

ADDITIONAL REMARKS OF RANUNCULACEAE IN TAIWAN. (3) *CLEMATIS* SECTION *VIORNA* (REICHB.) PRANTL

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Abstract: This is a taxonomic study of *Clematis* L. (Ranunculaceae), Section *Viorna* (Reichb.) Prantl in Taiwan. There are six taxa treated as five species and one variety where two are new to Taiwan; one new combination, *i.e.* *C. henryi* Oliv. var. *morii* (Hay.) T.Y. Yang & T.C. Huang and one new taxonomic state, *i.e.* *C. lasiandra* Maxim. The surface of leaflets and pollen grains of this section are observed. The taxonomic description, and distribution maps for each taxon and a key are also given.

INTRODUCTION

Clematis, one of the largest genera of the Ranunculaceae, which consists of about 300 species, is widely distributed from the tropic regions to frigid zones (Tamura, 1967). The genus was divided into 8 sections, *i.e.* *Viorna*, *Atragene*, *Meclatis*, *Fruticella*, *Clematis*, *Viticella*, *Cheiropsis* and *Naraveliopsis* (Chang, 1980). Moreover, the section *Viorna* usually divided into three subsections; *Crispae*, *Tubulosae* and *Connatae* (Tamura, 1967; Fang, 1980).

The section *Viorna* consists of about 85 species and is of wide distribution in the world from tropic regions to cold regions. There are about 30 species in Mainland China and 6 taxa (5 species and 1 variety) in Taiwan (Liu and Hsieh, 1976).

In the present study, two new taxa are reported from Taiwan, including one new combination, *i.e.* *C. henryi* Oliv. var. *morii* (Hay.) T.Y. Yang & T.C. Huang and one new taxonomic state, *i.e.* *C. lasiandra* Maxim. The leaf epidermis and pollen grains of this section are discussed. The distribution maps (modified from Ito, 1929 and Kuo, 1985), descriptions and a key to the treated taxa are given.

MATERIALS AND METHODS

The morphological descriptions are mainly based on the herbarium specimens. Some fresh flowers were collected and preserved in FAA. These flowers were used to prepare the drawings and the pollen slides which followed the Erdtman's

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method(1952). The leaves were treated by two methods for their surface studies. The light microscopic (LM) study (Chang and Yu, 1989) is as follow: to take the leaves and place them in the peeling solution (hydrogen peroxide: acetic acid = 2:1) at 30-50°C about 2h or longer until soft enough to separate epidermis; then transfer into water and stain in safranin (50% alcohol) about 12h and finally mounted in balsam. They were observed, drawn and taken the photographys under 400X. Epidermal cells and stomatal complex were described. Furthermore, the stomatal index (I) was calculated by the formula $I = S/(E+S) \times 100$ (S: No. of stomata; E: No. of epidermal cells). Coating the materials for the scanning electron microscopy (SEM) study is also treated. The micrographs of leaf surface were taken by Jeol T-20 SEM (University of Reading) and Nikon Optiphot LM (TUNG). Palynological study was done under Bausch & Lomb Nanolab 2100 SEM (National Chunghsing University) and Hitachi S-2300 SEM (TUNG) and Nikon Optiphot LM (TUNG).

Specimens examined in this study are marked with acronyms of the herbaria excluding TAI (The Herbarium, Department of Botany, National Taiwan University). Collections on which the illustrations were based, are marked with an asterisk (*). Acknowledgement is hereby made to the curators of the following herbaria for their kind loan of the specimens.

- BM** : Herbarium British Museum (Natural History), London, England, UK;
CDBI : Herbarium, Chengdu Institute of Biology, Academia Sinica, Chengdu, Sichuan, China;
E : Herbarium, Royal Botanic Gardens, Edinburgh, Scotland, UK;
G : Herbarium, Conservatoire et Jardin Botaniques, Genève, Switzerland;
HAST : Herbarium, Institute of Botany, Academia Sinica, Taipei, Taiwan, ROC;
K : The Herbarium, Royal Botanic Gardens, Kew, London, England, UK;
KUN : Herbarium, Kunming Institute of Botany, Academia Sinica, Kunming, Yunnan, China;
KYO : Herbarium, Department of Botany, Faculty of Science, Kyoto University, Kyoto, Japan;
NCAI : Herbarium, Department of Forestry, National Chiayi Institute of Agriculture, Chiayi, Taiwan, ROC;
NCKU : Herbarium, Department of Biology, National Chengkung University, Tainan, Taiwan, ROC;
P : Museum National d'Histoire Naturelle, Laboratoire de Phanerogamie, Paris, France;
PAI : Herbarium, Department of Forestry, National Pintung Institute of Agriculture, Pintung, Taiwan, ROC;
PE : Herbarium, Institute of Botany, Academia Sinica, Beijing, China;
SZ : Herbarium, Department of Biology, Sichuan University, Chengdu, Sichuan, China;
TAIF : Herbarium, Taiwan Forestry Research Institute, Taipei, Taiwan, ROC;
TCF : Herbarium, Department of Forestry, National Chunghsing University, Taichung, Taiwan, ROC;

- TI : Herbarium, Botanic Gardens Koishikawa, Hakusan, Bunkyo, Tokyo, Japan;
TUNG : Herbarium, Department of Biology, Tunghai University, Taichung, Taiwan, ROC.

RESULTS

1. Microscopic morphology

Two microscopic features are observed as additional criteria for identification.

(i) Leaf surface

The shape of epidermal cells on both sides are isodiametric with undulate walls, Types 3 and 5 (Wilkinson, 1988) or elongate, ca. 1 – 3 times as long as wide; anticlinal walls straight to undulate Types 3 and 5 (Pl. 1 and Fig. 1), and the ornamentation of cuticular is smooth, or with very low micropapillae, or striae (Pl. 2 – 4). The trichomes are usually simple, long or short, however, the distribution of trichome and the frequency are good characters to be used. The stomatal complex of the above-noted taxa are hypostomatic; the shapes are usually elliptical or sub-orbicular and the sizes are alike, between 0.35 to 0.47 μm long and 0.20 – 0.32 μm wide except *C. tsugetorum* which are usually large, ca. 0.41 – 0.57 \times 0.29 – 0.35 μm^2 ; the stomatal index varies from 13.2 and 17.9 but *C. tsugetorum* get a large value, i.e. 28.1 (Table 1).

(ii) Palynology

Pollen grains are of two types, one is tricolpate and the other is polyporate (Pl. 5 – 7). The former one is subsection *Connatae*, and the latter one is subsection *Tubulosae*. Furthermore, perforation of exine can be found only at *C. psilandra* (Pl. 6, C-D). The spinules on the grains in the tricolpate group are smaller than those of the group of polyporate. Moreover, the spinules on the colpate or the pore are usually larger than those on the others (Table 2).

2. Taxonomic treatment

A key to the taxa followed the description of each taxon are presented:

Key to the taxa of section *Viorna* of the *Clematis*

1. Lianes; petiole tendril; flowers campanulate; pollen grains tricolpate
2. Leaves simple or ternate compound; flowers white or golden; sepals velutinous outside
 3. Leaves densely golden velutinous (at least on abaxial side); leaf margin dentate; flowers golden (3) *C. leschenaultiana*
 3. Leaves glabrous or near so; leaf margin remotely serrate or mucronate-serrate; flowers white
 4. Leaves simple (la) *C. henryi* var. *henryi*

4. Leaves ternate compound (lb) *C. henryi* var. *mori*
2. Leaves pinnate or biternate compound; flowers pink, or pale pink; sepals glabrous outside (2) *C. lasiandra*
1. Erect shrubs; petiole ascending (non-tendril); flowers salverform; pollen grains polyporate
2. Leaves large, 7.1 – 11.0 cm long, 5.6 – 9.9 cm wide; flowers pink (4) *C. psilandra*
2. Leaves small, 2.0 – 3.4 cm long, 1.5 – 2.1 cm wide; flowers purple or blue (5) *C. tsugetorum*

Table 1. Leaf epidermis of *Clematis* Sects. *Viorna* in Taiwan

Character		Taxon	<i>C. henryi</i>	<i>C. henryi</i> var. <i>mori</i>	<i>C. lasiandra</i>	<i>C. leschenaultiana</i>	<i>C. psilandra</i>	<i>C. tsugetorum</i>
Upper epidermal cell	Shape	isodiametric or elongate, anticlinal walls undulate Types 3 & 5*	isodiametric walls undulate Types 3 & 5	isodiametric walls straight to undulate Types 3	isodiametric walls undulate Types 3 & 5	isodiametric walls undulate Types 3 & 5	isodiametric walls undulate Types 3 & 5	isodiametric or elongate, anticlinal walls undulate Types 3 & 5
	Size (μm^2)	0.64-0.86 x 0.28-0.40	0.64-0.86 x 0.26-0.45	0.68-0.98 x 0.28-0.42	0.81-0.87 x 0.24-0.48	0.48-0.96 x 0.32-0.60	0.69-1.15 x 0.42-0.58	0.69-1.15 x 0.42-0.58
	Trichome Form	simple, short and thin one	--	simple, short and thin one	simple, thin, mixed short & long ones	--	--	simple, short and thin one
Lower epidermal cell	Frequency	smooth	smooth	sparse	pubescent	smooth	smooth	glabrous
	Shape	elongate, anticlinal walls undulate Types 3 & 5	elongate, anticlinal walls undulate Types 3	elongate, anticlinal walls undulate Types 3 & 5	elongate, anticlinal walls undulate Types 5 & 6	elongate, anticlinal walls undulate Types 5	elongate, anticlinal walls undulate Types 3 & 5	isodiametric walls undulate Types 3 & 5
	Size (μm^2)	0.47-0.91 0.18-0.42	0.65-0.79 x 0.47-0.62	0.40-0.80 x 0.15-0.31	0.68-1.0 x 0.21-0.43	0.89-0.95 x 0.38-0.62	0.63-1.11 x 0.35-0.59	0.63-1.11 x 0.35-0.59
epidermal cell	Cuticular ornamentation	smooth	very low micro-papillae	striae; radiating striae from stomata	striae; radiating striae from stomata	very low micro-papillae	very low micro-papillae	very low micro-papillae
	Trichome Form	simple, short and thin one	simple, short and thin one	simple, short and thin one	simple, thin, mixed short & long ones	simple, thin, mixed short & long ones	simple, short and thin one	simple, short and thin one
	Frequency	glabrous	glabrous	glabrous	dense	along vein	glabrous	glabrous
Stomatal cell	Outer stomata rim	raised rim and long, narrow aperture	raised rim and long, narrow aperture	raised rim, concentric ring of striae	raised rim, concentric ring of striae	raised rim and long aperture	raised rim and long aperture	raised rim and long aperture
	Shape	elliptical	elliptical	suborbicular	elliptical	elliptical	suborbicular	suborbicular
	Size (μm^2)	0.36-0.42 x 0.27-0.31	0.38-0.44 x 0.22-0.26	0.37-0.47 x 0.26-0.32	0.39-0.47 x 0.27-0.29	0.36-0.43 x 0.20-0.28	0.41-0.57 x 0.29-0.36	0.41-0.57 x 0.29-0.36
Stomatal frequency**		12.3-14.1	13.1-16.7	12.5-15.3	9.8-12.8	8.9-11.7	10.2-13.3	10.2-13.3
Stomatal Index		14.7	17.9	15.1	13.2	16.7	20.1	20.1
Voucher Specimen		Taiwan: Nantou, Yang 1000 (LM); Yang 900 (SEM)	Taiwan: Nantou, Yang 2624 (LM); Yang 2578(LM); Yang 4223, China: Hubei: Wilson 1471 (SEM)	Taiwan: Nantou, Yang 2578(LM); Talchung, Yang 4223, China: Hubei: Wilson 9651 (SEM)	Taiwan: Chilay, G.P. Chen s.n. (LM); Wilson 9651 (SEM)	Taiwan: Chilay, Yang 4622 (LM); Yang 4213 (SEM)	Taiwan: Ilan, Yang 6092(LM); Hsintau, Yang 3164 (SEM)	Taiwan: Ilan, Yang 6092(LM); Hsintau, Yang 3164 (SEM)
Plate and Figure		Pl. 1. A-D; Pl. 4. A-B; Fig. 1. 1-2.	Pl. 1. E-H; Pl. 4. C-D; Fig. 1. 3-4.	Pl. 2. E-H; Pl. 4. E-F; Fig. 1. 5-6.	Pl. 3. A-D; Pl. 4. G-H; Fig. 1. 7-8.	Pl. 2. A-D; Pl. 4. I-J; Fig. 1. 9-10.	Pl. 3. E-H; Pl. 4. K-L; Fig. 1. 11-12.	Pl. 3. E-H; Pl. 4. K-L; Fig. 1. 11-12.

*: Wilkinson 1988. p.153

**: No. of stomata/0.0027mm²

1. *Clematis henryi* Oliv. in Hook., Icon. Pl. t. 1819. 1889; Finet & Gagnepain in Bull. Soc. Bot. Fr. **50**: 540. 1903; Matsumura & Hayata in J. Coll. Sci. Univ. Tokyo **22**: 6. 1906; Kawakami, List Pl. Form. 2. 1910; Rehder & Wilson in Sarg. Pl. Wils. **1**(3): 342. 1913; P'ei in Contr. Biol. Lab. Sci. Soc. China **10**: 107. 1936; Handel-Mazzetti in Act. Hort. Gothob. **13**: 193. 1939; Chang et al. Fl. Reip. Pop. Sinicae **28**: 96. 1980.

Clematis henryi Oliv. var. *leptophylla* Hayata, Icon. Pl. Form. **3**: 2. 1913; Sasaki,

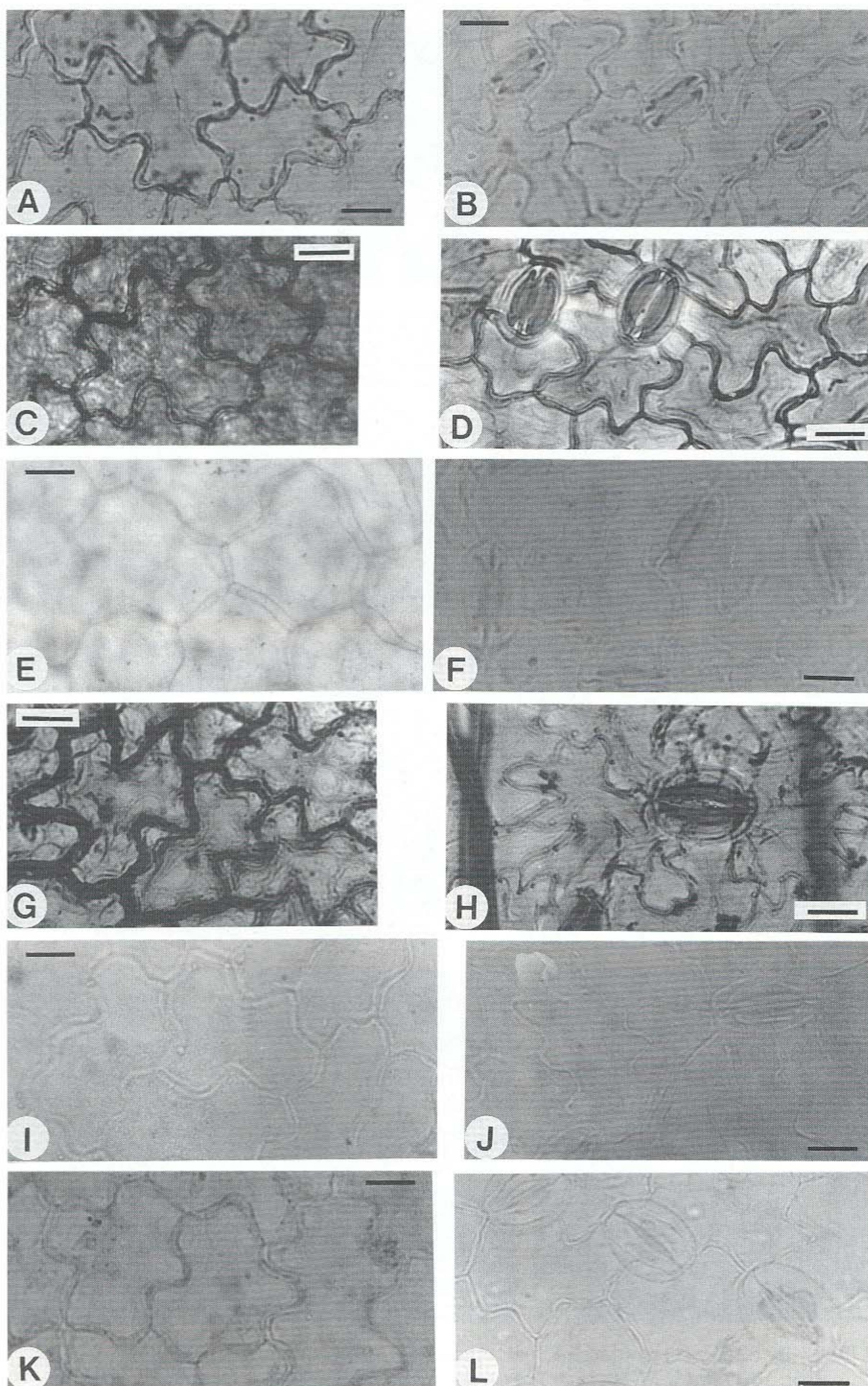


Plate 1. Light micrographs of leaf epidermis. *Clematis henryi* (A,B); *C. henryi* var. *morii* (C,D); *C. lasiandra* (E,F); *C. leschenaultiana* (G,H); *C. psilandra* (I,J); *C. tsugetorum* (K,L). A,C,E,G,I,K: adaxial surface; B,D,F,H,J,L: abaxial surface. Scale bar = 20 μm .

