# Ferns and Their Allies of the Ryukyu Islands 1. Dennstaedtiaceae and Pteridaceae

# Ferns and Their Allies of the Ryukyu Islands

## I. Dennstaedtiaceae and Pteridaceae

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### Summary

In this study segregated families such as, Dennstaedtiaceae, Pteridaceae, Dicksoniaceae, Lindsayaceae, Adiantaceae and Acrostichaceae are accepted for the ferns of Pteridaceae in the sense of Copeland (1947). However, the species included only in Dennstaedtiaceae and Pteridaceae are enumerated in this paper based on the examinations of the specimens. As a result one species, *Hypolepis bamleriana* Rosenstock (*Shimaiwahimewarabi*) and one variety, *Microlepia marginata* var. *bipinnata* Makino (*Kujakufumotoshida*), which are both in Dennstaedtiaceae, are added to the fern flora of the Ryukyu Islands. On the other hand *Pteris plumbea* Christ. (*Shintenin omotoso*) is excluded for the reason that the specimen for *Pteris plumbea* Christ. from the Ryukyu Islands once reported by Dr. Tagawa is considered to be a specimen of *Pteris cadieri* Christ. (*Kawaribaamakusashida*). Keys to genera and species are constructed for the identification of ferns within the families of the Ryukyu Islands. In addition, references to give descriptions or other informations about the species are cited for each species.


### Introduction

This study of mine deals with the ferns of Okinawa, Miyako and Yaeyama Archipelagos. I define these three groups of islands all together as the Ryukyu Islands, although the Ryukyu Islands may geographically include Amami, Tokara and Satsunan Archipelagos in addition to the archipelagos mentioned above.

Taxonomical studies of ferns of the Ryukyu Islands have been made by botanists of Okinawa and Japan proper. Among these Mr. Sakaguchi is the first person that intensively studied the Ryukyuan plants including ferns. He published General Index to the Flora of Okinawa in 1924. Some of the species in his manual, however, are incorrectly identified and erroneous specific names are applied to some others. Later the local botanists such as, Messrs. Sonohara, Tawada, Amano and Takamine made great contributions to the enumeration of ferns of the Ryukyu Islands in cooperation with Dr. Tagawa of Kyoto University. Dr. Ito of Tokyo University of Education made a collecting field trip to the Ryukyu Islands and reported his comprehensive studies on the ferns of this area. There are also some notable works done by Drs. Masmune, Iwatsuki, Hatusima and some other botanists. Recently a handy manual, Flora of Okinawa was produced by Dr. Hatusima and Mr. Amano. Although this publication gives a good account of the fern flora of this area, it is

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not fully satisfactory in detail.

My study on ferns and their allies of the Ryukyu Islands was undertaken to provide us with better and more up-to-date informations on the species that occur in the Ryukyu Islands. All the known species are classified according to the modern and reasonable scheme of taxonomy of the ferns and their allies. In addition, keys to genera and species are constructed for the identification of Pteridophytes of the Ryukyu Islands in case more than two genera or species exist in a family or genus.

In this part of my study I mainly deal with the ferns of Pteridaceae and Dennstaedtiaceae. Both of them were formerly included in the Pteridaceae by Copeland (1947). He characterized his family by solenostele rhizome, indument of hairs, marginal sori and tetrahedral spores, and included sixty-three heterogeneous genera in it. This scheme of classification was accepted by many botanists for years. His characterization of the family, however, is not consistent at all and there are so many exceptions within the family. I think this is because several divergent groups of ferns are included in the single family. Lately most of our contemporary pteridologists also have the same opinion and tend to disintegrate this enormously large family into several smaller ones. For example, Dr. Tagawa (1959) suggests that the Pteridaceae in the sense of Codeland be subdivided into five smaller families such as, Dennstaedtiaceae, Pteridaceae, Dicksoniaceae, Lindsayaceae, and Adiantaceae. This is not a new idea at all because some of these subdivided families had previously been recognized before Copeland by Gaudichaud, and also some others by Presl or Ching. Dr. Momose (1964) adopted the above five families with reference to his study on prothallia. Dr. Masamune (1951, 1953) on the other hand, recognizes four more families such as, Hypolepidaceae, Sinopteridaceae, Monachosporaceae and Acrostichaceae besides the five families mentioned above. Today pteridologists are all different in grouping the family into smaller families. American botanists Dr. Small (1964) and Dr. Wherry (1964) also classify the genus Acrostichum in a separate group because of its unique characteristics. Since I am of the same opinion in this matter, a modified scheme of taxonomy is adopted in which six families are recognized principally based on the nature of sori and indusium.

