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Author(s)	YOSHIDA, Tadao
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Typification of the taxa described by YENDO in his "Fucaceae"

Tadao YOSHIDA

The specimens of fucalean algae used by YENDO in his "Fucaceae of Japan" are located in the herbaria TI (Faculty of Science, University of Tokyo) and SAPA (Faculty of Agriculture, Hokkaido University). Typification was made concerning 18 taxa described by YENDO. Photographs of the holotype or lectotype of them were given here. But as for *Sargassum setaceum* and *S. assimile* var. *stipulatum*, typification could not be made because no original material was found in both herbaria.

Introduction

In his eminent work entitled "the Fucaceae of Japan" (1907), YENDO described 16 species, 2 varieties and 4 forms as new taxa belonging to the genera *Pelvetia*, *Cystophyllum*, *Coccophora*, *Sargassum* and *Ishige*. The last named genus was later removed from the Fucales to an independent family Ishigeaceae of the Punctariales by OKAMURA (in SEGAWA 1935). YENDO collection concerning to this work is deposited in the herbarium of the University of Tokyo (TI). He also examined many specimens of this group of algae collected by Dr. Kingo MIYABE. These are now included in the herbarium of the Faculty of Agriculture, Hokkaido University (SAPA) after they were identified and annotated by YENDO. As to several taxa, he based on only one specimen, therefore it is accepted to be the holotype. However, he usually wrote "original specimen" on several sheets of specimen of the same taxon, or in some cases there are no designation at all on the specimens he examined. These specimens must be considered as syntypes, because these are cited in the protologue.

In the course of my study on these genera of Japan, it is noticed that the typification of these taxa is necessary to advance the taxonomic knowledge. Some results were already been published (YOSHIDA 1978). Here I would like to determine the lectotype specimens of YENDO's taxa of the Fucaceae (sensu lato).

Typification

Pelvetia wrightii f. japonica YENDO 1907 : 23. *pl. 1, f. 5.*

In the protologue of this forma, following localities were cited : Osatsube, Numajiri, Muroran, Tomakomai, Shari-utoro, Moyoro, Mombetsu, Nemuro, Rubetsu, Hitokappu Bay.

MIYABE collection in SAPA contains the specimens determined by YENDO. These are as follows :

- 1) Numajiri, Prov. Oshima, June 8 1890. TANAKA
Osatsube, Prov. Oshima, Aug. 23 1890. MIYABE & NOZAWA
- 2) Muroran (=Mororan), Ponmoi, Prov. Iburu, Sept. 9 1890. YASUHARA
Mombetsu, Prov. Kitami, July 17 1890. ISHIKAWA
Nemuro, Aug. 4 1884. K. MIYABE
Tomakomai, Prov. Iburu, July 14 1890. YASUHIRO
- 3) Moyoro, Prov. Kitami, May 27 1892. WATANABE
Shari-utoro misaki, Prov. Kitami, July 21 1892. WATANABE
- 4) Muroran, Prov. Iburu, 1890. YASUHIRO
- 5) Nemuro, June 25 1892. TANAKA
- 6) Mombetsu, Prov. Kitami, 1892. WATANABE

The herbarium of Department of Botany, University of Tokyo (TI) contains 2 sheets of specimens from Etorofu Island, Kurile Islands and Nemuro, Hokkaido.

Among them, the specimen 4) from Muroran is thought to be the one from which YENDO illustrated his *pl. 1, f. 5.* It may be safe to select this specimen shown in Fig. 1 as the lectotype of this taxon.

YENDO distinguished this form from the other forms basing on the differences of thickness and breadth of the frond and the characters of vesicle. But judging from the original description and figures given in DAWSON's paper (1959), the emendation of characters of the typical form is not acceptable. It seems that there is no need to distinguish the form *japonica*.

Cystophyllum hakodatense YENDO 1907 : 32. *pl. 2, f. 13-15.*

The following specimens cited in the protologue are deposited both in SAPA and TI :

TI

- 1) Tsugaru Straits, April 1904
- 2) Shirisawabe, Hakodate, April 1898
- 3) Hebi-ura, Prov. Mutsu, April 1903
- 4) Shireto, Prov. Kushiro, May 1897. T. KAWAKAMI
- 5) Hakodate, April 1903
- 6) Rishiri Island, August 1899