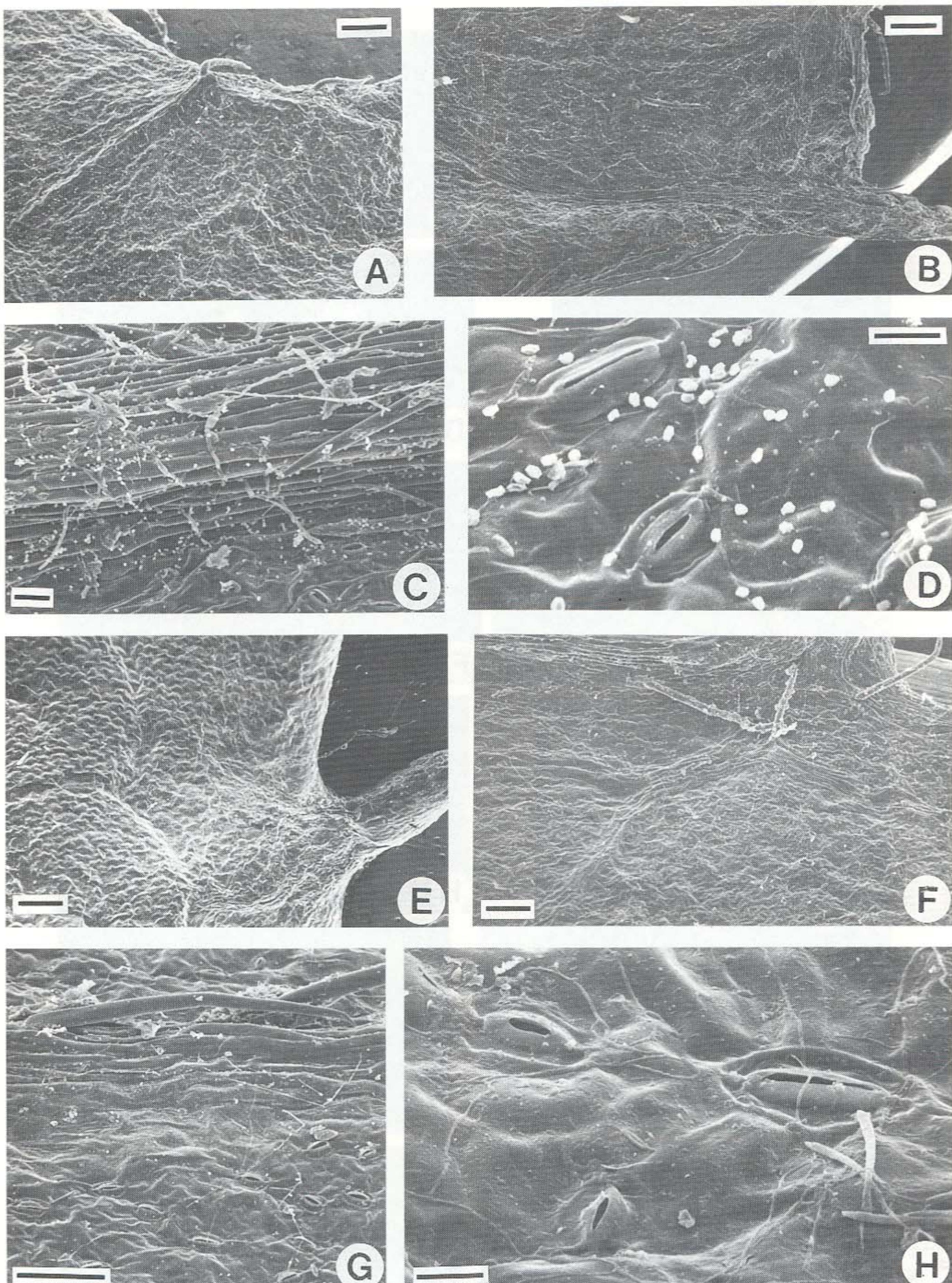


Plate 2. SEM micrographs of leaf epidermis. *Clematis henryi* (A-D) and *C. henryi* var. *morii* (E-H). A,B,E,F: leaf margin and surface, scale bar = 100 μm ; A and E showing adaxial side, B and F showing abaxial side. C,G: nerves and surface, abaxial side, scale bar = 20 μm . D,H: stomata and surface, scale bar = 10 μm ; D showing smooth surface and long, narrow aperture and H showing surface with very low micropapillae and long, narrow aperture.

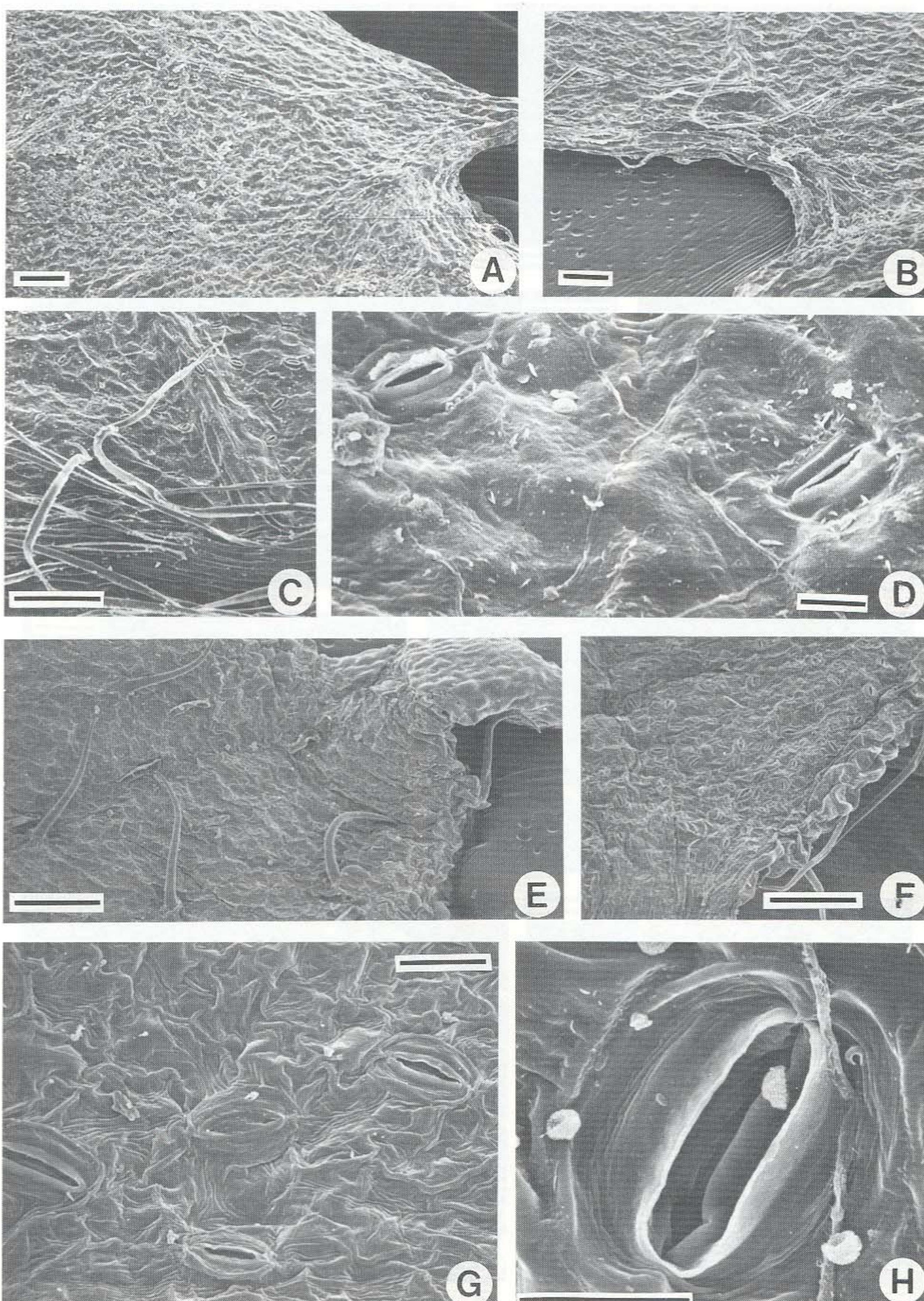


Plate 3. SEM micrographs of leaf epidermis. *Clematis psilandra* (A-D) and *C. lasiandra* (E-H). A,B,E,F: leaf margin and surface; A and E showing adaxial side, B and F showing abaxial side, scale bar = 100 um. C: nerves and surface, abaxial side, scale bar = 100 um. D,G: stomata and surface; D showing surface with very low micropapillae and stomata with long aperture, scale bar = 10 um; G showing striae surface and radiating striae from stomata, scale bar = 20 um. H: stomata with concentric rings of striae and long aperture, scale bar = 10 um.

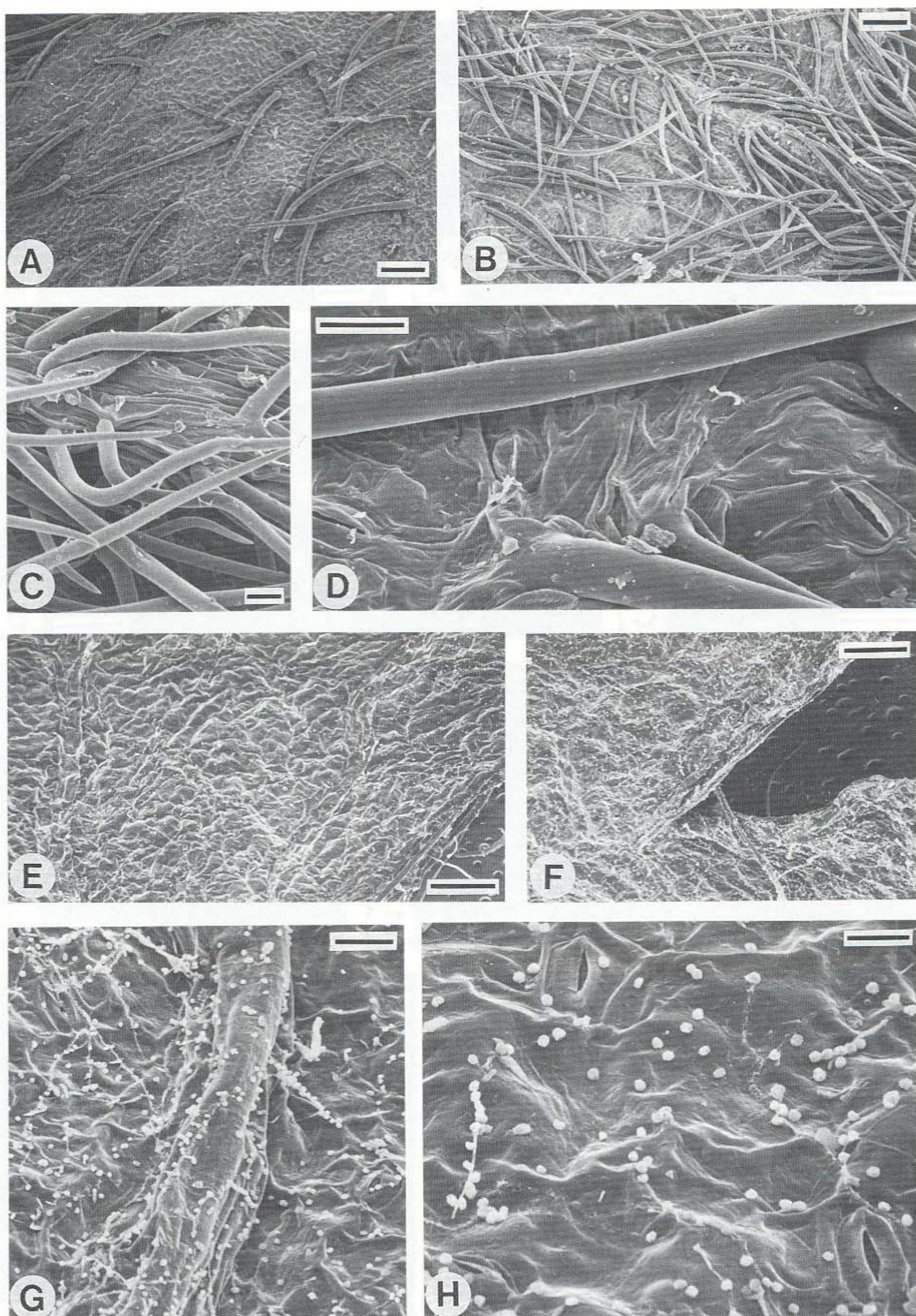


Plate 4. SEM micrographs of leaf epidermis. *Clematis leschenaultiana* (A-D) and *C. tsugetorum* (E-H). A,B: leaf surface, scale bar = 100 μm ; A showing adaxial side, pubescent surface and simple, thin trichome mixed short and long ones; B showing abaxial side, dense hairs surface and simple, thin trichome mixed short and long ones. C: nerves and hairs, abaxial side, scale bar = 20 μm . D: stomata and surface showing radiating striae from stomata and long aperture, scale bar = 20 μm . E,F: leaf margin and surface, scale bar = 100 μm ; E showing adaxial side, F showing abaxial side. G: nerve and surface, abaxial side, scale bar = 20 μm . H: leaf surface and stomata, showing nearly glabrous surface but with very low micropapillae and long aperture stomata, scale bar = 10 μm .

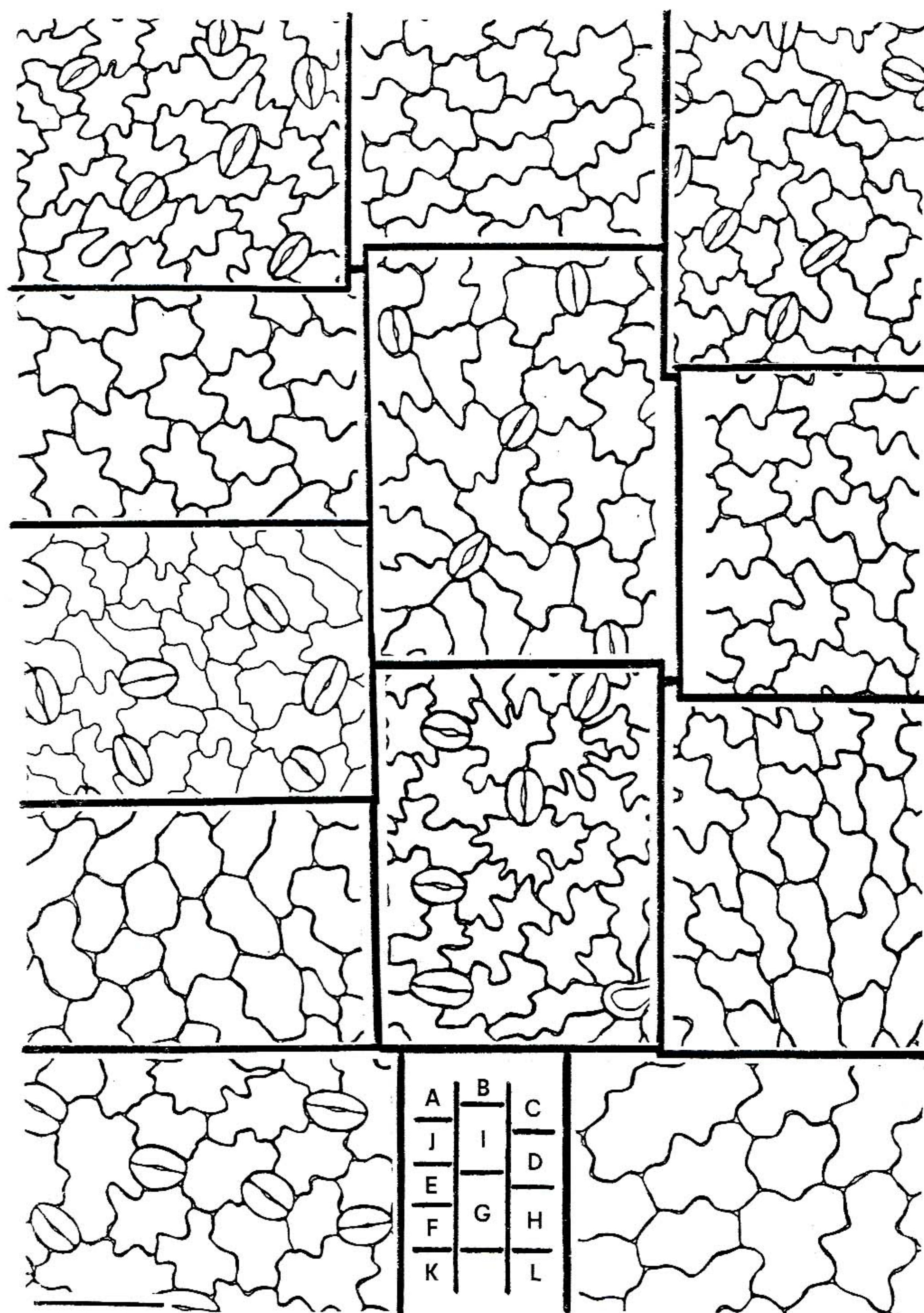


Fig. 1. Line drawings of leaf epidermis under light microscopy. *Clematis henryi* (A,B); *C. henryi* var. *morii* (C,D); *C. lasiandra* (E,F); *C. leschenaultiana* (G,H); *C. psilandra* (I,J); *C. tsugeorum* (K,L). A,C,E,G,I,K: abaxial surface; B,D,F,H,J,L: adaxial surface. Scale bar = 100 um.

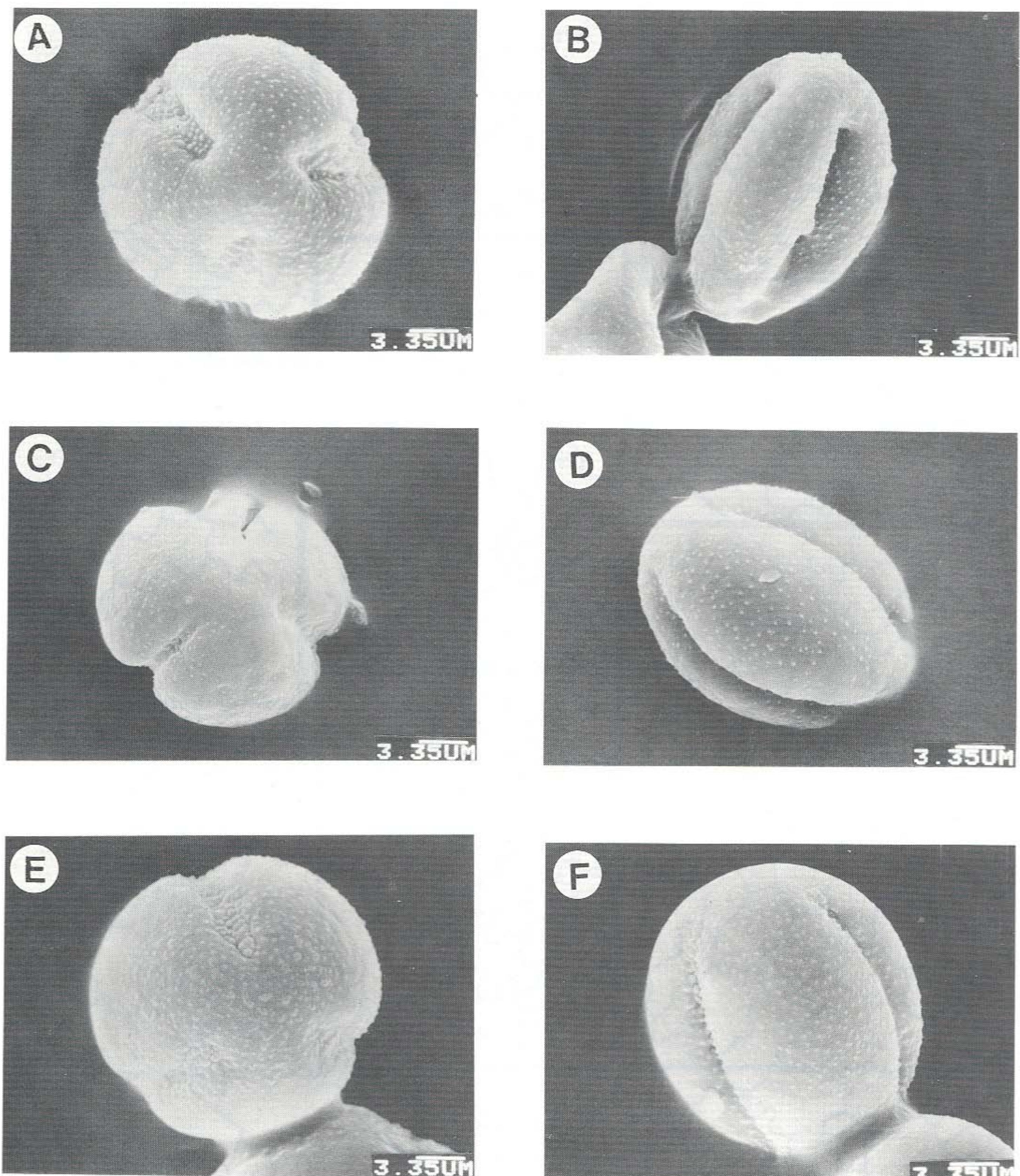


Plate 5. SEM micrographs of pollen grain. *Clematis henryi* (A,B); *C. henryi* var. *morii* (C,D); and *C. lasiandra* (E,F).