I would like to express my sincere appreciation to Dr. Motozi Tagawa who kindly allowed me to examine the specimens from the Ryukyu Islands preserved in the Herbarium of Kyoto University. I also wish to thank Mr. Kazuharu Shinjo of Education Research and Training Center, Government of the Ryukyus for the loan of his collection which was useful to obtain additional informations on distribution of the ferns in the Ryukyu Islands.

I am indebted to Mr. Kansho Kuroshima of Forestry Department, Government of the Ryukyus and Mr. Morishige Shimabukuro of Futenma Senior High School for their assistance in the collecting of specimens. Also I should like to acknowledge my indebtedness to the Foundation of the University of the Ryukyus for a grant-in-aid provided between 1967 and 1968.

## Preparation of data

The fern plants collected in the field should include rhizome, stipe and lamina with sori in order to obtain full morphological informations about the species concerned. These plants are usually pressed flat between moisture absorbing sheets of paper and dried by heating for a few days and preserved in the herbarium. These dried specimens are usually good to examine the general characteristics of the ferns. As to some plants a part of each is preserved in the mixture of alcohol and formaldehyde, and the materials preserved in the liquid are well suited for the examinations of sori and indusia as well as vascular bundles of a rhizome.

In this paper the characteristics used in constructing the keys to subdivided families, genera and species were gained through my own observations of the specimens. Most of these specimens were accumulated between 1957 and 1968 in the University of the Ryukyus. In instances where material was lacking, or was present but insufficient for a good characterization of a species, the specimens deposited in the Herbarium of Kyoto University were used. In addition I examined the personal collection of ferns kept by Mr. Kazuharu Shinjo for more detail distributional information on a species.

To obtain adequate data for constructing the keys, the following features of specimens should be noted as carefully as possible: dimensions, dermal surface (including presence or absence of hairs and scales) and vascular bundle of rhizome; color, dimensions, attachment (remote or clustered, articulate or not) and surface of stipe; color, size, branching manner, shape (if it is decompound, shape of pinna and pinnule is also included), consistency, surface (including hairs, scales and spines on rachis and costa), margin and venation (including false veins) of lamina: shape, size and position of sori: color, size, shape, surface, consistency and position of indusium: color, size, shape, nature of petiolula, and with the the particular attention to the annulus of sporangium; shape, size and surface of spores.

## Key to the segregated families of Pteridaceae

1) Sorus with an indusium ……(2)
1) Sorus without any kind of indusium ……(8)
  2) Sorus protected by a bivalvated indusium or by an indusium opening on marginal side ……(3)
  2) Sorus protected by an indusium formed by reflexed margin or more or less modified margin of the lamina opening on inside……(5)
3) Indusium bivalvated……Dicksoniaceae
3) Indusium not like abve ……(4)
  4) Sorus on tip of single vein and indusium half-cup-shaped; rhizome clothed with hair but without scales ……Dennstaedtiaceae
  4) Sorus often on terminal connected vein and laterally widened, or less often on single vein and half-cup-shaped or nearly so;

rhizome always with reddish bristle-like scales ; frond usually glabrous ..... Lindsayaceae

5) Sori continuous and elongate along the margin of lamina ..... Pteridaceae

5) Sori discontinuous and not like above ..... (6)

6) Sori borne on reflexed margin and protected by it ..... Adiantaceae

6) Sori protected by reflexed margin but not borne on it ..... (7)

7) Rhizome clothed with hairs but without scales; sori protected by reflexed tooth ..... Dennstaedtiaceae

7) Rhizome clothed with scales either with or without hairs ; sori protected by more or less modified reflexed margin ..... Pteridaceae

8) Sorus round and marginal or submarginal on single vein; frond herbaceous ..... Dennstaedtiaceae

8) Sporangia covering lower surface of fertile pinnae; frond thick coriaceous ..... Acrostichaceae

## DENNSTAEDTIACEAE

Rhizome long creeping, solenostelic, hairy, without scales; frond usually hairy, herbaceous, veins free; sorus terminal or subterminal on single vein; indusium often neary half-cup-shaped opening on marginal side, less often absent or reflexed tooth of segments, in the latter case reflexed tooth is not much different from lamina in consistency. Three genera occur in the Ryukyu Islands.

### Key to the genera of Dennstaedtiaceae

1) Sorus naked ..... Hypolepis

1) Sorus with an indusium ..... (2)

2) Sorus protected by a reflexed tooth opening on inside ..... Hypolepis

2) Sorus protected by a half-cup-shaped indusium opening on marginal side ..... (3)

3) Veins dichotomously forked and veinlets parallel to each other except basal vein ..... Scypholepia

3) veins elongate and pinnate but not dichotomously forked ..... Microlepia

### 1. **Hypolepis** Bernhardi

Frond large, about 2 m long, tripinnate or more compound in Ryukyuan species. Sorus roundish, naked or protected by a reflexed tooth. Only one species is known to occur in this area.

