rotundata 1 cm. longa 8 mm. lata apice recurvo-apiculata basi rotundata; posticum 1 longe saccatum apice ad orem cuspidato-acutum, ore plus minus obliquo 18 mm. in diametro, sacco obconico 2 cm. longo (calcare excepto) 1½ cm. lato basi acuto ad calcare lineare abeunti, calcare aseudento-recurvo lineari 8 mm. longo 1 mm. lato ad extremitatem 2-fido, ramis 2 mm. longis. Petala 3 : vexillum in plicato 8 mm. latum in explicato 16 mm, latum 6 mm. longum (in plicato oblique semi-rotundatum) apice emarginatum apiculatum, apiculis 1 mm. longis deorsum productis; also semi-oblongae 2 cm. longae 1 cm. latae latere posteriore (superiore) lobis singulis instructae, lobis 4 mm. longis 5 mm. latis semi-rotundatis acutis apiculatis, apiculis 2 mm. longis deorsum recurvis. Stamina 5, filamentis complanatis 3 mm. longis medio appendiculatis, appendiculis linearibus 1½ mm. longis, antheris circum pistillum cohaerentibus late rotundatis. Ovarium lineare cum stylo brevissimo 4 mm. longum 1½ mm. latum apice cum stylo obtusum 5-costatum.

HAB. Taihasenzan, ad 7000 ped. alt., leg. TAYEMON ITO, Junio 1915.

Near *I. Noli-tangere* LINN., but differs from it in having more minutely serrate leaves tipped with a small tail.

Rutaceae.

Evodia FORST.

Evodia hirsutifolia HAYATA sp. nov. Frutex ? Ramuli fusco-purpurascens. Folia opposita in ambitu lanceolata generaliter 9-11-foliolata, foliolo terminali maximo elongato-oblongo 10 cm. longo 3½ cm. lato apice acuminato basi acuminato membranaceo-chartaceo margine integro utraque pagine tenuiter brevissime hirsuto, costa supra subtusque tenuiter elevata, venis lateralibus primariis utraque pagine tenuiter elevatis hirsutis utroque latere costae 15-18 subrectis angulo obtusissimo a costa divaricatis, in exsicco supra fuscenti subtus pallido subtus minute pauca rufo-fusco-punctato, petiolulo terminali 13 mm. longo; foliolis lateralibus oppositis ovatis vel ovato-lanceolatis inferioribus gradatim minoribus, infimis minimis basi plus minus obliquis, superioribus subsessilibus, inferioribus breve petiolulatis, petiolis communibus 3-4 cm. longis cum rachibus haud alatis brevissime hirsutis. Cymae axillares

vel terminales, fructiferae cum pedunculis 6 cm. longae 8 -9 cm. latae, ramis oppositis transverse divaricatis; pedunculis 2½ cm. longis hirsutis. Fructus folliculifer 6 mm. longus 11 mm. in diametro generaliter 5-carpellaris, carpellis basi connatis obovatis apice rotundatis basi acutis dorso rotundato-convexis latere planis latere leviter compressis dorso grosse tuberculatis latere laevibus. Semina ellipsoidea 3½ mm. longa 3 mm. lata nitida nigerrima.

HAB. Rinkiho, leg. H. INABA, 1911, Aug.

Near *Evodia meliaefolia* BENTH., but differs from it in having thinly hairy leaves and cymes.

Evodia meliaefolia BENTS. ; MATSUM. et HAYATA Enum. Pl. Formos. p. 69. Frutex. Ramuli fuscentes lenticellis elevatis rotundatis minutis notati. Folia opposita in ambitu lanceolata vel ovata cum petiolis 10-20 cm. longa 9-12 cm. lata 5-11-foliolata, foliolis subaequalibus, foliolo terminali ovato-lanceolato 5½ cm. longo 2½ cm. lato apice caudato-acuminato basi obtuso aequali vel plus minus obliquo ad summum obtuso margine subintegro supra in exsiccato fuscenti subtus plus minus albicanti, costa supra tenuiter subtus distincte elevata, venis lateralibus tenuissimis, petiolulo circ. 1 cm. longo; foliolis lateralibus oppositis ovato-lanceolatis basi valde obliquis latere superiore 12 mm. lato latere inferiore 8 mm. lato, petiolulis 8 mm. longis; petiolis communibus 4 cm. longis. Flores non visi. Cymae ad axillas foliorum superiorum vel terminales cum pedunculis 5½ cm. longae totiusque latae trichotome ramosae dense fructiferae, pedunculis 3 cm. longis. Fructus folliculiformis depressus 3 mm. longus 7 mm. in diametro 3-5-carpellaris, carpellis subdistinctis subglobosis latere compressis dorso rugosissimis latere sublaevibus sutura ventrali dehiscentibus, endocarpiis et exocarpiis demum solutis, endocarpiis cartilagineis. Semina ellipsoidea 2½ mm. longa 2 mm. lata apice obtusa basi rotundata latere uno cicatricibus linearibus hilorum notata, testa osseo-crustacea nitidissima nigerrima; albumen carnosum; embryo amplus, cotyledonibus rotundato-ellipticis 1½ mm. longis, radícula brevissima 1/5 mm. longa.

HAB. in monte centralibus (Ahisen), ad 4000 ped. alt., leg. S. SASAKI, Jan. 1911.

Zanthoxylum LINN.

Zanthoxylum liukiense HAYATA sp. nov. Frutex. Ramuli teretes

haud aculeati, cortice longitudinaliter ruguloso ad rugulos fisso haud vel vix lenticellato glabro. Folia alterna pari- vel impari-pinnata tenuiter coriacea in ambitu linearia cum petiolis 20 cm. longa 6 cm. lata 19-23-foliolata, foliolis superioribus majoribus inferioribus minoribus; foliolo terminali oblongo-lanceolato 4-4½ cm. longo 1½ cm. lato apice caudato-acuminato ad summum obtuso retuso basi acuto margine erenulato utraque pagine glabro, costa supra tenuiter impressa subtus elevata, venis primariis lateralibus supra haud subtus tenuiter elevatis utroque latere costae 7-8 subrectis, utraque glabro obscure minute punctato; foliolis lateralibus ovato-oblongis apice breve caudatis basi obliquis latere superiore obtusis vel rotundatis latere inferiore acutis vel obtusis a se 1½ cm. remotis; rhachibus angustissime alatis semi-teretibus, petiolis communibus 2 cm. longis glabris. Paniculae axillares 4 cm. longae 3 cm. latae, ramis divaricatis glabris apice flores subglomeratim gerentibus (pedicellis ultimis 1-2 mm. longis crassis basi bracteis minutis triangularibus acutis ⅓ mm. longis instructis). Flores ♀: sepala 4 triangularia apice obtusa basi haud contracta minus quam 1 mm. longa totiusque lata sub microscopio margine ciliolata utraque pagine glabra crassiuscula. Staminodia 4 triangulari-linearia ⅔ mm. longa ⅓ mm. lata haud antherifera. Ovarium tetramerum 1 mm. altum glabrum, carpellis subdistinctis octantiformibus, stylis 2 mm. longis validiusculis exteriore recurvis apice oblique stigmatiferis. Discus sub ovario insitus incrassatus 1 mm. longus totiusque latus.

HAB. Loo-choo, Nagodake, leg. G. NAKAHARA, Aprili. 1907.

Near *Z. cuspidatum* CHAMP., but distinguishable from it by the much more numerous and smaller leaflets and much shorter common petioles.

Zanthoxylum acanthophyllum HAYATA sp. nov. Frutex? ramossissimus; rami teretes glabri fulvo-cinerascentes, cortice tenuiter ruguloso lenticellis haud elevatis minutis albis hac atque iliac notato; ramuli flexuosi alternatim foliati, utroque latere basis petiolorum spinis oppositis instructi, (spinis validissimis oppositis latere complanatis facie exteriore planis facie interiore subangulatis in sectione apice subulato-acutis basi triangulari-dilatatis circ. 1 cm. longis basi 6 mm. latis rectis a ramulo angulo circ. 90° egressis basi deorsum fulvescentibus sursum rubro-purpurascens nitidis). Folia rami annotini decidua majora 7-foliolata ambitu obovato-

oblonga vel oblonga cum petiolis 10 cm. longa 7 cm. lata, foliolo terminali obovato oblongo vel oblongo 5 cm. longo 2 cm. lato apice obtuso vel acuto basi obtuso vel cuneato basi integro excepto brevissime serrulato versus apicem crenulato, ad marginem tenuissime deorsum recurvo, pagine superiore glabro sed setulis 1 mm. longis ascendentibus consperso ad costas et venas haud setuloso, pagine inferiore glabro haud setuloso sed ad costas setuloso, costis et venis supra tenuissime impressis subtus elevatis, venis lateralibus primariis utroque latere costae 5-6 mediis a costa angulo 50° egressis subrectis ad marginem haud attingentibus, membranaceo vel chartaceo; foliolis lateralibus oppositis 3-jugis, jugis superrimis maximis quam foliolo terminali majoribus, jugis infimis minoribus, petiolis cum rhachibus a basi usque ad foliolum terminale $5\frac{1}{2}$ cm. longis a latere complanatis supra late canaliculatis utroque latere canaliculorum angustissime elevato-alatis subtus minute setulosus, supra ad jugas superiores inter foliola lateralia seta validiuscula 5 mm. longa singula instructis, ad jugam infimam setula minuta singula instructis; inter-jugis 14 mm. longis, cum petiolulo terminali (i. e. partibus rachis inter foliolum terminale et jugam superrimam) aequilongis; foliis ramulorum lateralium floriferorum hornotinatorum minoribus cum petiolo 3 cm. longis 2 cm. latis. Flores ♂ cymosi. Cymae ad apicem ramulorum lateralium terminales subumbelliformes sessiles, ramis (vel radiis) 5-6, $1\frac{1}{2}$ cm. longis glabris patentibus apice florem 5-6 umbellatim gerentibus, pedicellis ultimis 3 mm. longis basi articulatim deciduis basi bracteis singulis instructis, bracteis minutis subuliformibus 1 mm. longis. Sepala 5 inaequalia lanceolata vel lanceolato-triangularia 1 mm. longa apice lineari-acuminata basi $\frac{1}{3}$ mm. lata glabra. Petala 0. Stamina 4-5 sepalis opposita, filamentis $1\frac{1}{2}$ mm. longis $\frac{1}{5}$ mm. latis glabris, antheris apertis reniformibus in clauso ellipticis $\frac{3}{4}$ mm. longis glabris apice emarginatis dorso apice globulis singulis instructis, globulis nigro-coloratis. Rudimentum ovarii (vel discus?) globoso-pulviniforme $\frac{2}{3}$ mm. longum $\frac{3}{4}$ mm. latum apice apiculis brevibus instructum. Fl. ♀ ignoti.

HAB. Takao, leg. S. SASAKI, Mart. 1910.

Fagara LINN.

Fagara cyrtorhachia HAYATA sp. nov. Frutex scandentissimus. Rami subrecti remotissime aculeolati, aculeis 4 mm. longis latere complanatis descen-

dento-recurvis, remote foliati, corticein exsiccato fusco-cinerascenti longitudinaliter ruguloso minutissime lenticellato. Folia 7-17-foliolata in ambitu lanceolata, foliolis oblongis vel lanceolatis lateralibus suboppositis vel alternis, infimis longissimis oblongo-ovatis 5 em. longis 2 cm. latis apice acuminato-caudatis (ad summum caudae obtusis) basi cuneato-acutis margine integris in exsiccato supra subnitidis vel opacis fuscentibus subtus pallidioribus utroque glaberrimis, costa supra tenuiter impressa subtus elevata, venis lateralibus primariis supra vix subtus distincte elevatis gracillimis; foliolo terminali longissimo angustiore lanceolato 6 cm. longo 13 mm. lato, petiolulis 2 mm. longis supra sulcatis, rhachibus cum petiolis gracilibus arcuatis aculeolatis supra sulcatis. Paniculae axillares 4-5 cm. longae laxiuscule floriferae, rhachibus reotis minute hirsutis 4-quetris ad nodos glomeratim floriferis, vel floribus ad apicem ramorum paniculorum glomeratim pedicellatimque sitis, bracteis sub pedicello singulis, bracteolis duabus; bracteis cuspidato-triangularibus $\frac{1}{2}$ mm. longis hirsutis; bracteolis subulatis minutis $\frac{1}{2}$ mm. longis; pedicellis $\frac{1}{2}$ mm. longis hirsutis articulatis a rhachide solutis. Fl. ♂ : pallido-viridis. Sepala 5 triangularia $1\frac{2}{3}$ mm. longa et lata acuta utraque glabra margine plus minus breve hirsuta. Petala 5 elongato-oblonga 2 mm. longa 1 mm. lata apice obtusa basi leviter contracta margine subintegra sub microscopio minute denticulata utraque glabra. Stamina 5, filamentis $2\frac{1}{2}$ mm. longis glabris, antheris oblongo-sagittiformibus glabris $\frac{2}{3}$ mm. longis $\frac{1}{2}$ mm. latis apice obtusis basi sagittatis. Discus haud distinctus. Rudimentum ovarii depresso-globosum $\frac{1}{3}$ mm. longum, stylis 2 oblongis $\frac{1}{2}$ mm. longis. Fl. ♀ : viridescens. Sepala ut fl. ♂. Petala ovata $2\frac{1}{2}$ mm. longa $1\frac{1}{2}$ mm. lata utraque pagina glabra apice obtusa basi leviter contracta margine sub microscopio minute ciliolata. Staminodia 5 minuta, antheris obsoletis. Discus pulviniformis in specimine exsiccato indistinctus. Ovarium depresso-globosum $1\frac{1}{3}$ mm. longum totiusque latum glabrum, carpellis 4 (vel 5 ?) distinctis octantiformibus dorso minute impresso-punctatis, basi rotundatis apice abrupte ad stylum abeuntibus, stylis $1\frac{1}{2}$ mm. longis exterioribus valde recurvatis apice subgloboso-dilatatis stigmatosis. Panicula fructifera pyramidalis 3-4 cm. longa. Fructus folliculiformis 4 mm. longus 11 mm. in diametro, carpellis depresso-globosis $6\frac{1}{2}$ mm. longis 6 mm. latis apice plus minus apiculatis latere leviter compressis. Semina ignota.

HAB. Mt. Arisan; inter Heishana et Nimandaira, leg. B. HAYATA, Aprili. 1914, (fr.); inter Funkiko et Taroyen, leg. TAKEO ITO et B. HAYATA, Mart. 1914, (fl. ♀ et ♂).

Fagara cyrtorhachia and *F. leiorhachia* are contrasted by the leaves which are in the former 7-17 foliolate with smaller leaflets, but in the latter 5-foliolate with much larger leaflets.

Fagara laxifoliolata HAYATA sp. nov. Frutex? rami et ramuli haud aculeati longitudinaliter rugulosi minute lenticellati. Folia alterna tenuiter coriacea pari-vel imparipinnata 7-9-foliolata in ambitu oblanceolata cum petiolis 2 cm. longis 20-25 cm. longa 8-9 cm. lata, foliolis superioribus majoribus, inferioribus minoribus, foliolo terminali cuspidato-obovato 8 cm. longo 3½ cm. lato apice breve subito cuspidato-caudato ad summum tenuiter retuso basi subito acuminato margine integro tenuiter desuper excurvato utraque glabro supra nitido, costa supra valde impressa subtus prominenti, venis primariis lateralibus utraque pagine tenuiter sed distincte elevatis venulis supra elevatis distincte reticulatis sed subtus vix visis, venis rectis, petiolulo 2 cm. longo; foliolis lateralibus basi obliquis acutis, petiolulis 1 mm. longis sulcatis; foliolis a se 3 cm. remotis, rhachibus petiolisque et petiolulisque supra sulcatis; petiolis communibus 2 cm. longis. Paniculae axillares 5-7 cm. longae in ambitu pyramidales abundanter floriferae, rhachibus pedicellisque hirsutis, pedicellis ultimis 2-3 mm. longis basi articulatim solutis, bracteis minutis triangularibus ¾ mm. longis totiusque latis acutis margine minute ciliatis. Flores ♀ Sepala 4, triangularia ¾ mm. longa ¾ mm. lata apice acuta vel obtusa utraque glabra margine sub lente ciliolata. Petala 4 oblonga 3 mm. longa 2 mm. lata apice obtusa basi plus minus contracta margine sub microscopio minute crenulata utraque glabra. Staminodia nulla vel minuta squamiformia. Ovarium 4-merum, carpellis subdistinctis quadrantiformibus 1½ mm. longis dorso impresso-punctatis, stylis 1 mm. longis stigmatibus globosis oblique sitis. Discus (vel torus ?) sub ovario insitus ½ mm. longus pulviniformis.

HAB. Mt. Shichiseitonzan, leg. Y. SHIMADA, Aprili. 1911.

Near *F. Avicennae* DC (BENTH. Fl. Hongk. p. 58), but differs from it by the 4-carpelled flowers and obtusely cuspidate leaflets.

Fagara leiorhachia HAYATA sp. nov. Frutex scandentissimus. Rami

recti teretes fusco-cinerascentes, cortice longitudinaliter ruguloso lenticellis minutissimis notato. Folia 5—foliolata in ambitu obovata 14 cm. longa 12 cm. lata, foliolis infimis minimis, foliolo terminali maximo obovato vel oblongo 8 cm. longo 3 cm. lato apice longe caudato basi cuneato ad summum obtuso vel minute retuso supra subnitido, costa supra tenuiter impressa subtus elevata, venis primariis lateralibus supra tenuiter minus subtus distincte elevatis gracilibus rectis angulo obtusissimo divaricatis, margine tenuiter desuper recurvo, supra fusco subtus pallido utraque glabro (petiolulo 1½ cm. longo); foliolis lateralibus alternis vel suboppositis; petiolulis 6 mm. longis; rhachibus cum petiolis supra planis vel sub-sulcatis; petiolis communibus 3½ cm. longis; rhachis foliorum haud vel vix aculeolata. Flores ignoti. Panicula fructifera axillaris vel terminalis densissime fructifera. Fructus folliculiformis 6 mm. longus 12 mm. in diametro 3-4- vel 5-carpellaris, carpellis distinctis oblongo-subglobosis apice apiculatis 7 mm. longis 5½ mm. latis latere leviter compressis extus rugulosis, endocarpiis cartilagineis; semina ignota.

HAB. Mt. Arisan, inter Heishana et Funkiko, leg. B. HAYATA, Aprili. 1914, (fr.).

Near *F. laxifoliolata*, but differs from it in having 3-5-foliolate leaves.

Murraya LINN.

Murraya euchrestifolia HAYATA sp. nov. Frutex? Rami fusco-cinerascentes longitudinaliter minute rugulosi minute lenticellati, ramulis sursum tenuiter hirsutis. Folia abrupte (semper?) pinnata 4-8-foliolata cum petiolis 20-25 cm. longa in ambitu obovata tenuiter coriacea vel chartacea, foliolis superioribus majoribus inferioribus minoribus; foliolis superioribus elongato-oblongis 7-8 cm. longis 2½-3 cm. latis apice acuminatis ad summum obtusis basi acutis margine subintegris tenuiter desuper recurvis, costa supra minus subtus plus elevata, venis lateralibus primariis utroque latere costae 5-7 rectis a costa angulo 45°-50° egressis sursum ramosis utraque pagine tenuissime elevatis, pagine supra viridibus subtus pallidis minute paucisque nigro-punctatis utraque glabris, petiolulis 3 mm. longis, foliolis inferioribus minoribus circ. 5 cm. longis; foliolis suboppositis vel alternis a se 3½ cm. distantibus; petiolis communibus 3½ cm. longis interjugam aequantibus cum rhachibus teretibus glabris nigro-punctatis. Flores ignoti. Cymae terminales 8 cm. longae 13 cm. latae abundanter

fructiferare, ramis divaricatis. Fructus perfecte globosus 1 cm. in diametro glaber haud rugosus sublaevis minute nigro-punctatus, punctis plus minus elevatis, pericarpis tenuiter crassiusculis. Semina obovoideo-subglobosa 8 mm. longa totiusque lata, testa tenuiter membranacea ; albumen 0; embryo amplus, cotyledonibus crassissimis obovato-rotundatis 8 mm. longis totiusque latis 3 mm. crassis, radícula infra minutissima punctiformi 1 mm. longa inter cotyledones sita.

HAB. Nanto : Baikai, leg. TAYEMON ITO, Jan. 1914.

Near *M. Koenigii*, but differs from it in having much looser inflorescence and crimson-red fruits. *M. Koenigii* has much denser flowers and black fruits.

Clausena BURM.

Clausena tetramera HAYATA sp. nov. Frutex? Rami et ramuli teretes fuscentes longitudinaliter minute rugulosi minute lenticellati minute sparse hirsuti. Folia alterna chartacea pinnata in ambitu oblonga cum petiolis 25-30 cm. longa 10-14 cm. lata, foliolis superioribus majoribus ; foliolo terminali leviter minore caudato-ovato 6½ cm. longo 2½ cm. lato apice caudato-acuminato ad summum obtuso basi late cuneato margine subintegro vel crenulato, costa supra tenuissime subtus prominente elevata, venis lateralibus primariis utroque latere costae 9-11 ramosis sursum arcuatis supra haud subtus tenuiter elevatis cum costa rubro-coloratis, supra subglabro subtus ad costas et venas laterales tenuiter hirsuto; foliolis lateralibus oblique lanceolatis 8 cm. longis 2½ cm. latis apice acuminatis basi latere superiore late acutis latere inferiore angustissime cuneatis a se 2½-3 cm. remotis, petiolulis 5 mm. longis; petiolis communibus 4 cm. longis. Paniculae terminatae 20 cm. longae 15 cm. latae floribundae a basi ramosae tenuiter hirsute, ramis divaricatis, floribus ad apicem ramuli paniculae cymose sitis; rhachibus pedicellisque hirsutis; pedicellis ultimis 1 mm. longis basi articulatim solutis, bracteis minutis hirsutis oblongis ½ mm. longis. Calyx brevissime obconicus subplanus 4-lobatus, lobis semi-rotundato-triangularibus ⅓ mm. longis brevis cuspidatis extus rugosis intus laevibus margine apice ciliolatis vel haud ciliolatis. Petala 4 oblonga 3 mm. longa 2 mm. lata apice obtusa integra glabra extus plus minus punctato-tuberculata intus laevia. Stamina 8, filamentis basi dilatatis apice filiformibus, partibus dilatatis oblongo-quadrangularibus ⅔ mm. longis ⅔ mm. latis incrassatis apice interiore ad calcar productis glabris, partibus filiformibus 1 mm. longis glabris, antheris

dorsifixis oblongis $1\frac{1}{3}$ mm. longis apice obtusis leviter retusis basi sagittatis interiore dehiscentibus. Ovarium oblongum dense tuberculatum barbatum 1 mm. longum stipitatum, stipite $\frac{1}{2}$ mm. longo glabro, stylo glabro columnari crasso 1 mm. longo $\frac{1}{2}$ mm. lato apice perfecte truncato stigmatoso.

HAB. Hainan, leg. Z. KATSUMADA, 1910.

Near *Clausena Wampi*, but differs from it by the less hairy ovary and much dilated filaments.

Citrus LINN.

Citrus erythrocarpa HAYATA sp. nov. *Fortunella erythrocarpa* HAYATA. Frutex. Rami et ramuli graciles cinerascetes longitudinaliter tenuiter rugulosi. Folia alterna trifoliolata vel simplicia chartacea, foliolis ovato-lanceolatis vel lanceolatis 7 cm. longis $2\frac{1}{2}$ cm. latis apice acuminatis sed ad summum obtusis basi acuminatis margine integris utraque pagine glabris, costa supra tenuiter impressa subtus elevata, pellucido-punctatis, venis venulisque supra tenuiter vel obscure subtus distincte elevatis. Flores ignoti. Cymae terminales 2-3 cm. longae. Fructus drupiformis ellipsoideus 15 mm. longus 10 mm. latus apice brevissime apiculatus laevis glaber 1-spermus rubescens, pericarpis crassiusculis tenuibus. Semina solitaria ellipsoidea 13 mm. longa 8 mm. lata apice brevissime apiculata basi rotundata, testa rubescenti membranacea latere uno arillis linearibus ramosis adnatis instructa. Albumen O; embryo amplus ellipsoideus, cotyledonibus ellipticis 10 mm. longis 6 mm. latis crassissimis minute punctatis osseis; radícula brevissima truncata ad centrum minute impressa brevissime rubro-hirsuta.

HAB. inter Karapin et Suisharyo, leg. B. HAYATA, Aprili. 1914, (fr.).

Near *Citrus japonica* in the 1-seeded fruits, but differs from it in having shortly apiculate elliptical fruits and 3-foliolate leaves.

Simarubeae.

Picrasma BLUME.

Picrasma quassioides BENN. ; BENTH. Fl. Hongk. p. 61 ; HOOK. f. Fl. Brit. Ind. I. p. 520 ; HEMSL. Ind. Fl. Sin. I. p. 112 ; MATSUM. Ind. Pl. Jap. II.-2 p. 296.

HAB. Hogo, Musha, ad 4000 ped. alt., leg. B. HAYATA, Aprili. 1916, (♂ et ♀).

Compared with a Japanese specimen so named in the Herbarium at Tokyo. Petals of female flowers of the Formosan are acuter and more hairy than those of the Japanese.

Celastrineae.

Celastrus LINN.

Celastrus elevativena HAYATA sp. nov. Frutex scandentissimus, ramis et ramulis gracilibus interdum volubilibus fuscentibus cortice longitudinaliter elevato-striatis lenticellatis, lenticellis rotundatis. Folia alterna oblonga lanceolata vel obovato-oblonga 1½-5 cm. longa 12-23 mm. lata apice acuta basi obtusa vel acuta margine minute serrulata coriacea, costis venis venisque utroque pagine elevatis, utroque pagine glabra, petiolis 2-8 mm. longis. Capsulae axillares solitariae vel geminae, pedicellis 5-6 cm. longis rectis divaricatis, 3-valvatae, valvis viridibus crasse coriaceis extus transverse rugulosis tenuissime grosse reticulatis rotundatis 6 mm. in diametro apice reliquis styli apiculatis. Semina matura ignota.

HAB. Kwarenko, leg. U. FAURIE.

Near *C. leiocarpa* HAYATA, but differs from it in having narrower leaves with elevated veinlets on the upper surface.

Rhamneae.

Rhamnus LINN.

Rhamnus (Eurhamnus-Cervispina) oiwakensis HAYATA sp. nov. Frutex 1-2 m. alt. ramosissimus, ramis teretibus fusco-purpurascens nitidis laevibus haud lenticellatis, ramulis setiformibus alternatim vel decussatim dispositis ½-2 cm. longis teretibus, ramulis foliiferis brevissimis 3 mm. longis apice subverticillatim approximatis foliatis basi perulis dense obtectis, perulis coriaceis castaneo-coloratis 1 mm. longis ciliatis obtusis vel acutis convexis. Folia approximata obovato-spathulata vel obovata 1-½ cm. longa 6 mm. lata apice obtusissima vel rotundata basi cuneato-attenuata margine deorsum integra sursum crenata ad sinus crenarum setulis digiti-formibus rubescentibus 1/5 mm,

longis instructa, supra ad costas tenuiter hirsuta subtus glaberrima, supra venis costis planis haud distinctis, subtus costis venis venulis reticulatis distincte elevatis, petiolis 2 mm. longis minute hirsutis supra sulcatis, stipulis subulato-linearibus 1½ mm; longis hirsutis basi setulis digiti-formibus obtusis 4-5 brevissimis instructis. Flores ♂ axillares solitarii, pedicellis 4 mm. longis minute hirsutis apice ad calycem abeuntibus. Calyx late campanulatus pallido-viridis glaber, tubo tetragono-obpyramidali 8-costato 1 mm. longo 1½ mm. lato intus extusque glabro, limbo 4-partito, partibus oblongo-triangularibus 2⅔ mm. longis 1½ mm. latis plus minus crassiusculis glabris 1-nerviis apice acuminatis ad summum obtusis marginatis valvatis patentissimis. Petala 4 minute spathulata 1 mm. longa apice obtusa basi cuneato-attenuata glabra tenuissima concava stamina involventia ad marginem tubi calycis affixa glabra erecta. Stamina 4 ad marginem tubi calycis affixa petalis opposita, filamentis erectis validiusculis 1 mm. longis glabris, antheris ovatis ½-⅓ mm. longis apice obtusis basi lobatis dorsifixis. Rudimentum ovarii minutum globosum, stylo columnari ¼ mm. longo apice 2-partito. Fl. ♀ ignoti.

HAB. Oiwake, 7500 ped. alt., leg. B. HAYATA, Aprili. 1916.

Remarkable for the very small congested leaves.

Sabiaceae.

Meliosma BLUME.

Meliosma callicarpaefolia HAYATA (Pl. II.); Ic. Pl. Formos. III. p.

68. Descriptio aucta: Flores apertientes: bractea singula ovata ⅔ mm. longa ½ mm. lata apice obtusissima crassiuscula margine ciliolata; bracteola minuta 2. Sepala 3-4 late rotundata vel semi-rotundata 1¼ mm. lata ¾ mm. longa apice rotundata basi truncato-contracta integra concava glaberrima ad insertionem ⅓ mm. lata margine haud vel vix ciliolata. Petala 3 late rotundata plus minus inaequalia majora circ. 2 mm. lata 1½ mm. longa apice rotundata basi contracta ad insertionem ¼ mm. lata apice crassiuscula margine integra imbricata. Stamina perfecta 2 cum petalis alterna, filamentis glabris linearibus basi dorso appendicibus obsagittiformibus instructis, apice connectivis semi-rotundatis peltatis ½ mm. latis ⅓ mm. longis terminatis, loculis antherarum 2 supra connectivum sitis introrsis globosis se contactis ¼ mm. in diametro flavis. Staminodia

3 cum petalis affixa dorso complanata quadrangularia 1 mm. longa $\frac{2}{3}$ mm. lata apicc utroque latere auriculato-dilatata foveolataque. Glandulae disci 2-3 membranaceae triangulares $\frac{1}{2}$ mm. latae apice bicuspidatae vel simpliciter cuspidatae glabrae. Ovarium late rotundatum $\frac{2}{3}$ mm. longum $\frac{3}{4}$ mm. latum 2-loculare glabrum, stylo brevi columnari $\frac{1}{2}$ mm. longo apice subulato-acuto.

HAB. Arisan, 8000 ped. alt., leg. U. FAURIE, Junio 1914, (No. 270).

Rosaceae

Rubus LINN.

Rubus rarissimus HAYATA sp. nov. Suffrutex, rami annotini fusco-rubrescentes teretes tenuiter pubescentes minutissime striati remote aculeati, aculeis latere complanatis $2\frac{1}{2}$ mm. longis basi dilatatis apice deorsum plus minus recurvis, ramulis hornotinis fulvescentibus teretibus pubescentibus aculeatis 1-2-foliatis basi perulis multi-seriatis extus villosis instructis. Folia alterna trifoliata, folio terminali maximo subrhomboideo 8 cm. longo 6 cm. lato apice cuspidato basi triangulari-obtuso margine duplicato-dentato, (dentibus triangularibus apice breve aristatis, aristis sursum recurvis), supra subglabro vel tenuissime pubescenti subtus densissime brevissime villosa-tomentoso, tomentis pallido-fulvescentibus, costis et venis supra compressis subtus distincte elevatis, venis lateralibus primariis utroque latere 7-8 rectis mediis a costa angulo 30° egressis ad apicem dentium attingentibus, venulis rectis ad apicem dentium attingentibus vel reticulatis supra impressis subtus elevatis; foliolis lateralibus minoribus 6 cm. longis $3\frac{1}{2}$ cm. latis apice acuminatis basi oblique obtusis latere inferiore latioribus quam latere superiore, brevissime petiolulatis, petiolulis 1-2 mm. longis; petiolis communibus 6 cm. longis pubescentibus aculeatis, rhachibus $2\frac{1}{2}$ cm. longis, stipulis linearibus 8 mm. longis $\frac{2}{3}$ mm. latis acuminatis. Flores cymosi. Cymae terminales vel axillares pedunculatae vel sessiles cum pedunculis $2\frac{1}{2}$ cm. longae villosae 3-20-floratae, pedicellis ultimis 1 cm. longis. Calyx utraque villosus, cupula 3 mm. in diametro extus villosa intus glabra extus impressa intus elevata, lobis patentibus lineari-triangularibus 4-5 mm. longis 2 mm. latis villosis ad summum glabris. Petala 5 obovato-spathulata cum unguibus 4 mm. longa 3 mm. lata apice rotundato-truncata basi subito unguiculata, unguibus 1 mm. longis $\frac{3}{4}$ mm. latis, margine subintegra vel erosa intus glabra sed basi hirsuta

extus versus costam hirsuta. Stamina ∞ ad marginem cupulae inserta, filamentis filiformibus glabris 2 mm. longis, antheris ovato-oblongis $\frac{1}{2}$ mm. longis glabris. Receptaculum carpellorum elevatum globosum breve stipitatum villosum, carpellis ∞ semi-obovoideis basi brevissime stipitatis, (stipitibus pilosis) basi apiceque pilosis medio latereque glabris, stylis terminalibus 2 mm. longis rubescentibus basi pilosis sursum glabris apice oblique truncatis 2-lobatis stigmatiferis.

HAB. Arisan, ad 2500 ped. alt., leg. U. FAURIE, Junio 1914, (No. 33).

Near *Rubus idaeus* LINN. subsp. *nipponica* FOCKE, but differs from it in having more numerous and less pilose carpels.

***Cotoneaster* MEDIK.**

***Cotoneaster morrisonensis* HAYATA** Ic. Pl. Formos. V. p. 62. Flores axillares vel ad apicem ramulorum terminales solitarii, pedicellis 3-4 mm. longis strigoso-hirsutis, pilis adpressis fulvescentibus rectis. Calyx obconicus 2-3 mm. longus totiusque latus extus adpresse hirsutus apice 5-lobatus, lobis triangularibus crassiusculis extus hirsutis intus glabris apice obtuso-truncatis 1 mm. longis $1\frac{1}{2}$ mm. latis. Petala 5 ad basin lobi calycis affixa rotundata 3 mm. longa totiusque lata apice plus minus emarginata vel rotundata basi breve unguiculata contracta ad insertionem $\frac{2}{3}$ mm. lata margine subintegra vel tenuiter erosa intus valde concava. Stamina ∞ ad basin lobi calycis affixa, filamentis $1\frac{1}{2}$ mm. longis basi incrassatis apice subulatis glabris, antheris rotundato-ovatis $\frac{1}{2}$ mm. longis totiusque latis apice minus basi plus emarginatis; carpellis 2 a se distinctis dorso usque ad medium cum calycis tubo connatis sursum liberis, dorso dense albo-hirsutis, stylis columnaribus $1\frac{1}{2}$ mm. longis glabris.

HAB. Taihasenzan, leg TAYEMON ITO, ad 10000 ped. alt., Aprili. 1915.

***Photinia* LINDL.**

***Photinia lasiopetala* HAYATA** sp. nov. (Fig. 1.) Frutex, ramis et ramulis fusco-cinerascentibus longitudinaliter strigosis, lenticellis obscuris, haud hirsutis, ramulis annotinis glabris rubescentibus laevibus foliatis. Folia in vivo supra atroviridia et nitida in exsiccato pallido-rubra obovato-elliptica vel lanceolata obovata 10-15 cm. longa $2\frac{1}{2}$ - $4\frac{1}{2}$ cm. lata apice breve acuminata versus basin gradatim attenuata ad basin subito acuta margine minute serrulata margine versus basin integra coriacea utraque glabra, costa supra impressa subtus elevata, venis venulis supra minus subtus plus elevatis gracillimis, venis

Lateralibus primariis utroque latere circ. 15 tenuissimis a costa angulo 30° egressis prope marginem evanescentibus, petiolis 1-2 cm. longis glabris basi subito dilatatis caulem partim amplexantibus supra sulcatis; stipulis nullis. Panicula terminalis 8 cm.

longa pyramidalis, ramis divaricatis glabris vel tenuiter hirsutis, pedicellis 1- $\frac{1}{3}$ cm. longis hirsutis. Calyx pallido-viridis obconicus 2 mm. longus totiusque latus hirsutus 5-dentato-lobatus, lobis vel dentibus erectis triangularibus 1 mm. latis $\frac{2}{3}$ mm. longis apice acutis basi haud contractis crassiusculis, tubo intus glabro. Petala alba in ambitu obovata basi unguiculata, lamina subrotundata 2 $\frac{1}{2}$ mm. longa totiusque lata apice obtuse bilobata extus glabra intus basi longe albo-hirsuta, pilis crispatis, unguibus 1 mm. longis intus densissime hirsutis extus glabris exterioribus recurvis. Stamina circ. 20 ad apicem tubi 1-seriatim disposita, filamentis glabris filiformibus 2 $\frac{1}{2}$ -3 mm. longis, antheris reniformibus basi 2-lobatis apice emarginatis $\frac{2}{3}$ mm. longis totiusque latis flavis. Ovarium ovoideum usque ad medium cum tubo calycis connatum, partibus apicalibus liberis dense albo-hirsutis obconicis 1 mm. longis apice ad stylum abeuntibus; styli 2 basi connati dense hirsuti apice peltatim truncati stigmatosi; ovarium 2-loculare, loculis 2-ovulatis.

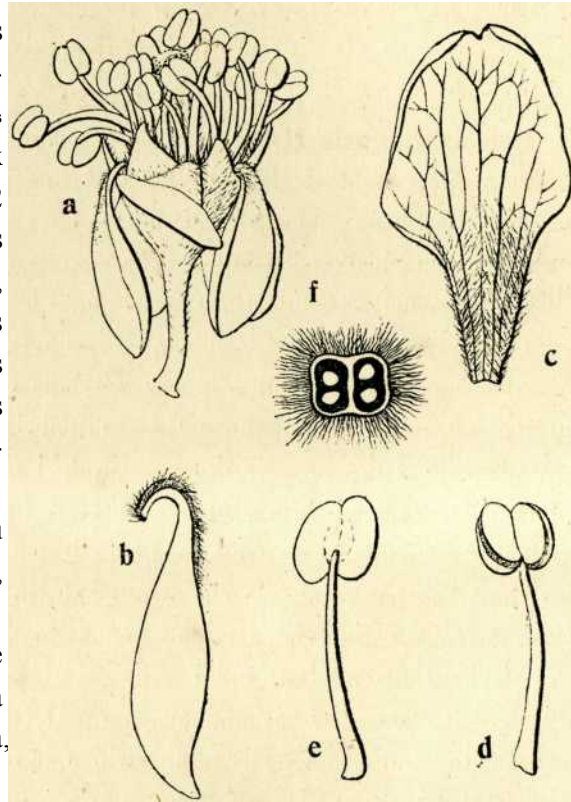


Fig. 1, *Photinia lasiopetala* HAYATA; a, a flower; b, a petal, seen from side; c, the same, seen from above; d, e, stamens, seen from different sides; f, cross section of ovary.

disposita, filamentis glabris filiformibus 2 $\frac{1}{2}$ -3 mm. longis, antheris reniformibus basi 2-lobatis apice emarginatis $\frac{2}{3}$ mm. longis totiusque latis flavis. Ovarium ovoideum usque ad medium cum tubo calycis connatum, partibus apicalibus liberis dense albo-hirsutis obconicis 1 mm. longis apice ad stylum abeuntibus; styli 2 basi connati dense hirsuti apice peltatim truncati stigmatosi; ovarium 2-loculare, loculis 2-ovulatis.

HAB. Musha: Baikei, ad 2500 ped. alt., Aprili. 1916, leg. B. HAYATA.

Near *P. serrulata* LINDL., but easily distinguishable from it in having hirsute unguiculate petals. The habit of this new shrub is nearly the same as that of *Deutzia scabra*.

Saxifrageae.

Itea LINN.

Itea arisanensis HAYATA sp. nov. Frutex, ramulis gracilibus, cortice longitudinaliter ruguloso glabro. Folia remote disposita oblonga vel oblongo-lanceolata 10-14 cm. longa 3-5 cm. lata apice acuminata deorsum recurva basi obtusa vel acuta margine tenuiter et remotissime serrulata, (serrulis minutis a se 4-5 mm. remotis ascendentibus apice interiore recurvis), chartacea utraque pagine glaberrima, costis et venis supra tenuiter impressis subtus elevatis, venis primariis lateralibus gracillimis utroque latere costae 5-8 arcuatis sursum margine subparalleli gradatim evanescentibus, venulis gracillimis costa transverse dispositis transverse reticulatis supra haud visis subtus distincte visis, petiolis 1-1½ cm. longis supra sulcatis glabris. Flores ignoti. Racemi fructiferi terminales vel axillares 8-10 cm. longi 1½-2 cm. lati, pedunculis 1-2 cm. longis cum rhachibus pubescentibus, fructibus geminatim vel solitariter secus rhachin racemi dispositis transverse patentibus vel descendentibus, pedicellis 5 mm. longis apice leviter dilatatis ad tubum calycis abeuntibus, bracteis sub pedicello linearibus vel lanceolatis 1½ mm. longis. Calycis fructiferi tubus infundibulicampanulatus 1 mm. longus 1½ mm. latus, limbo 2½ mm. in diametro margine lobato, lobis 5 triangulari-cuspidatis 1 mm. longis totiusque latis apice acutis, sinibus inter lobos late rotundatis. Carpella 2 supra tubum calycis fere distincta erecta leviter divaricata fusiformi-linearia supra cupulam ad 5 mm. exserta 1 mm. lata sparse minute hirsuta apice attenuata dorso in sectione convexa facie plana in sectione semi-rotundata sutura ventrali dehiscentia. Semina minuta numerosa ovoideo-fusiformia 1¾ mm. longa 1/5 mm. lata altri extremitate attenuata acuta altri extremitate obtusa, testa sicca rugosissima fusco-rubescens nitida.

HAB. Mt. Arisan : inter Suisharyo et Funkiko, leg. B. HAYATA, Aprili. 1914. (Fructus).

Near *Itea chinensis*, but distinguishable from it in having less serrate leaves of much thinner texture.

Crassulaceae.

Sedum LINN.

Sedum uraiense HAYATA sp. nov. Herba tenuissima basi repens, partibus erectis 10 cm. longis crispato-hirsutis, pilis transverse patentibus. Folia in exsiccatu tenuissime membranacea in vivo crassiuscula opposita vel rarius ternata a se 2-8 cm. remota petiolata, lamina ovata vel rotundato-ovata circ. 1½-2 cm. longa 13-15 mm. lata apice obtusissima basi subito attenuata ad petiolum abeuntia margine integra densiuscule patento-ciliolata supra sparsissime hirsuta subtus subglabra, petiolis 5-8 mm. longis. Cymae terminales laxissime floratae cum pedunculis 7 cm. longis brevissime patento-hirsutae, pedicellis terminalibus 2-5 mm. longis. Sepala 5 extus oblongo-triangularia 1½ mm. longa ⅔ mm. lata apice obtusa basi haud contracta margine integra extus dense hirsuta intus glabra tenuiter 1-nervia. Petala 5 lanceolata 3-3½ mm. longa ¾ mm-1 mm. lata apice acuminatissima basi leviter angustata ad insertionem ½ mm. lata integra tenuiter 1-nervia. Stamina 10, filamentis filiformibus 2 mm. longis glabris, antheris globosis ¼ mm. in diametro 2-ocularibus; glandulis 5 carpello oppositis rectangularibus ⅕ mm. longis. Carpella 5 lanceolata glanduloso-hirsuta apice ad stylum attenuata; carpella matura membranacea hyalina oblonga 2 mm. longa ⅔ mm. lata apice ad stylum abeuntia. Semina ovoideo-ellipsoidea utraque truncata circ. ½ mm. longa profunde 8-13-sulcata minute elegante transverse multo-striata in sectione teres, testa crustacean fusco-castanea. Embryo ignotus

Sedum drymarioides HAYATA Ic. Pl. Formos. IV. p. 110, (non HANCE).

HAB. Urai, in petrosis rara, leg. U. FAURIE, Aprili. 1914, (No. 810).

Near *S. drymarioides* HANCE, but differs from it in having much longer petals.

Hamamelideae.

Corylopsis SIEB. et ZUCC.

Corylopsis stenopetala HAYATA (Pl. III.) Ic. Pl. Formos. IV. p. 6.
Descriptio aucta: Spicae fructiferae erectae 3-4 cm. longae cum fructibus

2-3 cm. latae, pedunculis 4-5 cm. longis glabris; rhachis spicae post anthesin accrescens hirsuta dense fructifera; calycis tubus in fructu accrescens plus minus stipitatus cum stipite incrassato 1 cm. longus 8 mm. latus, lobis minutis dentiformibus; carpella 2 calycis tubo insita medio supra exserta oblonga apice bicornuta, cornibus exterioribus recurvis, 2-valvatim dehiscentia, exocarpio crustaceo fuscenti, indocarpio crustaceo-osseo albo-fulvescenti, 1-sperma; semina ellipsoidea 7-8 mm. longa, testa Crustacea nigra nitida.

HAB. Nanto : Jinrinsha, leg. U. MORI, Juli. 1907, (No. 292).

Halorageae.

Callitriche LINN.

Callitriche japonica ENGELM ; FRANCH. et SAVAT. Enum. Pl. Jap. II. p. 369; ITO et MATSUM. Tent. Fl. Lutch. p. 205; MATSUM. Ind. Pl. Jap. II.-2 p. 310.

HAB. Taihoku: Koteisho, leg. Y. SHIMADA, Mart. 1915. (Fl. et fr.).

DISTRIB. Japan.

Compared with a Japanese specimen in the Herbarium at Tokyo.

Begoniaceae.

Begonia LINN.

Begonia aptera HAYATA Mater. Fl. Formos. p. 122. Descriptio aucta: Cymae terminales cum pedunculis circ. 10 cm. longae 15 cm. latae, (pedunculis 5 cm longis), toto glabrae; pedicellis ultimis 5-13 mm. longis gracillimis. Flores ♂ : glabri albicantes; segmenta 4, exteriora 2 interiora 2; exteriora late cordato-rotundata 1½ cm. longa totiusque lata apice obtuse rotundata basi subcordata margine integra; segmenta interiora obovato-spathulata 9 mm. longa 4 mm. lata apice obtusissima basi cuneata subunguiculata margine integra. Semina numerosa, antheris obovatis 1¼ mm. longis 1 mm. latis apice emarginatis basi obtuso-cuneatis. Fl. ♀: segmenta ignota; ovarium late depresso-globosum 7 mm. longum 10 mm latum ex-alatum glabrum; styli 3, 4 mm. longi erecti apice 2-fidi, ramis erectis 3 mm. longis tortuosis.

HAB. Suisha, leg. B. HAYATA et S. SASAKI, Mai. 1912; Maisha, leg. B. HAYATA et S. SASAKI, Jun. 1912.

Begonia ferruginea HAYATA Mater. Fl. Formos. p. 123. Descriptio aucta: Segmenta 5; exteriora 2 majora, interiora 2 minora; exteriora late oblouga 10 mm. longa 7 mm. lata plus minus obliqua apice rotundata margine subintegra extus hirsuta intus glabra; segmenta interiora minora; intimum minimum glabrum oblongum 7 mm. longum $3\frac{1}{2}$ mm. latum apice obtusum. Styli 2-3 mm. alti semi-infundibuli-forme dilatati 2-fidi; ramis 2 mm. longis erectis tortuosis vermiformibus. Ovarium hirsutum oblongo-obovatum 6-7 mm. longum 4 mm. latum obliquum 3-alatum; ala posteriore elongata transverse sita lineari circ. 10 mm. longa 4 mm. lata apice obtusissima hirsuta; alis lateralibus verticaliter sitis linearibus 8 mm. longis sursum latioribus 1-2 mm. latis deorsum angustioribus ad nullum reductis hirsutis. Capsula ab apice pedicellorum subito deorsum reflexorum pendula 2-ocularis tenuiter ferrugineo-tomentosa demum subglabrata (alis exceptis) lineari-obovata 15 mm. longa 5 mm. lata apice subtruncata basi attenuata ad pedicellum abeuns; ala posteriore quadranguliformi $2\frac{1}{2}$ cm. longa $1\frac{1}{2}$ cm. lata apice obtusissima tenuiter tomentosa nervosa transverse descendenteque sita; alis lateralibus linearibus verticaliter sitis $1\frac{1}{2}$ cm. longis 4 mm. latis nervosis tenuiter tomentosis. Semina numerosissima minutissima polygono-ellipsoidea reticulata rubro-fulvescentia $\frac{1}{4}$ mm. longa.

HAB. Arisan, leg. B. HAYATA, Jan. 1912, (typus fructus).

The present species is contrasted from *B. laciniata* ROXB. var. *formosana* HAYATA in having hairy ovary and hairy outer segments which are obliquely oblong and quite rounded at the apex, and in having quite erect branches of the styles.

Begonia laciniata ROXB. var. **formosana** HAYATA Mater. Fl. Formos. p. 124. Descriptio aucta : Fl. ♀ : segmenta 5, exteriora 2; interiora 3; segmentum exterius rotundatum 8 mm. longum 7 mm. latum apice triangulari-obtusum basi rotundatum ad insertionem 3 mm. latum margine subintegrum; interiora minora inaequalia. Styli 2, breviores 1 mm. alti 2-fidi, ramis vermiforme recurvis. Ovarium oblique triquetrum 5 mm. longum ad angulum alatum, alis inaequalibus; ala posteriore quadranguliformi 4 mm. longa 3 mm. lata ovario transversum sita, alis lateralibus angustissime linearibus 3 mm. longis 1 mm. latis. Flores cum ovario alisque toto glabri.

HAB. Mai, Juli. 1912, leg. B. HAYATA.

Araliaceae.

Heptapleurum GAERTN.

Heptapleurum arboricolum HAYATA sp. nov. (Pl. IV.) *Schefflera arboricola* HAYATA. Frutex circ. 3-4 m. altus ramosus, ramulis crassiusculis sursum 7-8 mm. in diametro densiuscule lenticellatis, lenticellis oblongis 2-3 mm. longis sursum foliatis. Folia alterna longe petiolata palmatim 7-8-foliolata, foliolis centralibus majoribus, basilaribus minoribus, totis petiolulatis; foliolum centrale obovato-oblongum 9 cm. longum 4 cm. latum apice obtusissimum ad centrum summi emarginatum deorsum angustius ad extremitatem obtusum margine integerrimum, costa supra minus subtus plus elevata, venis venulis supra plus subtus minus elevatis, utraque pagine glaberrimum, supra nitidum subtus glaucum pallidum, venis lateralibus primariis utroque costae latere 5-6, mediis a costa angulo 45° egressis subrectis sursum arcuatis apice ramosis, venulis elevato-reticulatis, petiolulis 3½-2½ cm. longis semi-teretibus sursum sulcatis subalatis basi cum apice petioli articulatis glabris; petiolis communibus 12-15 cm. longis teretibus glabris subrectis apice subito sursum recurvis basi valde dilatatis, partibus dilatatis auriculi-formibus, auriculis 5 mm. longis et latis semirotundatis coriaceis. Racemi terminales vel ad axillas foliorum apicalium siti simplices vel paniculato-umbellatim dispositi; racemis vel ramis panicularum subaequilongis 20 cm. longis in ambitu cylindricis remote ramulosis, ramulis aequilongis 1 cm. longis divaricatis apice flores umbellatim circ. 10 gerentibus subglabris vel hirsutis, bracteis caducis ignotis, pedicellis florum 5-7 mm. longis radiatim divaricatis rectis glabris vel sparse hirsutis apice plus minus dilatatis ad calycem abeuntibus. Calyx depresso-campanulatus 1½ mm. longus 2 mm. in diametro margine integer vel obscure dentatus, dentibus minutis haud distinctis. Petala 5-7 lineari-triangularia 2½ mm. longa 1-1½ mm. lata apice acuta ad summum interdum intus cornibus instructa basi plus minus contacta 3-nervia glabra. Stamina 5-7, ad marginem disci inserta, filamentis glabris filiformibus complanatis 2½ mm. longis, antheris late rotundatis 1 mm. longis totiusque latis apice basique 2-lobatis. Discus pulvini-formis. Stylus subnullus, stigmatibus depresso-rotundato 1½ mm. in diametro ¼ mm. alto. Ovarium 5-7-loculare, loculis 1-ovulatis. Fructus obovoideo-globosus 5 mm. longus 4 mm. latus distincte 5-6-sulcatus.

HAB. Toyencho : Kappansan, ad truncos Fici insularis creseens, leg. S. SASAKI, Nov. 1915.

Near *Heptapleurum octophyllum* HANCE ; but distinguishable from it by the much smaller, thicker, coriaceous leaves and in the very depressed rounded stigmata. *H. octophyllum* is terrestrial, but this new species is always found to be epiphytic.

Caprifoliaceae.

Lonicera LINN.

Lonicera oiwakensis HAYATA sp. nov (Pl. V.) Frutex 1-2 m. altus, ramis rectis striatis teretibus, cortice cinerascenti minute muricato haud hirsuto longitudinaliter fissis et soluto, ramulis divaricatis strigoso-pilosis rectis. foliiferis teretibus. Folia opposita elliptica rigide coriacea 2½ cm. longa 1½ cm. lata apice emarginata vel rotundata basi rotundata vel truncata margine integra setulosa, costa supra impressa subtus elevata, venis supra impressis subtus elevatis, venulis reticulatis supra tenuiter impressis subtus elevatis, pagina supra scaberrima ad centrum reticulorum setula instructa, subtus ad venas venulas strigoso-hirsuta, in exsiccato supra fuscentia subtus fulvo-flavescentia, venis lateralibus primariis utroque costae 4 arcuatis, petiolis 2-3 mm. longis hirsutis supra sulcatis basi triangulari-dilatatis ad pulvinum abeuntibus, pulvinis foliorum cum iis oppositis fere amplexicaulibus. Flores subpenduli subalbi apice plus minus rosei a basi ramuli homotini brevis 1-2 cm. longi oriundi, pedunculis gracilibus nutantibus 1 cm. longis vel interdum ad nullum reductis valde complanatis strigoso-scabris apice 2-bracteatis flores geminatim gerentibus, bracteis oppositis linearibus falcatis recurvis 8 mm. longis 1 mm. latis acuminatis margine integris setulosis supra tenuiter hirsutis subtus costatis, ad costas setuloso-hirsutis. Calyx viridis cum eo opposite latere interiore toto connatus, tubo obconico-cylindrico glabro 2 mm. longo 1 mm. lato apice truncato basi cuneato, limbo cupuli-formi campanulato extus intusque glabro 1 mm. alto 2 mm. in diametro margine tenuiter et irregulariter 5-lobato, lobis apice rotundatis margine ciliolatis. Corolla alba apice rosea tubuloso-infundibuliformis, tubo 7 mm. longo 2 mm. lato basi obliquo valde oblique contracto latere anteriore prope basin gibboso extus setuloso-hirsuto intus strigoso-hirsuto, limbo

2-labiato, labio superiore latiore 7 mm. longo totiusque lato utraque glabro retrorse reflexo apice 4-lobato, lobis oblongis apice rotundatis apice concavis integris ; labio inferiore lineari-oblongo 8 mm. longo 4 mm. lato apice obtusissimo margine integro. Stamina 5 infra apicem tubi affixa exserta, filamentis circ. 6 mm. longis subglabris teretibus, antheris oblongo-linearibus $2\frac{1}{2}$ mm. longis albis. Stylus albus columnari-filiformis 1 cm. longus glaber apice plus minus latior, stigmate viridi subterminali peltato oblongo 1 mm. longo sub-oblique peltatim ad apicem styli sito; ovarium inferum 3-loculare, loculis 4-5-ovulatis.

HAB. Musha: Oiwake, ad 8750 ped. alt., leg. B. HAYATA, Aprili. 1916.

Near *L. Morrowii*; but differs from it in the pubescence of the leaves. Hairs on the leaves of this new species are much stouter having a conical dilated base, while those of *L. Morrowii* are much more slender without any conical base.

Lonicera transarisanensis HAYATA (Fig. 2) n. n. *Lonicera angustifolia* HAYATA (non RAFFIN) Ic. Pl. Formos. II. p. 75. Descriptio aucta: Corolla

glabra tubuloso-campanulata, tubo 12 mm. longo basi 1 mm. lato apice 3 mm. lato extus glabro intus densissime hirsuto, limbo expanso-campanulato 2-labiato, labio inferiore lineari 11 mm. longo 3 mm. lato apice obtusissimo basi haud contracto 7-8-nervio (nervis subparallelis) subtus glabro supra versus basin piloso, labio superiore deorsum recurvato margine latere integro rotundato 9 mm. longo totiusque lato apice in ambitu truncato vel emarginato erecto-patenti margine latere exteriori plicato-recurvo apice 4-lobato, lobis 2-lateralibus majoribus late triangularibus 3 mm. longis 4 mm. latis apice obtusissimis concavis margine exteriori integris interiore denticulatis basi latere interiore auriculis singulis triangularibus deorsum recurvis instructis, lobis 2-mediis minoribus rotundato-triangularibus $2\frac{1}{2}$ mm. latis apice obtusissi-

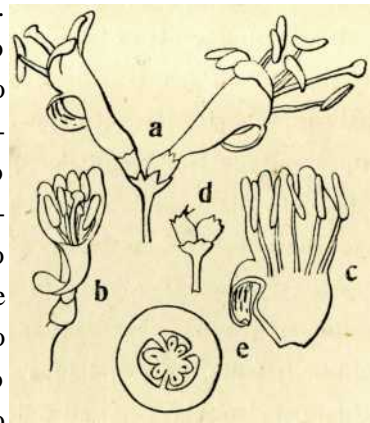


Fig. 2, *Lonicera transarisanensis* HAYATA ; a, a pair of flowers; b, a flower; c, corolla expanded; d, ovaries; e, cross section of an ovary; a, b, c, d, nearly natural size.

mis basi haud contractis margine integris; labio superiore extus glabro intus basi plus minus hirsuto. Stamina 5 ab apice tubi corollae oriunda, filamentis triquetris circ. 8 mm. longis deorsum hirsutis sursum glabris 1-nerviis, antheris linearibus 5 mm. longis 1 mm. latis apice obtusis basi bilobatis, lobis 1 mm. longis, versatilibus. Stylus filiformis 2 cm. longus exsertus dense pilosus (basi apice excepto) sursum glaber, stigmatibus globosis 2 mm. lato leviter 3-lobato.

HAB. Arisan, ad 2500 m. alt., leg. U. FAURIE, Junio 1914, (No. 359).

Near *L. Henryi* HEMSL., but differs from it in having quite glabrous peduncles, and in the costas of the leaves which are, in this new species, brownish hairy.

Compositae.

Chrysanthemum LESS.

Chrysanthemum arisanense HAYATA sp. nov. (Pl. VI.) Herba basi suffrutescens 40 cm. longa molle lanuginoso-hirsuta. Caulis simplex haud ramosus teres 2 mm. in diametro sectionis erectus. Folia radicalia ignota; caulina petiolata pinnatisecta in ambitu ovata 5 cm. longa 3 cm. lata apice acuminata basi truncata vel truncato-cordata, segmentis circ. 5; segmento terminali ovato-lanceolato 3 cm, longo 13 mm. lato apice acuminato basi ad rhachin attenuato laciniato-pinnatilobato, lobis linearibus vel serri-formibus ascendentibus apice cuspidatis acutis superiore leviter recurvis, segmentis lateralibus ovato-lanceolatis vel oblanceolatis oppositis laciniato-pinnatilobatis, apice acutis basi attenuatis; rhachis 2-1 mm. lata; pagina supra brevissime parce sed ad nervos venasque dense crispato-hirsuta subtus dense adpresso-hirsuta, pilis subalbicantibus; petiolis 2 cm. longis dense hirsutis dorso complanatis; folia superiora minora. Capitula 3-4 ad apicem caulis sub-umbellatim disposita, (pedunculis 2½ cm. longis adpresse hirsutis) rotundato-campanulata 8 mm. longa 10 mm. lata. Involucrum rotundato-obconicum 7 mm. longum, bracteis 3-seriatim dispositis, extimis brevissimis oblongo-ovatis 4 mm. longis 2 mm. latis dorso carinatis (ad carinam hirsutis) scariosis apice acutis basi haud contractis intus glabris, mediis longissimis oblongis 6½ mm. longis 3 mm. latis apice obtusis basi ad insertionem 1 mm. latis dorso 1-carinatis intus concavis scariosis utraque glabris, intimis oblanceolatis 6 mm. longis 2 mm. latis apice obtusis basi attenuatis

ad insertionem $\frac{2}{3}$ mm. latis dorso tenuiter carinatis scariosis utraque glabris. Flores marginales 1-seriatim? dispositi liguliformes foeminei. Corolla linguiformis, tubo subnullo vel $\frac{1}{2}$ mm, longo, lamina lineari-oblonga 6 mm. longa $1\frac{1}{2}$ mm. lata apice obtusa basi breve attenuata. Styli $2\frac{1}{2}$ mm. longi apice 2-fidi, ramis dorso complanatis linearibus circ. 1 mm. longis $\frac{3}{25}$ mm. latis utroque latere stigmatiferis apice truncatis breve pectinatis. Flores disci tubiformes hermaphroditi glandulis globosis minutis parce conspersi, tubo $1\frac{1}{2}$ mm. longo $\frac{1}{3}$ - $\frac{1}{2}$ mm, lato cylindrico, limbo campanulato-tubuloso $1\frac{1}{3}$ - $1\frac{1}{2}$ mm. longo 1 mm. lato apice 5-lobato, lobis triangularibus $\frac{1}{2}$ mm. longis totiusque latis apice acutis. Stamina 5 basi limbi oriunda, filamentis filiformibus glabris, antheris linearibus cum appendicibus connectivorum $1\frac{1}{3}$ mm. longis $\frac{3}{25}$ - $\frac{4}{25}$ mm. latis apice appendiculatis, appendiculis linearibus apice acuto-obtusis $\frac{1}{3}$ mm. longis $\frac{2}{25}$ - $\frac{3}{25}$ mm. latis, basi brevissime auriculatis. Styli ut floris foeminei. Achaeonium ellipsoideum utrinque obtusissimum plus minus obliquum $1\frac{3}{4}$ mm. longum 1 mm. latum fusco-purpurascens.