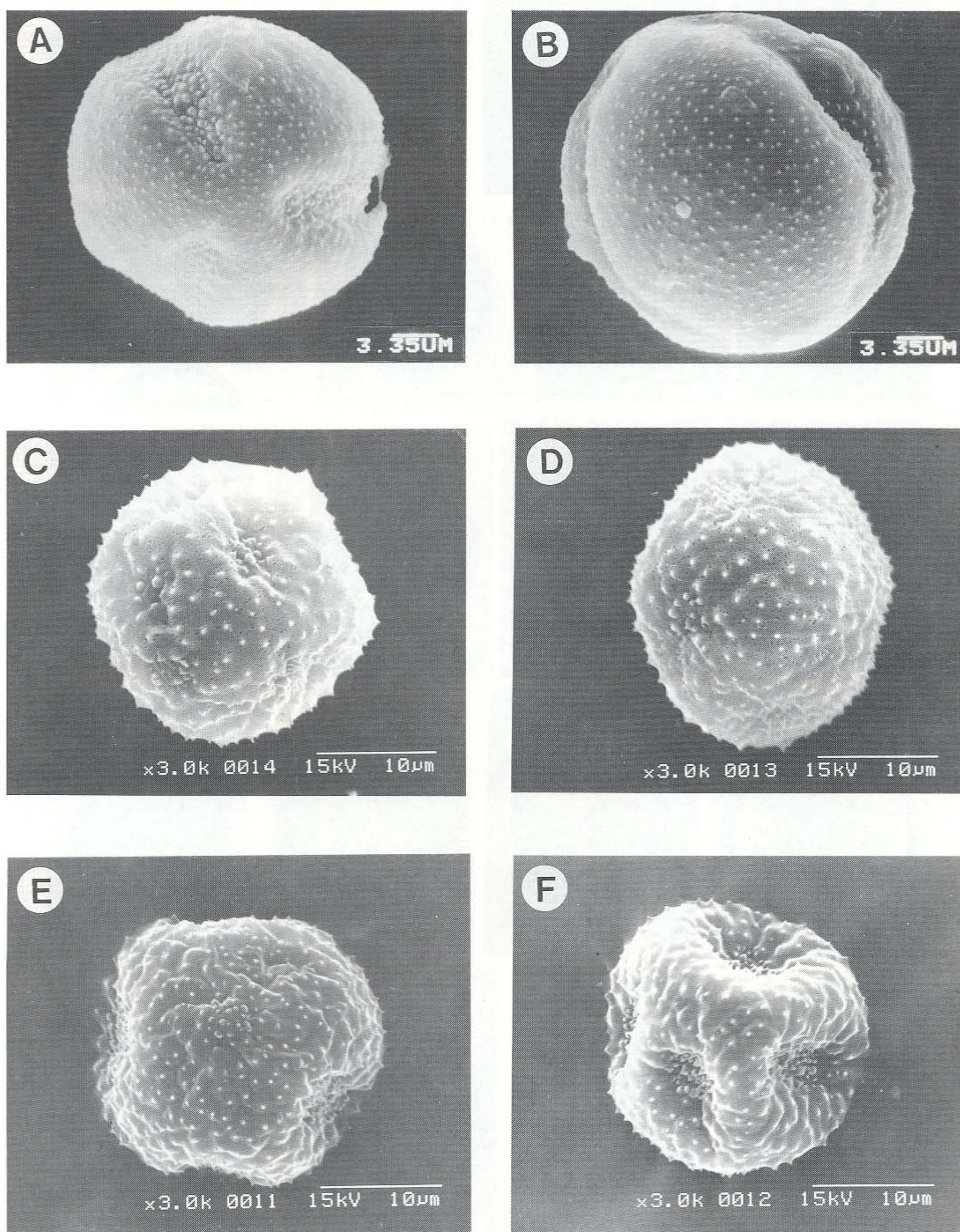


Plate 6. SEM micrographs of pollen grain. *Clematis leschenaultiana* (A,B); *C. psilandra* (C,D); and *C. tsugetorum* (E,F).

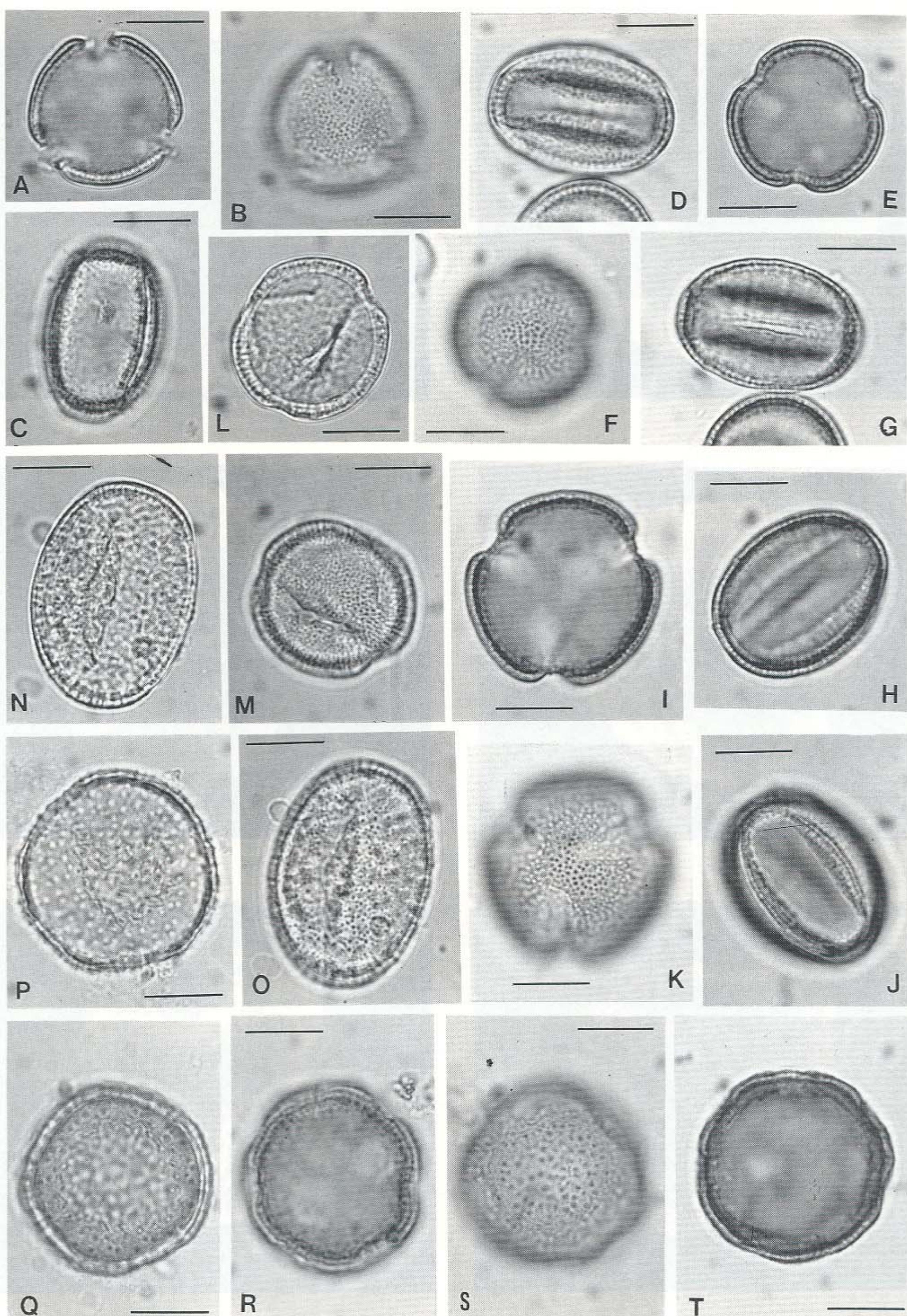


Plate 7. Light micrographs of pollen grain. *Clematis henryi* (A-C); *C. henryi* var. *morii* (D-G); *C. lasiandra* (H-K); *C. leschenaultiana* (L-O); *C. psilandra* (P,Q); *C. tsugeorum* (R-T). Scale bar = 10 um.

List Pl. Form. 183. 1928; Liu & Hsieh in Li *et al.*, Fl. Taiwan **2**: 484. 1976; T.C. Huang in Li *et al.*, Fl. Taiwan **6**: 48. 1979; T.I. Yang, List Pl. Taiwan 602. 1982; Wang in Bull. Bot. Res. **7**: 99. 1987.

Clematis hayatae Kudo & Masamune in Ann. Rep. Taihoku Bot. Gard. **2**: 77. 1932; Suzuki, Short Fl. Form. 65. 1936; Masamune, List Vasc. Pl. Taiwan 53. 1954; S.S. Huang in Biol. Bull. Nat. Taiwan Norm. Univ. **5**: 23. 1960; Liu, Ill. Nat. Intr. Lign. Pl. Taiwan **1**: 141. f. 121. 1960.

Table 2. Pollen grain morphology of *Clematis* Sect. *Viorna* in Taiwan

Character Taxon	Type of aperture	Size of pollen grain: Polar view X Equatorial view (μm^2)	Aperture character				Shape of pollen grain
			Apocol- plum diameter (μm)	Colpus width (μm) or pore diam. (μm)	End of colpus	Colpus or pore membrane	
<i>C. henryi</i>	3-colporate	18.1-18.7 \times 18.5	6.62-6.86	2.75-3.39	obtuse	dense conical spinules	oblate-spheroidal to porlate-spheroidal
<i>C. henryi</i> var. <i>mori</i>	3-colporate	14.4-14.8 \times 19.1	4.87-5.18	1.20-1.60	obtuse	dense conical spinules	suboblate
<i>C. lasiantha</i>	3-colporate	17.6-18.2 \times 19.0	7.38-7.50	3.07-3.19	acute	dense conical spinules	oblate-spheroidal
<i>C. leschenaultiana</i>	3-colporate	20.9-21.3 \times 24.3	6.50-6.39	4.79-6.26	acute	dense hemi-sphaerical spinules	suboblate
<i>C. psilandra</i>	polyporate	21.2-24.1 \times 21.8-26.0	--	5.06-5.41	--	dense conical spinules	suboblate to oblate-spheroidal
<i>C. tsugeorum</i>	polyporate	22.4-24.7 \times 23.5-25.5	--	4.71-5.41	--	dense acuminate spinules	oblate-spheroidal

Character Taxon	Character of exine						Plate	Voucher specimen		
	Structure of exine			Ornamentation of exine						
	Sexine (μm)	Nexine (μm)	Perfor- ation	Form of spinule	Length (μm)	Width (μm)				
<i>C. henryi</i>	0.67-0.8	1.0-1.2	absent	0.12-0.16	0.16-0.32	conical	Pl. 5. A-B, Pl. 7. A-C.	Nantou: Hsitou, Yang 800 (LM) & (SEM)		
<i>C. henryi</i> var. <i>mori</i>	0.67-0.83	0.75-0.83	absent	0.08-0.12	0.16-0.28	conical	Pl. 5. C-D, Pl. 7. D-G.	Nantou: E-W across High way, 104K, Yang 2579 (LM) & (SEM)		
<i>C. lasiantha</i>	0.75-0.83	1.0-1.2	absent	0.12-0.20	0.16-0.24; 0.52-1.12	conical; granular	Pl. 5. E-F, Pl. 7. H-K.	Nantou: E-W across Highway Yang 2578(LM); Taichung: Lishan, Yang 4227(SEM)		
<i>C. leschenaultiana</i>	0.67-0.83	0.5-0.67	absent	0.12-0.20	0.20-0.24; 0.44-0.88	acuminate; hemispherical	Pl. 6. A-B, Pl. 7. L-O.	Taipei: Wulai, Yang 954(LM); T.S. Hsieh s.n.(SEM)		
<i>C. psilandra</i>	0.67-0.83	0.67-0.83	present	0.41-0.59	0.82-1.47	conical	Pl. 6. C-D, Pl. 7. P-Q.	Chiayi: Mt. Alishan, Yang 3065(LM); Yang 4622(SEM)		
<i>C. tsugeorum</i>	0.67-1.0	0.83-1.0	absent	0.35-0.41	0.65-0.88	acuminate	Pl. 6. E-F, Pl. 7. R-T.	Taichung: Mt. Nanhuashan, Wang et al. 3715(LM); Yang et al. 5092(SEM)		

1a. *Clematis henryi* var. *henryi*.

Typus: China: Hubei Prov: Ichang, Henry 266 (K!), 3280 (BM!, K!, TI!)

亨利氏鐵線蓮

Figs. 2-3; Pl. 8.

A scandent perennial evergreen woody vine. Stem sulcate, velutinous when young and turned glabrous when getting old. Leaves simple, opposite, rarely whorled, subcoriaceous to chartaceous; petioles tendril, ca. 3.4 – 6.0 cm long. Leaves ovate-lanceolate or oblong-lanceolate, ca. (7.0–)8.9 – 12.5(–15.0) cm long,

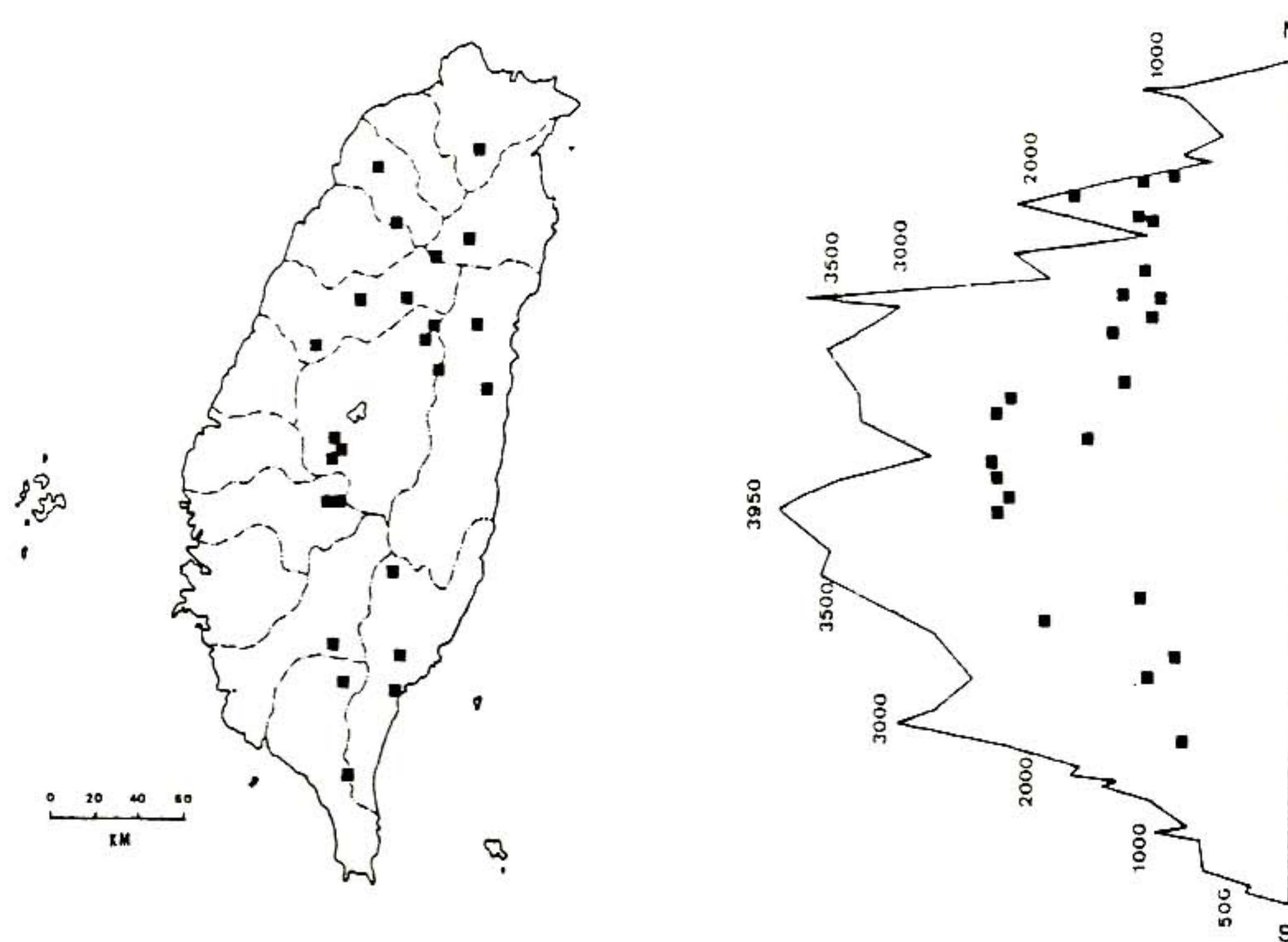


Fig. 2. Latitudinal and altitudinal distribution of *Clematis henryi* Oliv. in Taiwan.

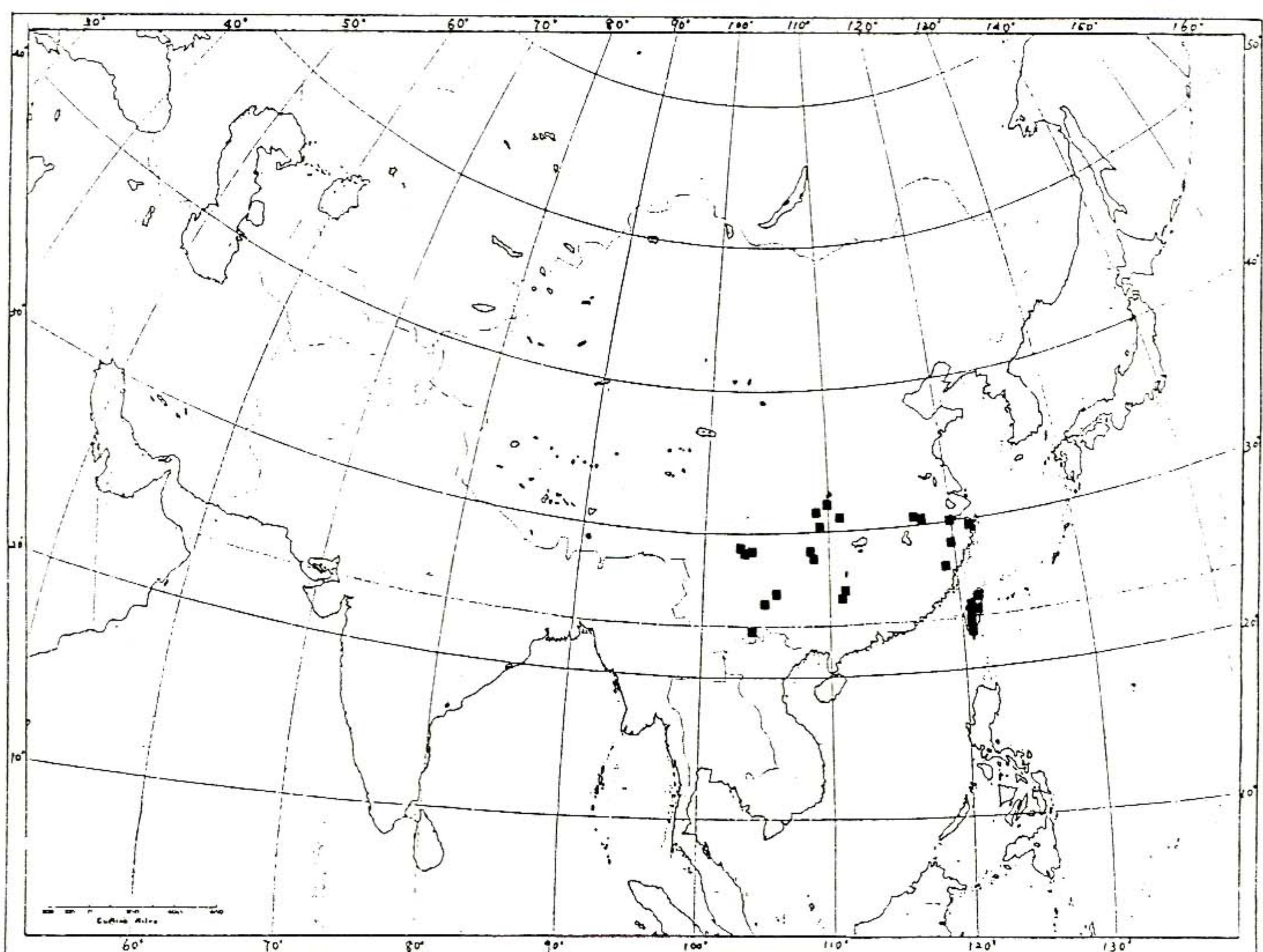


Fig. 3. Distribution of *Clematis henryi* Oliv. in Asia.

