

Arnica montana L.

Standardized Common Name: Arnica

Other Common Names: Leopard's Bane, Wolf's Bane, Mountain Tobacco

Family: Asteraceae (Compositae)

Parts in Commerce: Florets

Identification: Fragments of the subtending bracts and receptacle may be found in the material. Where loose florets are measured, the larger florets should always be selected to ensure that they belong to the terminal heads from which measurements in the literature were taken. The lateral heads are smaller, so the presence of florets that are qualitatively similar but smaller therefore does not demonstrate contamination. The type and quantity of pubescence present on each structure is also important for purposes of identification.

- Phyllaries in two main whorls with smaller phyllaries at base, lanceolate, (10–)12–17 mm long, 2–4 mm broad, light olive to reddish brown
- Phyllaries ciliate and pubescent at apices with hairs with a string-of-beads shape and often with long-stalked glandular hairs having stalks two cells thick (never with stalks one cell thick)
- Ray florets usually 11–15; disk florets numerous
- Ray florets female, ligulate, yellow-orange, the largest 18–25(–30) mm long and (4–)5–8 mm broad
- Ray floret apices with 3 (rarely 2) teeth, 1–3 mm long
- Ray florets with 7 or more veins, sparsely pubescent with straight hairs
- Disk floret corollas narrowly goblet-shaped (tubular below, with limb portion widening above attachment of anthers), with 5 triangular lobes
- Larger disk corollas 8.4–11.3 mm long, with tube 3–4.8 mm long and limb 5–6.6 mm long
- Lower portion of disk corolla pubescent with long, coarse septate hairs, especially at juncture of tube and limb (collar), and sometimes with small, short-stalked glandular hairs
- Disk florets have a pappus of 1 whorl of bristles, about as long as corolla (not with a second short outer whorl)
- Pappus bristles straw-colored or darker, not pure white, bearing setae along their length; setae very short (0.1–0.15, rarely to 0.2 mm), not fluffy-looking
- Anthers yellowish; filaments attached at collar

Adulterants: A variety of yellow-flowered composites, including *Doronicum* spp., *Heterotheca inuloides* Cass., *Calendula officinalis* L., and *Inula britannica* L. and other *Inula* spp., have been reported to be adulterants of *Arnica*. These and a number of other composite genera with superficially similar flowering heads are distinguishable by the presence of fewer main veins in the ligules or by the absence of the pappus or differences in its basic structure.

Other species of *Arnica* have been sold as substitutes (and, indeed, evidence for the pharmacological superiority of *A. montana* over these others is lacking). These can be difficult to tell apart, as there is no single floral feature that distinguishes *A. montana* from all other species. However, most material in commerce comes from Europe, where only two species exist, so the potential for substitution is minimized. The second European species, *A. angustifolia* Vahl, has a white pappus and the teeth of the ray florets are often >3 mm long. If *A. montana* must be distinguished from other species, glandular hairs with stalks two cells wide are perhaps the most obvious positive character, as they are found only in *A. montana* and the American *Arnica acaulis* (Walt.) B.S.P.; however, they are not always present.

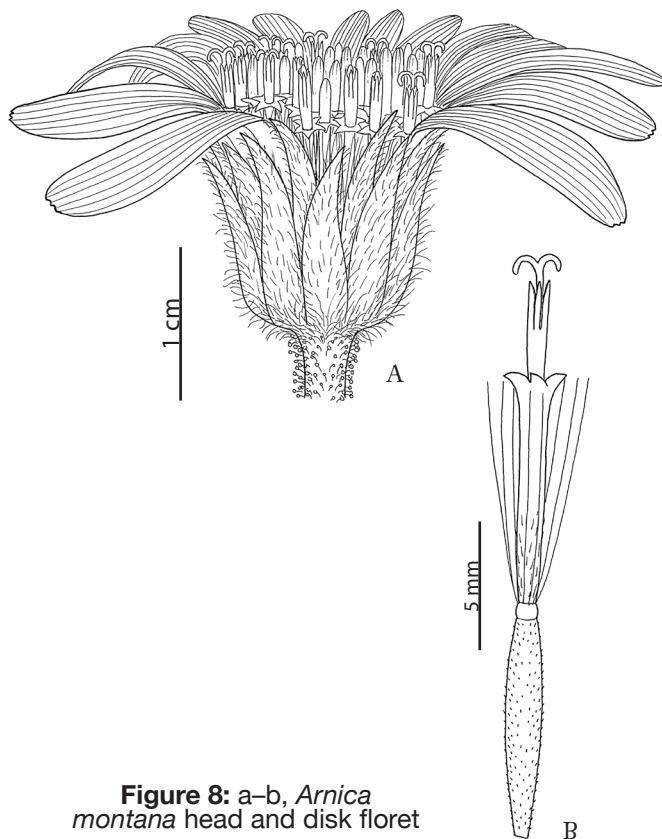


Figure 8: a–b, *Arnica montana* head and disk floret

***Arnica chamissonis* Less. subsp. *foliosa* (Nutt.) Maguire:**

A. montana is commonly collected in Europe from wild populations, and the root is sometimes collected as well as the flowers. As a result, the species is threatened by overharvesting. Other species of *Arnica* were screened for chemical resemblance to *A. montana*, and *A. chamissonis* subsp. *foliosa* was determined to be the most similar. In the interest of conservation, its use as a substitute for *A. montana* is promoted in Europe, and is increasingly considered acceptable by European pharmacopoeias.

