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# ON THE WILD CHRYSANTHEMUM OF NORTH JAPAN.

BY

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(With Plate I)

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## 本邦北部野生菊屬に就きて

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Prior to the publication of the Flora of Saghalien by Miyabe and Miyake<sup>1)</sup> in 1915, the only known species of *Chrysanthemum* growing wild in North Japan, including Saghalien, Kurile Islands, Yezo and north-eastern part of Honshiu was *Chrysanthemum arcticum* L.

In the work above mentioned, *Chrysanthemum Gmelini* (Ledeb.) Miyabe and *Chrysanthemum Weyrichii* Miyabe et Miyake were added. For many years I have noticed the fact, that the *Chrysanthemums* from different localities in Hokkaidô and north-eastern part of Honshiu differ from one another more or less, and also that their seedlings are very variable displaying at the same time conspicuous distinct characters peculiar to each type. By careful observations on the living specimens of these plants both at their native habitats and under their cultivated conditions in the Botanic Garden, and also on the dried specimens in the Herbarium of the Hokkaidô Imperial University, I have reached, at last, to the conclusion which I am going to try to set forth in the present paper.

As early as 1740, Gmelin<sup>2)</sup> described and figured a *Chrysanthemum* from Kamtschatka under the name "*Pyrethrum foliis longe petiolatis, palmatis, supra dilatatis, ultimis trilobis.*" It has been, however, the source

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1) Flora of Saghalien. 1915, p. 250-251.

2) Gmelin, Fl. Sib., Vol. II, p. 203, t. 84.

of much confusion. Ledebour,<sup>1)</sup> at first, had a very wide collective conception of the species including his Siberian specimens under *Chrysanthemum arcticum* L. But De Candolle<sup>2)</sup> considered the Siberian plant as a new species and described it under the name of *Leucanthemum sibiricum* DC., clearly distinguishing it from *Leucanthemum arcticum* DC. of the Kamtschatcan type. This correction is very reasonable from every point of view. But on the other hand his judgment in regard to their distinctive characters are not entirely correct. First, he pointed out as a differential character the ramous stem of the *Sibiricum* type and the simple one of the *arcticum* type. This seems to me, by no means, to be always constant. Because I find one Kamtschatcan specimen in the Herbarium of our University clearly showing an axilar flower bud, while its leaf characters and other points are exactly of the *arcticum* type. Moreover this is supported by the facts that in their native habitat, we find in the plant of the *arcticum* type both simple and branched forms growing mixed together, and that when these simple stemmed forms were brought under cultivation, they became extremely ramous the next year. This plainly shows that the ramous and simple character of the stem is the result of the nutritive or some other secondary influences. Secondly it seems to be erroneous in that he considered the Gmelin's Kamtschatcan plant as identical to his *Leucanthemum sibiricum*. As has been shown by the subsequent authorities, especially, Torrey and Gray,<sup>3)</sup> Herder<sup>4)</sup> and Miyabe,<sup>5)</sup> *Leucanthemum sibiricum* DC. is an inland plant, while *L. arcticum* DC. is a littoral one. This latter fact corresponds very well to the thick and shining characters of leaves. For this reason it is very questionable to call the Kamtschatcan plant of Gmelin as *Leucanthemum sibiricum* DC., although they have some resemblance to each other, especially on the point of the branching habit of the stem. Besides these two points discussed above, there are also good distinctive characters between them as have clearly been pointed out by De Candolle, *i.e.*, pinnatiparted radical and lower stem leaves and oblong involu-

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- 1) Ledebour, Fl. Art., Vol. IV., p. 105.
  - 2) De Candolle, Prodr. VI., 45.
  - 3) Torrey et Gray, Fl. N. Am., Vol. II., p. 142.
  - 4) Herder, Pl. Radd. Monop. Bd. III., Heft I., p. 48.
  - 5) Miyabe, Fl. Kurile Is. p. 242.

clar scales of the *sibiricum* type in contrast to the cuneate incised leaves and oval involuclar scales of the *arcticum* type. Ledebour<sup>1)</sup> was the first to recognize two species in the arctic littoral regions, distinguishing *Leucanthemum Gmelini* Lebeb. from *Leucanthemum arcticum* DC. The distinctive characters of the former compared with those of the latter are the ramous stem, pinnatiparted lower leaves and narrower scarious black margin of involuclar scales.