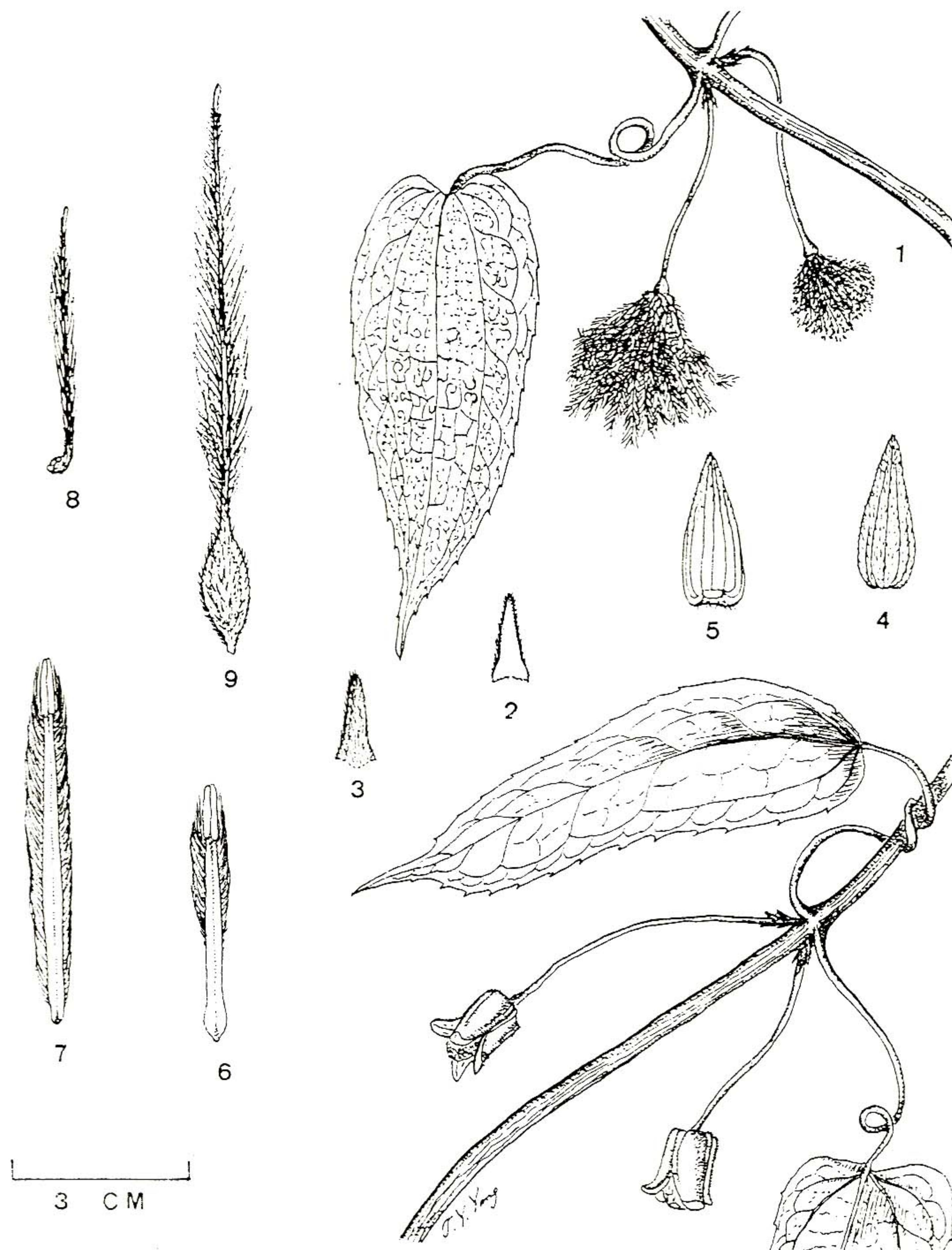


Plate 8. *Clematis henryi* Oliv. (Ranunculaceae). 1. Habit; 2. Bract (adaxial); 3. Bract (abaxial); 4. Sepal (abaxial); 5. Sepal (adaxial); 6 and 7. Stamens; 8. Carpels; 9. Achene.

(2.8-)3.1 – 4.6(-5.5) cm wide; apex acuminate; base cordate; unlobed or sometimes near base 3-lobed; margin remotely serrate or mucronately serrate, or few entire; glabrous on both surfaces or velutinous along the vein on beneath only; 3 – 5-main-veined, nerves flat or sunken on adaxial side and elevated on abaxial side. Inflorescence dichasium, axillary or terminal, usually solitary; pedicels albo-velutinous, with 2-3 or more pairs bracts, decussate, chartaceous, subulate or linear, glabrous inside and pubescent outside. Flowers white, turned yellowish-green or yellowish-brown when dry, campanulate, pendent, recurved at the tip, ca. 1.5 – 2.5 cm diameter. Sepals 4, oblong or ovate-oblong, ca. 1.5 – 2.5 cm long, 0.5 – 1.2 cm wide; apex acute; base obtuse; ablo-velutinous outside and glabrous except tip and margin inside. Stamens pubescent, numerous, several layers, inner ones shorter than outers', ca. 1.0 – 1.2 cm long; anthers 1-celled, linear, lateral longitudinal dehiscence, connective thin, unmucurate, glabrous; filaments linear, flat and dilated near base, long sericeous over than anther. Carpels numerous, with white sericeous. Fruits ca. 2.7 – 4.4 cm long, achenes narrow ovate or elliptical, elevated on both sides, reddish-brown to purplish-brown, ca. 0.3 – 0.4 cm long, velutinous; style persistence and lengthen tail-like, with pale yellow bearded.

Blooming season in Taiwan from November to February next year; fruiting season from November to April next year.

The distribution in China only, from Yunnan, Sichuan, Guizhou, Guangxi, Hubei, Hunan, Guangdong, Anhui, Jiangsu, Zhejiang to Taiwan. Taiwan, the species widely distributed at altitude between 1000 and 2500m region, i.e. Hsueshan Mountains, Central Mountains, Yushan Mountains and Alishan Mountains.

MAINLAND CHINA: YUNNAN: *Forrest* 7824(E), 15349(E,K); *Chungtien, Feng* 3417(KUN); *Weixi, Feng* 8694(KUN); *Mengtsz, Henry* 9846(E, K); *Tchaotong (Jaotong), Ducloux* 4100(P); *Wenshan, Hu* 51687(P). SICHUAN: *Tchenkeoutin, Farges* 1240(K); *Mt. Omei, Kuan et al.* 2767(E), *Kuanhsinpo, W.P. Fang* 13866(PE), *Longmendong, W.P. Fang* 18083(SZ), *Baochanfong, W.P. Fang* 19194(SZ), *99-daoguai, Yang* 5797(TUNG), *Y.B. Yang* 53357(SZ); *Wushan, K.H. Yang* 59852(CDBI). GUIZHOU: *Jiangkou, Tsiang* 7527(P), *Yinjiang, Tsiang* 7659(K), *Anlung, Tsiang* 9342(E); *Pinfa(Pinba), Cavalerie* 1524(K). GUANGXI: *Hohsien, J.C. Kuoh & Cheng* 12315(PE). SHAAXI: *Shanyang, J.S. Yang & Liang* 2602(PE). HUBEI: *Xinshan, C.L. Chen et al.* 2198(PE); *Wilson* 112(K), 2485(BM, E, K); *Enshih, Chow* 1831(E). HUNAN: *Chianghua, B.K. Li & Wan* 5203(PE). ANHUI: *Mt. Chuhuashan, Ching* 2658(K); *Mt. Huangshan, Cheng* 3926(PE). ZHEJIANG: *Chanhua, Ho* 26700(PE), *Ningpo, Schindler* 446a(K), 446c(BM); *Yunhe, S. Chen* 2824(PE). GUANGDONG: *Chujiang, C. Huang* 31639(SZ); *Lohchang, Mt. Chongguenshan, Tsang s.n.* Nov 1932. FUJIAN: *Nanping, Y.T. Chang* 79552(PE).

TAIWAN: **Taipei:** *Wulai, (S.) Suzuki* 18918. *Ilan: N. across Highway, T.Y. Yang* 2469; *Mt. Taipinshan, S. Sasaki s.n.* Mar 1918(TAIF); *Xiyuen, Chuang* 2466. **Hsinchu:** *Chutung, T.S. Liu et al.* 1413(HAST, TAI). **Taichung:** *Chiayang, S.Y. Lu* 12431(TAIF); *Chuanhsinshan Station, Ou et al* 3239(NCAI). **Nantou:** *Hsitou, Feung & Kao* 329,

Hayata s.n. Apr 1916(TAIF), *Kokawa* 180(KYO), 233(KYO), *Mikage* 77028(KYO), *I. Sasaki* 707(TI), *Yang* 900* 1000, 1001, 2641, 2648, 2650, 3235(Hsu Coll.) (TUNG); Mt. Fonghuangshan, *Yang* 2449(Leou Coll.); Shanlinhsia, *Yang* & *Chen* 2777, 2783, 2869(C.S. *Chen* Coll.); E-W across Highway, *Yang* 756, *Yang* et al. 3128(TUNG); Piluhsia, *Hung* & *Lee* 9(TUNG), *Yang* et al. 3190(TUNG); Meifong, *Mikage* 77042(KYO), *Peng* 9059(HAST), *Yang* 3212(TUNG), 3213(TUNG); Cashiahsgu, (Y.F.) *Chen* 12940(priv.); Salihsienhsia, *Yang* 4186(Wang Coll.) (TUNG); Mt. Nenkaoshan, *Kanehira* & *Sasaki* s.n. May 1918(TAIF); Wufong, *Chuang* 2088. **Chiayi:** Fenchihu, *Faurie* 1315 (BM, KYO, P), *Ho* s.n. Dec 1986(NCAI); Mt. Alishan, *Bernardi* 20056(G, K), *C.H. Chen* 10818(NCAI), *Z.Y. Chen* & *Lin* s.n. May 1987, *Faurie* 1313(KYO, P), 1315(BM, KYO, P), *Hayata* & *Sasaki* s.n. Jan 1912(Typus of *C. henryi* Oliv. var. *leptophylla* Hay., Holotype: TI!; Isotypes: K!, TAI!, TAIF!), *Kanehira* & *Sasaki* s.n. Feb 1918(TAIF), *Price* 124(K), *Sasaki* s.n. Jan 1912, *Wilson* 9644(BM, K), 9669(BM, K), *Yamamoto* & *Mori* s.n. Nov 1932, *Yang* 2551, 2567, 2675* (Wang Coll.), 3066; Mt. Tatongshan, *Lu* 13488(TAIF). **Kaohsiung:** Mt. Stone, *T.C. Huang* 6532; Liuokuei, *Y.P. Yang** s.n. Nov 1976(TAIF); Kuaigu, *Kuoh* 13317(NCKU), 13535(KCKU); Tona, *Yang* et al. 3266(TUNG); Uncertain place: Mt. Wuweishan, *Matuda* s.n. 1919. **Pingtung:** Tawu, *Huang* & *Kao* 7403, *Tagawa* 2146(KYO); Mt. Tawushan, *Matuda* s.n. May 1918. **Hualien:** Hopin, *Yang* 2927(*Tang* Coll.); Touhoukou, *Chiou* & *Lin* s.n. Apr 1983(TAIF). **Taitung:** Taitung, *Kawakami* & *Mori* 4511(TI); S. across Highway, *Wang* 2065; Chipen, *Cheng* & *Kao* 6058; Chinshueyin, *Lu* s.n. Feb 1973(TAIF); Yienpin, *Liao* 8754(NCAI); Chakahsi, *Kawakami* & *Mori* 4508(TAIF). s.loc.: *Matuda* s.n. Jan 1917.

1b. ***Clematis henryi* var. *morii* (Hay.) T.Y. Yang & T.C. Huang stat. nov.**

Clematis morii Hayata in J. Coll. Sci. Univ. Tokyo **25**: 42. 1908; Kawakami, List Pl. Form. 2. 1910; Hayata, Icon. Pl. Form. **1**: 19. pl. I. 1911; Sasaki, List Pl. Form. 183. 1928; Kudo & Masamune in Ann. Rep. Taihoku Bot. Gard. **2**: 77. 1932; Suzuki, Short Fl. Form. 65. 1936; Masamune, List Vasc. Pl. Taiwan 53. 1954; S.S. Huang in Biol. Bull. Nat. Taiwan Norm. Univ. **5**: 27. 1960; Liu & Hsieh in Li et al., Fl. Taiwan **2**: 488. 1976; T.C. Huang in Li et al., Fl. Taiwan **6**: 48. 1979; Chang et al. Fl. Reip. Pop. Sinicae **28**: 108. 1980; T.I. Yang, List Pl. Taiwan 602. 1982; Wang in Bull. Bot. Res. **7**: 100. 1987.

Typus: Taiwan: Nantou, Montibus Centralibus, *Kawakami* & *Mori* 1854.
(Holotype: TI!; Isotype: TAIF!)

森氏鐵線蓮

Fig. 4; Pl. 9.

A scandent perennial evergreen woody vine. Stem sulcate, usually velutinous when young and turned glabrous when getting old. Leaves ternate compound, opposite, rarely whorled; subcoriaceous; petioles tendril, ca. 2.6 — 5.5 cm long. Leaflets 3, near base sometimes simple one but 3-deeped-lobed, terminal segment oblong-lanceolate or ovate-lanceolate, ca. (5.3—)7.1 — 11.0(—13.4) cm long, (0.9—)1.7 — 2.9(—3.6) cm wide; apex acuminate; base cuneate or obtuse, and oblique on lateral ones; unlobed or sometimes 3-lobed; margin remotely serrate or mucronately serrate, rarely entire; glabrous on both surfaces; 3-main-veined,

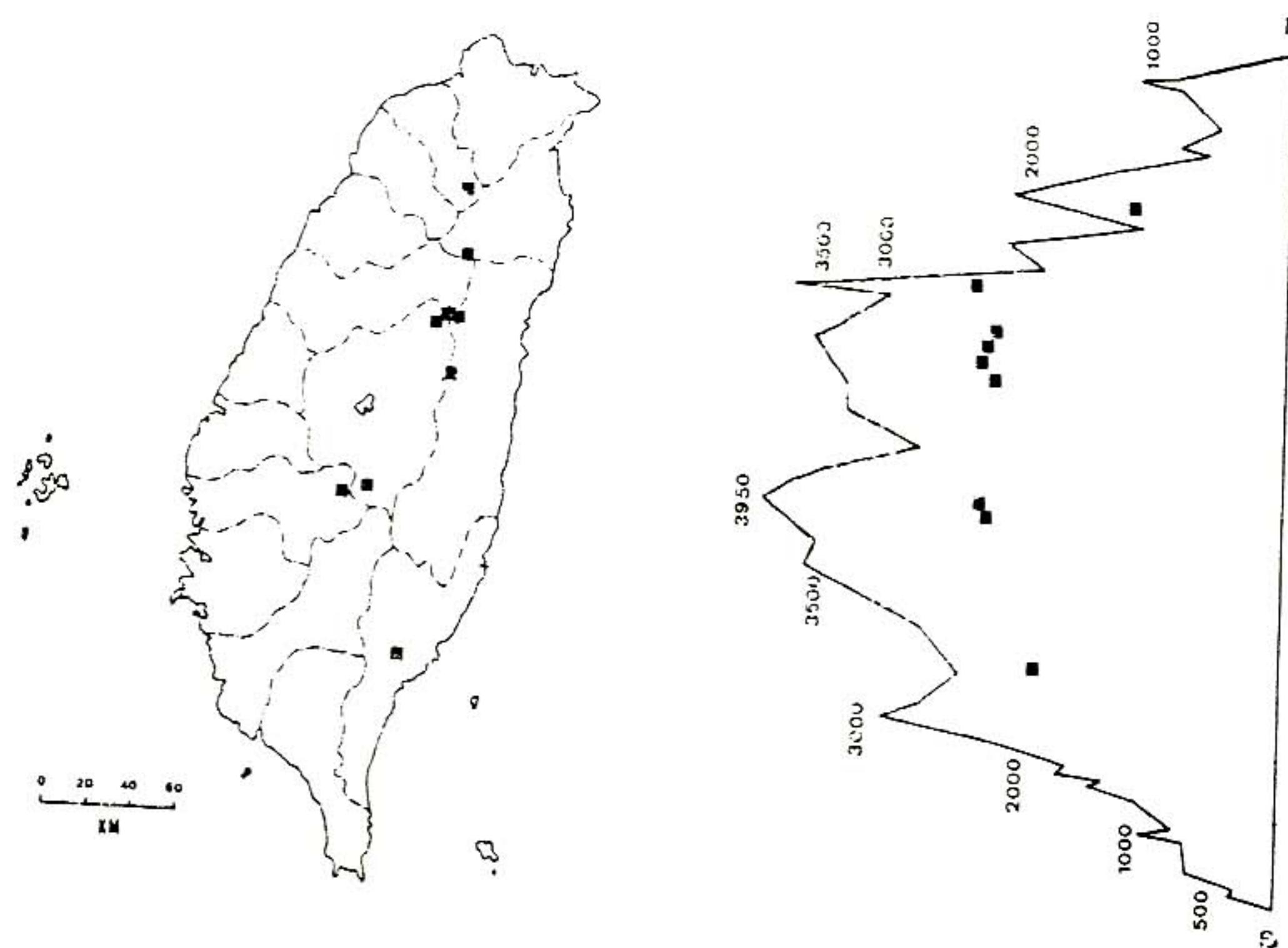


Fig. 4. Latitudinal and altitudinal distribution of *Clematis henryi* Oliv. var. *morii* (Hay.)
T.Y. Yang & T.C. Huang in Taiwan.

nerves flat or sunken on adaxial side and elevated on abaxial side; petiolulate. Inflorescence dichasium axillary or terminal, usually solitary; pedicels albo-velutinous, with 2 or more pairs bracts, decussate, chartaceous, subulate or linear, glabrous inside and pubescent outside. Flowers white, turned yellowish-brown when dry, campanulate, pendent, recurved at the tip, ca. 1.5 – 2.5 cm diameter. Sepals 4, rarely 5 or 6, oblong or ovate-oblong, ca. 1.5 – 2.5 cm long, 0.5 – 1.2 cm wide; apex acute; base obtuse; albo-velutinous outside and glabrous except tip and margin inside. Stamens pubescent, numerous, several layers, inner ones shorter than outers, ca. 0.7 – 1.7 cm long; anthers 1-celled, oblong, lateral longitudinal dehiscence, connective thin, mucurate or not, glabrous; filament linear, flat and dilated near base, long sericeous over than anther. Carpels numerous, with white sericeous. Fruits ca. 2.8 – 4.0 cm long; achenes narrow ovate or elliptical, elevated on both sides, brown, ca. 0.3 – 0.5 cm long, velutinous; style persistent and lengthen tail-like, with pale yellow bearded.

