

## A New Species of *Heterostemma lobulatum* in the Family Asclepiadaceae

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**Abstract** Taxonomic description and notes of *Heterostemma lobulatum* Y. H. Li et F. Konta are given in this paper. This species was discovered by the authors in Xishuangbanna, Yunnan, China during the course in 1988 expedition and reported as nomen nudum in 1996. The species is characterized by yellow flowers with two lateral lobules on each corona lobe. Floral characteristics suggest a derived taxonomic position of genus *Heterostemma* including *Heterostemma lobulatum* in the Asclepiadaceae.

**Key words:** Asclepiadaceae, taxonomic description, *Heterostemma lobulatum*, Yunnan.

*Heterostemma lobulatum* Y. H. Li et F. Konta was discovered by the authors of this paper at Hoiwa in Xishuangbanna, Yunnan, China in 1988. The name of this new species was recorded on the list of plants in Xishuangbanna (Y. H. Li, 1996) without taxonomical description. The present paper aims to describe the species and to give some taxonomical notes of this species. Floral characteristics of this species seems to show a derived taxonomic position of genus *Heterostemma* including *Heterostemma lobulatum* in the family Asclepiadaceae. This study is a part of the serial taxonomical works of Asclepiadaceae in China and Thailand (Konta & Kitagawa, 1989; Konta, T. P. Li & Kikkawa, 1989; Konta, 1991).

The genus *Heterostemma* has about 30 species distributed in tropical and subtropical Asia. From China, 11 species have hitherto been reported (T. P. Li, 1977) and seven from Xishuangbanna (Y. H. Li, 1996) including *Heterostemma lobulatum*.

### Materials and methods

Materials were collected at Hoiwa in Xishuangbanna and fixed by the mixed fixative

solution of alcohol 3 and gracial acetic acid 1. They were preserved in 70% ethanol solution after the fixation. Preparations for light microscopic observation were prepared using the usual paraffin embedding methods. Serial sections of 8  $\mu\text{m}$  in thickness were stained with Delafield's Haematoxylin and Eosin, or Delafield's Haematoxylin, Saffranin and Methyl-green. Materials for scanning electron microscopic observation were dehydrated in an ethanol series, critically point-dried, and coated with gold.

### Taxonomical description of *Heterostemma lobulatum* Y. H. Li et F. Konta

*Heterostemma lobulatum* Y. H. Li et F. Konta sp. nov.

Affine *Heterostemmati siamico*, sed corona trilobulata lobulis lateralibus valide minoribus differt.

*Liana.* Stems pubescent, green up to 10 m in height. Leaves opposite, stipe 1–3.5 mm long, lamina elliptic to oblong, 4–12 cm long, 1.5–5 cm wide, apex acute, base cuneate, glabrous (Fig. 1). Pedicel 15–25 mm long. Flowers blooming in autumn, perfect, pentamerous except for the gynoe-

