

On the Japanese ferns belonging to the *Polystichum polyblepharum* group

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(with 4 plates, 29 distribution maps and 2 tables)

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I. Introduction

On the Japanese members of the *Polystichum polyblepharum* group, Prof. S. KODAMA (1915) published in Japanese a very excellent article "On the Japanese *Polystichum aculeatum* and its allied species", which clarified all the common Japanese members precisely and described the variations of each member in detail. Prof. M. TAGAWA (since 1932) has much contributed to our knowledge of this group, criticizing on the characteristics of each species and describing several new species. After the Second World War, the Japanese Fernist Club was established and its earnest members have collected numerous difficult entities of this group one after another. The author on intimate terms with the Club has been investigating the materials for about 15 years and upon occasion published critical notes on them. Now the whole aspect of the Japanese members has become almost clear as explained in this paper. The author would like to take this opportunity to express his special thanks to the members of the Japanese Fernist Club and the curators of the following herbaria that have facilitated the study: Faculty of Agriculture, University of Tokyo; Faculty of Science, University of Tokyo; Faculty of Science, Kyoto University; Faculty of Science, Tokyo University of Education; Tokyo National Science Museum. The author is also much indebted to the members of the Yokosuka City Museum for the publishing of this report.

II. What is the *Polystichum polyblepharum* group

The *Polystichum polyblepharum* group is a provisional name for the group including *Polystichum setiferum* and its allies, and constitutes a larger part of Sect. *Metapoly-stichum* TAGAWA (1940). This group is characterized by the medium-sized bipinnate or bipinnatifid frond which is rarely gemmiferous near the apex of the rachis at the insertion of the pinna. The sori are mostly provided with peltate indusia, and rarely

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exindusiate. This group has its members nearly all over the world, being much differentiated in the Sino-Japanese Region.

In Japan, 19 species and 5 varieties have been known, and moreover, the hybridization among them is not rare. In this paper, 21 hybrids are recognized, and the parentages of 18 of them are indicated in the following two tables.

Table I. *Polystichum* × *Nomegatae* hybrid group

(Numbers indicate Enumeration order of each hybrid.)

	<i>P. p.-Mak.</i>	<i>P. Mak.</i>	<i>P. Tag.</i>	<i>P. Otom.</i>	<i>P. pol.</i>	<i>P. long.</i>
<i>P. pseudo-Makinoi</i>		13	14		25	24
<i>P. Makinoi</i>	13		15		26 ?	26
<i>P. Tagawanum</i>	14	15		17	27	27
<i>P. Otomasui</i>			17		28	
<i>P. polyblepharum</i>	25	26 ?	27	28		23
<i>P. longifrons</i>	24	26	27		23	

Table II. *Polystichum* × *Kurokawae* hybrid group

(Numbers indicate Enumeration order of each hybrid.)

	<i>P. p.-Mak.</i>	<i>P. Mak.</i>	<i>P. Tag.</i>	<i>T. pol.</i>	<i>P. long.</i>
<i>P. retroso-paleaceum</i>	34	36	40	37	39
<i>P. ovato-paleaceum</i>	33	35	40	37	38

III. A key to the Japanese species, varieties and hybrids

- 1 { With a gemma at the insertion of a lateral pinna near the apex of the rachis. Fronds somewhat dimorphous, the lamina of fertile ones mostly narrower. The serrations of the fertile lamina not aristate. With large, blackish scales on the lower part of stipes. Sori generally terminal on veinlets.....(1) *P. eximium*
- 2 { Without gemma. Fronds not dimorphous. The serrations aristate..... 2
- 2 { Sori near the costules of pinnules, dorsal or terminal on veinlets, without indusia. The apical part of laminae abruptly contracted, somewhat taking the style of a terminal pinna. Scales on stipes brown, narrow and distinctly tortuose when dried.....(2) *P. kiusiense*
- 3 { Sori indusiate. The apical part of laminae gradually narrowed..... 3
- 3 { Lower pinnae gradually shortened, the lamina attenuating downward from the middle. Sori near the costules of pinnules, mostly dorsal on veinlets..... 4
- 4 { Lower pinnae not so distinctly shortened. Sori usually terminal on veinlets... 7
- 4 { Pinnules completely independent, not confluent to costae of pinnae, with obtuse apex, shallowly serrated on the margin..... 5
- 6 { Pinnules with acute apex, deeply incised on the margin..... 6

- 5 { Sori generally dorsal on veinlets, with fertile sporangia. Scales on the stipe and rachis paler and softer. Laminae conspicuously attenuate downward. (3) *P. Braunii*
Sori mostly terminal on veinlets, sporangia scarcely producing spores. Scales on the stipe and rachis more rigid. (4) *P. × titibuense*
- 6 { Scales on the rachis lanceolate to filiform. Pinnules generally more or less confluent to the costae of pinnae. Sporangia fertile. (5) *P. microchlamys*
Scales on the rachis ovate or ovate-lanceolate, retrorsely appressed. Pinnules scarcely confluent to the costae of pinnae. Sporangia scarcely produce spores. (6) *P. × Shin-Tashiroi*
- 7 { Laminae rigid as *Arachniodes aristata*, with stiff and spiny serrations. Pinnules distinctly anadromously arranged. 8
Laminae softer, herbaceous or herbaceously coriaceous, with soft aristate serrations. Pinnules except in 2-3 pairs of lower pinnae usually catadromously arranged. Scales on the stipe and rachis copious and mostly brown. 11
- 8 { Stipes stout and conspicuously shorter than the laminae. Scales on the stipe and rachis dense, bright brown, membranous; ovate-lanceolate scales appear on the stipe. Lamina narrowly lanceolate, rigidly coriaceous. (7) *P. neo-lobatum*
Stipes slender and about as long as the laminae. Scales on the stipe and rachis bright brown at first, then turning to blackish brown and becoming sparse; scales on the stipes lanceolate to widely lanceolate. Laminae ovate-lanceolate. 9
- 9 { Scales on the lower part of the rachis lanceolate, attaining 1.5 mm in width. Lamina rigidly coriaceous. (8) *P. rigens*
Scales on the lower part of the rachis filiform to linear-lanceolate and narrower than 1 mm. 10
- 10 { Lamina thinly coriaceous, deeply dissected, with completely free pinnules. Scales on the rachis filiform. Sori produced from the base of laminae upward. (9) *P. tsus-simense*
Lamina thickly coriaceous; pinnules more or less confluent to the costae of pinnae. Scales on the lower part of the rachis linear-lanceolate. Sori generally produced from the apex of laminae downward. (9-a) var. *Mayebarae*
- 11 { Scales on the rachis filiform to lanceolate. 12
Scales on the rachis narrowly ovate to widely ovate. 35
- 12 { Sori in the lower pinnae produced regularly on both the upper and lower margins of auricles of pinnules. Stipes with blackish scales. Large ferns. 13
Sori not arranged in such a pattern. 18
- 13 { Sori submarginal, with completely fertile sporangia. Lamina opaque, somewhat abruptly contracted at the apex. (10) *P. pseudo-Makinoi*
Sporangia scarcely produce spores. Lamina more or less nitid, gradually attenuate at the apex. 14
- 14 { Sori medial. 15
Sori submarginal. 16

- 15 { Lamina blackish green and nitid. On the stipe conspicuously blackish scales present and ovate-lanceolate ones intermingling.....(13) *P. × Namegatae*
 { Lamina yellowish green and less nitid. Scales on the stipe linear-lanceolate and not so blackish but rather castaneous.....(25) *P. × Jitaroi*
- 16 { Lamina deep green. Scales on the stipe linear-lanceolate, rarely ovate-lanceolate, nearly entire; castaneous scales usually prominent.....(25) *P. × hakonense*
 { Lamina yellowish green. Scales on the stipe wider and fimbriate on the margin; castaneous or blackish scales sometimes not so prominent.....17
- 17 { Lamina less nitid. Sori submarginal, in the lower pinnae strictly produced on both the upper and lower margins of auricles of pinnules.··(14) *P. × kiyozumianum*
 { Lamina somewhat blackish-nitid. Sori more apart from the margin, rather produced near the upper corner of auricles of pinnules.....(17) *P. × Suginoi*
- 18 { Lamina yellowish green, opaque, more or less attenuate downward. Sori in the lower pinnae produced near the upper corner of auricles of pinnules. Castaneous scales at the base of stipes usually conspicuous in larger individuals. Scales on the lower part of the rachis lanceolate. Small fern with fronds shorter than 40 cm.....19
 { Lamina green to deep green and nitid. The lower pinnae not shortened.....20
- 19 { Sori submarginal. Scales pale brown and soft.....(29) *P. Ohmurae*
 { Sori medial. Scales brown and somewhat rigid.....(29-a) var. *fujipedis*
- 20 { Stipes provided with lustrous rigid blackish scales.....21
 { Stipes without blackish scales or with castaneous scales which are rather soft and not so lustrous.....26
- 21 { Serrations spiny, and patent. Rachis distinctly provided with ovate-lanceolate blackish scales. Sori intramedial; indusium fimbriate on the margin
 { (19) *P. Doianum*
 { Serrations aristate, soft and antrorse. Rachis scarcely provided with blackish scales. Indusium nearly entire on the margin.....22
- 22 { Lamina deep green but somewhat tinged with yellow. Sori supramedial or medial, scarcely producing spores and in the lower pinnae mostly arranged only near the upper corner of auricles of pinnules. Blackish scales on the stipe occasionally not conspicuous.....23
 { Lamina blackish green and nitid. Sori medial or intramedial. Blackish scales on the stipe usually conspicuous.....24
- 23 { Sori medial; the arrangement pattern of sori in the lower pinnae as the above-mentioned or not so regular.....(15) *P. × izuense*
 { Sori supramedial; the arrangement pattern of sori strictly as the above-mentioned.(17) *P. × Suginoi*
- 24 { Sori in the lower pinnae regularly produced near the upper corner of auricles of pinnules. Blackish scales often appear also on the rachis.··(16) *P. Otomasui*
 { Sori arranged not in such a regular pattern. Blackish scales usually only on the stipe.....25