1) **Hypolepis bamleriana** Rosenstock in H. Ito, Journ. Jap. Bot. 13:370. 1937; Bot. Mag. Tokyo 53:25. 1939; Fil. Jap. Ill. f. 62. 1944; Masamune. Sci. Rep. Kanazawa Univ. 1(1):51. 1951; Ohwi. Fl. Jap. Pterid. 37. 1957

Japanese uame: *Shimaiwahimewarabi*

This is a new addition to the fern flora of the Ryukyu Islands.

Specimens examined: near the summit of the Mt. Nishime-dake along the upper stream of the Oku River. Okinawa Isl. (Kuroshima, Shimabukuro & Nakamura 335-340, 355 in Univ. of the Ryukyus)

## 2. **Microlepia** Presl

Key to the species of Microlepia

1) Frond conspicuously tripinnate or more pinnate; rachis pubescent on both side ····· M. pyramidata
1) Frond pinnate to bipinnate or rarely tripinnate, but in the latter case rachis glabrous at least on upper surface ····· (2)
  2) Frond pinnate or bipinnate; rachis pubescent on both surface ····· (3)
  2) Frond tripinnate or bipinnate; rachis glabrous on upper surface ····· (4)
3) Frond pinnate ····· M. marginata
3) Frond bipinnate ····· M. marginata var. bipinnata
  4) Frond usually with more than 25 pairs of pinnae; veins conspicuously rising underneath ····· (5)
  4) Frond usually with less than 25 pairs of pinnae; veins not conspicuously rising underneath ····· M. obtusiloba
5) Frond bipinnate to tripinnatatiparted; sorus marginal; pinna usually less than 5 cm broad ····· M. strigosa
5) Frond tripinnate; sorus submarginal; pinna usually more than 5 cm wide at the broadest ····· M. substrigosa

1) **Microlepia marginata** (Panzer) C. Chr. in Makino & Nemoto, Fl. Jap. 2nd ed. 78. 1931; H. Ito, Bot. Mag. Tokyo 52:645. 1938; Fil. Jap. Ill. f. 1. 1944; Ohwi, Fl. Jap. Pterid. 32. 1957; Tagawa, Col. Ill. Jap. Pterid. 50. pl. 13, f. 78a. 1959; Sugimoto, Key. Herb. Pl. Jap. Pterid. 155. 1966; Hatusima & Amano, Fl. Okinava. rev. ed. 6. 1967

Japanese name: *Fumotoshida*

Specimens examined : Mt. Yonaha-dake, Okinawa Isl. (Nakamura 81); Mt. Ishikawa-dake, Okinawa Isl. (Nakamura 106) Mt. Onna-dake, Okinawa Isl. (Nakamura 1078); Mt. Nishime-dake, Okinawa Isl. (Nakamura 1274, 1290)

1a) **Microlepia marginata** (Panzer) C. Chr. var. **bipinnata** Makino, Journ. Jap. Bot. 3:47. 1926; Makino & Nemoto, Fl. Jap. 2nd ed. 78. 1931; Tagawa, Acta Phytotax. Geobot. 10:202. 1941; Col. Ill. Jap. Pterid. 50. pl. 13, f. 78b. 1959; Masamune, Sci. Rep. Kanazawa Univ. 1(1):49. 1951; Iwatsuki, Acta Phytotax. Geobot. 19:46. 1962; Sugimoto, Key. Herb. Pl. Jap. Pterid. 156. 1966

Japanese name: *Kujakufumotoshida*

Specimen examined: Hentona, Okinawa Isl. (Sonohara, without number and date, in Kyoto University)

2) **Microlepia obtusiloba** Hayata, Bot. Mag. Tokyo 23:27. 1909; Tagawa, Acta

Phytotax. Geobot. 5:101. 1936; Journ. Jap. Bot. 33:92. 1958; Col. Ill. Jap. Pterid. 51. 1959; Hatusima & Amano. Fl. Okinawa. rev. ed. 6. 1967

*Microlepia majuscula* Moore in H. Ito. Bot. Mag. Tokyo 52:645. 1938; Fil. Jap. Ill. f. 3. 1944; Masamune. Sci. Rep. Kanazawa Univ. 1(1):49. 1951

*Microlepia subpinnata* Hayata in H. Ito. Bot. Mag. Tokyo 52:645. 1938; Masamune. Sci. Rep. Kanazawa Univ. 1(1):50. 1951.