Blooming season from November to February next year; fruiting season from January to April.

Endemic, found in open land of Central Mountains and Alishan Mountains from altitude 1000 to 2500m.

The variety differs from var. *henryi* by leaves ternate compound only. This is similar to *C. henryi* var. *ternata* M.Y. Fang on the Flora Reipublicae Popularis Sinicae Vol. 28 (1980). The first author checked the specimens deposited at PE, and found that there are two specimens i.e. Liou 11315 (Typus) and 11450 (possibly the same sheet of Liou 11305 cited by Fang (1980). They were collected at the same town

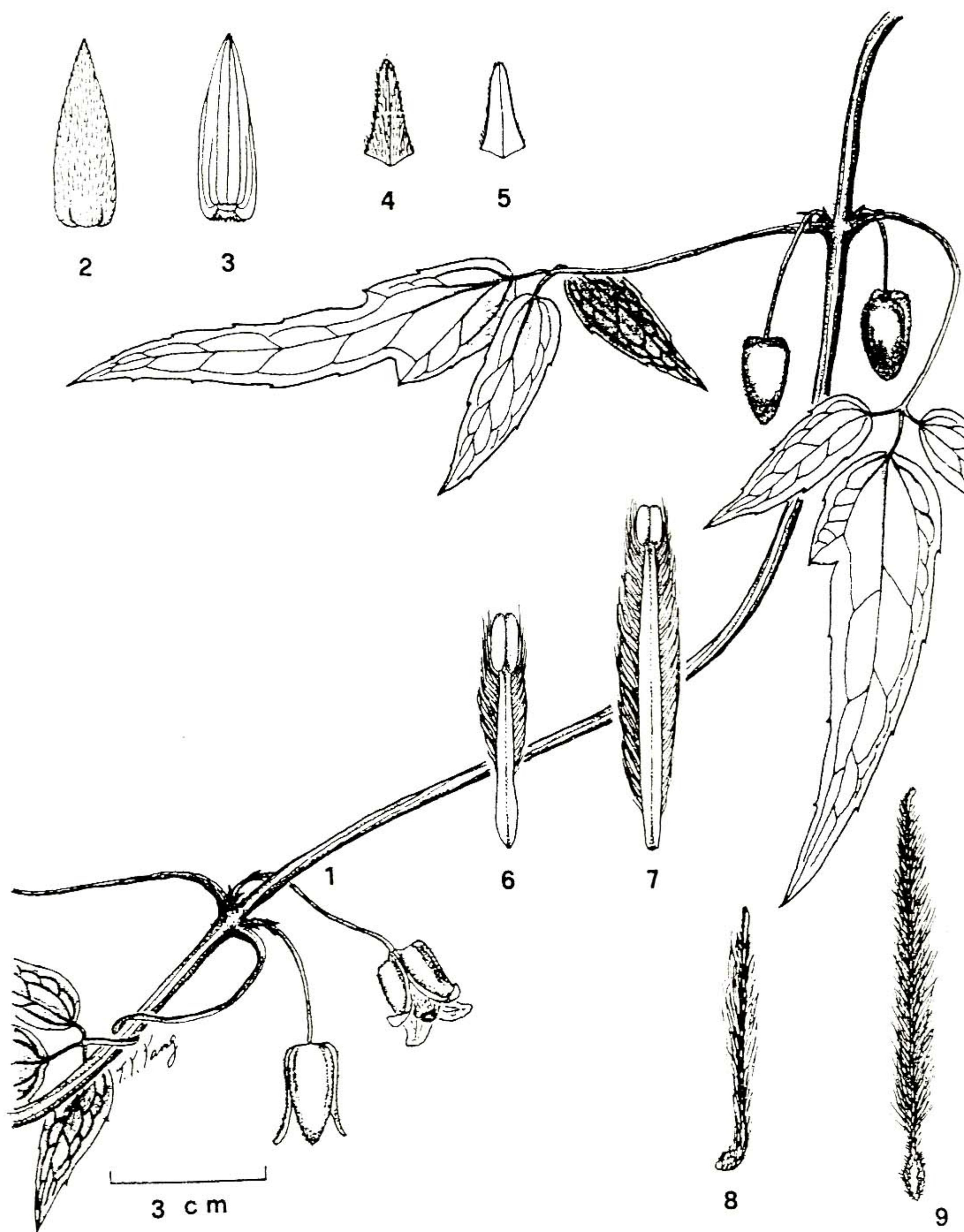


Plate 9. *Clematis henryi* Oliv. var. *morii* (Hay.) T.Y. Yang & T.C. Huang
 (Ranunculaceae). 1. Habit; 2. Sepal (abaxial); 3. Sepal (adaxial); 4. Bract
 (abaxial); 5. Bract (adaxial); 6 and 7. Stamens; 8. Carpels; 9. Achene.

of different places. Wang (1987) thought the taxon is a intermediate-type between *C. henryi* Oliv. and *C. morii* Hay., but we thought it just a variation of *C. henryi* with 3-lobed to ternate compound leaves. Such a leaf variation happened also in Taiwan.

TAIWAN: Taoyuen: Baling to Mt. Lalashan, Yang 1927(K.C. Yang & Hsieh Coll.).
Taichung: Mt. Nanhutashan, Yang 329A(Huang Coll.). **Nantou:** E-W across Highway, Hung & Lee 9(TUNG); Yang 752, 1729, 1746, 2485, 2579, 2624, 2637*, 2764*, 2852, 2948*, 3185(TUNG); Piluhsing, Yang et al. 4042(TUNG); Wusheh, Wilson 10061(K); Hsitou, Mikage 77026(KYO); Hosheh, Shimizu 11420(TI); Salihsienhsing, Yang 3656(TUNG); Cashiahsigu, Chen 12941(priv.); Kuankao to Dueikuan, Yang et al. 3424(TUNG).
Chiayi: Mt. Alishan, Kanehira & Sasaki s.n. Feb 1918(TAIF), F.Y. Lu & Ou 1080(NCAI), Yang 5565(TUNG). **Kaohsiung:** Kuaigu, F.Y. Lu & Ou 3304(TCF). **Hualien:** Tayulin, Mikage 77039(KYO); Mt. Nenkaoshan, Kanehira & Sasaki s.n. Mar 1918(TAIF); Yenpin, Ou & Lu 4873(TCF). **Taitung:** Chakahsi, Kawakami & Mori 4510(TI).

2. ***Clematis lasiandra*** Maxim. in Bull. Acad. Imp. Sci. St. Petersb. **22:** 213. 1876; Kuntze in Verh. Bot. Ver. Brand. **26:** 169. 1885; Finet & Gagnepain in Bull. Soc. Bot. Fr. **50:** 547. 1903; Handel-Mazzetti in Act. Hort. Gothob. **13:** 196. 1939; Wang in Act. Phytotax. Sinica **6:** 373. 1957; Chang et al. Fl. Reip. Pop. Sinicae **28:** 112. 1980.

Clematis lasiandra Maxim. var. *nagasawai* Hayata in J. Coll. Sci. Univ. Tokyo **25:** 40. 1908; Kawakami, List Pl. Form. 2. 1910; Hayata, Icon. Pl. Form. **1:** 18. 1911; Sasaki, List Pl. Form. 183. 1928; Kudo & Masamune in Ann. Rep. Taihoku Bot. Gard. **2:** 77. 1932; Suzuki, Short Fl. Form. 65. 1936; Masamune, List Vasc. Pl. Taiwan 53. 1954; S.S. Huang in Biol. Bull. Nat. Taiwan Norm. Univ. **5:** 26. 1960; Liu & Hsieh in Li et al., Fl. Taiwan **2:** 484. 1976; T.C. Huang in Li et al., Fl. Taiwan **6:** 48. 1979; T.I. Yang, List Pl. Taiwan 603. 1982.

Typus: Japan: Sikoku: Nagasaki, Nagayama s.n. 1863. (BM!, K!)

毛蕊鐵線蓮

Figs. 5-6; Pl. 10.

A scandent perennial deciduous woody vine. Stem sulcate, with gland hair when young and turned glabrous when getting old. Leaves biernate or flammuliform (Kuntze, 1885), the first several leaves usually alternate in the juvenile stage then opposite; chartaceous; petioles tendril, ca. 4.3 – 6.7 cm long, petiole base extended and combined together. Leaflets 9 to 15, sometimes to 21 or more segments, 5-leaflet at the pedicel or near the base, ovate or ovate-lanceolate, ca. (3.8–)4.7 – 7.2(–8.6) cm long, (1.3–)1.8 – 3.4(–4.8) cm wide; apex acuminate or acute; base obtuse, truncate or cordate, and oblique usually on lateral ones; 1 – 3-lobed; margin serrulate to double-serrate; velutinous or near so on adaxial surface; glabrous or sparse velutinous just along vein on abaxial surface; 3 – 5-main-veined, nerves flat or sunken on adaxial side and elevated on abaxial side; petiolulate. Inflorescence compound dichasium axillary; pedicels

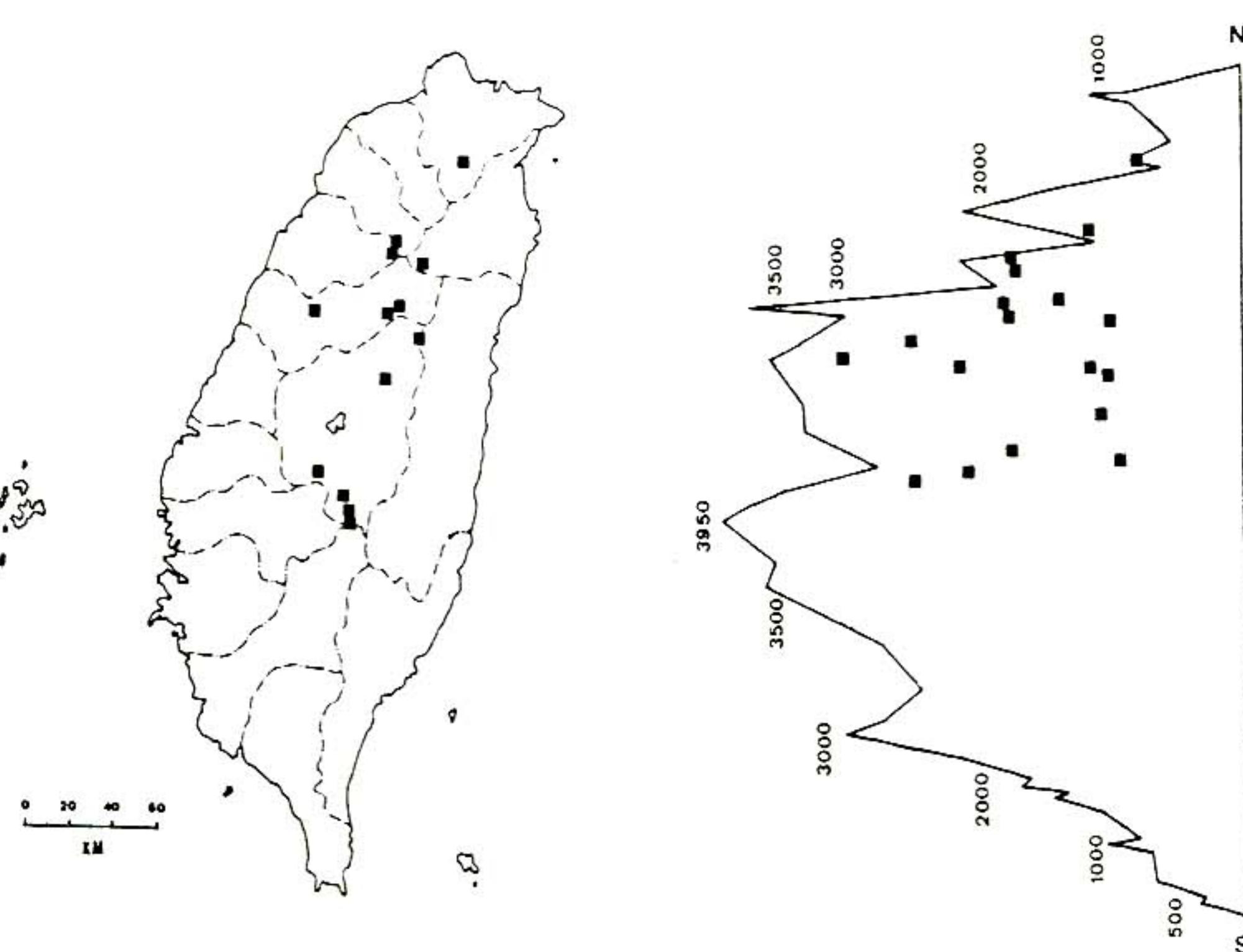


Fig. 5. Latitudinal and altitudinal distribution of *Clematis lasiandra* Maxim. in Taiwan.

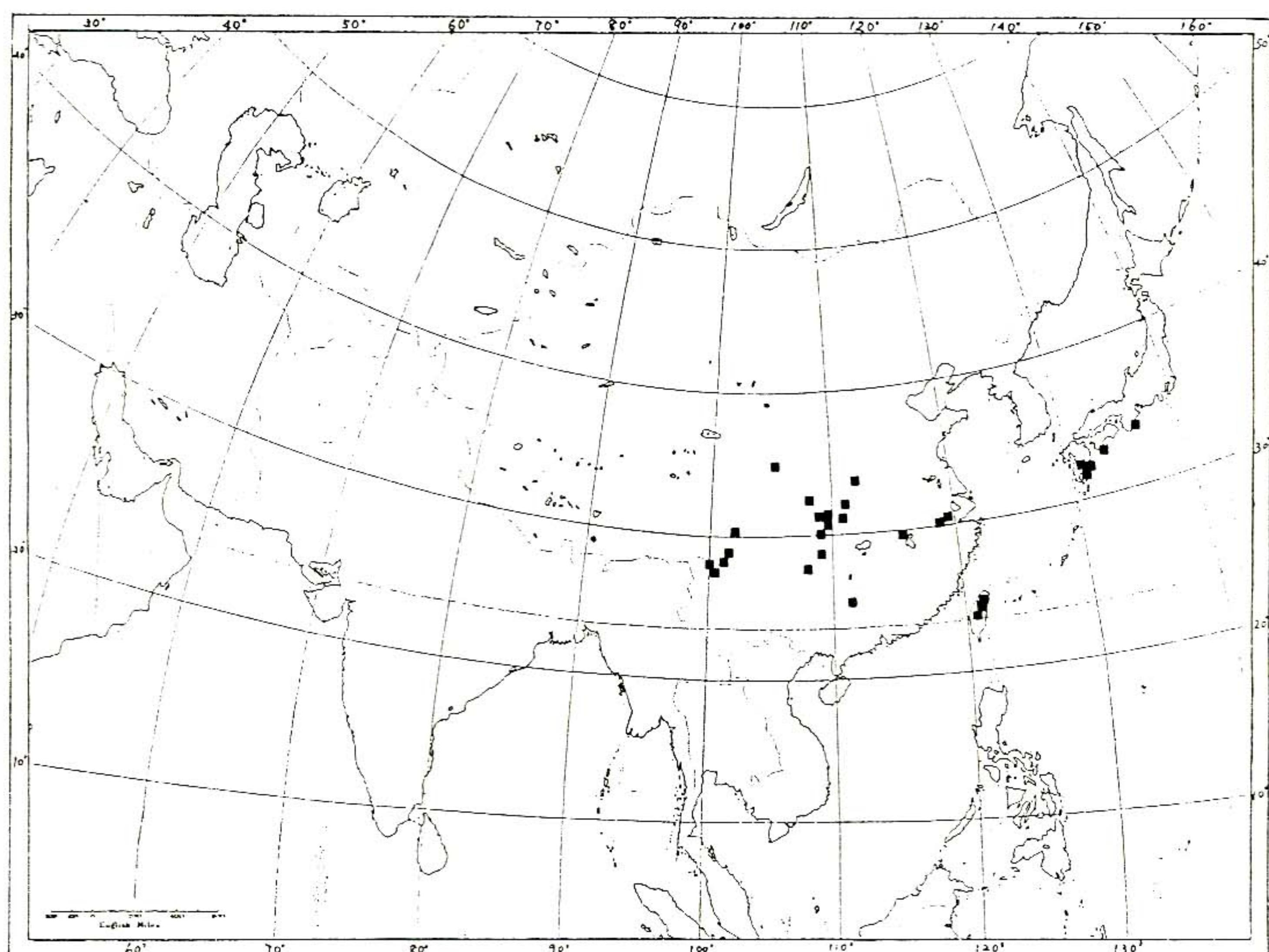


Fig. 6. Distribution of *Clematis lasiandra* Maxim. in Asia.

