

## THE GENUS VERBASCUM (SCROPHULARIACEAE) IN CHINA

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The two genera *Verbascum* and *Celsia* of Linnaeus were differentiated by the number of stamens, five in the former and four in the latter. Later authors maintained the two as distinct until in 1891, Kuntze (Rev. Gen. Pl. 1: 468) combined the two. In the more recent and also the most detailed studies ever made, Murbeck maintained the validity of the two genera, *Celsia* (in Acta Univ. Lundensis 22: (1): 1-237. 1926) and *Verbascum* (l. c. 29 (2): 1-630. 1933). Many cases of parallel species and sections are recognized in each genus. Pennell (in Mongr. Acad. Nat. Sci. Phila. 5: 36-40. 1945) is of the opinion that Kuntze's reasons for uniting the two into a single genus are most cogent. The appearance of the fifth stamens apparently has occurred in more than one group and is of comparatively little significance phylogenetically as well as taxonomically than other more important characters. Kuntze and Pennell are thus here followed in combining the two genera.

*Verbascum*, thus interpreted, is a large genus with over 120 species widely distributed in the temperate regions of the Northern Hemisphere. Only two species, as enumerated below, occur in China. As a result of having combined the two genera, *Verbascum* and *Celsia*, one new combination is here effected.

Collections from the following herbaria were examined and are cited:

- A Arnold Arboretum
- LA University of California at Los Angeles
- MO Missouri Botanical Garden
- NY New York Botanical Garden
- PH Philadelphia Academy of Sciences
- TAI National Taiwan University
- UC University of California
- US United States National Herbarium

Grateful acknowledgement is hereby made to the curators of these institutions for the permission to consult their collections.

### *Verbascum* (Bauhin) Linnaeus

*Verbascum* L., Sp. Pl. 177. 1753; Gen. Pl. ed. V. 83. 1754.

Type species: *V. thapsus* L. of Europe.

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*Celsia* L., Sp. Pl. 621, 1753; Gen. Pl. ed. V. 272. 1754.

Type species: *C. orientalis* L. of Cappodocia and Armenia.

#### Key to the Chinese Species

- A. Plant covered with simple, obscurely glandular hairs or glabrous; lower leaves lobed; pedicels solitary, spreading, longer than the subglobose capsules; stamens usually four.....*V. chinense*  
 AA. Plant covered with dense, branched, non-glandular hairs; lower leaves crenate or denticulate; pedicels fasciculate, more ascending, shorter than or equaling the ovoid capsules; stamens five.....*V. thapsus*

#### *Verbascum chinense* (L.) comb. nov.

##### 1. *Verbascum chinense* (L.) comb. nov.

The Chinese plant, originally considered by most authors to be the same as the Indian species, *V. coromandelianum* (Vahl) Kuntze, was recognized by Murbeck and Handel-Mazzetti as a distinct variety of the species. It is here treated as a separate species.

*Celsia coromandeliana* Vahl var. *chinensis* Murb. in Act. Univ. Lunds N. Ser. 22 (1): 133. 1925; Hand.-Mazz., Symb. Sin. 7: 829. 1936. Murbeck cited the following collections: *Delavay 418, 4430, S. Ten 6231, Ducloux s.n., Hance & Simpson s.n.; E. H. Wilson 791, Henry s.n.*

*Scrophularia chinensis* L., Mant. 2: 250. 1771, p.p. This synonym was first given by Forbes & Hemsley (in Journ. Linn. Soc. Bot. 26: 177. 1890). J. E. Smith in Rees' Cyclopaedia, earlier (1819) stated, that *Scrophularia chinensis* in the Linnean herbarium actually consists of an imperfect specimen of what seems to be an *Ocimum*, accompanied by a still more imperfect branch of what may be a *Celsia* or *Verbascum*. Bentham in DC. Prodr. 10: 317. 1846, stated that Linnaeus' *Scrophularia chinensis* is *Celsia coromandeliana* and *Salvia plebeja*.