- 25 { Scales on the stipe broader. Sporangia fertile. Rather small fern with fronds generally shorter than 50 cm, rarely longer.....(11) *P. Makinoi*
 { Scales on the stipe narrower. Sporangia sterile and the sori maintaining the compact appearance forever. Large fern with fronds attaining 1 m high.....
 {(26) *P. × lidanum*
- 26 { Sori submarginal. Scales on the rachis lanceolate, somewhat rigid and tortuose when dried. Small fern with narrow fronds up to 40 cm long....(18) *P. igaense*
 { Sori not so near the margin. Scales on the rachis filiform to lanceolate, soft.
 { Rather large ferns with fronds usually longer than 50 cm.....27
- 27 { Scales on the stipe and rachis lacerate or fimbriate on the margin. Sporangia fertile.....28
 { Scales nearly entire or sparsely denticulate.....30
- 28 { Scales densely fimbriate on the margin. Sori supramedial, and in the lower pinnae often produced preferentially near the upper corner of auricles of pinnules.
 { Lamina less nitid.....(12) *P. Tagawanum*
 { Scales irregularly lacerate on the margin. Sori mostly medial and produced from the apex of pinnae and pinnulae towards the base. Lamina very nitid.....29
- 29 { Scales on the upper surface of the rachis filiform.....(20) *P. polyblepharum*
 { Scales on the upper surface of the rachis lanceolate or wider..(20-a) var. *scabiosum*
- 30 { Sporangia fertile.....31
 { Sporangia scarcely produce spores.....32
- 31 { Scales on the lower part of the rachis filiform, tortuose when dried and nearly entire together with the scales on the stipes. Sori medial or intramedial.....
 {(21) *P. fibrilloso-paleaceum*
 { Scales on the lower part of the rachis linear and sparsely denticulate on the margin. Sori medial or submarginal and in the lower pinnae often produced only in the auricles of pinnules.....(22) *P. longifrons*
- 32 { Scales on the lower part of the rachis linear-lanceolate and narrower than 1.5 mm.
 {(27) *P. × Mashikoi*
 { Scales on the lower part of the rachis lanceolate and wider than 1.5 mm.....33
- 33 { Lamina herbaceous and somewhat yellowish.....(39) *P. × hokurikuense*
 { Lamina coriaceous herbaceous and deep green.....34
- 34 { Sori in the lower pinnae usually produced only near the upper corner of auricles of pinnules.....(28) *P. × kumamontanum*
 { Sori in the lower pinnae usually produced from the apex of pinnae and pinnulae toward the base.....(23) *P. × anceps*
- 35 { Sori submarginal, and in the lower pinnae regularly produced only on both the upper and lower margins of auricles of pinnules. Lamina yellowish green, opaque.
 { Stipes with blackish scales on the lower part.....36
 { Sori medial, and produced from the apex of pinnae and pinnulae toward the base.....37

- 36 { Scales on the lower part of the rachis longer than 7 mm and antrorse or patent.
..... (33) *P. × ongataense*
- 36 { Scales on the lower part of the rachis shorter than 5 mm and retrorsely appressed
except the basal part of the rachis,..... (34) *P. × Utsumii*
- 37 { Lamina opaque. Sporangia fertile.....38
- 37 { Lamina more or less nitid. Sporangia mostly sterile, sori maintaining the com-
pactness. Scales on the lower part of the rachis oblong-ovate.....41
- 38 { Scales on the rachis widely ovate, abruptly contracted at the apex.....39
- 38 { Scales on the rachis oblong-ovate, attenuate to the apex, mostly retrorse (rarely
antrorse).....40
- 39 { Scales on the rachis retrorsely appressed, shorter than 5 mm. Pinnules smaller
and about 20~25 pairs.....(30) *P. retroso-paleaceum*
- 39 { Scales on the rachis antrorse, longer than 7 mm. Pinnules comparatively large
and about 17~22 pairs.....(31) *P. ovato-paleaceum*
- 40 { Blackish scales conspicuous on the stipe and rachis.....(31-b) var. *myokoense*
- 40 { Without blackish scales or rarely with blackish scales at the base of the stipes.
..... (31-a) var. *coraiense*
- 41 { Conspicuous blackish scales appear on the stipe. Lamina deep green and lustrous.42
- 41 { Without blackish scales or provided with pale castaneous scales on the lower part
of the stipes. Lamina yellowish green.....43
- 42 { Scales on the lower part of the rachis large, antrorse or patent. (35) *P. × Kurokawae*
- 42 { Scales on the rachis small, retrorsely appressed except the basal part of the
rachis.....(36) *P. × microlepis*
- 43 { Sori medial or intramedial and produced from the apex of pinnae and pinnulae
towards the base. Scales on the rachis lacerate on the margin, irregularly patent.
Without castaneous scales.(37) *P. × Inadae*
- 43 { Sori medial or supramedial. Scales on the rachis more or less appressed.....44
- 44 { With castaneous scales on the lower part of the stipe. Scales on the rachis
ovate-lanceolate, mostly antrorse, about 1 cm long, subentire on the margin. Sori
produced from the apex of pinnae and pinnulae towards the base.....
- 44 {(38) *P. × takaosanense*
- 44 { With or without the castaneous scales on the stipes. Scales on the rachis smaller,
ovate, often retrorse, densely fimbriate on the margin. Sori in the lower pinnae
often produced only in the auricles of pinnules.....(40) *P. × Okanum*

IV. Enumeration of the Japanese members

(1) *Polystichum eximium* (METT. ex KUHN) C. CHR. in Bull. Dept. Biol. Coll. Sci. Sun Yatsen Univ. 6: 8 (1933); OGATA in Journ. Jap. Bot. 16: 38 (1940); TAGAWA in Acta Phytotax. Geobot. 10: 282 (1941); NAMEGATA & KURATA, Enum. Jap. Pterid. 310 (1961).

Phegopteris eximia METT. ex KUHN in Linnaea 36: 107 (1869).

Polystichum aculeatum var. *variiforme* HAYATA, Ic. Pl. Form. 5: 332 (1915).

Polystichum variiforme (HAYATA) TAGAWA in Journ. Jap. Bot. 13: 186 (1937).

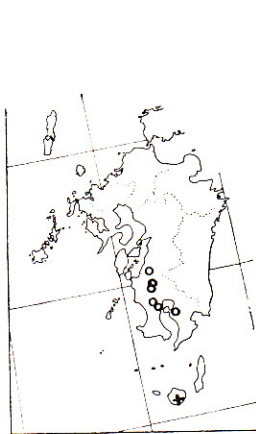
Polystichum fibrillosum CHING in Bull. Fan Mem. Inst. 2: 189, t. 4 (1931).

Polystichum gemmiferum TAGAWA in Acta Phytotax. Geobot. 3: 31 (1934): Col. III. Jap. Pterid. 81, 247, fig. 153 (1959).

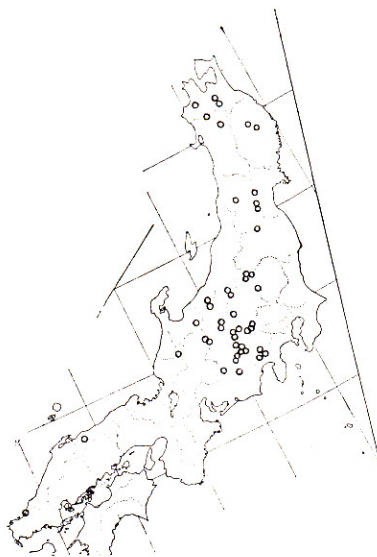
Polystichum eximium var. *minus* TAGAWA in Acta Phytotax. Geobot. 10: 292 (1941); OHWI, Fl. Jap. Pterid. 67 (1957).

Distr. Japan (Yaku-island), Formosa, Southern China, Tonkin and India. In sub-tropical regions. Refer to Distribution Map I.

In Japan, this fern has been only found in Tainokô-valley of Yaku-island, south of Kyûshû. There is no need to separate the Japanese one from the typical one. This fern is characterized by the subdimorphic fronds gemmiferous near the apex of the rachis and the subentire pinnules of fertile fronds. The fertile fronds are narrower and lanceolate, but rarely ovate-lanceolate as the sterile ones.



Distribution Map I. *P. eximium* (+)
and *P. kiusiense* (O)



Distribution Map II. *P. Braunii*

(2) ***Polystichum kiusiense*** TAGAWA in Acta Phytotax. Geobot. 15: 15 (1953); Col. III. Jap., Pterid. 81, 247 (1959); OHWI, Fl. Jap. Pterid. 68 (1957); OHMURA in Hokuriku Journ. Bot. (Journ. Geobot.) 7: pl. xxv, xxvi (1958); NAMEGATA & KURATA, Enum. Jap. Pterid. 312 (1961).

Distr. Japan (Kyûshû). Refer to Distribution Map I.

This is distinguished in the abruptly contracted leaf-apex and the subcostal sori without indusia. This robust fern has erect fronds attaining 1.0~1.5 m in height. In Japan it is only growing wild at several localities of Kagoshima Prefecture, southern part of Kyûshû. We are frightened out of our sense, when encountering the somewhat purpurascens deep green fronds standing on the floor of gloomy laurisilvae.

This distinct fern seems to be also present in South China, for Pl. 34 of *Poly-podiaceae Yaoshanensis* by WU, WONG & PONG (1931) may represent it.

(3) *Polystichum Braunii* (SPENN.) FÉE, Gen. Fil. 278 (1850~52); KODAMA in Bot. Mag. Tokyo 29: (325) (1915); TAGAWA in Acta Phytotax. Geobot. 1: 101 (1932); Col. Ill. Jap. Pterid. 83, 246, fig. 160 (1959); H. Ito, Fil. Jap. Ill. pl. 297 (1944); OHWI, Fl. Jap. Pterid. 67 (1957); NAMEGATA & KURATA, Enum. Jap. Pterid., 310 (1961).

Distr. Honshû (central and northern parts), Hokkaidô and widely distributed in the subfrigid zone of the northern hemisphere. Refer to Distribution Map II.

It is worthy of note that this northern fern is growing wild at Kasayama, Hagi-city, Western Honshû, in the midst of the warm-temperate zone and that with vigorous fronds attaining 1 m high.

(4) *Polystichum* $\times$ *titibuense* KURATA in Hokuriku Journ. Bot. (Journ. Geobot.) 12: 68 (1963).

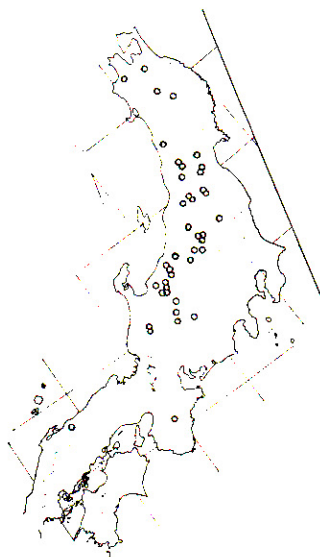
P. Braunii $\times$ *P. ovato-paleaceum* var. *coraiense*

Distr. Honshû (Provs. Shimotsuke, Musashi, Echigo and Shinano).

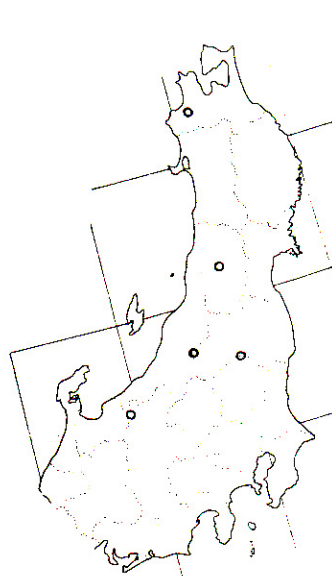
In general, this fern is apt to be mistaken for *Polystichum Braunii* because of the intramedial sori and the contracted base of laminae. However, the broader scales on the rachis and the pattern of sorus arrangement in the lower pinnae not occurring preferentially near the upper corner of auricles of pinnules, indicate the influence of *Polystichum ovato-paleaceum* var. *coraiense*. The sporangia mature and burst but the normal spores are not produced.