Japanese name: *Kooshunshida*

Specimens examined: Mt. Yonaha-dake, Okinawa Isl. (Nakamura 280. 1679. 1680. 1681. 1682); along the Urauchi River. Iriomote Isl. (K. Shinjo 1149 in his herbarium)

3) **Microlepia pyramidata** (Wall.) Laccaita in Tagawa. Acta Phytotax. Geobot. 10:198. 1941; Masamune. Sci. Rep. Kanazawa Univ. 1(1):49. 1951; Sugimoto. Key. Herb. Pl. Jap. Pterid. 157. 1966; Hatusima & Amano. Fl. Okinawa. rev. ed. 7. 1967

*Microlepia speluncae* Moore in Makino & Nemoto. Fl. Jap. 2nd ed. 78. 1931; H. Ito. Bot. Mag. Tokyo 52:645. 1938; Fil. Jap. Ill. f. 6. 1944

Japanese name: *Ooishikaguma*

Specimens examined: Mt. Onna-dake. Okinawa Isl. (N. Ikehara 285 in University of the Ryukyus); Miyako Isl. (Koidzumi. without number. in Kyoto University); Ishigaki Isl. (S. Tawada 101. E. Takamine 304 in Kyoto University)

4) **Microlepia strigosa** (Thunb.) Presl in Makino & Nemoto. Fl. Jap. 2nd ed. 79. 1931; Nakai. Bot. Mag. Tokyo 46:62. 1932; H. Ito. Bot. Mag. Tokyo 52:645. 1938; Fil. Jap. Ill. f. 4. 1944; Masamune. Sci. Rep. Kanazawa Univ. 1(1): 50. 1951; Ohwi. Fl. Jap. Pterid. 32. 1957; Tagewa. Col. Ill. Jap. Pterid. 50. pl. 14. f. 80. 1959; Hatusima & Amano. Fl. Okinawa. rev. ed. 7. 1967

Japanese name: *Ishikaguma*

Specimens examined: Mt. Ishikawa-dake. Okinawa Isl. (Nakamura 28); Mt. Katsu-dake. Okinawa Isl. (Nakamura 831); Mt. Onna-dake. Okinawa Isl. (Nakamura 1059); Mt. Omote-dake. Ishigaki Isl. (Nakamura 12. 31); Hoshidate. Iriomote Isl. (Nakamura 926)

5) **Microlepia substrigosa** Tagawa. Acta Phytotax. Geobot. 5:189. 1936; Col. Ill. Jap. Pterid. 51. 1959; H. Ito. Bot. Mag. Tokyo 52:645. 1938; Masamune. Sci. Rep. Kanazawa Univ. 1(1):50. 1951; Ohwi. Fl. Jap. Pterid. 33. 1957; Iwatsuki. Acta Phytotax. Geobot. 19:45. 1962; Hatusima & Amano. Fl. Okinawa. rev. ed. 7. 1967

Japanese name: *Usubaishikaguma*

Specimens examined: Mt. Yonaha-dake. Okinawa Isl. (Tagawa & Iwatsuki 4901 in Kyoto University)

### 3. **Scypholepia** J. Smith

1) **Scypholepia hookeriana** Presl in H. Ito. Bot. Mag. Tokyo 52:645. 1938; Fil. Jap. Ill. f. 7. 1944; Masamune. Sci. Rep. Kanazawa Univ. 1(1):50. 1951;

Tagawa, Journ. Jap. Bot. 26:187. 1951; Sugimoto, Key. Herb. Pl. Jap. Pterid. 172. 1966; Hatusima & Amano, Fl. Okinawa. rev. ed. 8. 1967

*Microlepia hookeriana* Presl in Makaino & Nemoto, Fl. Jap. 2nd ed. 78. 1931; Copeland, Genera Fil. 51. 1947

Japanese name: *Yanbarufumotoshida*

Specimens examined: Mt. Yonaha-dake, Okinawa Isl. (Nakamura 170, 781, 1711); Yona, Okinawa Isl. (K. Shinjo 1544 in his herbarium)

## PTERIDACEAE

Rhizome short and dictyostelic or long and solenostelic, usually with scales but rarely with hairs only; frond glabrous, ceraceous or coriaceous in some cases; sori usually elongate on marginal connected vein but in a few cases sori on the tips of the veins, often in contact, less often discrete; indusium scarious reflexed margin, usually continuous, rarely separate, but in all cases indusium opening on inside of the segment.