*Celsia coromandelianum* Vahl, Symb. Bot. 3: 79. 1794, p. p.; Benth. in DC. Prodr. 10: 1846, p. p.; Hance in Journ. Bot. 9: 231. 1878; Hook. f., Fl. Brit. Ind. 5: 251. 1886-90, p. p.; Forbes & Hemsl. in Journ. Linn. Soc. Bot. 26: 177. 1890. Vahl's plant was originally from India: "Habitat in India orientali. König".

*Celsia chinense* Druce in Rep. Bot. Exch. Cl. Brit. Isles 1916: 612. 1917.

The species is found in India and the Himalayas below 1000 meters. The Chinese variety is found in Yunnan, Szechuan, Hupeh, and Kwangtung. Flowers yellow. Flowering from April to July.

Szechuan: No precise locality, *Faber 790* (NY).

Hupeh: No precise locality, *Henry 193* (MO).

Kwangtung: No precise locality, *Herb. Hance s.n.* (NY).

Yunnan: Ta pin tze, *Delavay s.n.* (PH); Tong Tchouan, *E. E. Maire 3903*

(PH, LA); Kiao kia, *E.E. Maire* 3810 (PH), *S. Ten* 338 (UC), 6731 (LA); *Ducloux* 701 (UC), 1230 (UC); eastern slopes of the Likiang Snow Range, *J.F. Rock* 3894 (PH, US); northeast of Likiang, *R.C. Ching* 30108 (A).

This Chinese species differs from the Indian *V. coromandelianum* in that it is a taller, more robust plant, has leaves which are subglabrous, relatively shorter pedicels, a longer calyx, and a slightly larger corolla.

#### *Verbascum thapsus* Linnaeus

*Verbascum thapsus* L., Sp. Pl. 177. 1753; Benth. in DC. Prodr. 10: 225. 1846; Hook. f., Fl. Brit. Ind. 4: 250. 1883; Franch. in Bull. Soc. Bot. France 47: 10. 1907; Murb. in Act. Univ. Lunds N. Ser. 22 (2): 120. 1933; Pai in Contr. Inst. Bot. Nat. Acad. Peiping 2: 182. 1934; Hand.-Mazz., Symb. Sin. 7: 829. 1936. Linnaeus's type was from Europe: "Habitat in Europae, glareosis sterilibus".

Wide-spread in Europe and Asia; in China at altitudes of about 2300–3300 meters, in Sikang, Yunnan, and Tibet. Flowers yellow. Flowering from August to October.

Sikang: Muli, Achin, *T.T. Yü* 14417 (A); Tachienlu, *W.P. Fang* 3677 (US).

Yunnan: Yunnan Fu, *Ducloux* 174 (NY), *O. Schoh* 210 (US); Likiang, *J.F. Rock* 3287 (UC, US), 4296 (US), 4716a (US), *C.W. Wang* 71095 (A), *T.T. Yü* 15228 (A); Wei-si District, *C.W. Wang* 68063 (A, TAI), 64276 (A); Atuntze, *C.W. Wang* 70288 (A), *T.T. Yü* 7953 (A), 10517 (A), 10816 (A); Chungtien, *T.T. Yü* 13563 (A), *K.M. Feng* 1976 (A); no precise locality, *T.T. Yü* 6732 (A), *H.T. Tsai* 57465 (A).

This species is wide-spread in Europe and Asia, but in China it is confined to the Alpine regions in the extreme west. It belongs to the subspecies *enthapsus* of Murbeck.

