A Note on *Mitella stylosa* and Allied Species (Saxifragaceae)*

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*Mitella stylosa* was first described by Boissieu in 1897 based on the specimens collected by Faurie (no. 7786, April 29, 1892) at the foot of Mt. Ibuki-yama. Later, *M. leioptala* was described by Ohwi and Okuyama (1953) as having linear, eglandular petals and papillose seeds, and it has since been noted that petals with 2 to 3 divisions as well as linear ones are frequently observed, even in the same flower (Fukukoka, 1965), and that glandular and eglandular petals are found in the same population (Wakabayashi, 1973).

Recently I had a chance to examine the type materials of *M. stylosa* sent on loan from Muséum National d'Histoire Naturelle, Paris (P) and Conservatoire et Jardin botaniques, Genève (G). The characteristics found in *M. leioptala* are the same as those of *M. stylosa*. Thus, *M. leioptala* is here treated as a synonym of *M. stylosa*.

Among Japanese *Mitella*, *M. leioptala* was considered to be allied to *M. stylosa* (=*M. stylosa* auct. non Boiss. sens. Ohwi) (Fukukoka, 1965); to *M. makinoi* and *M. leioptala* (Ohwi and Okuyama, 1953); and to *M. makinoi*, *M. stylosa* and *M. furusei* (Wakabayashi, 1973).

Reexamining the variation in these species, I have intended to make the appropriate circumscription of them in this paper.

In addition to the type materials in P and G, I examined the specimens preserved in Kyoto University (KYO), Makino Herbarium (MAK), University of Tokyo (TI) and National Science Museum, Tokyo (TNS). Floral materials fixed in alcohol, which were collected at the various localities, were also used for this study.

I wish to show my sincere gratitude to the directors and curators of the herbaria mentioned above, and to Dr. K. Iwatsuki, Dr. H. Koyama and Mr. G. Murata for their kind advice as to writing this paper. My cordial thanks are due to the staff mem-

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bers of Makino Herbarium for their various support. The late Dr. J. Ohwi was very kind to discuss several aspects of this study with me, and I show here my best thanks to him. I am also thankful to Mr. D. E. Boufford for his linguistic check.

Type specimens of Mitella stylosa in P and G  The specimen, FAURIE no. 7786, from P (Fig. 1) has flowers with petals which are eglandular and linear, often two or three times divided, with calyces having entire margins and with rather long styles. The specimen from G has similar calyces and styles, but the petals are glandular and divided three times, and the seeds are papillose. Seeds are absent in the P specimen. Boissey's description "...petalis, saepius integris, interdum basi tripartitis,..." coincides with the feature of the petals in the P specimen. Thus, I propose to designate the specimen kept in P as the lectotype.

Variation in M. stylosa and M. makinoi  M. leiopetala and M. makinoi have been reported to be distinguishable from each other by the former having petals 1- to 3-divided (rarely apetalous), leaves obtuse to subacute and the margins of the calyx lobes entire; in the latter the petals are 5-divided, the leaves acute and the margins of the calyx lobes glandular-papillose. I have reexamined the variation within these characters.

In M. stylosa, 4- to 5-divided petals are rarely observed in plants which have petals predominantly 3-divided. Examples include specimens collected from the vicinity of Mt. Kanakuso (N. Fukuoka & Y. Inamasu 90, 29, KYO, G. Murata 8618, KYO) and Ojigahata (G. Murata et N. Fukuoka 41, KYO) in Pref. Shiga (Fig. 2, B). Two additional (6-7th) divisions are also rarely observed as vestiges in the petals from Ojigahata, as shown also by the petal venation (A: a). Even in the petals with 3 divisions, which have normally 3-parted venation branched below the lobes and with the branch running freely into each division (C: e), the 4-7th veins, which seem to be the vestiges of the 4-7th divisions, are frequently observed in the plants collected from Mt. Kanakuso (C: a-d). Near the base of the top division run one or two short veins along a long mid-vein. These short veins seem to be vestiges of the divisions higher up in position than the present ones. Moreover, near the bases of the petals there are often short veins which might be vestiges of divisions lower in position than the present ones. These veins branch from the side veins and run downwards, or remain free.

As Rosendaahl (1914) also pointed out, reduction in the number of petal divisions generally occurs in most species of Mitella. Therefore, in M. stylosa, though the present form of the petals is usually 3-divided to linear, these petals are reduced forms of petals with 5 divisions, which would have originated from ones with at least 7 divisions.