(5) *Polystichum microchlamys* (CHRIST) MATSUM., Ind. Pl. Jap. 1: 343 (1904); KODAMA in Bot. Mag. Tokyo 29: (326) (1915); in MATSUM., Ic. Pl. Koisik. 3: pl. 147 (1915); OGATA, Ic. Fil. Jap. 6: pl. 289 (1935); H. Ito, Fil. Jap. Ill. 300 (1944); OHWI, Fl. Jap. Pterid. 67 (1957); TAGAWA, Col. Ill. Jap. Pterid. 83, 161, fig. 61 (1959); NAMEGATA & KURATA, Enum. Jap. Pterid. 313 (1961).

Aspidium microchlamys CHRIST in Bull. Herb. Boiss. 7: 820 (1899).



Distribution Map III. *P. microchlamys*



Distribution Map IV. *P. x Shin-Tashiroi*

Distr. Honshû (central and northern parts), Hokkaidô (Mt. Asahi), the Kuriles and Kamtschatka. Refer to Distribution Map III.

In Honshû this is nearly restricted to the subalpine regions of the Japan-Sea side. A rather poor specimen collected at Otari hot-spring, Nagano Pref., Central Honshû by Mr. T. NAKAMURA seems to represent a hybrid between *Polystichum microchlamys* and *P. Braunii*. To clarify this hybridization decidedly, however, more plentiful specimens will be necessary.

(6) **Polystichum** × **Shin-Tashiroi** KURATA in Hokuriku Journ. Bot. (Journ. Geobot.) **11**: 38 (1962).

Polystichum microchlamys × *P. ovato-paleaceum* var. *coraiense*

Distr. Honshû (Provs. Mutsu, Uzen, Shimotsuke, Echigo and Shinano). Refer to Distribution Map IV.

The type specimen seems to represent a hybrid as indicated above, but a hybrid between *P. microchlamys* and *P. retroso-paleaceum* cannot be discriminated from it for the present.

(7) **Polystichum neo-lobatum** NAKAI in Bot. Mag. Tokyo **39**: 118 (1925); KURATA in Hokuriku Journ. Bot. **5**: 78 (1956); OHMURA in Hokuriku Journ. Bot. **6**: pl. iii (1957); OHWI, Fl. Jap. Pterid. 64 (1957); TAGAWA, Col. Ill. Jap. Pterid. 81, 248 (1959); NAMEGATA & KURATA, Enum. Jap. Pterid. 313 (1961); OKUYAMA, Col. Ill. Wild Pl. Jap. **6**: 146, pl. 513, fig. 5 (1962).

Polystichum lobatum var. *chinense* CHRIST in Nuov. Giorn. Bot. Ital. n. ser. **4**: 92 (1897).

Polystichum squarrosum var. *chinense* (CHRIST) C. CHR. in Acta Horti Gothob. **1**: 69 (1924).

Polystichum neo-lobatum var. *brevipinnum* TAGAWA in Acta Phytotax. Geobot. **9**: 92 (1940).

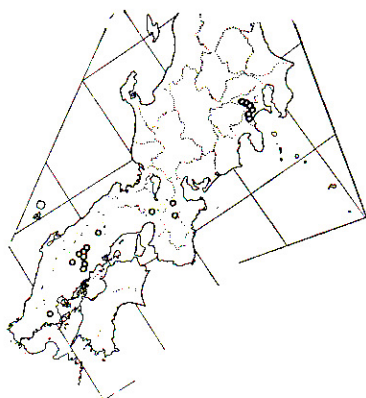
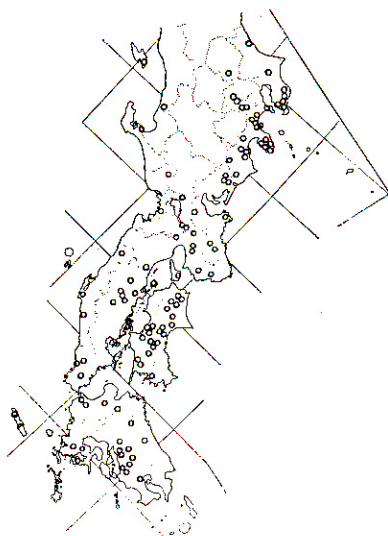
Distr. Honshû (Provs. Sagami and Shinano), Formosa, China, Tibet and Nepal.

This fern is clearly a closely allied species to *Polystichum squarrosum* and differs from it in its broader scales on the stipe and rachis.

(8) **Polystichum rigens** TAGAWA in Acta Phytotax. Geobot. **6**: 91 (1937); Col. Ill. Jap. Pterid. 81, 249, fig. 152 (1959); H. Ito, Fil. Jap. Ill. Pl. 315 (1944); KURATA in Hokuriku Journ. Bot. **4**: 16 (1955); OHWI, Fl. Jap. Pterid. 63 (1957); NAMEGATA & KURATA, Enum. Jap. Pterid. 315 (1961).

Distr. Sporadically found in the warm-temperate region of Honshû and Central China (Prov. Hupeh). Refer to Distribution Map V.

This is connected with *Polystichum tsus-simense* through the var. *Mayebarae* of the latter. On the other hand, it is also related to *P. squarrosum*, and in Central China there is a fern, probably not yet named, situated between the two species. *P. rigens* differs from *P. squarrosum* in the broader, ovate-lanceolate laminae and narrower scales on the rachis of laminae. The intermediate one of Central China coincides with *P. squarrosum* in the narrower lanceolate-linear laminae, but with *P. rigens* in the scales on the rachis.

Distribution Map V. *P. rigens*Distribution Map. VI. *P. tsus-simense*

(9) ***Polystichum tsus-simense*** (HOOK.) J. SM., Hist. Fil. 219 (1875); KODAMA in op. cit. (324) (1915); OGATA, Ic. Fil. Jap. 2: pl. 98 (1929); OHWI, Fl. Jap. Pterid. 64 (1957); CHING, Ic. Fil. Sin. 5: pl. 246 (1958); TAGAWA, Col. Ill. Jap. Pterid. 80, 249, fig. 151 (1959), OKUYAMA, Col. Ill. Wild Pl. Jap. 5: 146, pl. 425, fig. 5 (1960); NAMEGATA & KURATA, op. cit. 316 (1961).

Polystichum polyblepharum auct. non PR., NAKAI in Bot. Mag. Tokyo 39: 117 (1925); H. Ito, Fil. Jap. Ill. pl. 314 (1944).

Distr. Honshû, Shikoku, Kyûshû, Korea, Formosa and China. In warm-temperate regions. Refer to Distribution Map VI.

(9-a) var. ***Mayebarae*** (TAGAWA) KURATA in Hokuriku Journ. Bot. 6: 9 (1957); OHWI, l. c. (1957); OHMURA in Hokuriku Journ. Bot. 7: pl. xxiii, xxvi (1958); TAGAWA, Col. Ill. Jap. Pterid. 80, 249 (1959); NAMEGATA & KURATA l. c. (1961).

Distr. Nearly the same with that of the typical variety, but rather rare. Refer to Distribution Map VII.

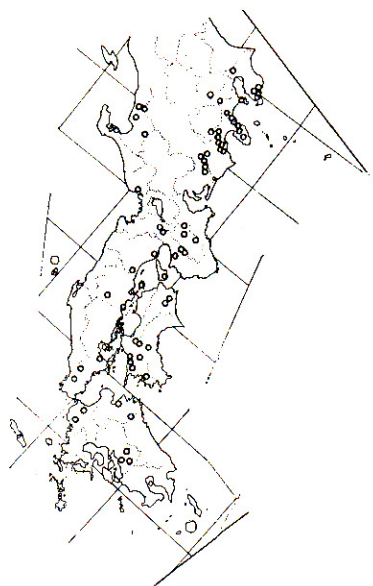
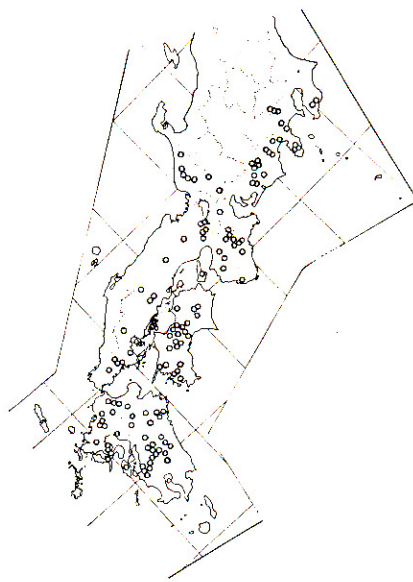
It is noteworthy that this variety is fairly restricted to the region ancient geologically and often encountered in the calcareous region. The vigorous form of this variety is also very similar to *P. rigens*.

(10) ***Polystichum pseudo-Makinoi*** TAGAWA in Acta Phytotax. Geobot. 5: 257 (1936); Col. Ill. Jap. Pterid. 82, 249, fig. 155 (1959); H. Ito, Fil. Jap. Ill. pl. 296 (1944); KURATA in Hokuriku Journ. Bot. 3: 65 (1954), OHWI, Fl. Jap. Pterid. 65 (1957); NAMEGATA & KURATA, op. cit. 314 (1961).

Distr. Honshû, Shikoku, Kyûshû and Central China. In the warm-temperate region. Refer to Distribution Map VIII.

This fern is common in deep mountains of the warm-temperate zone and one of the prominent indicators of humid atmosphere. Rarely there is found a form without blackish scales.

(11) ***Polystichum Makinoi*** (TAGAWA) TAGAWA in Acta Phytotax. Geobot. 5: 258 (1936);

Distribution Map VII. *P. tsus-simense*
var. *Mayebarae*Distribution Map VIII. *P. pseudo-Makinoi*

Col. III. Jap. Pterid. 81, 248, fig. 154 (1959); OHWI, op. cit. 65 (1957); KURATA in Hokuriku Journ. Bot. 8: 79 (1960); NAMEGATA & KURATA, op. cit. 313 (1961).

Polystichum aculeatum var. *nigro-paleaceum* MAKINO in Journ. Jap. Bot. 2: 21 (1922), non CHRIST (1893).

Polystichum aculeatum var. *Makinoi* TAGAWA in Acta Phytotax. Geobot. 1: 88 (1932).

Hab. China: 南川金佛山, Prov. Szechwan (李馨, 周继西 no. 92298); Prov. Yunnan (H. T. TSAI no. 52308).

Distr. Honshû, Shikoku, Kyûshû and new to China. Refer to Distribution Map IX.