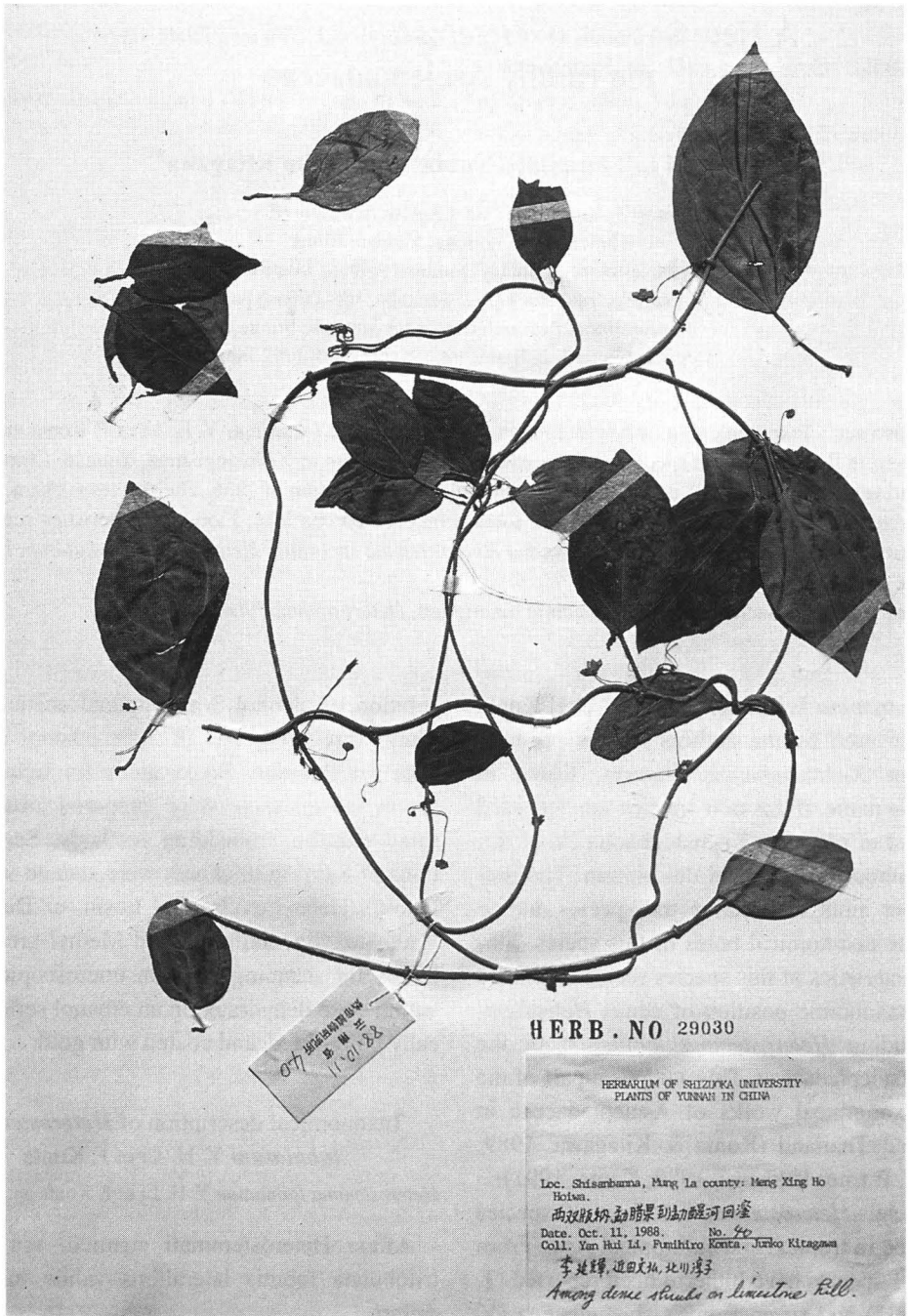


Fig. 1. Holotype of *Heterostemma lobulatum* Y. H. Li. et F. Konta.

cium; calyx lobes triangular, 5 mm long, 1 mm wide, valvate, shortly connate at base, corolla with short tube, saucer-shaped or disk-shaped, 9–10 mm in diameter, yellow (Fig. 2); corolla

lobes, valvate, spreading, triangular, 3–3.5 mm long, 3.5 mm wide, apex acute, glabrous: filaments inserted on the corolla tube, anther wings connate leaving five vertical lacunae into a sheath

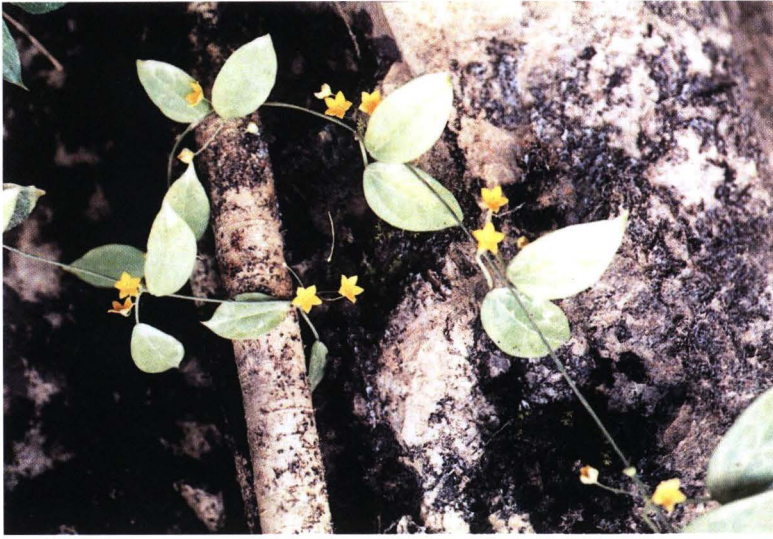


Fig. 2. Habit of *Heterostemma lobulatum* at the type locality.