HAB. Arisan, in rupibus rara, leg. U. FAURIE, Dec. 1914, No. 1427.

Near *Chrysanthemum indicum*, but differs from it in having more deeply lacinate leaves.

***Gerbera* GRON.**

***Gerbera integripetala* HAYATA** sp. nov. Folia radicalia circum basin scapi 5-6 disposita in ambitu oblonga 3 cm. longa 18 mm. lata margine inferiore utroque latere profunde sinuata (sinibus circ. 1 cm. longis 3 mm. latis, margine leviter dentatis, dentibus brevissimis interdum ad aristam reductis apice breve aristatis, aristis a se 4 mm. remotis), membranacea supra glabra subtus molle albo-tomentosa apice acuta basi obtusa, petiolis 4 cm. longis albo-lanuginoso-tomentosis basi gradatim dilatatis. Scapus simplex 15 cm. longus erectus rectus alb-lanuginosus versus apicem 2-3-bracteatus, bracteis linearibus adpressis 6 mm. longis acuminatis dorso costato-carinatis. Capitula simplicia erecta obconica 12 mm. longa; bracteis involucri 2-seriatim dispositis, exterioribus minoribus erecto-linearibus 4 mm. longis dorso costatis obtusis lanuginosis interioribus longioribus linearibus rectis 7 mm. longis apice truncatis 1 mm. latis. Flores ♀ ligulares marginales 1-seriatim dispositi extus purpurei intus albi, tubo corollae 3 mm. longo, limbo liguliformi lineari 8 mm. longo apice

truncate vel rarius obscure dentato glabro ; styli simplices ; setae pappi scabrae ; achaenia linearia hirsuta. Fl. ♀ : tubo corollae 4 mm. longo glabro; limbo 5-partito, partibus 2 distinctis, 3 connatis linearibus obtusis glabris deorsum recurvis; antherae lineares cum appendicibus et caudis 2½ mm. longae apice appendiculatae, appendicibus apicalibus lineari-oblongis ½ mm. longis obtusis, basi sagittatae caudis simplicibus ⅓ mm. longis instructae; filamentis complanatis glabris. Stylus columnaris 6 mm. longus glaber apice 2-lobatus, lobis complanatis subrotundatis stigmatosis, basi haud dilatatus; stylophorum nullum. Discus annuliformis 1/5 mm. altus. Achaenium hirsutum maturum ignotum.

HAB. Gokwanzan, leg. B. HAYATA, Aprili. 21, 1916.

Approaches to *G. Anandria*, but differs from it in having nearly entire corolla-lips of the marginal flowers, and in the pappus-hairs.

Lactuca LINN.

Lactuca vericolor SCH-BIP ; MATSUM. et HAYATA Enum. Pl. Formos. p. 212.

The Japanese plant has pale white or very slightly purpurascens flowers, while the Formosan has bright yellow ones. The two (Japanese and Formosan) are, therefore, not exactly identical. The Formosan should be regarded as a variety of the Japanese species.

Ericaceae.

Rhododendron LINN.

Rhododendron Morii HAYATA Mater. Fl. Formos. p. 173, et Ic. Pl. Formos. III. p. 139. Descriptio aucta: Flores ad apicem ramorum 5-10 quasi-umbellatim (cymose) congesti, umbellae basi perulis multis deciduis subsistentibus ; perulis exterioribus obovatis circ. 2 cm. longis 1 cm. latis valde concavis coriaceis apice brevis apiculatis brevissime hirsutis, interioribus gradatim elongatis circ. 3 cm. longis; bracteis basi pedicellorum sitis angustato-linearibus 3 cm. longis 7 mm. latis apice brevis cuspidatis (cuspidibus 4 mm. longis) extus plus minus sericeo-hirsutis; bracteolis lineari-filiformibus 8 mm. longis hirsutis; pedicellis circ. 2 cm. longis brevissime hirsutis. Calycis lobi triangulares vel semi-rotundati 1 mm. longi 1½ mm. lati margine ciliolati vel haud ciliolati extus parce hirsute intus glabri, ciliolis clavatis brevissimis. Corolla campanulata

plus minus obliqua rosea vel albescens intus latere superiore rubro-punctata, tubo obconico 2 cm. longo, lobis 5 reniformibus 1-1½ cm. longis latioribus quam longis apice rotundatis basi plus minus cordatis. Stamina 9-12, filamentis inaequalibus basi dilatatis hirsutis, antheris lineari-ellipticis 3½-4 mm. longis 2-ocularibus apice 2-porosis. Ovarium conicum ellipticum 5-6 mm. longum basi 3 mm. latum hirsutum. Styli 3 cm. longi haud exserti ~-formiter recurvi basi excepto glabri, stigmatibus brevissime 5-6-lobato; discus lobulatus obscurus.

HAB. Mt. Arisan, leg. B. HAYATA, Mart. 1914.

Styraceae.

Symplocos LINN.

Symplocos theifolia HAYATA n. n. *Symplocos adinandrifolia* HAYATA var. *theifolia* HAYATA Ic. Pl. Formos. V. p. 96.

HAB. Kuraru, leg. H. INABA, Aug. 1911.

Apocynaceae.

Anodendron A. DC.

Anodendron suishaense HAYATA sp. Nov (Pl. VII.) Frutex scandentia-volubilis. Rami et ramuli teretes fusco-purpurascens sublaeves, ramulis gracilibus. Folia opposita coriacea lanceolata vel oblanceolata 8-11 cm. longa 1½-2½ cm. lata apice acuta vel breve acuminata basi cuneata vel cuneato-acuta margine integra glabra supra nitida atro-viridia subtus pallida, costa supra subplana subtus elevata, venis lateralibus primariis utroque latere 7-8 basi rectis a costa angulo 60° egressis sursum subito arcuatis cum iis superioribus conjunctis, petiolis 1-1½ cm. longis supra sulcatis glabris. Cymae paniculae terminales cum pedunculis 7 cm. longae glabrae, pedunculis 2 cm. longis, ternatim ramosae, ramis rectis divaricatis ad ramificationem 1-bracteatis, bracteis oppositis triangularibus 2 mm. longis 1½ mm. latis cuspidato-acutis glabris dorso carinatis, pedicellis 2 mm. longis rectis glabris apice 2-bracteolatis, bracteolis oppositis ovatis 1½ mm. longis ⅔ mm. latis apice acutis. Calyx glaber 5-partitus, sepalis ovato-triangularibus 2 mm. longis 1 mm. latis apice acutis basi haud vel vix contractis dorso plus minus crassiusculis margine plus minus

ciliolatis; squamae inter sepala minutae lepidiformes $\frac{1}{5}$ mm. longae crassiusculae glabrae. Corolla flava hypocrateriformis, tubo 4 mm. longo extus glabro deorsum plus minus latiore $1\frac{1}{4}$ mm. lato sursum angustiore $\frac{2}{3}$ mm. lato intus dense hirsuto, lobis dextrorsum obtegentibus patentissimis tortuosis oblique cultriformi-linearibus 5-6 mm. longis $1\frac{1}{3}$ mm. latis falcatis recurvis extus glabris, intus latere uno glabro latere uno hirsuto. Stamina 5, filamentis brevissimis totis basi tubo corollae connatis apice subliberis intus plus minus hirsutis, antheris lineari-sagittiformibus $1\frac{1}{2}$ mm. longis $\frac{1}{3}$ mm. latis apice acuminatissimis basi sagittatis apice ad appendiculam membranaceam productis. Discus 5-dentatus circum ovarium situs, dentibus triangularibus obtusis $\frac{1}{3}$ mm. longis. Ovarium 2-partitum, stigmate breve stipitato conico $\frac{1}{2}$ mm. longo, stipite $\frac{1}{4}$ mm. longo toto glabro; partitis ovarii depresso-globosis $\frac{1}{2}$ mm. longis apice obtuso. truncatis.

HAB. Monte Suisha, leg. B. HAYATA, Mai. 1916.

Near *Anodendron laeve*; but differs from it in the much smaller yellow flowers.

Loganiaceae.

Gardneria WALL.

Gardneria Shimadai HAYATA sp. nov. Frutex, ramis et ramulis teretibus sublaevibus fuscentibus, squamis triangularibus 2 mm. longis oppositis hac atque iliac instructis. Folia opposita (jugis a se 3 cm. remotis) lanceolata chartacea $8\frac{1}{2}$ cm.-11 cm. longa 27-33 mm. lata apice obtuso-acuminata vel triangulari-acuminata basi obtusa margine integerrima tenuiter deorsum revurva utraque glaberrima supra viridissima subtus pallidissima, costa supra tenuiter elevata vel impressa subtus tenuiter prominenti, venis lateralibus primariis utroque latere costae 9-10 rectis a costa angulo $20-30^\circ$ egressis ad medium furcatim ramosis utraque pagine tenuiter elevatis, petiolis 7 mm. longis supra late sulcatis. Flores ignoti. Cymae fructiferae circ. 3 cm. longae glabrae pauciramosae, fructus 1-2 gerentes. Bacca globosa in exsiccato nigricans.

HAB. Tikushizan, leg. Y. SHIMADA, Mart. 1915, (fructus).

Near *Gardneria nutans* S. et Z., but differs from it in the much thicker leaves which are lanceolate and triangularly acuminate at the apex.

Gentianaceae.

Swertia LINN.

Swertia shintenensis HAYATA sp. nov. Herba annua 45 cm. alta erecta medio sursum ramosa. Folia radicalia ignota. Folia caulina opposita oblongo-ovata 6 cm. longa 3 cm. lata apice acuminata basi rotundato-cordata sessilia caulem semi-amplectantia margine integerrima crassiuscula glabra, venis primariis lateralibus paucis, venulis reticulatis; foliis ramorum floriferorum minutis lanceolatis 1 cm. longis 3 mm. latis apice acuminatis basi attenuatis ramos semi-amplectantibus oppositis glabris. Flores latissime cymosi, pedicellis 2-3 cm. longis. Calyx late campanulatus alte 4-lobatus, lobis semi-rotundato-triangularibus 4 mm. longis totiusque latis apice cuspidato-acutis vel acutis basi latissimis haud contractis obscure trinerviis glabris integris. Corolla campanulata altissime 4—fida, tubo 2 mm. longo, segmentis oblongis 17 mm. longis 9 mm. latis apice triangulari-acutis ad summum obtusis basi 3 mm. latis 5-nerviis vel obscure multi-nerviis, venulis reticulatis glabris intus medio 1-maculatis, maculis obtuse quadrangularibus 4½-5 mm. longis 4 mm. latis. Stamina 5 e basi loborum corollae oriunda, filamentis dorso complanatis glabris linearibus 5-6 mm. longis basi latissimis 2 mm. latis sursum gradatim angustatis apice subulato-linearibus distincte 1-nerviis, antheris ovato-linearibus 4½ mm. longis 2-2½ mm. latis apice obtusis basi alte 2-lobatis, lobis 2 mm. longis. Ovarium cum stipite 7 mm. longum obovoideum plus minus complanatum 4½ mm. latum, stipite circ. 2 mm. longo 3 mm. lato, stylo validissimo 4 mm. longo columnari-coniformi basi 3 mm. lato sursum angustiore apice stigmatate 2-partito coronato; segmentis stigmatatis ovatis 1½ mm. longis 1 mm. latis lamelliformibus horizontaliter dispositis.

HAB. in monte Shinten, 2400 ped. alt., leg. U. FAURIE, Nov. 1914, (No. 1256).

Near *Swertia Kuroiwai* MAKINO.

Boragineae.

Cordia LINN.

Cordia Kanehirai HAYATA sp. nov. Frutex ? Ramuli fulvo-cinerascentes

hirsuti. Folia chartacea lanceolato-ovata vel lanceolata 9-14 cm. longa 2½-6 cm. lata apice acuminata versus summum lineari-acuminata basi acuta vel obtusa, costa supra minus subtus plus elevata, venis lateralibus primariis utroque latere costae 5-6 arcuatis utraque elevatis, venis secundariis et venulis obscuris, margine remote serrulata vel subintegra, serrulis a se 7 mm. remotis apice interiore recurvis, utraque pagine hirsuta in exsiccato supra fusca subtus pallidiora, petiolis 7-20 mm. longis. Cymae terminatae dense floratae dense brevissime hirsute. Alabastrum floris: calyx-tubus cylindricus 4 mm. longus 2½ mm. latus 10-sulcatus extus fulvo-hirsutus; lobis 5 minutis setuliformibus interiore recurvis. Corolla staminaque ignota. Bacca ? ellipsoidea 13 mm. longa 8 mm. lata 1-pyrena; pyrenis oblique ellipticis utrinque obtusis grosse obtuscque spinoso-tuberculatis, testis crustaceis; semina ignota.

HAB. Koshun: Kuraru, leg. R. KANEHIRA, Jan. 1014, (No. 7).

Near *Cordia Cumingiana*.

Trigonotis STEV.

Trigonotis elevato-venosa HAYATA sp. nov. Herba humilis perennis cum pedunculis circ. 15 cm. longa erecta gracillima haud vel pauca ramosa in exsiccato ferrugineo-hirsuta, stolonibus gracillimis 15-20 cm. longis. Folia radicalia longe petiolata perfecte elliptica 2-2½ cm. longa 10-13 mm. lata apice rotundata plus minus emarginata et ad centrum brevissime mucronata basi obtusa margine integra vel crispato-undulata supra viridia haud nitida subtus pallida, costa supra impressa subtus elevata, venis supra elevatis sed subtus impressis, utraque pagine adpresse pubescentia, venis lateralibus 4-5 rectis angulo 45° a costa egressis per venam marginalem conjunctis, venis marginalibus a margine 1-2 mm. distantibus, petiolis longissimis 3-4 cm. longis; foliis stolonis minoribus breve petiolatis rotundatis 8 mm. longis. Caulis apice 2-ramosus vel simplex apice ad racemos abeuns. Racemi graciles 8 cm. longi recti simplices vel rarius a basi furcatim uni-plo ramosi hirsuti, ramis simplicibus rectis erectis secunde floriferis, pedicellis hirsutis 2 mm. longis haud bracteatis. Calyx viridis 5-partitus, segmentis obovato-spathulatis apice obtusis extus strigoso-hirsutis intus minute hirsutis 1½ mm. longis ½-⅔ mm. latis. Corolla alba rotata, tubo glabro 1½ mm. longo 1½ mm. lato basi truncato haud contracto, limbo 5-partito, segmentis rotundatis basi plus minus cuneato-

contractis $1\frac{1}{2}$ mm. in diametro glabris. Disci 5 ad basin loborum corollae affixi flavi pulviniformes $\frac{1}{2}$ mm. lati $\frac{1}{4}$ mm. longi orem tubi fere obtegentes. Stamina 5, filamentis filiformibus brevissimis $\frac{1}{4}$ mm. longis, antheris oblongis $\frac{1}{3}$ - $\frac{1}{2}$ mm. longis. Ovarium obconicum apice truncatum $\frac{1}{4}$ mm. longum glabrum stylo columniformi $\frac{2}{3}$ mm. longo, stigmatate globoso-peltiformi haud lobato ; ovarium 4-5—partitum. Nuculae 4-5 tetrahedri-formes circ. 1 mm. longae nitido-nigrae laeves ad angulos acutae.

HAB. Giran: Soseikyaku, leg. B. HAYATA, Mai. 11, 1916.

Remarkable for the leaves with costa impressed above but elevated below and veins elevated above but impressed below.

Convolvulaceae.

Parasitipomaea HAYATA n. g.

Parasitipomaea formosana HAYATA sp. nov. Parasitica aphylla; caulis tereto-filiformis circ. 1 m. longus 2-2 $\frac{1}{2}$ mm. in diametro. Flores cymose 2-3-congesti, cymis longe pedunculatis, pedunculis 10 cm. longis tereto-filiformibus lateraliter sitis, pedicellis $\frac{1}{2}$ -1 cm. longis basi bracteis instructis, bracteis linea-ribus 2 cm. longis 2 mm. latis apice acuminatis glabris vel multo minoribus. Calyx 5-partitus, partibus valde inaequalibus 3-exterioribus latioribus oblongo-linearibus 2 $\frac{1}{2}$ cm. longis 7 mm. latis apice acuminatissimis integris extus tenuiter hirsutis intus glabris, 2-interioribus angustissime linearibus 2 mm. latis apice acuminatissimis. Corolla infundibuliformis, tubo 4 cm. longo, limbo 5-lobato. Stamina 5, filamentis basi corollae ad 5 mm. altitudinem affixis basi dense barbatis caeterum glabris filiformibus circ. 2 cm. longis, antheris lineari-bus 3 $\frac{1}{2}$ mm. longis $\frac{2}{3}$ mm. latis apice obtusis basi profunde 2-lobatis, lobis circ. 1 mm. longis $\frac{1}{4}$ mm. latis obtusis. Discus circum ovarium situs annuliformis $\frac{1}{4}$ mm. altus. Ovarium ovoideum 1 $\frac{1}{2}$ mm. longum glabrum 3-loculare, loculis 2-ovuliferis, stylo filiformi erecto recto 3 cm. longo, stigmatate terminali 2-partito, partibus globosis sessilibus se contactis minute lamellato-botryoideis. Fructus ignotus.

HAB. Ako: Tanashu, leg. G. NAKAHARA, Jan. 1907.

Flowers are nearly the same as those of *Ipomaea*. But, its parasitic and leafless habit is so remarkable that it is sufficient to establish a new genus for it.

Scrophulariaceae.

Microcarpaea R. BR.

Microcarpaea muscosa R. BR. ; BENTH. Fl. Hongk. p. 253; HOOK. f. Fl. Brit. Ind. IV. p. 287 ; HEMSL. Ind. Fl. Sin. II. p. 192; MATSUM. et HAYATA Enum. Pl. Formos. p. 283. Herba minutissima subaquatica repens 3-4 cm. longa ad nodos radicans. Caulis teres $\frac{1}{2}$ mm. in diametro 1-nervatus glaber. Folia opposita glabra lineari-spathulata 2-3 mm. longa $\frac{1}{2}$ mm. lata apice obtusissima 1-nervia margine integra basi attenuata caulem semi-amplectantia. Flores axillares sessiles solitarii. Calyx erectus tubuloso-campanulatus 1 mm. longus $\frac{1}{2}$ mm. latus extus sparse hirsutus intus glaber apice 5-lobatus, lobis ovato-linearibus $\frac{1}{2}$ mm. longis $\frac{1}{4}$ mm; latis obtusis basi haud contractis margine ciliolatis. Corolla inclusa 1 mm. longa $\frac{1}{2}$ mm. lata 2-labiata glabra margine minute ciliolata intus sub microscopio glanduloso-hirsuta, labio superiore minuto $\frac{1}{5}$ mm. longo 2-lobato, lobis obtusis, labio inferiore majore $\frac{1}{2}$ mm. longo $\frac{2}{3}$ mm. lato 3-lobato, lobo medio oblongo-cuneato apice truncato, lobis lateralibus oblongis apice obtusis. Stamina 2 inter lobum centralem et lobos laterales labii inferioris inserta e medio tubi oriunda, filamentis $\frac{1}{5}$ mm. longis glabris, antheris reniformibus 2-ocularibus. Ovarium oblongum $\frac{1}{3}$ mm. longum glabrum 2-loculare, stylo columniformi $\frac{1}{4}$ mm. longo glabro apice oblique truncato stigmatifero.

HAB. in oryzatis Tamsui, leg. U. FAURIE, Nov. 1914.

Compared with a Japanese specimen so named in the Herbarium at Tokyo.

Gesneraceae.

Rhychoglossum BLUME.

Rhychoglossum ? Sasakii HAYATA sp. nov. Herba annua ? basi ascendens radicans, radicibus fibrosis. Caulis erectus circ. 10 cm. longus crispato-hirsutus, pilis patentibus. Folia alterna breve petiolata obliqua ovato-oblonga $6\frac{1}{2}$ cm. longa 3 cm. lata apice acuta vel acuminata basi valde obliqua, latere inferiore rotundata vel rotundato-cordata, latere superiore cuneato-acuta, latere inferiore 20 mm. lato latere superiore 12 mm. lato, costa basi interiore

leviter falcato-recurva, margine subintegra vel obscure crenulato-serrulata membranacea supra plus subtus minus hirsuta, petiolis brevissimis 3 mm. longis. Flores racemosi, racemis subsimplicibus secunde floriferis, pedicellis 3 mm. longis hirsutis. Calyx 4-partitus plus minus obliquus, segmentis ovato-oblongis $2\frac{1}{2}$ mm. longis 2 mm. latis apice obtusissimis basi plus minus obliquis sparse hirsutis. Corolla oblique tubosa 9 mm. longa 3 mm. lata apice 2-labiata, labio superiore late semi-rotundato 1 mm. longo 2 mm. lato apice perfecte rotundato, labio inferiore $3\frac{1}{2}$ mm. longo $4-4\frac{1}{2}$ mm. lato 3-lobato, lobis lateralibus oblongis latere exteriori 2 mm. longis latere interiore 1 mm. longis basi haud contractis, lobo terminali 2 mm. longo $1\frac{1}{2}$ mm. lato, extus glabra intus latere inferiore longe hirsuta, pilis superioribus circ. 1 mm. longis apice globuliferis, pilis inferioribus haud globuliferis. Stamina 4 basi corollae affixa, filamentis 3 mm. longis basi glabris sursum hirsutis complanatis $\frac{1}{4}$ mm. latis apice spathulatis 1-nerviis margine dense hirsutis; antherae uniloculares, loculis ad apicem filamentorum oblique sitis ^-formibus cordato-reniformibus latere exteriori fusco-hirsuto latere interiore glabro. Ovarium depresso-globosum $1\frac{1}{2}$ mm. longum 2 mm. latum glabrum, stylo $1\frac{1}{2}$ mm. longo columniformi apice dilatato 3-lobato. Discus ad latus anterior ovarii situs $\frac{1}{4}$ mm. longus 1 mm. latus crenulatus. Capsula depresso-globosa $2\frac{1}{2}$ mm. longa $3\frac{1}{2}$ mm. lata membranacea. Semina fusiformia rubescentia $\frac{1}{5}$ mm, longa elegante tortuose striata, testa crustacea.

HAB. Urai, leg. S. SASAKI, Sept. 1915.

As the specimens are too imperfect, the generic determination is rather conjectural.

Verbenaceae.

Callicarpa LINN.

Callicarpa antaoensis HAYATA sp. nov. Frutex ? Rami sublaeves pallido-cinerascentes, ramulis brevissime densissime villosis. Folia chartacea oblonga vel rhomboideo-oblonga 10-12 cm. longa 5-7 cm. lata apice acuta sed ad summum obtusa basi triangulari-acuta vel -obtusa margine subintegra vel tenuiter serrulata paucissime hirsuta vel subglabrata glandulis minutis dispersa subtus dense vel parce stellato-tomentosa, pilis stellatis $\frac{1}{3}$ mm. in diametro, costa supra tenuiter subtus prominente elevata, venis lateralibus

primariis utroque latere costae 8-9 subrectis vel plus minus recurvis supra tenuiter subtus prominente elevatis, venulis inter venas transversis supra haud subtus distincte elevatis, pagine subtus pallidissima glandulis flavis minutis densissime conspersa, petiolis 7 mm. longis dense breveque stellato-tomentosis. Cymae ad axillas foliorum superiorum sitae densissime floratae brevissime stellato-tomentosae, tomentis demum solutis, pedicellis brevissimis supra basin articulatis, partibus supra articulationem 1 mm. longis glabris apice ad calycem abcurrentibus. Calyx tubuloso-obconicus $1\frac{1}{2}$ mm. longus totiusque latus apice subtruncatus margine 4-5-dentatus, dentibus brevissimis vel obscuris, extus glandulis minutis conspersus intus glaber. Corolla tubuloso-campanulata $4\frac{1}{2}$ -5 mm. longa $2\frac{1}{2}$ mm. lata generaliter 4-lobata, lobis subrotundatis $1\frac{1}{2}$ mm. longis totiusque latis apice rotundatis basi haud contractis, extus intusque glabra. Stamina 4 exserta, filamentis filiformibus glabris 4-5 mm. longis subcrispatis supra basin corollae insertis, antheris ellipticis 2 mm. longis 1 mm. latis dorso valde compressis apice emarginatis basi emarginato-sagittatis dorso facieque prope medium densissime glandulis minutis conspersis, haud versatilibus. Ovarium oblongum 1 mm. longum $\frac{2}{3}$ mm. latum glandulis minutis densissime conspersum, stylis 7-8 mm. longis filiformibus glabris apice ad stigmata dilatatis.

HAB. Kotosho, leg. T. KAWAKAMI et S. SASAKI, Juli. 1912, fl. (No. 38).

Near *Callicarpa cana* LINN. ; but differs from it in having obtusely serrulate leaves.

Aristolochiaceae.

Aristolochia LINN.

Aristolochia Shimadai HAYATA sp. nov. Herba volubilis basi suffrutescens. Caulis subglaber teres tortuosus multo-striato-sulcatus sursum patentohirsutus. Folia alterna petiolata oblongo-reniformia circ. 10 cm. longa circ. 6 cm. lata, partibus superioribus oblongis 6 cm. longis circ. 4 cm. latis apice obtusissimis, partibus inferioribus reniformibus 4 cm. longis $5\frac{1}{2}$ mm. latis, basi auriculata, auriculis interiore recurvis (ab apice petioli usque ad apicem auriculae $1\frac{1}{2}$ cm. longis 2 cm. latis) margine subintegra 5-7-nervia chartacea, nervis et venis venulis supra leviter elevatis subtus valde elevatis, supra minus subtus

plus dense villosa, venulis reticulatis, petiolis circ. 3 cm. longis villosis. Flores axillares solitarii, pedicellis 2-3 cm. longis villosis medio 1-bracteatis, bracteis ovatis apice obtusissimis basi latis pedicellum amplectantibus 5 mm. longis 4 mm. latis extus sericeo-villosis intus subglabris. Ovarium inferum subnutans densissime patentissime villosum (pilis 1 mm. longis) 8 mm. longum 2 mm. latum profunde 6-sulcatum 6-loculare, (loculis 1-seriatim ovuliferis), sulcis $\frac{1}{4}$ mm. latis, angulis obtusissimis in sectione rotundatis. Perianthium v-formiter recurvum extus minute brevissime villosum simul longe hirsutum intus deorsum minute tuberculatum sursum glabrum laeve, tubo U-formi 2 cm. longo e basi supra medium 6 mm. lato supra medium usque ad apicem angustato 3-4 mm. lato, limbo ad apicem tubi oblique verticaliter sito $1\frac{1}{2}$ cm. longo totiusque lato plano parce minuteque hirsuto V-formi centro circum orem tubi oblique minute elevato-annulato reticulato. Stamina 6 cum styli connata sessilia, antheris linearibus inter strias stigmatiferas styli geminatim sitis 2 mm. longis $\frac{2}{3}$ mm. latis apice brevissime apiculatis. Stylus columniformis crassus 3 mm. longus cum antheris $1\frac{1}{2}$ mm. crassus apice 3-lobatus supra antheras 1 mm. productus, lobis semi-rotundatis 1 mm. longis $1\frac{1}{2}$ mm. latis.

HAB. Shimpo, Shinchikucho, leg. Y. SHIMADA, Dec. 15, 1915.

Near *Aristolochia Kaempferi* WILLD., but distinguishable from it in much longer leaves and smaller flowers. Also resembles *A. Fordiana* HEMSL., but differs from it in having quite obtuse leaves.

Laurineae.

Beilschmiedia NEES.

Beilschmiedia erythrophloia HAYATA Ic. Pl. Formos. IV. p. 20 et V. p. 150. Descriptio aucta: Flores pallido-flavescentes laxè paniculati; paniculis ad ramulos hornotinos lateraliter vel axillariter dispositis divaricatis cum pedunculis 6-8 cm. longis (pedunculis 2-3 cm. longis), ramis panicularum patentissimis, pedicellis ultimis 5-10 mm. longis toto glabris. Perianthii tubus obconicus $\frac{2}{3}$ mm. longus $1\frac{1}{2}$ mm. in diametro glaber, lobis 6 subaequalibus oblongis 2 mm. longis $1\frac{1}{2}$ mm. latis apice obtusis basi vix vel haud contractis extus glabris intus glabris concavis margine vix ciliolatis vel haud ciliolatis. Stamina ordinis I. et II. aequalia, filamentis late linearibus $\frac{2}{3}$ mm. longis $\frac{1}{2}$ mm

latis complanatis, antheris adnatis ovatis 2-ocularibus $\frac{2}{3}$ mm. longis apice obtusis introrsum dehiscentibus; stamina ordinis III. filamentis plus minus hirsutis basi utroque latere glandulis rotundatis $\frac{1}{4}$ mm. longis totiusque latis instructis, antheris elongato-ovatis $\frac{2}{3}$ mm. latis; ordinis IV. staminodia sessilia rhomboidea acuta $\frac{1}{2}$ mm. longaque lata. Ovarium ovoideum $\frac{2}{3}$ mm. longum et latum glabrum 1-loculare, stylo columniformi glabro 1 mm. longo apice truncato stigmatoso.

HAB. Baikei, ad 2000 ped. alt., leg. B. HAYATA, Aprili. 1916.

Thymelaeaceae.

Wikstraemia ENDL.

Wikstraemia mononectaria HAYATA Ic. Pl. Formos. V. p. 179.

Descriptio aucta: Fructus baccaeformis ovoideus cum stipitibus 6 mm. longus 3 mm. latus apice angustatus ad summum obtusus basi attenuatus ad stipitem abeuns, stipitibus circ. $1\frac{1}{2}$ -2 mm. longis, monospermus. Semina ovoidea 4 mm. longa 2- $2\frac{1}{2}$ mm. lata apice plus minus angustato-rostrata obtusa basi rotundata et brevissime apiculata, testa Crustacea nigricanti latere uno hilo notata, albumen carnosum sparsum. Embryo amplus; radícula supra brevis 1 mm. longa apice acutissima; cotyledonibus ovatis $2\frac{1}{2}$ -3 mm. longis $1\frac{2}{3}$ mm. latis crassiusculis.

HAB. Uraisha, leg. S. SASAKI, Sept. 1915, (fr.).

Loranthaceae.

Loranthus LINN.

Loranthus liquidambaricolus HAYATA sp. nov. Frutex parasiticus ad truncos *Liquidambaris* incolus, ramis cinerascentibus minute lenticellatis. Folia crasse coriacea oblonga vel ovato-oblonga 7 cm. longa 4 cm. lata apice truncato-rotundata basi acuta subito ad petiolum abeuntia, costis et venis utraque pagine tenuissime elevatis gracillimis, petiolis 12 mm. longis subalatis haud sulcatis subteretibus. Cymae laterales 3-floratae. Tubus perianthii cylindricus 18 mm. longus 3 mm. latus basi truncatus medio sursum gradatim angustior apice plus minus expansus, ab apice deorsum usque ad 5 mm. latere uno fissus extus brevissime hirsutus intus subglaber; lobis 4 linearibus 6 mm. longis $1\frac{1}{3}$ mm. latis

apice obtusis retrorse flexis tubo contactis apice sursum (interiore) recurvis valvatis crassiusculis basi haud contractis. Stamina 4 lobis perianthii opposita, filamentis totis cum tubo perianthii connatis; antheris sessilibus linearibus $4\frac{1}{2}$ mm. longis $\frac{2}{3}$ mm. latis apice acutis apice 2-dentatis, (dentibus triangularibus brevissimis), loculis linearibus a medio deorsum recurvis subglabris. Stylus 23 mm. longus filiformis in sectione pentagonus glaber, stigmatе terminali coniformi. Fructus obconico-cylindricus 6 mm. longus 3 mm. in diametro sectionis.

HAB. Nanto: kyoshiryo, leg. T. SOMA, Nov. 1915, ad truncos *Liquidambaris formosanae* crescens.

Loranthus Owatarii HAYATA in MATSUM. et HAYATA Enum. Pl. Formos. p. 357. Descriptio aucta : Flores ♂ : lacteo-flavi patentissimi circum nodos spicae 4-glomeratim siti sessiles, bracteis triangularibus 1 mm. longis acutis transverse patentibus. Involucrum cupuliforme $1\frac{1}{2}$ mm. in diametro $\frac{2}{3}$ mm. longum margine sub lente minute denticulatum vel sub-integrum. Perianthii segmenta 6 patentissima linearia oblanceolata $2\frac{1}{2}$ mm. longa $\frac{2}{3}$ mm. lata apice obtusa vel truncata glabra laevia distincta. Stamina 6 cum segmentis opposita, filamentis basi ad basin segmentorum adnatis sursum liberis 2- $2\frac{1}{2}$ mm. longis cum segmento aequilongis glabris incrassatis, antheris oblongis adnatis apice truncatis vel emarginatis 4-ocularibus, loculis operculatim dehiscentibus. Rudimentum ovarii brevissimum margine 5-dentatum, stylo columnari $1\frac{1}{2}$ mm. longo.

HAB. Oiwake, ad 7500 ped. alt., ad truncos *Qurci Morii*, Aprili. 1916, leg. B. HAYATA.

Viscum LINN.

Viscum Alni-formosanae HAYATA sp. nov. (Fig. 3.) Furcatim ramosissimum, ramis patentissimis teretibus rectis. Folia ad apicem ramulorum oppositam sita oblongo-obovata 4-5 cm. longa 12-18 mm. lata apice rotundata basi longe cuneato-attenuata integra crassiuscule coriacea 3-5-nervia sessilia vel breve petiolata. Cymae terminales sessiles 5 mm.-10 mm. longae ternatim decussatimque ramosae, floribus sessilibus cum rhachibus flavescentibus. Flores basillares utroque latere bracteis acute triangularibus 1- $1\frac{1}{2}$ mm. longis margine aristato-serrulatis dorso carinatis crassiusculis glabris instructi, laterales et

terminales haud bracteati, sed involucris crustaceis instructi. Perianthium campanulatum 2½-3 mm. longum 3½-4 mm. latum crassiusculum coriaceum glabrum; tubo 1½-2 mm. longo obconico, lobis rotundato-triangularibus vel oblongo-triangulari-

bus 2 mm. longis totiusque latis vel latioribus apice exterioribus recurvis glabris; antheris 3-4 cum lobis perianthii oppositis et eos adnatis oblongis vel oblongo-linearibus 1½-2 mm. longis facie multiporosis; rudimentum ovarii nullum. Fl. ♀: sessiles vel brevissime stipitati; ovarium viride inferum obconico-lineare 1-1½ mm. longum 1 mm. latum glabrum; perianthium 4-partitum, segmentis oblongo-triangularibus glabris incrassates coriaceis

apice obtusis basi articulatim solutis; stamina nulla; stylus globosus 1 mm. longus totiusque latus apice rotundatus stigmatosus.

HAB. Musha: Tsutsujigaoka, ad 6000 ped. alt., ad *Alnum formosanam* crescens, leg. B. HAYATA, Aprili. 23, 1916.

Approaches to *Viscum album* LINN., but differs from it in the male flowers

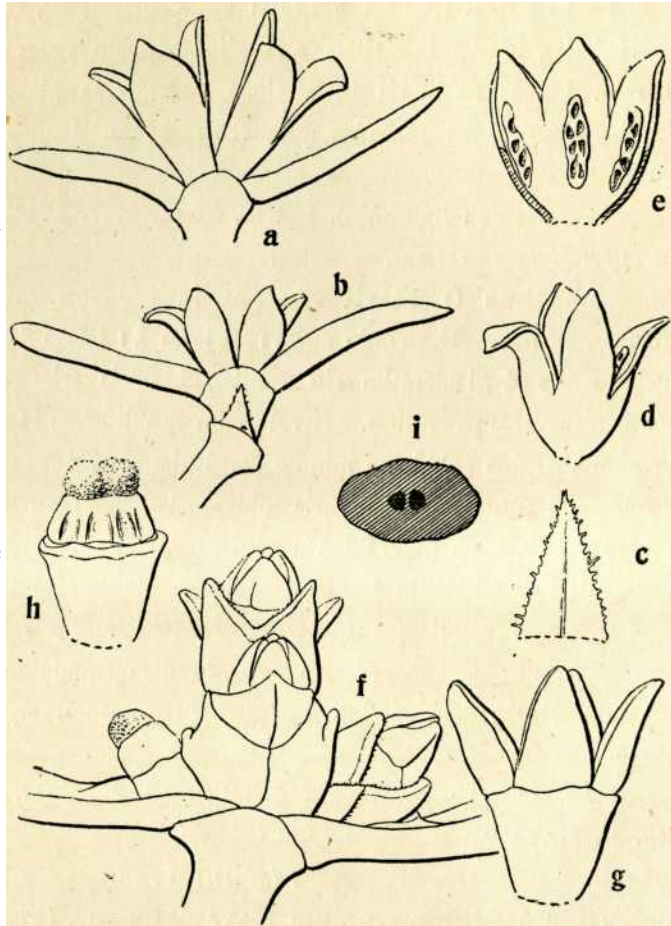


Fig. 3, *Viscum Alniformosamae* HAYATA. a, b, pairs of male flowers; c, a bract; d, a male flower; e, section of the same; f, female flower-cluster; g, a flower of the same; h, the same, perianth off; i, section of ovary

which are usually in pair at the top of the branches, and in the much narrower perianth-segments of the same flowers.

Viscum diospyrosicolum HAYATA Ic. Pl. Formos. V. p. 192. Descriptio aucta : Juvenile foliiferum, foliis oppositis oblongo-obovatis $1\frac{1}{2}$ cm. longis $4\frac{1}{2}$ mm. latis apice obtusissimis basi cuneatis margine integris chartaceis glabris venis haud visis sessilibus. Fl. ♂ : involucrum tenuiter crustaceum cupuliforme margine obscure denticulatum. Perianthium circ. ad basin 4-lobatum, lobis oblongo-triangularibus $1\frac{1}{4}$ mm. longis $\frac{3}{4}$ mm. latis apice acutis basi haud contractis crassiusculis leviter deorsum reflexis extus minute sub lente botryoideo-tuberculatis glabris. Antherae 4 ad medium loborum perianthii adnatae oblongae 5-6-porosae. Rudimentum ovarii nullum. Pseudofructus ellipsoideus $4\frac{1}{2}$ mm. longus 2 mm. latus apice obtusus ad centrum summi breve apiculatus laevis.

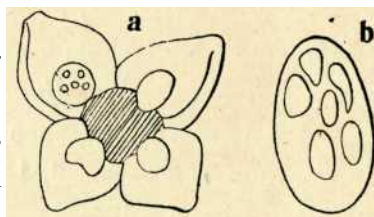


Fig. 4, *Viscum diospyrosicolum* HAYATA; a, a male flower; b, an anther.

HAB. Kyoshiryō, leg. B. HAYATA, 2200 ped. alt., Aprili. 1916, (fl. ♂).

Euphorbiaceae.

Daphniphyllum BLUME.

Daphniphyllum membranaceum HAYATA sp. nov. Arbor, ramis et ramulis validiusculis cicatricibus foliorum notatis haud lenticellatis. Folia alterna versus apicem ramulorum approximativim disposita longe petiolata oblongo-elliptica vel oblongo-lanceolata circ. 20 cm. longa 6 cm. lata apice acutissima vel breve cuspidata basi obtusa margine subintegra supra nitida viridissima subtus glauca chartacea vel chartaceo-membranacea, costa supra plana vel tenuiter impressa subtus prominenti, venis lateralibus primariis utroque latere costae 15-20 rectis vel plus minus flexuosis haud arcuatis gracillimis utroque pagine tenuiter elevatis a costa angulo 45° egressis, petiolis circ. 5 cm. longis rectis supra sulcatis basi plus minus dilatatis. Racemi florum ♀. versus apicem ramorum sub foliis supra cicatrices foliorum dispositi gracillimi glabri erecti recti 12 cm. longi laxissime floriferi, pedunculis 5-6 cm. longis, pedicellis gracillimis glabris 2 cm. longis divaricatissimis, bracteis

caducissimis haud visas. Flores ♀ : perianthii segmenta interdum complete ad nullum reducta, vel interdum brevissima glandulaeformia 7-8 apice peltato-truncata $\frac{1}{4}$ mm. longa totiusque lata distincta. Ovarium glabrum oblongum glabrum 2 mm. longum apice ad stylum $\frac{2}{3}$ mm. longum attenuatum basi obtusum, stigmate terminali subpeltato 2-fido, segmentis latissimis $\frac{2}{3}$ mm. longis subrotundatis ad apicem styli contactis, ovarium 2-loculare.

HAB. Rankanzan, leg. B. HAYATA, Mai. 1916.

Near *D. macropodum*, but different from it in the much thinner leaves, in the more or less rostrate ovaries and nearly obsolete perianth-segments.

Cyclostemon BLUME.

Cyclostemon hieranense HAYATA sp. nov. Arbor ? ramis et ramulis gracilibus, cortice cinerascenti, lenticellis albicantibus minutis elevatis. Folia alterna in exsiccato pallido-cinerascentia tenuiter coriacea oblongo-elliptica vel oblongo-lanceolata apice caudato-acuminata basi oblique acuta 12 cm. longa 4 cm. lata margine integra tenuiter deorsum recurva plus minus margine crispato-undulata, costa utraque elevata, venis venulis reticulatis supra minus subtus plus elevatis, venis primariis lateralibus utroque latere costae 8-10 tenuissimis arcuatis prope marginem reticulatis, utraque pagine glaberrima, petiolis 8 mm. longis semiteretibus fusco-coloratis. Flores ad partes inferiores efoliatis ramurorum hornotinorum lateraliter siti ad nodos 2-3-fasciculati graciliter pedicellati, pedicellis filiformibus 1 cm. longis, bracteis flores 2-3 includentibus caducissimis rotundatis apice triangularibus 7 mm. longis 6 mm. latis dense ciliatis coriaceis valde concavis. Sepala 4 patentia rotundata glabra 4 mm. longa 3 mm. lata apice rotundata margine ciliata. Stamina 7-10 circum rudimentum ovarii disposita, filamentis glabris $1\frac{1}{2}$ mm. longis, antheris oblongis utrinque emarginatis $1\frac{1}{2}$ mm. longis 1 mm. latis. Rudimentum ovarii plano-compressum $2\frac{1}{2}$ mm. in diametro margine repando-lamellatum plicatum. Fl. ♀ ignoti.

HAB. Hieranzan, leg. S. SASAKI, Feb. 1912.

Near *C. harapinense*; but differs from it by the much more acuminate and thicker leaves.

Urticaceae.

Fleurya GAUDICH.

Fleurya interrupta GAUD. ; MATSUM. et HAYATA Enum. Pl. Formos. p. 381. Herba annua ? radicibus fibrosis. Caulis subteres 30-40 cm. longus sparse hirsutus. Folia alterna petiolata triangulari-cordata membranacea 9-10 cm. longa 7-8 cm. lata apice triangulari-acuminata (acuminibus integris linearibus 1 cm. longis 3 mm. latis apice acutis) basi late truncate vel truncato-cordata margine grosse serrata, (serris sub-triangularibus 4 mm. longis 6 mm. latis apice acutis basi latissimis superioribus gradatim minoribus) margine brevissime ciliolata trinervia, nervis lateralibus extrorse 5-veniferis, venis et nervis prope serras furcatim ramosis, ramulis ad apicem serrarum convergentibus, utraque sparse hirsuta, petiolis 7-9 cm. longis gracillimis hirsutis vel subglabris, stipulis 2 subaxillaribus lineari-filiformibus circ. 1 cm. longis basi 1 mm. latis apice filiforme acuminates dorso prominente carinatis intus glabris extus hirsutis. Spicae a basi usque ad apicem caulis site axillares solitariae longe pedunculatae cum pedunculis 8-10 cm. longae, (pedunculis circ. 5 cm. longis gracillimis ascendentibus), pauca ramosae, ramis spicae circ. 5 mm. longis remote sitis. Flores ♀ ad ramos spicae densissime cymose glomeratimque dispositi, pedicellis subnullis vel ½ mm. longis. Perianthium fructiferum oblique globoso-obconicum 1 mm. longum totiusque latum glabrum vel sparse hirsutum inaequaliter 4-lobatum, lobis subtriangularibus ½ mm. latis ⅓ mm. longis margine denticulatis; staminodia nulla. Styli ad apicem ovarii oblique siti a basi 2-partiti, parte una longiore filiformi ⅔ mm. longa rubescenti descendente-recurva, parte una brevissima 1/10 mm. longa vel obsoleta. Achaenium valde complanatum triangulari-cordiforme 1½ mm. longum 1 mm. latum sublaeve angustissime alatum, pericarpis crustaceis.

HAB. Ako, leg. T. SOMA, Sept. 1913, (fr. et ♀).

Pilea LINN.

Pilea brevicornuta HAYATA sp. nov. (Fig. 5.) Herba; caulis basi procumbens ad nodos radicans, (radicibus fibrosis), sursum ascendens erectus sursum foliatus hirsutus (pilis horizontaliter patentibus ½ mm. longis) simul glanduloso-rubro-punctatis. Folia opposita (jugis a se 2 cm. distantibus),

longe petiolata ovato-oblonga vel ovato-lanceolata 4½ cm. longa 18 mm. lata apice acuminata basi triangulari-acuta vel obtusa margine basi apiceque excepto serrata (serris ascendentibus late triangularibus obtusis a se 3 mm. distantibus), trinervia, (nervis lateralibus ad apicem serrarum attingentibus), venis lateralibus primariis nervorum sub apicibus serrarum glandula singula calcarea terminatis, pagina supra cystolithis 6/10 mm. longis rectis conspersa subtus glabra, petiolis 6-7 mm. longis glabris supra sulcatis, stipulis intra-axillaribus castaneis membranaceis ovato-oblongis 4½ mm. longis 3 mm. latis apice obtusissimis basi caulem semi-amplectantibus glabris. Flores monoecii vel dioecii. Fl. ♂ cymosi, cymis solitariis vel geminatis axillaribus pedunculatis, pedunculis glabris 1½-2 cm. longis apice ramosis plus minus hirsutis ad nodos bracteatis, bracteis oblongis 1 mm. longis apice erosis, pedicellis ultimis ⅔ mm. longis. Perianthium

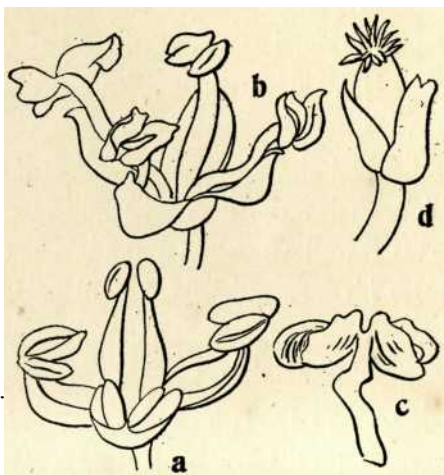


Fig. 5, *Pilea brevicornuta* HAYATA; a, b, male flowers; c, a stamen; d, a female flower.

rubescens 4-lobatum, tubo obconico 1 mm. lato glabro, lobis oblongis 2 mm. longis 1⅓ mm. latis apice cornuto-acutis glabris basi non contractis intus plus minus concavis glabris. Stamina 4, filamentis 2 mm. longis linearibus ⅓ mm. latis; antheris roseis, loculis divaricatis. Rudimentum ovarii minutum setiforme. Flores ♀ cymosi, cymis brevioribus inferioribus quam iis floribus ♂, breve pedunculatis cum pedunculis ½ cm. longis generaliter geminatim ad axillas foliorum sitis glabris bracteatis ramosissimis, floribus ad nodos glomeratis bracteatis, bracteis oblongo-triangularibus basi pedicelli ultimi sitis minutis 1/5 mm. longis, pedicellis ultimis ½-⅔ mm. longis. Perianthium fructiferum viride 3-partitum, segmentis inaequalibus, postico longiore oblongo ½ mm. longo glabro intus concavo apice truncato vel obtusissimo, segmentis lateralibus ovato-triangularibus ⅓ mm. longis apice acutis intus valde concavis glabris; rudimenta staminum 3 crassiuscula ⅔ mm. longa Ω-forme recurva. Achaenium castaneum ovatum ¾ mm. longum ½ mm. latum biconvexum apice obtusissimum basi con-

tractum, (stigmatē sessili infra apicem ovarii latere sito brevissime pectinato) rubescens rubro-punctatum, pericarpio coriaceo-crustaceo. Semina ovata utrinque acuta, testa membranacea. Embryo ignotus.

HAB. Mt. Arisan: inter Heishana et Nimandaira, Mart. 1914, leg. B. HAYATA.

Near *Pilea umbrosa* WEDD., but differs from it by the leaves which are usually acute at the base.

Pilea funkikensis HAYATA sp. nov. Herba subsucculenta altissima erecta aggregatim abundante crescens. Caulis 60-200 cm. altus vel altior glaber simplex haud ramosus subtetragnus 4 mm. crassus medio sursum foliatus erectus. Folia opposita (jugis a se 3-5 cm. remotis) longe petiolata in exsiccato chartacea in vivo crassiuscula elongato-ovato-oblonga vel elongato-oblonga 12-14 cm. longa 4½-5 cm. lata apice breve caudato-acuta (acuminibus 1 cm. longis) basi cuneato-obtusa obtusa vel rotundata margine tenuiter remoteque serrulata (serrulis ascendentibus ab apice ad apicem 5 mm. distantibus) trinervia, nervis supra impressis subtus elevatis, pagine supra dense subtus minus dense cystolithis vermiformibus conspersa, cystolithis 1/5-3/5 mm. longis, petiolis 3-6 cm. longis glabris, stipulis intra-axillaribus non satis notis. Flores dioecii vel monoecii, (si monoecii tunc inflorescentiae floris foeminei superiores, inflorescentiae floris masculini inferiores). Flores toto cymosi, cymis axillaribus solitariis vel geminatis. Cymae floris ♂ : quam eae fl. ♀ longiores et plus expansae 3-5 cm. longae 2-4 cm. latae sessiles vel breve pedunculatae ramosissimae glabrae ad nodos glomeratim dense floriferae ad nodos bracteatae, bracteis late triangularibus 1 mm. longis 1½ mm. latis apice obtusis basi haud contractis glabris; flores 10-30 ad nodos glomerati sessiles basi 1-bracteati, bracteis oblongis 1½ mm. longis ⅔ mm. latis vel minoribus apice acutis glabris; alabastrum floris ♂ obovoideum 1½ mm. latum apice cornibus erectis brevissimis segmentorum breve apiculatum glabrum; apertientes leviter rosei. Perianthium campanulatum, tubo 1 mm. in diametro intus cupulaeformi, 4-lobatum, lobis oblongis 1 mm. longis ⅔ mm. latis apice minute inflexis triangulari-acutis basi haud contractis intus valde concavis extus dorso infra apicem brevissime cornutis, cornibus erectis minutissimis triangulari-acutis; stamina 4 lobis perianthii opposite e basi loborum oriunda, filamentis lineari-

bus glabris $1\frac{1}{2}$ mm. longis quam labo plus minus longioribus in alabastro inflexis, antheris oblongis dorso infra apicem glandula singula $\frac{1}{5}$ mm. longa retrorse elevata rubra instructis; rudimentum ovarii conicum minutissimum. Cymae floris ♀ quam eae fl. ♂ breviores superiores $1-1\frac{1}{2}$ cm. longae totiusque latae sessiles vel breve pedunculatae; flores ad nodos densissime glomerati; perianthium achaeniferum 2-4-partitum vel lobatum, segmentis linearibus vel quadrangularibus $\frac{2}{3}-\frac{1}{2}$ mm. longis margine erosis apice truncatis haud cornutis glabris; rudimenta staminis 2 vel 4, filamentis ad nullum reductis, antheris abortis sessilibus minutissimis quadrangularibus $\frac{1}{10}-\frac{1}{5}$ mm. longis. Achaenium oblongum plus minus obliquum $\frac{1}{4}$ mm. longum $\frac{2}{3}$ mm. latum apice brevissime et lateque apiculatum ad summum stigmatem terminatum basi contractum acutum brevissime stipitatum biconvexum complanatum lentiforme laeve minute rubropunctatum, maturum ignotum; embryo ignotus.

HAB. Mt. Arisan: inter Toroyen et Funkiko, leg. B. HAYATA et TAKEO ITO, Mart. 1914; Nimandaira, leg. T. SOMA, Jan. 1915.

Near *Pilea petiolaris* BLUME, but differs from it in having much longer and thicker leaves.

Pilea kankaoensis HAYATA sp. nov. Annuua. Caulis 15-25 cm. longus succulentus glaber deorsum efoliatus sursum foliatus 5 mm. in diametro sectionis. Folia versus apicem caulis oppositam disposita a se 3-2-1 cm. distantia longe petiolata ovato-oblonga vel obovato-oblonga $2\frac{1}{2}-5$ cm. longa $1\frac{1}{2}-2\frac{1}{2}$ cm. lata apice caudata ad summum caudae obtusissima basi obtusissima rotundata vel truncata sed ad apicem petioli semper minute cordata Λ -formia margine integerrima crassiuscula plus minus succulenta supra fusco-viridia plus minus iridescencia supra cystolithis vermiformibus $\frac{1}{2}-\frac{3}{5}$ mm. longis conspersa subtus in exsiccato alveoli-forme elevato-reticulata in vivo haud reticulata glaberrima 3-nervia, nervis in exsiccato supra impressis subtus tenuissime elevatis gracillimis, nervo centrali ad acumen ipsum extenso, nervis lateralibus a margine 2-3 mm. distantibus margini parallelis sursum gradatim evanescentibus, venis transverse dispositis tenuissimis; petiolis 2-3 cm. longis teretibus cystolithis conspersis, stipulis intra-axillaribus latere interiore se connatis late triangularibus apice acutis vel obtusis 1 mm. longis 2 mm. latis. Flores monoecii corymboso-paniculati; paniculis ad folia superiora axillaribus cum

pedunculis 8-10 cm. longis, pedunculis 6-7 cm. longis, ramis paniculae pedato-patentibus glabris, rhachibus valde flexuosis glabris incrassatis ad nodos flores quasi-glomeratim gerentibus. Fl. ♂: sessiles; alabastrum obovoideo-globosum apice obtuse truncatum cornibus 4 brevissimis instructum basi obtusum; flores apertientes patentissimi, perianthii lobis oblongo-linearibus 1½ mm. longis 1 mm. latis apice acutis dorso sub apice brevissime cornutis utraque pagine glabris distincte 1-costatis; stamina 4, lobis perianthii opposita, filamentis ad ½ mm. perianthio adnatis sursum liberis, partibus liberis 1 mm. longis cum lobis perianthii aequilongis complanatis glabris inflexis, antheris ovatis apice emarginatis basi profundo cordatis vel profunde 2-lobatis 1 mm. longis. Fl. ♀ : pedicelli 1/5-1/10 mm, longi brevissimi basi 1-bracteati, bracteis triangulari-ovatis ¼ mm. longis obtusis vel breve 2-lobatis glabris; perianthium 4-partitum, segmentis valde inaequalibus, uno majore erecto concavo crassiusculo, alteris lanceolatis tenuissimis hyalinis ⅓ mm. longis acuminatis; staminodia nulla; ovarium obovoideo-ellipsoideum stigmate excepto ⅓ mm. longum glabrum 1-loculare 1-ovulatum, ovulis erectis, stigmate sessili pectinato-cristato; achaenium oblique ovato-oblongum apice obtusum plus minus recurvum basi cuneato-acutum glabrum minus quam 1 mm. longum ½ mm. latum latere plus minus complanatum biconvexum, pericarpio fulvescenti crustaceo. Semina ovoidea ⅔ mm. longa apice acuta basi rotundata plus minus complanata laevia glabra, testa membranacea; albumen paucum; embryo mediocrius subovatus ⅓ mm. longus; radícula supra brevis dimidium cotyledonis in longitudine aequans coniformis apice obtusa; cotyledones late rotundatae latiores quam longae.

HAB. Koshun: Kankao, leg. Z. KOBAYASHI, Juli. 1907, fl. ♂ (No. 5616); ibidem, leg. S. KAWAGOI, Oct. 1914, (fl. ♀ et fructus).

Near *P. lancifolia* HOOK. f.

Pilea minute-pilosa HAYATA sp. nov. Herba subsucculenta humilis 10-15 cm. alta. Caulis erectus basi paucè ramosus a basi sursum foliatus glaber. Folia opposita parva elliptico-ovata vel oblonga maxima 5½ cm. longa 2 cm. lata apice caudato-acuminata (acuminibus 1 cm. longis ad summum obtusis) basi obtusissima vel rotundata ad extremitatem basis minute cordata Λ -formia margine subintegra vel obscure minuteque crenulata in exsiccato membranacea in vivo crassiuscula 3-nervia, nervis lateralibus cum margine

parallelis prope basin acuminis evanescentibus, nervis supra impressis subtus elevatis, pagine supra (nervis exceptis) cystolithis minutissimis $\frac{3}{25}$ - $\frac{1}{5}$ mm. longis densissime conspersa subtus toto glabra, petiolis maximis $1\frac{1}{2}$ cm. longis teretibus glabris, stipulis triangularibus minutis axillaribus. Flores dioecii, masculini ignoti. Fl. foeminei cymosi, cyinis gracilibus glabris ad folia superiora axillaribus pedunculatis cum pedunculis 3-4 cm. longis ramosis ad nodos glomeratim floratis, ad nodos bracteatis, bracteis triangularibus minutissimis $\frac{1}{5}$ mm. longis obtusis; flores brevissime pedicellati, pedicellis $\frac{2}{5}$ mm. longis apice peltato-dilatatis cum flore articulatis, peltis fulvo-flavis; segmenta perianthii minutissima ignota. Achaenium fusco-rubescens ovatum obliquum complanatum lentiforme utrinque acutum muricatum. Semina conico-ovata apice acuta basi rotundata complanata $\frac{3}{5}$ mm. longa $\frac{13}{25}$ mm. lata, testa membranacea castanea; albumen paucum; embryo conico-ovatus complanatus $\frac{13}{25}$ mm. longus $\frac{9}{25}$ mm. latus apice acutus basi rotundatus; radícula coniformi apice acuta $\frac{6}{25}$ mm. longa cotyledones in longitudine aequans; cotyledonibus late rotundatis $\frac{6}{25}$ mm. longis $\frac{9}{25}$ mm. latis.

HAB. Pokupokusha, leg. U. MORI, Jun. 1912.

Differs from *P. kankaoensis* HAY., in having smaller leaves with much smaller vermiformed cystolithes on the upper surface.

Pilea ovatinucula HAYATA sp. nov. Herba subsucculenta 40-60 cm. longa glaberrima. Caulis erectus rectus sursum foliatus. Folia tenuissime membranacea ovato-oblonga vel ovato-lanceolata, mediocria 11 cm. longa 4 cm. lata apice acuminata, acuminibus linearibus $1\frac{1}{2}$ cm. longis 1-2 mm. latis ad summum obtusis, basi semper obtusa margine (basi acumineque integro excepto) serrulata, serrulis ascendentibus obtusis a se 4 mm. remotis brevissimis, 3-nervia, nervis supra tenuiter impressis subtus elevatis, ntraque pagine cystolithis vermiformibus $\frac{1}{10}$ - $\frac{1}{5}$ mm. longis minute conspersa, nervis lateralibus medio a margine 8 mm. distantibus cum margine subparallelis usque ad acuminem attingentibus et ibi evanescentibus, venis venulisque transverse reticulatis, petiolis $1\frac{1}{2}$ -3 cm. longis teretibus glabris, stipulis intra-axillaribus triangulari-cuspidatis castaneis membranaceis. Flores dioecii. Fl. ♀: spicato-paniculati, paniculis axillaribus 10-13 cm. longis glabris gracilibus erectis ramosis, ramis patentissimis; floribus secus rhachin spicatim glomeratim dispositis, bracteis minutis oblongo-triangularibus glabris.

Perianthium fructiferum 3-partitum, segmentis inaequalibus, segmento posteriore longiore $\frac{4}{5}$ mm. longo lineari dorso carinato intus concavo glabro, segmentis lateralibus ovato-triangularibus minoribus glabris; rudimenta staminum 3 crassa linearia $\frac{1}{2}$ mm. longa Ω -forme recurva. Achaenium elongato-oblongum $\frac{2}{3}$ mm. longum bicovexum sublaeve basi apiceque obtusum, stigmatibus apice ovarii oblique sito, pericarpio crustaceo; testa seminis membranacea; albumen paucum; embryo $\frac{1}{3}$ mm. longus.

HAB. Mt. Arisan, leg. B. HAYATA, Jan. 1912.

Distinguishable from *P. rotundinucula* by the oblong nutlets.