### Key to the genera of Pteridaceae

1) Rhizome creeping; frond remote ····· (2)
1) Rhizome short; frond clustered ····· (3)
  2) Rhizome and stipes with hairs but without scales ····· Pteridium
  2) Rhizome with scales; pinnae opposite, sessile and with stipulelike basal pinnules ····· Histiopteris
3) Two indusia often in contact along costa as ultimate pinnules so small and narrow ····· Onychium
3) Two indusia never in contact along costa ····· (4)
  4) Fronds deltoid to deltoid-ovate and ceraceous beneath; veinlets everywhere free ····· Aleuritopteris
  4) Fronds not with the above combinations of characteristics; veinlets terminally connected in the sori ····· Pteris

### 1. **Aleuritopteris** Fee

1) **Aleuritopteris argentea** (Gmell.) Fee in Ohwi, Fl. Jap. Pterid. 43. 1957; Hatusima & Amano, Fl. Okinawa. rev. ed. 6. 1967

*Cheilanthes argentea* (Gmell.) Kunze in Makino & Nemoto, Fl. Jap. 2nd ed. 36. 1931; H. Ito, Fil. Jap. Ill. f. 63. 1944; Masamune, Sci. Rep. Kanazawa Univ. 1(2):176. 1951; Tagawa, Col. Ill. Jap. Pterid. 62. pl. 19. f. 109. 1959; Sugimoto, Key. Herb. Pl. Jap. Pterid. 142. 1966

Japanese name: *Himeurajiro*

Specimens examined : Tokashiki Isl. (S. Nakazato 210 in University of the Ryukyus)

## 2. **Histiopteris** J. Smith

1) **Histiopteris incisa** (Thunb.) J. Smith in Makino & Nemoto, Fl. Jap. 2nd ed. 73. 1931; H. Ito, Bot. Mag. Tokyo 53:26. 1939; Fil. Jap. Ill. f. 38. 1944; Masamune, Sci. Rep. Kanazawa Univ. 1(2):172. 1951; Ohwi, Fl. Jap. Pterid. 37. 1957; Tagawa, Col. Ill. Jap. Pterid. 56. pl. 15. f. 92. 1959; Sugimoto, Key. Herb. Pl. Jap. Pterid. 149. 1966; Hatusima & Amano, Fl. Okioawa. rev. ed. 6. 1967

Japanese name: *Yunomineshida*

Specimens examined: Mt. Yonaha-dake, Okinawa Isl. (Nakamura 1672, 1673); Inaba, along the Urauchi River, Iriomote Isl. (Nakamura 36, 836); Mt. Haterumamori, Iriomote Isl. (Nakamura 471, 472, 473)

## 3. **Onychium** Kaulfuss

1) **Onychium japonicum** (Thunb.) Kunze in H. Ito, Bot. Mag. Tokyo 53:25. 1939; Fil. Jap. Ill. f. 57. 1944; Masamune, Sci. Rep. Kanazawa Univ. 1(2):176. 1951; Ohwi, Fl. Jap. Pterid. 45. 1957; Tagawa, Col. Ill. Jap. Pterid. 62. pl. 19. f. 110. 1959; Sugimoto, Key. Herb. Pl. Jap. Pterid. 158. 1966; Hatusima & Amano, Fl. Okinawa. rev. ed. 7. 1967

Japanese name: *Tachishinobu*

Specimens examined: Geruma Isl. in Zamami-son (Nakamura 825, 1102, 1155); Iheya Isl. (K. Shinjo 790, 823 in his herbarium)

## 4. **Pteridium** Scopoli

1) **Pteridium aquilinum** (Linn.) Kuhn. var. **latiusculum** (Desv.) Und. in Masamune, Sci. Rep. Kanazawa Univ. 1(2):172. 1951; Ohwi, Fl. Jap. Pterid. 37. 1957; Tagawa, Col. Ill. Jap. Pterid. 55. pl. 15, f. 91. 1959; Hatusima & Amano, Fl. Okinawa. rev. ed. 7. 1967

*Pteridium aquilinum* (Linn.) Kuhn. var. *japonicum* Nakai, Bot. Mag. Tokyo 39:106. 1925; H. Ito, Bot. Mag. Tokyo 53:26. 1939; Fil. Jap. Ill. f. 37. 1944; Sugimoto, Key. Herb. Pl. Jap. Pterid. 159. 1966

Japanese name: *Warabi*

Specimens examined: Mt. Yonaha-dake, Okinawa Isl. (Nakamura 785); Mt. Katsu-dake, Okinawa Isl. (Nakamura 1350, 1362); Mt. Kayo-dake, Iheya Isl. (Nakamura 1635); Inaba, Iriomte Isl. (Nakamura 22)

## 5. **Pteris** Linnaeus

Key to the species of Pteris

1) Terminal pinna simple (this characteristics especially distinct in fertile frond) ..... (2)

1) Terminal pinna pectinatedly pinnatifid to pinnatiparted ..... (9)

2) Frond usually with more than 10 pairs of pinnae; pinnae

becoming extremely smaller toward the base of the stipe ····· P. vittata

2) Frond usually with less than 10 pairs of pinnae; pinnae not becoming extremely smaller toward base of the stipe ····· (3)