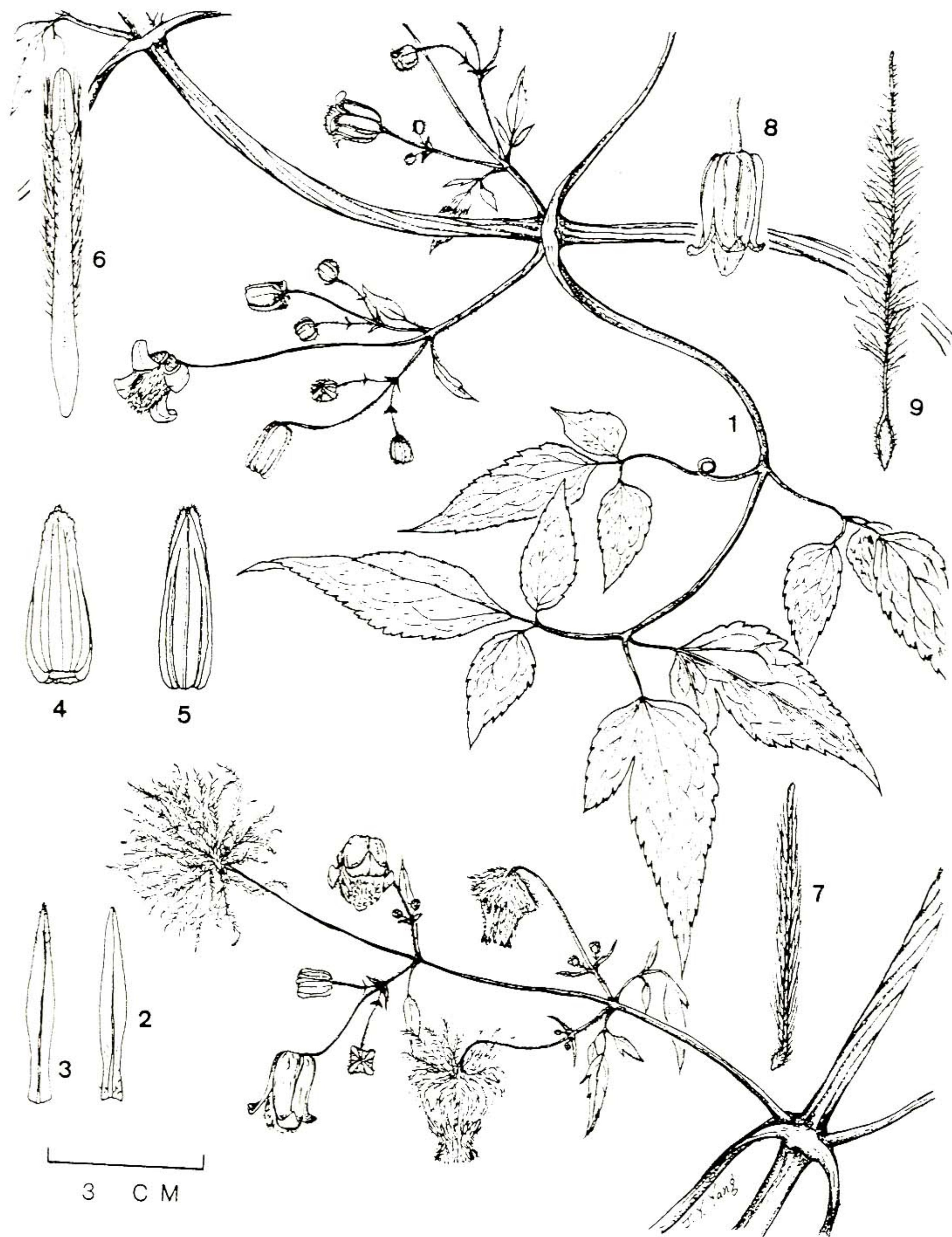


Plate 10. *Clematis lasiandra* Maxim. (Ranunculaceae). 1. Habit; 2. Bract (adaxial); 3. Bract (abaxial); 4. Sepal (adaxial); 5. Sepal (abaxial); 6. Stamen; 7. Carpels; 8. Flower; 9. Achene.

glabrous or nearly so, trichotomous branched; bracts leaf-like, lanceolate, almost glabrous on both sides (pubescent base inside and near tip outside only). Flowers pale pink to dark pink, sometimes near white, turned brown when dry, campanulate, pendent, recurved at the tip, ca. 1.5 – 2.5 cm diameter. Sepals 4, oblong or ovate-oblong, ca. 1.0 – 2.5 cm long, 0.5 – 1.0 cm wide; apex acute; base obtuse; glabrous on both sides except recurved tip and margin inside; nerves elevated outside. Stamens pubescent, numerous, several layers, inner ones shorter than outers', ca. 1.0 – 2.0 cm long; anthers 1-celled, oblong, lateral longitudinal dehiscence, connective thin, unmucurate, glabrous; filaments linear, flat and dilated near base, long sericeous over than anther. Carpels numerous, with sericeous. Fruits ca. 2.3 – 3.5 cm long, achenes ovate or elliptical, elevated on both sides, reddish-brown, ca. 0.3 cm long, velutinous; style persistent and lengthen taillike, with white bearded.

Blooming season in Taiwan from July to November; fruiting season from November to January next year.

The main distribution in China (south from Jujiang Range and north to Huangho Range, including Yunnan, Sichuan, Gansu, Shaanxi, Guizhou, Guangxi, Hubei, Hunan, Jiangxi, Guangdong, Anhui, Zhejiang to Taiwan) and to S. Japan (Ists. Ryukyu, Kyushu, Sikoku and part of Hoshu). In Taiwan, it grows in forest margins or open place of Hsueshan Mountains, Central Mountains and Yushan Mountains ca. 1000-2800cm.

MAINLAND CHINA: YUNNAN: *Forrest* 15351(K), 16155(K), *McLaren* D327; Lichiang, *Feng* 21088(PE), *Forrest* 3065(K); Shangpa, *H.T. Tsai* 54889(PE); Yangchang, *Cavalerie* 7870(K). SICHUAN: *Wilson* 1315a(K), 3119(K); Chenkou, *Dai* 102157(CDBI); Chinfoshan, *Kuan et al.* 2285(E); Hanyuan (Xikang Prov.), Nitou, *Smith* 13471(BM), *T.P. Wang* 9689(PE), Kangding, *Lancaster* 963(K), *Smith* 13331(BM); Lushan, *B.I. Peng* 46828(CDBI); Maowen, *Chipeiduei* 8881(CDBI); Paohsin, *Kuan & Wang* 3009(K, PE); Tchenkeoutin, *Farges s.n. s.d.* (P); Wuhsi, *K.H. Yang* 65457(CDBI). GANSU: Danchiu, *Y.C. Ho* 866(PE); Lower Tebbu, *Rock* 14683(G), 14707(E, K, P); Tienshue, *C.M. Liou* 10401(PE). SHAANXI: *Licent* 2964(K); Chowchih, *Kung* 3719(PE); Liouba, *K.J. Fu* 6237(PE); Shanyang, *J.B. Wang* 16532(PE); Taipaishan, *T.N. Liou & Tsoong* 1443(PE), *Purdom s.n.* 1910(K). GUIZHOU: Fanchingshan, *Steward et al.* 801(BM, E, K, PE); Houangtsaopa, *Cavalerie* 4327(K); Zenhuai, *Choun* 152(PE). HONAN: Sonhsien, *Instit. Forest. Honan* 949(PE). HUBEI: *Henry* 6713(BM); 7583(K), *Wilson* 673(K), 679(K), 1471(K); Dayiuhu, 1980 *Sino-Amer. Exped.* 1192(E); Fanghsien, *K.R. Liou* 452(PE); Ichang, *Henry* 2859(K), 3006(K), 3694(K) 4460(K); Lichuan, *Dai & Chien* 1557(PE); Malingtung, *Fan & Li* 597(P). HUNAN: Wushang, *L.H. Liou & Ho* 16000(PE). JIANGXI: Lushan, *Nei & Chen* 7920(PE). GUANGDONG: Ruyuan, *S.C. Liou* 29181(PE). ZHEJIANG: Mt. Tienmushan, *Ching* 3384(PE); Mt. Xitienmushan, *Law* 1070(PE).

TAIWAN: **Taipei:** Mt. Lalashan, *Sasaki s.n.* Oct 1930(TAIF). **Ilan:** Nanshan, *Chuang* 2439(TAI, TI). **Hsinchu:** Kuanwu, *Yang* 2334; Matalahsi, *Yang et al.* 3176*(TUNG); Mt. Tapachienshan, *Hung & Lee s.n.* Sept 1986(TUNG). **Taichung:**

Lishan, *Hsu* 12474, *S.F. Huang* 157, *Huang* 10030, *Idzumi & Tigashi* 1586(TI), *Kuoh et al.* 8662, *Yang* 783*, 1676, 2940, 3178(TUNG), 3759(TUNG), 4223(TUNG), 4227(TUNG); Huianshan, *Mori s.n.* Oct 1936; Wuling, *Yang* 2676 (*Huang* Coll.). **Nantou:** E-W across Highway, *Yang* 2578, 2622, 3186(TUNG); Meifong, *Tsai* 9505, *Yang* 790 (*T.I. Yang* Coll.), 3223* (TUNG); Wusheh, *Sasso s.n.* Nov 1932(NCAI); Hosheh, *Shimizu* 10830, 10989; Hsitou, *Yang* 3236 (*Hsu* Coll.) (TUNG); Shanlinhsia, *Yang & Chen* 2791*; Tungpu, *Jeng* 2462, *Yang* 4181(*Wang* Coll.) (TUNG); Salihsienhsia, *J.W. Hsu* 1983, *Yang* 3700(TUNG), 3835(TUNG); Mt. Yushan, *Kawakami s.n.* Nov 1905(TAIF), *Kawakami & Sasaki s.n.* Oct 1909(TAIF); Wanhsiang, *Chen* 12437(priv.). **Chiayi:** New across Highway, *Chen* 12836(priv.). **Tainan:** Hsinhua Farm, *Kuoh* 13132(CKH). **Kaohsiung:** Tienchi to Likuang, *Chen* 13375(priv.). **Hualien:** Tayulin, *Tang* 91; Shiokuluahsi, *Nagasawa* 611(Typus of *C. lasiandra* Maxim. var. *nagasawai* Hay., Holotype: TI!; Isotype: KYO!). **Taitung:** Yakou to Liyuen, *Yang et al.* 4251(TUNG).

JAPAN: KYUSHU: Isl. Asosan, *Ichikawa* 23(BM, P); Hyuga, *Tashiro s.n.* Oct 1934(TI), *Togasi s.n.* Oct 1956(BM, G, K, P); Kumamoto, *Mayebara* 5479(TI). SIKOKU: Tosa, *Faurie* 11811(P), *Nanokawa s.n.* Sept 1891(K). HONSHU: Kii, *Murata* 9409(KYO).

3. ***Clematis leschenaultiana* DC.**, Syst. 1: 151. 1818, Prod. Syst. 1: 6. 1824; Finet & Gagnepain in Bull. Soc. Bot. Fr. 50: 542. 1903; Kawakami, List Pl. Form. 2. 1910; Hayata in J. Coll. Sci. Univ. Tokyo 30: 5. 1911, Icon. Pl. Form. 1: 17. 1911; Sasaki, List Pl. Form. 183. 1928; Kudo & Masamune in Ann. Rep. Taihoku Bot. Gard. 2: 77. 1932; Handel-Mazzetti in Act. Hort. Gothob. 13: 191. 1939; Suzuki, Short Fl. Form. 65. 1936; Masamune, List Vasc. Pl. Taiwan 53. 1954; S.S. Huang in Biol. Bull. Nat. Taiwan Norm. Univ. 5: 24. 1960; Liu, Ill. Nat. Intr. Lign. Pl. Taiwan 1: 142. f. 122. 1960; Ohwi, Fl. Japan 598. 1965; Hatusima, Fl. Ryukyu 277. 1971; Liu & Hsieh in Li et al., Fl. Taiwan 2: 486. 1976; T.C. Huang in Li et al., Fl. Taiwan 6: 48. 1979; Chang et al. Fl. Reip. Pop. Sinicae 28: 120. 1980; T.I. Yang, List Pl. Taiwan 603. 1982; Wang in Bull. Bot. Res. 7: 100. 1987.

Clematis fulva Zoll. & Mor. ex Moritzi, Syst. Verz. Zoll. 35. 1845-46.

Clematis caesariata Hance in J. Bot. 8: 71. 1870.

Clematis acuminata DC. var. *leschenaultiana* Kuntze in Verh. Bot. Ver. Brand. 26: 167. 1885

Clematis acuminata DC. ssp. *leschenaultiana* Bruhl in Ann. Bot. Gard. Calc. 5: 75. 1896.

Clematis leschenaultiana DC. var. *fulva* O. Kuntz. in Ann. Jard. Bot. Buitenzorg 14. t. 20. 1897.

Clematis splendens Lévl. et Vant. in Bull. Acad. Inter. Geog. Bot. 11: 171. 1902.

Clematis connata sensu Matsumura & Hayata in J. Coll. Sci. Univ. Tokyo 22: 6. 1906; Kawakami, List Pl. Form. 1. 1910; Masamune, List Vasc. Pl. Taiwan 53. 1954; non DC.

Clematis wightiana sensu Hayata in J. Coll. Sci. Univ. Tokyo 25: 43. 1908; Kawakami, List Pl. Form. 2. 1910; non Wall.

Clematis leschenaultiana DC. var. *angustifolia* Hayata in J. Coll. Sci. Univ. Tokyo 30: 16. 1911, Icon. Pl. Form. 1: 18. 1911; T.C. Huang, Fl. Taiwan 6: 48. 1979.

Clematis angustifolia (Hay.) Hay., Icon. Pl. Form. 3: 1. 1913; Sasaki, List Pl. Form. 182. 1928; Kudo & Masamune in Ann. Rep. Taihoku Bot. Gard. 2: 76. 1932; Suzuki, Short Fl. Form. 64. 1936; S.S. Huang in Biol. Bull. Nat. Taiwan Norm. Univ. 5: 18. 1960.

Clematis leschenaultiana DC. var. *subglabrifolia* Merr. in Philipp. J. Sci. Series C Botany 10: 303. 1915.

Typus: Indonesia: Java, *Leschenault s.n.* s.d. (P?)

锈毛鐵線蓮

Figs. 7-8; Pl. 11.

A scandent perennial evergreen woody vine. Stem sulcate, dense golden velutinous. Leaves ternate compound, opposite, chartaceous; petioles tendril, ca. 6.6 — 11.7 cm long. Leaflets 3, ovate-elliptic to ovate-lanceolate, ca. (6.4—)7.3 — 10.5(—13.8) cm long, (2.2—)3.9 — 5.9(—7.8) cm wide; apex acuminate or acute; base cordate or obtuse, and oblique usually on lateral ones; unlobed or few 3-lobed; margin dentate; golden velutinous on adaxial surface and dense golden tomentose on abaxial surface; 3 — 5-main-veined, nerves flat or sunken on adaxial side and elevated on abaxial side; petiolulate. Inflorescence dichasium or cyme(compound dichasium) axillary; pedicels golden velutinous, trichotomous branched; bracts leaf-like, lanceolate, golden velutinous on both sides; bracteols subulate, golden pubescence. Flowers golden, campanulate, pendent, recurved at the tip, ca. 1.5 — 2.5 cm diameter. Sepals 4, oblong or ovate-oblong, ca. 1.5 — 2.5 cm long, 0.5 — 1.0 cm wide; apex acute; base obtuse; dense golden velutinous outside and glabrous or nearly so inside except recurved tip and margin. Stamens pubescent, numerous, several layers, inner ones shorter than outers', ca. 1.0 — 2.5 cm long; anthers 1-celled, linear, lateral longitudinal dehiscence, connective thin, unmucurate, glabrous; filaments linear, flat and dilated near base, long sericeous over than anther. Carpels numerous, with golden sericeous. Fruits ca. 3.5 — 4.7 cm long, achenes oblong-lanceolate or fusiform, elevated on both sides, reddish-brown, ca. 0.5 — 0.7 cm long, golden velutinous; style persistent and lengthen tail-like, with golden bearded.

Blooming season in Taiwan from December to February next year; fruiting season from February to April.

It is the only one species on this section distributed from North Hemisphere to South Hemisphere and widely distributed in old world. The distributed area from India, Himalaya, S. China (including Yunnan, Sichuan, Guizhou, Guangxi, Hubei, Hunan, Guangdong, Hainan, Fujian and Taiwan), Vietnam, Philippines to Indonesia (Sumatra and Java) and north distributed to S. Japan (Ists. Ryukyu and Kyushu only). In Taiwan widely distributed ca. 500-2500m mountains regions.

MAINLAND CHINA: YUNNAN: Guangnan, C.Z. Wang 385(PE); Hokou, H.T. Tsai 52633(PE); Mengtsz, Henry 9360(K); Wenshan, H.T. Tsai 51652(SZ). SICHUAN: Nanchuan, Kuan et al. 292(E), K.F. Li 60381(SZ), C.Y. Liou 3889(PE); Mt. Omei Y.B. Yang 53465 (SZ), Y.B. Yang 53482(SZ). GUIZHOU: Cavalerie 1986(P), 4244(K), Esquirol 4347(P); Tchenlin, Bodinier 2248(Typus of *C. splendens* Lévl. & Van., E!);

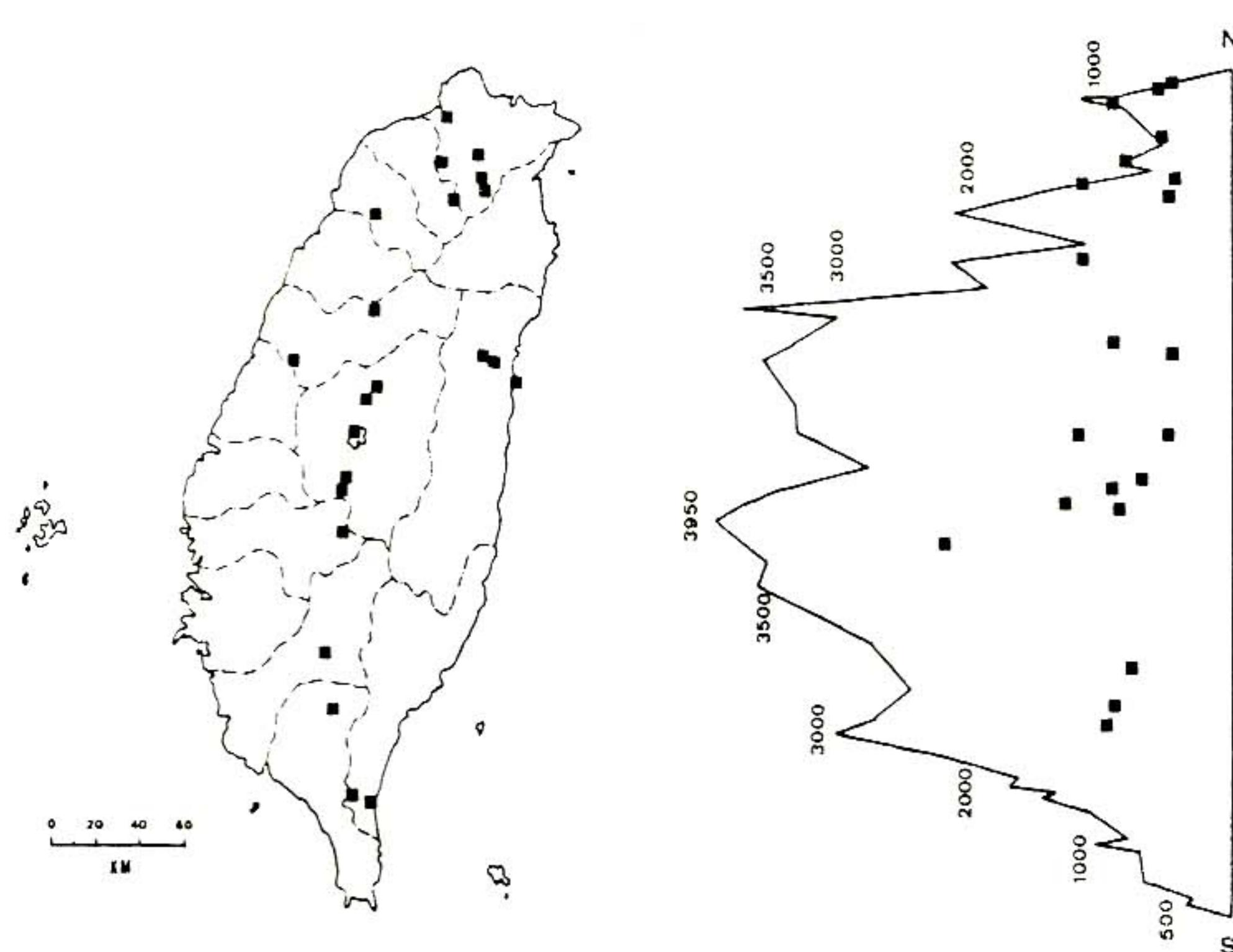


Fig. 7. Latitudinal and altitudinal distribution of *Clematis leschenaultiana* DC. in Taiwan.