SAPA

- 7) Onishika, Prov. Teshio, June 9 1891. M. FUKUSHIMA
- 8) Rumoi, Prov. Teshio, June 3 1891. FUKUSHIMA
Chikubetsu, Prov. Teshio, July 11 1891. FUKUSHIMA
- 9) Tomoshiri, Prov. Nemuro, Sept. 3 1892. TANAKA
- 10) Hakodate, April 1904
- 11) Nemuro, June 25 1892. TANAKA
- 12) Urakawa, Prov. Hidaka, June 1890. FUKUSHIMA
- 13) Muroran, Prov. Iburi, June 21 1890. HIROYASU
- 14) Atsuta, Prov. Ishikari, June 1 1893. K. MIYABE
Takashima, Prov. Shiribeshi, April 25 1888. K. MIYABE
- 15) Rumoi, Prov. Teshio, June 3 1891. S. NOZAWA
Tomakomai, Prov. Iburi, July 14 1890. YASUHIRO
Muroran, Prov. Iburi, June 21 1890. N. YASUHIRO
Zenibako, Prov. Shiribeshi, July 18 1881. S. HORI
- 16) Nemuro, Yezo, April 4 1884. K. MIYABE
- 17) Shikuzushi, Prov. Shiribeshi, May 2 1890. K. MIYABE
- 18) Shoya, Prov. Hidaka, August 5 1890. S. NOZAWA & M. FUKUSHIMA
- 19) Horoizumi, Prov. Hidaka, July 1890. M. FUKUSHIMA
- 20) Yoichi, Prov. Shiribeshi, May 10 1891. S. WATANABE
- 21) Esashi, Prov. Oshima, June 13 1891. TANAKA
- 22) Abashiri, Prov. Kitami, June 17 1892. WATANABE
- 23) Mashike, Prov. Teshio, May 9 1891. FUKUSHIMA
- 24) Cape Raiden, Prov. Shiribeshi, May 11 1891, TANAKA
- 25) Rumoi, Prov. Teshio, June 15 1892. MATSUOKA
- 26) Yamanaka, Prov. Shiribeshi, April 11 1884. K. MIYABE
- 27) Kushiro Harbour, July 23 1894. K. MIYABE
- 28) Abashiri, Prov. Kitami, June 17 1892. WATANABE

Among these syntypes, the specimen 18) represented in Fig. 2 is considered, from a sign marked on the label, to be served as the base of illustration given by YENDO in his pl. 2, f. 15-16, and is safe to be selected as the lectotype. Examination of the receptacle of this specimen revealed that this is a male individual, on the contrary to the explanation of his pl. 2.

Cystophyllum turneri YENDO 1907: 40. pl. 3, f. 7-11.

YENDO cited as synonym the name *Myagropsis turneri* KÜTZING, which is illegitimate because KÜTZING in his first publication (1843, p. 57) did not give any description and cited *Fucus myagroides* TURNER as synonym. Although YENDO treated his *Cystophyllum turneri* as a combination basing on *Myagropsis turneri* KÜTZING, the name *C. turneri* must be considered to be attributed to YENDO, and to be described as new species, as has been done by many authors.

The following specimens cited in the first publication of this name are located in SAPA and TI:

SAPA

- 1) Misaki, Prov. Sagami, April 1906
- 2) Prov. Awa, Y. TANAKA

TI

- 3) Misaki, Prov. Sagami, April 1904
- 4) Misaki, Prov. Sagami, April 1904
- 5) Misaki, Prov. Sagami, April 1905
- 6) Misaki, Prov. Sagami, April 1905
- 7) Jono, Prov. Buzen, S. YANO

Among them, specimens 1), 4), 5) and 6) show clear character of the vesicles disposing in a series with filiform links. It will be appropriate to designate specimen 1) as the lectotype (Fig. 3).

When this taxon is assigned to the genus *Myagropsis*, it must be called *Myagropsis yendoi* as renamed by FENSHOLT (1955), in that the name *M. turneri* is preoccupied.

Cystophyllum caespitosum YENDO 1907: 42. *pl. 3, f. 12-13.*

There is only one specimen of this taxon in TI (Fig. 4). It is a small young individual of 10 cm high, with neither vesicles nor receptacles, and is clearly different from what was used by YENDO in his illustration (*pl. 3, f. 12-13*). As the locality of this specimen was noted as Wakikawa, Prov. Echigo (Niigata Prefecture), this is considered to be one of the syntypes examined by YENDO. Although the specimen used for original illustrations seems to be lost, there is no reason to choose other specimen as neotype for this taxon.

Later this taxon was fully described and illustrated by YAMADA and FUNAHASHI (1963).

Coccophora imperata YENDO 1907: 53. *pl. 4, f. 8-12.*

There are two sheets of specimens from Akita Prefecture without date in TI. They consist the syntypes. One of which represented in Fig. 5 is designated as the lectotype.

OKAMURA and OSHIMA (1933) showed that *C. imperata* was a growth stage of *C. langsdorfi* (TURNER) GREVILLE appearing in August and September.

Sargassum setaceum YENDO 1907: 60. *pl. 7, f. 5-7.*

I could not find out any specimen of this taxon neither in TI nor in SAPA. The syntypes seem to be lost.

Sargassum tosaense YENDO 1907: 69. *pl. 9, f. 1-4.*

In TI, about 20 sheets of specimens without data of collection are placed in the cover of this taxon. These might constitute the syntypes. But it is impossible to determine which was used for the original illustration (pl. 9). From them, one sheet of specimen shown in Fig. 6 is selected as the lectotype. YENDO indicated that the locality of this species was Tosa Prov. (Kochi Prefecture).