around the style and adherent to the stigma head, forming gynostegium (Fig. 3-1, 2); corona stamineal, crown-shaped with five lobes, each lobe connate at base and centrifugally elongating at the upper part forming lanceolate lobe with two short lateral lobules, without vascular strand (Fig. 3-3; Fig. 4-1, 2, 4); anther with two globule pollinia, two pollinia of adjacent anthers combined with plate-shaped translator and a corpusculum forming yellow twin pollinia; gynoecium of two carpels forming separate, unilocular ovaries with distinct styles and united only by the common style-head, which is star-shaped in transverse and sagittate in vertical section, narrow furrow at the top, and lateral surfaces have glandular tissue of one cell in thick (Fig. 3-1, 3; Fig. 4-2, 4); ovaries superior; ovules unitegmic, anatropous with short funicles on submarginal placenta, number of ovules were two in transverse and four in vertical section of young ovary (Fig. 3-1, 4). Fruit of two distinct follicles.

*Habitat.* Among dense evergreen thickets or mixed ones of evergreen and deciduous trees on limestone hills.

*Holotype.* Meng Xing Ho Hoiwa, Mung La County, Xishuangbanna, Yunnan, China. Coll. Yan Hui Li, Fumihiko Konta, and Junko Kita-

gawa no. 40, Oct. 11, 1988 (KUN).

#### Taxonomical notes of *Heterostemma lobulatum* Y. H. Li et F. Konta

*Heterostemma lobulatum* is similar to *Heterostemma siamicum* in habitat and floral characteristics; both grow in dense evergreen thickets or mixed ones of evergreen and deciduous trees on limestone hills and bear sauser or disk-shaped yellow flowers. However, *Heterostemma lobulatum* differs from *Heterostemma siamicum* in corona and leaf shape. *Heterostemma lobulatum* is characterized by the corona with a lanceolate lobe with small two lateral lobules and ovate to elliptic leaves with angustate at base. *Heterostemma siamicum* has corona lobule without lateral lobules and ovate leaves with truncate at base.

The floral characteristics of *Heterostemma lobulatum* are noted in detail in this paper as a study of the serial taxonomical works of Asclepiadaceae in China and Thailand noted above. The proccess of development of the corona was also observed. Cells near the abaxial surface of each stamen were stained densely with Haematoxylin and Eosin at the stage of very young