Pilea rotundinucula HAYATA sp. nov. Rhizoma repens longum teres; caulis ascendens suberectus 30-60 cm. longus glaber (subtetragnus?). Folia opposita in vivo herbaceo-crassiuscula in exsiccato rigido-chartacea lanceolata vel oblanceolata longe petiolata, maxima 21 cm. longa 5 cm. lata apice acuminata basi acuminate ad petiolum abeuntia margine subintegra remotissime mucronibus instructa trinervia, nervis angulo acuto a se divaricatis basi usque 5 mm. conjugatis, nervis lateralibus cum margine parallelis a margine 1 cm. distantibus, nervis in exsiccato utraque pagine elevatis, venis venulisque transverse reticulatis, utraque pagine cystolithis vermiformibus minutissimis $\frac{1}{10}$ mm. longis conspersa, petiolis 1-4 mm. longis subteretibus, stipulis intra-axillaribus ovato-triangularibus $1\frac{1}{2}$ mm. longis 1 mm. latis castaneis membranaceis. Flores monoecii vel dioecii: si monoecii floribus foemineis superioribus quam iis masculinis. Fl. ♂ cymosi, cymis axillaribus cum pedunculis 2-3 cm. longis glabris ramosissimis densiuscule floriferis, bracteis minutis ovato-triangularibus apice acutis vel obtusis, pedicellis ultimis $\frac{1}{5}$ -1 mm. longis glabris. Perianthium 4-lobatum glabrum, lobis glabris enuibus 2 mm. longis $1\frac{1}{4}$ mm. latis apice dorso brevissime globuloso-apiculatis haud carinatis. Stamina 4, lobis perianthii opposita, filamentis glabris linearibus 2 mm. longis $\frac{1}{2}$ mm. latis, antheris cordiformibus leviter latioribus quam longioribus apice basique 2-lobatis, loculis sursum arcte contactis basi late divaricatis. Rudimentum ovarii setuloso-conicum glabrum minutissimum. Fl. ♀ cymosi, cymis superioribus glabris. Perianthium fructiferum 3-partitum, segmentis 3 inaequalibus glabris, segmento posteriore oblongo-lineari $1\frac{1}{4}$ mm. longo glabro naviculiformi apice interiore recurvo dorso earinato intus concavo, segmentis lateralibus ovato-

triangularibus $\frac{2}{3}$ mm. longis $\frac{1}{2}$ mm. latis apice acutis intus concavis dorso sub apice globuloso-cornutis. Rudimenta staminum 3 crassa 1 mm. longa $\frac{1}{3}$ mm. lata Ω -forme recurva. Achaenium rotundatum 1 mm. in diametro apice basique oblique obtusum laeve biconvexum, stigmatibus ad apicem ovarii plus minus oblique sito breve pectinato, pericarpio crustaceo. Semina rotundata $\frac{2}{3}$ mm. longa, testa membranacea; embryo ignotus.

HAB. Mt. Arisan, prope Funkiko, Jan. 1912, leg. B. HAYATA.

Pilea Somai HAYATA sp. nov. Herba; caulis 50-60 cm. altus sursum plus minus recurvus supra sulcatus subglaber subsimplex. Folia opposita herbaceo-crassiuscula in exsiccatu rigido-membranacea lineari-lanceolata maxima 11 cm. longa $2\frac{1}{2}$ cm. lata apice acuminata basi subito cuneato-attenuata ad petiolum abeuntia margine subintegra remotissime mucronibus instructa trinervia, nervis lateralibus cum margine parallelis ab ea 2 mm. distantibus sursum prope apicem ad marginem attingentibus vel prope marginem evanescentibus, venis utroque latere costae numerosis transverse dispositis cum venulis transverse reticulatis, nervis lateralibus basi gradatim convergentibus cum costa ad petiolum abeuntibus, utraque pagina cystolithis vermiformibus $\frac{1}{5}$ - $\frac{1}{10}$ mm. longis regulariter conspersa; nervis supra haud elevatis haud impressis subtus planis; costa centrali 1 mm. lata subtus cystolithis $\frac{1}{10}$ - $\frac{1}{5}$ mm. longis longitudinaliter conspersa; petiolis $1\frac{1}{2}$ -2 cm. longis supra sulcatis, stipulis intra-axillaribus singulis cuspidiformibus castaneis membranaceis $1\frac{1}{2}$ mm. longis 2 mm. latis apice acutis. Flores dioecii. Fl. ♀ cymosi, cymis axillaribus pedunculatis cum pedunculis 4 cm. longis, pedunculis 2 cm. glabris bracteis minutis. Perianthium fructiferum 3-partitum, segmentis inaequalibus, duobus minoribus triangulari-rotundatis 1 mm. longis apiculatis valde concavis margine integris glabris, uno majore $1\frac{1}{3}$ mm. longo dorso carinato. Rudimenta staminum 3 segmentis perianthii opposita glabra 1 mm. longa crassiuscula Ω -forme recurvata. Achaenium rotundato-ovatum $1\frac{1}{2}$ mm. longum $1\frac{1}{4}$ mm. latum complanatum biconvexum apice obtusum basi oblique contractum apice infra apicem latere stigmatiferum, stigmate brevissime pectinato, pericarpio crustaceo-coriaceo castaneo minute rubro-punctato. Semina ovata apice acuminata basi truncato-rotundata $1\frac{1}{4}$ mm. longa $\frac{1}{2}$ - $\frac{2}{3}$ mm. lata glabra, testa membranacea; albumen paucum; embryo circ. $\frac{4}{5}$ mm. longus; radícula conica supra $\frac{1}{4}$ mm.

longa; cotyledonibus late rotundatis $\frac{2}{3}$ nun. latis totiusque longis.

HAB. Kusukusu, Jan. 1912, (fructus).

Near *P. smilacifolia* WEDD., (HOOK. f. Fl. Brit. Ind. V. p. 553).

Pilea taitoensis HAYATA sp. nov. Herba subsucculenta 30-60 cm. longa; caulis erectus haud ramosus sursum approximativim foliatus glaber. Folia opposita ovato-lanceolata vel oblongo-ovata interdum valde obliqua rarius aequalia 10-15 cm. longa 4-6 cm. lata apice subito acuminata caudato-acuminata (acuminibus 2 cm. longis ad summum obtusis falcato-recurvis vel rectis) basi rotundata obtusa vel cuneato-obtusa sed ad extremitatem basis semper minute cordata λ -formia obliqua vel aequalia margine integra tenuiter cartilagineo-marginata vel grosse undulata 3-nervia, nervis lateralibus cum margine parallelis prope basin acuminis evanescentibus a margine 6 mm-1 cm. distantibus, venulis transverse dispositis grosse reticulatis, pagine supra cystolithis minutis circ. $\frac{1}{5}$ mm. longis vermiformibus (nervis venis venulisque exceptis) conspersa, subtus glabra sed ad nervos cystolithis longitudinaliter dispositis conspersa, petiolis cystolithis longitudinaliter dispositis conspersis $\frac{1}{2}$ - $\frac{1}{7}$ -plo laminam foliorum aequantibus, stipulis axillaribus triangularibus brevioribus. Flores dioecii. Flores σ cymosi, cymis paniculiformibus ad axillas foliorum superiorum dispositis cum pedunculis 5-13 cm. longis gracilibus glabris laxe ramosis ad nodos bracteatis, (bracteis minutis late triangularibus $\frac{1}{5}$ mm. longis $\frac{3}{5}$ mm. latis), pedunculis 3-7 cm. longis rectis erectis; flores ad nodos glomeratim dispositi brevissime pedicellati glabri, pedicellis circ. $\frac{3}{5}$ mm. longis glabris apice leviter dilatatis flavis cum flore articulatis. Perianthium glabrum 4-lobatum, tubo obconico $\frac{3}{4}$ mm. longo totiusque lato, lobis oblongo-linearibus $1\frac{1}{3}$ mm. longis $\frac{2}{3}$ mm. latis apice obtusissimis apice rotundatis vel obtusissimis dorso infra apicem plus minus callosis. Stamina 4, ad basin loborum sita, filamentis glabris complanatis linearibus cum lobo aequilongis $\frac{2}{3}$ mm. latis membranaceis multo fusco-rubro-striatis, antheris Ω -formibus, loculis basi divaricatis, dorso infra apicem glandula singula instructis.

HAB. Taito: Haroye, leg. Z. KOBAYASHI, Oct. 1907, (No. 6008), fl. σ , typus.

Somewhat comparable with an Indian *P. lancifolia* HOOK. f. (Fl. Brit. Ind. V. p. 553), but widely different from it in having quite entire and fleshy

leaves. Also near *P. kankaoensis* HAYATA, but distinguishable from it by the much larger oblique leaves and by the much longer and spreading panicles with pedicellate flowers. The cystolithes on the surface of the leaves of *P. taitoensis* are much shorter than those of *P. kankaoensis*.

Lecanthus WEDD.

Lecanthus Sasakii HAYATA sp. nov. Herba subsucculenta glabra ramosa. Caulis glaber 30-40 cm. longus foliosissimus ramosus basi plus minus repens ad nodos radicans, ramis et ramulis gracilibus tenuibus repentibus ad nodos radicanibus. Folia opposita longe petiolata membranacea oblongo-ovata maxima 11 cm. longa minima 4 cm. longa 22 mm. lata apice caudata (caudis linearibus 8 mm. longis 2-3 mm. latis apice acuminatis) basi cordata rotundata truncata vel triangulari-acuta margine prope basin et in cauda integra caeterum argute serrata, (serris mediis ascendentibus rotundatis triangularibus 3 mm. latis 2 mm. longis ab apice usque ad apicem 4 mm. distantibus apice breve cuspidatis sed haud aristatis) margine tota sub lento minute brevissime ciliolata trinervia, nervis lateralibus extrorsum venuliferis, venulis arcuatis ad apicem serrarum attingentibus, pilis rigidis calcareis $\frac{4}{5}$ mm. longis $\frac{4}{25}$ mm. latis 3-cellularibus liberis prope marginem ad paginam superiorem sparsissime dispositis, pagina supra pilis $\frac{1}{5}$ mm. longis densiuscule conspersa, subtus nervis venis exceptis glabra, nervis et venis pilis liberis conspersis, petiolis laminam foliorum in longitudine $\frac{1}{6}$ -plo aequantibus intus sursum plus minus sulcatis glabris, stipulis scariosis tenuissimis membranaceis subhyalinis axillaribus triangulari-ovatis 4 mm. longis $2\frac{1}{2}$ mm. latis apice obtusis basi caulem semi-amplectantibus intus glabris margine ciliatis extus pilis liberis conspersis. Flores ♀ capiculati, capitulis solitariter axillaribus subpeltiformibus 1- $\frac{1}{2}$ cm. in diametro pedunculatis (pedunculis circ. 1 cm. longis glabris) bracteis 1-2-seriatim dispositis involucre) involucri bractee late triangulares glabrae apice acutae versus apicem rubro-punctatae; bracteolae vel paleae ad receptaculum minutae lanceolatae vel lineares 1 mm. longae $\frac{1}{5}$ mm. late glabrae acuminatissimae; flores sessiles vel pedicellati, (pedicellis 1-2 mm. longis crassis glabris). Perianthii fructiferi segmenta 4 linearia $1\frac{1}{2}$ mm. longa $\frac{1}{2}$ mm. lata apice obtusa basi haud contracta utraque glabra dorso infra apicem brevissime cornuta, cornibus callosiformibus obtusissimis. Staminodia in fiore fructifero 3 hyalina

crassissima linearia $1\frac{1}{3}$ mm. longa $\frac{1}{2}$ mm. lata cum segmentis opposita apice triangulari obtusa Ω -formiter recurvata glaberrima. Achaenium fusco-rubescens ovoideum vel ellipsoideum 1 mm. longum $\frac{1}{2}$ - $\frac{2}{3}$ mm. latum glabrum laeve vel minuto obscureque muricatum utrinque obtusum apice stigmatem minuto coronatum basi stipite $\frac{1}{10}$ mm. longo stipitatum. Seminis testa fusco-rubescens membranacea elegante minuteque tuberculato-punctata; albumen paucum; embryo umplis ovoideus plus minus complanatus; radícula obconica cotyledones in longitudine $\frac{3}{4}$ -plo aequans apice obtusa basi ad cotyledones abeuns haud contracta. *Lecanthus Wightii* HAYATA Fl. Mont. Formos. p. 197, (non WEDD.).

HAB. in monte Arisan, Jan. 1912, leg. B. HAYATA et S. SASAKI.

Near *Lecanthus Wightii* WEDD., but distinguishable from it by the shortly tailed leaves.

Pellionia GAUDICH.

Pellionia arisanensis HAYATA sp. nov. (Fig. 6.) Caulis basi procumbens ad nodos radicans tetragonus sursum ascendens densissime brevissime hirsutus sursum foliatus. Folia alterna oblique ovato-oblonga vel oblonga circ. 3 cm. longa 1 cm. lata apice caudato-acuminata ad summum obtuso-acuta basi valde obliqua latere superiore obtusa fracta latere inferiore minute cordata vel rotundata vel subauriculata margine basi apice exceptis acute serrata, serris ascendentibus acutis utroque latere 4-5 a se remotis, pagine utraque subglabra; petiolis 3 mm. longis, stipulis singulis extra-axillaribus setiformibus latere superiore caulis sitis. Flores monoecii vel dioecii; flores masculini cymosi, cymis ad folia superiora solitariter axillaribus cum pedunculis $1\frac{1}{2}$ -2 cm. longis 1-2 cm. latis (pedunculis circ. 1 cm. longis basi bracteis minutis 2-3 instructis apice dense floriferis) sub lente minute hirsutis versus apicem ramosissimis, ramis hirsutis, pedicellis ultimis glabris 1- $1\frac{1}{2}$ mm. longis basi bracteis singulis instructis, bracteis lineari-lanceolatis 3 mm. longis $\frac{3}{4}$ mm. latis apice acutis utraque pagine glabris basi haud contractis dorso infra apicem cornu singulo instructis, cornibus latere complanatis $\frac{1}{3}$ mm. longis triangularibus dorso plus minus carinatis; pedicellis persistentibus apice cum flore caducissimo articulatis. Alabastrum floris subglobosum versus apicem 5-cornutum glabrum. Fl. ♂ : perianthium floris apertientis 5-fidum 4 mm. in diametro pallidum extus viridescens intus album, tubo brevi 1 mm. in diametro, lobis patentissimis

5, 3 interioribus latioribus oblongis 2½ mm. longis 1½ vel 1⅔ mm. latis apice obtusissimis vel truncatis vel acutis basi haud contractis margine erosio concavis dorso medio tenuiter carinatis infra apicem supra medium dorso 1-cornutis, cornibus 1 mm. longis latere complanatis deorsum recurvis unciformibus, lobis 2 exterioribus angustioribus spathulato-linearibus 2 mm. longis 1 mm. latis apice truncatis vel obtusissimis vel acutis infra apicem 1-cornutis. Stamina 5 lobis perianthii opposita, filamentis basi loborum affixis liberis glabris et iis aequiflongis, antheris

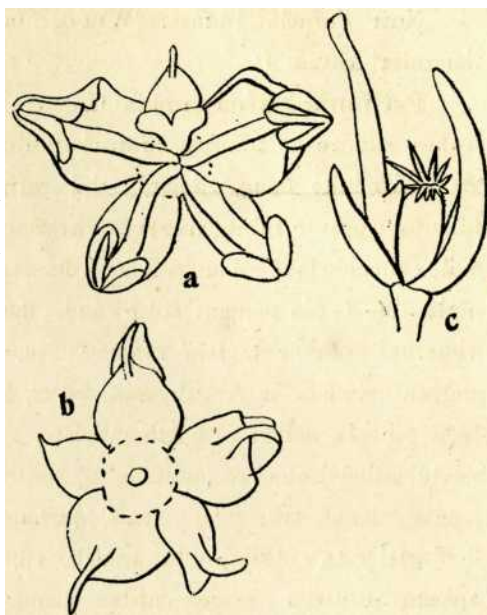


Fig. 6, *Pellionia arisanensis* HAYATA; a, a male flower; b, the same, seen from back; c, a female flower.

^-formibus albis, loculis oblongo-linearibus 1 mm. longis apice se contactis basi in angulo 30°-45°divaricatis. Rudimentum ovarii nullum. Flores foeminei densissime cymosi; cymae subcapituliformes patelliformes bracteis linearibus oblongis 1-2 mm. longis ½-1 mm. latis multis involucratae circ. 5 mm. in diametro ∞-floratae subsessiles vel brevissime pedunculatae (pedunculis 1 mm. longis brevissime hirsutis); cymis ramosissimis, ramis brevissimis, pedicellis ultimis ½ mm. longis vel nullis glabris. Perianthium 4-5-fidum, segmentis 2-exterioribus minoribus 3-interioribus majoribus totis erectis apertientibus, exterioribus linearibus ½ mm. longis 1/5 mm. latis apice acutis vel obtusis concavis erectis rectis glabris dorso haud carinatis, interioribus 2-3 plus minus longioribus linearibus apice acutis vel obtusis valde concavis dorso infra apicem longissime cornutis, cornibus circ. 1 mm. longis teretibus viridibus. Rudimenta staminum 5 minutissima pulviniformia. Ovarium ellipsoideum ⅓ mm. longum glabrum utrinque obtusum, stigmate sessili pectinato-penicillato. Fructus ignotus.

HAB. Mt. Arisan, leg. B. HAYATA, inter Heishana et Nimandaira, Mart. 1914.

Near *Pellionia radicans* WEDD. ; but distinguishable from it in the much narrower leaves.

Pellionia okinawensis HAYATA sp. nov. Herba basi procumbens ad nodos radicans, radicibus fibrosis filiformibus, sursum ascendens. Caulis circ. 20 cm. longus haud ramosus vel rarius pauci-ramosus dense brevissimeque hirsutus (pilis retrorse recurvis brevissimis $1/25$ - $2/25$ mm. longis) sursum foliatus. Folia alterna brevissime petiolata dorsiventraliter disposita ovata vel oblongo-ovata $2\frac{1}{2}$ - $3\frac{1}{2}$ cm. longa 13-16 mm. lata apice recto-elongato-triangularia ad summum obtusissima basi valde obliqua latere inferiore valde rotundata vel anguste cordata auriculiformia latere superiore recto-cuneata ad extremitatem basis obtusa margine haud ciliolata grosse serrata, (serris subcreniformibus ascendentibus obscure aristatis a sinibus mediis ad sinus proximos 6 mm. longis), haud trinervia, venis primariis lateralibus utroque latere costae 3-4 basi rectis medio subito arcuatis cum iis superioribus junctis, venulis prope apicem serrarum evanescentibus haud attingentibus, costis venis venulisque supra haud elevatis haud impressis subtus leviter elevatis, pagina supra subglabra, subtus venis venulis sparse hirsutis exceptis glabra, petiolis 2-3 mm. longis minutissime hirsutis, stipulis extra-axillaribus singulis linearibus $1\frac{1}{2}$ mm. longis acuminatis crassiusculis facie dorsali caulis sitis. Flores dense cymose dispositi; cymae densissime floriferae subcapituliformes sed haud involucreatae in ambitu rotundate 5-6 mm. in diametro solitariae pedunculatae, (pedunculis 5 mm. -10 mm. longis dense brevissime pilosis, pilis $1/25$ mm. longis descendente-patentibus); floribus pedicellatis, pedicellis $\frac{1}{2}$ mm. longis glabris basi bracteatis et bracteolatis, bracteis linearibus 3 mm. longis acutis intus glabris extus paucissime hirsutis, bracteolis angustissimis. Perianthii fructiferi segmenta 5, angustissime linearia erecta, 2-exterioribus minoribus, 3-interioribus majoribus ; exterioribus $1-1\frac{1}{3}$ mm. longis apice acuminatis $1/5$ mm. latis glabris dorso haud cornutis margine minute remoteque glanduloso-ciliolatis; interioribus dorso infra apicem longe cornutis, cornibus teretibus linearibus 1 mm. longis $1/10$ mm. latis. Rudimenta staminum 5 minuta inconspicua linearia $\frac{1}{3}$ mm. longa Λ -forme recurva. Achaenium ellipsoideum $1\frac{1}{3}$ mm. longum $\frac{3}{4}$ mm. latum apice obtusissimum basi subito acutum brevissime stipitatum prominente botrioideo-tuberculatum, (tuberculis apice rubro-maculatis $2/25$ mm. longis totius-

que latis latere complanatis); testa seminis membranacea fusco-rubescens; albumen paucum; embryo amplus dorso complanatus; radícula obconica; ad cotyledones abeuns.

HAB. Okinawa, leg. Y. TASHIRO, Mart. 1889.

Near *P. arisanensis* HAYATA, but distinguishable from it by the not caudate leaves, and by the pedunculate female inflorescence.

Pellionia trilobulata HAYATA Mater. Fl. Formos. p. 280. Descriptio aucta :—Flores dioecii. Fl. ♂ : dense cymosi; cymae subcapiculiformes bracteis involucratae pedunculatae axillares solitariae, pedunculis 6 mm. longis glabris erectis; bracteis inferioribus oppositis ovatis 3 mm. longis apice obtusis intus glabris extus hirsutis dorso carinatis (carinis sub apice ad cornuem productis, cornibus $\frac{1}{5}$ mm. longis obtusis) basi cum iis oppositis connatis margine ciliatis. Flores apertientes pedicillati, pedicellis $1\frac{1}{2}$ mm. longis apice cum flore articulatis. Perianthium : tubo breve obconico $\frac{1}{2}$ mm. longo $1\frac{1}{2}$ mm. in diametro, limbo 4-partito, partibus 2 exterioribus leviter minoribus oblongis 2 mm. longis $1\frac{1}{2}$ mm. latis apice obtusis basi contractis margine integris valde concavis dorso carinatis sub apice cornutis, cornibus circ. 1 mm. longis erectis vel interiore uncinato-recurvis, extus sparse hirsutis, partibus 2 interioribus leviter majoribus cum exterioribus conformibus sed margine sub microscopio minute erosis dorso carinatis cornutis. Stamina 4 segmentis perianthii opposita, filamentis basi segmentorum oriundis ad 1 mm. cum segmentis connatis caeterum liberis linearibus vittaeformibus 2 mm. longis $\frac{1}{2}$ mm. latis valde complanatis glabris, antheris 2-locularibus, loculis linearibus 1 mm. longis $\frac{1}{4}$ mm. latis apice contactis caeterum separatis divergentibus interiore alatis. Rudimentum ovarii nullum.

HAB. inter Heishana et Nimandaira, leg. B. HAYATA, April. 1914, (fl ♂).

Pellionia Tashiroi HAYATA sp. nov. Herba humilis basi procumbens ad nodos radice sursum ascendens, partibus ascendentibus 6-7 cm. longis. Caulis pauci-ramosus densissime brevissimeque hirsutus sursum foliatus. Folia alterna ovato-oblonga vel oblonga $1\frac{1}{2}$ cm. longa 1 cm. lata apice obtusa basi valde obliqua latere superiore obtusa plus minus fracta latere inferiore minute cordata vel rotundata, in latere inferiore latiora quam in latere superiore, pagina

supra subglabra pilis calcareis circ. $\frac{2}{5}$ mm. longis sparsissime conspersa subtus venis nervis sparse hirsutis exceptis glabra margine crenato-serrata, serris ascendentibus utroque latere 4-5 obtusissimis haud ciliatis, petiolis 1-2 mm. longis, stipulis singulis extra-axillaribus linearibus 1 mm. longis setiformibus glabris latere superiore caulis sitis. Flores dioecii. Flores foeminei ad axillas dense fasciculati, fasciculis capituliformibus subsessilibus vel brevissime pedunculatis (pedunculis $\frac{1}{4}$ mm. longis) 2 mm. in diametro bracteis multis involu-cratis; bracteis lanceolatis 1 mm. longis $\frac{1}{2}$ mm. latis acuminatis intus glabris basi plus minus contractis extus glabris patentibus; bracteis inter flores cum iis involucri aequiformibus; bracteolis floris minoribus; flores brevissime pedicellati vel sessiles. Segmenta perianthii 5, 3-majoribus, 2-minoribus; minoribus $\frac{1}{2}$ mm. longis linearibus haud cornutis; majoribus dorso infra apicem cornutis cum cornibus $\frac{2}{3}$ mm. longis. Ovarium minutissimum, stigmate terminali pectinato-penicillato.

HAB. Loochoo, leg. Y. TASHIRO, Mart. 1887.

Remarkable for the smaller heads of the female flowers.

Elatosterna FORST.

Elatostema herbaceifolia HAYATA sp. nov. Herba tenuis gracilis 50-60 cm. longa. Caulis gracillimus scandens glaber sursum remote foliatus. Folia alterna remote disposita tenuiter membranacea obovato-lanceolata vel ovato-lanceolata maxima 14 cm. longa 4 cm. lata apice caudato-acuminata, (acuminibus linearibus $3\frac{1}{2}$ cm. longis medio 4 mm. latis integris) basi obliqua obtusa latere superiore recto-angusto-cuneata, latere inferiore rotundata vel obtusa, latere superiore medio 16 mm. lato, latere inferiore medio 24 mm. lato, margine basi acumineque excepto grosse serrata (serris late triangulari-acutis apice subobtusis breve cuspidiformibus 9 mm. latis $2\frac{1}{2}$ mm. longis ascendentibus) venis nervisque tenuissimis, pagine supra pilis liberis $\frac{2}{3}$ mm. longis sparsissime cystolithis $\frac{1}{5}$ mm. longis vermiformibus toto regulariter conspersa, pagina subtus haud lepidota sed cystolithis vermiformibus conspersa, pilis liberis nullis, petiolis brevissimis 2 mm. longis, stipulis caducissimis lanceolatis membranaceis 4 mm. longis acutis gemmam involventibus demum deciduis. Flores dioecii. Fl. ♀: dense capitulati, capitulis axillaribus solitariis peltiformibus densissime brevissime villosis pedunculatis, pedunculis 2 mm. longis, receptaculis

capituli peltiformibus rotundatis 7-8 mm. in diametro supra leviter convexis subtus leviter concavis margine bracteis exterioribus 5 majoribus linearibus 2 mm. longis et interioribus linearibus minoribus $\frac{1}{2}$ mm. longis multis involueratis ; paleae inter flores densissime dispositae lineari-spathulatae $\frac{1}{2}$ - $\frac{1}{3}$ mm. longae $\frac{1}{8}$ - $\frac{1}{5}$ mm. latae apice truncatae et dense piloso-setulosae ; flores brevissime pedicellati, pedicellis $\frac{1}{10}$ mm. longis glabris; perianthium fl. ♀ minutum $\frac{1}{20}$ mm. longum $\frac{1}{10}$ mm. latum 3-4-lobatum, lobis linearibus. Ovarium ovoideum $\frac{1}{5}$ mm. longum, stigmate sessile pectinato.

HAB. Formosa, loco non indicate : Description above given is drawn from premature flowers. It is desirable to repeat the description when perfect materials are collected. Near *Elatostema lineolatum* WIGHT, but distinguishable from it in having much thinner leaves and quite glabrous branches.

Elatostema lineolatum WIGHT var. **major** THW. ; MATSUM. et HAYATA Enum. Pl. Formos. p. 384. Herbaceo-suffrutescens 60 cm. altus, ramis et ramulis teretibus fuscentibus densissime brevissime hirsutis (pilis transverse patentibus vel descendentibus) sursum foliatis. Folia alterna obovato-lanceolata vel oblanceolata membranacea sessilia vel brevissime petiolata 6-10 cm. longa 2-3 cm. lata apice caudato-acuminata (acuminibus 1-2 $\frac{1}{2}$ cm. longis basi 4 mm. latis ad summum aristato-acuminatis) basi plus minus obliqua recto-cuneato-acuminata ad extremitatem obtusa margine medio deorsum integra medio sursum grosse serrata, (serris latere superiore 2-3 latere inferiore 5, triangulari-acutis apice breve cuspidatis), venis lateralibus primariis utroque latere costae 4-5 a costa angulo acuto egressis, costis venisque supra planis subtus elevatis, pagine supra pilis liberis $\frac{2}{5}$ mm. longis et cystolithis brevissimis $\frac{1}{5}$ mm. longis vermiformibus conspersa, pagina subtus ad venas nervosque pilis liberis hirsuta, petiolis brevissimis 2 mm. longis adpresse hirsutis vel subnullis, stipulis linearibus 7 mm. longis singulis 1 mm. latis apice acuminatis aristatis hirsutis castaneis membranaceis extra-axillaribus latere superiore caulis sitis. Flores dioecii. Fl. ♀: ad axillas foliorum fasciculati; fasciculi solitarii basi bracteis castaneis 3-4 lanceolatis 1-2 mm. longis medio carinatis acuminatis margine ciliatis instructi capituli formes peltiformes 6 mm. in diametro bracteis 4-5 exterioribus majoribus involucrati, bracteis involucralibus majoribus plus minus connatis late ovatis 2 mm. latis totiusque longis apice obtusis vel acutis

dorso extus dense hirsutis intus glaberrimis, interioribus minoribus; bracteae inter flores (vel paleae) in forma variabilissimae lineares obovatae vel oblongae vel spathulatae intus glabrae extus apice dense pilosae circ. 2 mm. longae; pedicellis 2 mm. longis apice cum flore articulatis glabris. Perianthium 4-lobatum, tubo brevissimo, lobis lineari-oblongis $1\frac{1}{2}$ mm. longis $1\frac{1}{2}$ mm. latis apice obtusis extus dorso sub apicem breve cornutis basi haud contractis intus glabris extus versus apicem longe pilosis. Stamina 4 cum lobis perianthii opposita, filamentis a basi loborum liberis 2 mm. longis. Rudimentum ovarii glabrum minutum vel subnullum.

HAB. Mt. Arisan, leg. B. HAYATA, Jan. 1912.

Elatostema microcephalantha HAYATA sp. nov. Herba. Caulis basi repens radicans sursum ascendens 10-20 cm. longus breve hirsutus (pilis adpresso-ascendentibus circ. $\frac{1}{5}$ mm. longis), sursum foliatus, partibus caulis foliiferis plus minus flexuosis. Folia alterna herbaceo-membranacea a se $\frac{1}{2}$ -1 cm. remota ovata valde obliqua 2 cm. longa 13-14 mm. lata apice obtusa basi valde obliqua latere superiore cuneato-obtusa in latere inferiore rotundata vel rotundato-cordata medio latere superiore 5 mm. lata in latere inferiore 8 mm. lata margine partibus basilaribus exceptis grosse serrata, serris ascendentibus apice rotundatis vel obtusissimis mediis a se (ab sinu ad sinus) 5 mm. distantibus basi 5 mm. latis 3 mm. longis, subtrinervia vel obscure trinervia, nervis cum venis grossissime reticulatis, nervis venisque supra valde impressis subtus elevatis, venis ad apicem serrarum attingentibus, pagina supra marginibus exceptis glabra, margine ciliolata, pagina subtus sparsissime hirsuta, petiolis brevissimis 1 mm. longis hirsutis supra sulcatis, stipulis dimorphis, alteris extra-petiolaribus linearibus apice acutis $1\frac{1}{3}$ mm. longis $\frac{1}{3}$ mm. latis crassiusculis extus hirsutis intus glabris, alteris intra-petiolaribus triangulari-oblongis $\frac{2}{3}$ mm. longis $\frac{1}{2}$ mm. latis acutis membranaceis subglabris. Flores ♀ capitulati, capitulis solitariis axillaribus peltiformibus 3-4 mm. in diametro pedunculatis, pedunculis 2-3 mm. longis glabris. Involucrum subpeltiforme margine bracteis circ. 3-seriatim dispositis involucreto, bracteis exterioribus 5 latioribus oblongo-triangularibus acutis vel obtusis 1 mm. longis margine setulosis utraque pagine glabris, interioribus gradatim angustioribus, intimis linearibus apice margineque setulosis, bracteolis vel paleis inter flores sitis spathulatis circ. 1 mm. longis $\frac{1}{3}$ mm. latis

apice obtusis margine apiceque setulosis intus glabris extus dorso versus apicem plus minus setulosis deorsum glabris interdum valde angustatis lineari-filiformibus. Capitula unisexualia ; receptaculum subplanum glabrum ; flores pedicellati, pedicellis glabris $\frac{1}{2}$ mm. longis $\frac{1}{4}$ mm. crassis crassiusculis. Fl. ♀ minutissimi $\frac{1}{2}$ mm. in diametro: segmenta 3 triangularia vel linearia eirc. $\frac{1}{5}$ mm. longa versus apicem rubro-punctata; staminodia 3 segmentis perianthii opposita $\frac{1}{2}$ - $\frac{1}{3}$ mm. longa $\frac{1}{4}$ - $\frac{1}{5}$ mm. lata linearia vermiformia Ω -forme recurva infra achaenium insita. Achaenium ovoideo-ellipsoideum $\frac{3}{5}$ mm. longum $\frac{2}{5}$ mm. latum apice obtusum ad summum stigmatem penicillato minuto coronatum basi acutum stipite minute $\frac{1}{25}$ mm. longo obconico stipitatum sublaeve vel minute tuberculatum haud echinatum haud muricatum. Semina ovoideo-ellipsoidea; testa membranacea; albumen nullum; embryo amplius haud vel vix complanatus elliptico-obovoideus; radícula supra coniformi basi gradatim ad cotyledones abeunt cotyledones in longitudine $\frac{3}{4}$ -plo aequans; cotyledones crassae oblongae.

HAB. Mt. Arisan, leg. B. HAYATA, Jan. 1912. From the position of the seed and embryo, it is justly considered that the ovules are erect and orthotropous. Near *Elatostema sessile*, but differs from it by the smaller leaves.

Elatostema minutum HAYATA (Fig. 7) Fl. Mont. Formos. p. 198 t. 36. Descriptio aucta:—Fl. ♂ : cymosi, cymis axillaribus solitariis glabris capituliformibus breve pedunculatis, pedunculis 1 mm. longis basi minute bracteatis; cymis 6-floratis rarius 10-floratis bracteis et bracteolis involucratis, bracteis ordinis I. late rotundatis 2 mm. longis totiusque latis apice rotundatis infra apicem dorso brevissime cornuto-apiculatis margine minute ciliolatis utraque pagine glabris valde concavis; bracteis ordinis II. oblongo-naviculiformibus 2 mm. longis explicato totiusque latis apice 2-lobatis vel rotundatis dorso apice hirsutis margine apice ciliolatis deorsum haud ciliolatis intus glaberrimis, bracteis ordinis III. (vel bracteolis) obovato-cuneatis 2 mm. longis 1 mm. latis apice rotundatis latissimis leviter 2-lobatis apice margine ciliolatis caeterum haud ciliolatis; pedicellis florum $1\frac{1}{2}$ mm. longis glabris haud bracteatis. Perianthii lobi 5, lobis obovato-

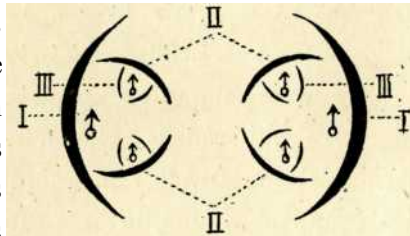


Fig. 7, *Elatostema minutum* HAYATA; a diagram of a male inflorescence.

linearibus 1 mm, longis $\frac{2}{3}$ mm. latis apice rotundatis ciliatis vel haud ciliatis intus concavis vel haud concavis dorso infra apicem cornutis vel haud cornutis. Stamina 5 cum lobis perianthii opposita, filamentis linearibus $1\frac{1}{2}$ mm. longis dorso complanatis, antheris ovato-oblongis $\frac{1}{2}$ mm. longis. Rudimentum ovarii 0.

HAB. Arisan, 2500 m. alt., Juni. 1914, U. FAURIE, (NO. 612).

Chamabaina WIGHT.

Chamabaina Morii HAYATA Mater. Fl. Formos. p. 282. Descriptio aucta: Flores dioecii. Fl. ♀: ad nodos ad axillas stipularum fasciculati brevissime pedicellati, pedicellis $\frac{1}{5}$ mm. longis basi bracteatis, bracteis ovato-oblongis $\frac{4}{5}$ mm. longis $\frac{2}{3}$ mm. latis apice obtusis intus glabris extus hirsutis castaneis apice setulis 2-3 instructis membranaceis, bracteolis lanceolatis $\frac{2}{3}$ mm. longis extus hirsutis. Perianthium obovoideo-urceolatum $\frac{2}{3}$ mm. longum $\frac{1}{2}$ mm. latum apice valde contractum brevissime rostratum ore 2-3-lobatum vel elobatum extus setuloso-hirsutum intus glabrum basi obtusum. Staminodia toto obsoleta. Ovarium ellipsoideum cum rostris $\frac{4}{5}$ mm. longum $\frac{1}{3}$ mm. latum, rostro (vel stylo) $\frac{1}{5}$ mm. longo apice peltatim dilatato, pelta (vel stigmatem) margine longe fimbriata. Achaenium maturum perianthio complete obtectum oblongum biconvexum $\frac{4}{5}$ mm. longum $\frac{1}{2}$ mm. latum rubescens nitidum apice latere uno prominente latere uno minus carinatum apice breve stylo brevissimo apiculatum basi obtusum, pericarpio crustaceo. Seminis testa membranacea; albumen paucum; embryo $\frac{2}{3}$ mm. longus; radícula oblongo-conica; cotyledonibus oblongis.

HAB. Mt. Hanpofukuzan, leg. T. SUMA, Dec. 1914, fr.

Juglandaceae.

Engelhardtia LESCH.

Engelhardtia formosana HAYATA n. n. *Engelhardtia spicata* BLUME var. *formosana* HAYATA Fl. Mont, Formos. p. 199. Descriptio aucta: Flores monoecii. Fl. ♂: spicato-paniculati, paniculis terminalibus pauci-ramosis, ramis simplicibus circ. 10 cm. longis gracillimis recurvo-cornutis spicatum florigeris, rhachibus dense lepidotis, lepidibus rotundatis $\frac{2}{25}$ mm. in diametro medio rotundato-elevatis margine integris, pedicellis subnullis, bracteis nullis, floribus a se 2-3 mm. remotis. Perianthium 3-4-partitum, partibus apice margineque

valde concavo-recurvis sacciforme globosis 1½ mm. in diametro extus dense lepidotis intus glabris. Stamina 8-10, antheris sessilibus oblongo-globosis ½ mm. longis ⅓ mm. latis utrinque emarginatis glabris. Rudimentum ovarii nullum. Fl. ♀: paniculae rami graciles basi ascendentes sursum subcernui bracteis nullis; flores pedicellati, pedicellis 2 mm. longis dense lepidotis transverse insitis, floribus ascendo-erectis; bractea 3-fida crassiuscula extus dense lepidota margine et intus densissime tomentosa, segmento anteriore longissimo lineari 1½-2 mm. longo ½ mm. lato, segmentis lateralibus brevioribus 1 mm. longis ⅔ mm. latis obtusis, totis intus densissime stellatis. Ovarium inferum 1⅓ mm. longum 1 mm. latum densissime lepidotum apice basique plus minus constrictum cum tubo perianthii connatum, lobis perianthii 4 linearibus crassiusculis 1½ mm. longis ½ mm. latis apice obtusis margine apiceque valde interiore recurvis sacciformibus extus sparse lepidotis. Styli brevissimi ¼ mm. longi 2-fidi, ramis divaricatis apice 2-lobis, lobis uncinato-recurvis stigmatosis; ovarium 2-loculare.

HAB. Uraisha, leg. S. SASAKI, Aug. 1910; ibidem, leg. B. HAYATA, Juli. 1912, fl. ♀ et ♂.

Cupuliferae.

Carpinus LINN.

Carpinus hogoensis HAYATA sp. nov. Arborescens; ramulis fusuo-purpurascensibus laevibus gracillimis, lenticellis minutis sparsissimis vel nullis. Folia membranacea vel membranaceo-chartacea alterna ovato-lanceolata 8 cm. longa 27 mm. lata apice triangulari-acuminata vel gradatim acuminatissima basi leviter cordata supra basin latissima margine simpliciter vel duplicatim serrulata, serrulis ascendentibus late triangularibus latere interiore serrulis secundariis unis instructis apice rectis vel interiore recurvis, utraque pagine hirsuta sed ad costas et venas sparse hirsuta subtus ad axillas inter costam et venae pilis dense fasciculatis instructa, costis et venis supra haud vel vix elevatis, subtus distincte manifesteque elevatis, venis primariis lateralibus utroque latere costae 15-17 rectis mediis a costa angulo 45° egressis usque ad apicem rectis prope apicem subito arcuatis ascendentibus ad apicem serrularum attingentibus, petiolis 17 mm. longis teretibus glabris vel sparse hirsutis haud sulcatis.

Spicae fructiferae terminales cum pedunculis 5-10 cm. longis nutantes, pedunculis 2-3 cm. longis, fructibus oppositis, jugis 1 cm. remotis, bracteis cultriformibus vel semi-ovatis 10-13 mm. longis 4-5 mm. latis apice acutis obtusis basi obtusissimis vel rotundatis basin achenii haud vel vix amplectantibus extus deorsum hirsutis intus subglabris margine latere interiore rectis integris, latere exteriori serratis curvis, latere interiore angustiore latere exteriori latiore costis et venis utraque pagine elevatis reticulatis, reticulis utraque pagine elevatis. Achaenium leviter complanatum ovato-rotundatum 3 mm. longum totiusque latum apice obtusissimum basi truncato-rotundatum minute pubescens sursum versus apicem barbatur reliquis stylorum apice coronatum facie circ. 10-costatum.

HAB. Musha: Hugo, ad 3500 ped. alt., leg. B. HAYATA, Aprili. 1916.

Near *C. Kawakamii* HAYATA, but separable from it by the elongate ovate-oblong leaves which are always cordate at the base.

Carpinus rankanensis HAYATA sp. nov. (Pl. X. et fig. 8.) Arbor. Ramuli fuscentes minute lenticellati, lenticellis fulvescentibus leviter elevatis verticaliter elongatis vel linearibus, ramulis ultimis laevibus fulvescentibus glabris. Folia decidua alterna viridia membranaceo-chartacea ovato-oblonga 8-10 cm. longa 3-4 cm. lata apice subito acuminata vel caudata basi profunde cordata margine irregulariter serrulata, serrulis ascendentibus ad apicem aristis superiore recurvis instructis, costis venisque supra impressis subtus elevatis supra ad costam hirsuta caeterum glabra, subtus ad costam venasque pilosa, pilis adpressis rectis mollis caeterum glabra, venis lateralibus parallelis utroque latere costae 20-25 a se 3-4 mm. distantibus rectis ad marginem attingentibus, petiolis 5-10 mm. longis glabris.

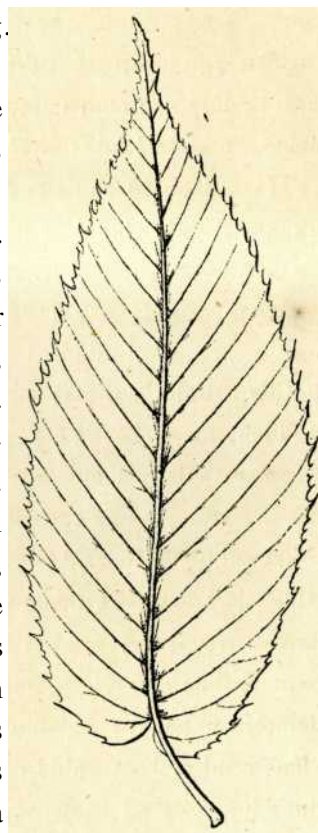


Fig. 8, *Carpinus rankanensis* HAYATA.

Amenta fructifera terminalia pendula cylindrico-linearia 10-12 cm. longa 2 cm. lata, pedunculis 2-3 cm. longis gracilibus deorsum recurvis hirsutis sursum bracteis 4-5 instructis; amenta longe cylindrica 10-12 cm. longa 18 mm. lata, bracteis fructiferis dense imbricatis plus minus oblique ovatis 13 mm. longis 7 mm. latis basi auriculato-plicatis achaenium firme amplectantibus basi dense barbatis utraque pagine elevato-reticulatis utraque pagine hirsutis margine pauciserratis. Achaenium prematurum 10-costatum glabrum apice barbatur stigma-tibus linearibus 2 coronatum.

HAB. Kankanzan, ad 4000 ped. alt., leg. B. HAYATA, Mai. 1916.

Near *Carpinus japonica*, but differs from it in the much longer and narrower fruiting catkins.

Quercus LINN.

Quercus longicaudata HAYATA Ic. Pl. Formos. III. p. 182. Descriptio aucta : Fructus cum cupulis conico-pyramidalis 1 cm. longus 9 mm. latus apice conico-acutus basi subtruncatus stipitatus, stipitibus 3 mm. longis. Glans coniformis subtriangularis in sectione apice acuta basi trimcata tenuiter hirsuta vel glabra castanea cupula complete inclusa, cupula coriaceo-crustacea sparse muricata.

HAB. Daibu, leg. S. NAKAI, Dec. 1912. (Fr.)

Quercus Sasakii KANEHIRA sp. nov. Arbor; ramuli teretes fusco-purpurascens minute laxiusculeque lenticellati haud rugosi, lenticellis rotundatis elevatis. Folia coriacea oblongo-oblancoolata vel obovato-oblonga vel oblonga 7-11 cm. longa 2½-3½ cm. lata apice acuminata vel cuspidato-acuminata basi truncata acuta vel obtusa margine a basi ad medium integra a medio sursum grosse serrata, serris ascendentibus apice plus minus interiore recurves, supra nitida subtus glauca, costis venisque supra haud elevatis subtus elevatis, venis primariis lateralibus utroque latere costae 9-11, mediis a costa angulo 40°-45° egressis rectis ad apicem serrarum attingentibus, petiolis 18-22 mm. longis semiteretibus glabris. Cupula depresso-semi-globosa 10-12 mm. alta 14 mm. in diametro extus fusco-glauca annulis notata, annulis circ. 10, intus fulvo-sericea. Glans semi-globosa valde depressa 8-9 mm. alta 16 mm. in diametro ad summum impressa ad centrum breve apiculata basi subplana, cicatricibus elevatis 9 mm. in diametro.

HAB. Kappanzan, leg. S. SASAKI, Nov. 1915. (Fr.)

Near *Q. glauca* TH. in the leaves, but distinguishable from it by the glandes which are very much depressed at the top.

Salicineae.

Salix LINN.

Salix eriostroma HAYATA sp. nov. Frutex. Rami recti, cortice laevi fulvescenti, brevissime hirsuti, ramulis foliiferis rectis gracilibus dense villosis. Folia chartacea oblongo-lanceolata 3-4 cm. longa 9-10 mm. lata margine integra utrinque acuta supra sparse subtus densissime sericeo-villosa, venis lateralibus primariis utroque latere costae circ. 10 sursum arcuatis tenuissimis, petiolis 3 mm. longis villosis, stipulis minutissimis lanceolato-triangularibus $\frac{1}{2}$ mm. longis. Amenta fructifera ad ramos annotinos lateraliter sita 6 cm. longa 8 mm. lata sessilia densissime fructifera, pedicellis pilosis 1 mm. longis, bracteis ellipticis 1 mm. longis extus pilosis apice truncatis intus glabris, fructibus 4 mm. longis glabris rubescentibus ad basin minute tenuiter hirsutis, rhachibus amenti dense pilosis.

HAB. Tonkurankei, leg. U. MORI, 1910, Aprili., (fr.)

Near *Salix transarisanensis* HAY., but distinguishable from it by the very much more villose bracts and by the leaves which are sericeously villose on the under surface.

Salix suishaensis HAYATA sp. nov. Frutex 2-3 m. altus ramosus, ramulis gracilibus laevibus sparsissime hirsutis. Folia chartacea oblonga obovata vel obovato-oblonga 8-9 cm. longa $3\frac{1}{2}$ cm. lata apice cuspidato-acuminata vel acuminata basi obtuse cordata vel minute cordata margine minute serrulata basi glandulis 2 instructa supra subglabra subtus fulvo-hirsuta utraque distincte venosa, petiolis 12 mm. longis. Amentum florum ♂ : lineari-cylindricum cernuum 6 cm. longum dense hirsutum dense floriferum, bracteis obovatis $2\frac{1}{2}$ mm. longis $1\frac{1}{2}$ mm. latis apice rotundato-obtusis basi angustioribus utraque pagine hirsutis membranaceis, discis obtusis $\frac{1}{2}$ mm. longis; staminibus 6, filamentis basi hirsutis sursum glabris, antheris reniforme-rotundatis 2-ocularibus.

HAB. Suisha, secus stagnum, Aprili. 1916, leg. B. HAYATA.

Near *S. Warburgii* SEEM., but separable from it by the leaves which are hirsute beneath.

Coniferae.

Podocarpus L' HÉR.

Podocarpus Nakaii HAYATA sp. nov. Arbor. Ramuli teretes fusci glabri. Folia ad nodos approximatum et versus internodia remote alternatimque disposita lineari-lanceolata vel linearia 5-9 cm. longa 8 mm.-11 mm. lata recta vel leviter falcato-recurva apice obtusa basi acuta vel breve attenuata margine integerrima coriacea utraque glabra supra nitida subtus pallida haud glauca, costa supra acute elevata subtus leviter elevata subplana, petiolis brevissimis usque ad 5 mm. longis subalatis. Fructus ad axillas foliorum solitariter siti, pedicellis 2 mm. longis glabris erectis apice bracteis 2 instructis, bracteis triangularibus 1½ mm. longis 1 mm. latis apice cuspidato-acutis dorso carinatis crassiusculis. Receptaculum carnosum oblique obconico-globosum medio tenuiter 2-lobatum 4 mm. longum totiusque latum, lobis apice breve apiculatis. Bacca oblique globosa 1 cm. longa 8 mm. lata apice apiculato-acuta glabra.

HAB. Nanto: Holisha, Toshoko, leg. S. NAKAI, Dec. 1915.

Near *P. macrophylla*, but distinguishable from it in having ovate berries which are acute at the apex.

Orchideae.

Cypripedium LINN.

Cypripedium formosanum HAYATA sp. nov. (Fig. 9.) *Cypripedium japonicum* HAYATA Ic. Pl. Formos. II. p. 136, (non THUNB.) Rhizoma repens ramosum ; caulis basi ascendens et erectus basi vaginis 1-8 cm. longis 5-8 instructus medio 2-foliatus apice flore singulo terminatus 2-25 cm. longus. Folia quasiopposita obovato-rotundata 10-13 cm. longa 7-9 cm. lata apice rotundata vel late triangulari-acuta ad summum aristis instructa basi cuneata membranacea duplicato-plicata supra glabra subtus minute sparsissime brevissime hirsuta margine minute ciliolata subintegra vel minute erosa palmatinervia, nervis 11-13 radiatim divaricatis apice vena marginali conjunctis, venulis inter nervos circ. 9, sessilia, vaginis cylindrico-tubulosis 7 cm. longis subglabris. Flores solitarii, pedunculis 11 cm. longis subglabris vel sparse hirsutis apice bracteis singulis instructis erectis rectis, bracteis ovato-lanceolatis

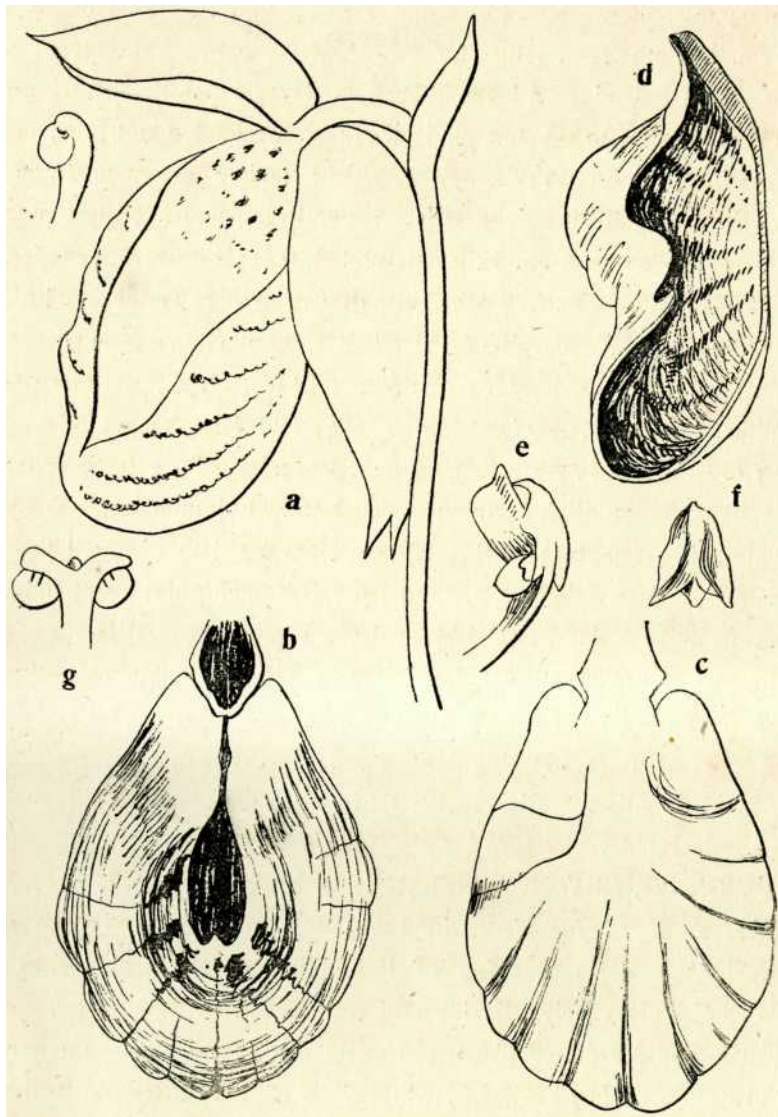


Fig. 9, *Cypripedium formosanum* HAYATA ; a, a flower; b, a lip seen from above; c, the same, seen from below; d, the same, in section; e, Column; f, staminode, seen from face; g, a stamen; h, the same, seen from side.

22 mm. longis 10 mm. latis sparse hirsutis vel subglabris basin ovarii amplectantibus. Ovarium 18 mm. longum subfusiforme 2 mm. latum 18 mm. longum dense hirsutum. Flores in alabastro pallido-flavescentes per anthesin

leviter purpurascens. Sepalum posticum distinctum subalbum ovato-lanceolatum 4½ cm. longum 2 cm. latum apice acutum vel obtusum integrum utraque pagine glabrum sed ad marginem inferiorem ciliatum parallero-nervium, sepala lateralia dua subalba se connata naviculiformia 4½ cm. longa 2½ cm. lata apice breve acuminata ad summum 2-apiculata basi leviter contracta intus glabra extus glabra margine inferiore ciliolata parallero-nervia. Petala plus minus obliqua ovato-lanceolata 5 cm. longa 18 mm. lata apice breve acuminata basi obtusa margine integra extus glabra intus deorsum hirsuto-barbata intus deorsum purpureo-inaculata margine haud ciliolata. Labellum sessile patens inflato-calceoliforme 5½-6½ cm. longum 4 cm. latum 2½ cm. altum, partibus basilaribus unguiculiformibus 1 cm. longis totiusque latis; lobi laterales ad basin calceoli subnulli; ore calceoli 17 mm. longo 7 mm. lato; calceolus intus prope fundum barbatus flavescens radiatim purpureo-maculatus. Columna brevis 1 cm. longa teres 2 mm. in diametro; antherae perfectae 2 ad latera rostellii fere sessiles 4 mm. longaeque latae subglobosae, loculis parallelis contiguis; staminodium pone rostellum incumbens late laminiforme leviter purpurascens late sagittiforme 1 cm. longum 7 mm. latum apice breve cuspidatum basi sagittatum, facie loculos 2 imperfectos ferens. Rostellum inter antheras perfectas antrorsum inflexum crassiusculum obtriangulare 6 mm. latum 7 mm. longum margine utroque latere lobulis singulis brevissimis instructum, subtus papilloso-stigmatosum. Capsula ignota.

HAB. Oiwake, ad 7500 ped. alt., leg. B. HAYATA, Aprili. 1916.

Differs from *C. japonicum* in the nearly glabrous peduncles and less hairy ovaries, in the maculation of light purple dots, which dots in the Japanese species are nearly colorless and translucent. In the living specimens, the Japanese and Formosan plants are easily distinguishable; the flowers of the former are more or less brownish, while those of the latter are whitish. In the Japanese species the leaves are nearly quite expanded when flowering, but in the Formosan, they are partly folded, but not quite expanded.

Microstylis NUTT.

Microstylis arisanensis HAYATA sp. nov. (Pl. XI. et fig. 10).
Terrestris ? Radices e basi pseudobulbi oriundae incrassatae numerosae. Pseudobulbi annotini ellipsoidei 7 mm. longi 5 mm. lati apice rotundati plus minus

Complanati subnudi; hornotini minores 3-4 mm. longi totiusque lati apice caulem singulum emittentes. Caulis simplex subtereto-complanatus anguste alatus cum racemo 7-15 cm. longus medio cum alis circ. 1 mm. latus basi cum pseudobulbo squamis scariosis 2-3 involutus glaber, squamis superioribus vaginiformibus tubiformibus, tubis $1\frac{1}{2}$ mm. longis 4 mm. latis apice obtusis, basi folio singulo instructus rarius 2-foliatus, tunc altro majore altro multo minore. Folia generaliter solitaria petiolata, lamina oblongo-ovata $5\frac{1}{2}$ cm. longa 3 cm. lata apice obtusissima basi obtusa membranacea utraque glabra margine integerrima basi ad petiolum gradatim abeunti, petiolis medio deorsum vaginiformibus cum vaginis $2\frac{1}{3}$ mm. longis membranaceis plicatis. Pars florifera raceme 2-8 cm. longa laxiuscule florifera, bracteis lanceolatis

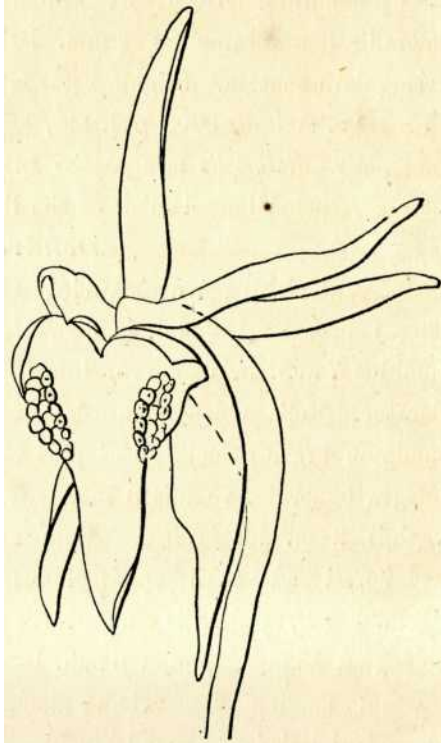


Fig. 10, *Microstylis arisanensis* HAYATA.

2-3 mm. longis apice acuminatis; pedicelli ovario excepto 3 mm. longi glabri; ovarium cylindricum $1\frac{1}{4}$ mm. longum $\frac{1}{2}$ mm. latum glabrum haud tortuosum, segmentis floris patentissimis. Sepalum posticum lanceolato-ovatum 3 mm. longum $1\frac{1}{4}$ mm. latum apice lineari-acuminatum ad summum obtusum basi leviter contractum intus convexum extus concavum tenuiter 1-nervium glabrum; lateralia cum postico conformia sed paulo breviora obliquaque. Petala linearia $2\frac{1}{2}$ mm. longa $\frac{1}{3}$ mm. lata apice acuminate 1-nervia glabra exteriore valde reflexa. Labellum triangulare 3 mm. longum 2 mm. latum apice cuspidato-acuminatum basi leviter cordatum margine prope basin interiore recurvum, discis 2 linearibus a basi labelli usque ad infra cuspidem extensis a se $\frac{2}{3}$ mm. distantibus botryoideo-tuberculatis, subtus toto glabrum supra a disco exteriore hirsutum caeterum glabrum basi brevissime unguiculatum, inter unguem et laminam lamella brevissima instruc-

turn tenuissime 5-nerviium. Columna brevissima cum antheris $\frac{1}{2}$ mm. longa vel longior; anthera persistens erecta 2-ocularis $\frac{1}{3}$ mm. longa $\frac{2}{3}$ mm. lata; pollinia 2 subquadrangulari-formia; clinandrium oblique truncatum, appendicibus lateralibus membranaceis $\frac{2}{5}$ mm. latis $\frac{2}{25}$ mm. longis erectis; rostellum late triangulare acutum. Stigma rotundato-cavum.

HAB. Arisan, 8000 ped. alt., leg. U. FAURIE, Junio 1914, No. 924.

Near *Microstylis monophyllos* LINDL., but distinguishable from it in having nearly rounded lateral lobes of the lips.

Dendrobium Sw.