Among the specimens from the high northern littoral regions, there are different forms of *Chrysanthemum arcticum*,<sup>2)</sup> i.e., those with the radical leaves 3-7 dentated or subtrilobed, or subpinnatifid and so on. As to the interpretation of these forms and to the identification of the Gmelin's plant to one of them, there remain naturally several possibilities according to the different points of view. Trautvetter paid no special attention to the existing different types and included them collectively under *Leucanthemum arcticum* DC.,<sup>3)</sup> and he also placed the Gmelin's plant in this group. But judging from his descriptions he seems to have had no pinnatiparted form described by Ledebour, which he had separated from the *arcticum* type. Maximowicz<sup>4)</sup> suggested that the *Leucanthemum Gmelini* of Ledebour may be a variety of *Leucanthemum arcticum* DC., although he had treated it as synonymous.<sup>5)</sup> Herder<sup>6)</sup> like Trautvetter recognised no distinction between these two types. Schmidt<sup>7)</sup> thought that one of his Saghalien specimens was identical to the Gmelin's plant but he treated it as synonymous to *Leucanthemum arcticum* for reason that he could find no good distinction. This probably resulted from the little attention he gave to the character of the leaf and involuclar scales, for I can see clearly the existence of those characters observed by Ledebour and pointed out in Miyabe and Miyake's Saghalien Flora. Lastly Miyabe<sup>8)</sup> distinguished *Chrysanthemum arcticum* L. and *Chrysanthemum*

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1) Ledebour, Fl. Ros., Vol. II., p. 541.

2) Trautv. et Mey., Fl. Och., p. 156.

3) Trautv. et Mey., l. c., p. 155.

4) Maximowicz, Prim. Fl. Amur. p. 156.

5) l. c., p. 155.

6) l. c., p. 48.

7) Schmidt, Fl. Sach., 1868, p. 250.

8) Miyabe, Flora of Saghalien, 1915, p. 250.

This name was once used by Turczaninow. (Cat. Balk. Nr. 606). But as it is impossible to think to find this Kamtschatkan plant in the district of Baical, we may pass it over.

*Gmelini* (Ledeb.) Miyabe distinctly in the materials from Saghalien and the west coast of Hokkaido. I may here add briefly the result of experiments with the Hokkaido plants which show clearly the fact that the general shape of the leaves remained constant within a certain limit of mould, so that no one can expect from the stock having cuneate pinnatilobed leaves, subcuneate pinnatifid fan-shaped leaves the next year.

Let us now turn our attention to our Hokkaido flora. Miquel<sup>1)</sup> said that his Yezo specimen, though he identified it as *Leucanthemum arcticum* DC., may rather rationally be transferred to *Leucanthemum Gmelini* Ledeb., as the incisions of the leaves are deeper than in the case of the Amur specimens of *Leucanthemum arcticum*. Franchet and Savatier<sup>2)</sup> called Maximowicz's Hakodate specimen *L. arcticum* DC., which, we learn from the note of Miyabe's<sup>3)</sup> "The Flora of Kurile Islands," that this form is not quite the same as his Kurile specimens.

In the preceding paragraphs I have made a hasty review of some prominent literature on the subject and I have come to the conclusion: (1) in the arctic littoral regions *Chrysanthemum arcticum* L. and *Ch. Gmelini* (Ledeb.) Miyabe are distinguishable, while *Ch. sibiricum* Fisch. is an inland plant: (2) the forms of radical leaves and of involuclar scales are the primary important distinctive characters while other characters are of secondary importance: (3) most of the Yezo and Honshiu forms may be different from those of Kamtschatka.

### 1. *Chrysanthemum yezoense* Maekawa. sp. nov. (Pl. I figs. 5-13.)

*Leucanthemum arcticum* Miq., Prol. Fl. Jap. p. 166 (non DC.). *Chrysanthemum arcticum* Fr. et Sav., Enum. Pl. Jap. Vol. I., p. 234. (non L.)