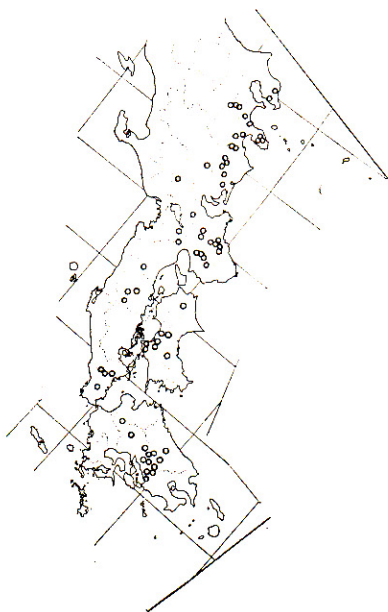
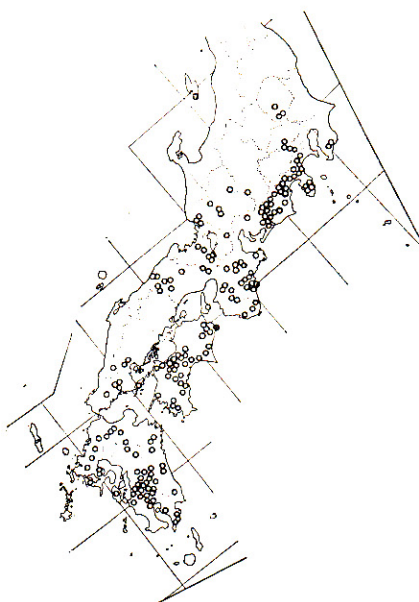
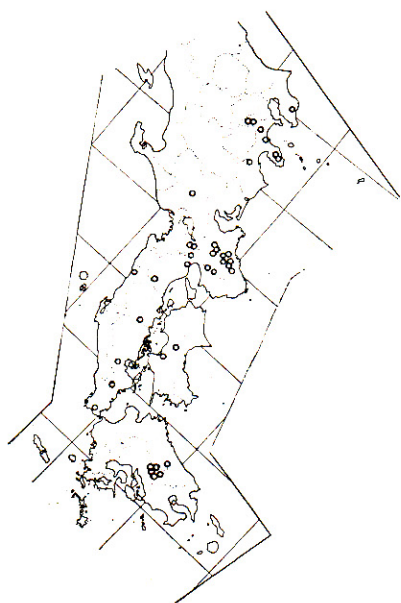
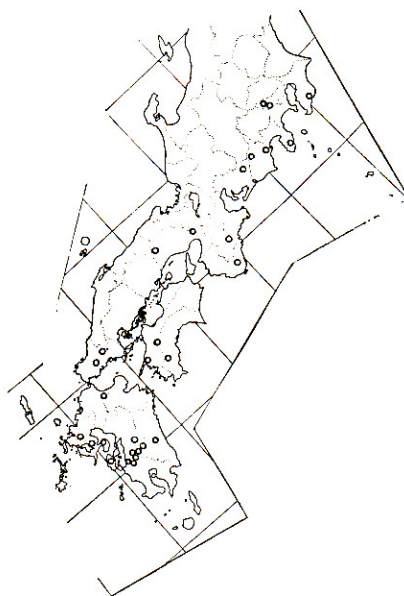
This fern grows often in association with *Polystichum pseudo-Makinoi*, but it is somewhat rarer than the latter, especially scarce in Shikoku and Kyûshû. *Polystichum setiferum* var. *Fargesii* (CHRIST) C. CHR. from China is probably the same with this fern. In the Sino-Himalayan Region, however, there are several related species to this fern, probably not yet described. To clarify the whole aspect of the so-called *Polystichum setiferum* var. *Fargesii*, future comprehensive investigation is necessary.

(12) **Polystichum Tagawanum** KURATA in Hokuriku Journ. Bot. 7: 41 (1958); TAGAWA, Col. III. Jap. Pterid. 82, 249, fig. 157 (1959); NAMEGATA & KURATA, op. cit. 315 (1961).

Polystichum pseudo-Makinoi var. *ambiguum* TAGAWA in Acta Phytotax. Geobot. 5: 258 (1936); OHWI, Fl. Jap. Pterid. 65 (1957).

Distr. Honshû, Shikoku and Kyûshû. Endemic to the warm-temperate region of Japan. Refer to Distribution Map X.

(13) **Polystichum × Namegatae** KURATA in Hokuriku Journ. Bot. 6: 113 (1957); OHMURA in Hokuriku Journ. Bot. 7: pl. xvi (1958); TAGAWA, Col. III. Jap. Pterid. 82, 248 (1959); NAMEGATA & KURATA op. cit. 313 (1961).

Distribution Map IX. *P. Makinoi*Distribution Map X. *P. Tagawanum*Distribution Map XI. *P. x Namegatae*Distribution Map XII. *P. x kiyozumianum**P. Makinoi* $\times$ *P. pseudo-Makinoi*

Distr. Honshû, Shikoku and Kyûshû. Refer to Distribution Map XI.

This hybrid is naturally formed and rather common where the two parent ferns grow intermingled. The spores are sometimes produced, but the germinability is not sure. It is noticeable, however, that this hybrid is found clustered and often more abundant than the parent ferns in the place.

(14) ***Polystichum* × *kiyozumianum*** KURATA in Hokuriku Journ. Bot. 9: 99 (1961); NAMEGATA & KURATA, op. cit. 312 (1961).

P. pseudo-Makinoi × *P. Tagawanum*

Distr. Honshû, Shikoku and Kyûshû. Refer to Distribution Map XII.

This hybrid is not rare in the type locality, Mt. Kiyozumi of Chiba Prefecture, Central Honshû, together with *Polystichum* × *Namegatae*. It is considered that this hybrid is generally established where the two parent ferns grow intermingled, but it has been apt to be included in *P. pseudo-Makinoi*. The sporangia only seldom burst out.

(15) ***Polystichum* × *izuense*** KURATA in Hokuriku Journ. Bot. 7: 42 (1958); TAGAWA, Col. Ill. Jap. Pterid. 82 (1959); NAMEGATA & KURATA, op. cit. 312 (1961).

P. Makinoi × *P. Tagawanum*

Distr. Honshû, Shikoku and Kyûshû. Refer to Distribution Map XIII.

This hybrid seems to be not rare where the two parent ferns grow intermingled, but it has been usually misidentified as *P. Makinoi*.

(16) ***Polystichum* *Otomasui*** KURATA in Hokuriku Journ. Bot. 12: 67 (1963).

Distr. Kyûshû (Prov. Higo).

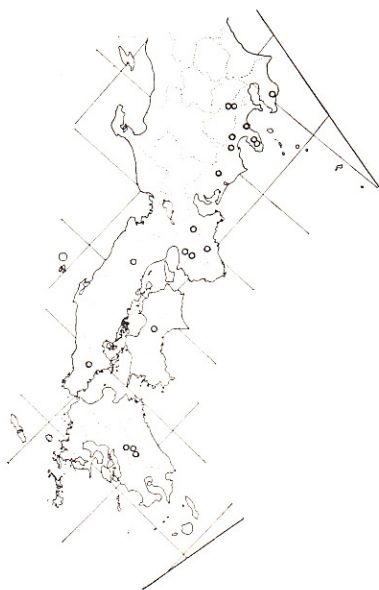
At a glance, this is apt to be confounded with *P.* × *izuense*, but the spores are plentifully produced.

(17) ***Polystichum* × *Suginoi*** KURATA in Hokuriku Journ. Bot. 12: 68 (1963).

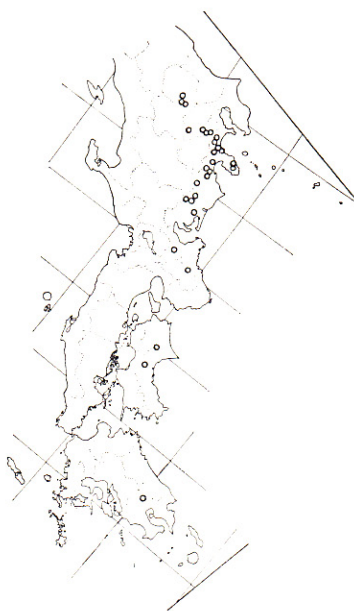
P. Otomasui × *P. Tagawanum*

Distr. Kyûshû (Prov. Higo).

This is very similar to *Polystichum* × *kiyozumianum* but the lamina is more lustrous and the sori in the lower pinnae are produced only on the upper side of the auricles of pinnules, not on both the upper and lower sides of the auricles as *P.* × *kiyozumianum*.



Distribution Map XIII. *P.* × *izuense*



Distribution Map XIV. *P. igaense*

(18) **Polystichum igaense** TAGAWA in Acta Phytotax. Geobot. 15: 15 (1953); Col. III. Jap. Pterid. 82, 247 (1959); KURATA in Hokuriku Journ. Bot. 3: 83 (1954); OHMURA in Hokuriku Journ. Bot. 6: pl. v (1957); OHWI, Fl. Jap. Pterid. 66 (1957); NAMEGATA & KURATA, op. cit. 311 (1961).

Distr. Honshû, Shikoku, and Kyûshû. Endemic to the warm-temperate zone of Japan. Refer to Distribution Map XIV.

This fern is very rare in Shikoku and Kyûshû. The stunted individual of *Polystichum Tagawanum* is apt to be mistaken for this fern. In the full-developed state, however, these two are clearly different from each other.

(19) **Polystichum Doianum** TAGAWA in Acta Phytotax. Geobot. 5: 256 (1936); Col. III. Jap. Pterid. 82, 247, fig. 156 (1959); H. Ito, Fil. Jap. III. pl. 291 (1944), ad figuram tantum; OHWI, Fl. Jap. Pterid. 64 (1957); OHMURA in Hokuriku Journ. Bot. 7: pl. xxiv, xxvi (1958); NAMEGATA & KURATA, op. cit. 310 (1961).

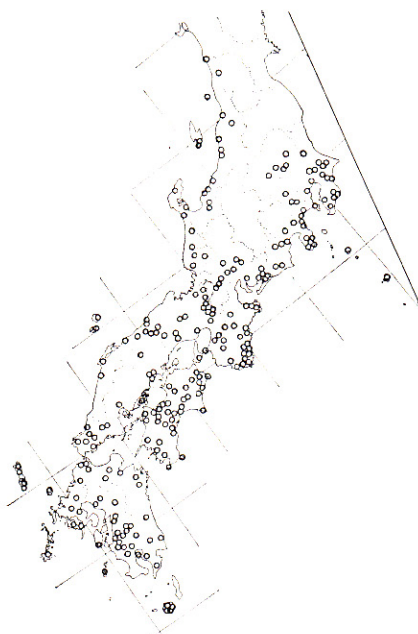
Distr. Kyûshû (Sakurajima-island).

This is distinguished in the lacerato-fimbriate indusia. In other characteristics this much resembles *Polystichum piceo-paleaceum* from Formosa and *P. nigro-paleaceum* from China and the Himalayas.

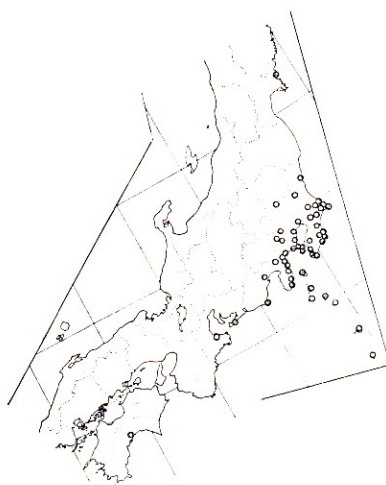
(20) **Polystichum polyblepharum** (ROEM. ex KUNZE) PR., Epim. Bot. 56 (1849), TAGAWA in Acta Phytotax. Geobot. 3: 45 (1934); Journ. Jap. Bot. 13: 186 (1937); Col. III. Jap. Pterid. 83, 248, fig. 159 (1959); OHWI, op. cit. 66 (1957); NAMEGATA & KURATA, op. cit. 314 (1961).