Dendrobium PereFauriei HAYATA sp. nov. Caulis erectus 60 cm. longus basi teres 3 mm. in diametro parte inferiore excepta medio sursumque tumidus 7 mm. in diametro, internodiis $2\frac{1}{2}$ -3 cm. longis, sursum foliatus et floratus. Folia oblongo-lanceolata 6-7 cm. longa $1\frac{1}{2}$ cm. lata apice obtusa ad summum breve apiculata basi plus minus obliqua in exsiccato chartacea margine integra 5-nervia, venulis 3 inter nervos parallelis, basi cum vaginis articulata, vaginis 2 cm. longis internodium amplectantibus. Racemi circ. 6 cm. longi 3-4-florati ad latus apicis internodii siti, bracteis oblongis acuminates 3 mm. longis, pedicellis cum ovariis 18 mm. longis. Sepalum posticum ovato-oblongum 15 mm. longum 6 mm. latum apice obtusum basi plus minus contractum tenuiter 5-nerviium; lateralia oblique triangulari-oblonga 16 mm. longa basi latissima 1 cm. lata apice acuta vel triangulari-acuta margine fere recta basi cum pede columnae connata mentum 1 cm. longum 3 mm. latum formantia. Petala oblonga 15 mm. longa 7 mm. lata apice acutissima basi cuneato-contracta tenuiter 5-7-nervia integra. Labellum in ambitu rhomboideum $1\frac{1}{2}$ cm. longum 1 cm. latum apice obtusissimum basi cuneatim contractum basi erectum medio subito reflexum fere elobatum medio sursum intus minute hirsutum a medio deorsum glabrum margine integrum infra medium medio callo uno crasso disciformi instructum extus glabrum. Columna brevissima 2 mm. longa vel subnulla haud alata, basi ad pedem 1 cm. longum 3 mm. latum apice anteriore recurvum producta.

HAB. Kwarenko, leg. U. FAURIE, Juli. 1915.

Dendrobium sanseiense HAYATA sp. nov. Epiphytica; rhizome cum pseudobulbis compositum longe repens squamis dense obtectum, pseudobulbis

subhorizontaliter sitis apice ascendentibus obovoideo-fusiformibus 2 cm, longis 4 mm. latis apice obtusissimis basi longe attenuatis apice 1-foliatis cum foliis articulatis. Folia coriacea oblonga vel obovato-oblonga 1½-2 cm. longa 8-10 mm. lata apice rotundata ad centrum emarginata vel brevissime 2-lobata basi subito ad petiolum attenuata margine integerrima deorsum recurva supra nitidissima subtus pallida costa supra impressa subtus elevata, petiolis 3 mm. longis. Flores singuli solitarii pedunculati, pedunculis ab apice pseudobulbi oriundis 1 cm. longis glabris erectis basi bracteis vaginiformibus et medio bracteis singulis instructis, bracteis mediis lanceolatis glabris 2½ mm. longis apice obtusis glabris basi rhachem complete amplectantibus. Flores solitarii. Ovarium cylindricum pedunculo haud latius. Sepalum posticum ovato-lanceolatum 6 mm. longum 2½ mm. latum apice acuminatum ad summum obtusum basi leviter constrictum supra basin latissimum 5-nervium utraque glabrum; lateralia obliquissima triangulari-lanceolata 8-9 mm. longa basi latissima 3 mm. lata cum pede columnae connata mentum 3 mm. longum formantia apice acuminatissima utraque glabra 5-nervia. Petala triangulari-lineararia 5 mm. longa basi latissima 2 mm. lata apice acuminato-obtusa glabra 5-nervia basi partim ad columnam partim ad pedem columnae adnata. Labellum in ambitu obovato-oblongum 9 mm. longum 4 mm. latum 3-lobatum, lobis lateralibus semi-oblongis 2 mm. latis margine integris in ambitu semi-rotundatis, lobo terminali subrotundato 3-4 mm. in diametro apice breve apiculato basi contracto margine minute eroso, discis 2 A-formibus infra lobum terminalem dispositis, nervis centralibus 7-9 parallelis, venis lateralibus contra marginem radiatim divaricatis. Columna 2 mm. longa prominente lateque alata, (alis a medio menti usque ad apicem columnae extensis), basi ad pedem 4 mm. longum 1½ mm. latum producta. Anthera oblonga 1½ mm. longa.

HAB. Girancho: Mt. Sanseizan, leg. B. HAYATA, Mai. 1916.

Near *Dendrobium Nakaharai* SCHLECHTER ; but quite separable from it in the much smaller leaves and flowers.

Dendrobium Somai HAYATA sp. nov. Epiphytica. Caules caespitosi recti erecti circ. 60 cm. longi teretes medio 2 mm.-2½ mm. in diametro nodosi, internodiis 2-2½ cm. longis reliquis vaginarum toto obtectis, superioribus brevioribus superiore foliiferis. Folia lanceolato-lineararia 7 mm. longa 5 mm.

lata apice acuminata basi contracta margine Integra, nervis 3 distinctis venulis inter nervos numerosis, vaginis cum internodio aequilongis tubuliformibus circ. 1½ cm. longis 2 mm. latis, ad latus oris auriculis singulis instructis, auriculis late semi-rotundatis 2 mm. latis 1 mm. longis emarginatis. Flores gemini e latere internodii oriundi furcato-pedicellati. Pedunculi 4 mm. longi basi vaginati, vaginis latere valde complanatis lineari-oblongis 5 mm. longis 2½ mm. latis apice rotundatis latere uno fassis coriaceis, vaginis intimis tenuissimis membranaceis hyalinis 4 mm. longis 2 mm. latis ore obliquissimis, pedicellis 5 mm. longis glabris; ovario cylindrico-obconico 4 mm. longo 1½ mm. lato glabro. Sepalum posticum lineari-lanceolatum 13 mm. longum 2½ mm. latum apice acuminatissimum 7-nervium basi haud vel vix contractum glabrum ; lateralia cum postico aequilonga obliqua basi latissima cum pede colummae mentum 4 mm. longum formantia. Petala angustissime linearia 13 mm. longa 1 mm. lata apice acuminatissima basi haud contracta 3-nervia glabra. Labellum ovatum 13 mm. longum 5 mm. latum medio sursum 3-lobatum, lobo terminali ovato 6 mm. longo 4 mm. lato apice cuspidato-acuminato margine crispulato, trinervium, nervis parallelis, secus nervos elevato-lamellatum, lamellis fimbriatis, disco a basi labelli usque ad medium extenso lineari 6 mm. longo ½ mm. lato crassiusculo glabro, lobis lateralibus obliquis cum lobo centrali contactis oblongo-triangularibus apice obtuso-acutis 1½ mm. latis latere interiore 1 mm. longis glabris margine sub-integris. Columna 2½ mm. longa 1½ mm. lata.

HAB. in seminario Taihoku culta, leg. T. SOMA, xlug. 1915, (fl.)

Near *D. fureatopediceUatum* HAYATA, but differs from it by the smaller flowers with glabrous discs.

***Bulbophyllum* THOU.**

***Bulbophyllum Saruwatarii* HAYATA sp. nov. *Cirropetalum Saruwatarii* HAYATA.** Epiphytica. Rhizoma repens teres. Pseudobulbus ampulliformis 2½ cm. longus 1½ cm. latus ovoideus glaber pallidus. Folia solitaria lineari-lanceolata crasse coriacea 7 cm. longa 14 mm. lata apice obtusa vel rarius brevissime 2-lobata basi ad petiolum 1 cm. longum abeuntia. Scapi e basi pseudobulbi oriundi 10 cm. longi ascendentes squamis vaginiformibus secus longitudinem totam 2-3 instructi, squamis vaginiformibus 1 cm. longis, apice flores 5-6 subcapitatim gerentes, sub flore singulo bractea una instructi, bracteis lanceo-

latis 8 mm. longis secus longitudinem plicatis apice acutis vel obtusis glabris tenuibus naviculiformibus pedicellum amplexantibus, pedicellis gracilibus 2 cm. longis subradiatim divaricatis. Flores pallido-lacteo-flavi vel plus minus pallido-viridescentes vel rubescentes. Sepalum posticum ovatum 1 cm. longum 5 mm. latum basi plus minus contractum glabrum concavum, lateralia basi obliqua lineari-lanceolata $1\frac{1}{2}$ cm. longa 5 mm. lata apice acuminata integra \pm convoluta dua se firme margine interiore paralleliter contigua. Petala plus minus obliqua 7 mm. longa 5 mm. lata ovata apice rotundata 5-nervia. Labellum ovatum 6 mm. longum 4 mm. latum minute hirsutum crassiusculum basi secus longitudinem plicatum margine sursum valde exteriori recurvum apice obtusum medio subito deorsum recurvum basi subito valde contractum. Columna subnulla a basi usque ad apicem antherae $3\frac{1}{2}$ mm. longa ad latus anterius prominente alata, alis late triangulari-formibus 2 mm. longis 1 mm. latis, basi ad pedem 6 mm. longum productum, pede lineari 6 mm. longo 1 mm. lato apice sursum subito recurvo. Clinandrium utroque latere appendiculis instructum, appendiculis lineari bus cuspidiformibus 1 mm. longis.

HAB. Keitao, leg. B. HAYATA, ad 4000 ped. alt., Aprili. 1916.

Near *B. omerandrum* HAY., but distinguishable from it by the entire petals.

Bulbophyllum transarisanense HAYATA n. n. *B. viridiflorum* HAYATA Ic. Pl. Formos. II. p. 133 (non SCHLECHTER).

Eria LINDL.

Eria arisanensis HAYATA Ic. Pl. Formos. III. p. 54 t. 12. Descriptio aucta : Pollinia 8, in loculo singulo 4 superposita.

Acanthephippium BLUME.

Acanthephippium Yamamotoi HAYATA sp. nov. Terrestis. Pseudobulbi. ovoidei 7 cm. longi 3-4 cm. lati apice plus minus rostrati vel haud rostrati 2-3-nodosi, basi radices teretes incrassatas abundanter emittentes. Caulis foliifer haud floratus ad apicem pseudobulbi terminalis circ. 10 cm. longus teres singulus basi vaginatus. Folia 2-3 ampla basi vaginata, vaginis 8-9 cm. longis nervosis, laminis oblongo-ellipticis 30 cm. longis 8 cm. latis apice acuminatis basi acuto-obtusis subito ad vaginam abeuntibus membranaceis nervosis, nervis lateralibus utroque latere costae 4, venis inter nervos laterales circ. 7, margine

integrus. Caulis florifer in specimine nostro 20 cm. longus vaginis multis toto involutus; foliis nondum evolutis, pseudobulbo parvo, racemo ascendenti singulo lateraliter ad latus apicis pseudobulbi sito 10 cm. longo 3-4-florifero plus minus purpurascenti, bracteis ovatis vel oblongis naviculiformibus 2½ cm. longis, pedicellis glabris cum ovariis 4 cm. longis subteretibus sursum 4 mm. latis. Flores majusculi 4 cm. longi 3 cm. lati extus albo-flavescentes intus rubropunctati. Sepala lata carnosa in urceolum obovatum obconicum 4 cm. longum 2 cm. latum cohaerentia apice libera; posticum fornicatum, parte libera late triangulari apice obtusa; lateralia latere anteriore ab apice usque ad mentum libera basi ad pedem columnae adnata mentum obconicum 2 cm. longum formantia. Petala sepalis inclusa, ad basin columnae adnata sepalis multo angustiora basi cum marginibus membranaceis pedis columnae continua oblonga 2½ cm. longa 1½ cm. lata apice obtusa basi cuneato-angustata. Labellum ad apicem pedis columnae articulatim situm inflexum sepalis inclusum 3-lobatum, lobis lateralibus latis erectis supra minute hirsutis, lobo medio lineari crassiusculo supra valde rugosissimo apice breve apiculato. Columna brevis 1½ cm. longa 7 mm. lata basi in pedem longissimum 1½ cm. longum medio incurvo-inflexum sursum liberum abeuns, partibus liberis 2½ cm. longis 5 mm. latis.

HAB. Uraisha, leg. K. YAMAMOTO.

Near *A. sylhetense* LINDL. (Ann. Roy. Bot. Gard. Calc. VIII. t. 154); but different from it in the much longer ovariis and in the discs of the lips.

Phajus LOUR.

Phajus grandifolius LOUR. ; MATSUM. et HAYATA Enum. Pl. Formos. p. 410.

HAB. Suisha, leg. B. HAYATA, Mai. 1916. Note:—Segments pale green on the back, but red-purple inside; lip purple towards the tip.

Phajus Somai HAYATA sp. nov. Terrestris. Caulis foliifer distinctus cum foliis 110 cm. longus 7-8-foliatus basi pseudobulbatus, pseudobulbo elongato-ovoideo 5 cm. longo 2 cm. lato pallido-viridi basi dense radicifero basi inferiore haud vaginato. Folia suberecta inferiora minora superiora majora, lamina membranacea fusco-viridi integra 5-nervia, venulis inter nervos 8-15, lanceolata majora 50 cm. longa 9 cm. lata apice acuminata basi gradatim atte-

nuata ad petiolum abeunti, petiolis superioribus petioli-formibus, inferioribus vagini-formibus in longitudine variabilibus circ. 23 cm. longis caulem complete amplectantibus. Caulis florifer distinctus aphyllus vaginatus circ. 80 cm. longus erectus rectus inferiore 12 mm. in diametro sectionis, vaginis inferioribus 4 cm. superioribus 7 cm. longis ore obliquis apice rotundatis vel obtusissimis membranaceis, partibus floriferis 25 cm. longis laxe floratis, bracteis lineari-lanceolatis $3\frac{1}{2}$ cm. longis apice acutis 5 mm. latis concavis ascendentibus, pedicellis (cum ovariis) $2\frac{1}{2}$ -3 cm. longis ascendentibus toto glabris. Flores majusculi flavi toto glabri 3-4 cm. longi. Sepalum posticum oblanceolatum 4 cm. longum 12 mm. latum apice acutum basi haud vel vix contractum; sepala lateralia quam postico breviora plus minus obliqua 33 mm. longa 12 mm. lata apice acuta basi obliqua basi latere superiore obtusa basi latere inferiore cordata vel auriculata toto glabra. Petala oblanceolata obliqua 33 mm. longa 12 mm. lata apice acuta basi angustata margine integra plus minus falcatim deorsum recurva. Labellum glabrum in ambitu obovato-obtriangulare 3 cm. longum basi crectum medio sursum recurvum, lobis lateralibus erectis latis columnam amplectantibus latere integris planis apice crispato-plicatis, lobo terminali latissimo margine validissime crispato-undulato-plicato; calcar brevis 5-6 mm. longo plus minus recurvo 1 mm. in diametro. Columna alba elongata 18 mm. longa semi-teres subalata facie anteriore hirsuta. Pollinia 8.

HAB. Urai, leg. B. HAYATA et T. SOMA, Mai. 1916.

Near *Phajus maculatus* LINDL. (Ann. Roy. Bot. Gard. Calc. VIII. t. 149) ; but differs from it in having much longer and looser racemes and in the yellowish lips which are not brown-colored at the margin.

Bletilla REICHB.

Bletilla formosana (HAYATA) SCHLECHT. *Bletia formosana* HAYATA Mater. Fl. Formos. p. 323.

HAB. Kaukaukei, leg. B. HAYATA, Mai. 15, 1916. Note: — Flowers nearly white or very slightly purple.

Tainia BLUME.

Tainia Shimadai HAYATA sp. nov. (Pl. VII. et fig. 11). Rhizoma repens 3 mm. crassum. Pseudobulbus elongato-ovoideo-ampulliformis $3\frac{1}{2}$ cm.

longus 7 mm. latus glaber apice rostrato-elongatus folio solitario terminatus basi squamis vaginiformibus duobus atro-purpureis instructus. Folia solitaria ex apice pseudobulbi oriunda procumbentia haud erecta elongato-lanceolata cum petiolis 43 cm. longa 3½ cm. lata apice acuminata basi longe gradatimque attenuata, (partibus attenuatis petioliformibus, partibus petioliformibus 4-5 cm. longis secus medium plicatis versus basin perfecte tubiformibus, partibus tubiformibus 7 mm. longis ad extremitatem plus minus dilatatis), membranacea 3-nervia, (venis internervis circ. 9, venulis transversis inter venas remote sitis a se circ. 5 mm. distantibus), utraque pagine glabra margine integra. Scapi gracillimi erecti aphyllis glabri pallido-viridi-purpurascens e basi pseudobulbi oriundi circ. 40 cm. longi, basi deorsum

vaginis paucis instructi, (vaginis 4-5 cm. longis tubuliformibus 6 mm. latis glabris nervosis semi-hyalinis ore obliquis apice acutis vel truncatis), medio sursum nudi haud vaginati squamis minutis 1-2 instructi, partibus floriferis 8-11 cm. longis gracillimis remotiuscule floratis; bracteis sub flore singulis, linearibus lanceolatis 3-6 cm. longis acuminatis. Flores racemosi, pedicellis (ovario excepto) 7 mm. longis subpatentibus. Ovarium cylindricum 4 mm. longum glabrum plus minus purpurascens apice 2 mm. latum basi ad pedicellum abeuns sulcatum glabrum apice haud contractum. Sepala pallido-purpurascens purpureo-striata, posticum lineari-oblongum 15 mm. longum apice obtusum 2½ mm. latum 3-nerviium basi attenuatum 1½ mm. latum; lateralia valde falcata linearia plus quam 10 mm. longa 2 mm. lata apice acuto-obtusa basi haud attenuata 2 mm. lata caeterum ut postico. Petala linearia 12 mm. longa 2½ mm. lata apice obtusa basi haud contracta 2½ mm. lata. Plus minus falcata glabra 3-nervia. Labellum flavum sub sinibus pur-

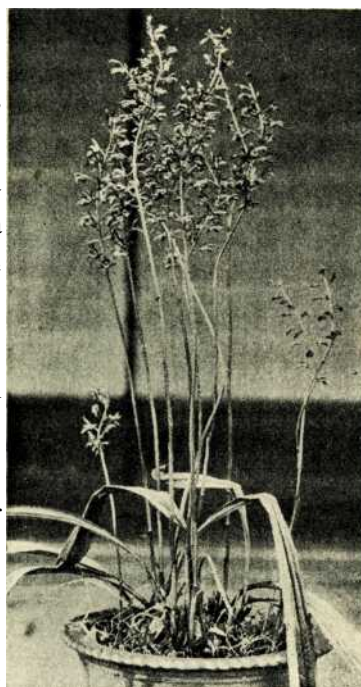


Fig. 11, *Tainia Shimadai* HAYATA, Photographed by Mr. Y. SHIMADA.

pureo-maculatum subtus flavum in ambitu obtriangulare 11 mm. longum 8 mm. latum basi triangulari-acutum cum pede coluranae articulatum basi erectum ad 4 mm. altitudinem subito reflexum deorsum recurvum patens, parte patenti (i.e. lamina) late rotundata 8 mm. longa 9 mm. lata 3-lobata, (lobo terminali latissimo $2\frac{1}{2}$ mm. longo $7\frac{1}{2}$ mm. lato apice truncato ad centrum brevissime latissimeque triangulari-acuto, lobis lateralibus ascendentibus plus minus interiore recurvis obtusissimis 2 mm. latis, sinibus inter lobos latiusculis $1\frac{1}{2}$ mm. latis truncatis), glabra medio discis 3-lamellatis flavis integris instructa. Columna erecta 7 mm. longa circ. 2 mm. lata apice alata basi ad pedem producta, pede 2 mm. longo cum sepalis lateralibus connato mentum formanti; anthera latiuscula antice truncata postice cordato-cornuta, cornibus late triangulari-obtusis crassiusculis purpureis.

HAB. Taihoku : Tikushizan, leg. Y. SHIMADA, Aprili. 1915, fl.

Near *Tainia laxiflora* MK., but differs from it in the very much longer leaves.

Calanthe R. BR.

Calanthe raishaensis HAYATA sp. nov. Terrestis. Folia basi racemi circ. 3 fasciculata, fasciculo squamis 1-2 vaginiformibus involuto, cum petiolis 60 cm. longa suberecta glabra, lamina oblanceolata 30-40 cm. longa $6\frac{1}{2}$ cm. lata apice subito acuminata vel acuta basi gradatim longeque attenuata ad petiolum circ. 30 cm. longum abeunti tenuiter membranacea. Racemi circ. 60 cm. longi erecti folio aequilongi simplices e centro fasciculi foliorum oriundi glabri, partibus floriferis 12 cm. longis laxe floratis, bracteis lineari-lanceolatis acuminatis 1-2 cm. longis, pedicellis (cum ovariis) 3-4 cm. longis. Sepalum posticum ovato-lanceolatum 3 cm. longum 8 mm. latum fere 5-nerviium apice acuminatissimum basi rotundatum contractum glabrum; lateralia quam posticum longiora 33 cm. longa 1 cm. lata oblongo-lanceolata apice acuminatissima basi obtusa integra glabra. Petala linearia $2\frac{1}{2}$ cm. longa 3 mm. lata apice acuminata basi haud contracta 3-nervia. Labellum late rotundatum 22 mm. latum 18 mm. longum 3-lobatum, (lobis lateralibus subrotundatis 5 mm. longis

totiusque latis apice rotundatis interiore recurvis, lobo terminali obtriangulari 1 cm. longo totiusque lato apice margine crispato-plicato ad centrum apicis cuspidate 3 mm. longo instructo toto subglabro), basi ad calcar productum, calcare cum partibus labelli columna connatis 3½ cm. longo intus extusque plus minus hirsuto deorsum recurvo. Columna 1 cm. longa basi labello connata tubum formans. Anthera triangularis 3 mm. longa totiusque lata apice cuspidate 1¼ mm. longo obtuso instructa basi segittate 2-lobato.

HAB. Raisha, in sylvis 3300 ped. alt., No. 905, Mart. 1914, leg. U. FAURIE.

Near *Calanthe arisanensis* HAYATA, but differs from it in having broader spurs and less crispate lips.

***Eulophia* R. BR.**

***Eulophia ochobiensis* HAYATA** sp. nov. Terrestriis aphylla. Tuber ellipticum 10 cm. longum 4 cm. latum abundanter radiciferum, radicibus teretibus incrassatis. Scapi simplices cum racemis 40 cm. longi erecti glabri 7-8 mm. in diametro pallido-purpurei basi squamati, squamis oblongis 2 cm. longis imbricatis apice obtusis vel acutis, racemis vel partibus floriferis 10 cm. longis laxiuscule floriferis, bracteis lanceolatis 3 cm. longis 6 mm. latis apice acuminatis purpureis, pedicellis cum ovariiis 6-10 mm. longis glabris. Sepala purpurea; sepalum posticum oblongo-ovatum 17 mm. longum 7 mm. latum apice acutum basi contractum glabrum, lateralia oblique oblongo-ovata 18 mm. longa 7 mm. lata apice acuminata. Petala pallido-flava oblique obovata 11 mm. longa 7 mm. lata apice triangulari-acuta vel obtusa basi breve lateque cuneata ad insertionem 3 mm. lata. Labellum pallidum extus glabrum intus medio apiceque hirsutum late cuneato-triangulare 1½ cm. longum 12 mm. latum apice late breveque 3-lobatum, lobo terminali triangulari 4 mm. longo totiusque lato apice obtuso, lobis lateralibus apice rotundatis, basi brevissime calcaratum. Columna dorso complanata 6 mm. longa 3 mm. lata pallido-flava.

HAB. Ochobi, B. HAYATA, Mai. 13, 1916.

Near *Eulophia macrorhiza* (BLUME Fl. Jav. t. 63 f.-2).

Cymbidium SAV.

Cymbidium arrogans HAYATA (Fig. 12) Ic. Pl. Formos. IV. p. 76.



Fig. 12, *Cymbidium arrogans* HAYATA.
Photographed by Mr. Y. SHIMADA.

Cymbidium albo-jucundissimum HAYATA (Fig. 13) Ic. Pl. Formos. IV. p. 74.



Fig. 13, *Cymbidium albojucundissimum* HAYATA.
Photographed by Mr. Y. SHIMADA.

vaginis usque ad medium tubiformibus cum tubo 5-7 cm. tongis apice acuminatis, partibus floriferis circ. 15 cm. longis laxe floratis, bracteis lanceolatis 3 cm. longis

Cymbidium oiwakensis

HAYATA sp. nov. (Fig. 14).
Torrestris, radicibus incrassatis. Folia 7-8-fasciculata, fasciculis basi squamis involutis, linearia 50-60 cm. longa 5-6 mm. lata apice acuta margine praesertim apice minute serrulata nervis manifestis 3, venulis inter nervos 1-2. Racemi distincti aphylli circ. 50 cm. longi foliis aequilongi basi et parte inferiore vaginis instructi,

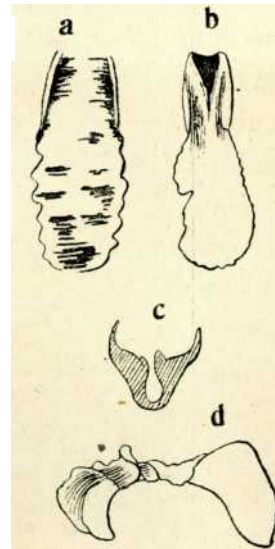


Fig. 14, *Cymbidium oiwakense* HAYATA; a, a lip, showing maculation on the surface; b, the same, showing the disc at the base; c, the same in section; d, the same lip, seen from side.

sursum recurvis ascendentibus glabris apice acuminatis valde concavis, pedicellis (cum ovariis) 2 cm. longis glabris. Flores 4 cm. in diametro. Sepala et petala pallido-viridescencia vel pallido-flavescentia extus purpureo-striata vel haud striata. Labellum fusco-purpureo-maculatum. Sepala lanceolata 27 mm. longa 6-7 mm. lata apice triangulari-acuta basi plus minus angusta glabra. Petala plus minus obliqua ovato-lanceolata 23 mm. longa 8 mm. lata apice acuto-obtusa basi plus minus contracta glabra. Labellum in ambitu ovatum 23 mm. longum ad basin columnae situm sessile erectum basi concavum, lobis lateralibus latiusculis erectis apice rotundatis semi-oblongis 3 mm. latis columnam laxe amplexantibus, labo medio valde recurvo oblongo 13 mm. longo 8 mm. lato apice obtusissimo margine valde crispato sub lente minute eroso. Disci 2 ()-formiter dispositi. Columna complanato-semi-teres 14 mm. longa 4 mm. lata margine obscure alata vel haud alata. Fructus fusiformis 4 cm. longus 1½ cm. latus erectus, stipite 1½ cm. longo erecto glabro.

HAB. Gokwanzan Oiwake, ad 7500 ped. alt., leg. B. HAYATA, Aprili. 1916.

Differs from the other species of this genus in Formosa in having manifestly denticulate lips.

Cymbi-

dium rubri-
gemum HAYATA sp. nov. (Fig. 15). Folia linearia tenuiter coriacea 30-40 cm. longa 7 mm. lata apice acuminata basi gradatim attenuata margine sub lente minutissime serrulata, nervis distinctis 3. Scapi

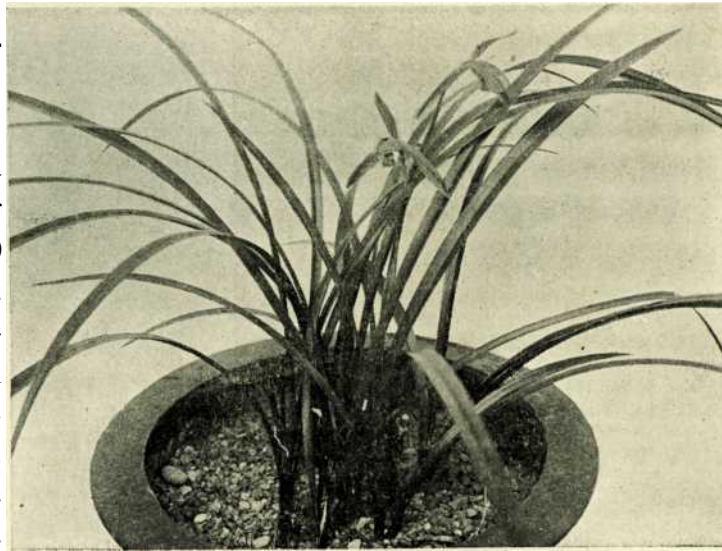


Fig. 15. *Cymbidium rubrigemum* HAYATA.
Photographed by Mr. T. SOMA.

cum racemis 25-30 cm. longi erecti basi squamis 3-4 instructi, squamis a se 5 cm. distantibus 5-6 cm. longis apice acuminatis a basi usque ad medium tubiformibus. Racemi 8 cm. longi pauciflorati, bracteis lanceolatis 3 cm. longis 4 mm. latis purpureis, pedicellis cum ovario 2 cm. longis glabris gracilibus.



Fig. 17, *Cymbidium sinense* WILLD. var. *margicoloratum* HAYATA. Photographed by Mr. T. SOMA.

Sepala subaequalia linearia 3 cm. longa 5 mm. lata apice acuta basi leviter contracta, Petala lanceolata plus minus obliqua 2½ cm. longa 6-7 mm. lata. Labellum oblongo-ovatum 20 mm. longum 8 mm. latum apice obtusum apice margine maculatum. Columna 1½ cm. longa.

HAB. Taihoku cult. Mart. 1914, leg. T. SOMA.

Near *Cymbidium oreophyllum* HAYATA, but distinguishable from it in having shorter and broader sepals.

Cymbidium sinense
WILLD. var. **margicoloratum**
HAYATA n. v. (Fig. 16-b et 17).
Folia lineari-oblancoolata tenuiter coriacea 50-60 cm. longa 2 cm.

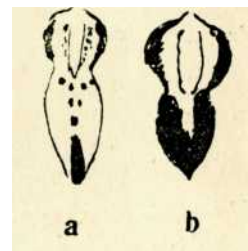


Fig. 16, a, *Cymbidium rubrigemmum* HAYATA; b, *Cymbidium sinense* WILLD. var. *margicoloratum* HAYATA.

lata apice acuminata basi gradatim attenuata ad extremitatem subito dilatata apicem pseudobulbi amplectantia, nervis distinctis 3, utraque pagine glabra margine integerrima. Scapi cum racemis 70-80 cm. longi teretes basi squamis 3-4 remote instructi, squamis a se 10 cm. distantibus linearibus apice acuminatis a basi usque ad medium tubuliformibus glabris scariosis 10 cm. longis nervosis. Racemi 30 cm. longi erecti recti remote floriferi, floribus a se 3-4 cm. distantibus, bracteis lanceolatis 1-2 cm. longis acuminatis, pedicellis (cum ovario) 3-2 cm. longis divaricatis. Sepalum posticum lineare 33 mm. longum 5 mm. latum apice obtuso-acutum, lateralia leviter breviora aequilata. Petala lanceolata 2½ cm. longa 7 mm. lata, apice obtusa basi contracta. Labellum ovatum 20 cm. longum 10 mm latum apice acutum (discis 2-lamellatis) margine apiceque coloratum. Columna 13 mm. longa.

HAB. Taihoku cult. leg. T. SOMA, Feb. 1914.

Differs from the type in the lips which in this new species are bluish purple at the margin, but not spotted. The lips of *C. sinense* are in greater parts spotted. I have not seen the type of the latter; but according to the description given in LINDL. Gen. et Sp. Orch. p. 162, the lips are " maculatum." The same character of the lips can be seen in a figure given in the Somokudsusetsu XVIII. Pl. 11.

Sarcochilus R. BR.

Sarcochilus kusukusensis HAYATA sp. nov. Epiphytica. Caulis 2-3 cm. longus toto foliatus vaginis foliorum imbricatis obtectus glaber. Folia in exsiccato coriacea linearia 4-5 cm. longa 5-6 mm. lata apice obtusa vel obtusissima ad summum oblique simpliciter apiculata vel breve 2-apiculata basi angustiora margine integra, nervis lateralibus utroque latere costae 5, vel 1 tum venis inter costas et nervas laterales 1-2, vaginis valde reflexis apice petioli-formibus basi vaginiformibus glabris. Racemi quasi-axillares cum pedunculis 4 cm. longi glabri erecti recti, pedunculis 3½ cm. longis, rhachibus plus minus incrassatis densissime floriferis 1 cm. longis dense bracteatis, bracteis sub flore singulo unis instructis dense imbricatis cuspidato-triangularibus 3-4 mm. longis glabris dorso acute carinatis in sectione triangularibus, pedicellis cum ovariiis 5 mm. longis glabris supra basin articulatis. Flores flavi 5 mm. longi. Sepala flava, posticum oblongum vel oblongo-obovatum 4½ mm. longum 2 mm. latum apice obtusum basi-

contractum glabrum tenuiter membranaceum 3-nerviis; lateralia postico aequilonga sed latiora plus minus obliqua basi cum pede columnae connata mentum 1 mm. longum abeuntia. Petala flava obovato-oblonga 4 mm. longa 2 mm. lata apice obtusissima basi cuneato-contracta. Labellum album purpureo-striatum pede columnae articulatim affixum 3 mm. longum sacciforme; lobi laterals erecti late triangulares; medius obsoletus ad apicem denticulatus et plus minus carnosus; labellum medio et utroque latere apicis callis dense pilosis instructum, et protuberantibus duobus sub apice labelli dispositis. Columna brevis 1½ mm. longa basi ad pedem 1 mm. longum producta.

HAB. Kusukusu, leg. B. HAYATA, Aug. 1914.

Differs from *S. formosana* HAY. by the far much smaller flowers with yellowish sepals and purple-striate lips.

Sarcochilus Saruwatarii HAYATA sp. nov. (Fig. 18). Epiphytica. Caulis 2 cm. longus toto foliatus et vaginis foliorum imbricatis obtectus glaber.

Folia alterna distiche disposita plana in exsicco membranacea linearia vel lineari-oblancheolata 4-5 cm. longa 5-8 mm. lata apice obtusa vel acuta oblique 2-lobata vel integra margine integra basi attenuata cum vaginis articulata, nervis lateralibus utroque latere costae 3, vaginis 3 mm. longis. Racemi penduli quasi-axillares graciles cum pedunculis 2-3 cm. longi, rhachibus 1 cm. longis valde flexuosis laxissime floratis, floribus 2-3, sub flore 1-bracteatis, bracteis

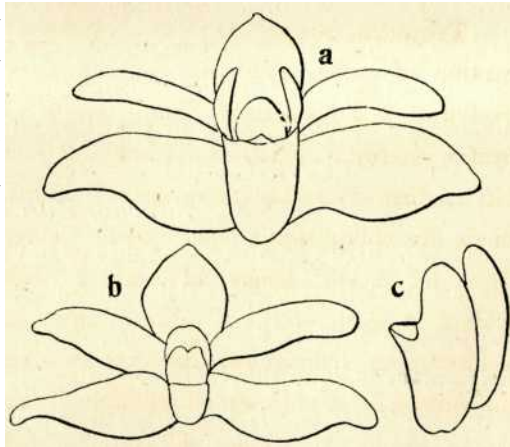


Fig. 18, *Sarcochilus Saruwatarii* HAYATA; a, a flower; b, another flower, lip taken off, showing the foot of the column; c, a lip, seen from side.

ovato-lanceolatis deorsum falcatis recurvis 2 mm. longis transverse patentibus secus costam plicatis alabastrum florum et rhachem racemi amplectantibus. Flores albi. Sepala inaequalia, posticum oblongum 5 mm. longum apice obtusum basi plus minus contractum; lateralia oblique ovato-oblonga 7 mm. longa 3 mm. lata apice obtuse basi haud vel vix contracta. Petala lineari-lanceolata

5 mm. longa 1 mm. lata apice obtusa basi haud vel vix contracta. Labellum intus rubro-flavum sacciforme, lobis lateralibus oblongis obliquis 3 mm. longis 2 mm. latis apice truncato-obtusis extus minute hirsutis margine minute erosis intus glabris, lobo medio crassissimo brevissimo triangulari $\frac{1}{2}$ mm. longo, sub lobo medio disco crasso uno insito; gibbo labelli in fundo densissime piloso. Columna brevissima $\frac{1}{2}$ mm. longa subalata cum alis $1\frac{1}{2}$ mm. lata basi ad pedem 2 mm. longum producta.

HAB. Keitao, leg. B. HAYATA, Aprili. 1916.

Approaches to *S. formosanus* HAY., but distinguishable from it by the far much smaller lips and racemose inflorescence.

Saccolabium BLUME.

Saccolabium formosanus HAYATA Mater. Fl. Formos. p. 336. Descriptio aucta: Fructus cylindricus pedicello excepto 2 cm. longus 5 mm. latus utrinque contractus obtusus plus minus obliquus, pedicello 5-6 mm. longo.

Tropidia LINDL.

Tropidia Somai HAYATA sp. nov. (Pl. XIII.). Rhizoma ascendente-erectum ad caulem gradatim abeuns; pseudobulbus nullus. Caulis in nostro specimine 2-3-fasciculatus cum racemis 17-20 cm. longus glaber florifer suberectus interdum efoliatus interdum 1-2-foliatus eramosus basi usque ad medium 2-5-vaginato-squamatus, squamis inferioribus vaginiformibus 7 mm.-15 mm. longis ore obliquissimis apice acutis nervosis glabris superioribus longioribus usque ad $3\frac{1}{2}$ cm. longis ad medium tubuliformibus sursum lamini-formibus apice acuminatis, foliis si adsunt supra medium caulis 1-2-dispositis. Folia membranacea oblongo-cordata ovato-oblonga vel lanceolata 9-7 cm. longa 6-2 cm. lata apice acuminata ad summum breve aristata basi subcordata rotundata obtusa vel acuta semper ad petiolum 1- $1\frac{1}{2}$ cm. longum caulem amplectantem gradatim abeuntia, margine integra 7-nervia, nervis supra minus subtus plus elevatis (in exsiccatu). Racemi 3-4 cm. longi recti, bracteis lanceolatis 6-7 mm. longis apice acuminatis basi rhachin semi-amplectantibus glabris, pedicellis cum ovario 5 mm. longis glabris. Sepalum posticum lanceolatum 6 mm. longum basi latissimum acuminatissimum glabrum; lateralia apicibus exceptis perfecte connata ventricum formantia erecta apice acuminata lanceolata, ventrico subinsertione 2 mm. longo 2 mm. lato. Petala lanceolata sepalo postico breviora.

Labellum ovato-lanceolatum eire. 6 mm. longum erectum glabrum ventricosocalcaratum, lamina lanceolata 4 mm. longa. Columna 2 mm. longa, rostello obliquissimo triangulari-lanceolato apice 2-fido; anthera dorsalis e basi columnae oriunda lanceolata apice acuminata 3 mm. longa $\frac{3}{4}$ mm. lata. Pollinia lineari-lanceolata 2 mm. longa apice attenuata ad caudiculam 2 mm. longam abeuntia; glandula lineari-oblonga 1 mm. longa. *Tropidia angulata* HAYATA in MATSUM. et HAYATA Enum. Pl. Formos. p. 414 (non BLUME).

HAB. Ako: Datestu, leg. T. SOMA, Juli. 1912.

Near *Tropidia angulata* BLUME (KING et PANTLING Orchid, t. 365), but distinguishable from it in having much inflated lips and sepals.

Spiranthes L. C. RICH.

Spiranthes australis LINDL. var. ***suishaensis*** HAYATA n. v. Terrestis. Radices incrassatae e basi caulis 3-4 oriundae teretes 5 cm. longae 3 mm. crassae. Caulis 30-50 cm. altus glaber teres basi foliis 2-3 medio squamis 1-2 instructus sursum ad spicam 10-20 cm. longam abeuns simplex haud ramosus. Folia inferiora majora oblanceolato-linearia 12-15 cm. longa 5-7 mm. lata apice obtusa vel acuta basi gradatim attenuata ad vaginam abeuntia, vaginis 1-6 cm. longis, toto glaberrima membranacea, nervis lateralibus utroque latere costae 3, venulis obliquis reticulatis. Spicae 10-20 cm. longae simplices. Flores perfecte albi approximativim secundeque dispositi, bracteis post anthesin auctis lanceolatis. Ovarium obovoideum plus minus obliquum 2-3 mm. longum glabrum vel plus minus hirsutum. Rhachis tortuosa minute hirsuta, bracteis ovatis 5-6 mm. longis 2-3 mm. latis concavis basin florum amplectantibus apice longe acuminato-cuspidatis glabris. Segmenta toto conniventia toto alba. Sepala trinervia; posticum lineare 5 mm. longum $1\frac{1}{2}$ mm. latum apice obtusum basi haud contractum glabrum; lateralia quam postico angustiora apice acuminato-obtusa 5 mm. longa 1 mm. lata. Petala quam sepalum tenuiora 5 mm. longa 1 mm. lata apice obtusissima 1-nervia. Labellum in ambitu oblongum 4-5 mm. longum $2\frac{1}{2}$ mm. latum apice obtusissimum basi erectum concavum columnam amplectans apice patens margine basi usque ad medium integrum medio sursum valde crispatum erosum ad paginam medio sursum breve crispato-hirsutum basi leviter gibbosum, gibbis intus protuberantibus duobus instructis. Columna 1 mm. longa.

HAB. Suisha, ad 2500 ped. alt., leg. B. HAYATA, Aprili. 1916.

This differs from the common *Spiranthes australis* by the perfectly white flowers with 2 rounded protuberances at the base of the lips. The protuberances are in *S. australis* are hooked and bent downwards.

***Physurus* RICH.**

***Physurus chinensis* ROLFE; MATSUM. et HAYATA Enum. Pl. Formos. p. 409.**

HAB. Karapin, leg. B. HAYATA, Mart. 1914. Note:—Flowers light ashy-purple or nearly white.

***Galeola* LOUR.**

***Galeola ochobiensis* HAYATA sp. nov. (Fig. 19).** Fulvescens ad truncos repens, radicibus numerosis incrassatis, radicibus aeriis oppositi-ramis teretibus in nostro specimine 3-4 cm. longis.

Caulis glaber teres ad nodos 1-squamatus, squamis ovatis obtusis ramos semi-amplectantibus 1-2 cm. longis. Racemi paniculato-ramosi, ramis 3-5 cm. longis, bracteis ovatis acutis 3 mm. longis persistentibus, pedicellis cum ovariis 4-5 mm. longis glabris. Flores pallido-lacteo-rubescentes glabri. Sepala

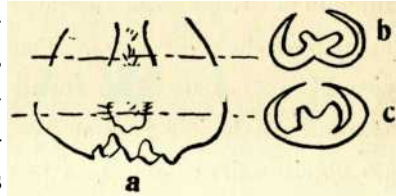


Fig. 19, *Galeola ochobiensis* HAYATA; a, a lip, expanded; b, c, sections of the same lip, which is not unfolded.

conniventia demum plus minus patentia, posticum oblongo-lineare 12 mm. longum 3 mm. latum glabrum apice obtusum, lateralia quam postico latiora 4 mm. longa apice obtusissima basi haud contracta. Petala angusta linearia et spathulata 12 mm. longa 2 mm. lata apice obtusissima vel rotundata basi attenuata. Labellum ad basin columnae sessile latum concavum columnam laxe involvens sepalis aequilongum 10 mm. longum in explicato 10 mm. latum obscure 3-lobatum, lobis lateralibus latissimis transverse venulosis, lobo medio minuto undulato-crispo facie villosa callis duobus instructo, callo superiore subrotundato villosa, callo inferiore minus villosa. Columna 7 mm. longa exalata apoda. Capsula linearis cylindrical pendula 16 cm. longa 5 mm. lata.

HAB. Ochobi, leg. B. HAYATA, Mai. 14, 1916.

Found climbing on a tree in forests on a cliff at the sea-coast. Near *G. altissima* REICH, f.; but differs from it in having differently shaped lips.

Vanilla Sw.

Vanilla Somai HAYATA sp. nov. (Pl. XIV.). Epiphytica. Caulis ramosus scandens glaber teres viridis flexuosus. Folia alterna oblongo-lanceolata 17 cm. longa 5½ cm. lata apice acuminata ad summum obtusa basi contracta rotundata vel truncata margine integra coriacea plana utraque glabra, nervis in exsiccato utraque elevatis 25-30 parallelis, petiolis 1 cm. longis dilatatis semi-amplexicaulibus. Racemi quasiterminales 2-3 cm. longi sessiles; rhachibus flexuosis multifloratis sed abortu 1-2-floratis, bracteis oblongo-triangularibus membranaceis 1-1½ cm. longis naviculiformibus plicatis glabris apice obtusis vel acutis divaricatis, pedicellis cum ovariis 3-4 cm. longis gracilibus 2-3 mm. latis glabris. Flores 4 cm. longi pallido-virides; sepalum posticum oblanceolatum 4 cm. longum 1 cm. latum apice abrupte acutum ad summum obtusum basi attenuatum glabrum, lateralia plus minus obliqua quam posticum angustiora. Petala lineari-oblanceolata 4 cm. longa 5 mm. lata apice abrupte acuminata basi gradatim attenuata. Labellum pallido-viride extus sursum leviter roseum 4 cm. longum tubuloso-infundibuliforme in explicato obtriangulare 3-lobatum margine crenulatum (lobo medio minuto deorsum subito recurvo viridi) medio fasciculo pilorum 5 mm. longo 3 mm. lato instructum apice viridissimum pilis brevibus conspersum, medio lineis miniatis 2 cm. longis recurvis utroque latere sitis. Columna 3 mm. longa.

HAB. Remogan, leg. B. HAYATA et T. SOMA, Mai. 1916.

Near *Vanila Griffithii* var. *formosana* ; but differs from it in having pale green cream-colored lips.

Vrydagzynia BLUME.

Vrydagzynia formosana HAYATA sp. nov. Caulis basi repens ad nodos radicans sursum ascendens suberectus, partibus erectis circ. 10 cm. longis teretibus foliatis glabris. Folia glabra alterna versus apicem caulis fere approximativim disposita, lamina oblonga 2½-3½ cm. longa 1½ cm. lata apice acuta ad summum acutissima basi obtusa vel rotundata subito ad petiolum cum vaginis 1 cm. longum abeunti, petiolis basi vaginiformibus, vaginis 5 mm. longis 2½ mm. latis. Racemi terminales soliterii cum pedunculis 5 cm. longi, pedunculis 2½ cm. longis hirsutis, bracteis ovato-lanceolatis apice obtusis basi vix contractis extus hirsutis intus glabris margine ciliolatis valde concavis alabastrum

floris amplexantibus, pedicellis (= ovariis sessilibus) 6 mm. longis 1 mm. latis hirsutis. Segmenta conniventia extus sparse hirsuta intus glabra sursum albicantia deorsum viridescantia. Sepalum posticum lineari-lanceolatum 6 mm. longum 2 mm. latum apice obtusissimum leviter dilatatum basi vix contractum cum petalis galeam formantia. Sepala lateralia obliqua $5\frac{1}{2}$ mm. longa $2\frac{1}{2}$ mm. lata apice obtusa basi valde obliqua latere inferiore auriculato-cordata latere superiore acute ovato-oblonga. Petala oblique ovato-lanceolata $4\frac{1}{2}$ mm. longa 2 mm. lata apice attenuata ad summum perfecte truncata ad summura $\frac{1}{2}$ mm. lata basi contracta 1-nervia. Labellum erectum oblongum apice obtusissimum medio callo uno crassiusculo notatum, basi ad calcar latissimum 4 mm. longum 2 mm. latum productum. Columna brevis $1\frac{1}{2}$ mm. longa crassiuscula anteriore apice 2-cornuta, cornibus (stigmatosis) $\frac{1}{2}$ mm. longis obtusissimis; anthera rotundata $1\frac{1}{2}$ mm. longa totiusque lata. Rostellum triangulare $1\frac{1}{2}$ mm. longum. Calcar intus callis 2 longe stipitatis a columnae basi descendentes instructum.

HAB. Inter Urai et Agioku, leg. B. HAYATA, Mai. 1916.

Near *V. gracilis* BLUME.

Zeuxine LINDL.

Zeuxine tabiyahanensis HAYATA sp. nov. = *Adenostylis tabiyahanensis* HAYATA. Terrestis. Caulis basi repens ad nodos radicefer, partibus ascendentes 20 cm. longis erectis usque ad medium foliiferis simplicibus, apice ad racemum abeuntibus deorsum glabris sursum hirsutis. Folia plus minus obliqua vel aequalia oblonga vel elongato-oblonga 5-7 cm. longa $2\frac{1}{2}$ cm. lata apice acuta ad summum acutissima basi acuta subito ad petiolum 1 cm. longum abeuntia margine integra chartacea vel membranacea utraque pagine glabra, nervis lateralibus utroque latere costae 1, venis inter costam et nervos laterales 3-4, petiolis basi vaginatis cum vaginis $2\frac{1}{2}$ cm. longis, vaginis 1- $1\frac{1}{2}$ cm. longis $\frac{1}{2}$ cm. latis, ore obliquo. Racemi simplices terminales 6 cm. longi laxe floriferi hirsuti, bracteis lanceolatis $1\frac{1}{2}$ cm. longis 4 mm. longis plus minus hirsutis. Ovarium oblique cylindricum utroque constrictum 1 cm. longum hirsutum. Sepala suberecta extus hirsuta intus glabra; posticum oblongum 1 cm. longum 7 mm. latum apice triangulari-acutum ad summum obtusum basi haud contractum ad summum obtusum valde concavum cum petalis galeam formans 3-nervium; lateralia elongato-oblonga postico aequilonga 4 mm. lata apice

obtusissima basi leviter contracta 3-nervia integra plus minus obliqua. Petala glabra cultriformia vel semi-obovata 1 cm. longa 4 mm. lata apice obtusa basi attenuata margine interiore subrecta margine exteriori curva, margine exteriori prope apicem crenulata 2-nervia. Labellum basi cum alis columnae connatum erectum basi (hypochilo) saccato-concavum, hypochilo 5 mm. longo 3-nervio ad nervos laterales fimbriis instructo, medio (mesochilo) angustato 2 mm. longo sulcato basi auriculis instructo; lamina, (epichilo) 2-lobata, lobis divaricatis late obtriangularibus 4 mm. longis apice fere truncatis latissimis 5 mm. latis basi 2 mm. latis apice dentato-erosis latere integris duobus se angulo 180° egressis utraque pagine breve hirsutis. Columna brevis 2 mm. lata 2 mm. longa facie anteriore 2-alata apice 2-cornuta, cornibus membranaceis deorsum (§)-formiter recurvatis 2 mm. longis; rostellum longe 2-fidum, segmentis linearibus 2½ mm. longis; anthera elongata triangularis 3 mm. longa 1½ mm. lata apice acuta basi sagittata; stigmata 2 utroque latere basis rostelli disposita sessilia.

HAB. Tabiyahanzan, leg. B. HAYATA, Mai. 1916.

The present species approaches to *Cheirostylis*, *Zeuxine Odontochilus* and *Anoedochilus*, but is not referable to neither. The new orchid is different from *Cheirostylis* in having distinct sepals and petals, from *Zeuxine* and *Odontochilus* in the lateral arms of the columns, and from *Anoedochilus* by not having distinct spurs. As the specimen is wanting pollinia, it is quite uncertain as to its proper genus.

Myrmechis BLUME.

Myrmechis drymoglossifolia
HAYATA sp. nov. (Fig. 20). Terrestri
basi procumbens ad nodos radicans,
partibus erectis 4-7 cm. longis. Caulis
teres glaber vel subglaber. Folia
alterna petiolata rotundato-ovata 6-7
mm. longa 5-6 mm. lata apice trian-
gulariobtusata basi rotundato-truncata
margine integra vel crispato-repandulata

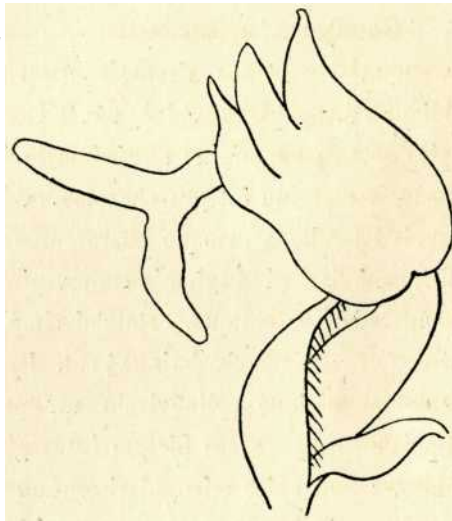


Fig. 20, *Myrmechis arisanensis* HAYATA.

3-nervia, nervis tenuissimis, utraque glaberrima, petiolis cum vaginis 3-4 mm. longis dorso complanatis basi vaginatis, vaginis 1-2 mm. longis 1-1½ mm. latis obconiciformibus glabris semi-hyalinis membranaceis ore obliquis. Flores terminales solitarii pedunculati, pedunculo (ovario excepto) 6 mm. longo basi apiceque bracteato hirsuto; bractea inferiore basi vaginata, vagina tubiformi 1-2 mm. longa ore ciliata, lamina ovata circ. 2 mm. longa glabra; bractea superiore ovata 4 mm. longa ovarium amplectanti hyalina margine retrose ciliata; ovario ovato-linearari 4-5 mm. longo glabro 1½ mm. lato. Sepala et petala basi usque ad medium conniventia ovato-lineararia 6 mm. longa apice attenuata conniventia tubum 3-4 mm. latum formantia toto glabra. Labellum Y-forme: hypochilo cum tubo perianthii conniventi; mesochilo libero lineari 2 mm. longo 1 mm. lato, lamina (epichilo) v-forme bipartita, partibus divaricatis linearibus 2 mm. longis 1 mm. latis. Columna nulla; anthera dorsalis ovata 1½ mm. longa apice attenuata; pollinia 2 sectilia ; stigma ignotum.

HAB. Arisan, 8000 ped. alt., leg. U. FAURIE, Juni. 1914, (No. 929).

Near *Myrmechis gracilis* BL. and *M. japonica* ROLFE ; but differs from them in having much smaller leaves.

Goodyera R. BR.

Goodyera arisanensis HAYATA sp. nov. Caulis cum spicis 25 cm. longus glaber basi 5-6-foliatus erectus apice ad spicam abeuns sursum squamis 8-9 remote instructus. Folia oblonga vel ovato-oblonga 4 cm. longa 1½ cm. lata apice acuta vel breve acuminata basi acuta margine integra chartacea vel crasse membranacea utraque pagine glabra, petiolis 2 cm. longis dilatatis basi vaginatis, vaginis ½ cm. longis hyalinis, ore obliquo. Spicae terminales simplices 11 cm. longae densiuscule floratae, bracteis lanceolatis post anthesin auctis 3 mm. longis acuminatis ovario aequilongis. Ovarium ovoideo-fusifforme 3 mm. longum glabrum. Segmenta conniventia 3 mm. longa. Sepalum posticum ovato-lanceolatum 3 mm. longum 1 mm. latum glabrum 1-nervium, nervo manifesto, glabrum cum petalis galeam formans basi plus minus contractum; lateralia, oblique lanceolato-oblonga 3½ mm. longa 1¼ mm. lata postico latiora glabra manifeste 1-nervia apice obtusa vel acuta basi haud contracta. Petala lineari-lanceolata 3½ mm. longa ⅔ mm. lata apice obtusa basi angustata tenuiter mem-

branacea 1-nervia. Labellum subsaccatum subrectum haud recurvum 2½ mm. longum 1½ mm. profundum extus glabrum apice triangulari-acutum, sacco apice rotundato intus glabro lineis callosis cristatis duabus instructo. Columna brevissima ½ mm. longa; rostellum membranaceum aristato-2-fidum. Capsula ellipsoidea 7 mm. longa 4 mm. lata utrinque valde constricta glabra vel sparsissime hirsuta. Anthera ovata 1 mm. longa apice 1-aristata.

HAB. Mt. Arisan, ad 2500 m. alt., leg. U. FAURIE, Dec. 1914.

Near *Goodyera nantoensis* HAYATA, but differs from it in having larger flowers and leaves with different venation.

Goodyera cyrtoglossa HAYATA Ic. Pl. Formos. p. 113.

HAB. Rosuikiei, leg. B. HAYATA, Aprili. 1916. Note: — Some of the flowers are upside down; rhachis purple-red; segments pale-ochraceous, column green, lip white.

Goodyera longicolumna HAYATA sp. nov. Caulis teres basi procumbens ad nodos 3 cm. se remotos 5 mm. crassos radices 2-3 emittens, radicibus teretibus incrassatis, basi sursum ascendens, parte ascendenti cum spicis 30 cm. longa simplicibus a basi usque ad medium foliosa erecta sursum ad spicam simplicem 7 cm. longam abeunti deorsum glabra sursum minute hirsuta. Folia 9-10 oblonga vel elliptica membranacea glaberrima 9-10 cm. longa 4½ cm. lata apice breve cuspidato-acuminata vel acuta ad summum obtusa basi obtusa subito cuneatim ad petiolum abeuntia margine integra, nervis lateralibus 5-6 utroque latere costae, petiolis circ. 6 cm. longis gracilibus basi subito dilatatis subvaginatis caulem amplectantibus. Spicae (vel racemi) simplices circ. 10 cm. longae erectae dense vel densiuscule floriferae, bracteis lanceolatis hirsutis margine aristato-ciliolatis 1½ cm. longis acuminates ascendentibus. Ovarium lineare 7 mm. longum breve hirsutum. Segmenta extus toto hirsuta. Sepalum posticum oblongo-lanceolatum 8 mm. longum 3 mm. latum apice obtusissimum basi vix vel haud contractum cum petalis galeam formans manifeste 1-nervium, lateralia postico aequilonga fere aequiformia apice obtusa. Petala oblanceolato-spathulata 7 mm. longa 2 mm. lata apice obtusissima basi gradatim attenuata tenuissime membranacea manifeste 1-nervia. Labellum saccatum 7 mm. longum 4 mm. latum apice triangulari-acutum ad summum obtusum, sacco intus hirsuto. Columna cum rostello 5 mm. longa 1½ mm. lata, rostello 2-lobo, lobis acutis.

Anthera ovata 3 mm. longa apice acuminata.

HAB. Urai, leg. S. SASAKI, Aprili. 1910.

Remarkable for the rostellum which is much longer than that of any other species of the genus in the island.

***Gastrodia* R. BR.**

Gastrodia dioscoreirhiza HAYATA sp. nov. Terrestriis aphylla. Tuber longissimum cylindricum vermiforme recurvum haud radiciferum 20-30 cm. longum 10-20 cm. in diametro rugosissimum squamis tenuissimis hyalinis sparse obtectum apice ad scapum abeuns. Scapi complanati fulvo-rubescens hac atque iliac vaginis brevibus instructi. Rhachis florifera 3-4 cm. longa glabra, bracteis oblongis 3 mm. longis 2 mm. latis apice obtusis valde concavis glabris, pedicellis erectis glabris ovario excepto 4 mm. longis, ovariis obconico-cylindricis apice haud contractis 2 mm. latis 2 mm. longis basi attenuatis. Sepala cum petalis connata tubum formantia fulvo-rubescens, tubo circ. 1 cm. longo 4 mm. lato 5-lobato, lobis exterioribus (sepalis) 1-2 mm. longis semi-clausis valde concavis intus laevibus extus tuberculatis, lobis interioribus (petalis) rotundatis 1½-2 mm. longis laevibus 1½ mm. latis basi contractis. Labellum..... Columna elongata triquetra ad angulos manifeste alata.

HAB. Girancho: Soseikyaku, leg. B. HAYATA, 12, Mai. 1916.

Very remarkable for its long cylindrical tubers.

***Platanthera* RICH.**

Platanthera stenoglossa HAYATA Ic. Pl. Formos. IV. p. 123.

HAB. Rankanzan, leg. B. HAYATA ad 4000 ped. alt., Mai. 1916.

Note: — Rhachis and sepals pale green; petals and lips pale yellow.

***Gymnadenia* R. BR.**

Gymnadenia Tominagai HAYATA sp. nov. Terrestriis. Caulis simplex 8-10 cm. longus erectus subrectus gracillimus supra basin 2-foliatus apice 1-2-floratus. Folia alterna oblanceolata 4 cm. longa 3½ mm. lata apice acuta basi gradatim attenuata erecta membranacea integra. Flores 1-2 terminales vel laterales, bracteis lanceolatis 1 cm. longis 3 mm. latis apice acuminatis glabris. Ovarium sessile ovoideo-cylindricum 7 mm. longum glabrum. Sepala inaequalia ; posticum erectum intus concavum oblongum 6 mm. longum apice obtusum basi plus minus contractum glabrum 3-nerviis, lateralia quam

posticum majora 7-8 mm. longa 4 mm. lata basi obliquissima basi latere inferiore rotundata. Petala ovato-oblongo-triangularia 6 mm. longa 3 mm. lata apice triangulari-acuta vel obtusa dorso apice plus minus carinata basi valde obliqua latere inferiore auriculato-rotundata basi latere superiore rotundata basi plus minus brevissime unguiculata. Labellum ad basin columnae adnatum sessile anteriore expansum secus longitudinem deorsum leviter plicatum, lamina in ambitu obtriangulari 1 cm. longa totiusque lata medio 3-lobata, lobis laterali-bus triangularibus lobo centrali aequilongis a lobo centrali angulo 45° egressis apice acutis, lobo centrali rectangulariformi 3-4 mm. longo 3 mm. lato apice 3-cuspidato, tota pagine tuberculatum, tuberculis acutis minutissimis, basi calcaratum, calcare infundibuli-tubuliformi 5½ mm. longo 1 mm. lato apice acuto. Columna brevissima 1½ mm. longa.

HAB. Nantocho: Gundaizan, leg. T. TOMINAGA, Aug. 1916.

Near *Gymnadenia lepida* REICHB. fil., but separable from it by the much narrower erect leaves.

Habenaria WILLD.

Habenaria Miersiana CHAMP. ; MATSUM. et HAYATA Enum. Pl. Formos. p. 419.

HAB. Shakko, leg. U. FAURIE, (NO., 951) Sept. 1914.

Haemodoraceae.

Peliosanthes ANDR.