Sargassum kashiwajimanum YENDO 1907: 71. *pl. 8, f. 4.*

TI contains one sheet of specimen (Kashiwajima, Tosa Prov., leg. Tomitaro MAKINO). This is upper part of a sterile plant (Fig. 7), and is undoubtedly that used for the illustration by YENDO in his pl. 8, f. 4. Although YENDO did not designate it as type, this specimen must be accepted as the holotype of this taxon.

Sargassum kushimotoense YENDO 1907: 72. *pl. 16, f. 20.*

YENDO mentioned in his protologue two specimens of this taxon. One is deposited in TI (Kushimoto, Kii Prov., March 1902) and is the base of his illustration. This species can be lectotypified by this specimen (Fig. 8). The other is in SAPA.

Sargassum kjellmanianum YENDO 1907: 102. *pl. 15, f. 1-5.*

YOSHIDA (1978, Fig. 1) designated a specimen in SAPA as the lectotype of this taxon. He also showed that this taxon is conspecific with *S. miyabei*, and he proposed that the name *S. miyabei* must be retained for this taxon.

Sargassum kjellmanianum* f. *muticum YENDO 1907: 104.

One specimen in TI collected at Izumo, Kii Prov. (Wakayama Prefecture) was selected as the lectotype (YOSHIDA 1978, Fig. 4). FENSHOLT (1955) recognized this forma as distinct at the specific level, with the name *S. muticum* (YENDO) FENSHOLT, in that this taxon is monoecious and with discoid holdfast and has spherical vesicles with mucronated apices.

Sargassum miyabei YENDO 1907: 112. *pl. 14, f. 13-14.*

As in the cases of the two taxa mentioned above, YOSHIDA (1978, Fig. 3) designated as the lectotype a specimen in SAPA collected at Cape Soya, Prov. Kitami (July 18 1892, leg. FUKUSHIMA). This is a part of a female individual without a basal part. Examination of syntype specimens confirmed that this species is dioecious and with peculiar fibrous holdfast, shown previously by YAMADA (1944).

Sargassum thunbergii* f. *latifolia YENDO 1907: 115.

There are several specimens of this taxon in TI and SAPA. These

are as follows :

TI

- 1) Strait Tsugaru, April 1903

SAPA

- 2) Chishiya, Aniwa Bay, Saghalin, June 12 1906. K. NAKAMURA
Shoya, Prov. Hidaka, August 17 1892. E. TOKUBUCHI
- 3) Shari-Utoro, Prov. Kitami, July 21 1892. WATANABE

On the label of the specimen 1), YENDO wrote "specimen typicum". Therefore, this must be regarded as the holotype of this taxon (Fig. 9).

Sargassum thunbergii f. nipponicum YENDO 1907: 115. *pl. 15, f. 5.*

Although YENDO cited many localities in his protologue, only two sheets of specimens, one in TI and another in SAPA, are located. On the latter sheet, 3 individuals are mounted. One on the left has such collection data as "Zenikame-zawa, Prov. Oshima, August 25 1890". The other 2 individuals are labeled as "Shitsukari, Prov. Ihuri, August 17 1890, leg. K. MIYABE". The former in TI (Fig. 10) was collected at "Tachimachi, Hakodate, July 27 1899". On the label of this sheet, YENDO wrote "Type specimen". Therefore, this specimen must be recognized as the holotype of this taxon.

Sargassum kiushianum YENDO 1907: 121. *pl. 15, f. 6-9.*

In TI, only one sheet of specimen is located, and it is concluded that this is the holotype of this taxon. This specimen represented in Fig. 11 is a distal part of a branch with receptacles about 30 cm long, collected by YANO from Jono, Prov. Buzen (Fukuoka Prefecture).

Sargassum micracanthum var. stipulatum YENDO 1907: 125.

As mentioned by YENDO, this taxon is based on *S. micracanthum* sensu J. AGARDH (1897, p. 52, non KÜTZING), the type must be that in AGARDH herbarium, collected by KJELLMAN from Japan (exact locality was not given).

Sargassum nigrifolium YENDO 1907: 127. *pl. 16, f. 1-3.*

Four sheets of specimens were deposited in TI. These are as follows :

- 1) Kisami, Prov. Izu, March 29 1899
- 2) Kisami, Prov. Izu, March 1899
- 3) Misaki, Prov. Sagami, August 1906
- 4) Prov. Nagato

The locality mentioned in the protologue indicates Iwami Prov. instead of Nagato Prov., but there is no specimen in TI collected from Iwami Prov. The specimens 1) and 2) might be duplicates. The specimen 1), a young sterile individual of about 13 cm high, seems to be the base of pl. 16, f. 1,

and it is certain that pl. 16, f. 2, 3 were drawn from the specimen 3), which is mature branch without basal parts about 60 cm long. For the purpose of typification, the specimen 3) might be better (Fig. 12).

Sargassum assimile* var. *stipulatum YENDO 1907: 143. *pl. 17, f. 2-3.*

I could not find out any specimen concerning to this taxon.