Aspidium polyblepharum ROEM. ex KUNZE in Bot. Zeit. 1848: 572.

Polystichum aculeatum var. *japonicum* (FRANCH. & SAV.) CHRIST in Ber. Schweiz. Bot. Gesells. 3: 26 (1893); KODAMA in Bot. Mag. Tokyo 29: (326) (1915); NAKAI in Bot. Mag.



Distribution Map XV. *P. polyblepharum*



Distribution Map XVI. *P. fibrilloso-paleaceum*

Tokyo 39: 113 (1925).

Polystichum japonicum (FRANCH. & SAV.) DIELS in ENGL. & PRANTL, Nat. Pfl.-fam. 1-4: 191 (1899); H. ITO, Fil. Jap. Ill. pl. 292 (1944).

Distr. Honshû, Shikoku, Kyûshû and Korea. Refer to Distribution Map XV.

This is one of the most common ferns in the warm-temperate region of Japan. The Formosan *Polystichum parvipinnulum* is a near ally of this species.

(20-a) var. **scabiosum** KURATA in Hokuriku Journ. Bot. 11: 38 (1962).

Distr. Honshû (Prov. Kazusa).

The spores are plentifully produced but it has been only known by two individuals.

(21) **Polystichum fibrilloso-paleaceum** (KODAMA) TAGAWA in Acta Phytotax. Geobot. 14: 16 (1949).

Polystichum aculeatum var. *fibrilloso-paleaceum* KODAMA in Bot. Mag. Tokyo 29: (327) (1915).

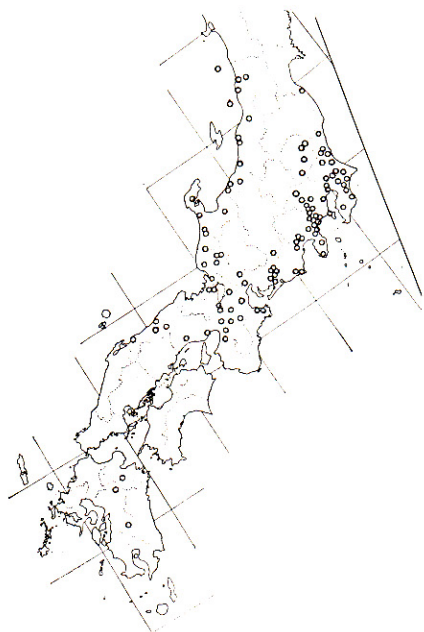
Polystichum polyblepharum var. *fibrilloso-paleaceum* (KODAMA) TAGAWA in Journ. Jap. Bot. 13: 186 (1937); Col. Ill. Jap. Pterid. 83, 248 (1959); KURATA in Hokuriku Journ. Bot. 3: 83 (1954); OHWI, op. cit. 67 (1957); NAMEGATA & KURATA, op. cit. 314 (1961).

Distr. Honshû, Shikoku and the Izu Archipelago. Refer to Distribution Map XVI.

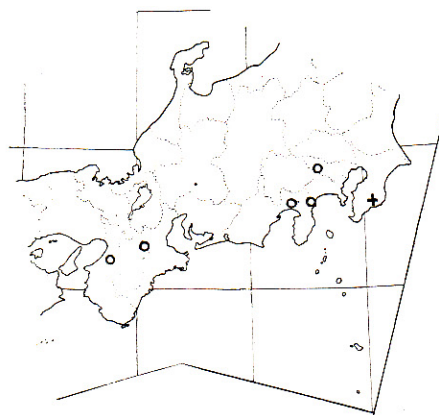
This is found on the forest floor near the coast of the Pacific side of Honshû and especially very common in the Izu Archipelago. This is characterized by the fibrillose scales on the rachis which are nearly entire and tortuose when dried. The scales of the stipe are linear or linear-lanceolate and somewhat castaneous at the base of the stipe.

(22) **Polystichum longifrons** KURATA, sp. nov.

Polystichum polyblepharum var. *fibrilloso-paleaceum* form. *intermedium* TAGAWA in



Distribution Map XVII. *P. longifrons*



Distribution Map XVIII. *P. polyblepharum* var. *fibrilloso-paleaceum* form. *intermedium* (○) and *P. polyblepharum* var. *fibrilloso-paleaceum* form. *intermedium* (+)

Journ. Jap. Bot. **13**: 187 (1937).

Polystichum polyblepharum var. *intermedium* (TAGAWA) KURATA in Hokuriku Journ. Bot. **4**: 16 (1955), **9**: 100 (1961); TAGAWA, Col. Ill. Jap. Pterid. **83**, 248 (1959); NAMEGATA & KURATA, op. cit. 314 (1961).

Arcte proximum *P. polyblepharum*, sed differt: frondibus angustioribus lineari-lanceolatis, squamis stipitis rachidisque angustioribus margine parcellissime denticulatis, squamis inferioribus stipitis plerumque castaneis, soris in pinnis inferioribus saepe genitis praecipue prope basin auricularum pinnularum.

Hab. Honshû: Shimo-odano, Ongata-mura, Prov. Musashi (Y. TOKASHIKI, June, 1956 —the type in Herb. Fac. Agr., Univ. Tokyo).

Distr. Honshû and Kyûshû. Refer to Distribution Map XVII.

This fern is decidedly distinct from *Polystichum polyblepharum* in the narrower frond and the narrower scales on the stipe and rachis which are subentire on the margin. The inferior scales on the stipe are usually castaneous. The sori are situated rather near the margin. In *Polystichum polyblepharum* the scales are scarcely castaneous.

This fern is often copiously found at the foot of low mountains in Central Honshû. In Kyûshû it has been very seldom collected at a few localities and in Shikoku it has never been found.

(23) ***Polystichum* × *anceps*** KURATA, hybr. nov.

P. longifrons × *P. polyblepharum*

Ab anteriore differt laminis latioribus, squamis inferioribus rachidis latioribus lanceolatis; a posteriore squamis inferioribus stipitis angustioribus saepe castaneis, squamis inferioribus rachidis subintegris.

Hab. Honshû: Dôryô-son, Mt. Hakone, Prov. Sagami (S. KURATA, Nov. 1956 —the type in Herb. Fac. Agr., Univ. Tokyo); ibidem (K. IIDA, June, 1959); Hatajuku, Mt. Hakone, Prov. Sagami (S. KURATA no. 176, May, 1954); Yugawara, Prov. Sagami (K. IIDA, July, 1959); Gotenba-shi, Prov. Suruga (T. WATANABE, July, 1962); Nishisawada, Numazu-shi, Prov. Suruga (Y. SHIMURA, July, 1958); Suse, Toyohashi-shi, Prov. Mikawa (E. TORII, Aug., 1959); at the foot of Mt. Takayasu, Nakakawachi-gun, Prov. Kawachi (K. SETO, Nov. 1950); Mt. Futatabi, Prov. Settsu (M. INADA, Jan., 1964); Ichiburi, Prov. Echigo (N. SATOMI, Jun. 1954); Noo, Prov. Echigo (S. KURATA no. 861, July, 1963).

The sporangia seem to be unable to mature fully. This hybrid is not rare at places where both the parent ferns grow intermingled. In the type specimen, the castaneous scales on the stipe are not so conspicuous.

(24) ***Polystichum* × *hakonense*** KURATA in Hokuriku Journ. Bot. **9**: 99 (1961), NAMEGATA & KURATA, op. cit. 311 (1961).

P. longifrons × *P. pseudo-Makinoi*

Hab. Honshû: Mt. Makinoo, Prov. Izumi (M. YAMANAKA, 1949); ibidem (T. KODAMA, 1950).

Distr. Honshû (Provs. Sagami, Suruga, Iga and Izumi). Refer to Distribution Map XVIII.

This fern has deep green lustrous laminae gradually attenuate at the apex.

(25) ***Polystichum* × *Jitaroi*** KURATA, hybr. nov.*P. polyblepharum* × *P. pseudo-Makinoi*Valde simile *P. × hakonensi*, attamen recedit ab eo laminis opacis et soris medialibus.**Hab.** Honshû: Sengoku-zawa, Mt. Kiyozumi, Prov. Kazusa (S. KURATA, no. 937, Sept. 1963—the type in Herb. Fac. Agr., Univ. Tokyo); ibidem (S. KURATA no. 873, 880, June, 1958). Refer to Distribution Map XVIII.

This hybrid fern has large fronds attaining 115 cm in length. The large scales on the stipe are linear-lanceolate and no ovate scale is found. Judging from the habitat circumstances and morphological characteristic, this is surely a hybrid between *P. polyblepharum* and *P. pseudo-Makinoi*. It is somewhat curious that *P. × hakonense* to be influenced by *P. longifrons* provided with narrow scales has wider scales than *P. × Jitaroi* to be influenced by *P. polyblepharum* provided with wide scales.

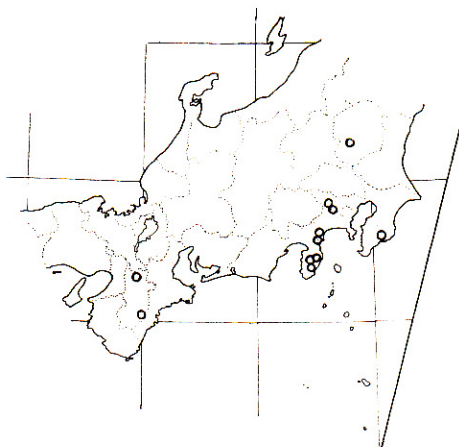
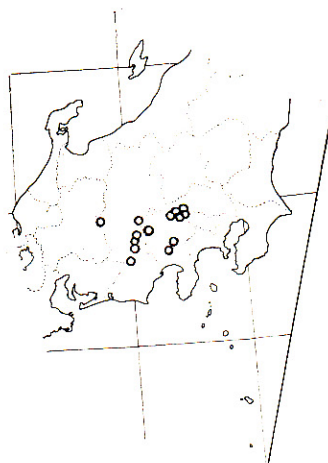
The scientific name is dedicated to Mr. Jitaro Suzuki who collected plants earnestly from the Taishô to Shôwa era and established the basis of the flora of Mt. Kiyozumi, Chiba Prefecture, the type locality of this hybrid.

(26) ***Polystichum* × *Iidanum*** KURATA, hybr. nov.*P. longifrons* × *P. Makinoi*

Valde simile speciei posteriori, sed differt frondibus robustioribus ad 1 m altis, squamis stipitis angustioribus, et soris fere sterilibus.

Hab. Honshû: Yugawara, Prov. Sagami (K. IIDA, Aug., 1958—the type in Herb. Fac. Agr., Univ. Tokyo); ibidem (M. OTOMASU, Nov., 1961).

This is very rarely found where the two parent ferns grow intermingled. The sorus composed of nearly sterile sporangia is like other hybrid ferns. There still remains some doubt about the parentage. It is conceivable that *P. polyblepharum* takes the place of *P. longifrons* in the formation of this hybrid.