M. makinoi, at the present, has been recognized as having the most constant forms of divided petals: the petals with 5 divisions. However, from my observations there are some specimens which often have linear to 4-divided petals among the normally 5-divided ones, and others which rarely have the linear to 4-divided petals among the 5-divided ones.
Fig. 1. Type specimen of *Mitella stylosa* Boiss. preserved in P.
Fig. 2. Variation of petal shape and petal venation of *M. stylosa* Boiss. var. *stylosa*. Arrows show the vascular vestiges of probable petal divisions. A: eglandular petals, a-1: Ojigahata, Pref. Shiga. m-n: Umetani, Pref. Gifu. B: glandular petals, vicinity of Mt. Kanakuso, Pref. Shiga. C: glandular petals, Mt. Kanakuso, Pref. Shiga.
As shown in Fig. 5, M. sptosa usually has fewer glandular hairs on or near the margins than does M. stylosa and M. farusei var. subramosa. Whether the margins of the calyx lobes are glabrous or glandular papilllose is due to the occurrence of these hairs on or near the margins. As shown in Fig. 5, M. stylosa usually has fewer glandular hairs on or near the margins than does M. stylosa.
Fig. 4. Leaf shapes of *M. stylosa* Boiss. A: leaves of var. *makinoi* (HARA) WAKABAYASHI, collected from various localities of Shikoku and southern Kyushu. B: leaves of var. *stylosa*, collected from various localities of the Ibuki-Suzuka mountain range in Honshu.

*M. makinoi*. However, there are several examples where this character cannot be used to discriminate between species.

As examined above, there seems to be no distinct gap between *M. stylosa* and *M. makinoi* in the number of petal divisions, in the shapes of the leaves and in the occurrence of glandular hairs on the calyx-lobes. Until this time the difference between both groups
Fig. 5. Occurrence of glandular hairs on the abaxial sides of calyx-lobes of *M. stylosa*. A: var. *makinoi* (HARA) WAKAYASHI collected from several localities in Shikoku and southern Kyushu. B: var *stylosa* collected from several localities in the Ibuki-Suzuka mountain range in Honshu.

has usually been recognized but the continuum between them has been unnoticed. Also, in other characters such as flower shape, the surface pattern of seeds, chromosome number and the karyotype, as pointed out by me (1973), no distinct difference between these two is shown. Therefore, *M. stylosa* and *M. makinoi* are circumscribed together as belonging to the same species in which the rank of each taxon is treated as variety.

*Variation in M. furusei*  
*M. furusei* has been known to be distributed from the southern parts of Pref. Nagano to Pref. Aichi, and in the western half of Pref. Gifu, in central Honshu. This species is distinguishable from *M. stylosa*, mainly by having seeds not papillose and the petal divisions many (7- to 9(11)-divided). As pointed out in my previous paper (1973), *M. furusei* seems to be closely related to "*M. stylosa*" as seen in the similarity of the leaves, the flowers having nearly erect calyx lobes, the seeds being not papillose, and cytological evidence. In flower shape, variable forms are observed in *M. furusei*. The styles may be very long, as in plants from Pref. Shimane, Pref. Tottori and Pref. Hiroshima (Fig. 6, a–c), or very short, especially in

plants from Pref. Fukui, Pref. Kyoto, Pref. Hyogo and Mt. Nachi in Pref. Wakayama (h–l). Several intermediate forms between the two are found in other localities. The flower shape of *M. furusei* resembles well those having the short styles. The problem of whether or not the style length has diagnostic value for discriminating natural groups needs further study.

A notable difference between var. *furusei* and var. *subramosa* is found only in the number of petal divisions. Var. *subramosa* usually has 3- to 5-divided petals, though linear to 2-divided petals are rarely observed in plants which have petals predominantly 3-divided. Also, 6- to 7-divided petals are rarely observed in plants which have petals predominantly 5-divided (specimen: Yasutomi-cho, Pref. Hyogo, *K. Tatebe* s.n., KYO).

According to my observations and discussion presented above, I wish to summarize the taxonomy as follows:

**Taxonomy**


var. *stylosa*


Distr. From Mt. Kanakuso southward to the vicinity of Eigenji-cho in the Ibuki-Suzuka mountain range in Pref. Shiga, central Honshu.

This species is characterized mainly by the leaves being dark-green on the upper sides, pale-green with reddish veins on the under sides; purplish-brown and rather campanulate flowers with petals usually linear to 3-divided and with rather long styles; papilllose seeds.

var. *makinoi* (Hara) Wakabayashi, com. nov.


Distr. Shikoku and southern most of Kyushu.