Sargassum sagamianum YENDO 1907: 151. *pl. 17, f. 6-10.*

While YENDO indicated as localities of this taxon, Sagami, Shima and Hiuga Provinces, only one specimen (Oosashi, Prov. Shima, February 2 —) is deposited in TI. This specimen seems to be used for original illustration of YENDO (pl. 17, f. 6-10), and is designated as the lectotype (Fig. 13).

Sargassum nipponicum YENDO 1907: 153. *pl. 17, f. 11-16.*

There are two sheets of specimens indicated both as "specimen original" by YENDO's hand are preserved in TI. These are considered to be syntypes.

- 1) Oshima, Prov. Kii, March 1902
- 2) Takamatsu, Prov. Hiuga, July 1900

The former is up to 50 cm high sterile individual, and the latter contains 2 individuals with receptacles on one sheet. The latter is here designated as the lectotype (Fig. 14).

Acknowledgements

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Fig. 1. Lectotype of *Pelvetia wrightii* f. *japonica* YENDO. Muroran, Prov. Iburi, Hokkaido. 1890. leg. HIROYASU (SAPA).

1



Fig. 2. Lectotype of *Cystophyllum hakodatense* YENDO. Shoya, Prov. Hidaka, Hokkaido. Aug. 5 1890. leg. S. NOZAWA and M. FUKUSHIMA (SAPA).

2

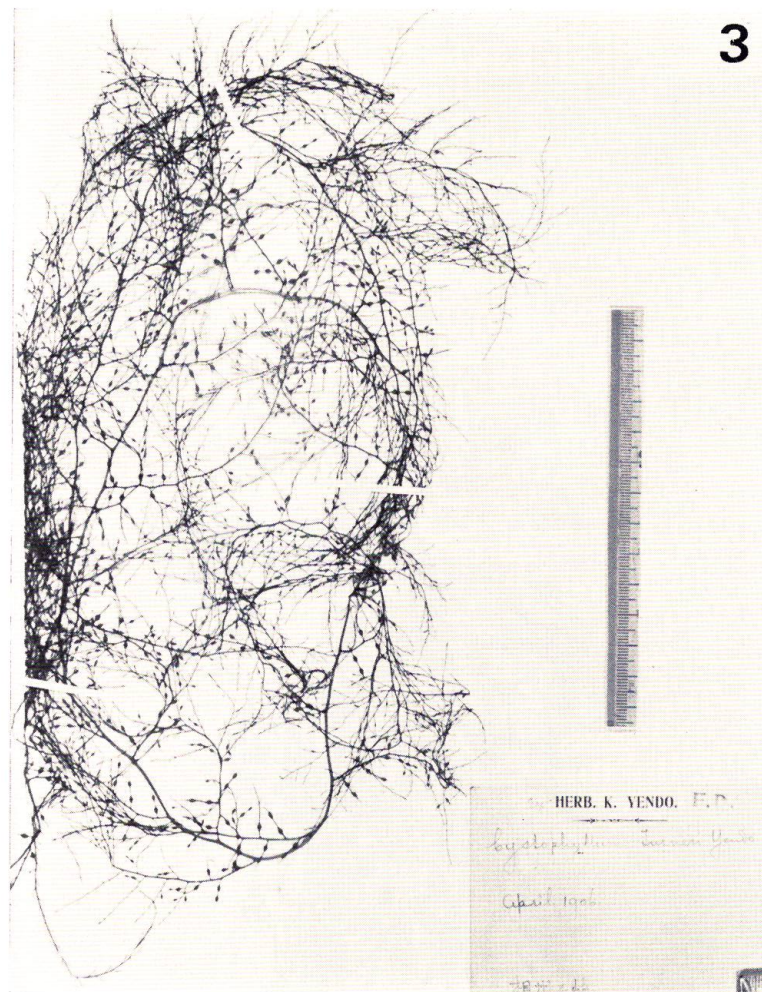


Fig. 3. Lectotype of *Cystophyllum turneri* YENDO. Misaki, Prov. Sagami, Kanagawa Prefecture. April 1906 (SAPA).