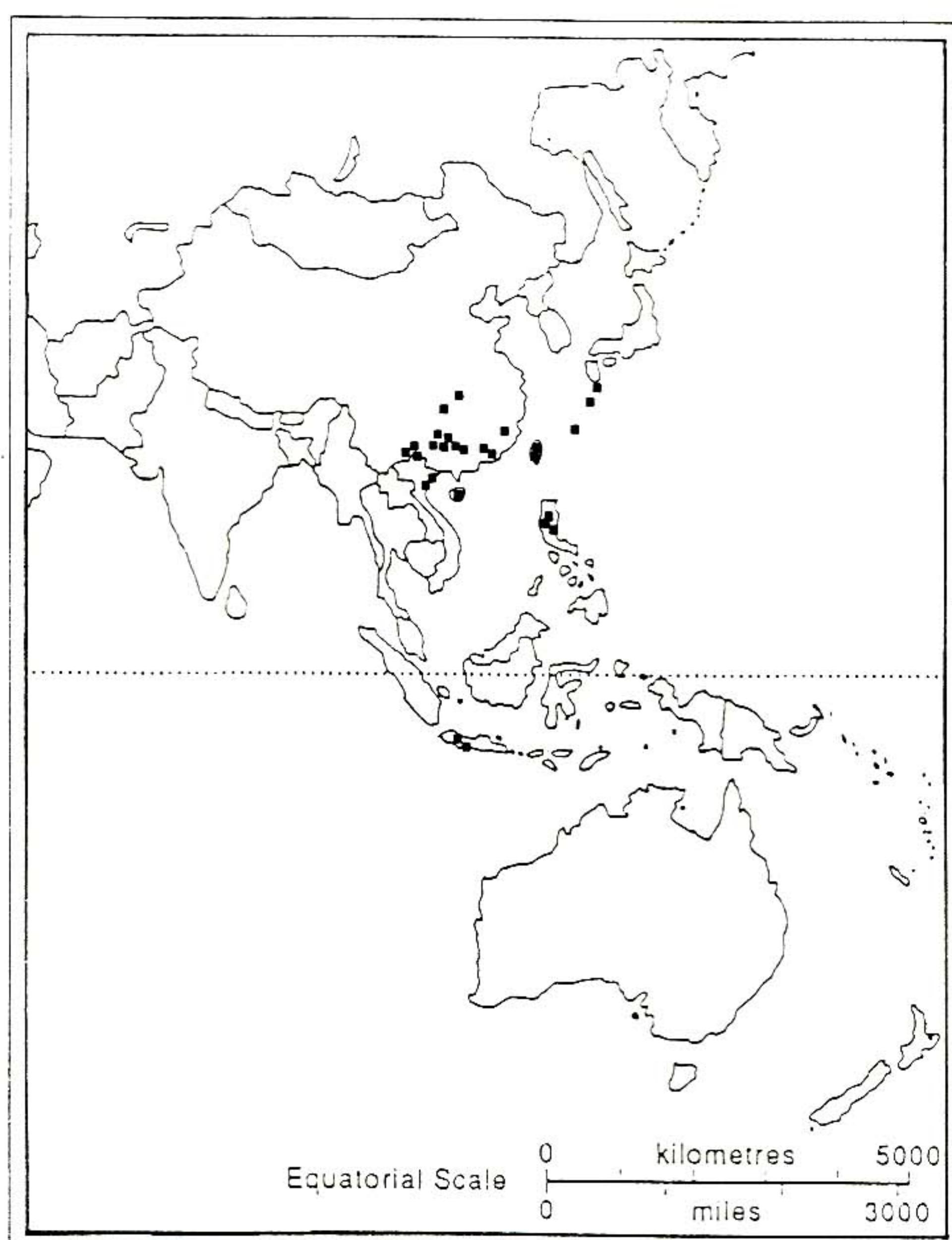


Fig. 8. Distribution of *Clematis leschenaultiana* DC. in Asia.

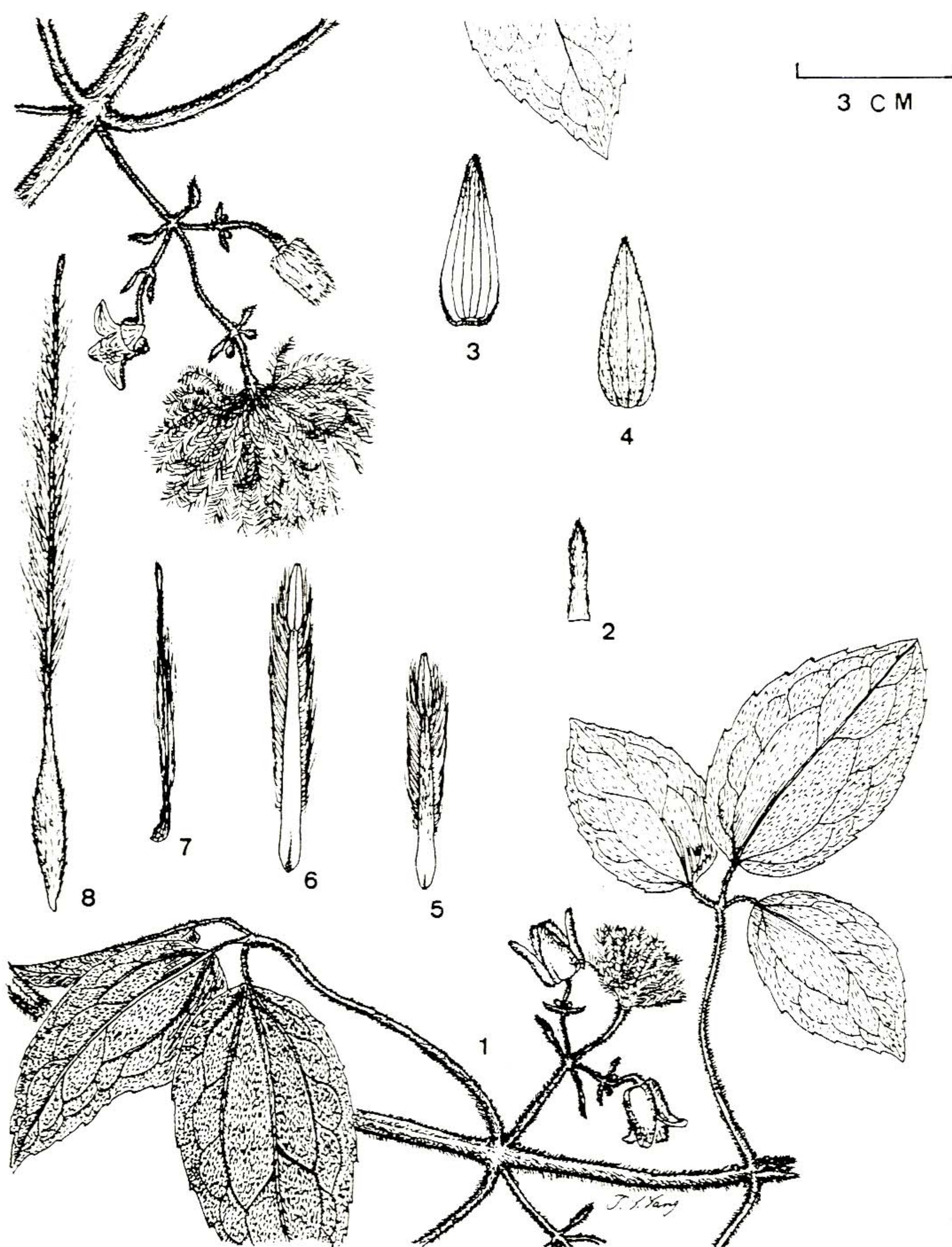


Plate 11. *Clematis leschenaultiana* DC. (Ranunculaceae). 1. Habit; 2. Bract; 3. Sepal (adaxial); 4. Sepal (abaxial); 5. Stamen (abaxial); 6. Stamen (adaxial); 7. Carpel; 8. Achene.

Hoangkochou, *Martin & Bodinier* 2248(Typus of *C. splendens* Lévl. & Vant., E!); Pakaing, *Esquirol* 360(E); Taehheng, *Tsiang* 9261(P); Tsehen, *Tsao* 1165(PE). GUANGXI: Fongshan, *L.W. Hsu* 1411(PE); Linkuei, *L.C. Chen* 94304(PE); Yangshuo, *Liang & Huang* 45782(PE). HUBEI: Ichang, *Henry* 3284(K). HUNAN: Ijang, Meitien, *Choun* 641(PE); Lochang, *S.C. Chen* 182(TAIF); Paimu Village, *W.T. Tsang* 23405(G). GUANGDONG: Chujiang, Lungtaushan, *Ko* 50273(SZ) *McClure* 13735(BM, G); Tewenkuan, *C. Huang* 163703(PE); Wungyuen, *Lau* 841(P), 25217. HAINAN: Wujishan, *McClure* 8614(BM, G, K). FUJIAN: *DeGrijs* 6700(Typus of *C. caesariata* Hance, BM! K!); Nanping, *G.S. Ho* 263(PE); Wanmayyien, *Chung* 1338(K).

TAIWAN: **Taipei:** Mt. Kuangyingshan, *Nakamura* 4189, *Yang* 354B; Hsitienshan, Pitan, *Chuang* 2592(TAI, TI); Kueishan, *Chuang* 3159(TAI, TI), *Sasaki** s.n. Mar 1934; Hayao, *Suzuki* 18432; Wulai, *T.S. Hsieh* s.n. Jan 1989(TUNG), *Kao & Chuang* 4681(HAST), *Yamamoto & Suzuki* s.n. Mar 1936, *Yang* 954*, 955, 1182, 1185, 2686; Mt. Peichiatienshan, *Yang* 1920. **Taoyuen:** Mt. Lalashan, *Kao* 10210. **Hsinchu:** Mt. Wujishan, *Kawakami* s.n. Jun 1907(TAIF), *Simada* 1128B(TAIF); Meihua, *Simada* s.n. Jan 1918(TAIF); Mt. Chialichienshan, *Sasaki* s.n. Jan 1916(TAI, TAIF). **Taichung:** Huoyenshan, *K.H. Chen* et al. s.n. Apr 1979(TCF); Mt. Anmashan, *Liu* et al. 17; E-W across Highway, *T.J. Tsai* et al. s.n. Mar 1979 TCF). **Nantou:** Hsitu, *Feung & Kao* 321, *H.C. Li* et al. 10103, *Ou* et al. 3073(NCAI), *Yang* 175A, 885, 888, 2975; Mt. Fonghuangshan, *Kuo* 10315(TAI, TI); Sunmoon Lake, *Yang* 2437 (*Huang* Coll.); Mt. Chichitashan, *Yang* et al. 5882(TAI, TUNG); Hueihsien Farm, *Ou* et al. 8940(TCF); Mt. Kuandaoshan, *Suzuki* 21104(PE, TAI); Puli, *Y.C. Liu* et al. 889(NCAI), *Midage* 77057(KYO); Chienhsia, *Hsu & Kuoh* 11298; Salihsienhsia, *J.W. Hsu* 1898, *W.H. Hu* 509. **Chiayi:** Chungpu, *G.P. Chen* s.n. Feb 1977(TUNG), *Fu* s.n. Feb 1980(TUNG), *Y.C. Li* s.n. Feb 1977(TUNG); Erkuei, Shuechanliou, *Owatari* s.n. Jan 1898(TI); Fenchihu, *Faurie* 1317(BM, P), 1720(KYO), *Kanehira & Sasaki* s.n. Jan 1918(TAIF); Mt. Alishan, *Kawakami & Sasaki* s.n. Mar 1911(TAIF); Shinko, Rahao, *Kawakami* s.n. 1908(Typus of *C. leschenaultiana* DC. var. *angustifolia* Hay., TI!). **Tainan:** Kuanjinlin, *Kuoh* 11312(NCKU). **Kaohsiung:** Chishan, *Yamamoto & Mori* 743; S. across Highway, *Kuoh* 11117(NCKU, TUNG), 13879(NCKU). **Pingtung:** Wutai, *I.S. Chen* 1591. **Hualien:** Hualien Harbour, *Yashikawa* s.n. Mar 1923(TAIF); Tienhsian, *Yamamoto & Tanaka* s.n. Oct 1930; Yenhai-lindao, *Yang, Hsieh* et al. 5484(TAI, TUNG); Lushue to Hsinchen, *Chiou & Lin* s.n. Apr 1983(TAIF); Hueitouwan to Shahmeiyuen, *Hsieh & Tang* T.176; Longchien to Panpien, *Shimizu* 11157. **Taitung:** Tawu, *Chuang & Kao* 3421; Chinshueyin, *Chang* 7310(PAI); Mt. Tajenshan, *Kawakami & Mori* 4509(TAIF). Uncertain place or no local place: Ilukoshia, *Kawakami & Mori* 2149(TI); Kakinlushia, *Owatari* s.n. Mar 1898(TI); *Sasaki* s.n. Jan 1931, s.n. Dec 1932.

VIETNAM: Tonkin: Dongdang, *Balansa* 1534(P); Langson, *Petelot* 3190(Colani Coll.) (P), 6733(P).

PHILIPPINE: LUZON: Mt. Polis, *McGregor* s.n. Feb 1913(Typus of *C. leschenaultiana* DC. var. *subglabifolia* Merr., BM! K!), *Ramos & Edano* s.n. Feb 1920 (BM); Benguet, Baguio *Elmer* 5923(K).

INDONESIA: JAVA, *Forbes* 855(BM), *Shuttleworth s.n.* s.d. (Isotype of *C. fulva* Zoll. & Mor. ex Moritzi, BM!)

JAPAN: RYUKYU: Nagoshi, Mt. Katsudake, *Furuse* 4739(K). KYUSHU: Yakushima, *Yamazaki* 6933(TI), 6948(TI), Tokunoshima, *J. Murata & Endo* 20(TI).

4. ***Clematis psilandra*** Kitagawa in J. Jap. Bot. **13**: 352. 1937; Masamune, List Vac. Pl. Taiwan 53. 1954; Shimizu in J. Fac. Tex. Sci. Technol., Shinshu Univ. n. 36. Ser. A. (Biol.), n. **12**: 25. 1963; Liu & Hsieh in Li *et al.*, Fl. Taiwan **2**: 489. 1976; T.C. Huang in Li *et al.*, Fl. Taiwan **6**: 48. 1979; T.I. Yang, List Pl. Taiwan 604. 1980.

Clematis heracleifolia DC. var *taiwanica* S. Suzuki & Hosokawa in Trans. Nat. Hist. Soc. Form. **23**: 96. 1933; T. Suzuki, Short Fl. Form. 65. 1936.

Typus: Taiwan: Pingtung, Mt. Mutoo, Hannoki et Adel, *Hosokawa* 5405 (Holotype: TAI! Isotype: TAI!)

光蕊鐵線蓮

Fig. 9; Pl. 12.

An erect perennial deciduous shrub, ca. 50-120 cm tall. Stem sulcate, albo-velutinous, turned glabrous when old; axillary bud in the last year growing branch or older one with bud scales. Leaves ternate, opposite, chartaceous; petioles ascending, ca. 5.6 – 10.6 cm long, densely velutinous. Leaflets 3, broad ovate, ovate or elliptical, ca. (4.5–)7.1 – 11.0(–12.0) cm long, (3.8–)5.6 – 9.9(–12.8) cm wide; apex acuminate; base truncate or obtuse, lateral segments oblique; 3 – 5-lobed, margin serrate; glabrous or near so on adaxial side and pubescence alone nerves on abaxial side; 5-main-veined, nerves flat or sunken on adaxial side and elevated on abaxial side; petiolules on terminal segment and subsessile or sessile on lateral ones. Inflorescence dichasium, terminal and axillary, usually clustered; pedicels albo-velutinous; bracts chartaceous, subulate or leaflike with serrate or lobed, sparse velutinous inside and dense villous outside. Flowers polygamo-dioecious, pale pink, turned brown when dried, salverform, ca. 1.0 cm diameter, recurved at the tip. Sepals 4, oblong-lanceolate to linear, turned wider above middle, ca. 1.4 – 2.0 cm long, 0.3 – 0.5 cm wide; apex cuspidated-mucronulate; base obtuse; sericeous-tomentose outside and glabrous inside. Stamens sparse pubescent, numerous, ca. 0.4 – 1.0 cm long; anthers 1-celled, linear, lateral longitudinal dehiscence, connective mucurate, glabrous on both sides or sparse hairs outside; filaments linear, dilated near anther, sparse hairs outside. Carpels numerous, albo-sericeous. In staminate flowers with normal stamens and sterile carpels. Fruits ca. 2.4 – 4.9 cm long, achenes ovate or elliptical, elevated on both sides, deeply brown. ca. 0.35 – 0.45 cm long, yellow velutinous; style persistence and lengthen tail-like, with yellowish bearded.

Blooming season from July to September; fruiting season from August to October.

Endemic, found in Central Mountains and Alishan Mountains ca. 1000-2500m open land.

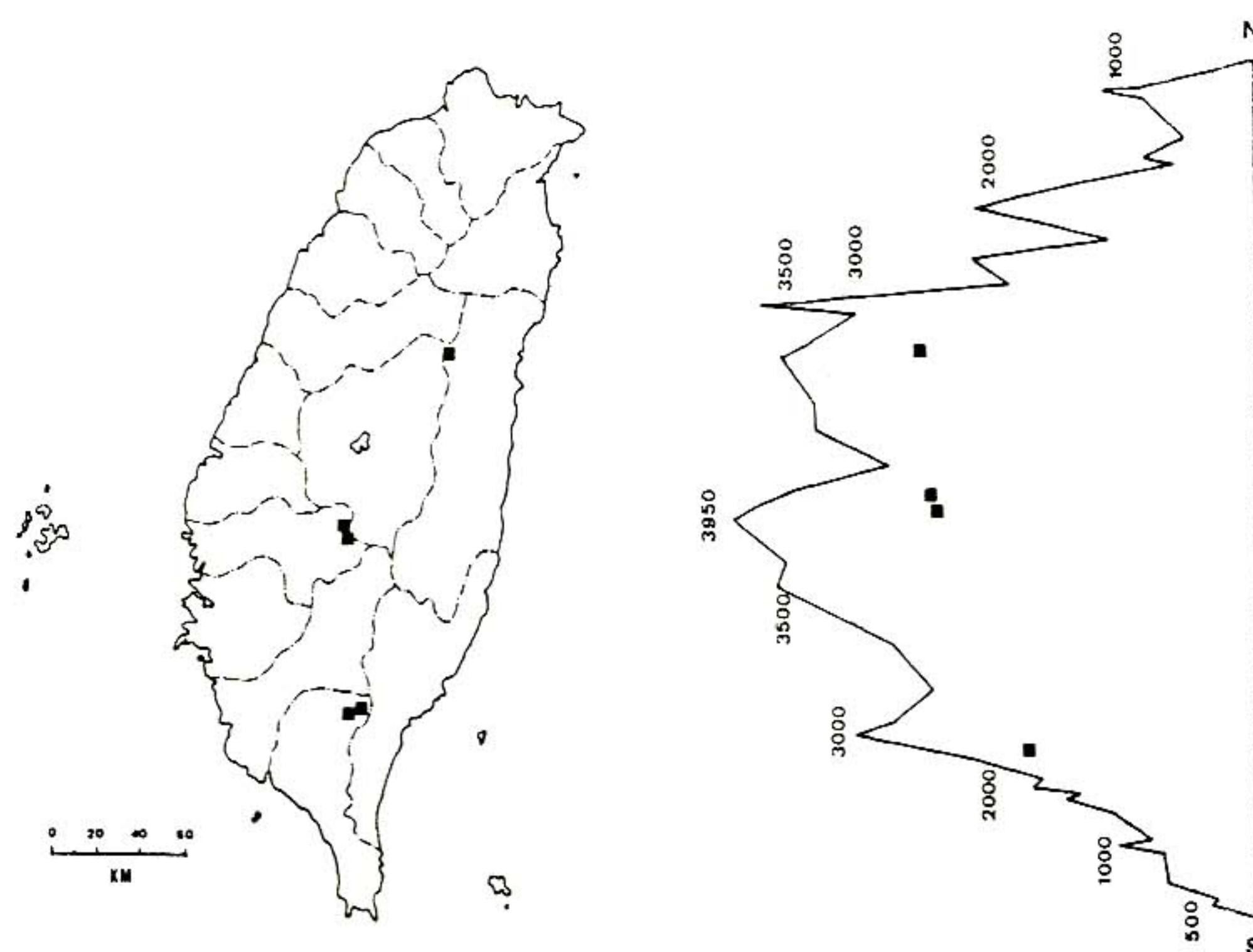


Fig. 9. Latitudinal and altitudinal distribution of *Clematis psilandra* Kitagawa in Taiwan.