## 中國之 *Verbascum* 屬(玄參科)植物

李 惠 林

玄參科中 Linnaeus 氏所定之二屬，*Verbascum* 及 *Celsia*，其分別僅在雄蕊之多寡：前者有 5，後者有 4。二屬間有若干近似相關之種。第五雄蕊之存在與否，可在各不同種類間發生。在系統上，此二屬殊無分列之必要。茲從 Kuntze 及 Pennell 二氏，認為一屬。

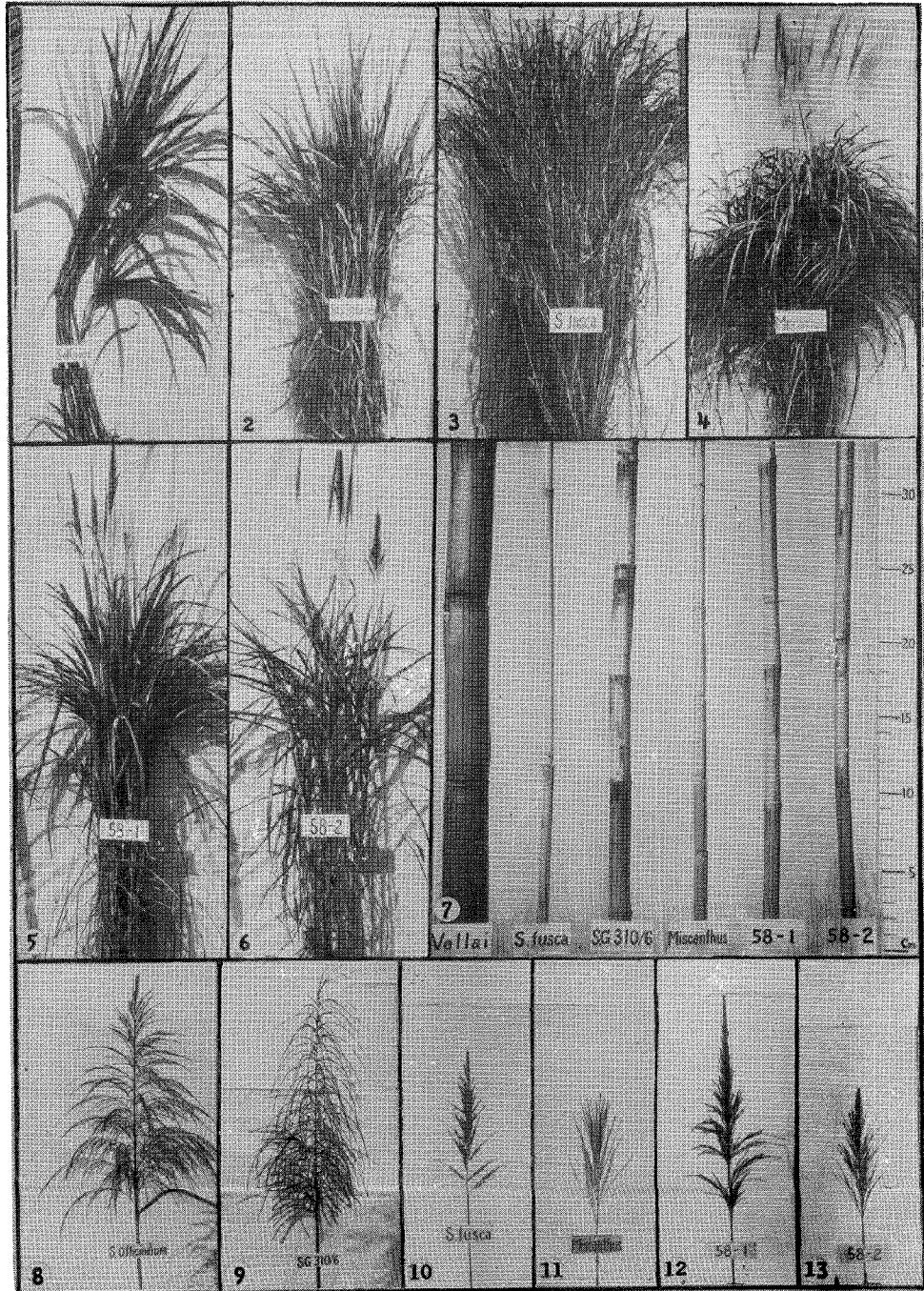
*Verbascum* 屬為分佈北半球溫帶之一大屬，為種不下 120，但在中國僅有 2 種。茲記載此 2 種之分類，其中一為新合名。（摘要）