Caulis plerumque ascendens, striatus, ramosus, glaber. Folia glabra, basi cuneata, sub-cuneata vel late sub-cuneata; radicalia et caulina inferiora longe petiolata; lamina pinnatifida vel pinnatilobata, lobis plus-minus inciso-

1) Miquel, Prol. Fl. Jap. p. 106.

2) Franchet et Savatier, Enum. Plant. Vol. I., p. 234.

3) Miyabe, l. c., p. 242.

dentatis, dentibus apice obtusis, acutis vel cuspidatis; caulina media petiolata, stipulata vel stipulis defecta, trifida vel multifida, petiolis lateribus lobulis linearibus praeditis vel nudis; superiora stipulata vel exstipulata; summa oblonga, trifida, serrato-marginata, vel ligularia. Involucrorum squamae exteriorae lineari-oblongae, apice acuminatae, sursum dilatatae, partis dilatatis obovatis membranaceis fusco-marginatis.

**var. typicum** Maekawa. var. nov. (Figs. 8-10.)

Folia basi cuneata; radicalia et caulina inferiora late ovate vel elliptica; caulina media et superiora exstipulata, petiolis lobulos laterales deficientibus.

NOM. JAP. *Kohama-giku*.

HAB. *Yezo*. Prov. Nemuro: Katsuramui (Maekawa!).—Prov. Tokachi (Nakamura!).—Prov. Hidaka: Samani (Nishida!; Nozawa!); Horoizumi (Tokubuchi!); Shoya (Tokubuchi!); Sakupai (Tokubuchi!); Urakawa (Tanouchi!).—Prov. Oshima: Hakodate (Greatrex!; Nishida!); Shiokubi (Sugiyama!).

*Honshiu*. Prov. Aomori: Samé, near Hachinohe (Maekawa!).

**var. stipulatum** Maekawa. var. nov. (Figs. 5-7).

Folia media et superiora stipulata. Cetera ut typo.

NOM. JAP.

HAB. *Yezo*. Prov. Oshima: Hakodate (Nishida!).

*Honshu*. Prov. Aomori: Samé (Maekawa!).

**var. lobulifolium** Maekawa. var. nov. (Figs. 11-13.)

Folia basi subcuneata vel late subcuneata; radicalia et caulina inferiora flabelliformia; lamis 5-fidis, lobulis multe obtuso- vel cuspidato-dentatis; media et superiora ad petiolos lobulis lateralibus praedita.

NOM. JAP. *Hireha-no-Kohamagiku*.

HAB. *Honshu*. Prov. Aomori: Samé (Maekawa!).

**2. Chrysanthemum arcticum** L. Sp. Pl. ed. 2. p. 889; A. Gray, Syn. Fl. North Am. I. p. 365; Miyabe, Fl. Kuril. p. 242; Koidz., Bot. Mag. Tokyo, XXV. p. 221; Miyabe and Miyake, Fl. Sagh. p. 251; Britt. et Br., Ill. Fl. N. St. Can. III. p. 457.

*Leucanthemum arcticum* DC. Prodr. IV. p. 45; Ledeb. Fl. Ross. II. p.

541; Trautv. et Mey. Fl. Ocht. p. 179; Maxim., Prim. Fl. Amur. p. 155; Herd., Pl. Radd. Monop. Bd. III. Heft. I., p. 47.

NOM. JAP. *Chishima-kohamagiku*.

HAB. *Kamtschatka*. Oxernoi (Yokoyama!); Opara (Igari!); Baroness Korf Bay (Yokoyama!).

*North-eastern Siberia*. Anadyr (Yokoyama!).

*Behring Sea Regions*. St. Lorenz Bay (Yokoyama!); Behring Island (Yokoyama!).

*Saghalien*. Shikka-District: Shikka (Miyake!).

*Kuriles*. Shimushu (Ishikawa!).

**var. yezoense** Maekawa. var. nov. (Figs. 1-4.)

Glabrum vel glabriusculum. Caulis ramosus vel simplex. Folia basi sub-cuneata vel late subcuneata; radicalia et caulina inferiora flabelliformia, trifida, lobis plus-minus incisodentatis, dentibus truncato-rotundatis vel obtusiusculis; media elliptica, 3-5-lobata, lobis plus-minus dentatis acutis; superiora ligulariformia, margine integra. Involucrorum squamae ellipticae vel ovatae, fusco-scarioso-marginatae.