This variety is distinguished from var. stylosa mainly by having petals usually 5-divided. Though the distribution southward from Ohsumi-peninsula has been unknown, a specimen (T. Makino, May 9, 1904) made from a plant cultivated in Tokyo from seeds originating in Isl. Amami-ohshima, Pref. Kagoshima, is preserved in MAK. The seeds are papillose and the petals are mostly 3-divided. Thus, this plant is not distinguishable from var. stylosa. It is likely that this may be rediscovered in this area.


var. furusei
Distr. Central Honshu: from southern parts of Pref. Nagano to Pref. Aichi, and in the Western half of Pref. Gifu. This species is characterized mainly by having leaves dark-green on the upper sides, pale-green with reddish veins on the under sides; flowers
with calyx-lobes nearly erect, with petals many-divided (7–9(11)) and with short styles; non-papillose seeds.

var. **subramosa** **WAKABAYASHI**, var. nov.


![Fig. 8. Type specimen of *Mitella furusei* Ohwi var. *subramosa* WAKABAYASHI.](image)
Fig. 9. Distribution of M. furusei Ohwi. ★: var. furusei ●: var. subrososa WAKABAYASHI


Differt a var. furusei petalis vulgo 3-5 divisis.


Distr. Southwestern Honshu and northern Kyushu. (Fig. 9).


This variety is distinguishable from var. furusei mainly by having petals usually 3- to 5-divided. The style length is variable, from short to long, as mentioned above.

It is of note that each variety is isolated westwards and eastwards by the Ibuki-Suzuka mountain range.

References


チャルメルソウの学名として、これまでMitella stylosa Boiss.が使われてきた。M. stylosaはFAURIEが伊吹山山麓で採集した標本（no. 7786, April 29, 1892）に基づいてBOISSIEU（1897）が記載したものである。筆者（1973）が報告したように、これまでの調査では伊吹山一帯でチャルメルソウを見つけることは出来なかった。そこでM. stylosaのタイプ標本を詳しく観察する必要性が生じた。最近、筆者はパリ博物館（P）およびジュネーブ植物園（G）からFAURIEの採集標本（no. 7786）を借用し、詳しく観察する機会を得た。その結果、これらの標本はタキミチャルメルソウであることが明らかとなった。

ところでチャルメルソウにMitella stylosaの学名をあてたのは大井（1932）が最初である。大井は京大に保存されているFAURIEの採集標本に基づいて、チャルメルソウにM. stylosaをあてたのであるが、その京大の標本はFAURIEの手許にあった控えの標本で、同一台紙に7786と3234の標本が貼られている。7786は葉のみの不完全個体で、3234は花序をつけた個体である。3234は明らかにチャルメルソウであり、大井は7786も同一種と判断して、M. stylosa Boiss.をチャルメルソウの学名としたのである。上に述べたようにM. stylosa Boiss.はタキミチャルメルソウの学名となったので、チャルメルソウに学名をつける必要がある。

チャルメルソウの学名を決定するにあたり、近縁種を再検討したところ、種子表面に突起がない点や花形の類似などからミカワチャルメルソウM. furuseiに最も深い関係があることが判明した。両者の区別点となる形質の変異を詳しく検討したところ、顕著な差が認められなかったので、両者は同一種内の変種関係にあると判断した。そこで新たにM. furusei var. subramosaWAKABAYASHIと命名した。

なお、タキミチャルメルソウについても検討したところ、種子表面に突起がある点や花形の類似などからシコチャルメルソウM. makinoiとの類縁が推定された。この2つは、花弁の構造、葉の先端の形、萼裂片の辺縁の腺毛の有無などを指標形質として区別されている。しかし、Fig. 2と3に図示したように、花弁の構造には様々な変異型があり、また脈をとつけてみると、数個の裂片をもっていたものから全縁のものまでの単純化をほどとづけることも可能である。葉形も、Fig. 4に比較したように、この形質だけで種差を指標する程のものではない。また、萼裂片の背軸面の腺毛を、それぞれ数個所から得た個体について示すとFig. 5のようにになり、四国産のもと伊吹・鈴鹿山系のものとの間に決定的な差は認められない。これらの形質の比較から、両者の関係もこれまで指摘されていたほど顕著であるとは判断出来なかったので、これらは互いに変種関係にあると考えたい。したがってシコチャルメルソウの学名はM. stylosa var. makinoi（HARA）WAKABAYASHIとなる。

シコチャルメルソウの立派な図及び和文の記載は牧野：大日本植物志第1巻第2集（1902）に出ている。しかしここにはチャルメルソウの和名が使用されている。牧野図鑑（1940）及び牧野新日本植物図鑑（1961）のチャルメルソウもシコチャルメルソウである。