(27) ***Polystichum* × *Mashikoi*** KURATA in Hokuriku Journ. Bot. 7: 116 (1958), pro. sp.; NAMEGATA & KURATA, op. cit. 313 (1961).*P. polyblepharum* × *P. Tagawanum*Distribution Map XIX. *P. × Mashikoi*Distribution Map XX. *P. Ohmurae*

Distr. Honshû (Provs. Shimotsuke, Kazusa, Musashi, Sagami, Izu and Yamato). Refer to Distribution Map XIX.

This is manifestly the hybrid between *P. polyblepharum* and *P. Tagawanum*, but the scales on the inferior part of the rachis are narrower than both the parent species. There is surely a hybrid between *P. longifrons* and *P. Tagawanum*, which resembles too much *P. × Mashikoi* to distinguish the two ferns objectively, but the parentage is imaginable on the basis of the habitat conditions.

(28) **Polystichum × kumamontanum** KURATA in *Hokuriku Journ. Bot.* 12: 68 (1963).

P. Otomasui × *P. polyblepharum*

Distr. Kyûshû (Hitoyoshi-shi, Prov. Higo).

This hybrid is very similar to *Polystichum × Mashikoi*, but differs from it by the wider scales on the lower part of the rachis and the intramedial sori.

(29) **Polystichum Ohmurae** KURATA in *Hokuriku Journ. Bot.* 5: 79 (1956); 9: 100 (1961); OHMURA in *Hokuriku Journ. Bot.* 6: pl. i, ii (1957); OHWI, op. cit. 67 (1957); NAMEGATA & KURATA, op. cit. 313 (1961).

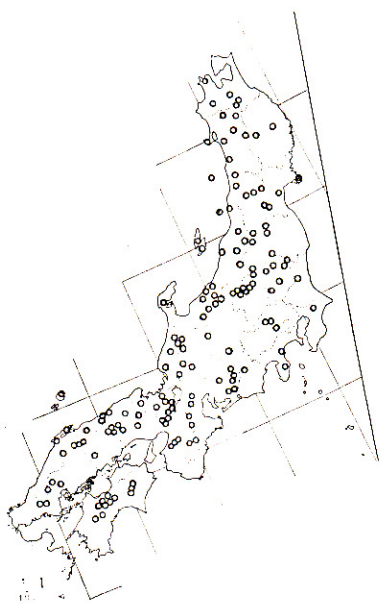
Distr. Endemic to Central Honshû (Provs. Musashi, Kai, Suruga, Shinano and Tôtômi). In the upper part of the cool-temperate mountain to the lower part of the subfrigid mountain. Refer to Distribution Map XX.

(29-a) var. **fujipedis** NAMEGATA & KURATA in *Hokuriku Journ. Bot.* 9: 100 (1961); NAMEGATA & KURATA, op. cit. 313 (1961).

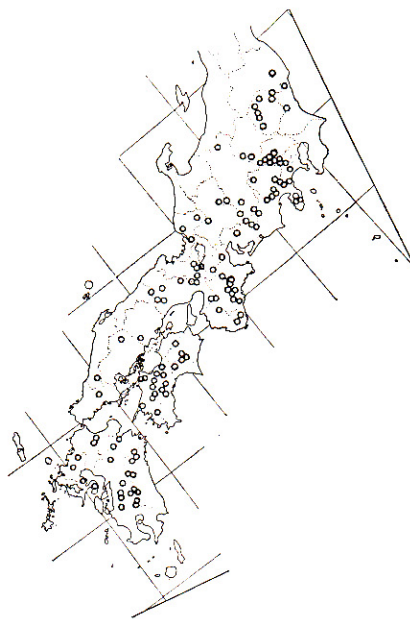
Distr. Honshû (Prov. Kai).

The variety has been only known from the type individual.

(30) **Polystichum retroso-paleaceum** (KODAMA) TAGAWA in *Journ. Jap. Bot.* 13: 187 (1937); Col. Ill. Jap. Pterid. 82, 249, fig. 158-a (1959); H. Ito, *Fil. Jap. Ill.* pl. 298 (1944);



Distribution Map XXI. *P. retroso-paleaceum*



Distribution Map XXII. *P. ovato-paleaceum*

OHWI, op. cit. 66 (1957); OKUYAMA, Col. Ill. Wild Pl. Jap. 5: 59, pl. 382, fig. 3 (1960); NAMEGATA & KURATA, op. cit. 314 (1961).

Polystichum aculeatum var. *retroso-paleaceum* KODAMA in Bot. Mag. Tokyo 29: (330) (1915).

Distr. Hokkaidô, Honshû, Shikoku and Dagelet Isl., east of the Korean Peninsula. In the cool-temperate region. Refer to Distribution Map XXI.

This fern is characterized by the subrotundate, retrorse and appressed scales on the undersurface of the rachis, but in general on the basal part of rachis the scales are antrorse. Very rarely all the scales are antrorse.

(30-a) form. **cruciatum** OHMURA et KURATA, form. nov.

A typo differt pinnis basalibus elongatis, bipinnatis et valide auctis in latere basiscopico.

Hab. Honshû: Sannô-kyô, Misakubo-machi, Prov. Tôtômi (S. TASHIRO, June, 1958—the type in Herb. Fac. Agr., Univ. Tokyo).

Distr. Honshû (Provs. Rikuchû and Suruga).

(31) **Polystichum ovato-paleaceum** (KODAMA) KURATA, stat. nov.

Polystichum aculeatum var. *ovato-paleaceum* KODAMA in Bot. Mag. Tokyo 29: (329) (1915).

P. retrosa-paleaceum var. *ovato-paleaceum* (KODAMA) TAGAWA in Journ. Jap. Bot. 13: 187 (1937); Col. Ill. Jap. Pterid. 83, 249, fig. 158-b (1959); H. ITO, Fil. Jap. Ill. pl. 299 (1944); OHWI, op. cit. 66 (1957); NAMEGATA & KURATA, op. cit. 315 (1961); OKUYAMA, Col. Ill. Wild Pl. Jap. 6: 143, pl. 512, fig. 2 (1962).

Distr. Honshû, Shikoku, Kyûshû and Korea (Mt. Tokyu, Prov. N. Chella). Refer to Distribution Map XXII.

This fern is surely a close ally of *Polystichum retrosa-paleaceum* which differs from this in such characters as the robust frond, more numerous and smaller pinnules, smaller, suborbicular, retrorse and appressed scales on the rachis. This fern is distributed in the upper part of the warm-temperate zone to the lower part of the cool-temperate zone of Central and Southern Japan. It is worth while to note that it is scarcely found on the Japan-Sea side of Central Honshû, where *P. retrosa-paleaceum* grows copiously.

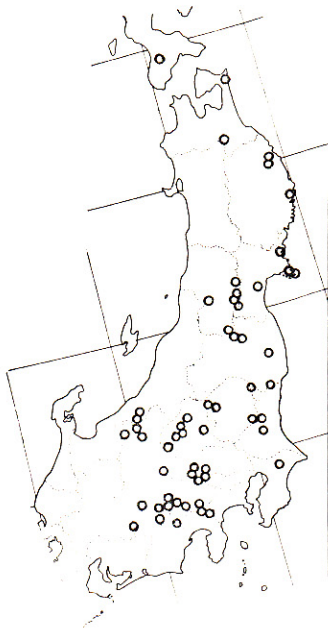
(31-a) var. **coraiense** (CHRIST) KURATA, comb. nov.

Polystichum aculeatum var. *coraiense* CHRIST, Repert. Sp. Nov. 5: 11 (1908); KODAMA in Bot. Mag. Tokyo 29: (328) (1915).

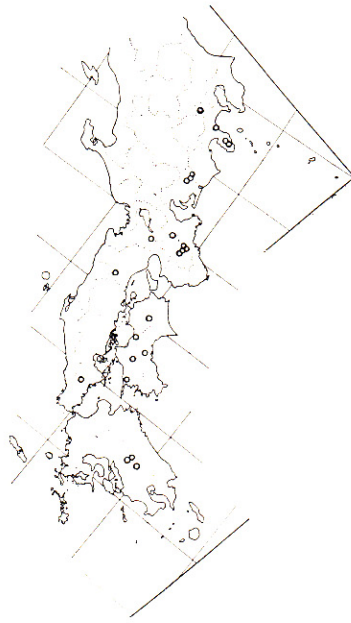
P. retrosa-paleaceum var. *coraiense* (CHRIST) TAGAWA in Journ. Jap. Bot. 13: 187 (1937); Col. Ill. Jap. Pterid. 83, 249 (1959); OHWI, op. cit. 66 (1957); NAMEGATA & KURATA, op. cit. 315 (1961).

Distr. Hokkaidô, Honshû and Korea. Refer to Distribution Map XXIII.

The typical form of this variety is found in the upper part of the cool-temperate region and has retrorse scales on the rachis, but a form with antrorse scales is not rare around the area of the var. *ovato-paleaceum*. In such places, it is not easy to separate the two varieties.



Distribution Map XXIII. *P. ovato-paleaceum* var. *coraiense*



Distribution Map XXIV. *P. x ongataense*

(31-b) var. **myokoense** KURATA, var. nov.

Arcte affine var. *coraiensi*, sed differt paleis stipitis rachidisque saepe atro-castaneis.

Hab. Honshû: Suginosawa, Myôkôkôgen-machi, Prov. Echigo (T. KURAMATA, June, 1963—the type in Herb. Fac. Agr., Univ. Tokyo); ibidem (E. SAKUMA no. 38, Nov., 1962).

In the var. *ovato-paleaceum* and the var. *coraiense*, castaneous scales sometimes appear on the lower part of the stipes, but they are not so blackish as those of the var. *myokoense* and not found on the rachis at all.

(32) **Polystichum x amboversum** KURATA, hybr. nov.

P. ovato-paleaceum x *P. retro-paleaceum*

Ab anteriore differt paleis rachidis alicubi adpresse retrorsis, pinnulis plus minusve minoribus; a posteriore differt paleis rachidis majoribus, saepius antrorsis.

Hab. Shikoku: Mt. Tsurugi, Prov. Awa (Y. KATO, July 1962—the type in Herb. Fac. Agr., Univ. Tokyo). Honshû: Mt. Hiei, Prov. Ohmi (T. KODAMA, June, 1951); Yunishikawa, Prov. Shimotsuke (S. TASHIRO, Aug., 1959).