NOM. JAP. *Ōba-chishima-kohamagiku*.

HAB. *Saghalien*. ~~Odmani~~-District: Soriofka (Faurie!).

*Kuriles*. Urup (Ritahara!)—Etorofu (Kambe!; Ishikawa!; Tanaka and Miyabe, Jr.!; Kitahara!).—Kunashiri (Yendo!).

*Yezo*. Prov. Nemuro: Katsuramui (Miyabe!; Maekawa!); Hanasaki (Maekawa!).

Along the coast of Nemuro we see this variety and *Ch. yezoense* growing in groups here and there. On the 12th. of August 1919, I visited the place just at the flowering time of this variety, while *Ch. yezoense* was still in leaves. This difference in the flowering season, the latter blooming about one month later, as has been pointed out by Miyabe, constitutes a good difference between them. It is an interesting fact that this district is the most northern limit of *Ch. yezoense*, and probably at the same time the southernmost limit of the *var. yezoense* of *Ch. arcticum*. It is also noteworthy that the leaves of *Ch. yezoense* are very highly scented while those of *Ch. arcticum* are almost scentless.

3. **Chrysanthemum Gmelini** (Ledeb.) Miyabe, in Miyabe and Miyake, Fl. Saghal. p. 251.

*Leucanthemum Gmelini* Ledeb., Fl. Ros. Vol. II. p. 541; Schmidt, Fl. Sach. p. 250.

NOM. JAP. *Aki-no-kohamagiku*.

HAB. *Saghalien*. Northern Saghalien: Alexandrovski (Takeo!).—Sikka-District: Jimutaki (Miyabe and Miyagi!). Odomari-District: Solewi-yofuka (Miyabe and Miyagi!; Faurie!; Miyake!).

*Kuriles*. Etorofu (Kambe!; Miura!; Miyabe Jr. and Tanaka. Yokoyama!).—Paramushir (Takeo!).

4. **Chrysanthemum littorale** Maekawa. sp. nov. (Figs. 14-22.)

Planta maritima. Caulis in speciminibus rupestribus plerumque brevis ca. 10 cm altus, in speciminibus arvensibus elongatus, ultra pedalis, erectus, simplex vel ramosus, glaber. Folia basi subcuneata; radicalia et caulina inferiora pinnatipartita, pinnis remotis, ambitu late ovatis, inciso-pinnatifidis, lobulis apice acutis; caulina media stipulata, pinnatipartita, pinnis incisus vel integris, stipulis acerosis; superiora stipulata, ligulariformia, trifida vel indivisa. Involucrorum squamae externae herbaceae, lineari-subulatae, apice dilatatae, fusco-scarioso-marginatae.

NOM. JAP. *Yezo-no-sonare-giku*.

HAB. *Yezo*. Prov. Shiribeshi: Yoichi (Yamamoto!); Oshoro (Maekawa!); Shikuzushi (Miyabe!; Arimoto!; Maekawa!).

This plant seems to have a very limited distribution, namely, Akaiwa, Oshoro, Ranshima, and Yoichi in the province of Shiribeshi. The distinction from *Ch. yezoense* type is observed even in a very early stage. In the form of cotyledons and of succeeding small infantile leaves, we can see the impression of their specific leaf character. In the above diagnosis I have described the stem leaves as stipulated. But we meet very often stipuleless form in nature. One may very well treat them as a distinct form. In my field experiments, however, all of the cultured specimens, about 1500 in number raised in three successive years, carried stipules without exception. I think wild stipuleless forms are not destitute of them, but probably have shed them or have their development suppressed in a very early stage.



5. **Chrysanthemum Weyrichii** Miyabe et Miyake. Fl. Sagh. p. 251.  
*Leucanthemum Weyrichii* Maxim. Prim. Fl. Amur. p. 397; Schm. Fl.  
Sach. p. 147.

NOM. JAP. *Pireogiku*.

HAB. *Saghalien*. Northern Saghalien: Alexandrovski (Takeo!).—  
Sikka-District: Solenuiya (Miyabe and Miyagi!).—Odomari-District: Solewi-  
yohuka (Miyabe and Miyagi!).