3) Pinnae of sterile frond with irregular lobes; false veins in mesophyll abundant ····· P. cadieri

3) Pinnae of sterile frond without irregular lobes; false veins in mesophyll absent or scanty if any ····· (4)

4) Sterile pinnae broad, 15 mm to 30 mm wide and white-variegated along the costa ····· P. cretica var. albo-lineata

4) Sterile pinnae neither broad like above nor white-variegated along the costa ····· (5)

5) Pinnae prominently decurrent on rachis forming conspicuous wing (wing connects nearly all lateral pinnae) ····· P. multifida

5) Pinnae not decurrent at all or if more or less decurrent, then not forming conspicuous wing ····· (6)

6) Frond bipinnate ····· P. ensiformis

6) Frond pinnate ····· (7)

7) Frond with only one pair of lateral pinnae ····· P. ryukyuensis

7) Frond with more than two pairs of lateral pinnae ····· (8)

8) Only one pair of lateral pinnae at the base with segments ····· P. ryukyuensis

8) More than two pairs of lateral pinnae with segments ····· P. ensiformis

9) Lamina tri-parted and each lateral division with one branch at posterior ····· (10)

9) Lamina not with the above combinations of characteristics ····· (11)

10) Frond small, usually less than 50 cm long; false veins present ····· P. grevilleana

10) Frond large, usually more than 100 cm long; false vein absent ····· P. wallichiana

11) Pinnae narrowed near the rachis; margin of the segments entire ····· P. fauriei

11) Pinnae not narrowed near the rachis; margin of the segment not entire ····· (12)

12) Spines present on costa of upper surface of the blade ····· P. inaequalis var. simplicior

12) Spines absent on costa of upper surface of the blade ····· (13)

13) Pinnae regularly pinnatiparted only on posterior side ····· P. semipinnata

13) Pinnae regularly pinnatiparted on both anterior and posterior sides or nearly so ..... P. dispar

1) **Pteris cadieri** Christ. in Tagawa, Acta Phytotax. Gebot. 9:204. 1940; H. Ito, Fil. Jap. Ill. f. 42. 1944; Shieh, Bot. Mag. Tokyo 79:287. 1966; Sugimoto, Key. Herb. Pl. Jap. Pterid. 162. 1966; Hatusima & Amano, Fl. Okinawa. rev. ed. 7. 1967

*Pteris dimorpha* Copel. in Tagawa, Acta Phytotax. Geobot. 2:200. 1933; H. Ito, Bot. Mag. Tokyo 53:25. 1939

Japanese name: *Kawaribaamakusashida*

Specimens examined: Mt. Yonaha-dake, Okinawa Isl. (T. Kanashiro 121 in Kyoto University); Mt. Kitameiji, Okinawa Isl. (T. Kanashiro 545 in Kyoto University); Mt. Kabuto, Kume Isl. (S. Tawada 77 in Kyoto University); Mt. Maetake, Ishigaki Isl. (Nakamura 1221); Vicinity of the Kanbire Fall, Iriomote Isl. (M. Shimabukuro 500 in University of the Ryukyus)

2) **Pteris cretica** Linn. var. **albo-lineata** Hook. in Makino & Nemoto, Fl. Jap. 2nd. ed. 105. 1931; Ohwi, Fl. Jap. Pterid. 39. 1957; Tagawa, Col. Ill. Jap. Pterid. 58. Pl. 16, f. 94b. 1959; Sugimoto, Key. Herb. Pl. Jap. Pterid. 162. 1966; Hatusima & Amano, Fl. Okinawa. rev. ed. 7. 1967

*Pteris nipponica* Shieh, Bot. Mag. Tokyo 79:285. 1966

Japanese name: *Matsuzakashida*

Specimens examined: Taminato-ugan, Okinawa Isl. (Nakamura 87); Mt. Katsu-dake, Okinawa Isl. (M. Tagawa & K. Iwatsuki 4921 in Kyoto University)

3) **Pteris dispar** Kunze in H. Ito, Bot. Mag. Tokyo 53:25. 1939; Fil. Jap. Ill. f. 46. 1944; Ohwi, Fl. Jap. Pterid. 40. 1957; Tagawa, Col. Ill. Jap. Pterid. 58. pl. 16, f. 96. 1959; Shieh, Bot. Mag. Tokyo 79:288. 1966; Sugimoto, Key. Herb. Pl. Jap. Pterid. 164. 1966; Hatusima & Amano, Fl. Okinawa. rev. ed. 7. 1967

*Pteris quadriaurita* Retz. in Makino & Nemoto, Fl. Jap. 2nd ed. 108. 1931

*Pteris semipinnata* Linn. var. *dispar* (Kunze) Baker in Masamune, Sci. Rep. Kanazawa Univ. 1(2):175. 1951