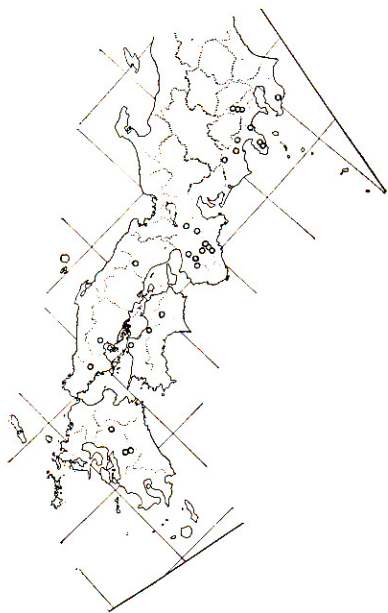
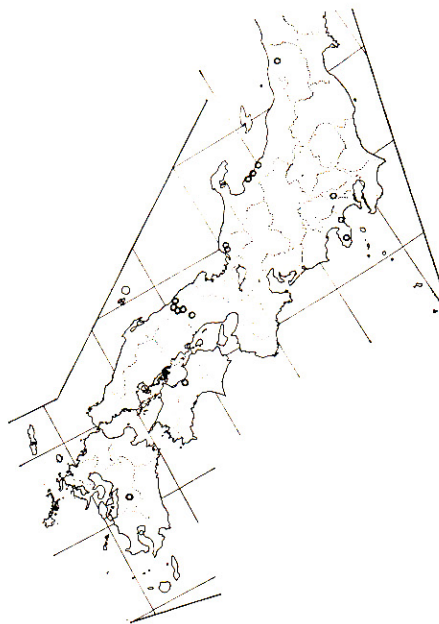
Dist. Honshû (Provs. Shimotsuke, Tôtômi and Ohmi) and Shikoku (Prov. Awa).

The size and number of pinnules of the type specimen coincide with *Polystichum ovato-paleaceum*. The specimen from Mt. Hiei, however, has pinnae similar to those of *Polystichum retroso-paleaceum*.

(33) **Polystichum x ongataense** KURATA in Hokuriku Journ. Bot. 6: 114 (1957); OHMURA in Hokuriku Journ. Bot. 6: pl. xvii, xviii (1957); TAGAWA, Col. Ill. Jap. Pterid. 82, 248 (1959); NAMEGATA & KURATA 314 (1961).

P. ovato-paleaceum x *P. pseudo-Makinoi*

Dist. Honshû, Shikoku and Kyûshû. Refer to Distribution Map XXIV.

Distribution Map XXV. *P. x Kurokawae*Distribution Map XXVI. *P. x Inadae*

(34) ***Polystichum x Utsumii*** (KURATA) KURATA, stat. nov.

Polystichum x ongataense nm. *Utsumii* KURATA in Hokuriku Journ. Bot. 8: 17 (1959).

P. pseudo-Makinoi x P. retroso-paleaceum

Distr. Honshû (Provs. Yamashiro and Harima).

At first sight this fern looks like *Polystichum pseudo-Makinoi* but the scales on the rachis are wider. From *P. x ongataense* it differs in smaller pinnules and smaller retrorse scales on the rachis.

(35) ***Polystichum x Kurokawae*** TAGAWA in Journ. Jap. Bot. 26: 20 (1951), pro sp.; Col. Ill. Jap. Pterid. 82, 247 (1959); KURATA in Hokuriku Journ. Bot. 3: 65 (1954); OHMURA in Hokuriku Journ. Bot. 6: xvi, xviii (1957); OHWI, op. cit. 65 (1957); OTOMASU in Hokuriku Journ. Bot. 10: 71 (1961); NAMEGATA & KURATA, op. cit. 312 (1961).

P. Makinoi x P. ovato-paleaceum

Distr. Honshû, Shikoku and Kyûshû. Refer to Distribution Map XXV.

The scales on the rachis attain usually 8 mm in length and 4 mm in width.

(36) ***Polystichum x microlepis*** KURATA, hybr. nov.

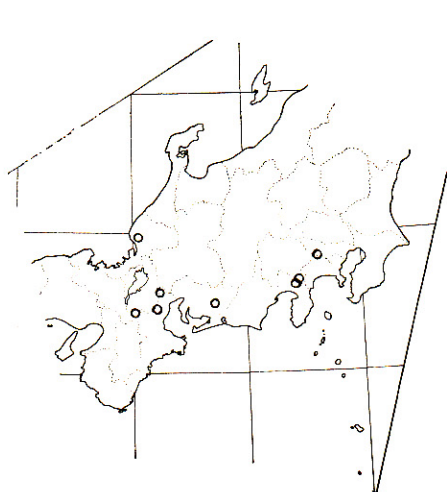
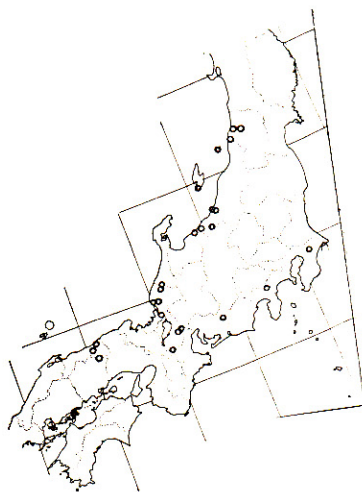
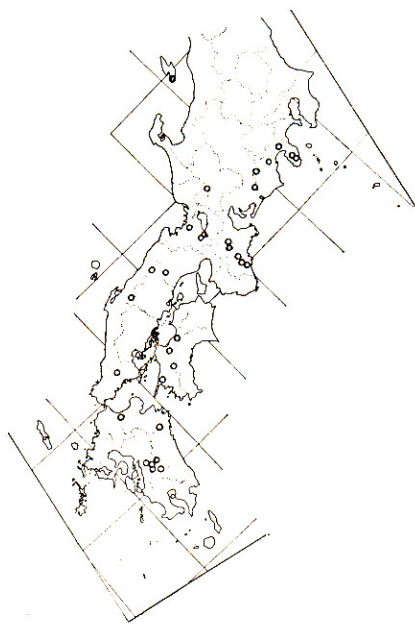
P. Makinoi x P. retroso-paleaceum

Valde simile *P. x Kurokawae*, sed differt paleis rachidis minoribus, ad 5 mm longis 2 mm latis, et adpresse retrorsis.

Hab. Honshû: Mt. Funakoshi, Prov. Harima (S. KURATA, no. 1803, July, 1958—the type in Herb. Fac. Agr., Univ. Tokyo).

The pinnules are smaller than *P. x Kurokawae* and nearly of the same size with *P. retroso-paleaceum*.

(37) ***Polystichum x Inadae*** KURATA in Hokuriku Journ. Bot. 11: 6 (1962), pro sp.

Distribution Map XXVII. *P. x takaosanense*Distribution Map XXVIII. *P. x hokurikuense*Distribution Map XXIX. *P. x Okanum*

P. polyblepharum × *P. retroso-paleaceum*

Distr. Honshû, Shikoku and Kyûshû. Refer to Distribution Map XXVI.

There are individuals decisively regarded as a hybrid between *P. polyblepharum* and *P. ovato-paleaceum*, judging from the habitat circumstances. Practically, however, it is impossible to separate this hybrid from *P. x Inadae* morphologically. In the Distribution Map XXVI, the stations of both the hybrids are included. The specimens from Kyûshû represent, of course, a hybrid between *P. ovato-paleaceum* and *P. polyblepharum*, for in Kyûshû *P. retroso-paleaceum* cannot be found.

(38) **Polystichum**×**takaosanense** KURATA in Hokuriku Journ. Bot. 8: 17 (1959).

P. longifrons × *P. ovato-paleaceum*

Distr. Honshû. Refer to Distribution Map XXVII.

(39) **Polystichum**×**hokurikuense** KURATA, hybr. nov.

P. longifrons × *P. retroso-paleaceum*

Persimile *P.*×*takaosanensi*, sed differt paleis inferioribus rachidis angustioribus ovato-lanceolatis vel lanceolatis.

Hab. Honshû: Noo, Nishikubiki-gun, Prov. Echigo (S. KURATA no. 856, July, 1963 —the type in Herb. Fac. Agr., Univ. Tokyo).

Distr. Honshû (Provs. Uzen, Echigo, Ecchû, Kaga, Echizen, Shimoosa, Suruga, Mikawa, Ise, Ohmi and Inaba). Refer to Distribution Map XXVIII.

This new hybrid fern is apt to be mistaken for *P. longifrons*, which differs in the rigid texture of laminae, fertile sporangia and linear scales on the rachis. It seems to be fairly common in the lowland of the Hokuriku district of the Japan-Sea side of Central Honshû.

(40) **Polystichum**×**Okanum** KURATA in Hokuriku Journ. Bot. 8: 16 (1959); NAMEGATA & KURATA, op. cit. 313 (1961).

P. retroso-paleaceum × *P. Tagawanum*

Distr. Honshû (Provs. Sado, Wakasa, Izu, Suruga, Tôtômi, Mikawa, Mino, Ohmi, Yamashiro, Iga, Yamato, Kii, Harima, Inaba, Hôki and Suwô), Shikoku (Provs. Tosa and Iyo) and Kyûshû (Provs. Buzen, Bungo and Higo). Refer to Distribution Map XXIX.

The type stock from Namera Government Forest, Prov. Suwô is now cultivated in Tokyo and considered to be a hybrid between *P. retroso-paleaceum* and *P. Tagawanum*. The specimens from Kyûshû and other places where *P. retroso-paleaceum* is not growing, however, are considered to be a hybrid between *P. ovato-paleaceum* and *P. Tagawanum*. In the future we may distinguish these two hybrids from each other morphologically.

摘 要

日本産イノデ類の全貌がほぼ明らかになったので、ここに 19 種、5 変種、1 品種、および 21 雑種にとりまとめて報告した。その和名、学名、分布は以下の通りである。

(1) コモチイノデ (田川, 1934) (一名, フリサンイノデ) *Polystichum eximium* (METT.) C. CHR.

屋久島, 台湾, 中国, トンキン, インド。

(2) キュウシュウイノデ (田川, 1953) *Polystichum kiusiense* TAGAWA

九州 (水俣市, 薩摩, 大隅高隈山), 中国南部。

(3) ホソイノデ (児玉, 1915) *Polystichum Braunii* (SPENN.) FÉE

本州 (長門笠山, 伯耆大山, 中部以北), 北海道, 北半球の亜寒帯に広く分布する。

(4) チチブイノデ (倉田, 1963) *Polystichum*×*titibuense* KURATA

ホソイノデとイワシロイノデの雑種で, 本州 (下野, 武蔵, 越後, 信濃) に見出される。

(5) カラクサイノデ (牧野, 根本, 1914) *Polystichum microchlamys* (CHRIST) MATSUM.