*Kuriles*. Shumshu (Ishikawa!).—Paramoshir (Tarao!).—Etorofu (Yoko-  
yama!; Tanaka and Miyabe Jr. !; Kambe!).

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**Explanations of the Figures.**

Fig. 1. *Chrysanthemum arcticum* L. var. *yezoense* Maekawa ( $\times 2/3$ ). Fig. 2. Involucre. Fig. 3. a -b. Radical leaves. Fig. 4. Seedling.

Fig. 5. *Chrysanthemum yezoense* Maekawa var. *stipulatum* Maekawa ( $\times 2/3$ ). Fig. 6. Involucre. Fig. 7. a-b. Stipulated superior stem leaves ( $\times 2/3$ ). Fig. 8. a-b. Astipulated superior stem leaves of var. *typicum* Maekawa ( $\times 2/3$ ). Fig. 9. *Ditto*, a. lower stem leaf ( $\times 2/3$ ); b. radical leaf ( $\times 2/3$ ). Fig. 10. *Ditto*, seedling. Fig. 11. a-b. Radical leaves of var. *lobulifolium* ( $\times 1/2$ ). Fig. 12. a-c. *Ditto*, stem leaves ( $\times 1/2$ ). Fig. 13. *Ditto*, superior stem leaves ( $\times 1/2$ ).

Fig. 14. *Chrysanthemum littorale* Maekawa ( $\times 2/3$ ). Fig. 15. Involucre. Fig. 16. a-c. Radical leaves ( $\times 1/2$ ). Fig. 17. a-b. Stem leaves ( $\times 1/2$ ). Fig. 18. a-c. Superior stem leaves ( $\times 1/2$ ). Fig. 19. Seedling. Fig. 20. Ray flower ( $\times 2$ ). Fig. 21. a-b. Disk flower. Fig. 22. Pistil ( $\times 2$ ).

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## 摘 要

樺太。北海道。本州東北部に産する菊屬植物は、從來 *Chrysanthemum arcticum* L. 和名こはまぎくと *Chrysanthemum Gmelini* (Ledeb.) Miyabe. 和名あきのこはまぎくと *Chrysanthemum Weyrichii* Miyabe et Miyake. 和名ひれをぎくの三種を記録せられたり。この中、ひれをぎくは樺太に産し、あきのこはまぎくは、樺太及北海道の一部に産し、こはまぎくはペーリング、カムチャツカの地方より本邦領域内に入りては、千島より樺太北海道を経て青森縣に至るまで、凡て同一種のものゝを産する事を知られたり。

著者は、從來こはまぎくと稱せられたるものの中、葉の形状、托葉の有無、總苞の形状、毛茸の存否等によりて、明瞭に種類の區別存在するを認識し、尙之を培養に徴せしに、其結果も亦是等諸點は明瞭に各特徴を維持し、區別の相紛叫するの慮なき事を憊めたるを以て、次の如き種類及變種を認む可きものとせり。

*Chrysanthemum arcticum* L. 和名。ちしまこはまぎく。産地。北千島、樺太東海岸。

*Chrysanthemum arcticum* L. var. *yezoense* Maekawa. 和名。おほぼちしまこはまぎく。産地。南千島、北海道本島北部。

*Chrysanthemum yezoense* Maekawa var. *typicum* Maekawa. 和名。こはまぎく。産地。北海道本島北部、太平洋沿岸。

*Chrysanthemum yezoense* Maekawa var. *stipulatum* Maekawa. 和名。産地。北海道本島太平洋沿岸、本州東北部、太平洋沿岸。

*Chrysanthemum yezoense* Maekawa var. *lobulifolium* Maekawa. 和名。ひれはのこはまぎく。産地。本州東北部、太平洋沿岸。

*Chrysanthemum Gmelini* (Ledeb.) Miyabe. 和名。あきのこはまぎく。産地。樺太。

*Chrysanthemum littorale* Maekawa. 和名。えぞのそなれぎく。産地。北海道後志國沿岸。

*Chrysanthemum Weyrichii* Miyabe et Miyake. 和名。ひれをぎく。産地。樺太。

以上の諸種を、其産地と對比して考察する時は、北より南に移るに伴ひて變化せる興味ある分布上の事實を認むる事を得べし。



C. Suzaki, del.