Japanese name: *Amakusashida*

Specimens examined: Geruma Isl. in Zamami-son (Nakamura 211); Izena Isl. (Nakamurm 1025); Kawata, Higashi-son, Okinawa Isl. (Nakamura 1311); Mt. Kayo, Iheya Isl. (Nakamura 1654); Mt. Kara, Ishigaki Isl. (Nakamura 1536); Mt. Nosoko-dake, Ishigaki Isl. (Nakamura 1546); Mt. Fukaiomoto, Ishigaki Isl. (Nakamura 1578); Mt. Komi-dake, Iriomote Isl. (Nakamura 1447)

4) **Pteris ensiformis** Burman in Makino & Nemoto, Fl. Jap. 2nd ed. 106. 1931; H. Ito, Bot. Mag. Tokyo 53:26. 1939; Fil. Jap. Ill. f. 43. 1944; Masamune, Sci. Rep. Kanazawa Univ. 1(2):173. 1951; Shieh, Bot. Mag. Tokyo 79:286. 1966; Sugimoto, Key. Herb. Pl. Jap. Pterid. 164. 1966; Hatusima & Amano, Fl. Okinawa. rev. ed. 7. 1967

Japanese name: *Hokoshida*

Specimens examined: Kawata, Higashi-son, Okinawa Isl. (Nakamura 301); Ie Isl. (Nakamura 1594, 1596, 1601, 1607); Mt. Katsu-dake, Okinawa Isl. (Nakamura 1354); Inaba, Iriomote Isl. (Nakamura 374)

5) **Pteris fauriei** Hieron. in Tagawa, Col. Ill. Jap. Pterid. 59. pl. 17, f. 99. 1959; Shieh, Bot. Mag. Tokyo 79:290. 1966; Sugimoto, Key. Herb. Pl. Jap. Pterid. 164. 1966; Hatusima & Amano, Fl. Okinawa. rev. ed. 7. 1967

*Pteris quadriaurita* Retz. in H. Ito, Bot. Mag. Tokyo 53:26. 1939; Fil. Jap. Ill. f. 52. 1944; Ohwi, Fl. Jap. Pterid. 40. 1957

Japanese neme: *Hachijoshida*

Specimens examined: Mt. Ishikawa-dake, Okinawa Isl. (Nakamura 195); Mt. Yonaha-dake, Okinawa Isl. (Nakamura 950); Mt. Onna-dake, Okinawa Isl. (Nakamura 1088); Ie Isl. (Nakamura 1608); Inaba, Iriomote Isl. (Nakamura 963)

6) **Pteris inaequalis** Baker var. **simplicior** Tagawa, Journ. Jap. Bot. 14:603. 1938; Col. Ill. Jap. Pterid. 59. 1959; H. Ito, Fil. Jap. Ill. f. 49. 1944; Sugimoto, Key. Herb. Jap. Pl. Pterid. 166. 1966; Hatusima & Amano, Fl. Okinawa. rev. ed. 7. 1967

*Pteris inaequalis* Baker var. *inaequalis* Ohwi, Fl. Jap. Pterid. 40. 1957

*Pteris excelsa* Gaud. var. *simplicior* (Tagawa) Shieh, Bot. Mag. Tokyo 79: 289. 1966

Japanese name: *Oobanoamakusashida*

Specimens examined: Ie Isl. (Nakamura 1621)

7) **Pteris grevilleana** Wallich in Makino & Nomoto, Fl. Jap. 2nd ed. 106. 1931; Tagawa, Acta Phytotax. Geobot. 9:203. 1940; H. Ito, Bot. Mag. Tokyo 53:26. 1939; Fil. Jap. Ill. f. 45. 1944; Shieh, Bot. Mag. Tokyo 79:287. 1966; Sugimoto, Key. Herb. Pl. Jap. Pterid. 164. 1966; Hatusima & Amano, Fl. Okinawa. rev. ed. 7. 1967

Japanese name: *Ashigatashida*

Specimens examined: Mt. Omoto-dake, Ishigaki Isl. (S. Tawada without number in Kyoto University); Nagura, Ishigaki Isl. (E. Takamine 337 in Kyoto University); Mt. Haimi-dake, Iriomote Isl. (M. Tagawa & K. Iwatsuki 4692 in Kyoto University)