## Explanation of Plate Figures

### Plate I.

- Figs. 1. Plant of *S. officinarum*, var. 28 NG 264.  
2. Plant of SG 310/6, BC<sub>1</sub> of (Vellai × *S. fusca*) × *S. fusca*.  
3. Plant of *Sclerostachya fusca*.  
4. Plant of *Miscanthus japonicus*.  
5. Plant of 58-1 (SG 310/6 × *M. japonicus*).  
6. Plant of 58-2 (SG 310/6 × *M. japonicus*).  
7. Internodes of the stems of the plants whose identities are labeled directly below each. Notice the relative size of the stem.  
8. Panicked raceme of *S. officinarum*, var. 28 NG 264.  
9. Panicked raceme of SG 310/6.  
10. Panicked raceme of *S. fusca*.  
11. Panicked raceme of *M. japonicus*.  
12. Panicked raceme of 58-1.  
13. Panicked raceme of 58-2.

Plate I



**Plate II.**

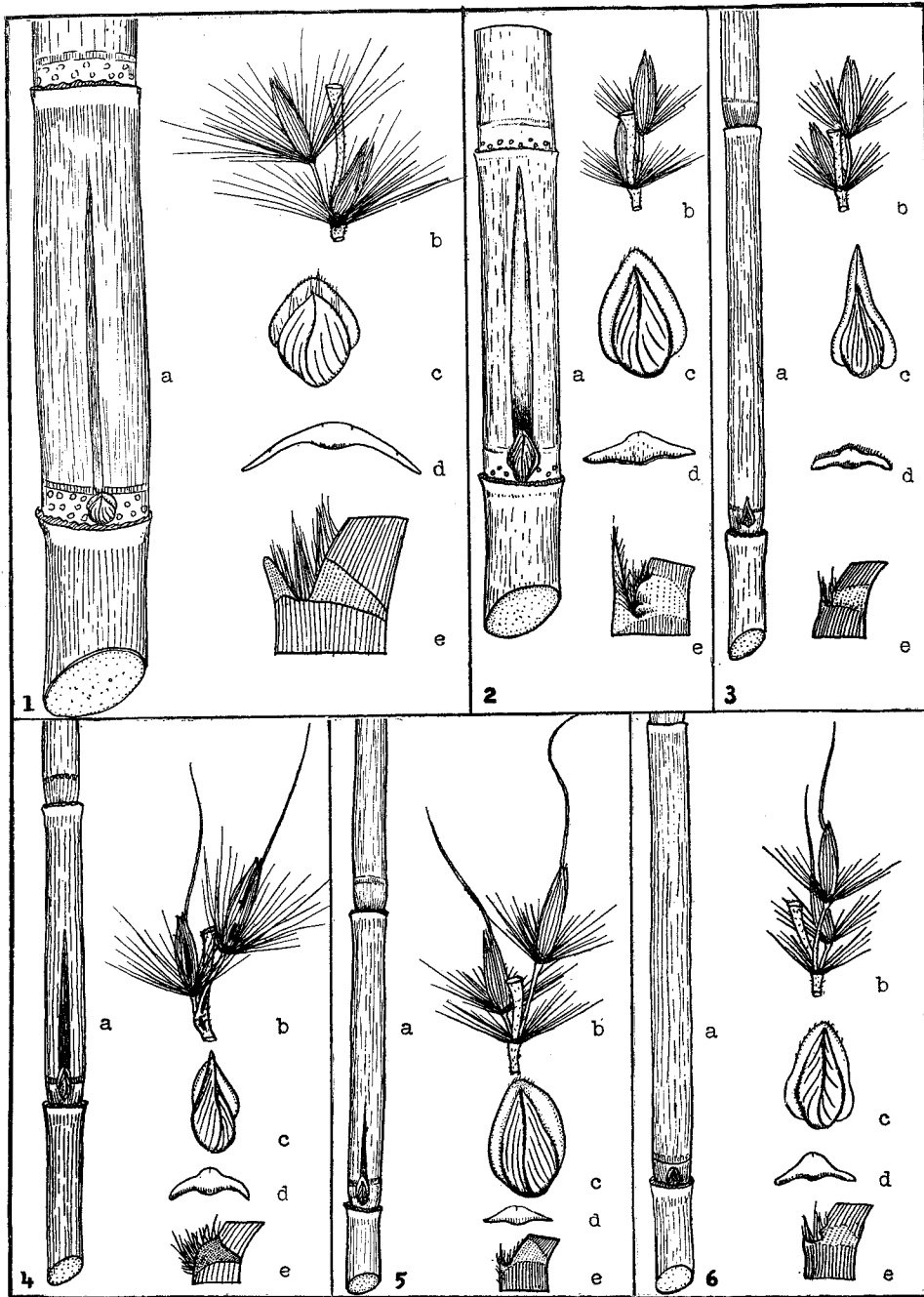
Vegetative and flowering parts of different plants:

- a. complete internode of a stem.
- b. paired spikelets.
- c. bud.
- d. ligule.
- e. auricle.

- Figs. 1. Of *S. officinarum*.  
2. Of SG 310/6.  
3. Of *S. fusca*.  
4. Of *M. japonicus*.  
5. Of 58-1.  
6. Of 58-2.



Plate II



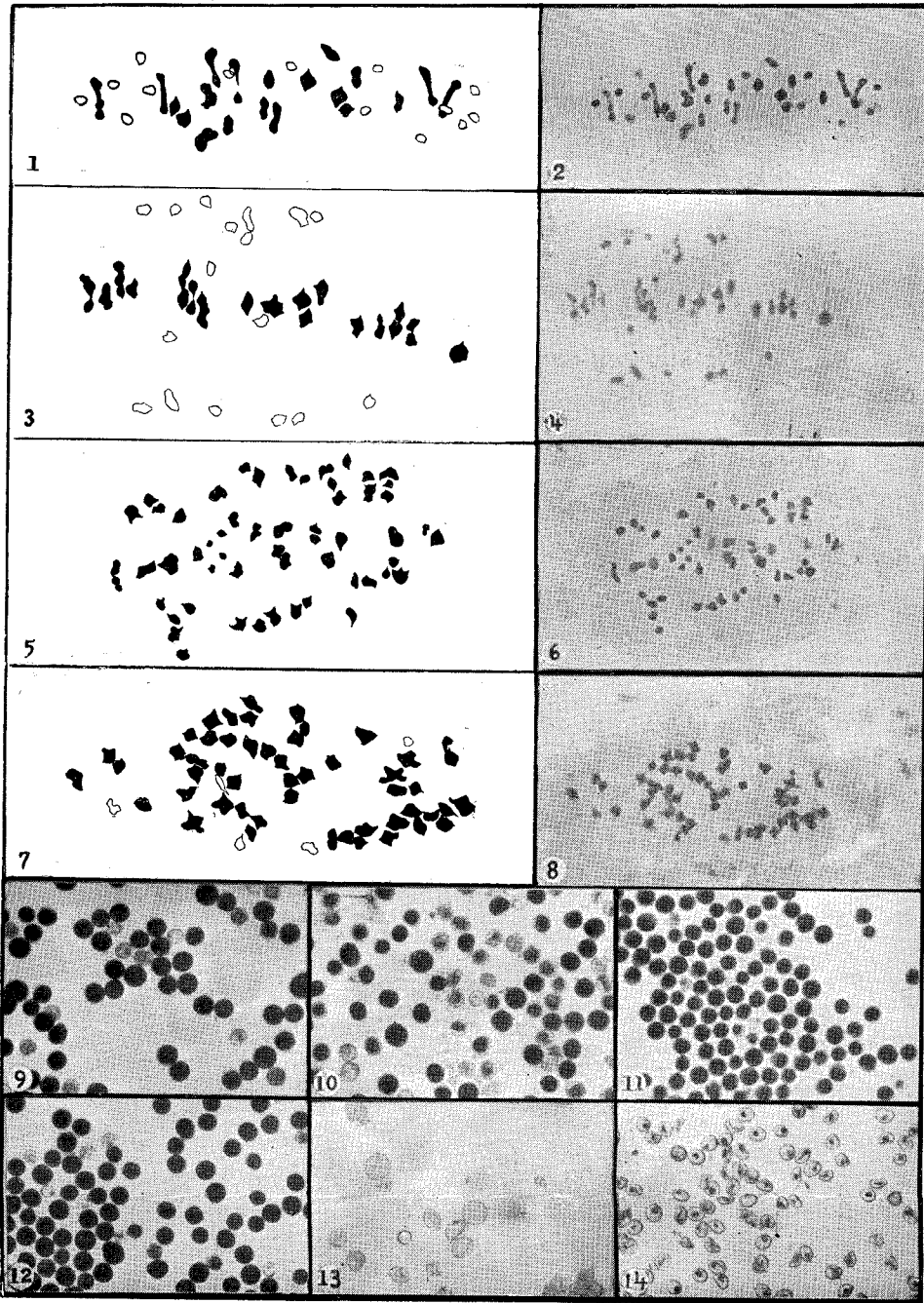
**Plate III.**

Camera lucida drawings and photomicrographs:

- Figs. 1. MI of 58-2, showing  $20^{II}+15^I$  chromosomal association.  
2. Photomicrograph of the same.  
3. MI of 58-2, chromosomal association  $1^{IV}+17^{II}+17^I$ . Univalents migrated to the poles ahead of the bivalents which is rather unusual.  
4. Photomicrograph of the same.  
5. AI of 58-2, showing dividing univalents forming laggards on the equator.  
6. Photomicrograph of the same.  
7. MI of 58-1. Chromosomal association  $1^{III}+49^{II}+5^I$ .  
8. Photomicrograph of the same.  
9-14. Pollen grains of *S. officinarum*, var. 28 NG 264, SG 310/6, *S. fusca* M. japonicus 58-1, and 58-2 respectively.



Plate III



#### Plate IV.

- Figs.
1. Unequal bivalents found in different sporocytes in MI of 58-2.
  2. Trivalents found in different sporocytes in MI of 58-2. Notice inequality in size and form in the chromosomes.
  3. Tetravalents found in different sporocytes in MI of 58-2. Notice the inequality of the chromosomes. Majority of these are in chains. A few in rings, however.
  4. Chromosomes in MI of 58-2 arranged in idiograms. Chromosome association  $1^{III} + 22^{II} + 8^I$ . Univalents are in outline. Notice unequal bivalents (arrow pointed). Notice also closed and open types of bivalents.
  5. The same. Chromosome association  $1^{III} + 18^{II} + 16^I$ .
  6. Unequal bivalents found in early prophase.
    - a. At leptonema. The unequal segments of this unequal pair do not pair with each other.
    - b. At pachynema. Unequal bivalent on the left, equal on the right.
    - c. At diplonema. The unequal pair appears to have less chiasmata than those of equal pair.
    - d. At diakinesis. Unequal pairs on the left and equal pair on the right.
    - e. At diakinesis. The unequal pair on the left has terminalized. Compare with the equal pair on the right.

Plate IV