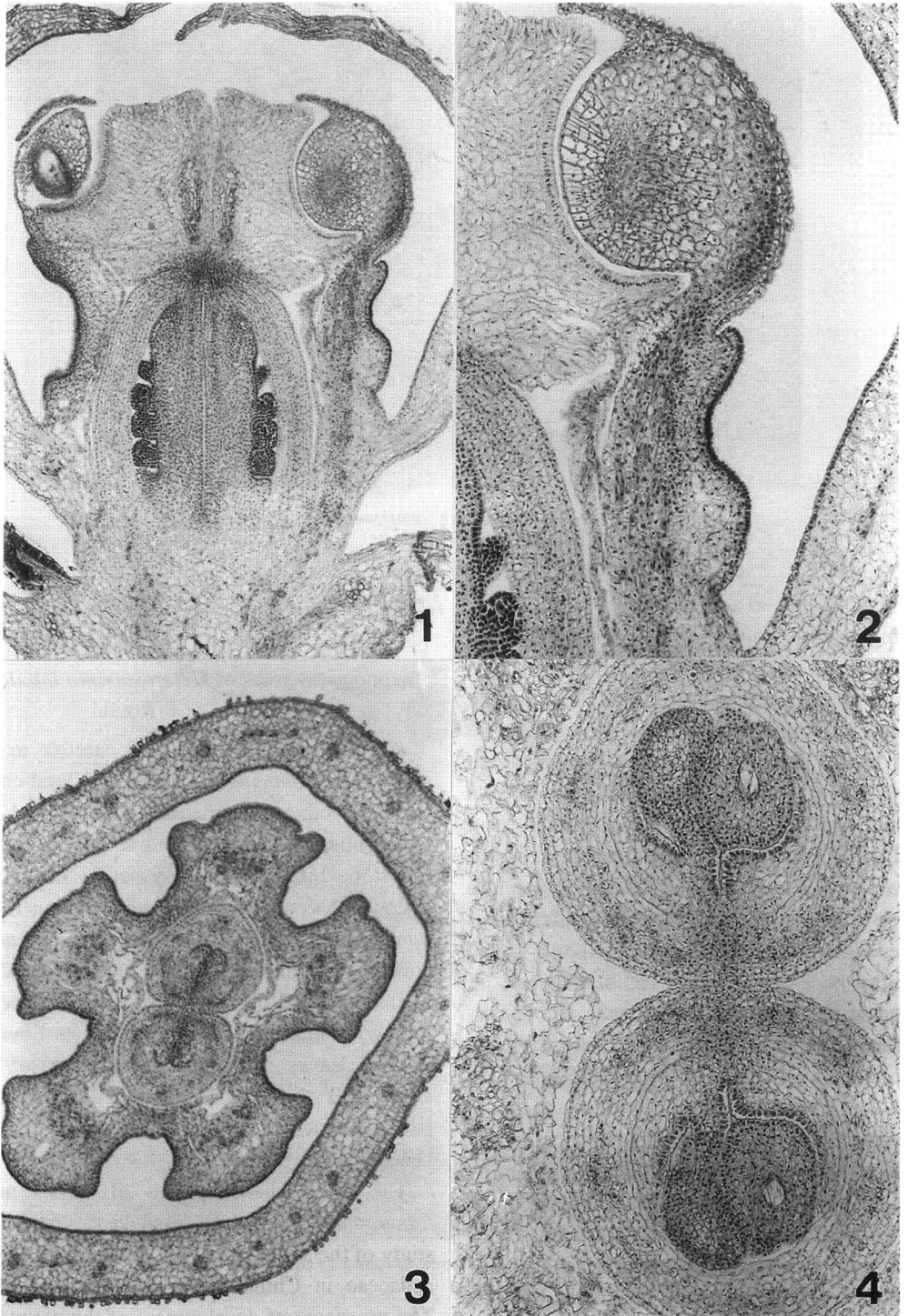


Fig. 3. Vertical and transverse sections of flowers of *Heterostemma lobulatum*. 1. Vertical section of gynostegium showing two ovaries connate to a stigma head and vertically arranged ovules in each ovary. 2. Vertical section of anther showing glandular tissue at the lateral wall of stigma head. 3. Transverse section of flower showing two ovaries, basal part of five staminal corona lobes, and a tube of corolla. 4. Transverse section of flower showing two submarginal ovules in each ovary (1, 3.  $\times 55$ , 2, 4.  $\times 100$ ).