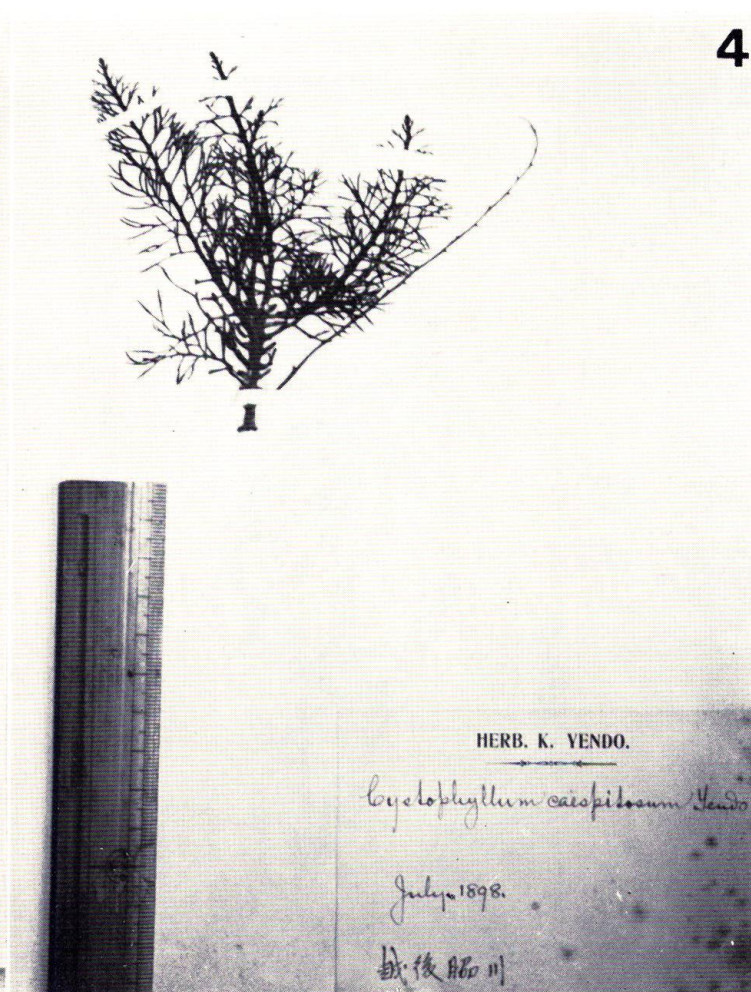


Fig. 4. Lectotype of *Cystophyllum caespitosum* YENDO, Wakikawa, Prov. Echigo, Niigata Prefecture. July 1898 (TI).



Fig. 6. Lectotype of *Sargassum tosaense* YENDO (TI).

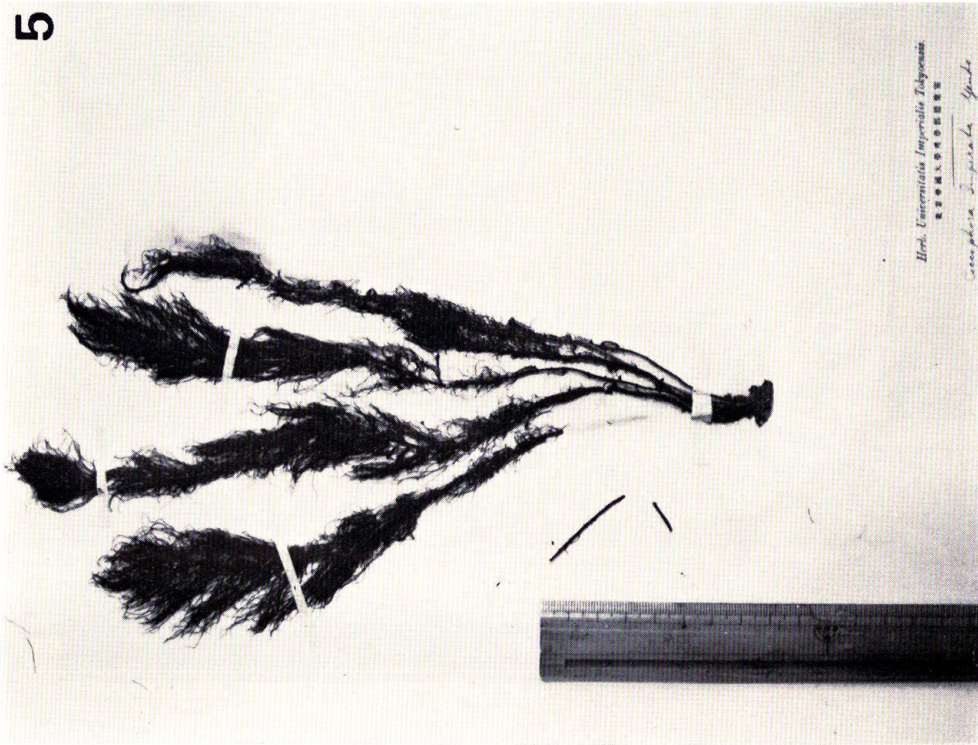


Fig. 5. Lectotype of *Coccophora imperata* YENDO, Akita Prefecture (TI).



Fig. 7. Holotype of *Sargassum kashiwajimanum* YENDO. Kashiwa-jima, Prov. Tosa, Kochi Prefecture. leg. T. MAKINO (TI).