Feliosanthes arisanensis HAYATA sp. nov. (Pl. XV.) Rhizoma nodosissimum repens 5 mm. crassum recurvum dense radicans, radicibus incrassatis 1½-2 mm. crassis. Folia singulariter disposita haud fasciculata longe petiolata oblanceolata chartaceo-membranacea 23-25 cm. longa 5-6 cm. lata apice acuminate basi gradatim recto-attenuata ad petiolum abeuntia margine integra sub microscopio minutissime serrulata utraque pagine glabra multi-nervia, venulis tessellatis, in specimine exsiccato nervis venis venulis tessellatisque totis elevatis distinctis, petiolis 25-26 cm. longis subteretibus glabris toto nudis haud squamatis. Scapi efoliati esquamati perfecte nudi 30-35 cm. longi (cum racemis) erecti recti glabri subteretes apice racemosi; racemi circ. 10 cm. longi laxiuscule florati, floribus tortu subsecunde dispositis basi bracteatis, bracteis

linearibus 1-2 cm. longis 2-3 mm. latis apice acuminatis basi latissimis dorso extus 3-nerviis leviter 3-carinatis valde concavis naviculiformibus descendentes apice ascendente-recurvis. Flores nutantes supra-axillares, ex altitudine 1 mm. supra axillas bractearum oriundi pedicellati, pedicellis glabris recto-descendentibus 3 mm. longis apice cum flore articulatis basi latere inter bracteam et pedicellum bracteola singula instructis, bracteolis glabris triangulari-lanceolatis 4 mm. longis intus concavis subplicatis naviculiformibus extus a basi usque ad apicem prominente carinatis apice interiore recurvis descendentes. Perianthium obconicum circ. 8 mm. longum 6-lobatum, tubo obconico 4 mm. longo 7 mm. lato glabro, lobis 3 exterioribus oblongo-triangularibus 6 mm. longis 4 mm. latis apice triangulari-obtusis basi leviter contractis utraque glaberrimis crassiusculis suberectis, lobis 3 interioribus aequilongis sed minus latis. Corolla secundaria e basi loborum perianthii oriunda erecta late tubosa 3 mm. longa 6 mm. lata crassissima extus intusque brevissime hirsuta apice plus minus contracta ore semi-clausa brevissime latissime 6—dentata vel subintegra intus infra apicem antherifera, antheris sessilibus rotundato-oblongis $\frac{3}{4}$ longis $\frac{2}{3}$ mm. latis apice emarginatis basi 2-lobatis interiore dehiscentibus. Ovarium 5 mm. longum cum tubo perianthii ad 2 mm. altitudinem connatum sursum 3 mm. liberum (parte libera late coniciformi) brevissime densissime pilosum apice triangulari-acutum ad stylum glabrum brevem 1 mm. longum crassiusculum abeans, deorsum 3-loculare sursum 1-loculare ovulis e basi loculorum oriundis linearibus 2 mm. longis $\frac{1}{3}$ mm. latis erectis in loculo singulo 2-3. Styli apice clavati ad summum leviter 3-lobati, stigmatibus ad summum styli λ -forme dispositis. Bacca globosa 1-sperma. Semina globosa 7 mm. in diametro, testa ? crassissima spongiosa ? Embryo linearis centralis 4-5 mm. longus 1 mm. latus subteres vel plus minus complanatus. *Peliosanthes courtallensis* HAYATA Fl. Mont. Formos. p. 225 (non WIGHT).

HAB. Mt. Arisan, prope Karapin, leg. B. HAYATA et S. SASAKI, Jan. 1912; leg. G. NAKAHARA.

Near *Peliosanthes courtallensis*, but differs from it in the much smaller flowers.

Peliosanthes Tashiroi HAYATA sp. nov. Rhizoma repens, radicibus incrassatis. Folia singulariter sita longe petiolata elongato-oblonga vel lanceolata circ. 20 cm. longa 3-7 cm. lata apice acuminata basi attenuata gradatim ad petiolum abeuntia margine integra sed sub microscopio minutissime serrulata chartaceo-membranacea utraque pagine glabra, nervis venis venulis tessellatisque utraque pagine in exsiccato distincte visis, petiolis basi nudis haud squamatis glabris subteretibus 24-25 cm. longis laminam foliorum in longitudine superantibus. Scapi cum racemis 12-22 cm. longi erecti glabri haud foliatis haud squamati glabri. Racemi 15-10 cm. longi glabri laxiuscule floriferi tortu subsecunde dispositis. Flores subnutantes, bracteis et bracteolis ut in *P. arisanensis*, sed quam iis minoribus vel interdum bracteolis medio pedicelli sitis, pedicellis 4 mm. longis descendentibus glabris cum perianthio articulatis. Perianthium 5-lobatum late campanulatum 1½ cm. latum extus glabrum, tubo late campanulato 2 mm. longo 4½-5 mm. lato glabro, lobis 5 triangulari-oblongis 5-6 mm. longis 4 mm. latis apice obtusis basi plus minus contractis margine integris sed minute ciliolatis vel haud ciliolatis extus glabris intus brevissime hirsutis. Corolla secundaria 2 mm. longa semi-globosa 5 mm. lata extus brevissime densissime hirsuta apice ore semi-clausa contracta 5-lobata, (lobis brevissimis late triangularibus 1 mm. latis ¼ mm. longis late acutis) intus hirsuta infra apicem loborum intus antherifera. Stamina 5, antheris sessilibus rotundato-ovatis 4/5 mm. longis 3/5 mm. latis apice emarginatis basi 2-lobatis interiore dehiscentibus. Ovarium sublibebrum fere superum basi leviter cum tubo perianthii connatum conicum brevissime dense hirsutum 2 mm. longum 2½ mm. latum basi latissimum sursum attenuatum apice ad stylum brevissimum glabrum 1 mm. longum apice stigmatiferum abeuns, ovulis a basi loculi oriundis paucis erectis. Bacca ellipsoidea, 1-sperma. Semina 7 mm. longa 6 mm. lata ellipsoidea, testa crassissima spongiosa ?

HAB. Taihoku cult.: leg. Y. TASHIRO, Feb. 1912.

Near *P. arisanensis* HAYATA, but separable from it by the pentamerous flowers.

Liliaceae.

Heterosmilax KUNTH.

Heterosmilax arisanensis HAYATA Ic. Pl. Formos. V. p. 235, descriptio aucta: Perianthium floris ? ovoideo-fusifforme 4 mm. longum 3 mm. latum glabrum apice leviter trilobatum, lobis triangularibus $\frac{1}{2}$ mm. longis obtusis semi-clausis glabris. Staminodia 3 linearia $2\frac{1}{2}$ mm. longa $\frac{1}{4}$ mm. lata complanata glabra. Ovarium ovoideum cum stylo brevissimo $2\frac{1}{2}$ mm. longum $1\frac{2}{3}$ mm. latum glabrum apice stylo conico $\frac{1}{3}$ mm. longo apiculatum, stylo apice acuto obscure 3-lobato, stigmatibus inconspicuis; ovarium 3-loculare, loculis 2-ovulatis.

HAB. Arisan, 2500 m., leg. U. FAURIE, Jun. 1914, (No. 309).

Rohdea ROTH.

Rohdea Watanabei HAYATA (XVI.) Ic. Pl. Formos. V. p. 236.

Lilium LINN.

Lilium Kanashiroi HAYATA sp. nov. Caulis simplex gracilis erectus 30 cm. longus teres $1\frac{1}{2}$ mm. in diametro sectionis glaber toto foliifer. Folia linearia lineari-lanceolata 6 cm. longa 2 mm. lata apice acuta vel obtusa basi deorsum attenuata ad basin subito dilatata sessilia chartacea, costa supra tenuiter impressa subtus tenuiter elevata. Flores ad apicem caulis solitarii terminales et generaliter cernui flavi. Segmenta (perianthii) a medio sursum retrorse reflexa patentia flava, exteriora 3 (§)-forme reflexa lineari-spathulata cum unguibus 4 cm. longa deorsum unguiformia, unguibus $1\frac{1}{2}$ cm. longis 3 mm. latis crectis margine interiore recurvis extus laevibus intus deorsum 2-striatim hirsutis, laminis linearibus $2\frac{1}{2}$ cm. longis 6 mm. latis planis exterioribus recurvis margine integra planis apice obtusis pilis claviformibus dense obtectis infra apicem extus callis singulis instructis intus infra apicem leviter concavis utraque pagina glabris haud costatis, nervulis parallelis undulatis; 3-interiora cum unguibus spathulata 4 cm. longa, unguibus $1\frac{1}{2}$ cm. longis apice gradatim ad laminam abeuntibus intus 2-striatim hirsutis extus glabris carinatis carinis ad laminam abeuntibus, lamina lineari $2\frac{1}{2}$ cm. longa 8 mm. lata apice emarginata vel breve 2-lobata apice in ambitu truncata margine integra sursum minute ciliolate sursum pilosiuscula, extus medio

prominente carinata intus haud carinata. Stamina 6, filamentis linearibus 22 mm. longis 1 mm. latis 1-nervatis complanatis apice subulato-acuminatis glabris, antheris flavis 8 mm. longis 1½ mm. latis utrinque emarginatis versatilibus. Ovarium cylindricum 14 mm. longum 2 mm. latum apice 6-lobulatum glabrum, stylo columnari 1 cm. longo glabro acute triquetro apice plus minus dilatato, stigmatibus 2-fido, segmentis patentibus semi-rotundatis 3 mm. longisque latis apice obtusis.

HAB. Loo-choo, leg. S. KANASHIRO, NO. 340, fl. flavo.

The present lily was previously identified with the Japanese *L. callosum* S. et Z. The latter is however limited to the southern part of Japan, while this new species is found only in the Loo-choo islands. The difference between the two species is, besides many others, observed in the color of the flowers. The perianth of *L. callosum* is reddish, while *L. Kanashiroi* is yellowish. The callosities at the apex of the leaves of the former can never be seen in the latter.

Lilium talanense HAYATA sp. nov. (Fig. 21). Pseudobulbi depresso-ovati vel depresso-rotundati 2½ cm. longi 3 cm. lati, squamis carnosissimis ovatis apice abrupte acutis, radicibus fibrosis e basi pseudobulbi oriundis. Caulis 20-30 cm. longus erectus rectus gracilis 2 mm. in diametro a basi usque ad medium foliifer. Folia linearia 5 mm. longa apice acuminata basi latissima 2-3 mm. lata glabra, costa supra impressa subtus tenuiter elevata, sessilia, superiora minora squamiformia. Flores ad apicem caulis terminales suberecti solitarii, interdum floribus 1-2 racemosum dispositis, pedunculis bracteis minoribus 2-3 remote alternatimque instructis, bracteis linearibus 5 mm. longis 1 mm. latis apice truncatis interiore recurvis callosis. Flores rubescentes 3 cm. in diametro. Segmenta, exteriora 3 lineari-spathulata 4½ cm. longa 6 mm. lata, apice calloso-obtusa concava plus minus cristata basi unguiforme attenuata utraque glabra, interiora paullo latiora 8 mm. lata apice obtusa haud cristata dorso prominente distincteque carinata basi unguiculata attenuata. Stamina 6, filamentis filiformibus complanatis 1-nerviis glabris 2½ cm. longis apice subulatis pallido-rubris, antheris rubris versatilibus linearibus 7 mm. longis. Ovarium clavato-prismatico-cylindricum 17 mm. longum 3 mm. latum apice truncatum basi attenuatum viride glabrum, stylo columnari 10 mm. longo clavato-triquetro



Fig. 21, *Lilium talanense* HAYATA.
(After a water-colour drawing by Mrs. T. KAWAKAMI.)

glabro, stigmati terminali globoso 3-4 mm. lato basi 3-lobato fulvo.

HAB. Shintikucho: Talang, Taiheito, ad 1900 ped. alt., leg. S. YAMADA, Aug. 1914.

Near *Lilium cattsom* S. et Z., but differs from it in the perianth-segments which are scarlet on the upper surface but light red on the back. The segments of *L. callosum* are usually purple on the back.

Juncaceae.

Juncus LINN.

Juncus leptocladus HAYATA sp. nov. Annua. Caulis tenuissimus glaber scandentissimus ramosissimus 26 cm. longus subteres gracillimus. Folia radicalia linearia circ. 12 cm. longa 1 mm. lata apice acuminata basi plus minus vaginata dorso complanata glaberrima margine interiore tenuissime recurva erecta tenuissima herbacea, vaginis 2-3 cm. longis latere uno fissis margine membranaceis. Flores laxissime cymosi breve vel longe pedicellati basi bracteis 2 instructi, bracteis triangulari-ovatis apice acutis hyalinis 2 mm. longis 1½ mm. latis glabris haud costatis haud nervosis. Perianthii segmenta exteriora 3 lanceolato-linearia 6½ mm. longa ⅔ mm. lata apice acuminata glabra late 1-costata margine hyalina, segmenta interiora lineari-lanceolata 4 mm. longa ⅔ mm. lata apice acuminata late 1-costata margine hyalina glabra. Stamina 6, filamentis filiformibus 1 mm. longis glabris basi se brevissime connatis, antheris linearibus 1 mm. longis ⅓ mm. latis utrinque obtusis. Ovarium glabrum lineari-ovoideum circ. 1 mm. longum ⅓ mm. latum apice ad stylum ½ mm. longum abeuns tri-sulcatum trigonum, stigmatibus 3-fidis.

HAB. Arisan, ad 8000 ped. alt., leg. U. FAURIE, Junio 1914.

Somewhat near *Juncus bufonius* LINN., but widely different from it in having far much longer perianth.

Aroideae.

Arisaema MART.

Arisaema arisanensis HAYATA sp. nov. Tuber depresso-globosum 2 cm. longum 3 cm. latum, radicibus a facie superiore tuberis oriundis teretibus. Caulis cum spadice 30 cm. longus glaber basi 13 mm. latus 1-2-vaginis instructus

2-foliatus. Folia 2 subopposita basi vaginata longe petiolata, petiolis vagina excepta 15 cm. longis glabris teretibus erectis, lamina tripartita 3-foliolata, foliolis sessilibus, foliolo terminali ovato-lanceolato 12 cm longo 4 cm. lato apice recto-acuminato (acumine lincari versus apicem filiformi, partibus filiformibus 1½ cm. longis) basi subito cuneato margine subintegro membranaceo utraque pagine pubescenti, venis lateralibus tenuissimis, foliolis lateralibus foliolo terminali aequilongis aequilatis sed valde obliquis latere inferiore basi rotundatis vel obtusissimis latere superiore basi acuminatis sessilibus. Spadix terminalis, pedunculo 6 cm. longo 3-4 mm. lato apice gradatim dilatato ad spatham abeunti. Spatha clavato-cylindrica 9-10 cm. longa, tubo 5 cm. longo 2 cm. lato latere uno fisso, limbo saccato-fornicato verticaliter late multi-striato, striis viridibus 2-3 mm. latis, tenuiter pubescenti. Spadix ♂ columniformis 6 cm. longus basi florifer; partibus floriferis cylindricis 13 mm. longis 6 mm. latis densiuscule floriferis; appendice 4½ cm. longa basi cylindrica, partibus inferioribus appendicis cylindricis 6-7 mm. longis 4 mm. latis, partibus supra partem cylindricam subito dilatatis 8 mm. latis sursum gradatim angustioribus apice obtusis. Fl. ♂ : stamen 1, subsessile; anthera 2-locularis, loculis globosis approximatis ½ mm. in diametro.

HAB. Arisan, 2500 m. alt., leg. U. FAURIE, Junio. 1914.

Resembles *Arisaema ringens* in having trifoliolate leaves and fornicate spathas, and in the spadix; but distinguishable from it in having much smaller hairy leaflets with a filiform tip and in the spadix which is more or less attenuate towards the apex.

Amorphophallus BLUME.

Amorphophallus (*Candarum*) **gigantiflorus** HAYATA sp. nov. (Fig. 22). Bulbus depresso-globosus vel semi-globosus 15 cm. longus 22 cm. latus basi rotundatus apice latissimus ad centrum valde depressus e centro scapum emittens facie cicatricibus radicis tuberculatus, radicibus incrassato-filiformibus 20-30 cm. longis 2½ mm. in diametro simplicibus haud ramosis. Scapus cum spadice circ. 45 cm. longus e centro summi bulbi oriundus spadice excepto 7 cm. longus 3½ cm. crassus rugosus basi bracteis duabus involutus, bractea inferiore triangulari-oblonga 20 cm. longa 10 cm. lata apice obtusa vel apiculata coriacea minute-nervosa intus concave margine interiore recurvata basin

scapi amplectanti, bractea superiore longiore 31 cm. longa 12 cm. lata obovato-oblonga basin scapi amplectanti intus concave minute nervosa. Spatha in statu obconico-campulata 30 cm. longa sursum 40 cm. in diametro, latere uno fissa spadice sinestro obtegens in explicato fere rotundata 40-50 cm. in diametro apice obscure triangulari-obtusa margine plicato-undulata, exta glabra laevis purpurco-viridescens albo-maculata (maculis rotundatis 6 mm. in diametro) usque ad prope 18 cm. altitudinem plus purpurea versus apicem plus viridescens, intus prope marginem laevis, partibus infra-marginalibus 7 cm. latis intus rugulosis viridescens,



Fig. 22, *Amorphophallus gigantiflorus* HAYATA.

partibus mediis 7 cm. latis intus laevibus albis, partibus inferioribus intus a basi usque ad 12 cm. altitudinem atro-purpureis densissime verrucoso-tuberculatis, (tuberculis setuloso-coniformibus circ. 2 mm. longia fulvis), prope latere uno laevis. Spadix in ambitu claviformis 38 cm. latus sessilis, partibus ovariiferis inferioribus 13 cm. longis cum pistilis 8 cm. latis cylindricis ovario excepto 5 cm. latis dense ovariiferis; partibus staminiferis superioribus obconicis cum staminibus 7 cm. longis 10 cm. latis basi 5 cm. latis apice 10 cm. latis densissime staminiferis ;

appendice depresso-conico-globosa 6 cm. longa 19-20 cm. lata ad summum rotundata atro-purpurea cava hac atque iliac grosse rugosa vel laevi toto minute tenuissime verrucosa. Fl. ♂ : densissime dispositi, stamine 1 ; anthera sessilis transverse insita lineari-rectangulari flavescens 4-5 mm. longa 2-3 mm. lata apice truncata laevis, loculis adnatis linearibus crassis. Fl. ♀ : pistillum densiuscule dispositum transverse insitum. Ovarium valde depresso-globosum glabrum leviter purpurascens 3 mm. longum 5 mm. latum laeve 3-loculare, parietibus crassissimis, loculis parvis, ovulis solitariis loculum complete occupantibus; stylo columnari 1 cm. longo glabro leviter purpurascenti, stigmati terminali 3-lobato cineraceo.

HAB. Tainancho : Kareikosho, Takunansha, leg. S. YUKI, Mai. 1914, fl.

Near *Amorphophallus campanulatus* BLUME (ENGL. Arac. in ENGL. PRANTL Nat. Pfl.-fam. II-3, p. 127, fig. 81).

Cyperaceae.

Cyperus LINN.

Key to the Formosan Species.

(Principally following to C. B. CLARKE in HOOK. f. Fl. Brit.

Ind. VI. pp. 597-619).

- I. Inflorescence umbellate throughout or capitate; spikelets digitate or clustered, not spicate. Style-branches linear, rarely linear-lanceolate. Very small slender annual, umbels nearly head-like, very rarely reduced to a single head. Spikelets small. Glumes mucronate..... *C. uncinatus*. Small or middle-sized, annuals or perennials; rhizome 0, or in *O. Haspan* creeping. Leaves and branches moderately long, narrow, weak. Inflorescence umbellate. Glumes scarcely cuspidate.
- Nut pale brown subequally trigonous *C. difformis*.
 Nut pale brown ovoid $\frac{1}{3}$ - $\frac{1}{2}$ length of obtuse glume.....*C. Haspan*.
 Nut marble-white plano-convex (plane face against rhachilla)
C. flavidus.
- Tall perennial with green somewhat broad (broadest in the genus) often 3-nerved leaves. Umbels compound*C. diffusus*.
- II. Inflorescence umbellate; spikes often more or less corymbed; spikelets (sometimes very shortly) spicate. Style-branches linear.

Series A. Rhachilla of spikelets not much winged. Leaves and bracts long (except in *C. malaccensis*).

Annuals, or sometimes flowering the second year.

Spikelets oblong or oblong-linear 12-25 mm. long 3 mm.-6 mm. broad..... *C. compress.*

Spikelets linear 8 mm.-13 mm. long 1½ mm. broad.....*C. Iria.*

Rhizome becoming woody, elongate stolons frequent. Large (or middle-sized).

Spikelets very narrow nearly filiformed 1-½ mm. broad.

Leaves usually few, topmost erect short green, sword-shaped, shortly candate.....*C. malaccensis.*

Leaves many, topmost spreading, long, much exceeding inflorescence.... *C. distans, C. nutans, C. eleusinoides.*

(Note : I can not satisfactorily distinguish these three species one from another).

Spikelets much broader oblong or linear never filiformed 1½-3 mm. broad.

Spikelets broadly linear nearly 2 cm. long 2-3 mm. broad...
..... *C. procerus.*

Spikelets oblong or linear narrower and shorter, not exceeding 8 mm. in length.

Glumes not imbricate, rhachilla hairy..... *C. pilosus.*

Glumes densely imbricate, rhachilla glabrous.

Nut oblong ⅔ mm. long..... *C. densespicatus.*

Nut elongately oblong nearly 1 mm. long.....

.....*C. mediorubra.*

Series B. Rhachilla of spikelets (usually conspicuously) winged.

Tall. Stolons long, hardening into creeping rhizomes. Leaves short, rarely ½ length of stem. Glumes approximate, closely imbricate..
..... *C. tegetiformis.*

Tall. Rhizome very short, woody; stolons 0, i. e. lateral shoots from base of stem immediately ascending. Glumes scarcely imbricate in fruit.....*C. Zollingeri.*

Tall or medium plants, stoloniferous or rhizome woody. Leaves and

bracts long, Rhachilla of spikelets winged. Glumes closely imbricate.

Stem at the base nodosely thickened suddenly constricted into a long rhizome..... *C. rotundas*.

Rhizome woody long-creeping, stem at top trigonous at base nodose.....*C. stolonifer*.

Stolons elongate rather slender, stem tall at base bulbose woody;*C. tuberosus*.

Tall. Stolons 0. Leaves and bracts long. Umbel large compound, spikes and spikelets many. Rhachilla of spikelets conspicuously winged. Anthers apiculate, not rarely crested, style (with its 3 branches) small. Nut small, ashy black.

Spikes digitate scarcely peduncled long-cylindric dense, spikelets linear 12-30-fld., glumes closely imbricate, wings of rhachilla oblong persistent, anthers short-oblong not crested *C. radiatus*.

Spikes (some) peduncled long cylindric, spikelets very many linear 8-20-fld., glumes closely imbricate, wings of rhachilla oblong persistent, anthers oblong not crested...*C. exaltatus*.

Umbel large compound, rays divaricate, spikes cylindric, spikelets very many linear 6-40-fld., wings of rhachilla lanceolate yellow soon deciduous, anthers linear-oblong scarcely crested; nut oblong-obovoid $\frac{1}{2}$ length of glume.....*C. digitatus*.

Cyperus procerus ROTTB. ; C. B. CLARKE in HOOK f. Fl. Brit. Ind. VI. p. 610 ; HEMSL. Ind. Fl. Sin. III. p. 215.

HAB. Hokuto, leg. T. SOMA, Nov. 1914.

Cyperus dense-spicatus HAYATA sp. nov. (Fig. 23-a-d). Caulis haud ramosus circ. 1 m. altus acute triqueter glaber erectus. Folia pauca linearia cum vaginis 60 cm. longa, laminis 7 mm. latis apice acuminatis margine integris haud scabris; foliis caulinis nullis, bracteis basi inflorescentiae insitis foliiformibus 40-50 cm. longis 6 mm. latis inflorescentiam in longitudine multo excedentibus glabris patentissimis. Inflorescentia duplicato-umbellata sessilis 10 cm. longa 15 cm. in diametro, radiis circ. 10 patentibus 10 cm. longis rectis simplicibus vel apice umbelluliferis, umbellulis sessilibus circ. 5-radiatis,

radiis 2-3 cm. longis a basi usque ad apicem densissime spiculiferis. Spiculae lineares 7 mm. longae 2 mm. latae; squamis infima persistenti excepta caducissimis, mediis rotundatis $1\frac{1}{2}$ mm. longis $1\frac{1}{3}$ mm. latis dorso subcarinatis apice ad cuspedem brevem abeuntibus subplicatis nuculam amplectantibus. Nucula oblonga $\frac{1}{2}$ mm. longa $\frac{1}{3}$ mm. lata laevis apice basi que obtuse facie plana dorso convexa subtrigona; stylus 3-fidus.

HAB. In paludosis Maruyama, leg. U. FAURIE, Mai. 1903, (No. 790).

Near *Cyperus pilosus* VAHL., but differs from it by the very much densely spicate and much shorter spikelets.

***Cyperus mediorubescens* HAYATA sp. nov.** (Fig. 23, e-g). Folia radicalia ignota. Caulis acute triqueter circ. 80 cm. altus glaber basi usque ad inflorescentiam simplex eramosus, bracteis manifestis 6 basi inflorescentiae insitis; bracteis inaequilongis longioribus circ. 40 cm. longis 5-6 mm. latis apice acuminatis inflorescentiam in longitudine 5-6-plo aequantibus. Inflorescentia umbelliformis sessilis, radiis circ. 10 simplicibus vel apice umbelluliferis inaequilongis 4-10 cm. longis glabris, umbellulis (i.e. spicis spicularum) circ. 5-radiatis 2-5 cm. longis patentibus a basi usque ad apicem densissime spiculiferis. Spicae (i.e. radii umbellularum) 2-5 cm.

longae 1 cm. latae sessiles densissime spiculiferae, bracteolis basi spiculae sitis singulis. Spiculae lineares rectae 6 mm. longae $1\frac{1}{2}$ -2 mm. latae apice basi que obtusae floribus utroque latere 10-12; squamis (glumis) mediis $1\frac{1}{2}$ mm. longis apice cuspidatis castaneis. Achaenium oblongum utrinque obtusum $\frac{2}{3}$ mm longum laeve subtrigonum dorso plus minus compressum plano-convexum dorso convexum facie planum; styli 3-fidi. Rhachilla latere compressa haud alata.

HAB. Ako: Sekisansho, leg. G. NAKAHARA, Sept. 1905.

Near *Cyperus pilosus* VAHL., but different from it by the very much densely spicate, much shorter spikelets.

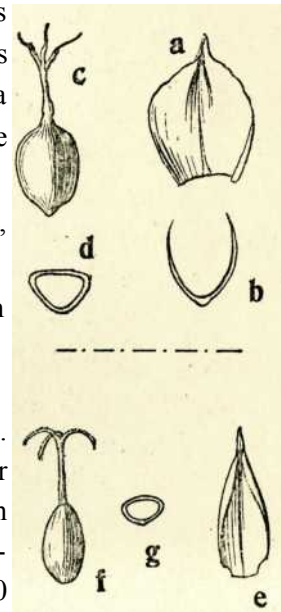


Fig. 23, a-d, *Cyperus densesplicatus* HAYATA.; a, a scale; b, the same in section; c, a nutlet; d, the same in section, e-g, *Cyperus mediorubescens* HAYATA; e, a scale; f, a nutlet; g, the same, in section.

Eleocharis R. BR.**Eleocharis acicularis** R. BROWN; MATSUM. et HAYATA Enum. Pl.

Formos. p. 480.

HAB. Taihoku: Koteisho, leg. Y. SHIMADA, Juli. 1914.

Eleocharis fistulosa LINK in HOOK. f. Fl. Brit. Ind. VI. p. 626.

HAB. Toyen, leg. S. SASAKI, NOV. 1910.

Eleocharis capitata R. BR. ; HOOK. f. Fl. Brit. Ind. VI. p. 627; MATSUM. et HAYATA Enum. Pl. Formos. p. 480.

HAB. Ako, leg. T. SOMA, Mai. 1915.

" Roots fibrous, stems somewhat slender, spikelets small dense obtuse, bristles as long as nut retrorsely scabrous brown or ferruginous, nut black smooth, style 2-fid base small depressed pale". " Stems 2-14 in. Spikelets 1/8-1/2 in. pale. Bristles 7, or fewer. Nut as long as 2/5 glume, compressed, obovoid."

Eleocharis (*Eu-eleocharis*—*Leiocarpicae*) **Shimadai** HAYATA sp. nov.

(Fig. 24). Annu. Caulis efoliatus 15-30 cm. longus 1/2 mm. latus erectus

rectus glaber teres basi vaginis singulis instructus, vaginis 3 mm. longis tubulosis 1/2 mm. latis haud fissis ore subtruncatis apice triangulari-acutis. Spicula solitaria terminalis oblonga cylindrical 7 mm.-20 mm. longa 2 1/2-4 mm. lata apice acuta basi obtusa basi bracteis persistentibus singulis instructis, bracteis oblongis apice obtusissimis basi

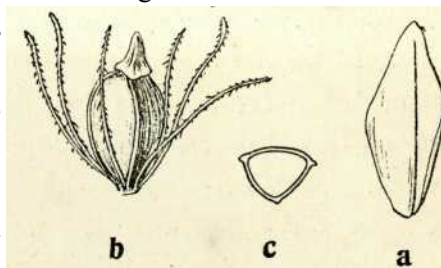


Fig. 24, *Eleocharis Shimadai* HAYATA; a, a scale; b, a nutlet with setae; c, the same in section.

spiculam semiamplectantibus hyalinis; squamis mediis rhomboideo-obovatis valde concavis 2 1/2 mm. longis 1 1/3 mm. latis apice obtusissimis basi subtruncatis. Setae 6 achaenium in longitudine duplo aequantes filiformes retrorse scabrae. Achaenium flavum obovoideum 1 mm. longum 1/2 mm. latum laeve dorso costato-angulatum facie planum in sectione triangulare apice obtusissimum basi angustatum, stylo basi valde dilatato, partibus dilatatis conicis apicem achaenii mitra-forme obtectis.

HAB. Hokuto, leg. Y. SHIMADA, (NO. 14, typus) Oct. 1914; Daiburin ,

leg. Y. SHIMADA, Mart. 1908, (No. 4320); Taikokan, leg. T. SOMA, 1912, Oct.

Near *E. afflata* STEUD, but differs from it by the much longer bristles which are as long as $3/2$ nuts. In *E. afflata* and *E. japonica*, the bristles are hardly visible from without, but in this new species, they are very conspicuous, and exerted beyond the glumes.

***Fimbristylis* VAHL.**

***Fimbristylis* (Sect. *Dichelostylis*) *aginkotensis* HAYATA sp. nov.** (Fig. 25). Tenuissima dense caespitosa 30-15 cm. alta. Folia basi caulis sita quam

caulis multo breviora 8 cm. longa filiformia erecto-recurvata basi vaginata, vaginis $1\frac{1}{2}$ -4 cm. longis 1 mm. latis tubuliformibus ore obliquis, laminis filiformibus 3-10 cm. longis in plicato $\frac{1}{3}$ - $\frac{1}{4}$ mm. latis margine interiore recurvo-plicatis igitur teretibus gracillimis glabris. Scapi foliis duplo longiores 10-30 cm. longi $\frac{1}{2}$ mm. lati gracillimi teretes vel plus minus complanati glabri apice spiculam singulam gerentes et apice ad bracteas abeuntes, bracteis singulis vel duabus 5-7 mm. longis linearibus apice obtusis $\frac{1}{2}$ mm. latis spicas exceedentibus basi dilatatis. Spicula ovoidea 7-8 mm. longa 3 mm.

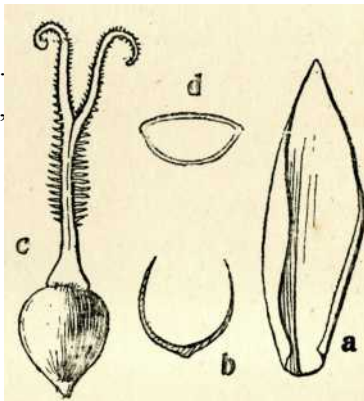


Fig. 25, *Fimbristylis aginkotensis* HAYATA; a, a scale; b, the same, in section; c, a nutlet with style; d, the same, in section.

lata apice obtusa basi rotundata, squamis mediis late oblongis 3 mm. longis $2\frac{1}{2}$ mm. latis apice breve acutis dorso ad setulam brevissimam productis. Nuculae obovatae $1\frac{1}{5}$ mm. longae $\frac{4}{5}$ mm. latae laeves biconvexae dorso plus facie minus convexae apice subtruncatae basi triangulari-acutae flavo-fulvescentes; styli 2 mm. longi basi dilatati sursum sub ramificatione dense barbati deorsum prope basin glabri apice 2-fidi, ramis recurvis.

HAB. Agincort, leg. T. KAWAKAMT, 1907, Sept.

Near *F. ferruginea* VAHL, but differs from it by the much more dilated conical base of the styles and in the inconspicuously tessellate nuts.

***Fimbristylis* (Sect. *Dichelostylis*) *anpinensis* HAYATA sp. nov.** (Fig. 26). Planta dense caespitosa basi densissime radicefera radicibus fibrillatis. Caulis gracilis 60-40 cm. longus glaber teres subrectus vel plus minus recurvus basi squamis

et foliis instructus basi sursum efoliatus inflorescentis exceptis haud ramosus, squamis infimis triangularibus minutis interioribus gradatim elongatis longioribus ad folium abeuntibus. Folia subacerosa recta erecta glabra cum vaginis 10-20 cm. longa, vaginis quam lamina duplo longioribus 2 mm. latis apice transverse vel plus minus oblique truncates latere dorsali excepto tenuissime membranaceis hyalinis, laminis acerosis apice acutis vel obtusis margine plus minus plicato-recurvis in sectione ^-formibus glabris in explicato 1 mm. vel minus quam 1 mm. latis. Cymae subumbellatae vel corymbosae, (radiis vel ramis 5-8, 1-6 cm. longis laxe et pauceque 1-5 spiculiferis), basi bracteis 4-5 suffultis, bracteis foliiformibus basi gradatim dilatatis basin cymae amplectantibus 1-5 cm. longis nunquam ramos inflorescentiae superantibus.

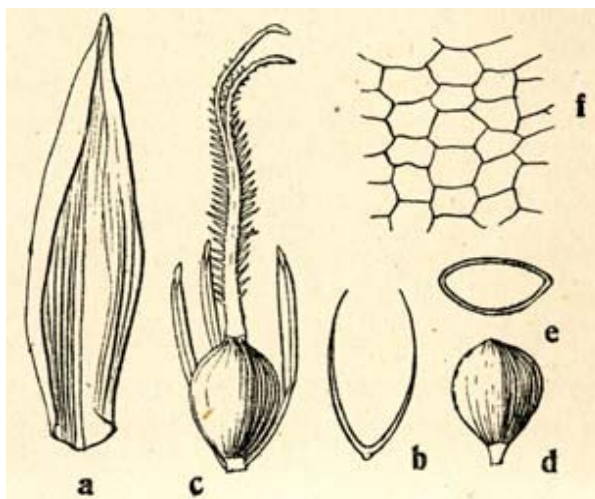


Fig. 26, *Fimbristylis anpinensis* HAYATA; a, a scale; b, the same in section; c, an ovary with the style and stamens; d, a nutlet; e, the same in section; f, cellular structure of the outer coat of the nutlet.

Spicula lineari-oblonga 1 cm. longa 3-4 mm. lata apice acuta basi obtusa; squamis mediis ovato-oblongis $4\frac{1}{2}$ mm. longis $2\frac{1}{2}$ mm. latis apice acutis obscure 1-costatis integris. Nucula obovata $1\frac{1}{3}$ mm. longa $\frac{4}{5}$ mm. lata apice truncato-rotundata basi cuneato-attenuata laevis facie minus dorso plus convexa. Styli $4\frac{1}{2}$ mm. longi apice 2-fidi (ramis glabris filiformibus $1\frac{1}{2}$ mm. longis recurvis) basi haud dilatati glabri supra basin usque ad ramificationem barbati.

HAB. Anpin, leg. TAKAGI, Oct. 1914.

Near *F. ferruginea*, but separable from it by the perfectly smooth nutlets.

Fimbristylis (sect. *Dichelostylis*) **boninensis** HAYATA sp. nov. (Fig. 27).

Planta caespitosa ascendens. Caulis (vel scapus) 20-50 cm. longus erectus rectus valde complanatus (ut videtur) glaber in exsiccato multo-sulcato-striatus 2 mm.- $2\frac{1}{2}$ mm. latus apice capitatum spiciger basi squamis et foliis suffultus, squamis exterioribus ovatis, interioribus gradatim elongatis ad folium abeuntibus. Folia

coriacea ad basin caulis conferta cum vaginis 7-35 cm. longa 5-2½ mm. lata linearia erecta vel recurva glabra, vaginis 3-10 cm. longis cylindricis latere interiore tenuissime membranaceis hyalinis ore oblique truncates minute hirsutis, laminis glabris coriaceis margine sub lente minute serrulatis margine exteriori leviter recurvis. Capitula spicularum globosa singulariter vel geminatim sita 2 cm. in diametro basi bracteis 2 instructa, bracteis 2-4 cm. longis foliiformibus horizontaliter divaricatis. Spicula dense 10-20 congesta ovoideo-fusiformis 8-12

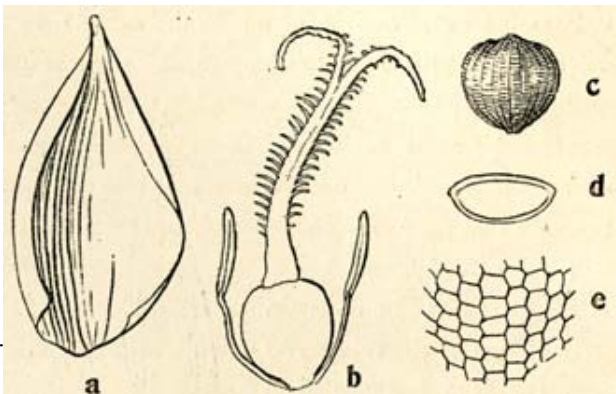


Fig. 27, *Fimbristylis boninensis* HAYATA; a, a scale; b, an ovary with the style and stamens; c, a nutlet; d, the same in section; e, cellular structure of the outer coat of the nutlet

mm. longa 3-5 mm. lata apice acuta basi obtusa, squamis mediis ovato-triangularibus 3½ mm. longis totiusque latis apice breve cuspidato-acutis 1-costatis integris. Nucula obtriangulari-obovoidea 1½ mm. longa 1 mm. lata vel minus lata apice truncata ad centrum breve apiculata basi obtusa vel cuneato-obtusa longitudinaliter tessellata dorso plus facie minus convexa subplanoconvexa. Styli 3 mm. longi lineares ½ mm. lati apice 2-fidi, ramis recurvis, basi haud vel vix dilatati apicem nuculae obtegentes medio sursum usque ad ramificationem dense barbati basi cum ramis glabri.

HAB. Bonin : Chichizima, leg. H. HATTORI, Sept. 1905.

Comparable to some extent to *F. sericea*, but greatly different from it by the very much longer glabrous leaves.

***Fimbristylis* (Sect. *Eleocharioides*) *kagiensis* HAYATA sp. nov.** Annu? caespitosa 10-15 cm. alta. Caulis (vel scapus) 8-15 cm. longus basi squamis foliis suffultus. Folia cum vaginis 6-15 cm. longa quam caulis longiora vel breviora suberecta vel ascendentia lineari-filiformia vel acerosa glabra, vaginis 1½ cm. longis laminam ½-⅓-plo aequantibus tubiformibus latere interiore tenuissime membranaceis, ore obliquo utraque latere auriculis rotundato-triangularibus

instructo ad insertionem laminae breve ciliato, lamina 4-10 cm. longa margine interiore plicato-recurva in explicata 1 mm. lata margine glabra sed versus apicem breve serrulata ad apicem obtusa. Spicula terminalis solitaria ovoideo-globosa vel elongato-ovoidea 6-7 mm. longa 3 mm. lata basi bracteis singulis vel duabus instructa, bracteis minutis cuspidato-triangularibus 3 mm. longis basi $1\frac{1}{2}$ mm. latis caducissimis glabris margine hyalinis tenuissimis medio tri-nerviis. Squamae valde concavae glabrae 3 mm. longae in explicato 3-4 mm. latae rotundatae brevissime mucronatae basi truncatae multinerviae dorso medio castaneae versus basin margineque hyalinae ecoloratae. Nuculae biconvexae $1\frac{1}{2}$ mm. longae 1 mm. latae apice fere rotundatae basi plus minus cuneato-angustatae fulvo-pallidae, stylis plus minus exsertis 2 mm. longis basi plus minus incrassatis sursum barbatis apice 2-fidis, ramis gracillimis desuper recurvis haud barbatis rubro-ferrugineis.

HAB. Kagi, leg. T. SOMA, Sept. 1914.

Near *F. polytrichoides* VAHL, but differs from it in having whitish nutlets with the barbate styles.

Fimbristylis (Sect. *Trichelostylis*) **kankaoensis** HAYATA sp. nov. (Fig. 28). Rhizoma subrectum ramosum, radicibus et reliquis foliorum dense obtectum apice ad caulem abeuns.

Folia glabra basi caulis densissime fasciculata patentissima cum vaginis 4-5 cm. longa, vaginis valde dilatatis 13 mm. longis latissimis cum iis alteris connatis tenuibus, laminis linearibus basi latissimis sursum gradatim angustioribus basi $3-3\frac{1}{2}$ mm. longis crasse coriaceis valde rigidis supra concavis subtus convexis margine sub lente minute

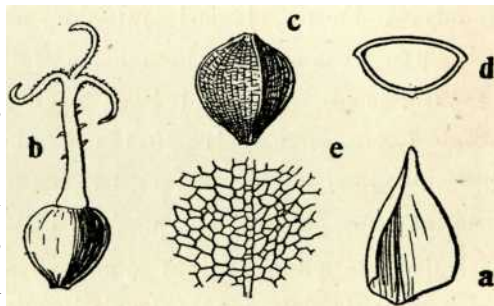


Fig. 28, *Fimbristylis kankaoensis* HAYATA; a, a scale; b, an ovary with the style; c, a nutlet; d, the same in section; e, cellular structure of the outer coat of the nutlet, dorsal angle seen from front.

duplicato-serrulatis sursum subintegris apice obtusissimis. Scapi 10-18 cm. longi erecti recti graciles complanati (semper ?) $\frac{2}{3}$ mm. lati glabri plus minus sulcati a centro fasciculorum foliorum basilarium oriundi basi squamis lineari-lanceolatis 3-4 instructi versus apicem cymosi 2-4 ramosi, ramis inaequalibus

minus quam 2 cm. longis ad apices spiculas capitulatim gerentibus. Spiculae ad apicem ramulorum capitatum 4-5 sitae rotundato-ovate 4-5 mm. longae 3 mm. latae apice obtusissimae basi rotundatae, squamis infimis (i.e. bracteolis ?) sterilibus ovato-triangularibus apice acutis 2 mm. longis; squamis mediis ovato-triangularibus 2 mm. longis $1\frac{1}{2}$ mm. latis apice obtusis dorso prominente carinatis. Nuculae depresso-obovatae $\frac{2}{3}$ mm. longae totiusque latae apice truncatae basi acutae sub lente minute tuberculatae sursum fusco-fulvescentes deorsum flavo-fulvescentes vel maturo fusco-rubescens dorso valde convexae vel angulato-convexae facie subplanae in sectione plano-convexae vel subtrigonae; styli $1\frac{1}{2}$ mm. longi 3-fidi subglabri.

HAB. Kankao, leg. B. HAYATA, Juli. 1914.

Comparable to some extent to *F. junciformis* KUNTH, but greatly different from it in having dark brown nuts with quite glabrous styles.

Fimbristylis (Sect. *Eleocharioides*) **takaosnsis** HAYATA sp. nov. (Fig. 29). Rhizoma ramosum fere erectum dense radiciferum. Caulis caespitosus gracillimus circ. 20 cm. longus teres vel subcomplanatus $\frac{1}{2}$ mm. latus vel latior erectus apice plus minus recurvus apice ad bracteas singulas productus, bracteis interdum obsoletis filiformibus erectis spicam exceedentibus 1-1 $\frac{1}{2}$ cm. longis. Folia ad basin caulis sita pauca 1-3 cum vaginis 10-15 cm. longis filiformia erecta, vaginis 2-3 cm. longis 1 mm. latis tubuliformibus ore obliquissimis glabris, auriculis late triangularibus $\frac{1}{2}$ mm. longis

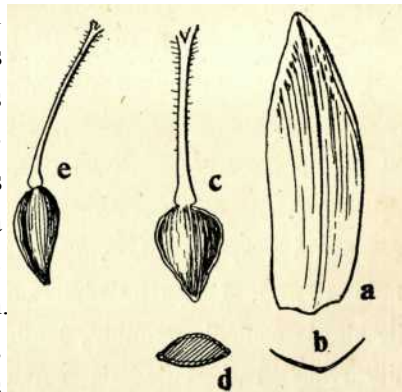


Fig. 29, *Fimbristylis takaosnsis* HAYATA; a, a scale; b, section of the same; c, a nutlet with the style; e, the same, seen from side; d, section of the same.

$\frac{2}{3}$ mm. latis, laminis 5-6 cm. longis in plicato latere complanatis $\frac{1}{3}$ mm. latis apice acutis margine integris prope apicem paucis minute obscure setuloso-serrulatis. Spicula solitaria cylindrico-ovata circ. 1 cm. longa 3 mm. lata utrinque obtusa basi bracteis deciduis singulis instructa; squamis mediis oblongo-linearibus 3-3 $\frac{1}{2}$ mm. longis 1 mm. latis apice obtusis vel triangulari-obtusis obtusissimis vel truncates sursum castaneo-fulvescentibus medio margine basique ecoloratis. Achaenium

(maturum) obovatum 1 mm. longum $\frac{2}{3}$ mm. latum facie subplanum dorso convexum in sectione sursum piano-convexum deorsum rhomboideum dorso facieque tuberculis minutis notatum apice obtuso-truncatum basi cuneato-acutum; stylus gracilis $2\frac{1}{2}$ mm. longus apice supra squamam exsertus supra medium pilosus supra medium 2-fidus, (ramis 1 mm. longis gracilibus recurvis), basi leviter dilatatus vel haud dilatatus glaber.

HAB. Takao, leg. Y. SHIMADA, Mai. 1915.

Near *F. polytrichoides* VAHL, but differs from it by the much larger spikelets and nuts which are as long as $\frac{1}{3}$ glume with much longer styles than nuts.

Fimbristylis (Sect. *Dichelostylis*) **tikushiensis** HAYATA sp. nov. (Fig. 30). Planta plus minus caespitosa. Caulis cum inflorescentiis 40-80 cm. longus

brevissime hirsutus vel subglabratus teres in exsiccato multo-sulcatus basi sursum usque ad inflorescentiam haud ramosus erectus rectus basi squamis et foliis suffultus, squamis exterioribus ad folium abeuntibus. Folia basi caulis conferta erecta vel recurva linearia 30-40

longa 3-4 mm. lata apice obtuse basi vaginata supra minus subtus plus villosa hirsuta, vaginis 5-15 cm. latis ore obliquis hirsutis. Inflorescentia 10-15 cm. longa cylindrico-pyramidalis in circumscriptione, basi umbellatim ramosa, ramis lateralibus inaequalibus 2-10 cm. longis, ramo centrali longissimo 15 cm. longo, apice spiculas singulas vel multas corymbose laxaque gerentibus, basi bracteis 5-8 quasiverticillatim instructa, bracteis foliiformibus vel acerosis 2-5 cm. longis inflorescentiam $\frac{1}{3}$ -plo aequantibus villosis. Spiculae oblongae 1 cm. longae 5 mm. latae apice acutae, squamis mediis rotundotriangularibus $3\frac{1}{2}$ mm. longis 3 mm. latis apice acutis. Nuculae obovato-rotundatae 1 mm. longae $\frac{4}{5}$ mm. latae apice truncatae basi obtusae biconvexae

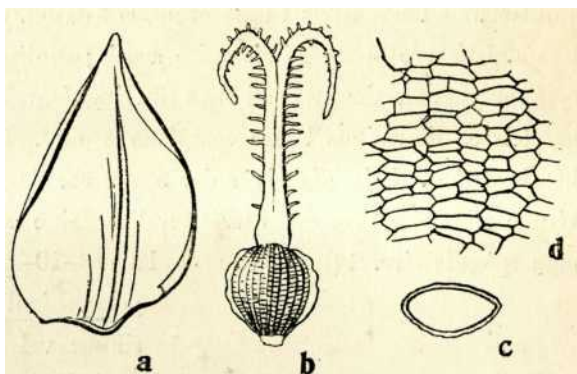


Fig. 30, *Fimbristylis tikushiensis* HAYATA; a, a scale; b, a nutlet, with the style; c, the same in section; d, cellular structure of the outer coat of the nutlet.

sub lente tessellatae leviter elevato-tuberculatae. Styli 3 mm. longi apice 2-fidi, (ramis recurvis), medio sursum usque ad ramificationem dense barbati basi glabri haud vel vix dilatati; ramis styli glabris.

HAB. Tikushiko, leg. Z. KOBAYASHI, Aug. 1907.

Near *F. diphylla* VAHL, but separable from it by the scabrous broader nutlets and villose leaves.

Scirpus LINN.

***Scirpus* (Sect. *Euscirpus*) *erecto-gracilis* HAYATA sp. nov.** (Fig. 31). Annuæ dense caespitosa efoliata. Caulis simplex haud ramosus erectus triqueter glaber 7-25 cm. longus 1 mm. latus efoliatus basi vaginis 2-3 instructus, vaginis infimis brevibus, superioribus longioribus tubuliformibus 3-4 cm. longis 2 mm. latis ore obliquissimis apice acutis; caulis apice cyma singula terminatus et ad bracteam singulam abeuns, bracteis cauliformibus latere complanatis circ. 10 cm. longis 1 mm. latis glabris apice acutis erectis rectis. Cymae ad apicem caulis quasilateraliter sitae sessiles cum spiculis circ. 1 cm. longae et latae 8-10-spiculigeræ, spiculis sessilibus vel breve

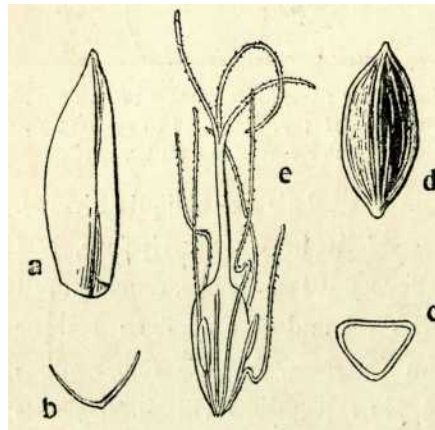


Fig. 32, *Scirpus morrisonensis* HAYATA; a, a scale; b, the same in section; c, a pistil with setae; d, nutlet; e, the same in section.

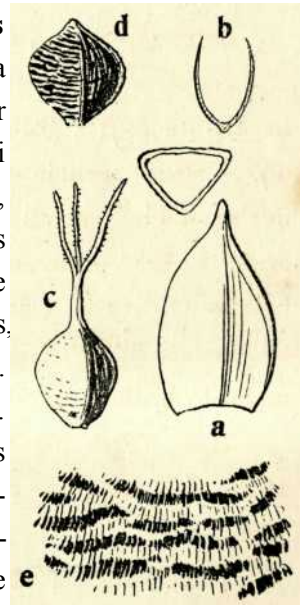


Fig. 31, *Scirpus erecto-gracilis* HAYATA. a, a scale; b, the same in section; c, an ovary; d, a nutlet; d, section of the same; e, cellular structure of the outer coat of the nutlet; transverse grooves and ridges are distinguished by black and white.

pedicellatis, pedicellis basi bracteis minutis instructis. Spiculae oblongae 4 mm. longae 2½ mm. late, basi bracteis (vel squamis sterilibus ?) singulis instructae; squamis mediis 2⅓ mm. longis apice cuspidatis. Nuculae depresso-obovatae 1⅓ mm. longae 1 mm. latae apice late breve acutae basi breve cuneatae in sectione

triangulares dorso angulato-convexae facie planae sursum fusco-rubescetes deorsum fulvescentes transverse rugulosae.

HAB. Ako: Kotansho, leg. G. NAKAHARA, (NO 510), Sept. 1905; Bioritsu : Soyosho, leg. G. SHIMADA, Aug. 1907.

Related to *S. supinus*, *S. erectus* and *S. articulatus*; but different from them by the very much smaller spikelets and by the absence of bristles.

Scirpus morrisonensis HAYATA, (Fig. 32) Fl. Mont. Formos. p. 230.

Scirpus (Sect. *Euscirpus*) *Sasakii* HAYATA sp. nov.

Scirpus supinus LINN. ? " CLARKE in HOOK. f. Fl. Brit. Ind. VI. p. 655 :—Stems medium terete, spikelets in a single lateral head, glumes ovate keeled with suberect mucro, bristles 0, styles 3-fid, nut obovoid triquetrous obtuse transversely scabrous undulate black."

HAB. Toyen, leg. S. SASAKI, NOV. 1910; Taihoku, leg. S. SASAKI, Juli. 1909.

It is with some hesitation that I have compared this plant to *S. supinus* LINN. The nuts of our plant are very faintly transversely muricated, the styles are 2-fid, bristles always present (6 in number), nuts plano-convex. Our plant is, however, certainly nearer to *S. supinus* than to *S. erectus* in the characters of carinate mucronate glumes and angular spikelets. The description of this new species will be given in the next volume.

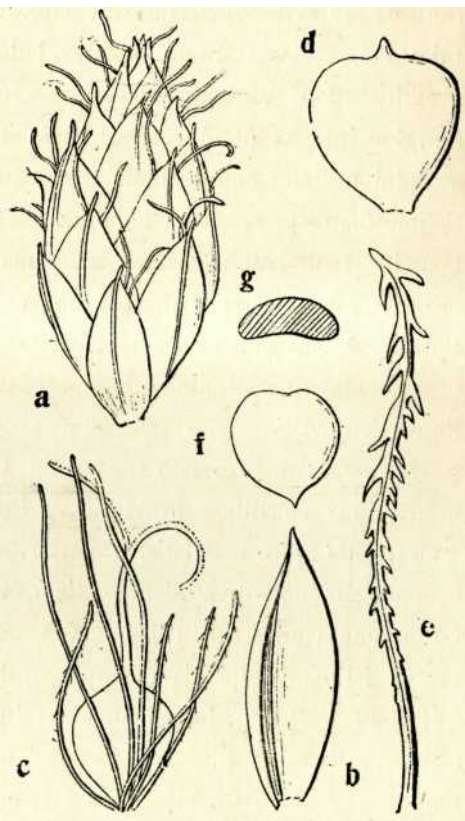


Fig. 33, *Scirpus Sasakii* HAYATA; a, a spikelet; b, a glume; c, an ovary with filaments and setae; d, a nutlet; e, a seta (greatly magnified); f, a seed; g, section of the same.

Rhynchospora VAHL.

Rhynchospora glauca VAHL; C. B. CLARKE in HOOK f. Fl. Brit. Ind. VI. p. 671; HEMSL. Iud. Fl. Sin. III. p. 259.

HAB. Loo-choo : Nakanoshima, leg. S. KAWAGOI, Oct. 1910.

Rhynchospora longisetigera HAYATA sp. nov. Ad humidum vel aquam crescens haud caespitosa semper solitaria; rhizoma ignotum versimiliter repens ? Caulis tenuis gracilis 60-100 cm. altus erectus basi usque prope apicem haud ramosus versus apicem pauci-ramosus glaber triqueter 1-1½ mm. latus basi foliis radicalibus caulinis basilaribusque 4-5 suffultus. Folia radicalia caulinis multo breviora linearia circ. 10 cm. longa secus longitudine interiore plicata in plicato 1 mm. lata vel haud plicata plana tunc 2 mm. lata apice acuminata basi vaginato-dilatata, costa supra impressa subtus acute carinata, margine integra haud scabra laevia utraque pagine glabra apice acuminata, acuminibus interdum triquetris interdum subplanis. Folia caulina 3-4 remotissime disposita inferiora longiora cum vaginis 20-30 cm. longa foliis radicalibus longiora basi vaginata, vaginis 2-4 cm. longis tubuliformibus glabris ore truncatis, auriculis perfecte obsoletis, nervis lateralibus haud visis. Spiculae versus apicem rami et caulis pauce corymbose vel subglomeratim 3—6 dispositae breve pedicellatae, pedicellis plus minus hirsutis 1-3-bracteatis, bracteis lineari-lanceolatis apice interdum setosis vel toto obsoletis; spiculae lineari-fusiformes in maturo late fusiformes 6-7 mm. longae utrinque acutae, squamis inferioribus sterilibus brevioribus, infimis ovato-triangularibus 2 mm. longis 1 mm. latis apice subulatis, superioribus gradatim longioribus 1-2 fertilibus; squamis fertilibus ovato-lanceolatis 7 mm. longis 2½ mm. latis apice acuminatis ad summum ad setulam ⅓ mm. longam productis basi contractis angustissimis medio latissimis spiculam amplectantibus castaneis; costa obscura. Setae 5, filiformes 4-4½ mm. longae nuculam in longitudine 2-plo superantes antrorse scabrae. Stamina 3. Nucula obovata 2 mm, longa 1½ mm. lata apice late truncata basi cuneata biconvexa latere prominente carinata sub lente tenuissime elevato-reticulata castanea; stylus longissimus 8 mm. longus gracillimus filiformis medio sursum bifidus basi valde conico-dilatatus ad basin 1 mm. latus glaber.

HAB. Suisha, leg. B. HAYATA, Mai. 1912.

Near *R. glauca* Vahl; but separable from it in the very much longer setae and longer spikelets.

Cladium P. BR.

Cladium jamaicense

CRANTZ (Fig. 34); HAYATA Mater. Fl. Formos. p. 377. Our specimens are a little different from the typical form of the species. In the former, the spikelets are arranged in the less numerous clusters and the inflorescence is looser than in the latter.

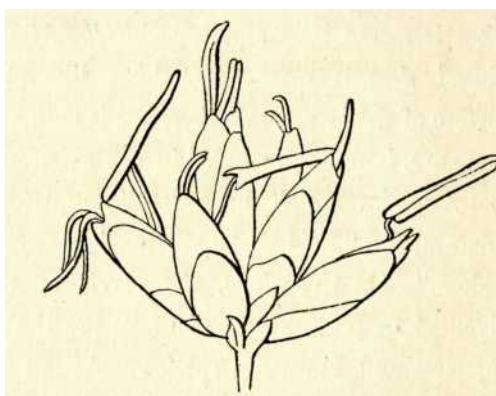


Fig. 34, *Cladium jamaicense* CRANTZ; a, a cluster of spikelets.

Scleria BERG.

Scleria pubigera MARINO.

HAB. Toyen, leg. T. SOMA, Oct. 1914; Daijiorin, leg. Y. SHIMADA, Oct. 1914.

Compared with a specimen so labelled in the Herbarium at Tokyo. Our specimens are more patently or sometimes retrorsely hairy, while the Japanese are less patently hairy.

Carex LINN.

On working up the collections of *Carex*, I have principally followed the system of G. KUKENTHAL appearing in ENGLER'S "Das Pflanzenreich: Cyperaceae-Caricoideae." Among the subgenera, *Primocarex* is not represented in Formosa, while *Vignea* is represented by 1. *Indocarex* also by 5, and *Eucarex* by 28 species. As to the arrangement of the sections of the subgenus *Eucarex*, I have found it extremely difficult to follow KUKENTHAL'S system. According to this eminent authority, the subgenus is divided into two groups on the basis whether utricles are "erostrati vel brevirostres raro longirostres, rostrum ore truncatum vel emarginatum raro leviter bidentatum," or "longius vel brevius rostrati, rostrum ore bidentatum raro integrum." This arrangement is not proved to be practicable in the Formosan species. The latter group is divided into two divisions on the basis whether leaves are "nunquam septatodosa" or "septato-nodosa." I am very much puzzled to understand

what is meant by "septato-nodosa." After some considerations, I became convinced that it means something like elevation of tessellate veinlets on the surface of the leaves, and therefore it means "gegittert." According to his system there are, however, included in the subgroup of "folia nunquam septato-nodosa" many species which have "folia septato-nodosa;" and there are also in the subgroup of "folia septato-nodosa," many plants whose leaves are not "septato-nodosa." On the whole, the clavis of the sections of the subgenus *Eucarex* given by KUKENTHAL is not practicable, as far as are concerned the Japanese and Formosan species. As an example of the contradiction, I may point out *Carex alliiformis* included after his system in the subgroup of "folia nunquam septato-nodosa," and *C. pumila* referred to the subgroup of "folia septato-nodosa." The leaves of the former species have distinctly elevated tessellate veinlets, while those of the latter do not show any trace of elevated veinlets.

Conspectus of the subgenera of the Formosan Species.

- a. Spicules usually bisexual, sessile, cladoprophyllum (scale at the base of spicules) mostly wantingsubg. *Vignea*.
- b. Spicules bisexual or unisexual often pedunculate, cladoprophyllum usually exists.
 - a. Spicules usually bisexual, cladoprophyllum utriculiformed....
subg. *Indocarex*.
 - b. Spicules mostly unisexual, cladoprophyllum ocreaeformed....
subg. *Eucarex*.

Subgenus **Vignea** NEES.

Spicules ♂ at the apex.

Sect. *Faetideae*.....*C. pseudo-arenicola*.

