

Urtica dioica L.

Stinging Nettle Aerial Parts

Herba Urticae

Urticaceae

Stinging nettle leaf is predominantly used in Western herbalism as a nourishing blood tonic, diuretic, blood purifier, antiarthritic, and for seasonal allergies. Three subspecies of *U. dioica* occur in North America: ssp. *dioica*, *gracilis*, and *holosericea* (Boufford 1997). *Urtica dioica* ssp. *dioica* is a naturalized introduction from Europe. These subspecies differ in floral arrangement, leaf and stem indumentum, and chromosome number. All may be found in trade and no distinction is made among the three species medicinally, so there is no need to distinguish them for quality control purposes. However, in order to clarify some of the variation that a microscopist might encounter, the main differences in the subspecies are given here. This variation has been incorporated into the description. Another species of *Urtica*, *U. urens*, can be found among *U. dioica* supplies but is considered interchangeable in use. Differentiation between these two species is also provided.

A. Leaf

Surface view: Upper epidermis is composed of cells with slightly sinuous anticlinal walls; idioblasts (lithocysts) contain ovoid or spherical cystoliths 30–50 μm in diameter that are visible through the leaf surface, appearing as light areas on the dark green leaf; covering trichomes are unicellular, thick walled, rigid, tapering, up to ~150–200 μm in length, and occur more frequently toward the leaf margin; epidermal cells form a rosette pattern around the trichome base; glandular trichomes have a unicellular stalk and a two-celled head (seldom one, three, or four cells), are ~20 μm long, and occur abundantly mainly along the veins; stinging trichomes have a multicellular parenchymatous base in which a single, large, needle-like cell up to 2 mm long is embedded; the wall of this cell is heavily thickened and impregnated with silica; the cell is rounded at the base, tapering, and closed at the apex with a

small, lateral, globose head that breaks off when touched, discharging a fluid irritant; stinging trichomes may be frequent, rare, or absent on the upper surface; stomata are absent on the upper surface; lower epidermis has abundant anomocytic (less frequently anisocytic) stomata; stinging trichomes are present; covering and glandular trichomes, as on upper surface, may be absent, moderate, or dense.

Transverse section: Bifacial; palisade cells in a single row; cystoliths two to three times the width of a palisade cell, but not as long, often tapering toward the mesophyll, with a stratified or warty surface; cystoliths on the upper side are conspicuous and, on the lower side, considerably smaller or absent.

B. Stem (May Be Absent)

Surface view: Trichomes as on the leaf; stinging trichomes may be present or absent.

Transverse section: Quadratic with prominent corners; several vascular bundles are located at each corner; between bundles, the cells are thickened and pitted; fiber caps with an irregular outline occur outside the phloem; fiber cell walls are only slightly thickened, with a large cell lumen; small calcium oxalate cluster crystals 10–20 μm diameter are present; pith is parenchymatous with a central cavity.

Longitudinal section: Cluster crystals are arranged in distinct columns.

C. Flowers

Unisexual; pollen grains spheroidal with a smooth exine, ~16–20 μm diameter; ovary with numerous very small cluster crystals of calcium oxalate.

Powder: Fragments of the leaves with cystoliths and small glandular trichomes; covering trichomes; stinging trichomes (mostly broken); fragments of flowers (pollen grains, calcium oxalate from ovary) and stems (fibers, calcium oxalate) may be present.