TAIWAN: **Chiayi:** Mt. Alishan, (C.E.) Chang 3913(PAI), Chen 5467, Z.Y. Chen & Lin s.n. May 1987, F.Y. Lu & Ou 1438(NCAI), Peng 4599(HAST), Yamamoto & Yamaguchi s.n. Oct 1931, Yang 2558, 3065, 3070, 3086, 4214*(TUNG), 4213*(TUNG), 4622(TAI, TUNG). **Pingtung:** Hannoki, Suzuki s.n. Aug 1932; Wutai, Chang 11958(PAI), Namba et al. 1573(TI); Mt. Tawushan, Huang & Kao 7455, Namba et al. 197(TI). **Hualien:** Tayulin, Kuoh et al. 6915. No. local name: Kawakami et al. s.n. Nov 1904(TI).

5. ***Clematis tsugetorum*** Ohwi in Act. Phytotax. Geobot. **2:** 153. 1933; Suzuki, Short Fl. Form. 65. 1936; Kitagawa in J. Jap. Bot. **13:** 358. 1937; Masamune, List Vasc. Pl. Taiwan 53. 1954; Liu & Hsieh in Li et al., Fl. Taiwan **2:** 493. 1976; T.C. Huang in Li et al., Fl. Taiwan **6:** 49. 1979; Chang et al. Fl. Rep. **28:** 93. 1980; T.I. Yang, List Pl. Taiwan 605. 1982.

Typus: Taiwan: Hualien, Mt. Nengkaoshan, Ohwi 3277 (Holotype: KYO!; Isotype: TAI!).

高山鐵線蓮

Fig. 10; Pl. 13.

An erect perennial deciduous small shrub, ca. 30 – 60 cm tall. Stem sulcate, sparse velutinous, turned glabrous when old; axillary bud in the last year growing branch or older one with bud scales. Leaves ternate or pinnate, opposite, chartaceous; petioles ascending, ca. 3.3 – 4.8 cm long, dense velutinous. Leaflets 3 to 5, ovate or elliptical, ca. (1.3–)1.99 – 3.42(–3.8) cm long, (1.1–)1.5 – 2.1(–2.8) cm wide; apex acuminate; base truncate or obtuse, lateral segments oblique; 1 – 3-lobed; margin irregularly serrate; pubescence or sparse pubescent on adaxial side and sparse pubescent alone nerves on abaxial side; 3 – 5-main-veined, nerves flat or sunken on adaxial side and elevated on abaxial side;

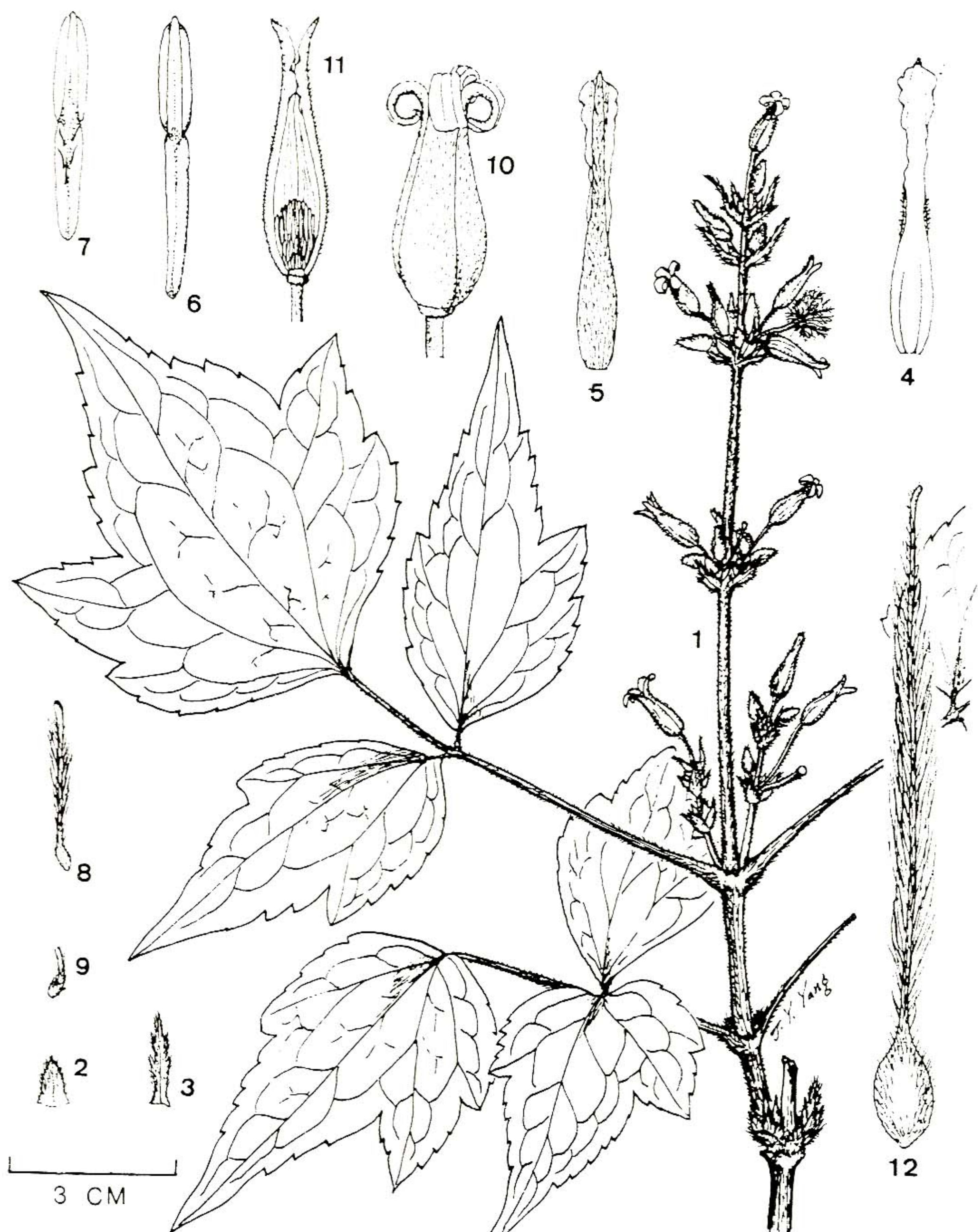


Plate 12. *Clematis pailandra* Kitagawa (Ranunculaceae). 1. Habit; 2. Bud scale;
3. Bract; 4. Sepal (adaxial); 5. Sepal (abaxial); 6. Stamen (adaxia); 7.
Stamen (abaxial); 8. Carpel; 9. Sterile carpel; 10. Flower; 11. Dissected
flower (with sterile carpels); 12. Achene.

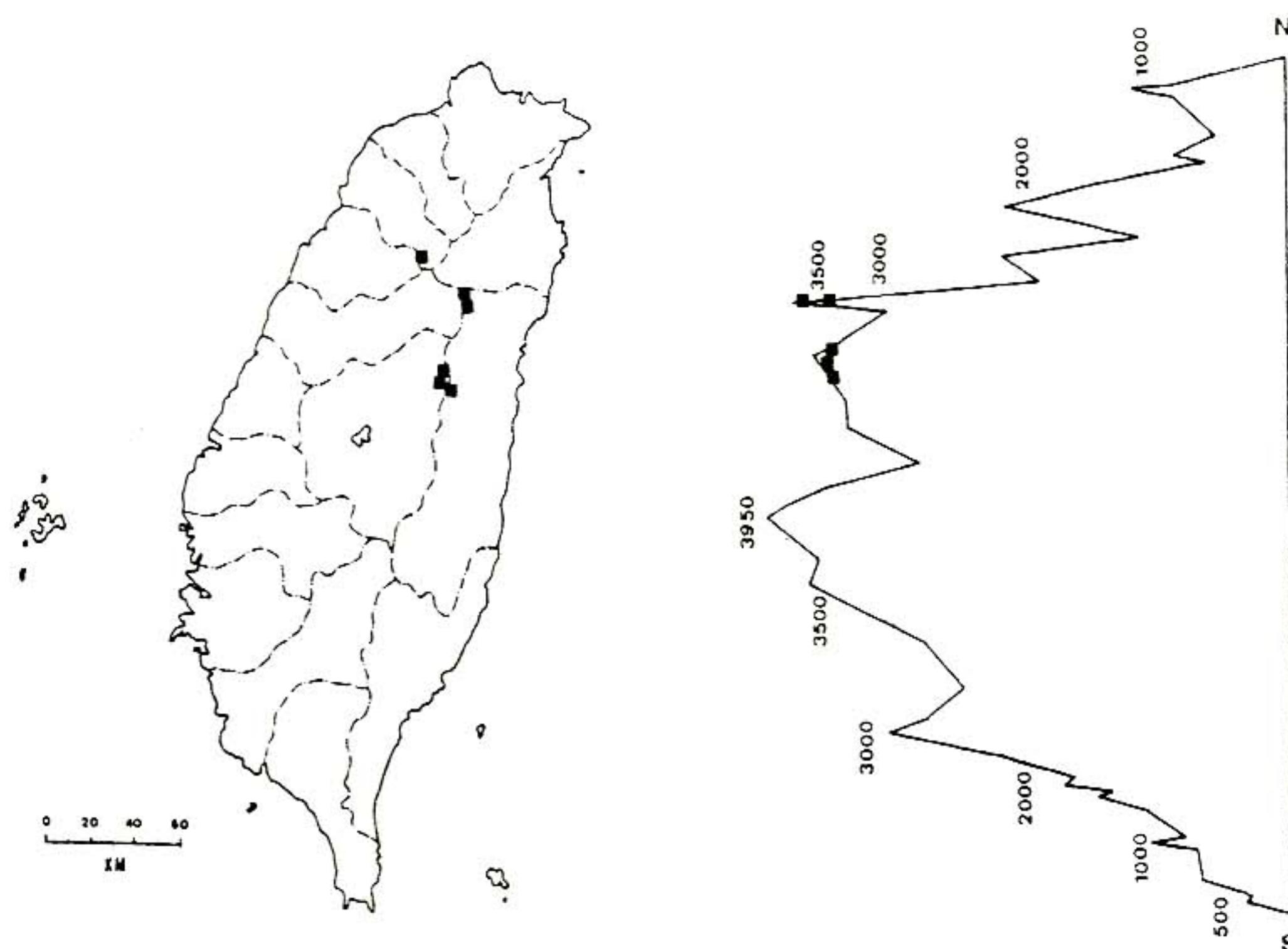


Fig. 10. Latitudinal and altitudinal distribution of *Clematis tsugetorum* Ohwi in Taiwan.

petiolules on terminal segment and subsessile or sessile on lateral ones. Inflorescence solitary, terminal and axillary, few dichasium (3-flowered); pedicels long, albo-velutinous; bracts chartaceous, leaf-like, lobed or serrate, glabrous or nearly so inside and dense villous outside. Flower polygamo-dioecious, pale blue or purple and turned brown when dry, salverform, ca. 1.0 – 1.2 cm diameter, recurved at the tip. Sepals 4, obovate-oblong or obovate-lanceolate, turned wider above middle, ca. 1.5 – 2.0 cm long, 0.5 – 0.7 cm wide; apex obtuse-mucronulate; base obtuse; villous outside and glabrous inside. Stamens sparse pubescent, numerous, ca. 0.6 – 1.0 cm long; anthers 1-celled, linear, lateral longitudinal dehiscence, connective mucurate, glabrous on both sides or sparse hairs outside; filaments linear, dilated near anther, sparse hairs outside. Carpels numerous, sericeous. In staminate flowers with normal stamens and sterile carpels. Fruits ca. 2.1 – 3.0 cm long, achenes elliptical, elevated on both sides, reddish-brown around and dark brown in central, ca. 0.4 – 0.5 cm long, velutinous; style persistence and lengthen tail-like, with pale yellow or maize bearded.

Blooming season from July to September; fruiting season from August to October.

Endemic, found in north part limestone region above altitude 3000m., e.g. Nengkaoshan, Chilaishan, Nanhutashan and Tapachienshan.

TAIWAN: Ilan: Mt. Chungyangchienshan, Tamura & Koyama 23654(KYO, TI); Mt. Nanhutashan, Jiliting, Yamazaki *et al.* 302(TI). **Hsinchu:** Mt. Tapachienshan, R.S. Chiang s.n. Sept 1986(TUNG), Hsieh 1336, Kao 8502, Kuoh 3842, Sasaki s.n. Jul 1932, J.T. Wu 1336, Yang 2352* 2366, 3164*(TUNG), 3165(TUNG), Y.P. Yang s.n. Jul 1976(TAIF). **Taichung:** Mt. Nanhutashan, Z.Y. Chen & Hsu s.n. Jun 1986, Ohwi

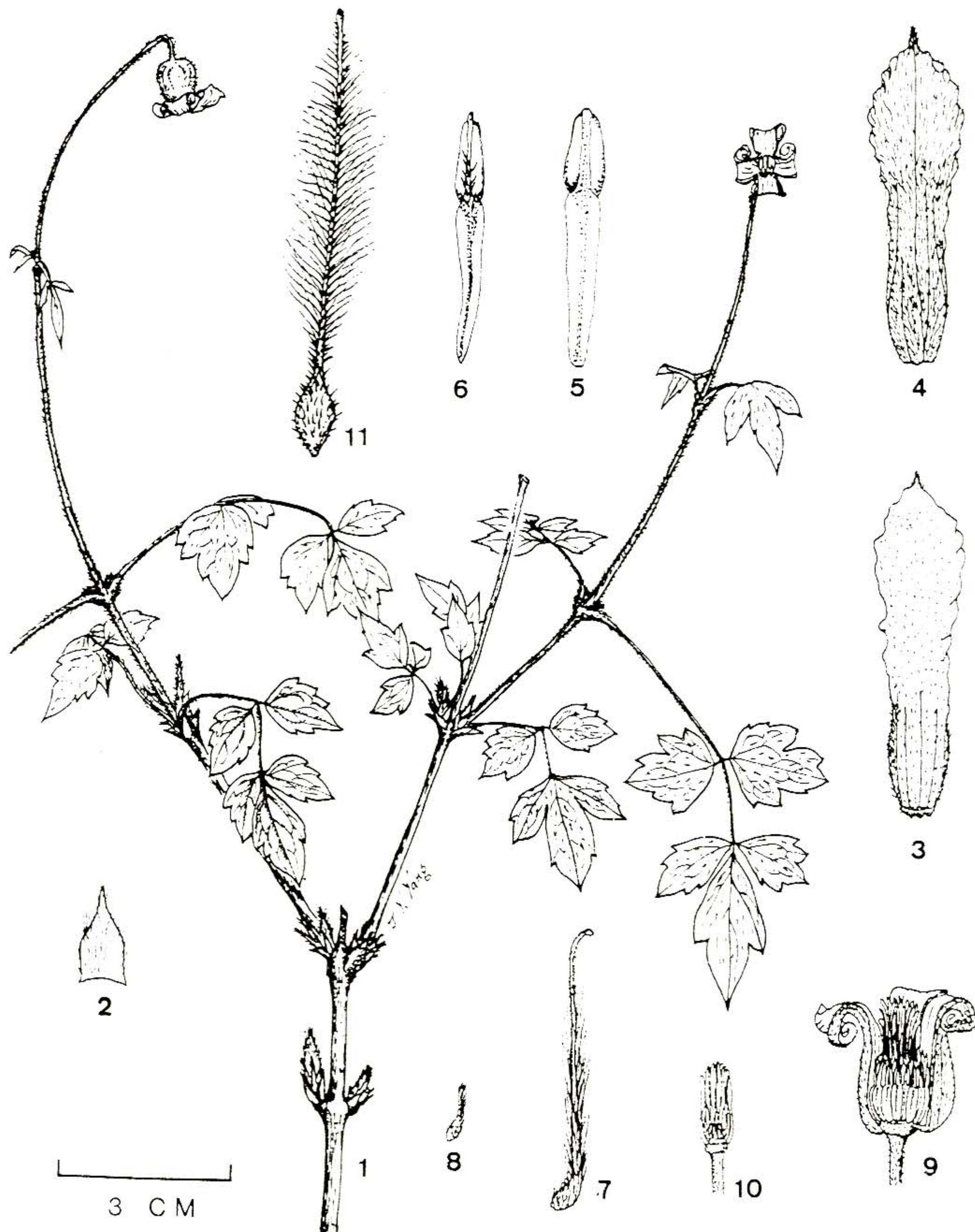


Plate 13. *Clematis tsugetorum* Ohwi (Ranunculaceae). 1. Habit; 2. Bud scale; 3. Sepal (adaxial); 4. Sepal (abaxial); 5. Stamen (adaxial); 6. Stamen (abaxial); 7. Carpel; 8. Sterile carpel; 9. Flower; 10. Dissected flower (with sterile carpels); 11. Achene.

4041(KYO), *Sasaki** s.n. Oct 1928, *T. Suzuki et al.* 17427, 18089, *Wang et al.*, 3715* 3752, *Yang et al.* 5092(K, PE, TAI, TUNG); Mt. Hsueshan, *Kojima* s.n. Aug 1933(KYO). **Nantou:** Mt. Chilaichunanfong, *Sasaki* s.n. Aug 1929; Mt. Nengkaoshan, Tienchi, *Huang et al.* 5784, *Tamura & Koyama* 23330(KYO, TI). **Hualien:** Mt. Nengkaoshan, *Hashioka* s.n. Jul 1934, *Ohwi* 3162(KYO).

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臺灣毛茛科植物之新見(3)

尾葉鐵線蓮組之訂正

楊宗愈 黃增泉

摘要

本文為臺灣毛茛科尾葉鐵線蓮組 (*Clematis* Sect. *Viorna*) 植物之訂正研究。共處理六個分類羣，其中變更二個學名：森氏鐵線蓮 (*C. henryi* Oliv. var. *morii* (Hay.) T. Y. Yang & T. C. Huang) 為新的分類組合，毛蕊鐵線蓮 (*C. lasiandra* Maxim.) 為分類階級更動。文中比較本組植物之葉表特徵及花粉形態，並對每一分類羣加以描述、繪圖，及附其在臺灣和亞洲的分佈圖。