Spicules ♂ at the base.

Sect. *Elongatae*: This is not represented in Formosa.

Carex pseudo-arenicola HAYATA sp. nov. (Fig. 35, f-j). Rhizoma repens plus minus ascendens teres supra quasi-1-seriatim caules vel fasciculos foliorum gerens. Fasciculus foliorum 5-6-foliatus basi squamis oblongis apice acutis 3-4 instructus, foliis linearibus cum vagina 17 cm. longis 2 mm. latis, vaginis tubuliformibus 3 cm. longis circ. 2 mm. latis ore perfecte truncatis,

laminis glabris chartaceo-membranaceis planis marginibus haud scabris. Caulis glaber basi foliis paucis instructus scapiformis circ. 20 cm. longus apice spiculas spicatum gerens, spicis 2-3 cm. longis 5 mm. latis; spicula terminali masculina, lateralibus bisexualibus. Spiculae erectae haud patentes a se 2-4 mm. distantes; lateralibus 7-8-floratis, floribus superioribus masculinis caeterum foemineis; cladophyllum nullum. Fl. ♂ : squamis oblongis 3 mm. longis ; stamina 3, antheris linearibus 1¼ mm. longis apice fasciculo minuto singulo pilorum coronatis basi brevissime auriculatis. Fl. ♀ : glumis (vel squamis) mediis ovato-lanceolatis 3-4 mm. longis 1½ mm. latis apice acuminatis glabris 1-costatis margine erosis. Utriculus ovato-lanceolatus 4 mm. longus 1 mm. latus apice acuminato-attenuatus ad summum 2-dentatus basi obtusus dorso convexus facie planus margine sub microscopio remote minute setulosus dorso 5-castaneo-striatus glaber. Nucula oblonga glabra plano-convexa *Carex arenicola* HAYATA Mater. Fl. Formos. p. 378 (non F. SCH.)

HAB. Mt. Morrison, leg. T. KAWAKAMI et U. MORI, Oct. 1908.

Resembles *C. arenicola* F. SCHMIDT in the external features; but really distinct from it in having lanceolate utricles which are attenuate at both apex and base, and in the lack of spongy excrescence at the base of the utricles.

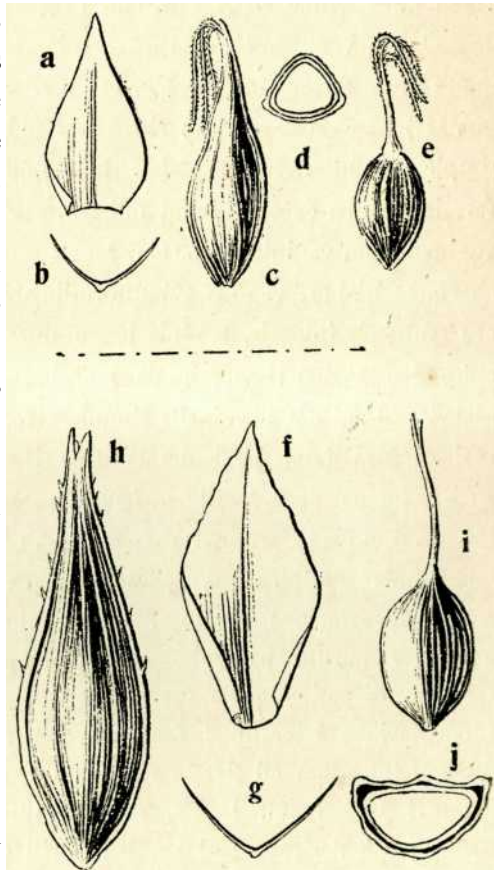


Fig. 35, a-e, *Carex satsumensis* FR. et SAV. var. *Nakaii* HAYATA; a, a scale; b, the same in section; c, an utricle; d, the same in section; e, a nutlet. f-j, *Carex pseudoarenicola* HAYATA; f, a scale; g, the same in section; h, an utricle; i, a nutlet; j, the same in section, with the utricle.

Subgenus **Indocarex** BAILL.

Spicules all supported by a fertile cladoprophyllum ; bracts nearly none
sect. *Japonicae*.

Spicules all supported by a sterile cladoprophyllum.

Spicules cylindrical 2-6 cm. longsect. *Polystachyae*.

Spicules hardly longer than 1.5 cm.sect. *Indicae*.

Sect. *Japonicae*.

Culms slender nearly 30 cm. long*C. satsumensis*, var. *longiculma*.

Culms very much shorter, usually 10 cm. long.. *C. satsumensis* var. *Nakaii*.

Carex satsumensis FR. et SAV. var. **longiculma** HAYATA n. v. (Pl. XVII.) Dense caespitosa; rhizoma haud repens. Caulis circ. 30 cm. longus simplex haud ramosus glaber basi foliis 2-4 suffultus apice spicato-paniculiformis basibus exceptis haud foliatus. Folia basi caulis quasi-fasciculata longe vaginata cum vaginis 30-40 cm. longa caulem in longitudine superantia tenuiter chartacea glabra, vaginis tubuliformibus 5-10 cm. longis tenuiter membranaceis ore truncatis integris, laminis longe linearibus 20-30 cm. longis 2½-3 mm. latis apice longe lineari-acuminatis margine tenuiter scabriusculis utraque pagine glabris. Panicula terminalis singula circ. 6 cm. longa cylindrica 1-1½ cm. lata basi et basi rami paniculae bracteis instructa erecta, ramis brevibus paucis 1 cm. longis ascendentibus haud patentibus interdum leviter patentibus; bractea cum cladoprophylo singula sub ramo paniculae insita; bracteis infimis longissimis foliiformibus paniculam in longitudine superantibus; bracteis caeteris brevioribus 2-3 mm. longis subulato-linearibus basi dilatatis. Spiculae a basi ramorum paniculae usque ad apicem vel in parte superiore paniculae spicatim dispositae generaliter bisexuales (sed in ramo inferiore unisexuales tunc floribus lateralibus foemineis, iis terminalibus masculinis); spiculae inferiores interdum ad florem singulum foemineum reductae, superiores bisexuales cylindricae 5-6 mm. longae, floribus inferioribus foemineis superioribus masculinis ; spiculae totae basi bractea sterili et cladoprophylo instructae (vel cladoprophyllum rarius obsoletum) ; bracteis sterilibus triangulari-ovatis 2 mm. longis 1 mm. latis apice cuspidatis; cladoprophyllis ovatis 1½-2 mm. longis valde concavis subventricosis apice late truncatis leviter bidentatis vel haud dentatis exteriore reflexis utriculum reductum amplectantibus. Fl. ♂ : squamis ovato-lanceolatis 3 mm. longis quam squama floris foeminei angustioribus apice

acutis; stamina 3, antheris linearibus $1\frac{1}{5}$ mm. longis $\frac{1}{5}$ mm. latis apice connectivo brevissimo apiculatis basi subtruncatis obscure brevissime auriculatis. Fl. ♀ : squamis ovatis vel ovato-oblongis vel ovato-lanceolatis $1\frac{1}{2}$ -2 mm. longis apice acutis; utriculus fructifer ovato-fusiformis $2\frac{1}{2}$ -3 mm. longus $\frac{3}{4}$ mm. latus glaber obscure costulatus apice gradatim attenuatus ad summum brevissime minuteque 2-dentatus basi obtusus. Nucula ellipsoidea $\frac{1}{4}$ mm. longa $\frac{2}{3}$ mm. lata fusco-castanea apice basique obtusa laevis; stylus basi dilato-incrassatus interdum geniculato-recurvus apice trifidus glaber.

HAB. in monte Morrison, 6000 ped. alt., leg. T. KAWAKAMI et S. SASAKI, Oct. 1909.

Differs from the type by the much longer and slenderer culms with longer leaves and by the tubi-formed cladophylla.

Carex satsumensis FR. et SAV. var. **Nakaii** HAYATA n. n. (Fig. 35, a-e). Caespitosa 6-7 cm. alta. Folia basi caulis fasciculata, (fasciculis 5-8-foliatis basi squamis oblongis instructis, squamis superioribus gradatim ad folium abeuntibus), erecta vel patentia linearia cum vaginis 6-8 cm. longa cum cauli aequilonga vel quam caules breviora; foliis exterioribus basi vaginatis sed iis interioribus haud vaginatis, vaginis tubulosis circ. 1 cm. longis 2- $2\frac{1}{2}$ mm. latis glabris ore perfecte truncatis integris; ligulis brevissimis lamelliformibus integris; laminis linearibus 5-6 cm. longis 3 mm. latis apice acuminatissimis subplanis coriaceis laevibus margine scaberrimis. Caulis cum spica 7-8 cm. longus acute triqueter glaber erectus $\frac{2}{3}$ mm. latus laevis; spica $2\frac{1}{2}$ cm. longa cylindrica 1 cm. lata densiuscule spiculigera, spiculis horizontaliter patentibus; bracteis deciduis linearibus quam spica brevioribus. Spiculae lineares 8 mm. longae; terminali masculina, lateralibus bisexualibus; laterales deorsum flores foemineos sursum flores masculinos gerentes; squamis infimis (i. e. cladophyllis) ovatis dorso basi ventricosis basin spiculae amplectantibus 2 mm. longis apice obtusis; squamis mediis ovato-triangularibus apice acutis basi perfecte truncatis 2 mm. longis glabris. Utriculus ovoideo-fusiformis $2\frac{1}{2}$ mm. longus $\frac{2}{3}$ mm. latus glaber dorso convexus facie subplanus in sectione trigonus dorso multo tenuiter elevato-striatus facie haud striatus apice attenuatus basi obtusus apice brevissime 2-dentatus. Nuculae oblongae $1\frac{1}{2}$ mm. longae $\frac{2}{3}$ mm. latae nigricantes trigonae dorso convexae facie planae apice basique obtusae infra summum constrictae apice ad stylum abeuntes laeves.

HAB. Monte Morrison, ad 9000 ped. alt., leg. S. SASAKI, Oct. 1909; montibus centralibus, leg. U. MORI et S. NAKAI, Dec. 1909.

Differs from the type by the much shorter culms and by the tubiformed cladophylla.

Sect. *Polystachyae*.

Carex baccans NEES. (Fig. 36, a-f); MATSUM. et HAYATA Enum. Pl. Formes. p. 493.

Sect. *Indicae*.

- a. Partial panicles explicate.
 a. Spicules very much slender
 *C. pseudo-filicina*.
 β. Spicules oblong, stronger than the preceding species
 *C. filicina*.
 b. Partial panicles contracted
 *C. hakuensis*.

Carex pseudofilicina HAYATA (Fig. 36, g-k), Mater. Fl. Formosa. p. 391.

Carex filicina NEES. ; MATSUM. et HAYATA Enum. Pl. Formos. p. 495.

Carex hakuensis HAYATA sp. nov. (Fig. 37). Rhizoma ignotum. Caulis triqueter circ. 1 m. altus glaber foliatus. Folia radicalia ignota ; can- lina erecta cum vaginis 30-40 cm. longa glabra, vaginis triquetris cy- lindricis 5-6 cm. longis 6 mm. latis

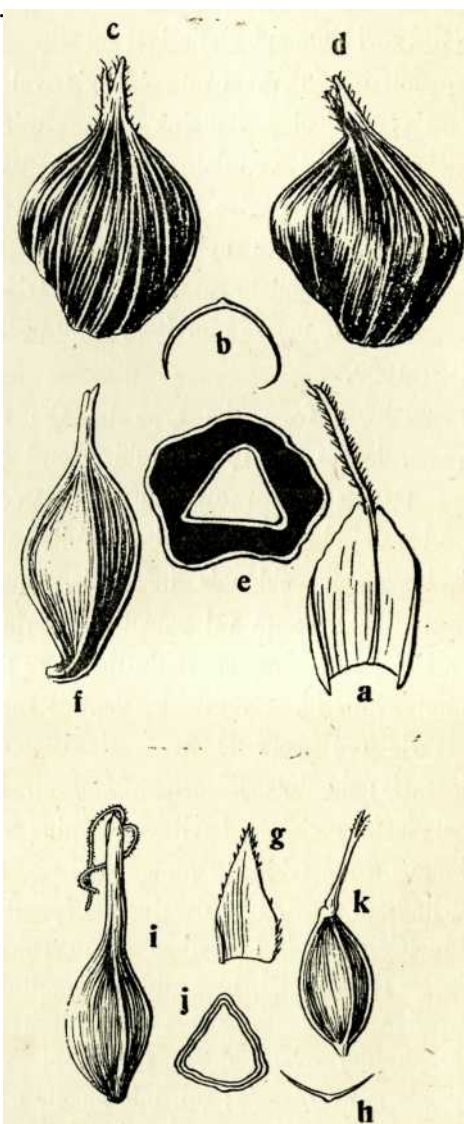
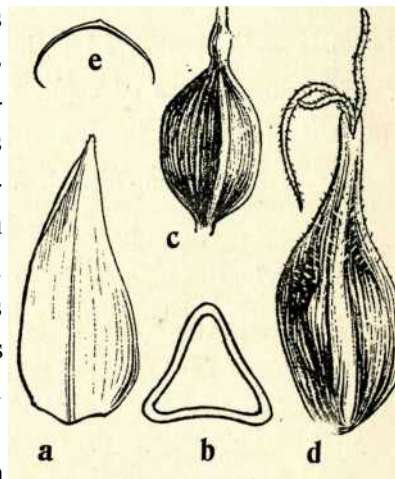


Fig. 36, a-f, *Carex baccans* NEES ; a, a glume; b, the section of the same; c, an utricle; d, the same, seen from another side; e, section of the same; f, a nutlet, g-k, *Carex Pseudofilicina* HAYATA; g, a glume; h, the section of the same; i, an utricle; j, the section of the same; k, a nutlet.

glabris ore obliquis nervosis, laminis linearibus 25-35 cm. longis 1 cm. latis apice acuminatissimis utraque pagine laevibus glabris margine scabris, acuminibus supra scaberrimis subtus laevibus. Panícula terminalis 15cm. longa in ambitu cylindrica 4 cm. lata ad nodos foliata, ramis paniculae eretis 12 cm. longis semiteretibus ad angulos minute hirsutis a basi usque ad supra medium haud ramosis versus apicem ramulos 4-5 gerentibus, ramulis a basi usque ad apicem spiculigeris basi bracteis minutis singulis instructis; bracteis ovatis 2 mm. longis apice 2-fidis dorso interdum apice setigeris,



Fi9. 37, *Carex hakkuensis* HAYATA; a, a glume; b, an utriculus; c, a nutlet; d, the section of the same; e, the section of the glume.

(setis 3 mm. longis hirsutis) basi amplexicaulibus; ramulis ordinis I. et II. basi bracteis singulis et cladophyllis singulis instructis hirsutis; cladophyllis ramuli ordinis I. semi-urceolatis 2 mm. longis dorso infra apicem ventricosis basin rhachis semi-amplectantibus apice expansis 2-fidis dorso minute plus minus hirsutis dorso nervosis apice margineque tenuiter membranaceis medio basique crassiusculis; bracteis singulis basi spiculae insitis late ovatis 2½ mm. longis 3 mm. latis apice subito subulato-acutis membranaceis; cladophyllis basi spiculae insitis late ovatis 1⅓ mm. longis 1 mm. latis intus valde concavis extus valde convexis dorso plus minus minute hirsutis apice truncates 2-dentatis sterilibus. Spiculae toto bisexuales cylindrico-fusiformes 8-10 mm. longse 1½-2 mm. latae apice acutae basi obtusae, floribus paucis basilariibus foemineis caeteris masculinis. Fl. ♂: squamis floris masculini elongato-ovatis 4½ mm. longis 2⅓ mm. latis membranaceis apice obtusis medio tenuiter trineriviis, antheris 3 linearibus 2 mm. longis 1/5 mm. latis apice obtusis apice sub microscopio pilis minutis setiformibus 4-5 instructis. Fl. ♀: squamis floris foeminei ovatis 2½-3 mm. longis circ. 2 mm. latis apice acutis basi leviter contractis. Utriculus fructifer elongato-ellipticus apice attenuatus 3⅔ mm. longus 1¼ mm. latus sursum minute hirsutus deorsum glaber trigonus basi

obtusus apice 2-dentatus. Nucula fusco-castanea trigono-oblonga 1½ mm. longa 1 mm. lata apice obtuse ad stylum abeuns basi acuta ad stipitem 0.3 mm. longum abeuns trigona ad angulos prominente carinata facie leviter concava; stylus basi plus minus incrassatus apice 3-fidus.

HAB. Hakkutaisan, leg. U. MORI, Sept. 1910.

Subgenus **Eucarex** Coss et GERM.

Utricles not, or very shortly, rostrate.

Female spicules densely flowered, bracts not vaginate.. Sect. *Maximae*.

Female spicules loosely flowered, bracts usually vaginate. Nutlet.

mitrate at the apex.....Sect. *Mitrataes*

Utricles long or shortly rostrate, beak 2-toothed rarely entire.

Leaves never septato-nodose (excepting *Carex alliiformis*)

Scales ♀ dark purple or dark brown.....Sect. *Frigidae*.

Scales ♀ ferruginous or pale, rarely dark-brown.

Beaks of utricles 2-toothed or entire.

Spicules ♀ mostly loosely flowered, bracts mostly vaginate ;

utricles nearly straight ovate-elliptical or narrower,

pale green obsoletely nervose Sect. *Hymenochlaence*.

Spicules ♀ densely flowered, bracts mostly not vaginate;

utricles at length divaricate, ovate, rich brown or

dark green, many-nerved.....Sect. *Tumidae*.

Beaks of the utricles conspicuously 2-toothed.....

Sect. *Rhomboidales*.

Leaves septato-nodose (*Carex pumila* excepted)

Utricles glabrous

Utricles membranaceous long rostrate... Sect. *Pseudo-cypereae*.

Utricles subcoriaceous or suberous shortly rostrate

Sect. *Paludosae*.

Utricles more or less hirsute.....Sect. *Hirtoe*.

Sect. *Maximae*.

Carex maculata BOOTT; MATSUM. et HAYATA Enum. Pl. Formos. p. 495.

Sect. *Mitratce*.

1. Bracts shortly vaginate at the base; spicules ♀ oblong densely flowered..... 2
 Bracts long vaginate at the base; spicules ♀ narrowly cylindrical subloosely flowered..... 3
2. Scales of ♀ and ♂ long caudate at the apex.....*C. breviculmis*.
 Scales of ♀ and ♂ very shortly caudate at the apex..*C. morrisonicola*.
3. Scales of male flowers acute at the apex..*C. orthostemon*.
 Scales of male flowers very obtuse or truncate at the apex.....4
4. Male spicules narrowly cylindrical..... *C. tristachya* var. *pocilliformis*.
 Male spicules broadly cylindrical.....*C. transalpinea*.

Carex breviculmis B. BR. (Fig. 38, a-e); MATSUM. et HAYATA Enum. Pl. Formos. p. 493.= *Carex chinensis* HAYATA Mater. Fl. Formos. p. 381 (non Retz.).

Carex morrisonicola HAYATA Mater. Fl. Formos. p. 387.

Carex tristachya THUNB. var. **pocilliformis** KUK. (Fig. 38, j-m); MATSUM. et HAYATA Enum. Pl. Formos. p. 496. Caespitosa. Caulis basi foliis 3-4 suffultus glaber erectus

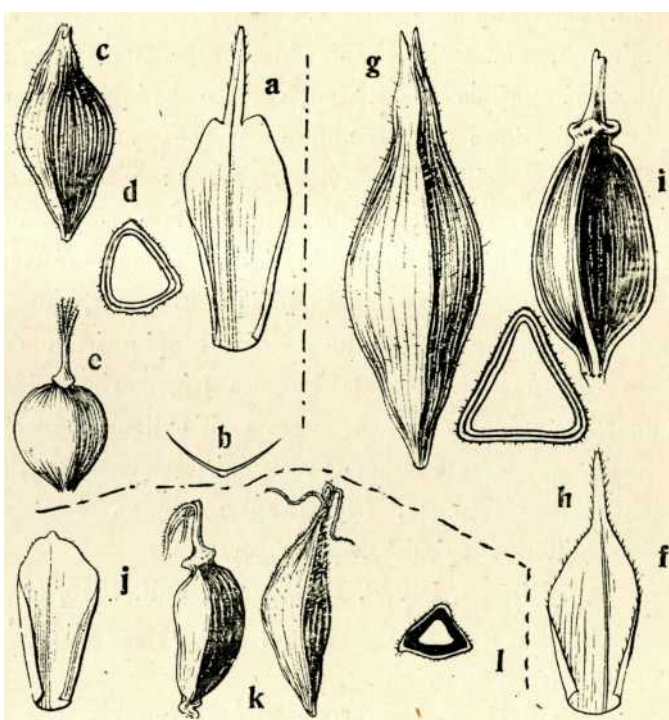


Fig. 38, a-e, *Carex breviculmis* R. BR; a, a glume; b, section of the same; c, an utricle; d, section of the same; e, a nutlet. f-i, *Carex orthostemon* HAYATA; f, a glume; g, an utricle; h, section of the same; i, a nutlet. j-m, *Carex tristachya* THUNB, var. *pocilliformis* KUKENTH.; j, a glume; k, an utricle; l, section of the same; m, a nutlet.

gracillimus 20-25 cm. longus paucissime ramosus vel haud ramosus versus apicem spiculas 2-4 gerens. Folia basi caulis 3-4-quasi-fasciculata tenuiter coriacea haud rigida glabra vaginata cum vaginis 10-25 cm. longa quam caulis breviora, vaginis 3 cm. longis 1½ mm. latis ore obliquis integris, (ligulis integris brevissimis lamelliformibus), laminis linearibus 7-22 cm. longis 2 mm. latis apice acuminatis margine subintegris sed sub lente retrorse minute molleque setulosus utraque pagine glabris. Spiculae paucae versus apicem caulis 2-4 sitae; inferiores lateralesque foemineae; terminales bisexuales sursum floribus foemineis deorsum floribus masculinis instructae; vel terminales masculinae. Spiculae masculinae erectae terminales triquetrae cylindrico-filiformes 1-2 cm. longae ½-2/3 mm. latae, (bracteis obsoletis). Fl. ♂; squamis mediis vagini-formibus 2 mm. longis apice obtusissimis tenuiter hirtellatis ore obliquissimis glabris; stamina 3, filamentis glabris brevibus dilatatis fere perfecte se connatis, antheris linearibus 1 mm. longis apice basique truncatis; rhachillae rectae. Spiculae foemineae cylindrico-lineares 15-18 mm. longae 3 mm. latae erectae sessiles vel graciliter pedicellatae. Fl. ♀: squamis mediis triangulari-ovatis 2 mm. longis 1½ mm. latis utriculum fere amplectantibus 1-costatis apice triangulari-obtusis glabris. Utriculus trigono-obovoideus 2⅓ mm. longus 1 mm. latus apice breve late oblique rostratus, (rostris exteriori recurvis) basi cuneatus hirsutus multo costulatus apice haud dentatus sed tenuissime fissus crassiusculus. Nucula castanea trigono-rhomboideo-obovoidea 1⅔ longa 1 mm. lata sublaevis apice truncata basi oblique constricta brevissime stipitata, stipite crasso, apice truncata plus minus depressa partibus basis styli dilatis mitriformibus coronata. Stylus apice trifidus. Bractae basi spiculae infimae insitae foliiformes spiculas 2-plo superantes.

HAB. Ritozan, leg. T. KAWAKAMI, Juli. 1913, (No. 4).

Near *C. tristachya* THUNB. ; but differs from it in having obovate, much shorter nutlets.

Carex orthostemon HAYATA (Fig. 38, f-i), Mater. Fl. Formos. p. 389.

Carex transalpina HAYATA Mater. Fl. Formos. p. 398.

Sect. *Frigidae*.

Scales of male flowers distinctly costate, costa pale yellow....*C. Shimadai*.

Scales of male flowers not at all or very slightly costate..*C. fulvorubescens*.

Carex Shimadai HAYATA (Fig. 39, a-e), Mater. Fl. Formos. p. 396.

Carex fulvo-rubescens HAYATA (Fig. 39, f-j), Mater. Fl. Formos. p.

383.

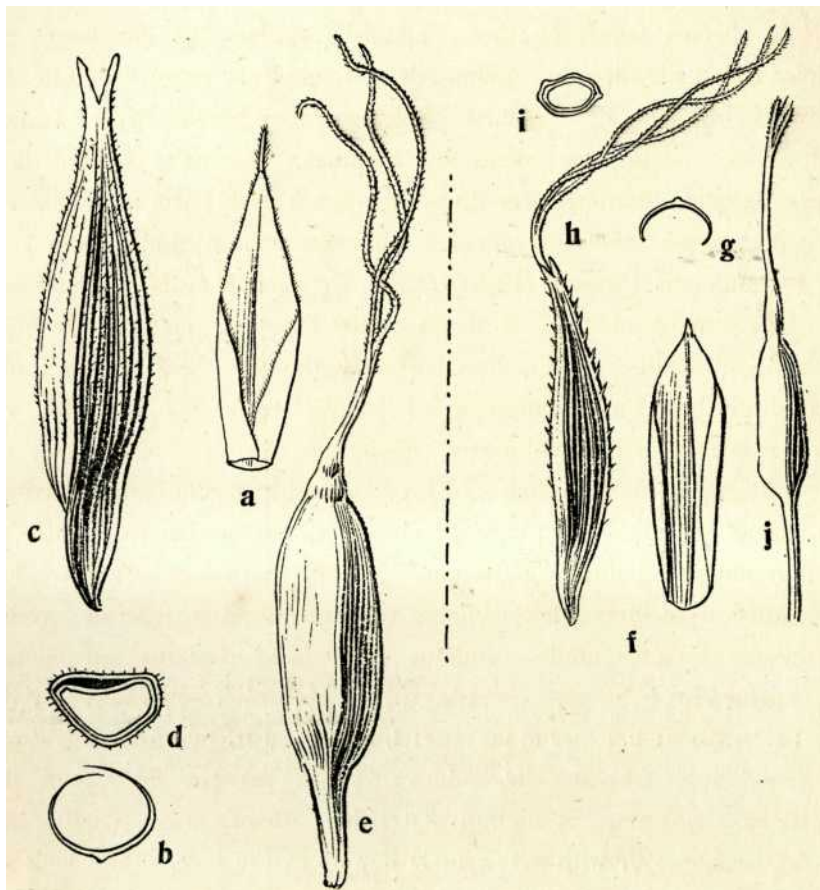


Fig. 39, a-e, *Carex Shimadai* HAYATA; a, a glume; b, section of the same; c, an utricle; d, section of the same; e, a nutlet, f-j, *Carex fulvo-rubescens* HAYATA; f, a glume; g, section of the same; h, an utricle; i, section of the same; j, n nutlet.

Sect. *Hymenochlaenae*.

Carex longispica HAYATA Mater. Fl. Formos. p. 386.

Carex Nakaharai HAYATA (Fig. 40, a-d), Mater. Fl. Formos. p. 387.

Carex bilateralis HAYATA (Fig. 40, e-i), Mater. Fl. Formos. p. 380.

Carex brunnea THUNB. (Fig. 40, j-n); MATSUM. et HAYATA Enum. Pl. Formos. p. 493.

HAB. Kotosho, leg. T. KAWAKAMI et S. SASAKI, Juli. 1912.

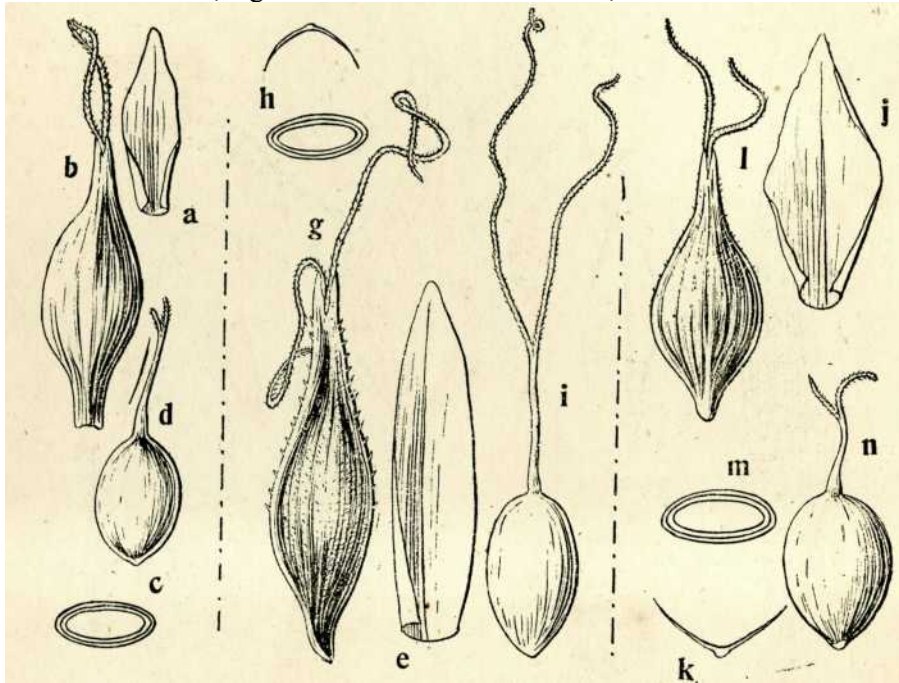


Fig. 40, a-d, *Carex Nakaharai* HAYATA ; a, a glume; b, an utricle; c, section of the same; d, a nutlet, e-i, *Carex bilateralis* HAYATA ; e, a glume; f, section of the same; g, an utricle; h, section of the same; i, a nutlet, j-n, *Carex brunnea* THUNB. ; j, a glume; k, section of the same; l, an utricle; m, section of the same; n, a nutlet.

Sect. *Tumidae*.

Lateral spicules ♀, with a few male flowers at the base, bracts long vaginate, vaginae purple, ♀-scales fusco-rubescens..... *C. alliiformis*.

Lateral spicules only ♀, bracts not vaginate, ♀-scales pale-yellow, or sordid stramineous.

Utricles 2½ mm. long..... *C. pseudojaponica*.

Utricles 4 mm. long..... *C. Kawakamii*.

Carex alliiformis C. B. CLARKE; KUKENTHAL Cyper.-Caricoid. in Pfl.-reich p. 618. *Carex purpurascens* KUK. ; MATSUM. Ind. Pl. Jap. II.-I p. 129.

HAB. Okinawa.

Carex pseudojaponica HAYATA (Fig. 41, e-d), Mater. Fl. Formos. p. 392.

Carex Kawakamii HAYATA (Fig. 41, e-h), Mater. Fl. Formos. p. 385.

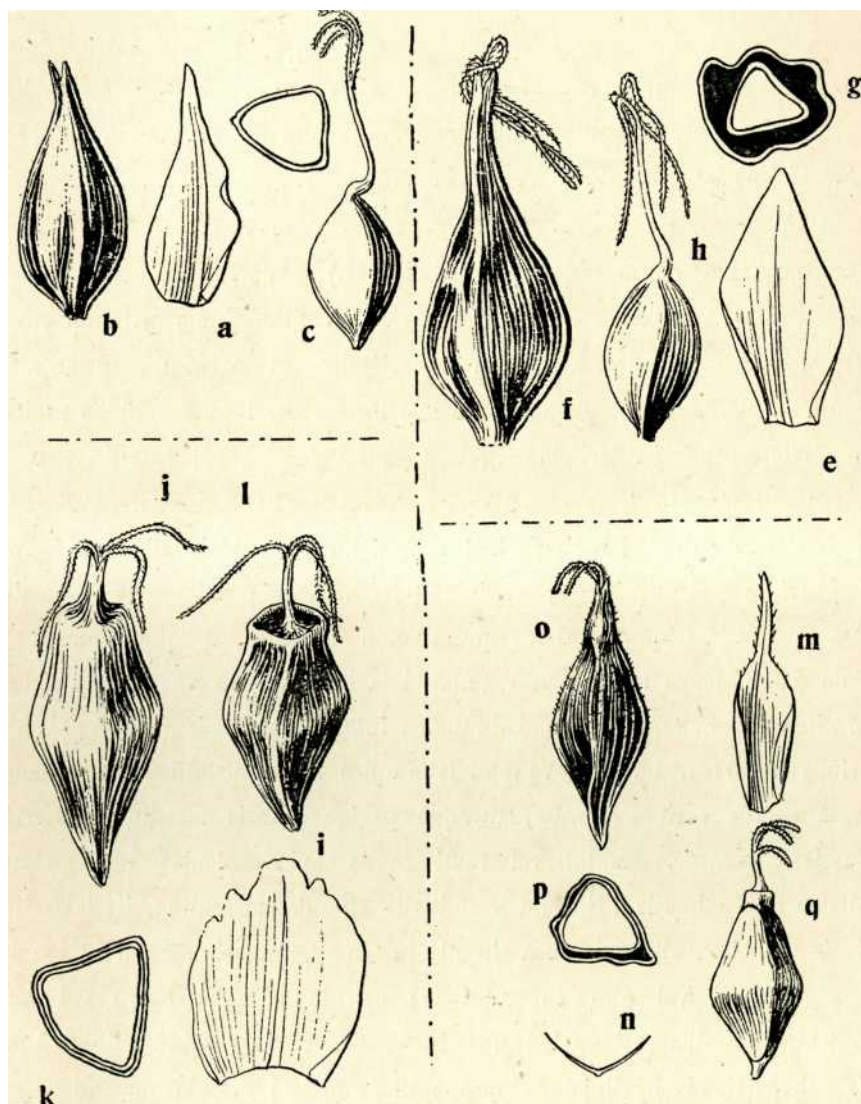


Fig. 41, a-d, *Carex pseudojaponica* HAYATA; a, a glume; b, an utricle; c, nutlet; d, section of the same; e-h, *Carex Kawakamii* HAYATA; e, a glume; f, an utricle; g, section of the same; h, a nutlet; i-j, *Carex obtusobracteata* HAYATA; i, a glume; j, an utricle; k, section of the same; l, a nutlet; m-q, *Carex chinensis* RETZ; m, a glume; n, section of the same; o, an utricle; p, section of the same; q, a nutlet.

Sect. *Rhomboidales*.

1. Male spicules lineari-cylindrical. Female spicules cylindrical..... 2
Male spicules often subclavate. Female spicules oblong or ovate..
C. arisanensis.
2. Scales obtuse.....*C. obtusobracteata*.
Scales acute or caudate..... 3
3. Culms lateral..... *C. atronucula*.
Culms central*C. chinensis*.

Carex arisanensis HAYATA (Pl. XVIII.) Mater. Fl. Formos. p. 378.
Dense caespitosa; rhizoma haud repens. Caulis tenuissimus primum erectus sed fructibus maturis deorsum recurvus trigonus ad angulos anguste alatus interdum efoliatus basi squamis linearibus instructus, interdum foliis radicalibus et foliis caulinis basilaribus suffultus glaber simplex vel interdum versus apicem ramo singulo instructus; squamis basi caulis 3-4-sitis. Folia 3-4-fasciculata (fasciculis basi squamis 3-4-suffultis), cum vaginis 10-40 cm. longa cauli breviora vel aequilonga, vaginis 1-3 cm. longis primum tubiformibus demum toto fissis triquetris dorso prominente carinatis utroque latere apicis auricula 5 mm. longa apice obtusa $\frac{2}{3}$ mm. lata latere altero cum laminis connata latere altero libera tenuissime membranacea integra instructis glabris; laminis linearibus 7-40 cm. longis 3-7½ mm. latis apice lineari-acuminatis, costa supra impressa subtus carinato-elevata, utraque pagine glabris margine scaberrimis chartaceis suberectis. Caules vel rami caulis apice spiculas 1-3 gerentes, spiculis se approximatis. Spicula terminalis singula masculina, iis lateralibus foemineis vel bisexualibus bractea singula instructis, bracteis spicam in longitudine aequantibus vel eam superantibus; spicula lateralis breve vel longe pedicellata, pedicellis basi vagina una instructis, vaginis tubiformibus 1 mm. longis subventricosis hyalinis cladophylli-formibus; spicula masculina pedicellata, (pedicellis 2 mm. longis haud vaginatis), subclavato-cylindrica 6 mm. longa 1 mm. lata triquetra apice obtusa; squamis mediis oblongis 2½ mm. longis 1 mm. latis apice obtusissimis integris 1-costatis basi rhachin complete

amplectantibus; stamina 3, filamentis filiformibus 3 mm. longis basi plus minus dilatatis, antheris linearibus 2 mm, longis $\frac{1}{5}$ mm. latis apice subacutis basi subtruncatis. Spicula foeminea in ambitu cylindrica 6 mm. longa 2 mm. lata 5-6-florata; matura 2-3 fructifera; squamis mediis fructiferis ovato-oblongis $2\frac{1}{2}$ mm. longis $1\frac{1}{2}$ mm. latis apice obtusis basi rhachin semi-amplectantibus glabris integris. Utriculus maturus trigonus ovoideus fusiformis apice longe-rostratus cum rostris 6 mm. longus 2 mm. latus basi acutus tenuiter multi-striatus glaber, rostris 2-3 mm. longis apice 2—dentatis. Nucula obovoideo-trigona 3 mm. longa 2 mm. lata apice obtusissima basi acuto-obtusa subflava laevis; stylus ad basin geniculatim anteriore recurvus tunc subito angulo recto ascendens apice 3-fidus glaber.

HAB. Mt. Arisan, 7400 ped. alt., leg. B. HAYATA, Aprili. 1914.

Very much resembles *C. filipes* FR. et SAV. (KUKENTHAL Cyperaceae-Caricoideae in EXGL. Pfl.-reich p. 640, fig. 109), but differs from it in the more approximately flowered female spicules, and in the very much shortly peduncled male spicules. A sheath which is very much like cladoprophyllum is always present at the base of the pedicel of a lateral spikelet.

Carex obtusobracteata HAYATA sp. nov. (Fig. 41, i-1).

The description will be given in the next volume.

Carex atronucula HAYATA Mater. Fl. Formos. p. 379.

Carex chinensis RETZ. (Fig. 41, m-q); BOOTT Illustr. I. (1858) pp. 13 et 74 t. 36 ; MATSUM. et HAYATA Enum. Pl. Formos. p. 494.

Carex sociata HAYATA Mater. Fl. Formos. p. 398 (non BOOTT.)

Sect. *Pseudo-cypereae*.

Carex Sasakii HAYATA (Fig. 42, a-e), Mater. Fl. Formos. p. 395.

HAB. Nanto: Suisha, leg. U. MORI, (NO. 3749).

Sect. *Paludosae*.

Carex pumila THUNB. (Fig. 43); MATSUM. et HAYATA Enum. Pl. Formos. p. 496.

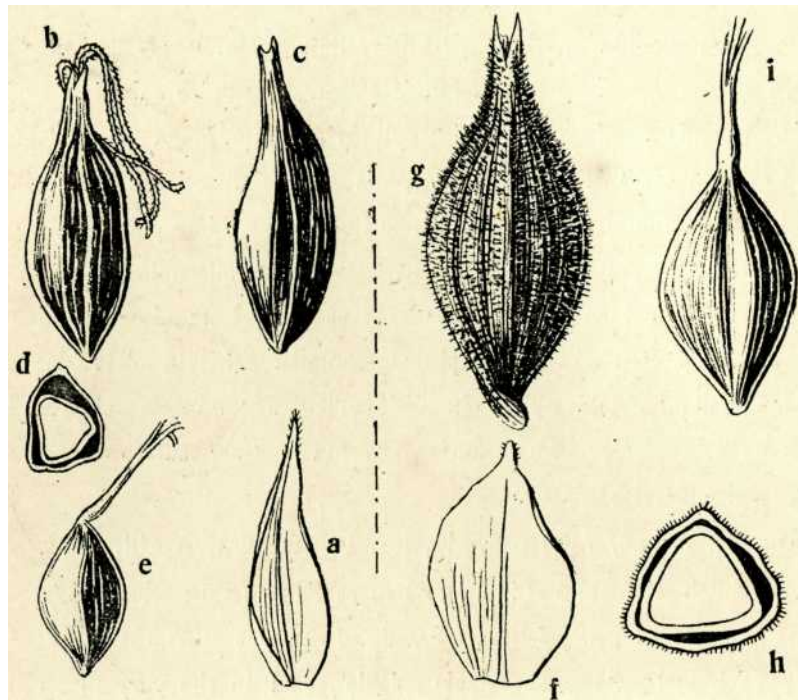


Fig. 42, a-e, *Carex Sasakii* HAYATA ; a, a glume; b, an utricle; c, the same, seen from side; d, section of the same; e, a nutlet, f-i, *Carex hebecarpa* C. A. MEY. var. *ligulata* KUK. ; f, a glume; g, an utricle; h, section of the same; i, a nutlet.

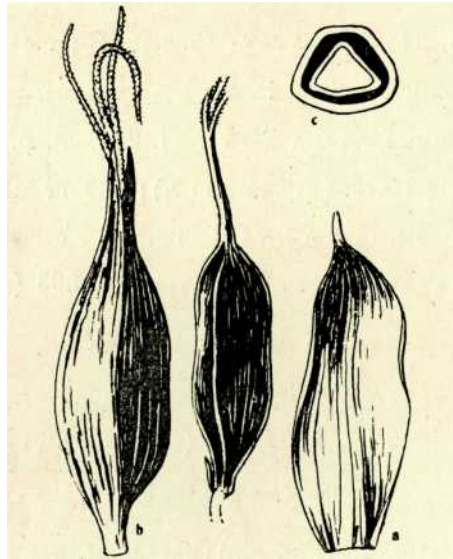


Fig. 43, *Carex pumila* THUNB. x 6; a, a glume; b, an utricle; c, section of the same; d, a nutlet.

Sect. *Hirtae*.

Carex hebecarpa C. A. MEY var. **ligulata** (Nees) KUKENTHAL (Fig. 42, f-i), Cyperaceae-Caricoideae p. 745; MATSUM. Ind. Pl. Jap. II.-1 p. 113.

HAB. Musha: Sakuragamine, ad 8000 ped. alt., leg. R. PRICE, Oct. 1912.

Agrees pretty well with the specimens so labelled in the herbarium at Tokyo.

Section uncertain.

Carex reflexistyla HAYATA (Fig. 44) ; Mater. Fl. Formos. p. 393.

Carex Dunni HAYATA Mater. Fl. Formos. p. 382.

Carex tatsutakensis HAYATA sp. nov. (Fig. 45). Densissime caespitosa, rhizomatibus brevissimis haud repentibus, radicibus fibrosis rigidissimis. Caules semper quasingemini basi foliis 3-4 suffulti, 4-10 cm. longi foliis breviores, alter longior, alter multo brevior; caulis longior apice spiculam masculinam terminalem singulam et spiculas foemineas duas laterales gerens; caulis brevior spicula foeminea singula terminatus; caulis haud

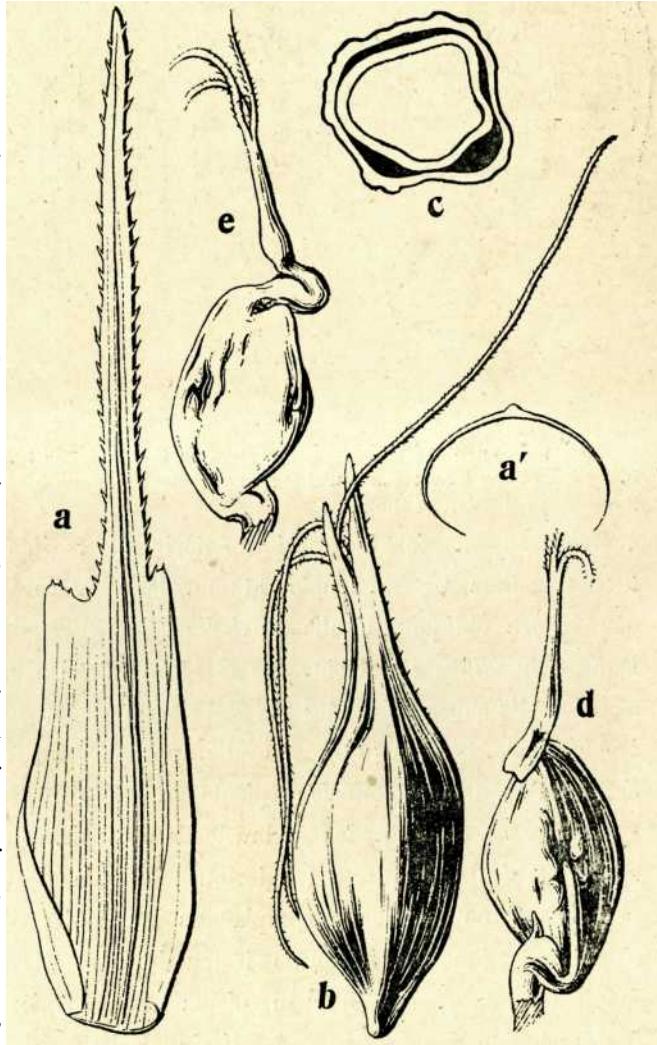


Fig. 44, *Carex reflexistyla* HAYATA x 12; a, a glume; a', section of the same; b, an utricle; c, section of the same; d, a nutlet; e, the same, seen from another side.

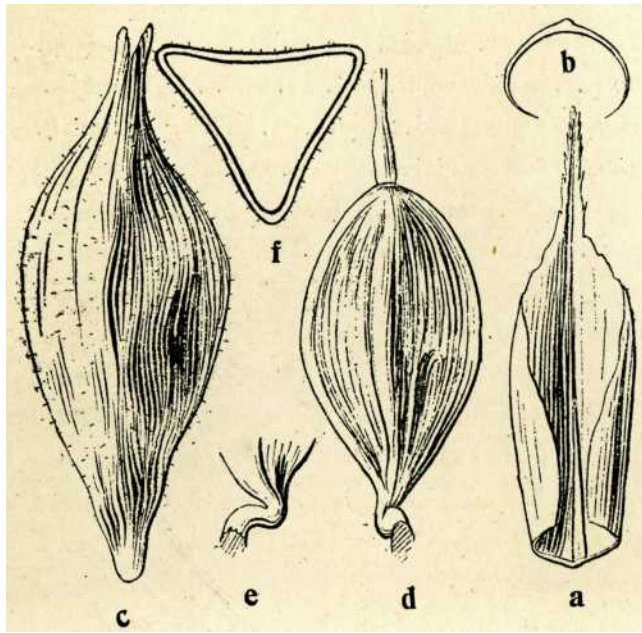


Fig 45, *Carex tatsutakensis* HAYATA x 12; a, a glume; b, section of the same; c, an utricle; d, a nutlet; e, stipe of the same; f, section of the same.

ramosus, foliis caulinis nullis; bracteis basi spiculae insitis (sed spicula foeminea terminalis caulis brevioris haud bracteata), bracteis inferioribus longioribus 7-8 cm. longis spiculas 5-6-plo superantibus, foliiformibus; bracteis basi spiculae masculinae insitis setaeformibus brevioribus spiculas in longitudine aequantibus. Folia tenuiter coriacea 4-5-fasciculata, fasciculis basi squamis ovatis fuscentibus 3-4 instructis foliis interioribus longioribus cum vaginis 16 cm. longis cauli longioribus, vaginis plus minus purpureis tubuliformibus 2-3 cm. longis $1\frac{1}{2}$ mm. latis latere uno fissis vel haud fissis glabris ore obliquis, ligulis brevissimis lamelliformibus integris haud ciliatis, laminis linearibus 10-13 cm. longis $1\frac{1}{2}$ mm. latis acuminatis margine sub lente scabriusculis supra sub lente vix scabriusculis subtus glabris. Spiculae in cauli longiore circ. 3 versus apicem caulis approximativ dispositae; terminalis masculina; lateralibus foemineis; spicula in caule longiore masculina terminalis cylindrica erecta 1 cm. longa, bracteolis obsoletis, squamis totis fertilibus quam squama spiculae foemineae longioribus; spicula foeminea lateralis pedicellata, pedicellis 3-5 mm. longis complanatis latere hirsutis erectis ad basin bracteis singulis et bracteolis singulis instructis; bracteis foliiformibus inferioribus longissimis 8 cm. longis quam spicula multo longioribus, superioribus 2-3 cm. longis; bracteolis ad basin pedicelli singulariter sitis palei-formibus linearibus $2\frac{1}{2}$ mm. longis $\frac{1}{2}$ mm. latis apice truncatis hyalinis ecoloratis basin pedicelli semiamplectantibus; squamis (glumis) spiculae foemineae totis fertilibus mediis elongato-

oblongis 4 mm. longis 2 mm. latis apice acutis basi haud contractis rhachin spiculae complete amplectantibus dorso prominente carinatis, carinis apice ad setulam 1—2 mm. scabram abeuntibus. Utriculus obovoideo-fusififormis 5½-6 mm. longus 2 mm. latus trigonus facie concavus apice subito attenuatus ad summum breve bi-dentatus basi gradatim acuminatus brevissime hirsutus, pilis 1/10 mm. longis transverse patentibus. Nucula obovoidea trigona facie concava ad angulos prominente carinata apice obtusa basi triangulari-acuta stipitata, stipite 1½ mm. longo cum utriculo fere perfecte connato apice libero et geniculatim recurvo, stylo basi leviter incrassato medio sursum 3-fido, ramis gracilibus crispato-reeurvis.

HAB. Musha: Tatsutaka, ad 7000 ped. alt., leg. W. R. PRICE, NO. 797.

The culms of this new species appear to be always in pair which are supported by a single fascicle of leaves at their base; but in reality, they are not in pair. That they appear to be in pair, is due to the fact that a single culm bears a single branch at its very base.

Carex Morii HAYATA sp. nov.
(Fig. 46). Folia radicalia ignota. Caulis erectus circ. 80 cm. longus acute triqueter gracillimus 1-1½ mm. latus glaber. Folia caulina inferiora a se 15-30 cm. distantia linearia cum vaginis 25 cm. longa, vaginis atro-purpureis 2-4 cm. longis nitidis triquetris prismaticis 3-4 mm. latis ore obliquissimis apice gradatim ad limanam abeuntibus, laminis planis circ. 20 cm. longis 4½ mm. latis apice acuminatis coriaceis margine integris scabris facie scabris; folia caulina basi ramos 1-2 amplectantibus, ramis gracillimis erectis. Spiculae ad apicam caulis vel ramorum laxè paniculatim dispositae, paniculis in circumscriptione linearibus circ. 25 cm. longis 4 cm. latis,

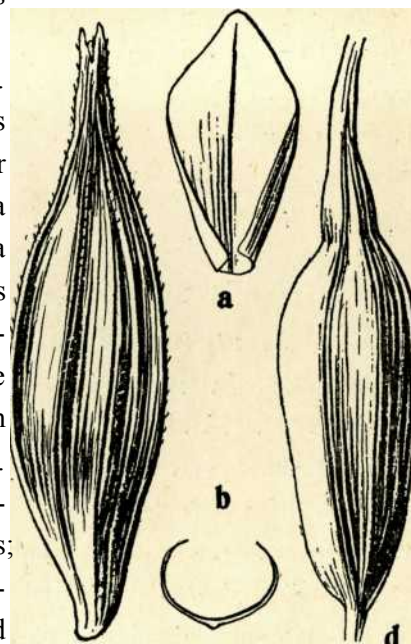


Fig. 46, *Carex Morii* HAYATA x 12; a, a scale; b, the same in section; c, an utriculus; d, a nutlet.

pedicellis spiculae gracillimis $\frac{1}{2}$ -2 cm. longis, bracteis sub ramo sitis castaneo-coloratis vaginiformibus 1-1 $\frac{1}{2}$ cm. longis apice setaeformibus. Spiculae inferiores bisexuales, superiores masculinae; spicula masculina lineari-cylindrica plus minus recurva 2-3 cm. longa 1 $\frac{1}{2}$ mm. lata apice acuminata basi obtusa, squamis inferioribus sterilibus; squamis mediis ovatis 4 $\frac{1}{2}$ mm. longis 2 mm. latis apice acutis; stamina 3, filamentis glabris, antheris linearibus 2 mm. longis $\frac{1}{5}$ mm. latis apice ad connectivum brevissime productis, partibus productis subacutis, basi auriculis brevissimis; spiculae bisexuales obovatae brevissime pedicellatae 5 mm. latae pauci-floratae; fl. ♀ medii: squamis (glumis) ovatis 3 $\frac{1}{2}$ -4 mm. longis 2 mm. latis utriculo brevioribus apice aculis obtusis vel cuspidatis margine integris basi perfecte rhachin utriculi amplectantibus glabris dorso 1-costatis. Utriculus fusiformis 6 $\frac{1}{2}$ mm. longus 1 $\frac{1}{2}$ mm. latus apice rostrato-attenuatus ad summum 2-dentatus basi breve attenuatus dorso convexus facie concavus utraque hirsutus tenuiter multo striatus. Nucula elongato-obovoideo-elliptica 3 $\frac{1}{2}$ -4 mm. longa 1 $\frac{1}{2}$ mm. lata laevis dorso convexa facie plana apice abrupte rostrata ad stylum abeuns.

HAB. Formosa, loco non indicato, leg. U. MORI, 1912.

Gramineae.

Arundinaria MICH.

Arundinaria Kunishii HAYATA sp. nov. (Fig. 47). Frutex. Rhizoma repens circ. 40 cm. longum 1 $\frac{1}{2}$ cm. in diametro plus minus recurvum, internodiis 2-2 $\frac{1}{2}$ cm. longis, squamis complete obtectum, squamis stramineis glabris 5 cm. longis apice triangulari-obtusis interdum 2-fidis complete rhizome amplectantibus. Turio crectus rectus e rhizomate lateraliter oriundus deorsum purpurascens sursum viridescens sparse hirsutus nitidus. Culmus

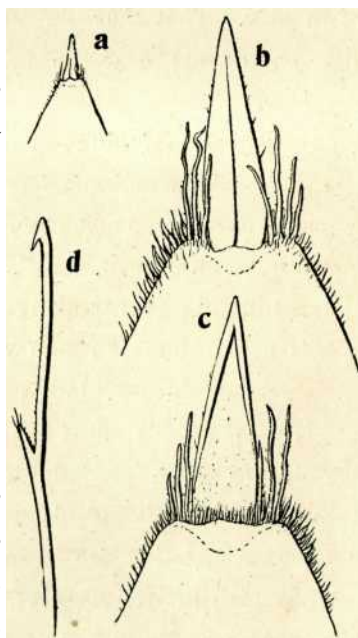


Fig. 47, *Arundinaria Kunishii* HAYATA; a, an apical portion, a sheath of turion; b, the same, magnified seen from surface; c, the same, seen from back; d, the same, in vertical section; a, natural size; others magnified.

erectus rectus 6 m. altus, 2 cm. in diametro; vagina decidua purpurea apice attenuata primum ad summum truncata sparse hirsuta demum glabra nitida margine ciliata apice utroque latere auriculis minutis et setis auricularibus instructa, pseudophyllis lineari-triangularibus 5 mm. longis 4 mm. latis apice acuminatis, ligula brevissima villosa; merithallium nitidum medium 25 cm. longum 9 mm. latum; lignum 1½ mm. crassum; canalis 5½ mm. in diametro; pulvillus inferior prominente annuliformis, pulvillus superior tenuiter elevatus, pulvilli a se 7 mm. distantes; squama bicarinata bifida subglabra. Rami ternatim siti simplices vel pauciramulosi, ramulis 3-5-10-foliatis; vaginella valde imbricata 5-10 cm. longa complanata ore truncata, setis auricularibus utroque latere circ. 10 erectis rectis vel crispatis; ligula brevissima hirsuta. Folia lineari-lanceolata 15-24 cm. longa 2-3½ cm. lata apice subito acuminatissima basi abrupte ad petiolum 5-7 mm. longum abeuntia margine sursum latere uno hirsuta latere uno scabra, nerviis secundariis utroque latere costae 7-11, venulis inter nervos secundarios 7.

HAB. Nanto: Rinkiho et Rosuiko, Aprili. 1916, leg. B. HAYATA ; Kagi : Shokosho, culmus 10 m. altus 2½ cm. in diametro.

Near *Arundinaria japonica*, but differs from it in having ternate branches, and in having shining vaginas of the turions. The vaginas of *A. japonica* is quite lusterless.

Arundinaria niitakayamensis HAYATA in Tokyo Bot. Mag. XXI. p. 49 et Fl. Mont. Formos. p. 240.

Sasa niitakayamensis CAMUS Bambus. (1913) p. 24.

In our species, the stamens are usually in three, and the branches are always ternate,—characters quite assignable to *Arundinaria*, but not to *Sasa*. As Monsieur CAMUS gave no comment, I can not understand on what ground did he transfer this species to *Sasa*.

Arundinaria oiwakensis HAYATA sp. nov. (Fig. 48). Frutescens. Rhizoma horizontaliter sympodialiterque repens, partibus novellis squamis imbricatis obtectis, 5 mm. crassum, radicibus teretibus incrassatis 4 mm. in diametro. Turio erectus rectus purpurascens hirsutus multistriatus, striis viridescentibus, pilis albis vel fulvescentibus caducissimis obtectus; vaginae mediae turionis subcoriaceae caducae dorso hirsutae instus glabrae nitidae basi ad insertionem dense

villosa-hirsuta margine ciliolata; pseudophyllis minutis linearibus vel triangulari-linearibus 7-8 mm.-25 mm. longis basi 1½ mm. latis extus glabris intus basi hirsutis semper deflexis intus canaliculatis; auriculis nullis; ligula lineari-triangulari erecta recta apice fimbriato-ciliata cum ciliis 5-10 mm. longa, ciliis validis 3-4 mm. longis erectis subrectis sub lente hirsuto-scabridis. Culmus distante situs rectus erectus 300 cm.-440 cm altus, parte inferiore non ramifera 130 cm.-140 cm longa 9 mm. in diametro, teres haud striatus; merithallium inferius 23 cm. longum 8 mm. in diametro. lignum 2 mm. crassum; canalis medullaris 3 mm. in diametro; inferior pulvillus infundibulari-prominens elevatus, superior pulvillus leviter elevatus, pulvilli a se 4-5 mm. distantes; squama bicarinata usque ad basin aequaliter bifida 2 cm. longa ad carinas hirsuta caeterum glabra. Rami multo-fasciculati 60 cm. longi haud solidi foliiferi; ramuli tenuissimi 3-5-foliiferi. Folia lineari-lanceolata 8-15 cm. longa 1-1½ cm. lata apice acuminata acuminatissima basi triangulari-cuneata ad petiolum brevissimum abeuntia margine scabra, nervis secundariis 2—3-pariis, nervulis 8 inter secundarios; vaginella 4-6 cm. longa, setae auriculares 8-10 erectis rectis scabris; ligula oblonga 1½ mm. longa obtusissima hirsuta. Inflorescentia cum ramis foliiferis intermixta ad apicem ramuli terminalis. Spiculae 7—10 laxe paniculatim dispositae longe pedicellatae. Spicula matura non visa.

HAB. Musha-Oiwake, ad 7000 ped. alt., leg. B. HAYATA, Aprili. 23, 1916.

Very near *A. niitakayamensis* HAY., perhaps a form of the latter.

Arundinaria Usawai HAYATA sp. nov. (Fig. 49). Rhizoma longe repens lateraliter turiones gerens 8 mm. in diametro. Turio erectus rectus

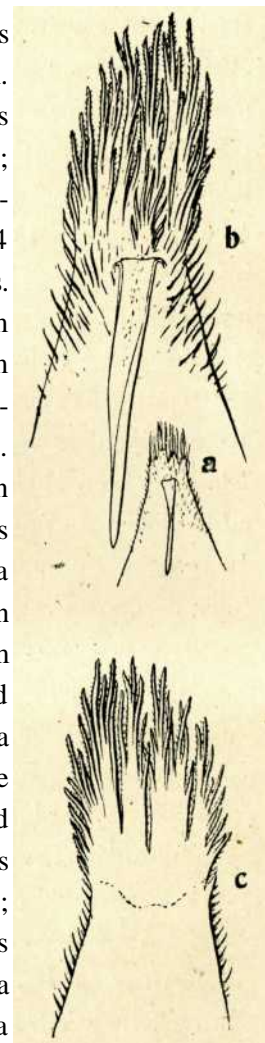


Fig. 48, *Arundinaria oiwakensis* HAYATA; a, a sheath of a turion; b, the same, seen from surface; c, the same, seen from back; a, natural size; others magnified.

purpurascens haud nitidus opacus; vagina media purpurascens opaca haud nitida scabra pilis brevissimis fusco-purpureis triangulari-formibus adpresse conspersa margine sursum ciliolata; setae auriculares utroque latere apicis vaginae 4-5 site rectae erectae hirsute; ligula brevissime hirsuta; pseudophyllis minutis longe triangularibus 4 mm. longis 1½ mm. latis apice acuminatis. Culmus distans 3 m. altus prope basin 1-1½ cm. in diametro toto vaginis persistentibus obtectus, partibus non ramiferis 110 cm. longis; merithallium inferius 25 cm. longum 14 mm. in diametro, pulvillis a se 7 mm. distantibus, pulvillis inferioribus prominente annuliformibus, pulvillis superioribus haud vel vix prominentibus; lignum 3 mm. crassum; canalis medullaris 7 mm. in diametro; squama bicarinata 2-fida, segmentis linearibus 15 mm. longis ad carinas hirsutis. Rami ternati vaginati, centrale majore, laterales minores. Ramuli vaginati vel interdum nudi 1-2-foliati; vaginella circ. 5 cm. longa glabra apice utroque latere auriculis minutis et setis auricularibus instructa, ligula minuta fimbriata hirsuta. Folia lineari-lanceolata 11-31 cm. longa 13-43 mm. lata apice acuminatissima basi plus minus oblique obtusa ad extremitatem subito cuneata ad petiolum 2-5 mm. longum abeuntia margine scabra, nervis secundariis utroque latere costae 5-8, nervulis inter secundarios 7-10.