8) **Pteris multifida** Poiret in Makino & Nemoto, Fl. Jap. 2nd ed. 107. 1631; H. Ito, Bot. Mag. Tokyo 53:26. 1939; Fil. Jap. Ill. f. 40. 1944; Masamune, Sci. Rep. Kanazawa Univ. 1(2):174. 1951; Ohwi, Fl. Jap. Pterid. 39. 1957; Tagawa, Col. Ill. Jap. Pterid. 58. pl. 16, f. 95. 1959; Shieh, Bot. Mag. Tokyo 79:287. 1966; Sugimoto, Key. Herb. Pl. Jap. Pterid. 169. 1966; Hatusima & Amano, Fl. Okinawa. rev. ed. 7. 1967

Japanese name: *Inomotoso*

Specimens examined: Ie Isl. (Nakamura 1602, 1603); Toguchi, Nakagusuku-son, Okinawa Isl. (S. Tawada 32 in Kyoto University)

9) **Pteris ryukyuensis** Tagawa, Acta Phytotax. Geobot. 4:204. 1935; Col. Ill. Jap. Pterid. 58. 1959; H. Ito, Bot. Mag. Tokyo 53:26. 1939; Fil. Jap. Ill. f. 41. 1944; Masamune, Sci. Rep. Kanazawa Univ. 1(2):174. 1951; Ohwi, Fl. Jap. Pterid. 58. 1957; Shieh, Bot. Mag. Tokyo 79:286. 1966; Sugimoto, Key. Herb. Pl. Jap. Pterid. 168. 1966; Hatusima & Amano, Fl. Okinawa. rev. ed. 7. 1967

Japanese name: *Ryukyuinomotoso*

Specimens examined: Mt. Katsu-dake, Okinawa Isl. (Nakamura 1099); Izena Isl. (Nakamura 1001); Yagaji Isl. (Nakamura 1584, 1585, 1586); Ie Isl. (Nakamura 1616, 1617)

10) **Pteris semipinnata** Linn. in Makino & Nemoto, Fl. Jap. 2nd ed. 108. 1931; H. Ito, Bot. Mag. Tokyo 53:26. 1939; Fil. Jap. Ill. f. 47. 1944; Masamune, Sci. Rep. Kanazawa Univ. 1(2):175. 1951; Ohwi, Fl. Jap. Pterid. 40. 1957; Tagawa, Col. Ill. Jap. Pterid. 58. pl. 16. f. 97. 1959; Shieh, Bot. Mag. Tokyo 79:288. 1966; Sugimoto, Key. Herb. Pl. Jap. Pterid. 169. 1966; Hatusima & Amano, Fl. Okinawa. rev. ed. 7. 1967

Japanese name: *Ooamakusashida*

Specimens examined: Kawata, Higashi-son, Okinawa Isl. (Nakamura 125, 148); Dana, Iheya Isl. (K. Shinjo 702, 760 in his herbarium); about 2 km from Komi Village along the cross road to Inaba, Iriomote Isl. (Nakamura 1438, 1439)

11) **Pteris vittata** Linn. in Ohwi, Fl. Jap. Pterid. 38. 1957; Tagawa, Col. Ill. Jap. Pterid. 57. pl. 16. f. 93. 1959; Shieh, Bot. Mag. Tokyo 79:287. 1966; Sugimoto, Key. Herb. Pl. Jap. Pterid. 169. 1966; Hatusima & Amano, Fl. Okinawa. rev. ed. 7. 1967

*Pteris longifolia* Linn. in Makino & Nemoto, Fl. Jap. 2nd ed. 107. 1931; H. Ito, Bot. Mag. Tokyo 53:26. 1939; Fil. Jap. Ill. f. 39. 1944; Masamune, Sci. Rep. Kanazawa Univ. 1(2):174. 1951

Japanese name: *Moejimashida*

Specimens examined: Shuri, Okinawa Isl. (Nakamura 151); Hedo-ishiyama, Okinawa Isl. (K. Shinjo 2171 in his herbarium)

12) **Pteris wallichiana** Agardh in Makino & Nemoto, Fl. Jap. 2nd ed. 109. 1931; H. Ito, Bot. Mag. Tokyo 53:26. 1939; Fil. Jap. Ill. f. 55. 1944; Masamune, Sci. Rep. Kanazawa Univ. 1(2):175. 1951; Tagawa, Acta Phytotax. Geobot. 16:73. 1956; Col. Ill. Jap. Pterid. 60. pl. 18, f. 104. 1959; Ohwi, Fl. Jap. Pterid. 41. 1957; Shieh, Bot. Mag. Tokyo 79:292. 1966; Sugimoto, Key. Herb. Pl. Jap. Pterid. 199. 1966; Hatusima & Amano, Fl. Okinawa. rev. ed. 7. 1967

Japanese name: *Nachishida*

Specimens examined: Near the summit of the Mt. Nishime dake along the upper stream of the Oku River, Okinawa Isl. (Nakamura 350, 352, 353); along the upper stream of the Genga River, Okinawa Isl. (Nakamura 241, 242)

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