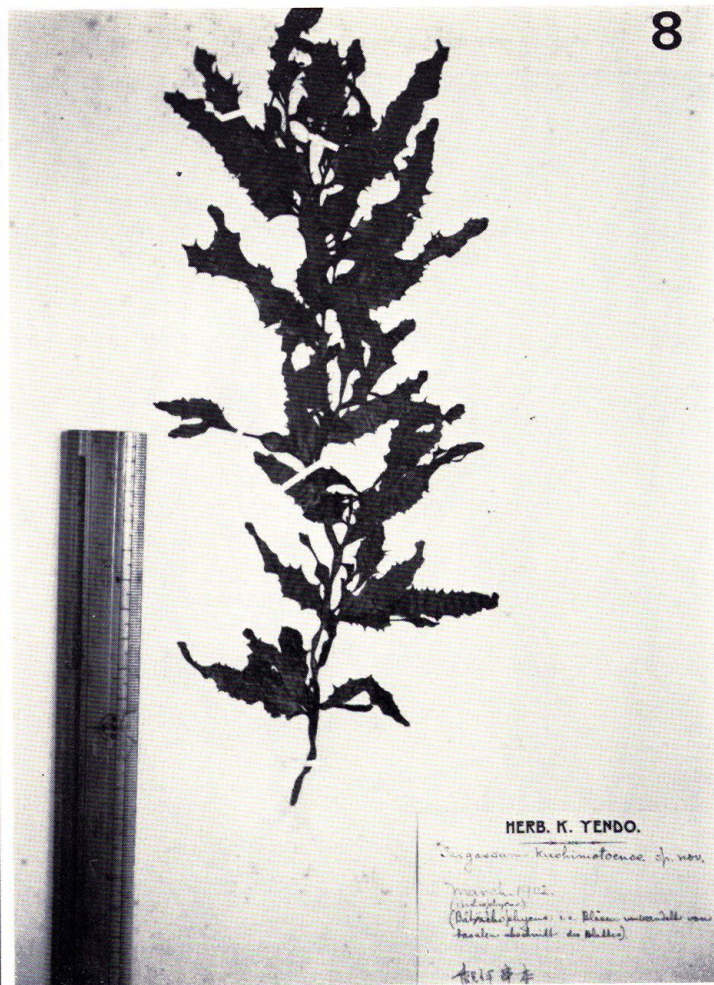


Fig. 8. Lectotype of *Sargassum kushimotoense* YENDO. Kushimoto, Prov. Kii, Wakayama Prefecture. March 1902 (TI).

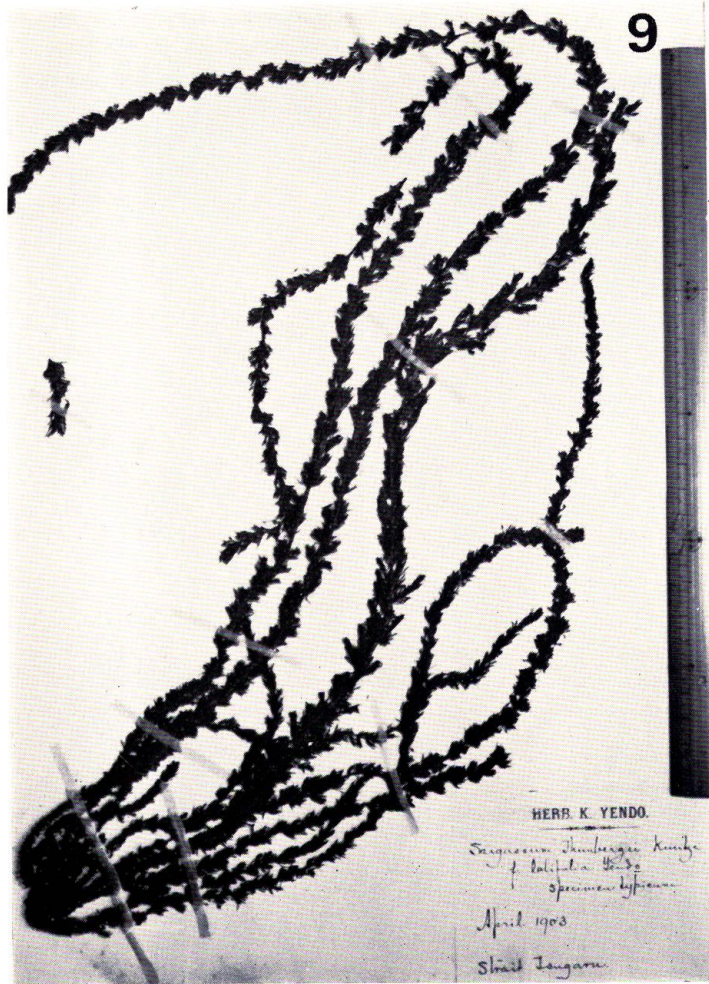


Fig. 9. Holotype of *Sargassum thunbergii* f. *latifolia* YENDO. Strait Tsugaru, between Honshu and Hokkaido. April 1903 (TI).