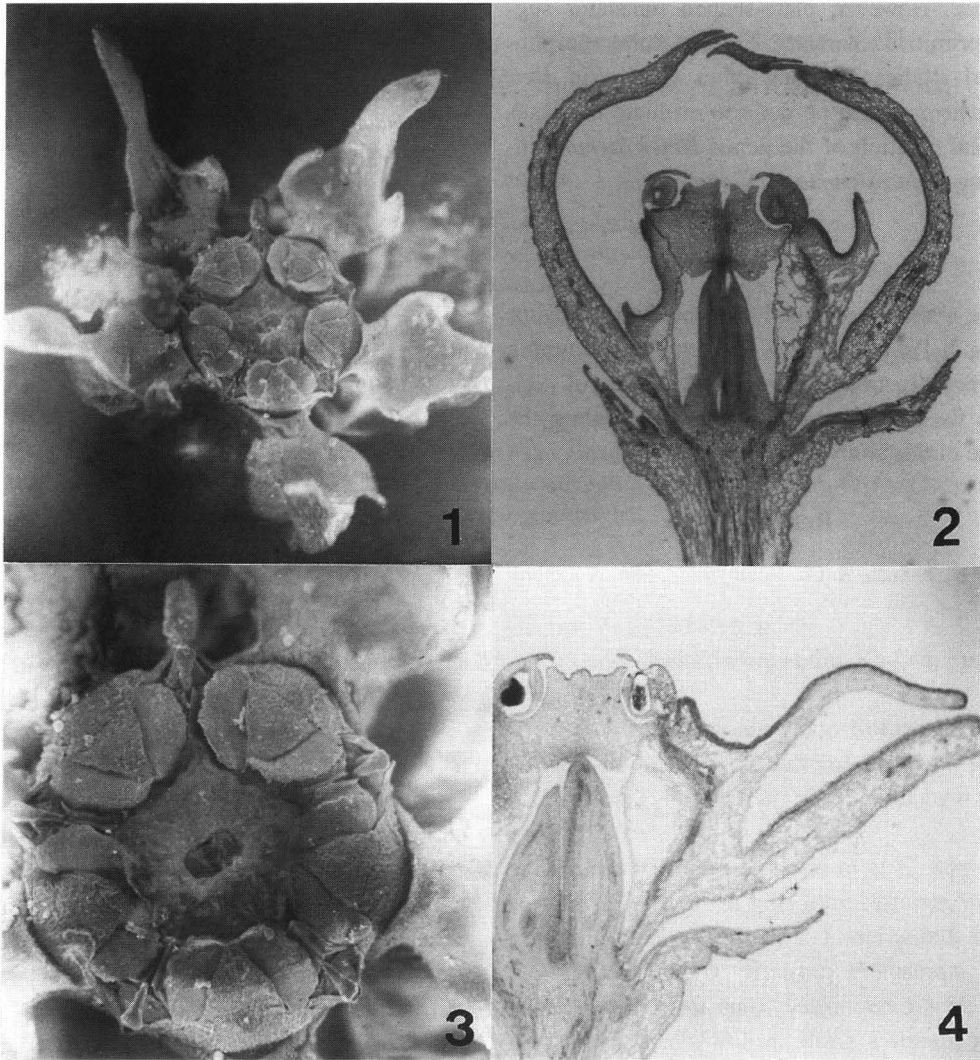


Fig. 4. Top view and vertical sections of flowers of *Heterostemma lobulatum*. 1. Top view of gynostegium showing corona with a lanceolate lobe and lateral small lobules which characterize *Heterostemma lobulatum*. 2. Vertical section of flower showing corolla and base of corona lobe. 3. Top view of gynostegium showing five anthers and a furrow of stigma head. 4. Vertical section of flower showing filament with single vascular strand and staminal corona lobe without vascular supply (1.  $\times 20$ , 2.  $\times 20$ , 3.  $\times 50$ , 4.  $\times 20$ ).

buds. This part developed rapidly at the later stages near the opening of corolla lobes to form lobulate corona. Similar processes are observed with the other Asclepiad species studied (Konta & Kitagawa, 1989; Konta, T. P. Li & Kikkawa, 1989; Kitagawa & Konta, 1990; Konta, 1991). Fig. 3-1 and 3-4 show that smaller numbers of ovules in an ovary of *Heterostemma lobulatum* than other Asclepiad species such as *Cynanchum*

*auriculatum* (Konta, Suda, & Kobayashi, 1966) and *Telosma cordata* (Konta, T. P. Li, & Kikkawa, 1989). Floral characteristics of *Heterostemma lobulatum* including small numbers of ovules in an ovary (Fig. 3-1, 4), and the development of corona lobes without vascular strands (Fig. 4-2, 4) during later stages of flower development seems to suggest that the genus *Heterostemma* has derived in taxonomical position in the Asclepi-

adaceae. However, plate-shaped translator suggest primitive character. Further floral morphological studies of many other species in *Heterostemma* should be done to evaluate the taxonomical position of the genus *Heterostemma* including *Heterostemma lobulatum*.

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