A. chamissonis subsp. *foliosa* is widely distributed in western North America and is variable enough that well over a dozen species-level synonyms have been published for it. Its flowers differ from those of *A. montana* in several characters:

- Ligules usually 12–18 mm long, shallowly toothed, pale yellow
- Involucral bracts pubescent with slender, multicellular hairs that do not resemble a string of beads; hairs two cells wide never present
- Disk corollas tubular, not widening above limb, usually 7.5–8.7 mm long
- Disk corollas with soft hairs; collar not much more pubescent than remainder of corolla
- Bristles of disk pappus occasionally longer than 0.2 mm

Taxonomy: *Arnica* includes about 32 species of perennial herbs, which are native to cooler parts of the Northern Hemisphere, with a center of diversity in western North America. *Arnica montana* is one of two species native to Europe.

Description: Rhizomatous perennial herb. Stem usually unbranched, 15–60 cm high, pubescent. Basal leaves petiolate, oblanceolate, obtuse, to 17 cm long; cauline leaves opposite, 3(2–4) pairs, ovate to obovate, lanceolate or oblanceolate, 4–18 cm long, 2–5 cm broad; base usually sheathing; apex obtuse; margins entire or barely toothed; upper surface pubescent and glandular. Peduncle 10–30 cm high; heads 3(1–7), with terminal head much larger than lateral heads. Heads hemispheric to top-shaped; terminal heads 15–22 mm high. Involucre of 16–22(–26) bracts (phyllaries) in two main whorls, with ring of smaller bracts at the base; phyllaries lanceolate, (10–)12–17 mm long, acute, pubescent. Ray florets usually 11–15; disk florets numerous. Ray florets pistillate, ligulate, in terminal heads 18–25(–30) mm long and (4–)5–8 mm broad, yellow to yellow-orange, 3-toothed. Disk florets perfect; corolla 8.4–11.3 mm long in terminal heads, narrowly to broadly goblet-shaped, with 5 triangular-lanceolate lobes; tube and base of limb pubescent especially at juncture of tube and limb (collar); filaments attached at collar; anthers yellow; pappus of bristles about as long as corolla, usually straw-colored (sometimes darker), bearing small setae. Disk achenes 6–10 mm long, tapering at base, pubescent with short stiff double hairs and glandular hairs; ray achenes smaller than those of disk, with shorter pappus.

References:

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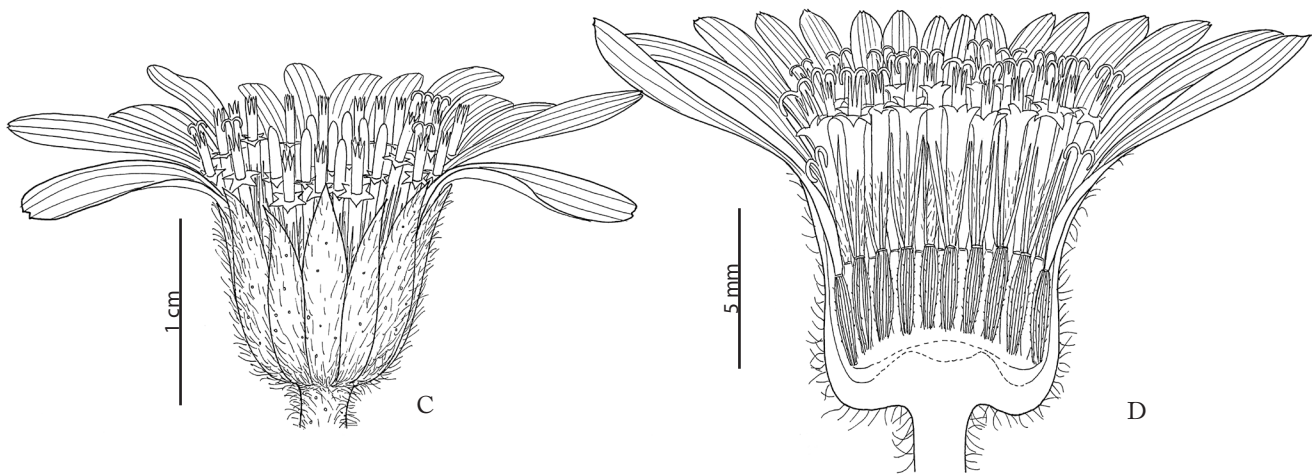


Figure 8: c–d, *A. chamissonis* head and sectioned head