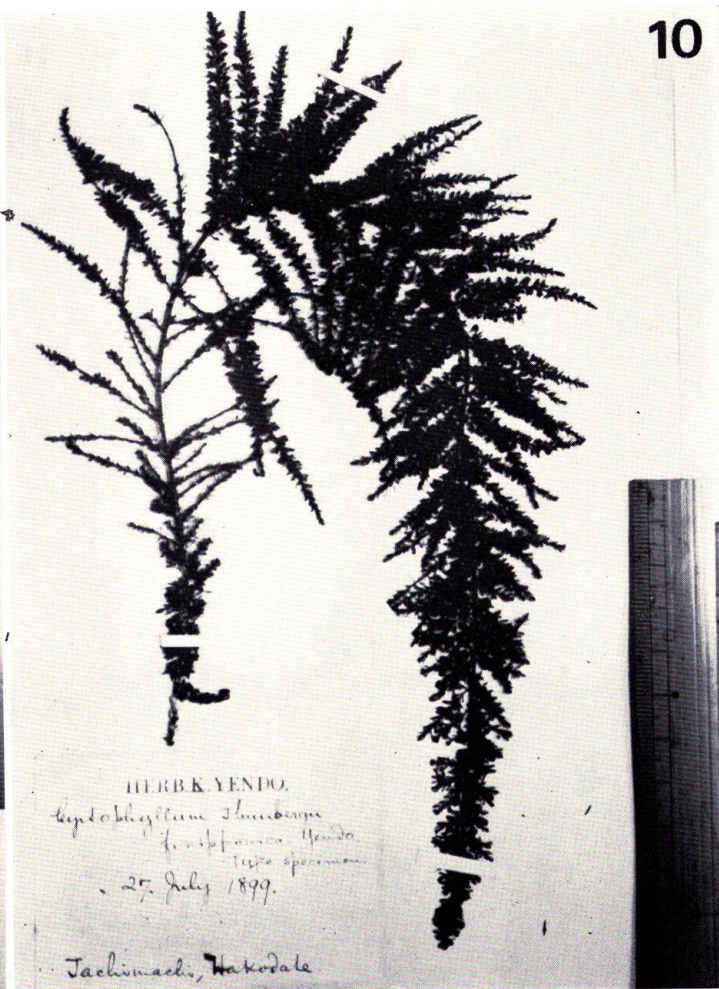


Fig. 10. Holotype of *Sargassum thunbergii* f. *nipponica* YENDO. Tachimachi, Hakodate, Prov. Oshima, Hokkaido. July 27 1899 (TI).

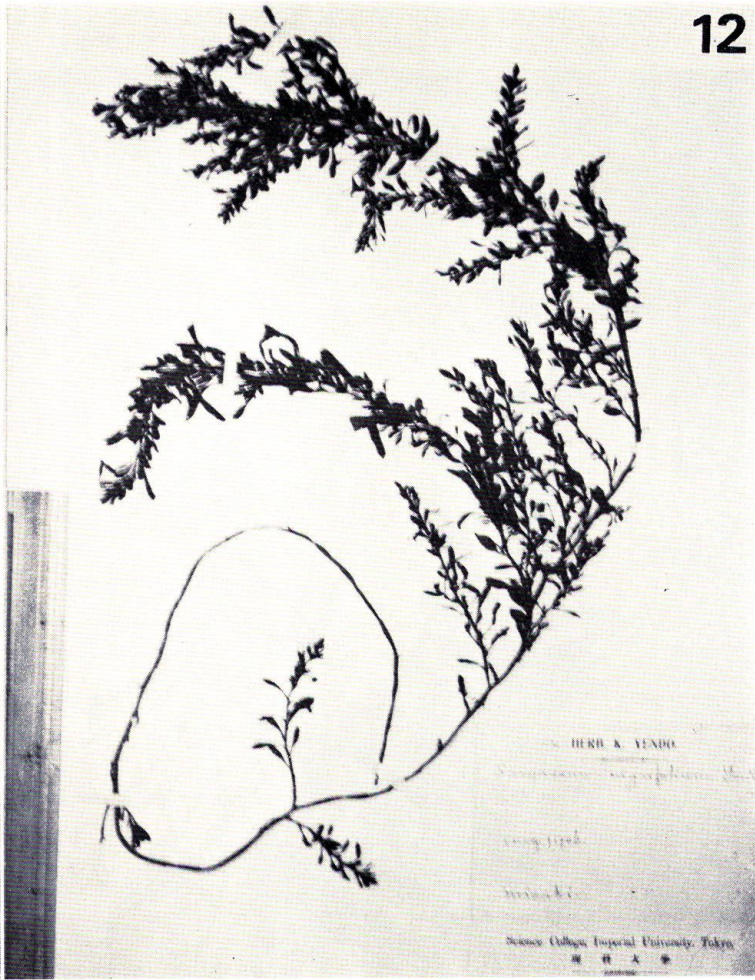
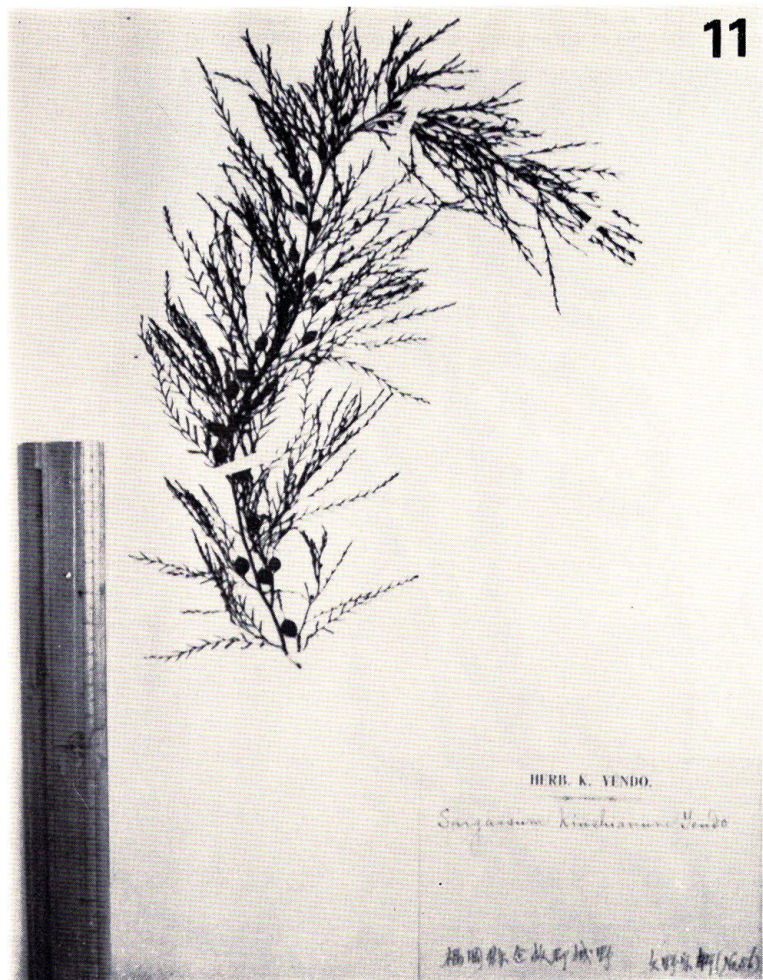