HAB. Shishitao ad 2000 ped. alt., leg. B. HAYATA, Aprili. 1916. typus!.

Near *A. japonica*, but differs from it by the ternate branches on the culms and by the not hairy scabrous lusterless presistent sheaths.

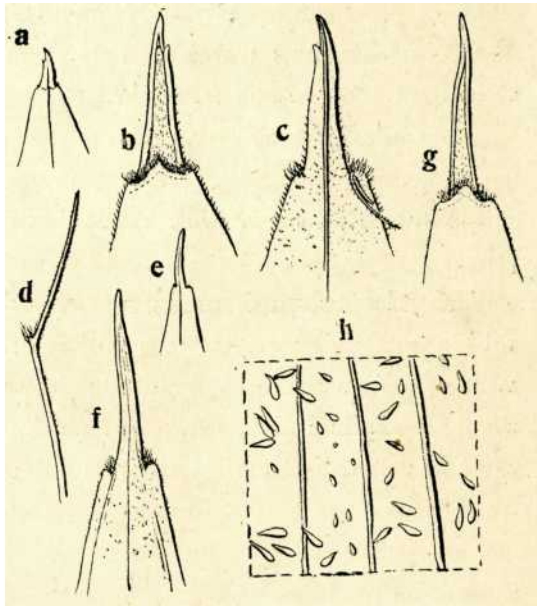


Fig. 49, *Arundinaria Usawai* HAYATA; a, a sheath of a turio; b, the same seen from back; c, the same seen from surface; d, vertical section of the same; e, another sheath; f, the same seen from surface; g, the same, seen from back; h, hairs on the surface; a and e, natural size; others more or less magnified.

Phyllostachys SIEB. et Zucc.

Phyllostachys pubescens H. LEHAIE Nat. Syst. Bamb. in Act. III. Congr. Int. Bot. p. 233 tt. 55-57.

Phyllostachys mitis Riv.; MATSUM. Ind. Pl. Jap. II- 1 p. 94.

HAB. Rosuiko, cult., leg. B. HAYATA, Aprili. 1916.

Note:—Rhizome repens, culms distant, erect, side branches single or in pairs.

Phyllostachys formosana HAYATA sp. nov. (Fig. 50). Arborescens vel frutex. Rhizoma repens; turio purpurascens plus minus maculatus glaber, vagina medio margine haud ciliolata glabra tenuiter membranacea apice abrupte ad pseudophyllum abeuns truncata, partibus truncatis 1 cm. latis, apice haud auriculata setulis auricularibus nullis; ligula subnulla; pseudophyllum

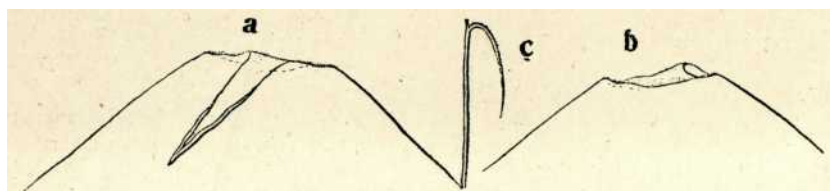


Fig. 50, *Phyllostachys formosana* HAYATA; a, apical portion of a sheath of a turion, seen from surface; b, the same, seen from back; c, vertical section of the same; natural size.

lineare 16 cm. longum 3 mm. latum apice acuminatum margine undulatum et interiore recurvum. Culmus distans 7 m. longus a basi usque ad 2 m. altitudinem 3½ cm. in diametro, rotundatus in sectione, canalis 2½ cm. in diametro; lignum ½ cm. crassum; merithallium in 2 m. altitudinem mediocriter 10 cm. longum valde variabile interdum irregulare ut *Bambusa heteroclada*; pulvillus inferior distincte elevatus annuliformis, pulvillus superior tenuissime elevatus a iis inferioribus 3 mm. distans; merithallium ramiferum in sentione Q-forme, ramis solitariis vel geminis. Ramuli graciles 1-2-foliati; vaginella 3 cm. longa 1 mm. lata latere convoluto-imbricata latere sursum ciliolata apice pubescens, auriculis inaequalibus, una majore una minore, semi-rotundatis hirsutis, ligula minuta hirsuta, setis auricularibus non existis. Folia lanceolata vel lineari-lanceolata. 8-12 cm. longa 17 mm. lata apice acuminata basi obtusa ad petiolum 3-5 mm. longum abeuntia margine scabra, nervis secundariis utroque latere

costae 4—5, venulis inter secundarios 7.

HAB. Rinkiho: Daikosho, leg. B. HAYATA, Aprili. 2, 1916.

Near *P. aurea*, but differs from it by the turions with purple maculated vaginae and in the absence of the auricular setae.

Phyllostachys lithophila HAYATA sp. nov. (Fig. 51). Arborescens. Rhizoma horizontaliter longe repens teres 2½ cm. in diametro. Turion glaber fulvo-purpurascens pins minus maculatus striatus, squama media apice obtuse vel acuta, partibus apicaribus cum pseudophyllo aequilatis, apice margine hirsuta; ligula brevissima ½ mm. longa apice truncata hirsuta; pseudophyllum triangulare-lineare in specimine nostro 8 mm. longum 3 mm. latum basi gradatim latius haud contractum utraque glabrum, partibus basilaribus carnosus intus hirsutis. Culmus minutissime striatus distans erectus rectus 15 m. altus. Merithallium in 2 m. altitudine 4½ cm. in diametro perfecte circulare in sectione; lignum 6-7

mm. crassum; canalis medullaris 3 cm. in diametro; pulvillus inferior acute tenuiter elevatus, pulvillus superior obscure tenuissime elevatus, vulvillis a se 4 mm.

distantibus. Rami gemini vel solitarii; ramuli 1-3-foliati,

vaginella 3-4 cm. longa apice hirsuta, setis auricularibus paucissimis generaliter obsolete nullis; ligula membranacea cylindrica 2 mm. longa uno latere fissa hirsuta. Folia lineari-lanceolata 10-20 cm. lata apice acuminatissima basi rotundata vel cuneata ad petiolum 2-7 mm. longum abeuntia supra glabra subtus basi hirsuta caeterum glabra, margine uno laevi, uno scabro, nervis secundariis utroque latere costae 5-6, venulis inter secundarios 9-10.

HAB. Rinkiho: Chorin, leg. B. HAYATA, Aprili. 1916.

Near *P. Makinoi* HAYATA, but differs from it in having vaginae passing

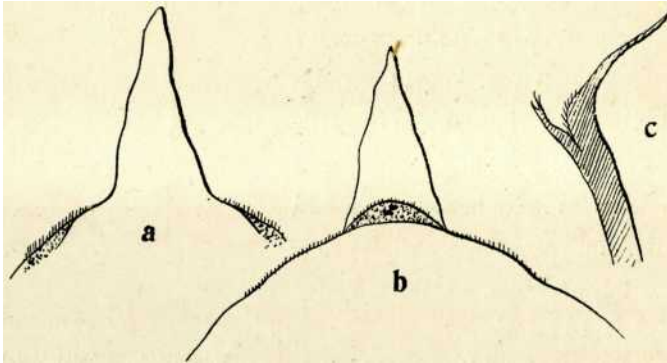


Fig. 51, *Phyllostachys lithophila* HAYATA; a, an apical portion of a sheath of a turion; b, the same, seen from within; c, the same in vertical section; all figures magnified.

to the pseudophylla which are very much smaller than those of *P. Makinoi* and in the absence of the auricular setae in the leaves. Turions of this new species are much paler than those of *P. Makinoi*.

Phyllostachys Makinoi HAYATA (Fig. 52) Ic. Pl. Formos. V. p. 250. Descriptio aucta: Arborescens. Rhizoma repens teres vel complanatum 2 cm. in diametro. Turio fusco-purpurascens; vagina purpureo-maculata apice obtusa subito truncata, partibus truncatis quam basi pseudophylli duplo latioribus, apice haud auriculata haud setosa; ligula lata quam pseudophyllum duplo latior, extus pubescens intus glabra nitida apice truncata in specimine nostro 20-7 mm. lata 2 mm. longa; pseudophyllum lineari angustum in specimine nostro 2-8 cm. longum 3½-8 mm. latum apice acuminatum basi latissimum supra basin subito contractum glabrum. Culmus rectus erectus 15 m. altus.

HAB. Rinkiho: Rosuiko, leg. B. HAYATA, Aprili. 2, 1916.

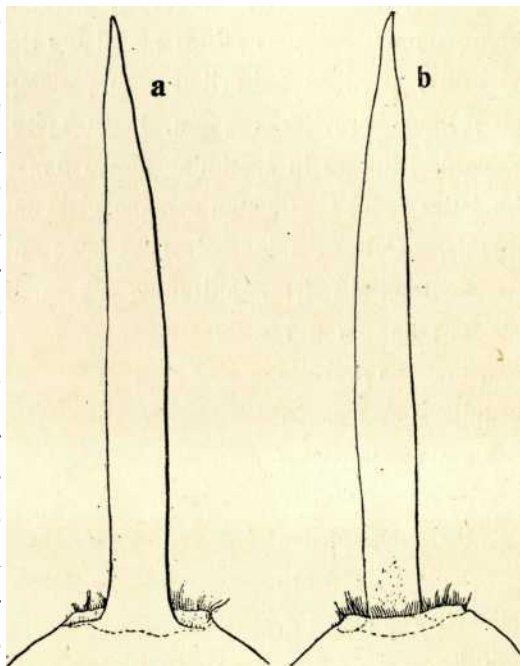


Fig. 52, *Phyllostachys Makinoi* HAYATA; a, a sheath of a turion, seen from without; b, the same, seen from within; natural size.

Phyllostachys nigripes HAYATA sp. nov. (Fig. 53). Rhizoma repens teres 6 mm. in diametro fuscens. Turio deorsum purpurascens sursum viridis glaber; vagina media in specimine nostro 4 cm. longa 1½ cm. lata apice membranaceo-coriacea apice obtuso-truncata quam basis pseudophylli latior margine ciliolata, auriculis nullis; ligula ⅔ mm. longa intus glabra extus hirsuta apice truncata hirsuta. Pseudophyllum lineari-triangulare 9 mm. longum 2½ mm. latum. Culmus gracilis fusco-purpurascens 100 cm. altus. Merithallium medium 13 cm. longum 4½ mm. in diametro in sectione O forme uno latere sulcatum; pulvillus inferior annulariter prominens, is superior plus acute prominens a

eo inferiore 1½ mm, distans, nodiis valde prominentibus; squama bicarinata longe linearis 2-3 cm. longa 1-2 mm. longa extus hirsuta. Rami generaliter gemini; ramuli 3-foliati; vaginella 2½ cm. longa glabra, setis auricularibus utroque latere apicis 4-5 circ. 6 mm. longis; ligula obtusa 1 mm. longa obtuso-truncata extus hirsuta intus glabra apice eroso-ciliolata. Folia lineari-lanceolata 8-9 cm. longa 11-14 mm. lata apice acuminatissima basi obtusa ad petiolum 4-7 mm. longum abeuntia supra glabra subtus prope basin costae hirsuta caeterum glabra margine uno latere scabra uno latere glabra, nervis secundariis utroque latere 4-5, venulis inter secundarios 9-10.

HAB. Rosuiko : Yushako, leg. B. HAYATA, April. 5, 1916.

Near *P. puberula* var. *nigra*, but distinguishable from it in having quite glabrous turions.

***Bambusa* SCHREM.**

***Bambusa breviflora* MUNRO** Monograph p. 96; CAMUS *Bambus*. (1913) p. 118. " Chaume inerme, arborescent ? presque plein, dur, brillant, entre-noeuds longs de 13-16 cm.; rameaux fasciculés aux noeuds, les inférieurs noueux à la base, arrondis, simples ou rameux, florifères au sommet, souvent feuillés à la base, mais à feuilles promptement caduques, rameaux du sommet souvent feuillés, mêlés à d'autres florifères nus a la base. Feuilles lancéolées, longues de 4-10 cm. larges de 12-18 mm. arrondies à la base, à pétiole court comprimé, acuminées-sétacées au sommet, à bords rudes a peine deniés, glabrescentes en dessus, hirsutes en dessous, mimies de 4-5 paires de nervures latérales visible et d'autres intermediaires beaucoup plus faibles; gaines sillonnées, glabres, auriculées, à oreilles ciliées ou parfois longuemnt fimbriées (18 mm.) Panicule

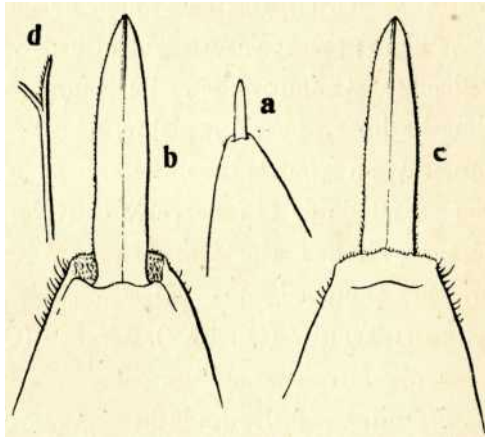


Fig. 53, *Phyllostachys nigripes* HAYATA; a, a sheath of a turion seen from surface; b, the same; c, the same, seen from within; d, the same, in vertical section, showing the ligule; a, natural size; others magnified.

sur des rameaux ou ramuscules terminaux, en epis verticilles, a verticilles formes de peii d'epillets et a pen pres equidistants. Epillets brillants livides, courts, au plus de 14 mm. de long, pauciflores, a 5-7-fl., subcylindriques, aigus; racheole courte, articulee. Fleurs superieures et inferieures graduellement imparfaites, les moyennes 2-3 hermaphrodites. Fleurs ♂ : Glumelle infer, nervee, glabre, obtuse, souvent mucronee; glumelle super, depassant un peu la sup. 2-carenee, a carenes finement fimbriees vers leur sommet, munie de 5-7 nervures entre les 2 carenes. Glumellules non visiblement nervees, finement fimbriees. Antheres a connectif obtus allonge. Style surmonte par 3 stigmates. Ovaire stipite, obove, hirsute au sommet. Chine, Formose: Tamsuy (OLDHAM), Linthao (CANTRO)."

HAB. Mt. Kwannonzan.

Bambusa dolichoclada HAYATA sp. nov. (Fig. 54). Rhizoma breve erectum crassum teres 4½ cm. in diametro. Culmus haud spinosus breve caespitosus 10 cm. altus in 2 m. altitudinem 4½ cm. in diametro teres circularis in sectione viridis saepe extus albo-cerifer a basi ramifer; ramie inferioribus efoliatis gracillimis longissimis horizontaliter patentibus. Merithallium ad 2m. altitudinem 30 cm. longum 4½ cm. in diametro, lignum 8 mm. crassum, canalis 33 mm. in diametro, pulvillus inferior prominens, is superior obscurus; pulvilli a se 7 mm. distantes. Rami ad nodos fasciculati. Vagina media coriacea extus fusco-hirsuta 24 cm. longa 28 cm. lata margine versus apicem tenuiter hirsuta apice late truncata, partibus truncatis 16 cm. latis plus minus rotundatis vel fere truncatis; ligula brevissima apice fimbriato-ciliata; pseudophyllum elongato-triangulari 17 cm. longum 16 cm. latum, basi cum partibus truncatis vaginae aequilatum, basi subito latius supra basin ad marginem valde undulato-crispato-plicatum hic ibidem longe setoso-barbatum extus subglabrum intus basi dense hirsuto-barbatum ; vaginella 5½-7 cm. longa 2-3 mm. lata glabra apice auriculis conspicuis setulosis utroque latere instructis, ligula brevissima truncata extus hirsuta ½ mm. longa haud ciliolata. Folia lineari-lanceolata 9-18 cm. longa 13-23 mm. lata apice acuminatissima basi subito rotundato-truncata abrupte ad petiolum 1½-2 mm. longum abeuntia margine scabra supra glabra supra prope latus unum scabra subtus tenuiter hirsuta, nervis secundariis utroque latere costae 5-7; venulis inter seeundarios 8-9 haud tessellatis.

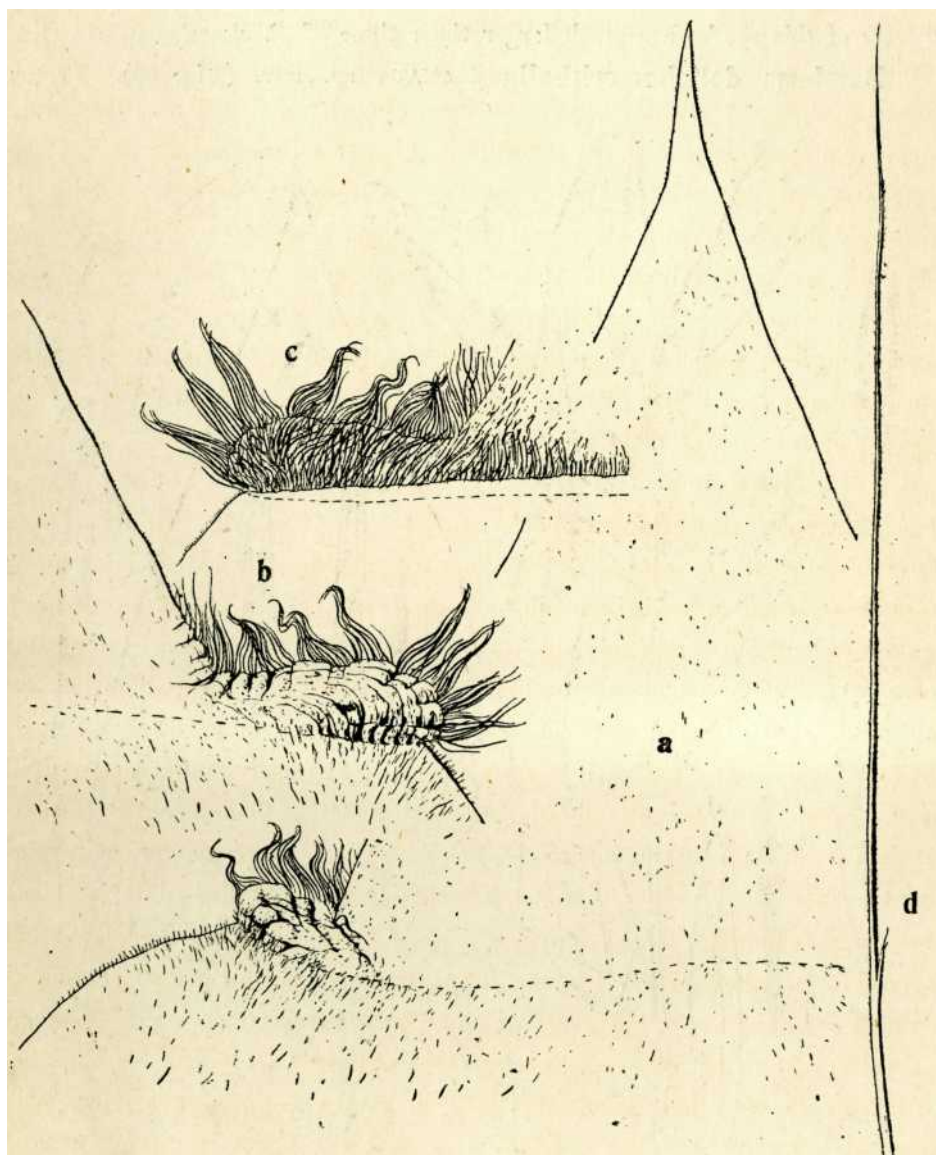


Fig. 54, *Bambusa dolichoclada* HAYATA; a, apical portion of a sheath of a turion, seen from without; b, another portion of the same; c, the same, seen from within; d, the same, in vertical section; all figures natural size.

HAB. Rinkiho: Aprili. 1916, B. HAYATA.

Near *B. stenostachys* HACK., but distinguishable from it by the much larger leaves, and in the unarmed branches and thinly ceriferous culms. The

flowers of this species are much larger than those of *B. stenostachys* HACK.

***Bambusa dolichomerithalla* HAYATA sp. nov.** (Fig. 55). Frutex.



Fig. 55, *Bambusa dolichomerithalla* HAYATA ; a, a portion of an inflorescence; b, a flower; c, a glume of the same flower, seen from the outer side; d, the same, seen from the inner side; e, cross section of the same; g, an apical portion of the same; h, a valva, seen from the outer side; i, the same, seen from the inner side; j, cross section of the same; k, an apical portion of the same; l, m, stamens; n, o, apical portions of the different stamens; p, a lodicule; q, an ovary; r, basal portion of a vagina; s, longitudinal section of the same; a, natural size b, c, d, e, h, i, j x 2; l, m x 3; p, x 6.

Rhizoma teres 3 cm. in diametro, internodiis 7-15 mm. longis, erectum crassum breve. Culmus erectus rectus caespitosus in 2 m. altitudinem $4\frac{1}{2}$ cm. in diametro 10 m. altus cum ramis ramulisque perfecte teres, partibus non ramiferis 6 m. longis. Merithallium medium vel inferius 25-60 cm. longum $2\frac{1}{2}$ in diametro viride vel albo-striatum, pulvillus inferior tenuiter elevatus duplicato-annulariformis, pulvillus superior obscurimus haud elevatus a eo inferiore 1 cm. distans ; lignum $2\frac{1}{2}$ mm. crassum ; canalis 2 cm. in diametro. Vagina coriacea 10 cm. longa 7 cm. lata apice late rotundata cum pseudophyllo juncta sparse hirsuta, pilis deciduis; pseudophyllo sub-membranaceo oblongo-triangulari 11 cm. longo 6 cm. lato apice acuminato basi plus minus contracto; ligula subnulla haud hirsuta. Rami ad nodos dense fasciculati, ramulis elongatis 5-8-foliatis, vaginella $3\frac{1}{2}$ - $7\frac{1}{2}$ cm. longa $1\frac{1}{2}$ - $2\frac{1}{2}$ mm. lata, auriculis interdum conspicue evolutis interdum haud evolutis, setis auricularibus interdum evolutis interdum haud visis, ligula brevissima truncata interdum crenulata. Folia lineari-lanceolata 9-27 cm. longa 1-3 cm. lata apice acuminata basi rotundata cuneata, ad petiolum 1-2 mm. longum abeuntia supra glabra subtus hirsuta vel subglabra, nervis secundariis utroque latere costae 3-7, venulis inter secundarios 4-8. Inflorescentia cum foliis interdum intermixta vel interdum haud mixta. Rami floriferes simplices haud ramosi, inferiores 1 m. longi. Spiculae ad nodos solitariae alternae sessiles bractea singula caducissima involutae lineari-lanceolatae complanatae 5-6 cm. longae 1 cm. latae pallido-virides glabrae nitidae teretes 7-8-floratae. Glumae inferiores non floriferae; valva (= gluma florifera) floris medii ovato-oblonga 2 cm. longa 11mm. lata apice acuta convoluta utraque glabra. Palea plicata in plicato lineari-lanceolata apice acuminata in summo obtusa ciliata 2-carinata ad carinam setuloso-ctiliolata extus glabra intus minute hirsuta secus carinam plicata, partibus plicatis medio 3 mm. latis, margine sursum minute ciliolata. Stamina 6, antheris pendulis linearibus 12 mm. longis apice attenuatis ad summum emarginatis basi sagittato- 2-lobatis, lobis 1 mm. longis ; lodiculis 3 obovato-cuneatis hyalinis nervosis apice triangulari-acutis erosus haud fimbriatis. Ovarium obovoideum stipitatum cum stipite 2-3 mm. longum $1\frac{1}{2}$ mm. latum patento-hirsutum, stigmatibus 3 filiformibus hirsutis.

HAB. Yusuiko, ad 3000 ped. alt., leg. B. HAYATA, Aprili. 1916 ; (sp. fl. et fol.); Roshinkosho: Kwaiyozan, leg. B. HAYATA, Aprili. 1916. Culmus

7 m. altus ad 2 m. altitudinem 3½ cm. in diametro.

Near *Bambusa vidgaris*, but differs from it by the nearly solitary and much longer spikelets. Also near *B. nana* var. *normalis*, but distinguishable from it by the much longer, internodes, spikelets and leaves.

***Bambusa Fauriei* HACKEL** (Fig. 56); MATSUM. et HAYATA Enum. Pl. Formos. p. 549.

***Bambusa liukiensis* HAYATA** sp. nov. Frutex. Rami graciles, ramulis 3-5-foliatis, vaginella 2-3 cm. longa glabra apice auriculata, auriculis oblongo-triangularibus 1 mm. longis ½ mm. latis apice obtusis oblique prominentibus margine setosis, setis 5 mm. longis scabris, ligula brevissima ½ mm. longa integra truncata. Folia lanceolata 5-7 cm. longa 8-11 mm. lata apice acuminatissima basi oblique rotundata vel obtusa ad petiolum 1 mm. longum abeuntia margine supra glaberrima subtus glaucissima tenuissime hirsuta margine scabra, nervis secundariis utroque latere costae 4-5, venulis inter secundarios 7-8 haud tessellatis. Paniculae compositae, ramis fasciculatis, bractea ignota. Spiculae lineari-fusiformes 2 cm. longae ad nodos solitariae vel 2-3-fasciculatae sessiles, floribus perfectis 3 et eo imperfecto 1; glumae non-floriferes inferiores minutae superiores majores; valva (gluma florifera) 12 mm. longa nervosa glabra fere convoluta acuta; palea plicata in plicato 10 cm. longo 1¾ mm. lata apice bifida, lobis acuminatis 2 mm. longis, dorso 2-carinata ad carinas hirsuta, inter carinas glabra, partibus plicatis 1½ mm. latis. Stamina 6, antheris linearibus 6-7 mm. longis 1 mm. latis apice brevissime 2-lobatis basi sagittato-2-lobatis,

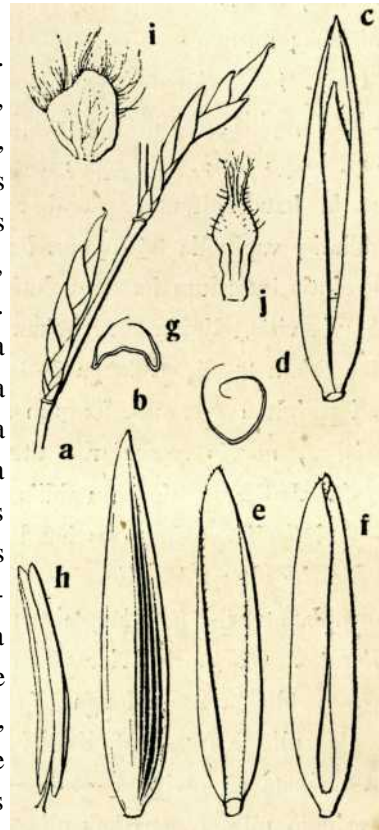


Fig. 56, *Bambusa Fauriei* HACK. a, a portion of the inflorescence; b, a glume of a flower, seen from the outer side; c, the same, with a valva, seen from the inner side; d, cross section of the same; e, a valva, seen from the outer side; f, the same, seen from the inner side; g, the same, in cross section; h, a stamen; i, a lodicule; a, natural size; b, c, e, f x 4; i, j x 6.

lobis 1 mm. longis; lodiculae obovatae $2\frac{1}{2}$ mm. longae 1 mm. latae apice triangulari-acuminatae fimbriatae basi cuneatae. Ovarium obovoideum 2 mm. longum 1 mm. latum apice globosum basi longe cuneatum sursum glabrum deorsum hirsutum, stigmatibus 3 filiformibus fimbriatis.

HAB. Liu-kiu, secus rivulas crescens, leg. J. MATSUMURA.

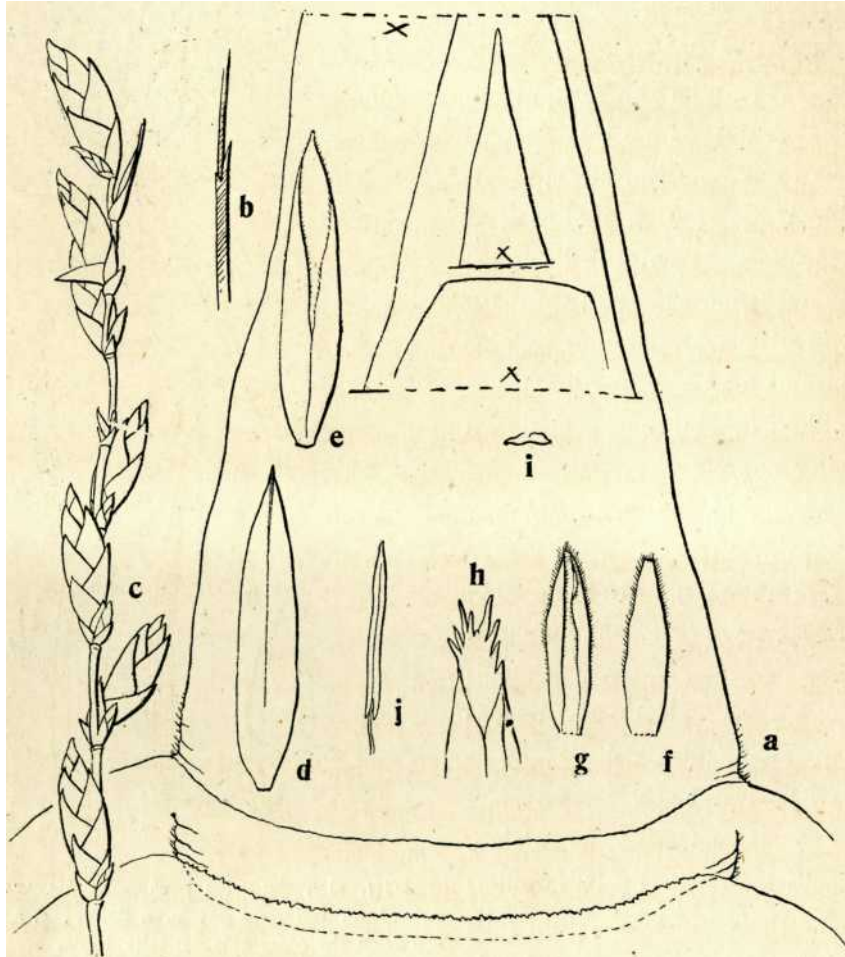


Fig. 57, *Barribusa Oldhami* MUNRO; a, a sheath of a turion, seen from the outer surface; a', basal portion of the same, seen from the inner side, showing the ligule; b, a portion of the same, in vertical section, showing the ligule; c, a portion of the inflorescence; d, a glume of a flower; e, the same, seen from the inner side; f, a palea of the same flower; g, the same, seen from the inner side; h, apical portion of the same, more magnified; i, cross section of the same valva; j, a stamen; a, b, c, natural size; others $\times 3$.

Distinctly differs from *B. nana* ROXB. In having much smaller and shorter spikelets and in having very prominent auricles at the apex of the vaginella.

Bambusa Oldhami MUNRO (Fig. 57); MATSUM. et HAYATA, Enum. Pl. Formos. p. 550. Rhizoma erectum breve crassum. Culmus caespitosus erectus vel plus minus recurvus 12 m. altus; merithallium in 1½ m. altitudinem 25 cm. longum 5½ cm. in diametro; lignum 12 mm. crassum; canalis 4 cm. in diametro, pulvillus inferior tenuissime elevatus, partibus inter pulvillum inferiorem et superiorem tenuiter impressis.

HAB. Rinkihō, leg. B. HAYATA, Aprili. 1916.

Bambusa pachinensis HAYATA sp. nov. (Fig. 58). Frutex. Rhizoma crassum erectum. Culmus caespitosus 2 m. altus. Rami fasciculati, ramulis 5-6-foliatis; vaginella 3½-5 cm. longa sursum margineque hirsuta deorsum glabra, auriculis inaequalibus palmiformibus 1 mm. latis instructa, auriculis setosis, setis 5-6, 7 mm. longis hand scabris; ligula brevissima ⅔ mm. longa extus hirsuta margine erosa. Folia lanceolata vel ovato-lanceolata 7½-10 cm. longa 18-20

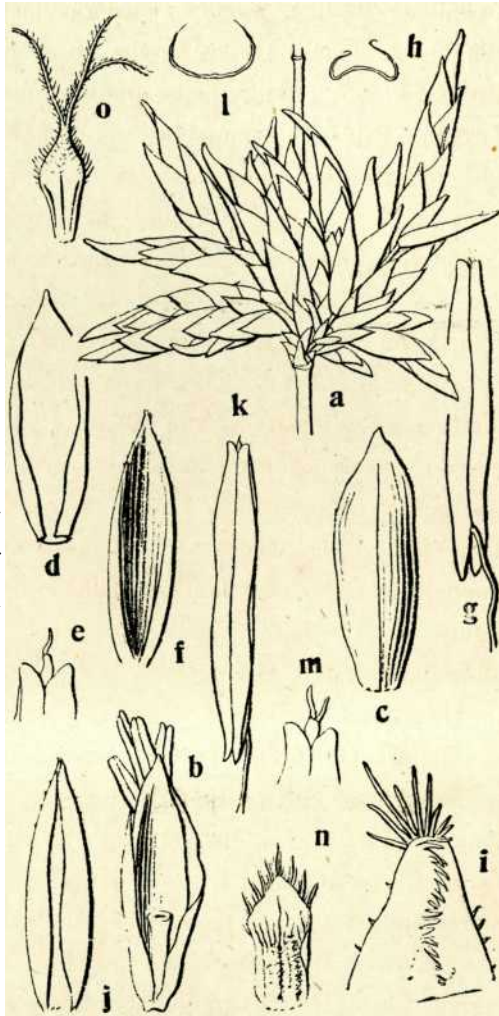


Fig. 58, *Bambusa pachinensis* HAYATA; a, a part of an inflorescence; b, a flower; c, a glume, seen from the outer side; d, the same, seen from the inner side; e, cross section of the same; f, a palea, seen from the outer side; g, the same, seen from the inner side; h, cross section of the same; i, an apical portion of the same; j, k, stamens; l, m, apical portion of different stamens; n, a lodicule; o, an ovary; a, natural size; b, c, d, e, f, g, h x 3; j, k, n, o x 6 others more magnified.

mm. lata apice acuminatissima basi plus minus rotundata vel leviter cordata ad petiolum 1½ mm. longum abeuntia margine utroque scabra supra prope costam scabra supra glabra subtus tenuiter hirsuta, nervis secundariis utroque latere costae 3-5, venulis intersecundariis 7-8 tessellatis, inter venulas pellucido-punctata. Paniculae compositae non foliiferae; spicae vel spiculae ad nodos multi- vel pauci-congestae, basi bractea instructae; bractea caducissima triangulari-ovata 1 cm. longa 5 mm. lata apice lamina minutissima cuspidato-triangulari 1½ mm. longa instructa. Spiculae lineares complanatae 3-4 cm. longae 6-7 mm. latae circ. 8-floriferae; rhachis minute hirsuta, rhachilla glabra. Valva (gluma florifera) ovata convoluta 13 mm. longa in explicato 10 mm. lata apice acuta extus glabra intus sursum dense hirsuta deorsum glabra valde coriacea nervosa; palea plicata 13 mm. longa coriaceo-membranacea extus ad costas hirsuta caeterum glabra intus sparse hirsuta apice hirsuta. Stamina 6, antheris linearibus 6 mm. longis apice emarginatis mucronatis basi sagittatolobatis, lobis 1 mm. longis; lodiculae obovatae 3 mm. longae 2 mm. latae apice rotundatae margine longe fimbriato-ciliatae. Ovarium cuneato-obovoideum 2 mm. longum 1 mm. latum apice hirsutum deorsum glabrum, stigmatibus 3 filiformibus hirsutis.

HAB. Pachina, leg. B. HAYATA, Mart. 1916.

Remarkable for the broader bracts which are almost wanting of a lamina.

Bambusa Shimadai HAYATA sp. nov. (Fig. 59). Frutex; rami et ramuli fasciculati, ramulis 5-12-foliatis, vaginella 1½ cm. longa glabra, auriculis subnullis, setis auricularibus 5-6 tenuissimis 1-2 mm. longis; ligula brevissima truncata integra. Folia lanceolata vel lineari-lanceolata 5 cm. longa 6-9 mm. lata apice acuminatissima basi rotundata vel obtusa ad petiolum 1-1½ mm. longum abeuntia utraque glabra subtus glauca margine scabra, nervis secundariis utroque latere costae 5, venulis intersecundariis circ. 7, haud tessellata. Ramuli floriferi ad nodos 2-3-congesti remote spiculiferi. Spiculae generaliter solitariae alternae a se circ. 2½ cm. remote basi 1-bracteatae; bracteae caducae, vaginellis 1-2 cm. longis, laminis lanceolatis basi abrupte dilatatis cum vaginella aequilatis caducissimis utraque pagine hirsutis. Spiculae cylindricae plus minus complanatae 3-4 cm. longae 4 mm. latae, floribus 4-5 a se 4-2 mm. distantibus; glumae inferiores non-floriferae minores.

Valva convolute 2 cm. longa apice acuta utraque pagine glabra nervosa valde coriacea. Palea coriaceo-membranacea 18 mm. lata plicata in plicato lanceolata 18 mm. longa utraque pagine glabra versus apicem carinata secus carinam plicata, partibus plicatis 2 mm. latis versus apicem ad marginem ciliolatis, ad apicem 3-4-setuloso-ciliolata. Stamina 6, antheris linearibus 1 cm. longis apice obtusis emarginatis; lodiculæ 3 inaequales hyalinae obovato-oblongae apice acutae vel obtusae erosae. Ovarium fere obovoideum apice hirsutum sessile haud stipitatum; stigmatibus 2-3?

HAB. Sekimensho, leg. S. SHIMADA, Mart. 1911.

Bambusa stenostachys

HACK. ; MATSUM. et HAYATA Enum. Pl. Formos. p. 550. Rhizoma erectum crassum. Culmus caespitosus plus minus flexuosus ad 2 m. altitudinem 4 cm. in diametro; lignum 1½ cm. crassum, canalis 12 mm. in diametro. Merithallium in 2 m. altitudinem 25 cm. longum 3½ cm. in diametro; pulvillus inferior valde prominente elevatus, pulvillus superior vix elevatus, a se 7 mm. distans; culmus a basi ramosus, ramis spinescentibus.

HAB. Rinkiho, leg. B. HAYATA, Aprili. 1916.

Bambusa tuldoides MUNRO " Monogr. p. 93;" CAMUS Bambus. p.

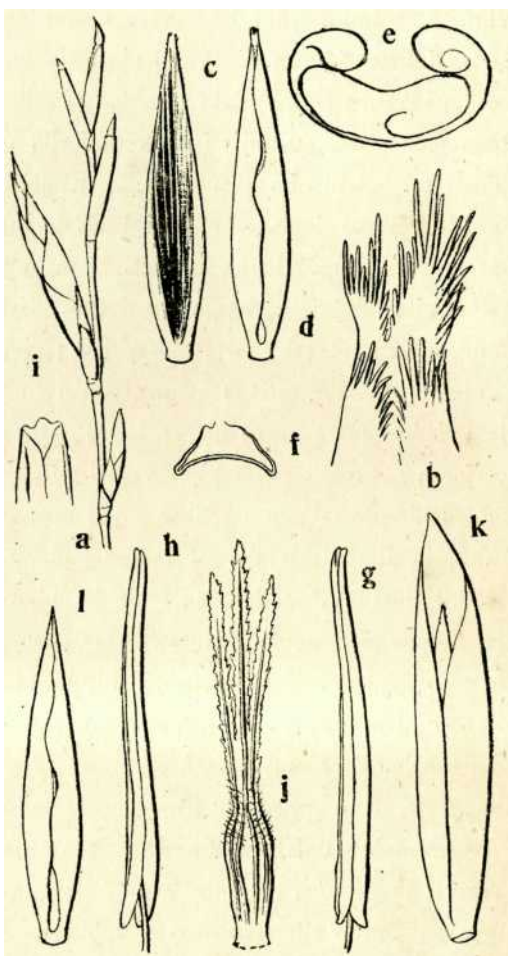


Fig. 59, *Bambusa Shimadai* HAYATA; a, a portion of an inflorescence; b, a flower; c, a palea, seen from the outer side; d, the same, seen from the inner side; e, cross section of a flower; f, cross section of a palea; g, h, stamens; i, an apical portion of a stamen; j, an ovary; a, natural size; others more or less magnified.

117.—"Chaumes à peine arborescents, fistuleux, à rameaux feuillés, a entre-noeuds sillonnés-striés. Feuilles de ces rameaux, longues de 12-20 cm. larges de 15-20 mm. lanceolées, arrondies à la base, pétiolées, à bords denticulés, à dents éloignées surtout vers la base, glabres en dessous, mais à toucher rude sur les bords, un peu poilues en dessous; nervures secondaires 6-8 paires, peu distinctes; games ciliées vers le sommet et munies de 2 auricules ciliées et fimbriées, feuilles de la panicule de même forme mais plus petites, atténuées à la base; à gaines non munies d'auricules fimbriées et ciliées comme les autres feuilles. Inflorescence en panicule feuillée, à rachis glabre, brillant dur, arrondi, de 6-8 mm. de diam., cette panicule lâchement composée, très rarement simple, à rameaux très inégaux subverticillés; les supérieurs 1-3, les inférieurs groupés par 5-6; entre-noeuds inférieurs scabriuscules au sommet. Epillets pâles, non brillants, membraneux, cylindriques un peu comprimés plus ou moins espacés, rarement agglomérés densément, longs de 25-30 mm. 4-8-flores, la fleur inférieure et les supérieures incomplètes. Rachéole à la fin visible, brièvement hirsute à sa partie supérieure. Glumes petites, ovals-aiguës, à nervure médiane un peu forte. Fleurs ♂ : Glumelle inférieure sub-obtuse au sommet, brusquement mucronée; glumelle supérieure presque aussi longue ou beaucoup plus courte que l'inf. acuminée, terminée par un fascicule de poils, à carenes brièvement ciliées au sommet. Glumellules 3, obovales, obtusiuscules, finement fimbriées. Etamines à anthers obtuses. Style très court. Stigmates 3, ténus. Ovaire stipité presque obovale, hirsute au sommet, couronné par les débris du style et des stigmates. Caryopse de 5 mm. de long, obtus, presque glabre."

" Chine : Canton, Hongkong, Formose, Tonkin."

There are yet two more species of Bamboos in Formosa; one is very near to a small form of *B. dolichomerithalla*, and the other is a species with leaves much like those of *B. Oldhami* and with turion-sheath much like those of *Phyllostachys edulis*.

Marattiaceae.

Archangiopteris CHRIST ET GIESENHAGEN.

Archangiopteris Somai HAYATA (Pl. XIX et fig. 60) Ic. Pl. Formos. V. p. 256. Rhizoma crassum breve horizontaliter situm subrepens reliquis stipularum et basibus stipitum approximativim obtectum, radicibus e facie inferiore rhizomatis abundanter oriundis incrassatis teretibus. Stipes circ. 50 cm. longus plus minus squamatus (squamis castaneis lanceolatis membranaceis acuminatis basi subcordatis 2-3 mm. longis) a basi ad 20 cm. altitudinem articulo-geniculatus ad hic ibidem tumido-incrassatus, basi ad extremitatem subito incrassatus in exsiccato fusco-nigricans stipulis amplis semi-rotundatis sublignosis instructus. Frons in circumscriptione ovata herbaceo-membranacea vel herbaceo-coriacea margine deorsum recurva supra atroviridis haud nitida plus minus variegata subtus pallidissima 40 cm. longa 25 cm. lata pinnata, pinnis 4-6; pinna terminali lanceolata 30 cm. longa apice subito acuminatissima, acumine lineari basi 3-4 mm. lato, basi obtusa margine a basi usque ad prope acumen regulariter crenulata (crenulis $\frac{1}{2}$ mm. longis 1 mm. latis) ad basin acuminis dentata, (dentibus ascendentibus apice obtusis $1\frac{1}{2}$ mm. longis), utraque pagina glabra, venis lateralibus simplicibus vel a basi furcatis, venulis parallelis a costa circ. angulo 90° divaricatis plus minus superiore recurvis a se 2-3 mm. remotis simplicibus distinctis haud elevatis haud impressis ad marginem fere attingentibus vel prope marginem evanescentibus apice haud elevatis, venulis recurrentibus nullis; pinnis laterali-

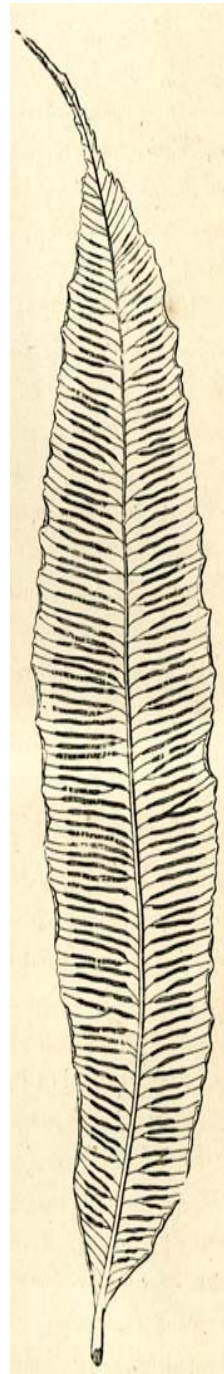


Fig. 60. A pinna of *Archangiopteris Somai* HAYATA. X 3/5.

bus cum terminali conformibus sed paullo minoribus, petiolulis 5-8 mm. longis haud dilatatis haud articulatis haud geniculatis teretibus in exsiccato fuscentibus. Sori lineares 10-12 mm. longi secus venulas siti; sporangiis 60-70 2-seriatim dispositis, sub soris pilis sparce sitis; costa pinnae utraque pagine plus minus elevata.

HAB. Urai, leg. T. SOMA et B. HAYATA, Mai. 1916.

Resembles *Archangiopteris Henryi* CH. et GIES. in having simply pinnate fronds with linear sori; but differs from it by the much shorter and not tumid petioles of the pinnae, in the very much longer apical tails of the latter, in the geniculate stipes with stipules at their very base, and in the less hairy sori which in our species are located much nearer to the costa than to the margin. Our species is, as a whole, much nearer to *Angiopteris* than *A. Henryi* is to the latter. The resemblance of our new fern with a simple pinnate form of *Angiopteris erecta* in its young stage is really very remarkable. The form of the stipules and the geniculation of the stipes are very similar in the two.

Cyatheaceae.

There are in Formosa four genera belonging to this family. *Dicksonia* and *Cibotium* are distinctly distinguished from the other genera even in sterile specimens. *Cyathea* and *Alsophila* are on the other hand much confused in the field, when they are not in fertile specimens. Eight species of *Alsophila* are recorded from Formosa, while *Cyathea* is represented only by one, *C. spinulosa* WALL. As far as I can judge from my field-knowledge, there exist in Formosa only three species of *Alsophila* and one species of *Cyathea*,— i.e. *A. formosana*, *A. podophylla*, *A. latebroso* and *C. spinulosa*. The first two species are distinguishable from the others by the much shorter stems not marked by the leaf-scars. *A. formosana* is the smallest and usually stemless with quite smooth stipes, while *A. podophylla* is a little larger with stems usually ½-1 m. long and very muricate stipes. *A. latebroso* is the largest, its stems being marked very distinctly with leaf-sears and 2-20 m. tall, its fronds being ovate-oblong 260-400 cm. long 145 cm. broad, and its stipes being 15 cm. long, nearly smooth or very slightly muricate and covered with numerous white long soft scales at the base, while *Cyathea spinulosa* is a little

smaller than the preceding species, its stems being also marked with leaf-scars and 1-4 m. tall, its frond ovate-oblong 170-200 cm. long, 85 cm. broad, and its stipes 40-50 cm. long and very aculeate at the base. These four species are widely distributed in the island from Koshun northwards to Kelung. They are all that I know from Formosa. As to the other species recorded from the island, *A. contaminans*, *A. pastulosa* and *A. tomentosa* are presumably forms of *A. latebrosa*. *A. subglandulosa* HANCE is very likely a species of *Dryopteris*, as far as I can conjecture from a drawing made by myself in the British Museum from the original specimen preserved there; and finally *Alsophila denticulata* BAKER mentioned in Journ. Bot. (1885) p. 102 and MATSUM. et HAYATA Enum. Pl. Formos. p. 571, is very likely a species belonging also to *Dryopteris*. So far as I am aware, we have never seen so small a tree-fern as the latter species described as "stipe about a foot long; frond ovate-deltoid, 1½ ft. long, tripinnatifid, but fertile also in a bipinnate form."

Polypodiaceae.*

Athyrium ROTH.

Athyrium cryptogrammoides HAYATA sp. nov. Rhizoma ignotum. Stipes 10-25 cm. longus stramineus basi sparse squamatus, squamis lanceolatis castaneis apice acuminatis 5 mm. longis 1 mm. latis basi haud contractis. Frons in ambitu oblonga 30 cm. longa 15 cm. lata apice acuminatissima basi obtusa tripinnata, pinnis mediis alternis 10 cm. longis 3 cm. latis in ambitu lanceolatis apice acuminatissimis basi obtusissimis, pinnulis ordinis I. mediis oblique triangulari-lanceolatis 2 cm. longis 7 mm. latis apice obtusis basi oblique truncatis, pinnulis ordinis II. infimis longissimis, mediis obovatis 5 mm. longis 2 mm. latis apice obtusis basi oblique cuneatis pinnatilobis, lobis utroque latere circ. 2 lineari-oblongis 1 mm. longis ⅔ mm. latis basi haud contractis apice acutis vel obtusis 1-nerviis, nervis simplicibus haud furcatis prope apicem attingentibus. Sori basi loborum pinnularum ordinis II. singulariter siti. Indusium lineare reniforme vel cordatum 1-4 mm. longum ⅔ mm. latum margine erosum. Textura chartacea vel chartaceo-coriacea; pinnae a rhachibus

* For convenience sake, the genera under this family are arranged in alphabetical order.

frondis angulo circ. 45° agressae ascendentes, mediis longissimis superioribus gradatim minoribus versus apicem ad lobos acuminium abeuntibus; acuminibus frondis lineari-filiformibus utroque latere lobis remotis instructis; pinnis mediis a se 2½ cm. remotis, pinnulis ordinis I. mediis a se 10-8 mm. remotis, pinnulis ordinis II. a se 2-3 mm. distantibus. Rhachis frondis subteres vel semi-teres straminea 1 mm. in diametro supra sulcata glabra; rhachis pinnarum ordinis I. gracillima ⅓ mm. in diametro semi-teres glabra; rhachis pinnularum ordinis II. ⅓-½ mm. lata plus minus complanata supra profunde sulcata secus sulcum setulosa, setulis erectis 1 mm. longis validiusculis a se 1-1½ mm. remotis.

HAB. Gokwanzan, leg. YADA, Dec. 1914.

Remarkable for the very narrow linear segments and pinnulis.

Blechnum Linn.

***Blechnum* (*Blechnidium*) *plagiogyriifrons* HAYATA sp. nov. (Pl. XX.)**

Rhizoma longe horizontaliter repens teres gracile, squamis dense obtectum, squamis castaneo-coloratis ovato-lanceolatis 5 mm. longis 1 mm. latis apice acuminatis vel filiforme-acuminatis ad summum obtusis basi subcordatis vel rotundatis margine subintegris. Stipes gracilis distans 20 cm. longus cum fronde aequilongus supra tenuiter sulcatus subteres supra pallidus subtus purpurascens basi squamatus caeterum toto glaber. Frons ovato-lanceolata 20-27 cm. longa 7-9 cm. lata ad rhachin pinnatifida, lobis vel segmentis approximatis linearibus, pinnis inferioribus prope medium longissimis 3½-5 cm. longis basi 8-11 mm. latis basi latissimis falcatis recurvis apice acutis margine integris, superioribus gradatim minoribus ad lobum terminalem abeuntibus, lobo terminali 3-5 cm. longo lineari-acuminato integro vel undulato; segmentis inferioribus prope basin frondis abrupte minoribus ad auriculas abeuntibus, auriculis utroque latere basis frondis 2-3 vel 4 semi-rotundatis 3-8 mm. longis et latis; pagina tenuiter coriacea utraque glabra supra atro-viridis subtus pallidissima vix vel haud nitida, costa frondis supra elevata tenuiter sulcata subtus elevata, costis segmentorum supra tenuissime elevatis vel impressis subtus elevatis, venis venulis reticulatis. Sori utroque latere costae pinnae secus costam approximatis siti lineares, a rhachi costae frondis 2 mm. remotis et ab apice pinnarum 1½ cm. distantes. Indusium lineare 1½ mm. latum margine erosum vel denticulatum; pinnae ad marginem subito tenuiores deorsum recurvae.

HAB. Inter Ushoko et Arisan, ad 7000 ped. alt., leg. B. HAYATA, Aprili. 1916.

Near *Blechnum melanopum* (HOOK. Sp. Fil. III. p. 64 t. CLXI.); but slightly different from it in having less anastomosing veins. In appearance, the present species is very like sterile fronds of *Plagiogyria falcata* which grow on rocks with the new fern.

***Cyclophorus* DESV.**

***Cyclophorus Sasakii* HAYATA sp. nov.** (Fig. 61). Rhizoma repens teres gracile primum versus apicem densissime squamatum, (squamis castaneis

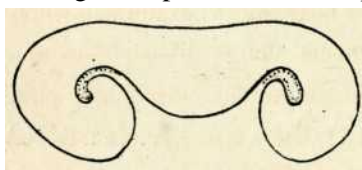


Fig. 61, Cross section of a frond of *Cyclophorus Sasakii* HAYATA.

lineari-lanceolatis 5-6 mm. longis $\frac{1}{2}$ mm. latis apice acuminatissimis basi rotundatis peltatim insertis, basi ad extremitatem pauce fimbriatis vel haud fimbriatis), demum subglabratum 1 mm. in diametro sectionis remote frondigerum.

Frons a se circ. 1 cm. distans subsessilis vel brevissime tipitata lineari-lanceolata $3\frac{1}{2}$ cm. longa 3 mm. lata apice obtusa basi ad stipitem abeuns margine integerrima valde deorsum usque ad costam convoluto-recurva supra medio impresso-sulcata, supra glabra-subtus stellato-pilosa. Textura crassissima. Sori ignoti.

HAB. Shintiku : Karizenzan, leg. S. SASAKI, Jan. 1916.

Very near *Polypodium angustissimum* BAKER. Undoubtedly our plant belongs to the same section with that species.

***Dryopters* ADANS.**

***Dryopteris Sasakii* HAYATA n. n.**

Dryopteris tenuifrons HAYATA Ic. Pl. Formos. IV. p. 184 (non C. CH.).

***Dryopteris woodsii* HAYATA sp. nov.** Rhizoma ascendens crassum dense squamatum. Stipes 4-5 cm. longus dense squamatus, squamis stramineis lineari-lanceolatis circ. 1 cm. longis 1-1 $\frac{1}{2}$ mm. latis apice acuminatissimis margine aristis brevissimis minutis remote instructis. Frons in ambitu ovato-lanceolata apice acuminata basi obtusa vel truncata 9 cm. longa $3\frac{1}{2}$ -4 cm. lata pinnata, pinnis divaricatis a rhachi frondis angulo 90° egressis, superioribus gradatim minoribus, pinnis infra medium sitis longissimis lineari-triangularibus 18 mm. longis 8 mm. latis apice obtusissimis basi truncatis brevissime

stipitatis pinnatifidis, lobis oblongis apice truncatis dentatis latere margine integris; textura herbacea chartacea; rhachis breve squamato-hirsuta; pagina frondis sub microscopio minute glanduloso-hirsuta. Sori reniformes $1\frac{1}{4}$ mm. longi $1\frac{1}{2}$ mm. lati basi profunde cordati sacciforme et pulvim-formes, ad sinus inter pinnarum lobos siti.

HAB. in rupibus Arisan, ad 2500 m. alt., leg. U. FAURIE, Junio 1914. No. 518.

Humata CAV.

Humata dryopteridifrons HAYATA sp. nov. Rhizoma ignotum. Stipes circ. 30 cm. longus glaberrimus haud squamatus teres supra stramineus subtus castaneo-coloratus. Frons lanceolato-ovata circ. 23 cm. longa 10 cm. lata apice acuminata basi obtusa vel rotundata basi tripinnata sursum bipinnata, pinnis infimis triangulari-lanceolatis 10 cm. longis 3 cm. latis apice acuminatis basi latissimis truncatis bipinnatis, pinnulis ordinis I. infimis longissimis superioribus gradatim brevioribus versus apicem ad lobos abeuntibus, pinnulis ordinis I. infimis exterioribus longissimis 23 mm. longis 13 mm. latis triangulari-lanceolatis apice obtusissimis basi triangulari-acutis pinnatis, pinnulis ordinis II. infimis interioribus obovatis 1 cm. longis 7 mm. latis apice obtusissimis basi cuneatis margine lobulatis, lobulis obtusis; pinnis petiolatis, petiolis infimis 1 cm. longis, pinnulis ordinis I. petiolulatis, petiolulis 3 mm. longis, pinnulis ordinis II. subsessilibus; pinnis alternis mediis a se $3\frac{1}{2}$ cm. remotis a rhachibus frondis, pinnulis a rhachibus pinnarum angulo 45° egressis. Textura membranacea glabra, pagine supra ad solum rotundato-elevata. Sori ad apicem loborum lateris superioris vel infra sinus inter lobos lateris superioris siti; indusium depresso-rotundatum 2 mm. latum $1\frac{2}{3}$ mm. longum integrum basi contractum ad insertionem 1 mm. latum.

= *Davallia dryopteridifrons* HAYATA.

HAB. Arisan, ad 2500 m. alt., leg. U. FAURIE, Junio 1914. (No. 615).

Remarkable for the broad lobes of the pinnules of the very thin texture.

Monachosorum KUNZE.

Monachosorum Maximowiczii (BAK.) HAYATA Tokyo Bot. Mag. (1909) p. 2; KODAMA in MATSUM. Ic. Pl. Koishikaw. I. p. 29 t. 15; *Polypodium Maximowiczii* BAK. Syn. Fil. p. 504; *Polystichum Maximowiczii* DIELS

Nat, Pfl. Fam. I.-4, p. 189.

Var. **melanocaulon** HAYATA n. v. = *Polystichum Maximowiczii* var. *melanocaulon* HAYATA. Textura quam typo crassiora; stipites nigro-purpurascens.

HAB. Nokozan, Aprili. 1916.

***Polypodium* LINN.**

***Polypodium suisha-stagnale* HAYATA sp. nov.** Rhizoma repens teres 6 mm. in diametro sectionis viride adpresse squamatum, squamis fulvis ovato-oblongis 5 mm. longis 2 mm. latis apice acutis vel obtusis basi peltatim cordatis vel profunde cordatis, lobis cordis imbricatis, margine erosis vel remote eroso-setulosis. Stipes erectus 65 cm. longus stramineus nitidus. Frons lanceolato-linearis 60 cm. longa 18 cm. lata pinnati-fida vel subpinnata, pinnis infimis longissimis superioribus gradatim minoribus, pinnis lateralibus superrimis minimis, pinna terminali longiore; pinnis lateralibus linearibus infimis 14 cm. longis 18 mm. latis apice obtusis vel acuminatis; pinna terminali lineari 10 cm. longa 13 mm. lata margine subintegra; pinnis a rhachi frondis angulo 45° egressis utraque pagine glabris costis et venis supra minus subtus plus elevatis; costa frondis utraque elevata haud sulcata, alis angustissimis 2-3 mm. latis; frons a medio sursum sorifera. Sori rotundati 2 mm. in diametro supra valde elevati, subtus valde impressi 1½ mm. profundi; receptaculum 1 mm. in diametro tenuiter elevatum.

HAB. in stagnis Suisha, leg. B. HAYATA, Aprili. 26, 1916.

The present new fern was found in a very boggy place in a floating island in Suisha-lake. Very near *P. longissimum* BLUME, but distinguishable from it by the thinner texture and by the deeper sunken sori.

***Vittaria* SM.**

Key to the Formosan Species of *Vittaria*.

1. Sori sunk in a two-lipped marginal groove (§ *Euvittaria*).....2
Sori in a slightly intramarginal line, with the unaltered edge of the frond produced beyond and often rolled over it (§ *Taeniopsis*) .. 4
2. Fronds usually pendulous, very long usually over 30 cm., sometimes attaining to 1 m. or even more.....3
Fronds usually erect more or less recurved at most 30 cm. long..... 2-3

- mm. broad *V. anguste-elongata*
3. Fronds not tortuous *V. elongata*
 Fronds usually tortuous *V. tortifrons*
4. Fronds very narrow, usually 30 cm. long 2 mm. broad; sorus on the
 middle between margin and costa *V. mediosora*
 Fronds 4-8 mm. broad 40-80 cm. long, sori located near the margin...5
5. Fronds pendulous, scales brownish *V. arisanensis*
 Fronds suberect, scales much darker *V. suberecta*

Vittaria anguste-elongata HAYATA sp. nov. = *Vittaria* sp. HAYATA Ic.