本州 (伯耆大山, 大和太皐山, 中部以北), 北海道 (大雪山), 千島, カムチャッカ。

(6) シロウマイノデ (倉田, 1962) *Polystichum*×*Shin-Tashiroi* KURATA

カラクサイノデとイワシロイノデまたはサカゲイノデとの雑種で, 本州 (陸奥, 羽前, 下野, 越後, 信

濃)に見出される。

- (7) ヤシャイノデ (田川, 1940), (一名, イナイノデ) *Polystichum neo-lobatum* NAKAI
本州 (相模西丹沢, 信濃遠山川), 台湾, 中国, チベット, ネパール。
- (8) オニノデ (田川, 1937) *Polystichum rigens* TAGAWA
本州 (武蔵, 相模, 伊賀, 大和, 摂津, 美作, 備中, 備後, 周防)。中国中部に近似のものを産し, 更に研究を要する。
- (9) ヒメカナワラビ (一名, キョスミンダ) *Polystichum tsus-simense* (HOOK.) J. SM.
本州 (常陸, 佐渡, 越後以西), 四国, 九州, 朝鮮, 台湾, 中国。
- (9-a) オオキヨズミンダ (田川, 1934) var. *Mayebarae* (TAGAWA) KURATA
本州 (房総, 武蔵, 越後以西), 四国, 九州, 中国中部。
- (10) サイゴクイノデ (田川, 1936) *Polystichum pseudo-Makinoi* TAGAWA
本州 (上総, 武蔵, 加賀以西), 四国, 九州 (南は霧島山, 紫尾山まで), 中国 (浙江, 江西)。
- (11) カタイノデ (牧野, 1922) *Polystichum Makinoi* (TAGAWA) TAGAWA
本州 (上総, 武蔵以西), 四国, 九州 (豊後, 日向, 肥後, 北薩), 中国 (四川, 雲南)。
- (12) イノデモドキ (田川, 1936) *Polystichum Tagawanum* KURATA
本州 (佐渡, 下野, 上総以西), 四国, 九州 (南は大隅半島まで)。
- (13) ミツイシイノデ (倉田, 1956) *Polystichum* × *Nomegatae* KURATA
本州 (上総, 武蔵以西), 四国, 九州 (日向, 肥後)。サイゴクイノデとカタイノデの雑種。
- (14) キヨズミノデ (倉田, 1960) *Polystichum* × *kiyozumianum* KURATA
本州 (上総, 武蔵以西), 四国, 九州。サイゴクイノデとイノデモドキの雑種。
- (15) カタイノデモドキ (倉田, 1958) *Polystichum* × *izuense* KURATA
本州 (上総, 武蔵以西), 四国 (土佐), 九州 (肥後)。カタイノデとイノデモドキの雑種。
- (16) ナンピイノデ (倉田, 1963) *Polystichum Otomasui* KURATA
九州 (球磨)。
- (17) オオイノデモドキ (倉田, 1963) *Polystichum* × *Suginoi* KURATA
九州 (球磨)。イノデモドキとナンピイノデの雑種。
- (18) チャボイノデ (黒川, 砂子 ex 田川, 1953) *Polystichum igaense* TAGAWA
本州 (下野, 武蔵・相模, 伊豆, 甲斐, 駿河, 遠江, 三河, 伊賀, 大和), 四国 (土佐), 九州 (霧島山)。
- (19) サクラジマイノデ (田川, 1936) *Polystichum Doianum* TAGAWA
九州 (桜島)。
- (20) イノデ *Polystichum polyblepharum* (ROEM.) PR.
本州 (羽後, 常陸以西), 四国, 九州, 朝鮮南部。
- (20-a) カズサイノデ (倉田, 1962) var. *scabiosum* KURATA
本州 (上総)。
- (21) アスカイノデ (伊藤圭介 ex 児玉, 1915) *Polystichum fibrilloso-paleaceum* (KODAMA) TAGAWA
本州 (陸前椿島以南の太平洋岸を伊勢まで), 四国 (高知市), 伊豆諸島。
- (22) アイアスカイノデ (橋本忠太郎, 1938) *Polystichum longifrons* KURATA
本州 (磐城, 羽前以西, 伯耆, 播磨まで), 九州 (豊後, 肥後)。
- (23) ドウリョウイノデ (飯田和, 新称) *Polystichum* × *anceps* KURATA
本州 (越後, 相模, 駿河, 三河, 山城, 河内, 摂津)。イノデとアイアスカイノデの雑種。
- (24) ハコネイノデ (倉田, 1961) *Polystichum* × *hakonense* KURATA
本州 (相模, 駿河, 伊賀, 和泉)。サイゴクイノデとアイアスカイノデの雑種。
- (25) ジタロウイノデ (新称) *Polystichum* × *Jitaroi* KURATA
本州 (上総清澄山)。サイゴクイノデとイノデの雑種。清澄山のフロラ調査に努力された鈴木治太郎氏に献名。

- (26) アイカタイノデ (倉田, 1960) *Polystichum* × *Idanum* KURATA
本州 (相模)。カタイノデとアイアスカイノデの雑種。
- (27) アマギイノデ (倉田, 1958) *Polystichum* × *Mashikoi* KURATA
本州 (下野, 上総, 武蔵, 相模, 伊豆, 大和)。イノデモドキとイノデの雑種。
- (28) タントウイノデ (倉田, 1963)。 *Polystichum* × *kumamontanum* KURATA
九州 (球磨)。ナンビイノデとイノデの雑種。
- (29) トヨグチイノデ (杉本, 大村 ex 倉田, 1956) *Polystichum Ohmurae* KURATA
本州 (武蔵, 甲斐, 信濃, 駿河, 遠江)。
- (29-a) フジイノデ (行方 ex 倉田, 1961) var. *fujipedis* NAMEGATA & KURATA
本州 (富士吉田市)。
- (30) サカゲイノデ (児玉, 1915) *Polystichum retroso-paleaceum* (KODAMA) TAGAWA
北海道, 本州, 四国, 朝鮮 (ウツリョウ島)。
- (30-a) ジュウモンジイノデ (田代, 大村 ex 倉田, 1961) form. *cruciatum* OHMURA & KURATA
本州 (陸中, 遠江)。
- (31) ツヤナシイノデ (田中, 1871) *Polystichum ovato-paleaceum* (KODAMA) KURATA
本州 (磐城以西), 四国, 九州 (南は霧島山まで), 朝鮮。
- (31-a) イワシロイノデ (児玉, 1915) var. *coraiense* (CHRIST) KURATA
北海道, 本州 (中部以北), 朝鮮。
- (31-b) ミョウコウイノデ (新称) var. *myokoense* KURATA
本州 (越後妙高山麓)。
- (32) アイツヤナシイノデ (新称) *Polystichum* × *amboversum* KURATA
本州 (下野, 近江), 四国 (剣山)。サカゲイノデとツヤナシイノデの雑種。
- (33) オンガタイノデ (倉田, 1956) *Polystichum* × *ongataense* KURATA
本州 (武蔵以西), 四国, 九州 (肥後)。サイゴクイノデとツヤナシイノデの雑種。
- (34) ハリマイノデ (倉田, 1959) *Polystichum* × *Utsumii* (KURATA) KURATA
本州 (山城, 播磨)。サイゴクイノデとサカゲイノデの雑種。
- (35) アカメイノデ (黒川 ex 田川, 1949) *Polystichum* × *Kurokawae* TAGAWA
本州 (上総, 武蔵以西), 四国 (阿波, 伊予), 九州 (肥後)。カタイノデとツヤナシイノデの雑種。
- (36) サカゲカタイノデ (倉田, 1960) *Polystichum* × *microlepis* KURATA
本州 (播磨船越山)。カタイノデとサカゲイノデの雑種。
- (37) フナコシイノデ (倉田, 1960) *Polystichum* × *Inadae* KURATA
本州 (羽前, 北陸, 伊豆, 播磨, 因幡), 四国 (伊予), 九州 (肥後)。イノデとサカゲイノデまたはツヤナシイノデとの雑種。
- (38) タカオイノデ (倉田, 1959) *Polystichum* × *takaosanense* KURATA
本州 (武蔵, 駿河, 三河, 伊勢, 近江, 越前)。アイアスカイノデとツヤナシイノデの雑種。
- (39) ホクリクイノデ (新称) *Polystichum* × *hokurikuense* KURATA
本州 (羽前, 北陸, 下総, 駿河, 三河, 伊勢, 近江, 因幡)。アイアスカイノデとサカゲイノデの雑種。
- (40) ナメライノデ (倉田, 1959) *Polystichum* × *Okanum* KURATA
本州 (佐渡, 上総以西), 四国 (伊予, 土佐), 九州 (豊前, 豊後, 肥後)。イノデモドキとサカゲイノデまたはツヤナシイノデとの雑種。



Fig. 1. *Polystichum eximium* growing from a gemma.
Yaku-island. 仔芽より生じたコモチイノデの苗 (屋久島,
佐竹健三氏撮影)。

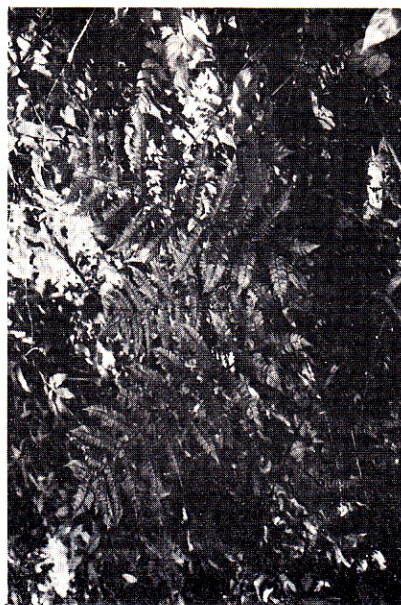


Fig. 2. *Polystichum kiusiense*. Gori Government
Forest, Prov. Satsuma. キュウシュウイノデ (薩摩
五里国有林)。



Fig. 3. Type individual of *Polystichum* × *Shin-Tashiroi*
at the foot of Mt. Shirouma, Prov. Shinano. シロウ
マイノデ (信州白馬山麓)。



Fig. 4. *Polystichum neo-lobatum*. Nishi-zawa, Tan-
zawa, Prov. Sagami. ヤシヤイノデ (相州西丹沢)。



Fig. 6. *Polystichum Tagawanum*. Dantô Government Forest, Prov. Higo. イノデモドキ (肥後段塔国有林)。



Fig. 8. *Polystichum x kiyozumianum*. Mt. Kiyozumi, Prov. Kazusa. キヨズミイノデ (上総清澄山)。



Fig. 5. *Polystichum Makinoi*. Mt. Mitsuishi, Prov. Kazusa. カタイノデ (上総三石山)。



Fig. 7. *Polystichum x Namegatae*. Mt. Mitsuishi, Prov. Kazusa. ミツイシイノデ (上総三石山)。



Fig. 10. ditto. 同前。



Fig. 12. *Polystichum* $\times$ *hakonense*. Sukumogawa, Mt. Hakone, Prov. Sagami. ハコネイノデ (相州箱根山須雲川)。



Fig. 9. *Polystichum Otomasui*. Dantô Government Forest, Prov. Higo. ナンピイノデ (肥後段駈国有林)。



Fig. 11. *Polystichum fibrilloso-paleaceum*. Tsubaki-island, Prov. Rikuzen. アスカイノデ (陸前峰島)。



Fig. 13. *Polystichum* × *Mashikoi*. Mt. Kiyozumi, Prov. Kazusa. アマガイノデ (上総清澄山)。



Fig. 14. *Polystichum* × *Kurokawae*. Sannokô, Prov. Yamato. アカメイノデ (大和三ノ公)。



Fig. 15. Type individual of *Polystichum* × *Okanum* cultivated in Tokyo. ナメライノデのタイプ株 (東京にて栽培)。



Fig. 16. *Polystichum* × *Okanum*. No-pass, Prov. Buzen; a hybrid between *P. ovato-paleaceum* and *P. Tagawanum*. ナメライノデの1型 (ツヤナシイノデ × イノデモドキ, 豊前野峠)。