Fig. 11. Holotype of *Sargassum kiushianum* YENDO. Jono, Prov. Buzen, Fukuoka Prefecture. leg. S. YANO (TI).

Fig. 12. Lectotype of *Sargassum nigrifolium* YENDO. Misaki, Prov. Sagami, Kanagawa Prefecture. Aug. 1906 (TI).



Fig. 13. Lectotype of *Sargassum sagamianum* YENDO. Oosashi, Prov. Shima, Mie Prefecture (TI).

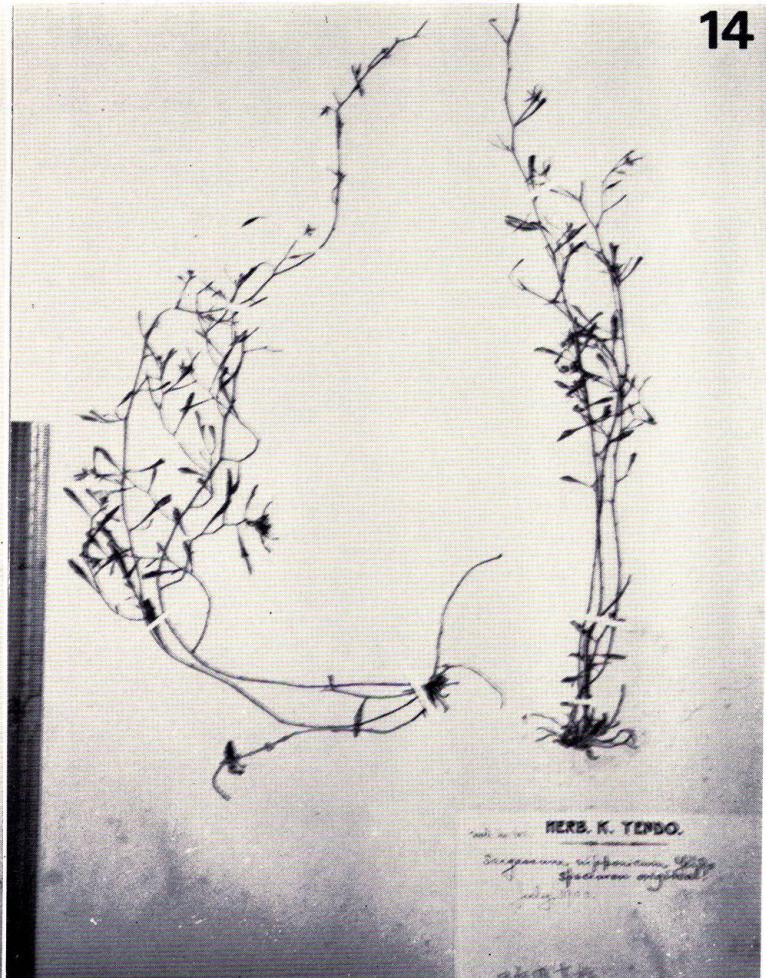


Fig. 14. Lectotype of *Sargassum nipponicum* YENDO. Takamatsu, Prov. Hiuga, Miyazaki Prefecture. July 1900 (TI).