Pl. Formos. V. p. 346, fig. 149-a. Epiphytica ad truncos arboris crescens. Rhizoma dense squamatum dense frondigerum, squamis castaneo-fuscentibus 4-6 mm. longis basi ½ mm. latis linearibus basi latissimis ½ mm. latis apice subulato-acuminatis margine remote setulosis. Stipes supra subnullus subtus complanatus basi squamatus. Frons longissime linearis usque ad 30 cm. longa usque ad 3 mm. lata apice acuminatissima basi gradatim attenuata glabra margine integra margine haud vel vix recurva glabra. Textura chartaceo-coriacea, costa supra vix vel distincte elevata subtus plana haud elevata vel plus minus impressa. Sori ad sulcos marginales siti.

HAB. Urai, Suisha, Kelung, Giran, Soseikyaku.

Near *V. elongata* Sw.; but separable from it in the much smaller fronds which are usually more or less tortuous, and in the scales which are brownish and less dark than those of *V. elongata*.

Vittaria elongata Sw.; MATSUM. et HAYATA Enum. Pl. Formos. p. 625.

HAB. Kaukaukei, Botansha, Suiteiryō, Urai, Randaisan.

Vittaria suberecta HAYATA sp. nov. *Vittaria* sp. No. III. Ic. Pl. Formos. V. p. 347 fig. 149 j-k. Epiphytica ad truncos arboris crescens suberecta plus minus curvato-descendens. Rhizoma cum basibus stipitum dense squamatum, squamis persistentibus fusco-nigricantibus lineari-lanceolatis 2 mm. longis apice subulato-acuminatis margine remote setulosis, dense frondigerum. Stipes atro-purpureus basi dense squamatus sursum glaber brevissimus subtetragonus supra sulcatus. Frons longissime linearis 20-50 cm. longa 3½-8 mm. lata apice acuminatissima basi gradatim attenuata ad stipitem brevissimum

abeuns margine integerrima in exsiccato deorsum recurva utraque pagine glaberrima, costa supra impressa subtus prominente elevata; textura crassa in exsiccato valde coriacea, venis haud visis. Sori intramarginales. *Vittaria lanceola* HAYATA in MATSUM. et HAYATA Enum. Pl. Formes. p. 625 (non CHRIST).

HAB. Musha Oiwake, ad 7000 ped. alt., leg. B. HAYATA, Aprili. 1916; Mingetsu; Arisan, inter Keitao et Goshorin; Gokwanzan, Urai.

Near *V. japonica*, but differs from it in the much thicker fronds and in the cellular structure of the scales which are a little darker than those of *V. japonica*.

Vittaria tortifrons HAYATA sp. nov. Epiphytica; rhizoma repens longissimum dense squamatum, squamis lanceolato-filiformibus 5-7 mm. longis nigricantibus basi ovatis vel ovato-cordatis 1 mm latis medio linearibus versus apicem filiformibus basi versus longitudinem exteriore plicatis margine remote serrulatis. Stipes 10-20 cm. longus. Frons longissime linearis verticaliter pendula usque ad 220 cm. longa 10-13 mm. lata apice basique gradatim angustissime acuminata utraque pagine glaberrima manifesto tortuosa, venis lateralibus distincte visis. Sori ad sulcos marginales siti.

HAB. Remogan, leg. B. HAYATA, Mai. 1916; Keitao, Ochobi, Kusukusu, Taito: Chihon.

Near *V. scolopendrina* THWAITES, but separable from it in the thinner and narrower fronds which have costa not impressed but somewhat elevated on both surfaces, and especially by the sori which are in this new species at the marginal groove, but not intra-marginal.

Woodsia.

Woodsia polystichoides EAT. Rhizoma brevissimum repens dense frondigerum. Stipes nitidus castaneus vel stramineus dense caespitosus 3-4½ cm. longus deorsum dense squamatus sursum sparse squamatus et cripto-hirsutus, pilis castaneis crispatis, squamis castaneis lanceolatis 2-3 mm. longis ½ mm. latis apice acuminatis margine integris vel fimbriis 1-2 instructis basi cordatis vel peltatis. Frons lineari-lanceolata 5-9 cm. longa 1½-2 cm. lata apice acuminata vel ad summum obtusa basi cum medio aequilata truncata simpliciter pinnata, pinnis mediis lineari-oblongis 7 mm.-11 mm. longis 2½ mm.-4mm. latis apice

obtusis basi obliquis, latere inferiore basi fractis cuneato-acuminatis, latere superiore basi truncatis auriculatis latissimis cum rhachi parallelis, auriculis 4 mm. longis 2 mm. latis apice obtusissimis, margine subintegris vel repandis ; costa supra impressa subtus tenuissime elevata inconspicua, venis lateralibus utraque pagine haud elevatis indistinctis basi vel medio furcatis, ramis simplicibus apice clavatis prope marginem attingentibus; pagine supra presertim versus costam hirsuta, subtus hirsuta et secus costam squamata, squamis lanceolatis acuminatis 2 mm. longis $\frac{1}{4}$ mm. latis pilis circ. 1 mm. longis articulatis; textura chartacea. Sori sescus marginem pinnarum 1-seriatim dispositi, prope apicem ramorum venarum lateraliter siti depresso-globosi 1 mm. in diametro. Indusium inferum cupuliforme margine lobulato-erosum intus glabrum extus setuloso-pilosum. Rhachis pilosa et squamata, pinnis alternis sessilibus vel subsessilibus mediis a se 8 mm. remotis, a rhachi angulo recto vel obtuso divaricatis, pinnis superioribus gradatim minoribus ad pinnam terminalem minutam abeuntibus.

HAB. Arisan, ad 8000 ped. alt., leg. U. FAURIE, Junio 1914.

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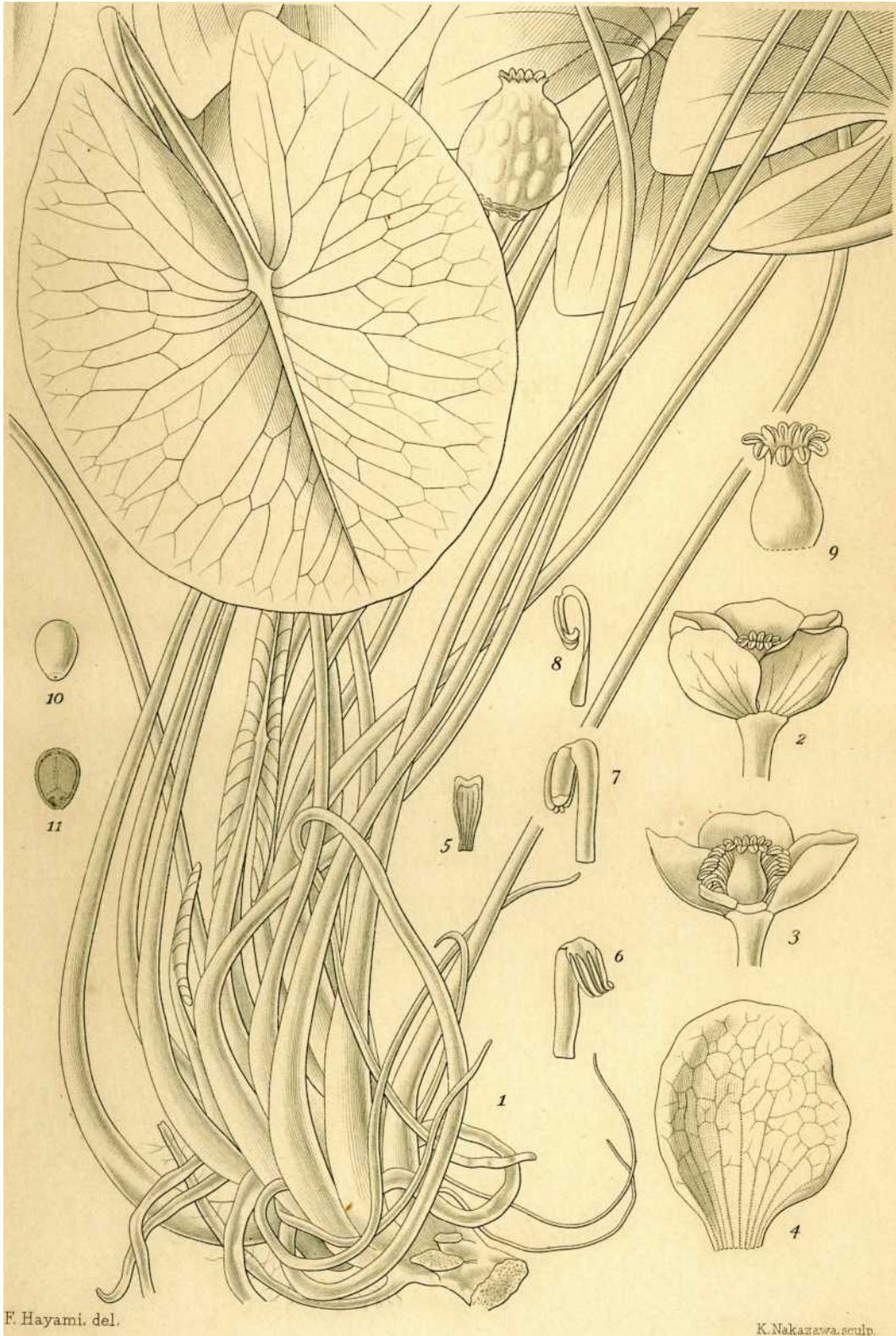
VI.

PLATE I.

Explanation of Pl. I.

Nuphar Shimadai HAYATA.

- Fig. 1. The plant.
2. A flower.
3. The same, sepals partly taken off.
4. A sepal.
5. A petal.
6. 7, 8. stamens, seen from different sides.
9. Ovary.
10. A seed.
11. The same in section.



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PLATE II.

Explanation of Fl. II.

Meliosma callicarpaefolia HAYATA.

- Fig. 1. A branch.
2. A leaf.
3. A flower.
4. A bracteole.
5. A sepal.
6. A petal.
7. A flower, sepals and petals taken off, showing stamens and staminodes.
8. 9, 10. Stamens seen from different sides.
11. A staminode.
12. Ovary with disc-glands.



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PLATE III.

Explanation of Pl. III.

Corylopsis stenopetala HAYATA.

- Fig. 1. The plant, natural size.
2. A flower x 10.
3. A petal x 10.
4. 5. Stamens, seen from different sides x 10.
6. A gland x 10.
7. Ovary x 7.
8. Fruit-bearing spike n. s.
9. A fruit, n. s.
10. A seed, n. s.
11. The same, in section.



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VI.

PLATE IV.

Explanation of Pl. IV.

Heptapleurum Sasakii HAYATA.

- Fig. 1. A branch.
2. A leaf.
3. A flower.
4. The same, petals taken off.
5. A petal.
6, 7. Stamens, seen from different sides.



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VI.

PLATE V.

Explanation of Pl. V.

Lonicera oiwakensis HAYATA.

- Fig. 1. The plant.
2. A leaf.
3. A portion of the upper surface of a leaf.
4. A portion of the lower surface of a leaf.
5. Pair of flowers.
6. The same seen from back.
7. A flower seen from side.
8. Ovaries and a style.
9. Corolla expanded.
10, 11. Stamens, seen from different sides.
12. Ovary in vertical section.
13. A portion of the outer surface of the corolla-tube.



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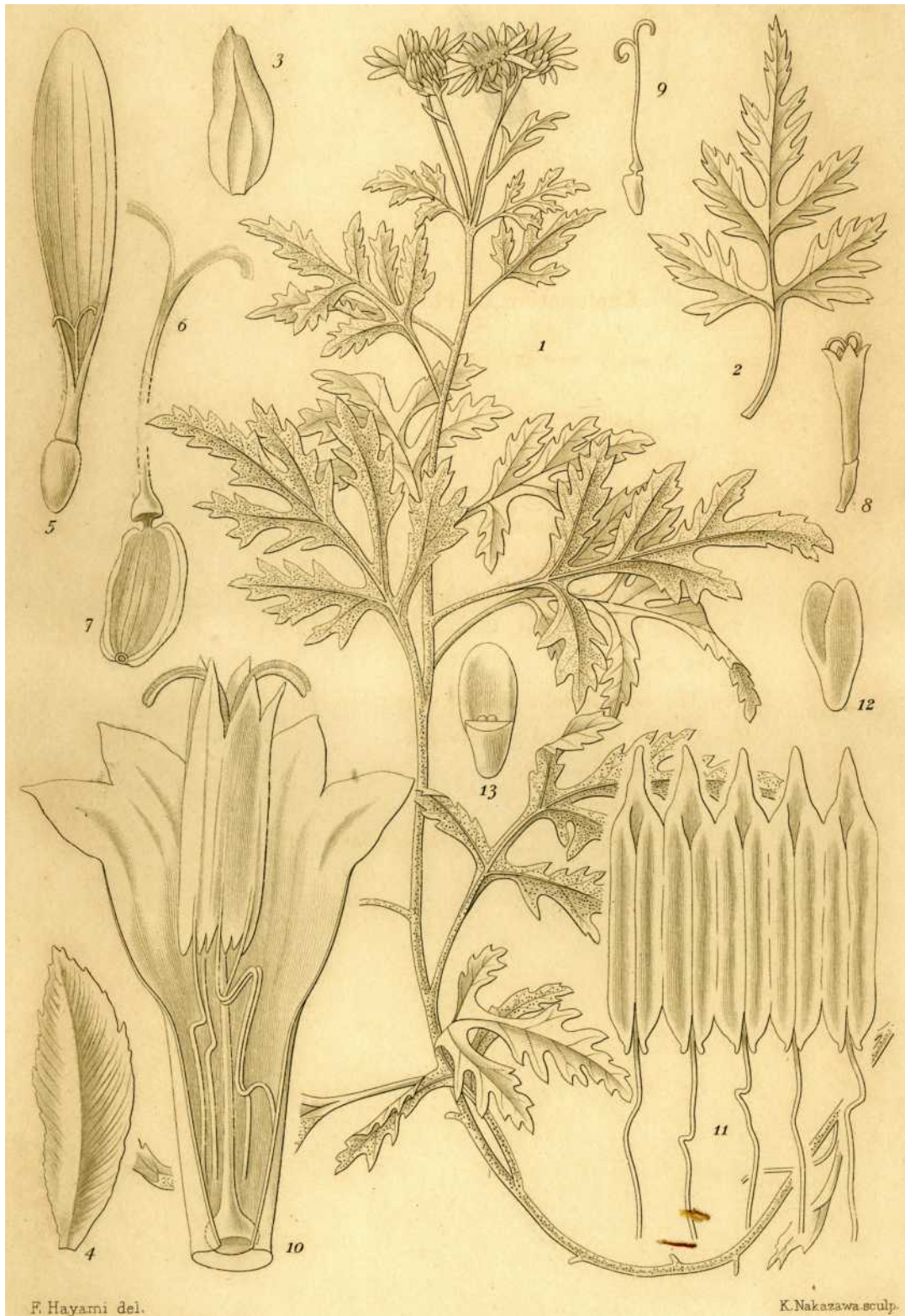
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PLATE VI.

Explanation of Pl. VI.

Chrysanthemum arisanense HAYATA.

- Fig. 1. The plant.
2. A leaf.
3. An outer involucral bract.
4. An inner involucral bract.
5. A marginal flower.
6. Apical portion of the style.
7. Basal portion of the same style with the achene.
8. A disc-flower.
9. The same, corolla and stamens taken off.
10. Corolla expanded and stamens.
11. Stamens expanded.
12. An embryo.
13. The same, one of the cotyledons taken off.



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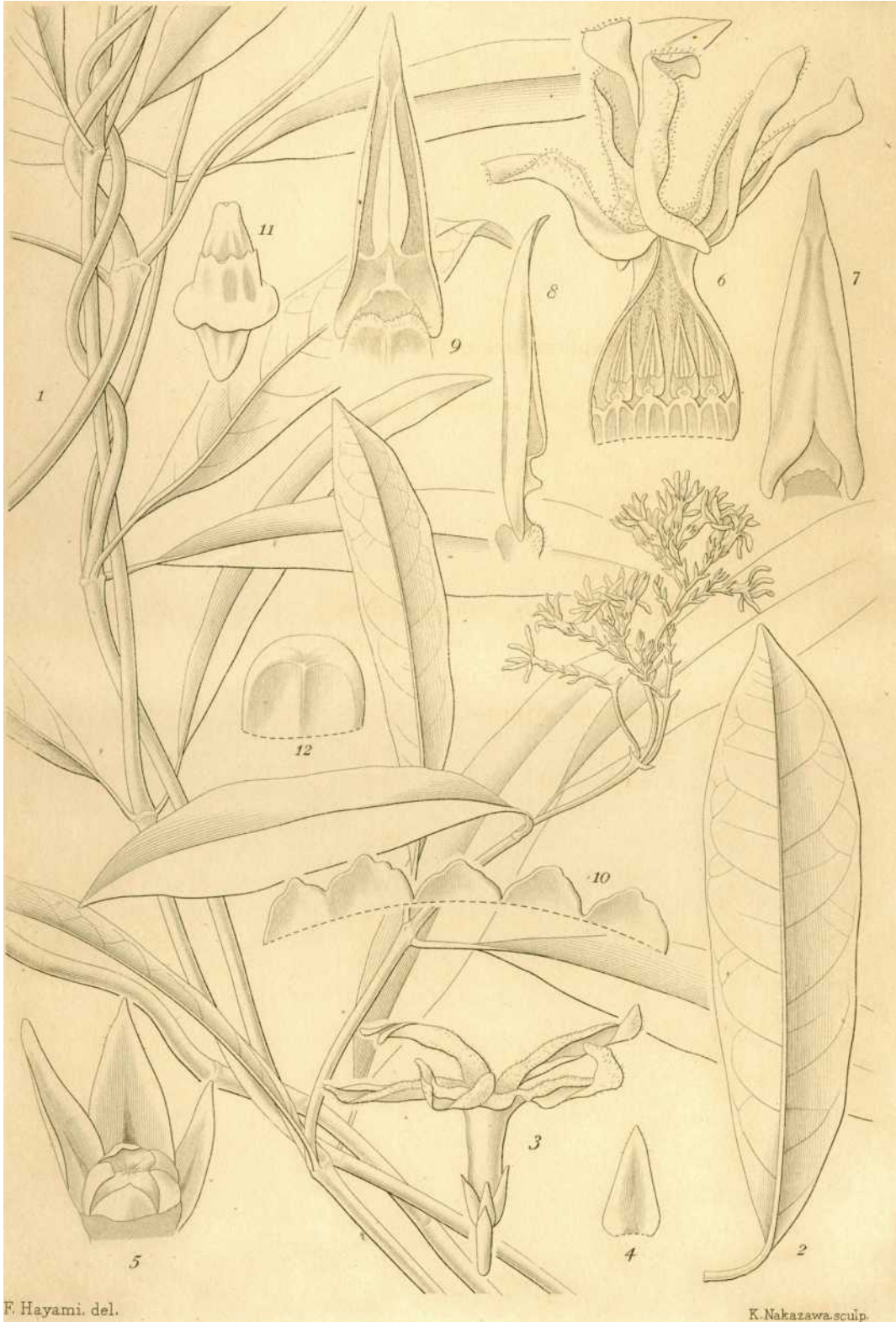
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PLATE VII.

Explanation of Pl. VII.

Anodendron suishaense HAYATA.

- Fig. 1. The plant.
2. A leaf.
3. A flower.
4. A bracteole.
5. Sepals and ovary with disc-glands.
6. Corolla expanded, showing stamens.
7, 8, 9. Stamens, seen from different sides.
10. Disc-glands, expanded.
11. Style.
12. A carpel of the ovary.



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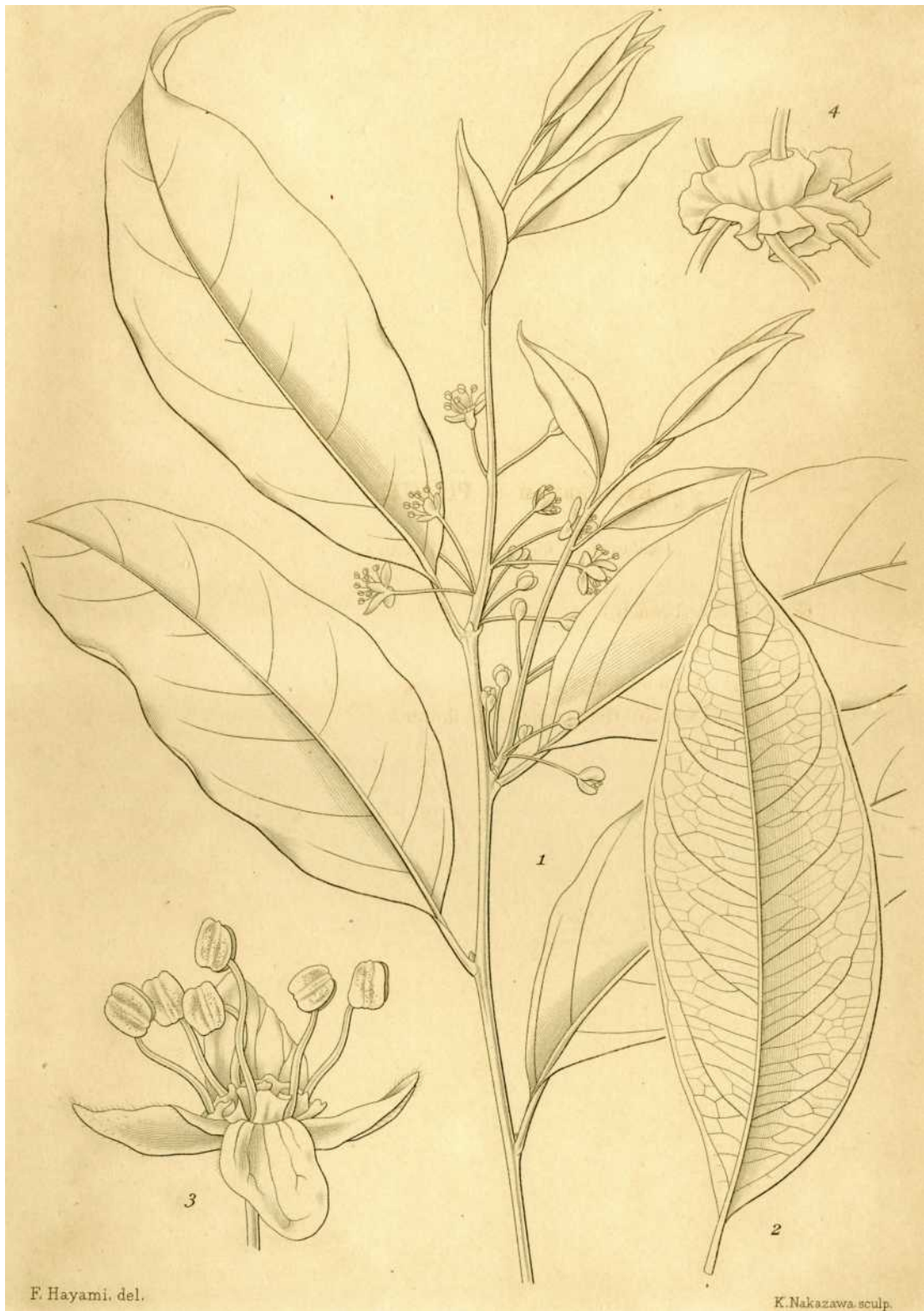
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PLATE VIII.

Explanation of Pl. VIII.

Cyclostemon hieranense HAYATA.

- Fig. 1. A branch.
2. A leaf.
3. A male flower.
4. Discs in the center of a flower.



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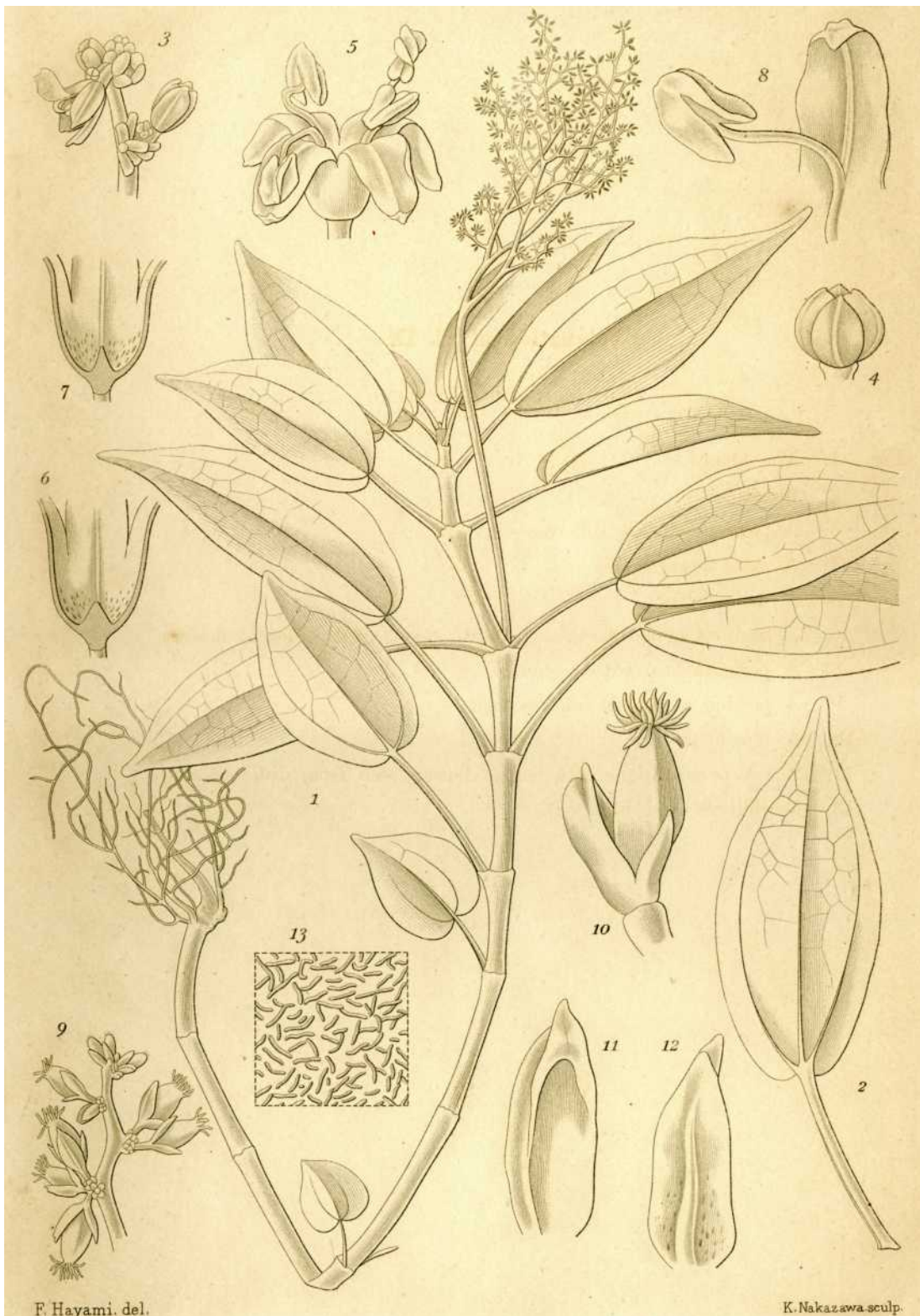
VI.

PLATE IX.

Explanation of Pl. IX.

Pilea kankaoensis HAYATA.

- Fig. 1. The plant.
2. A leaf.
3. A portion of male inflorescence.
4. A male flower-bud.
5. A male flower.
6, 7. Sections of a tube of a perianth taken from different flowers.
8. A perianth-lobe with a stamen.
9. A portion of female inflorescence.
10. A female flower.
11, 12. A perianth-lobe of a female flower, seen from different sides.
13. Cystolithes on a leaf x 13.



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VI.

PLATE X.

Explanation of Pl. X.

Carpinus rankanensis HAYATA.

- Fig. 1. A branch.
2. A bract on the peduncle.
3. A fructiferous bract, seen from the inner side.
4. The same, seen from the outer side.
5. A premature achene.
6. The same, in section.



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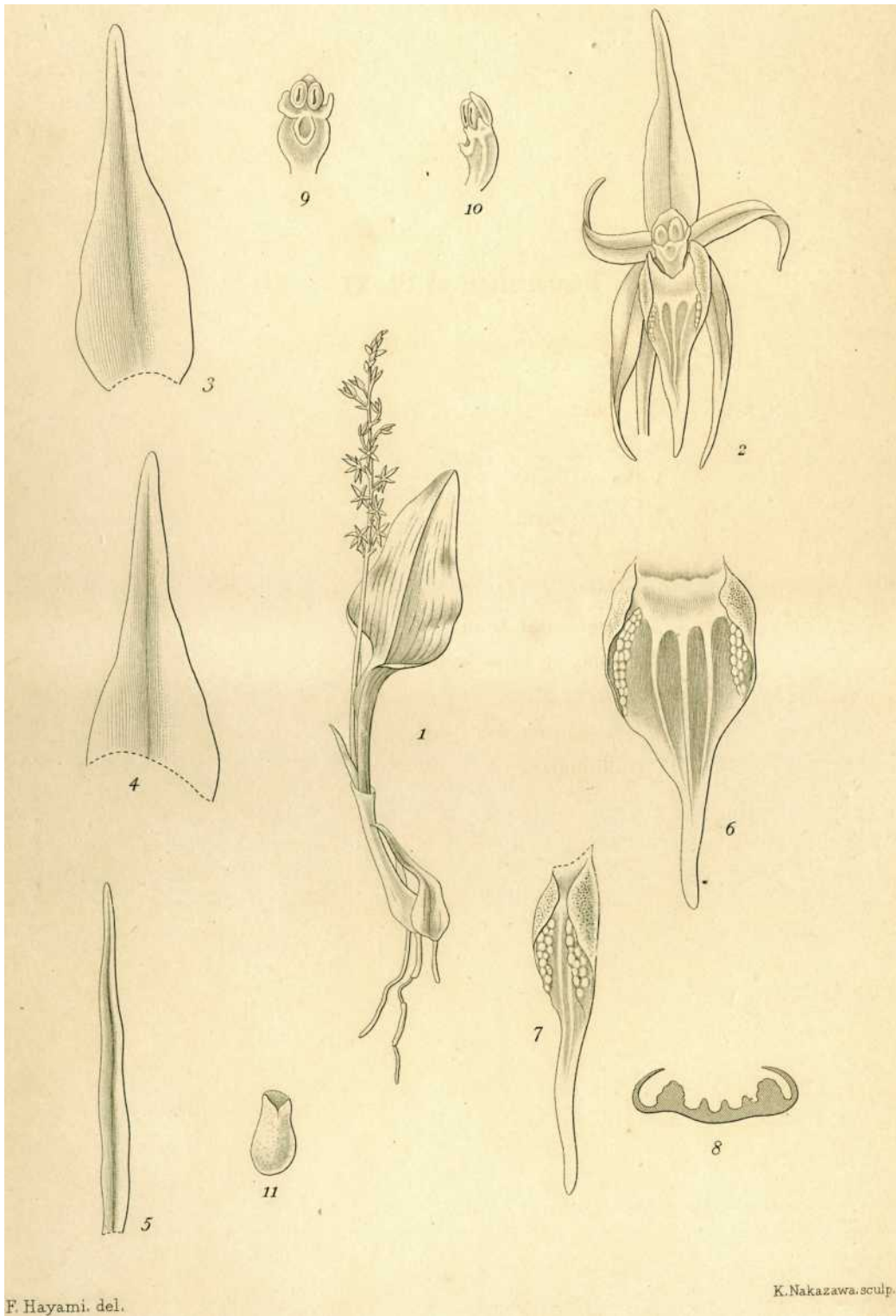
VI.

PLATE XI.

Explanation of Pl. XI.

Microstylis arisanensis HAYATA.

- Fig. 1. The plant.
2. A flower.
3. A dorsal sepal.
4. A lateral sepal.
5. A petal.
6. A labellum.
7. The same, seen from side.
8. The same, in cross section.
9. Column.
10. The same, seen from side.
11. A pollinium.



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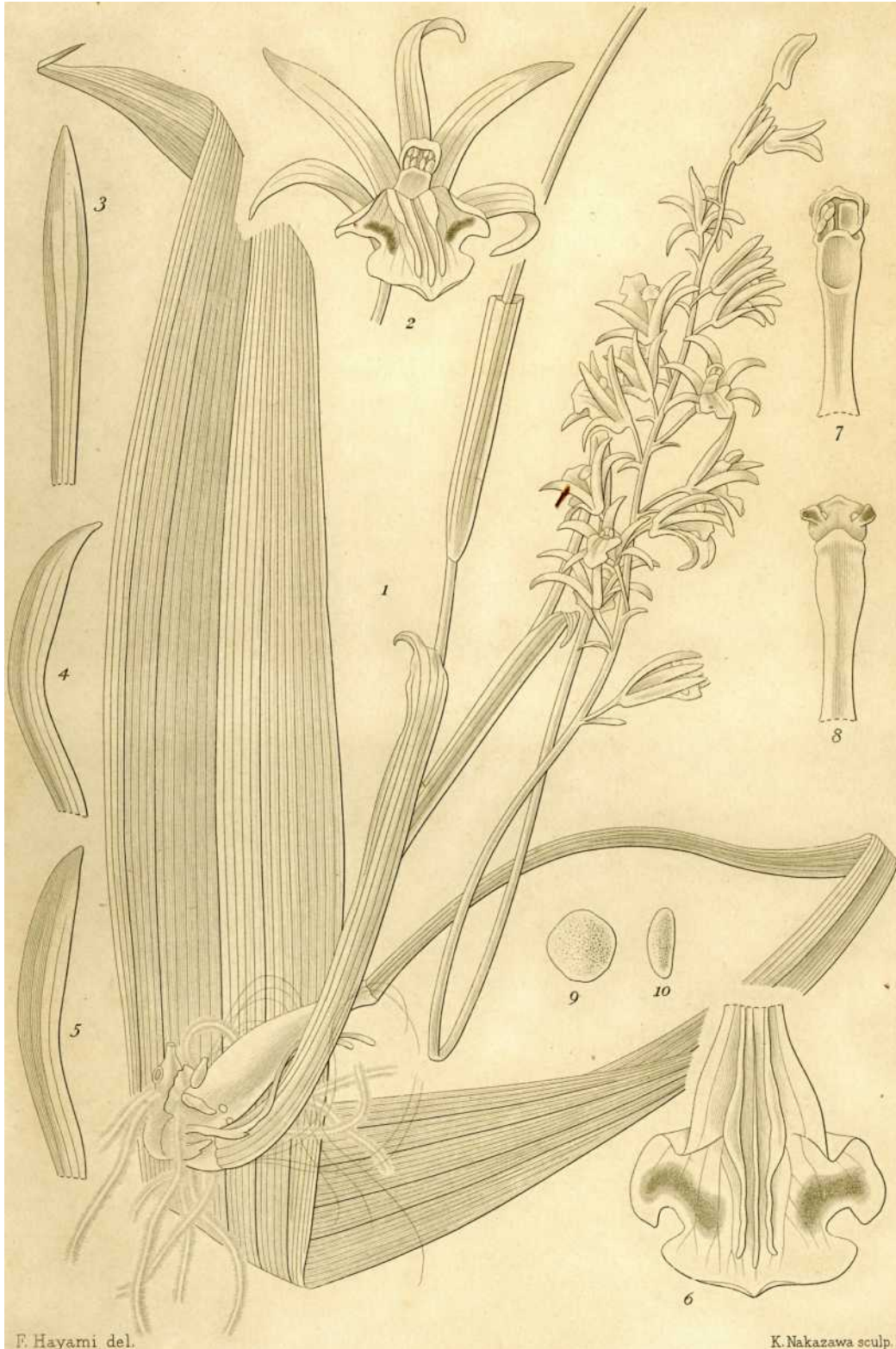
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PLATE XII.

Explanation of Pl. XII.

Tainia Shimadai HAYATA.

- Fig. 1. The plant.
2. A flower.
3. A dorsal sepal.
4. A lateral sepal.
5. A petal.
6. A lip.
7. A column with the operculum.
8. The same, seen from dorsal side.
9. A pollinium.
10. The same, seen from side.



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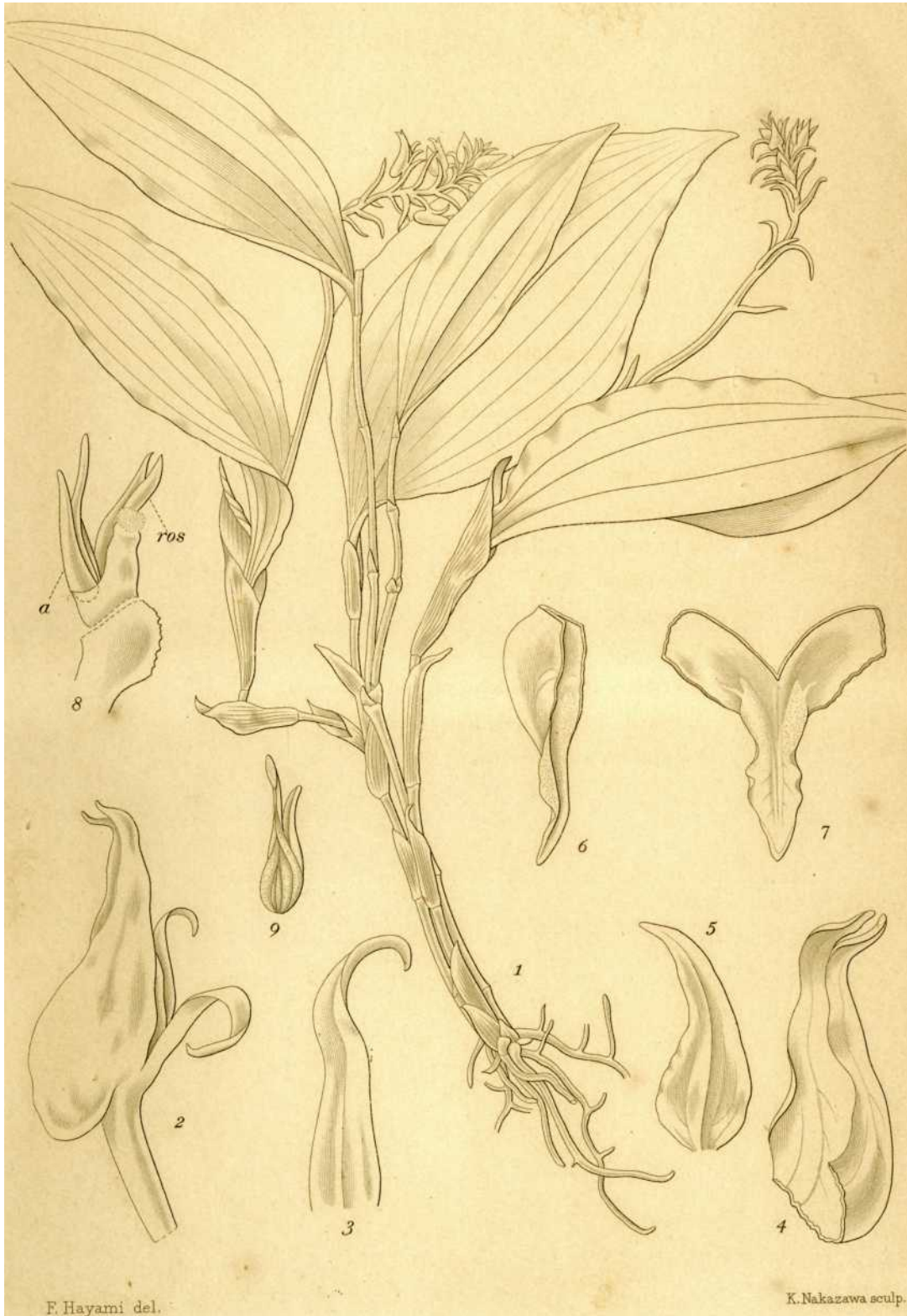
VI.

PLATE XIII.

Explanation of Pl. XIII.

Tropidia Somai HAYATA

- Fig. 1. The plant.
2. A flower.
3. A backward sepal.
4. Two lateral sepals.
5. A petal.
6. A lip, seen from side.
7. The same, basal portion cut and expanded.
8. A column; ros.= rostellum ; a = anther.
9. An anther with po inia.



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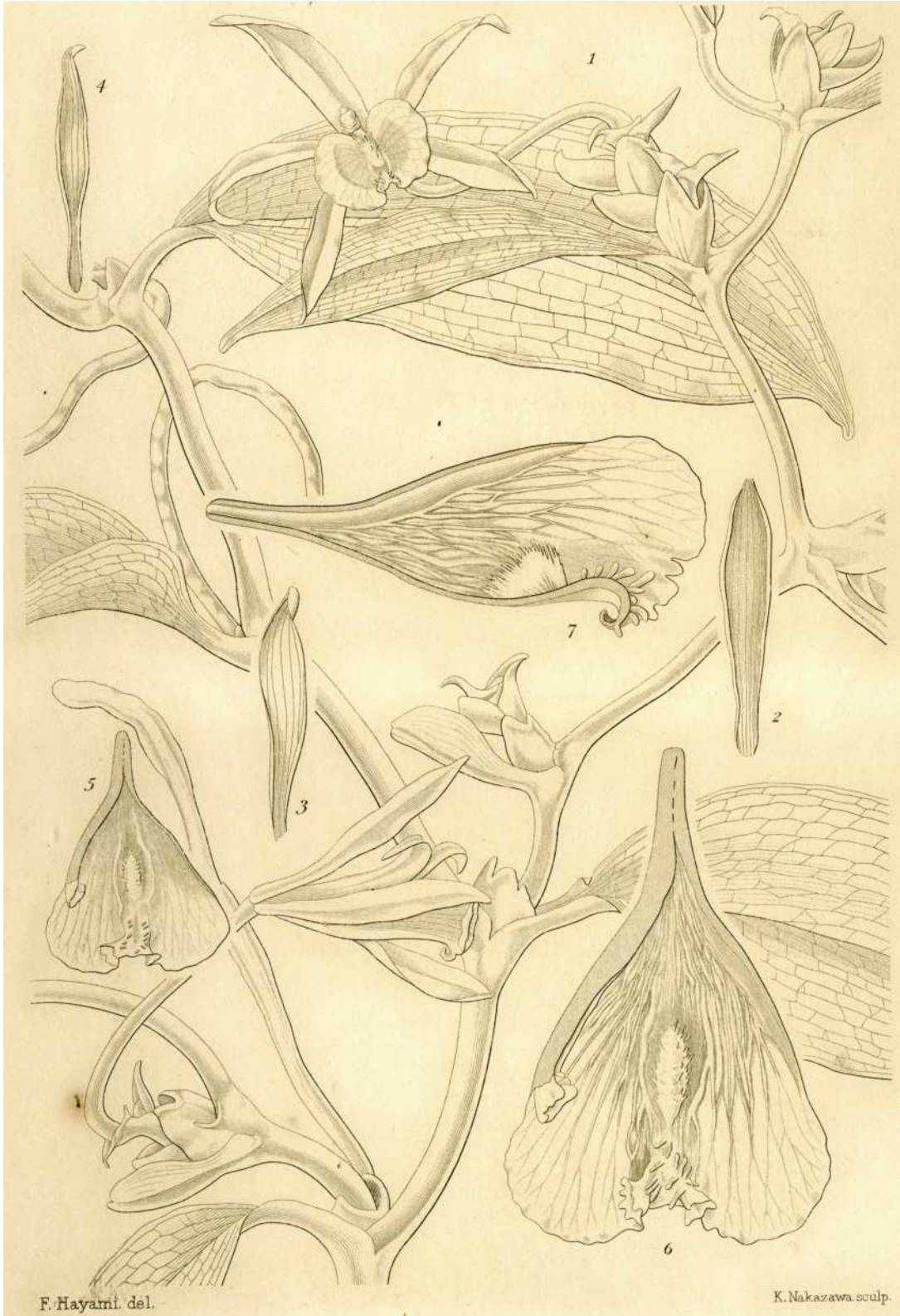
VI.

PLATE XIV.

Explanation of Pl. XIV.

Vanilla Somai HAYATA.

- Fig. 1. The plant, n. s.
2. A backward sepal, n. s.
3. A lateral sepal, n. s.
4. A petal, n. s.
5. A lip, n. s.
6. The same, magnified.
7. The same, in vertical section.



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VI.

PLATE XV.

Explanation of Pl. XV.

Peliosanthes arisanensis HAYATA.

- Fig. 1. The plant.
2. A flower.
3. The same in vertical section.
4. A portion of a staminal tube, showing two anthers.
5. A stigma.
6, 7. Seeds.
8. Cross section of a seed.



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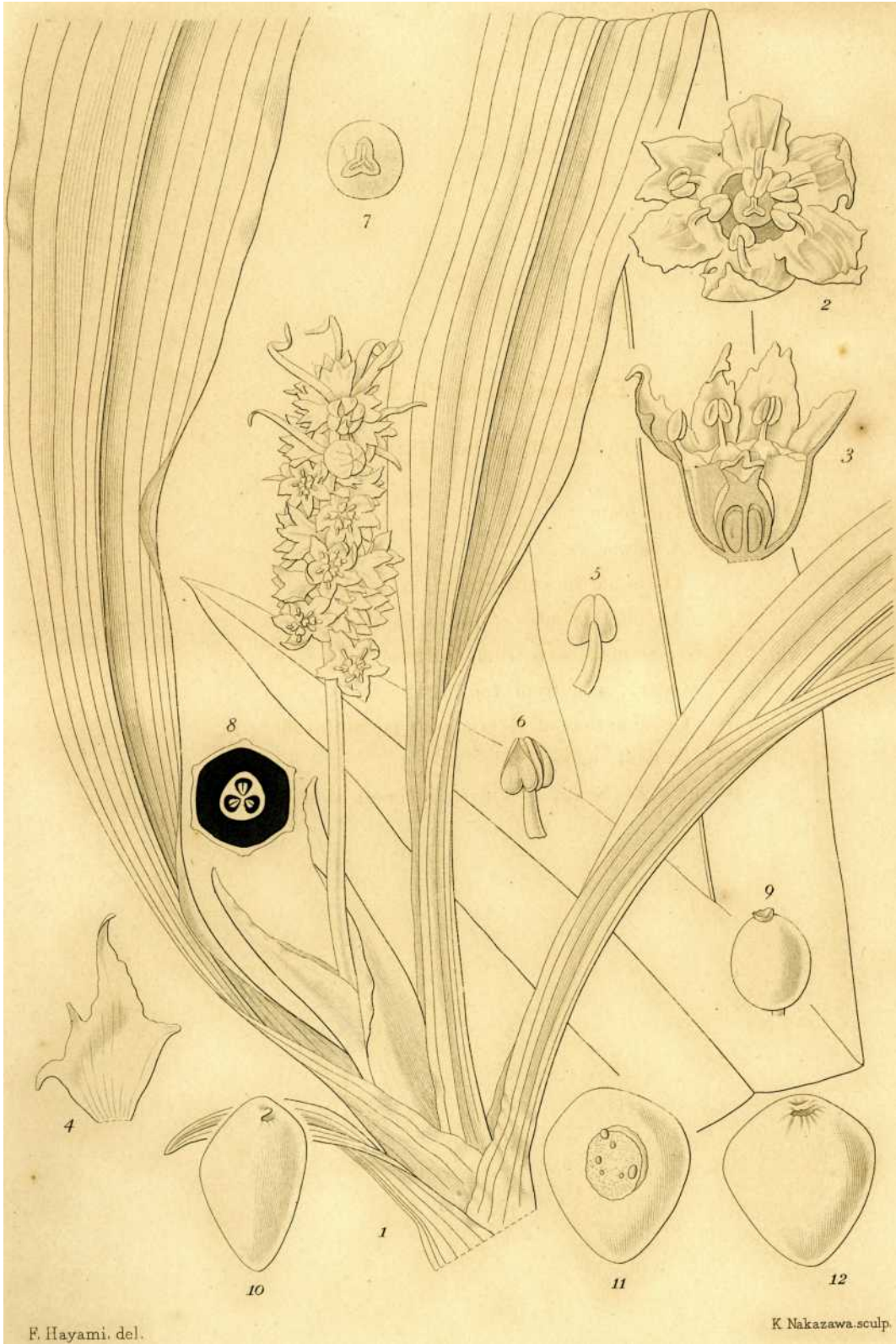
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PLATE XVI.

Explanation of Pl. XVI.

Rohdea Watanabei HAYATA.

- Fig. 1. The plant.
2. A flower, x 3.
3. The same in vertical section, x 4.
4. An interior lobe of the perianth, x 6.
5, 6. Stamens seen from different sides, x 6.
7. Ovary, seen from top, x 6.
8. Cross section of ovary with perianth-tube.
9. A fruit, n. s.
10, 11, 12. Seeds, seen from different sides, x 3.



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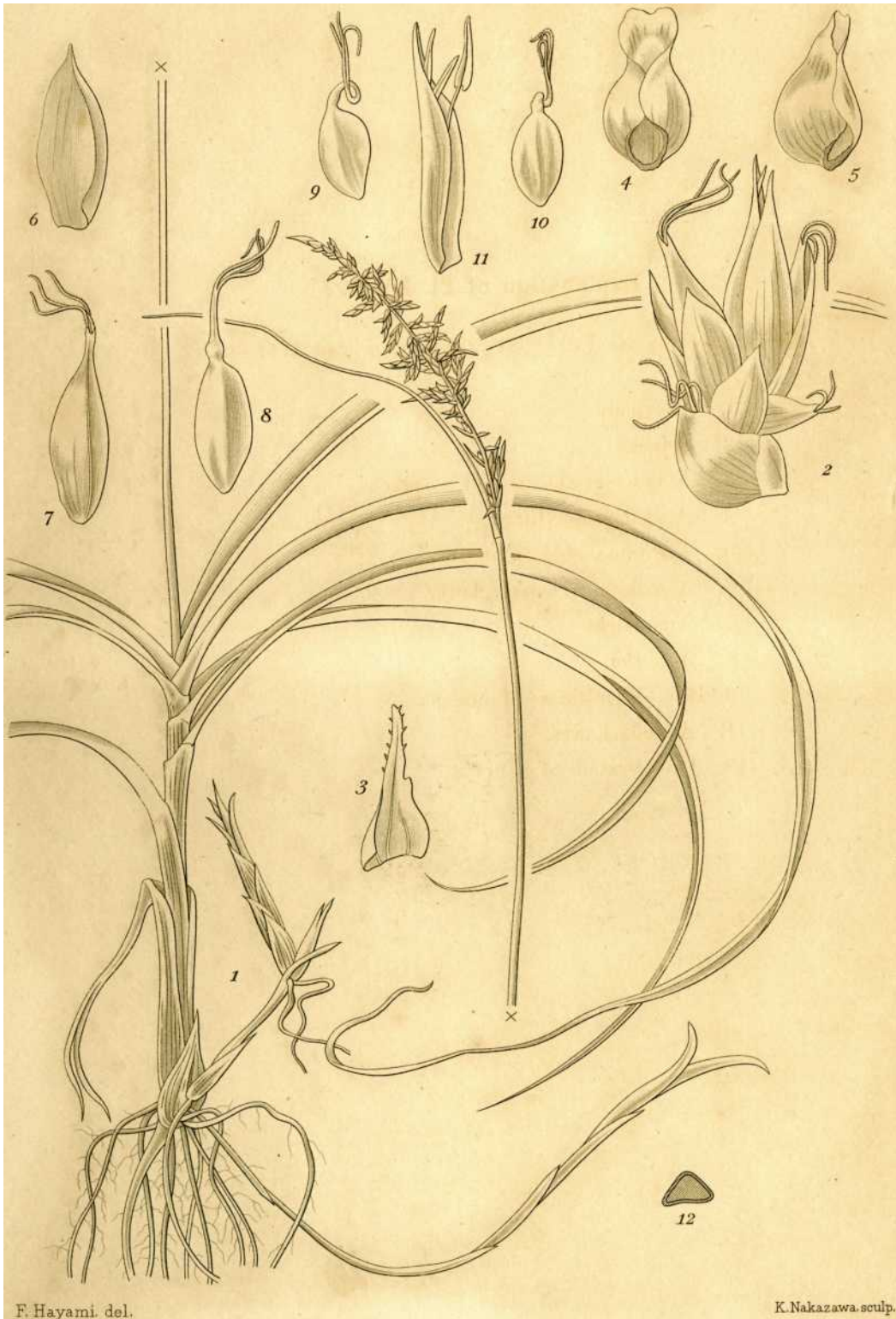
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PLATE XVII.

Explanation of Pl. XVII.

Carex satsumensis FR. et SAV. var. *longiculma* HAYATA.

- Fig. 1. The plant.
2. Spikelet.
3. A bract at the base of a spikelet.
4. A cladoprophyllum.
5. The same, seen from side.
6. A scale of a female flower.
7. An utricle.
8. A nutlet.
9, 10. Other forms of nutlets.
11. A male flower.
12. Cross section of a nutlet.



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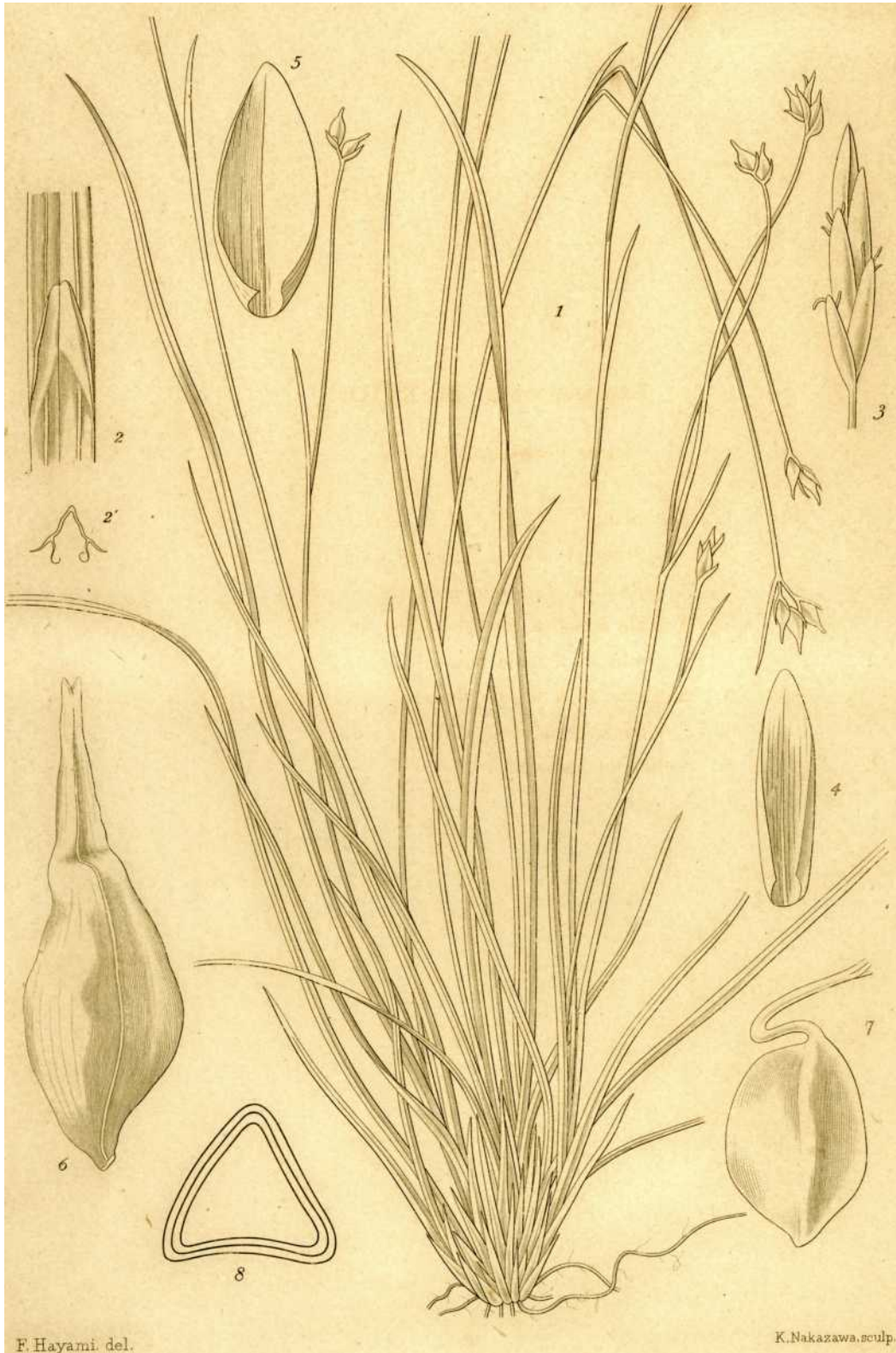
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PLATE XVIII.

Explanation of Pl. XVIII.

Carex arisanensis HAYATA.

- Fig. 1. The plant.
2. A portion of a leaf, showing a ligule.
2'. A section of the same portion.
3. A male spikelet, anthers fallen off.
4. A glume of a male flower.
5. A glume of a female flower.
6, 7. Utricles seen from different sides.
8. Section of the same.
9. A nutlet.



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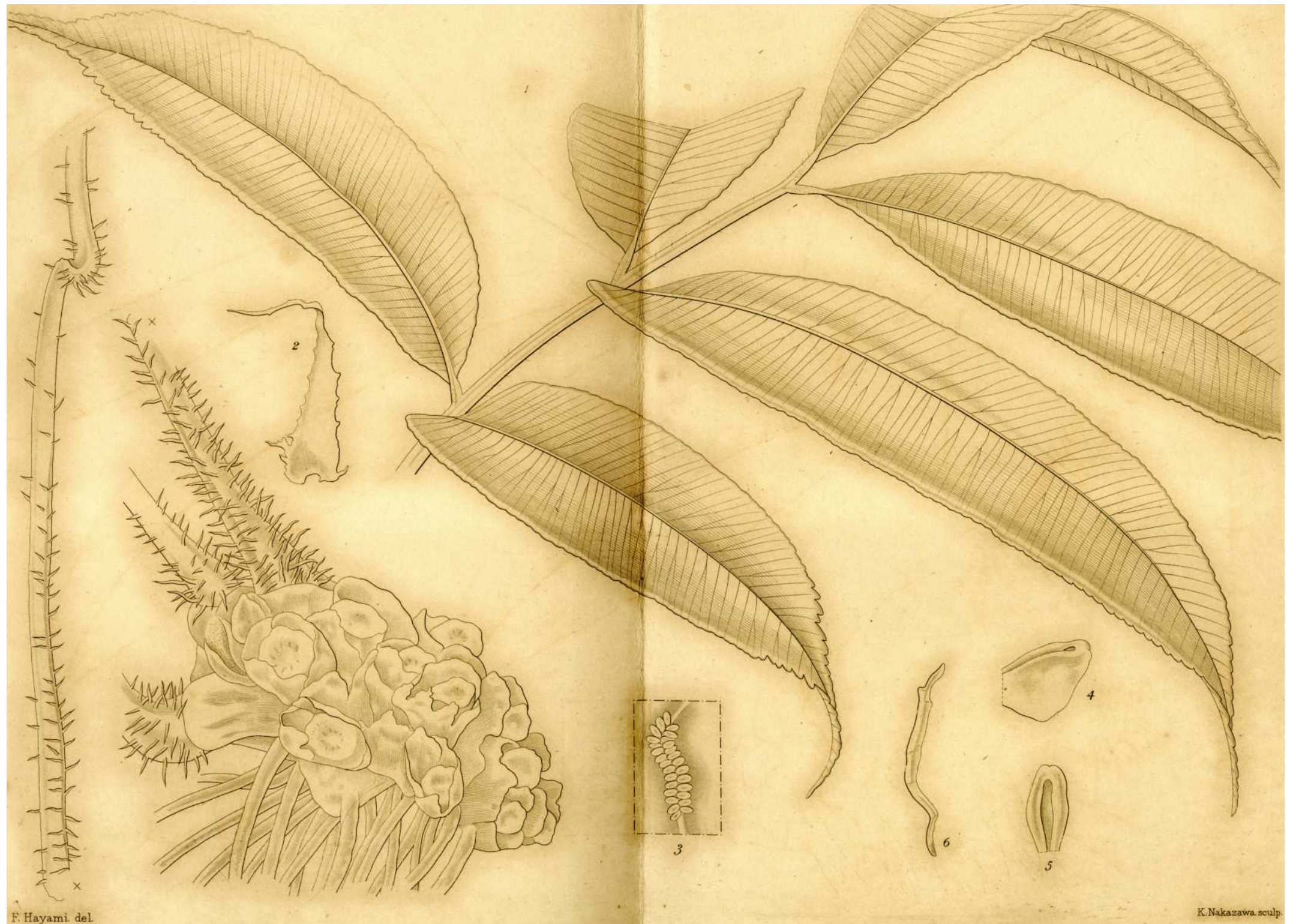
VI.

PLATE XIX.

Explanation of Pl. XIX.

Archangiopteris Somai HAYATA.

- Fig. 1. The plant.
2. A scale.
3. A sorus.
4, 5. Sporangia.
6. A hair of an indusium.



F. Hayami del.

K. Nakazawa sculp.

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VI.

PLATE XX.

Explanation of Pl. XX.

Blechnum plagiogyriifrons HAYATA.

- Fig.
1. The plant.
 2. A scale on the rhizome.
 3. A pinna, indusium and sporangia taken off, showing venation.
 - 4, 5. Basal and apical portion of a pinna.
 6. Cross section of a fertile pinna.
 7. Portion of the same section, showing the receptaculum.

