

***Aristolochia manshuriensis* Kom.****Manchurian Birthwort Stem***Caulis Aristolochiae manshuriensis***Pinyin: Guan mu tong***Aristolochiaceae*

The roots of *Aristolochia manshuriensis* have been used in traditional Chinese medicine and are referred to as guan mu tong in Chinese pinyin, which creates its association with the original mu tong derived from *Akebia* species plants. Historically, *A. manshuriensis* (guan mu tong) was used as a substitute for *Akebia* spp. (chuan mu tong), as were *Clematis armandii* and *Clematis montana* (also known as chuan mu tong). *A. manshuriensis* contains the toxic aristolochic acids (AA), and because of this has been removed from China's pharmacopoeia (PPRC). Aristolochic acid-containing ingredients or products for internal consumption are prohibited for importation or trade in the European Union and United States, though certain species remain available in some parts of Asia.

Nonetheless, *A. manshuriensis* may still be encountered in commerce and may be confused with other botanicals sharing the common name mu tong, including the nontoxic species *Akebia quinata* and *A. trifoliata*. The problem of adulteration is compounded by the similarity in appearance of *A. manshuriensis* and *Clematis armandii*, the latter of which has historically become a common substitute for the *Akebia* species. According to Bensky et al. (2004), a diuretic action for *A. manshuriensis* has not been established, so these authors consider this botanical to be an obsolete entry in the Chinese materia medica. The microscopic characterizations for each of these species are provided in this text.

**Transverse section:** Cork is of variable thickness and often scalloped in appearance; grooves occur where the cork is thin and convex areas protrude where cork is thick; convex areas consist of several strata of thin-walled, radially elongated cork cells alternating with narrow bands of small rectangular cells; phelloderm is composed of a few rows of radially aligned, thin-walled cells alternating with concentric rings of orangish brown

smaller cells; parenchymatous primary cortex, with rare scattered sclereids and abundant calcium oxalate cluster crystals, up to 50  $\mu\text{m}$  diameter, more frequent toward the cork; between the cortex and secondary phloem are large rectangular bundles of lignified, septate fibers, usually opposite regions of vessels in the secondary xylem; secondary xylem of numerous cuneiform groups of vessels and tracheids alternating with broad medullary rays; groups are rounded at their inner end; large vessels (up to 250  $\mu\text{m}$  diameter) are concentrically arranged, alternating with zones of narrow vessels and tracheids; thin-walled medullary ray cells are slightly radially elongated; narrow, partially thickened cells in the medullary rays tend to be tangentially aligned with narrow vessels and tracheids (annual rings); orangish brown zones of radially elongated cells run through the medullary rays; cluster crystals are less frequent in medullary rays; conspicuous pith contains cluster crystals; secretory cells with slightly thickened, convex walls are present but inconspicuous in all parenchymatous tissues; starch is absent.

**Longitudinal section:** Vessels and tracheids are pitted or, infrequently, scalariform.

**Powder:** Many colorless fragments of parenchyma, most of them containing numerous cluster crystals of calcium oxalate; fragments of pitted vessels and tracheids; few fragments of cork and phloem fibers; sclereids are generally absent but may be present.

