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Verbascum (Scrophulariaceae)

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9. VERBASCUM Linnaeus, Sp. Pl. 1: 177. 1753; Gen. Pl. ed. 5, 83. 1754 * Mullein, molène [Ancient Latin name used by Pliny, probably corruption of *barbascum*, bearded, alluding to dense tomentum, or *barbarum*, medicinal plaster, alluding to use of some species] I

Guy L. Nesom

Herbs, annual, biennial, or perennial; stolons absent. **Stems** erect, glabrous or variously glabrate, puberulent, hirsute, tomentose, or floccose, sometimes glabrescent, stipitate-glandular or eglandular. **Leaves** basal and cauline, alternate, not succulent to somewhat leathery; stipular lines absent; petiole present or absent; blade margins entire to serrate, crenate, dentate, sinuate, or lobed. **Inflorescences** terminal, spicate, racemose, or paniculate, flowers solitary or clustered in fascicles; bracts present. **Pedicels** present, sometimes reduced; bracteoles present or absent. **Flowers** bisexual; sepals 5, calyx radially symmetric or slightly asymmetric, campanulate, lobes linear-oblong to elliptic or triangular; petals 5, (tube very shallow), corolla yellow to orange, white, purple, creamy, or pink, sometimes with purple center or red-tinged tips, radially symmetric or slightly asymmetric, rotate with petals spreading to slightly deflexed or shallowly cupulate, abaxial lobes 3, adaxial lobes 2, (broadly obovate to suborbicular); stamens [4] 5, inserted at base of corolla, equal to subequal or anterior pair longer, filaments usually densely villous, sometimes anterior (proximal) pair glabrous, (anthers oblong-reniform and transversely medifixed or anterior pair oblong-linear and longitudinally to obliquely inserted and decurrent), staminode 0 [1]; ovary 2-locular, placentation axile; stigma capitate or spatulate, (sometimes base decurrent on style). **Capsules** symmetric, ovoid to elliptic-ovoid, broadly elliptic, ovoid-globose, or subglobose, dehiscence septical. **Seeds** 50--300, tan or brown to orangish, conically cylindric, (usually pitted and rugose, appearing transversely and longitudinally ribbed), not winged. $x = 6$.

Species ca. 300--360 (12 in the flora): introduced; Europe, Asia, ne Africa.

Chromosome counts of $2n = 18, 26, 30, 32, 34, 36, 40, 44, 45, 48, 50, 64, 66$ have been reported for species of *Verbascum*. A base number is not clear, but $x = 6$ appears to be a reasonable fit ($2n = 18, 30, 36, 48$, and 66 would thus be polyploid levels). In any case, the range of numbers reflects both polyploidy and dysploidy.

Stamen number, placenta structure (entire and sessile versus 2-fid and stalked), capsule shape, and the number of flowers per node/bract have been used as diagnostic characters to distinguish *Celsia* Linnaeus and *Staurophragma* Fischer & C. A. Meyer as segregates from *Verbascum* (S. Murbeck 1925; A. Huber-Morath 1973; F. A. Karaveliogullari and Z. Aytaç 2008). Huber-Morath (1978) later included *Celsia* and *Staurophragma* within *Verbascum*. All species treated here are *Verbascum* in the strict sense.

Taxonomic treatments of *Verbascum* have been inconsistent in use of rank for infraspecific taxa; both varieties and subspecies appear in this treatment as well. Since

all of our taxa are introduced to North America, further study of the species in their native environs is warranted before any uniformity can be established. In any case, use of one rank or the other does not imply a biological or evolutionary difference.

Hybrids are commonly produced among many combinations of parents. *Verbascum thapsus*, which is the most common and widespread of the species in the flora area, is known to have formed four distinctive hybrids in North America: *V. x\kernerii* Fritsch [*thapsus* x *phlomoides*]; *V. x\pteroaulon* Franchet [*thapsus* x *blattaria*]; *V. x\spurium* K. Koch [*thapsus* x *lychnitis*]; and *V. x\bumnickii* Franchet [*thapsus* x *densiflorum*]. *Verbascum x\ramigerum* Link ex Schrader [*densiflorum* x *lychnitis*] has been reported in Europe; it and other combinations may be expected in the flora area.

Plants of *Verbascum* collected as weeds in a lawn in Duluth, Minnesota, in 2001 and 2002 (*Schimpf* DJS318 and DJS327, MIN), have been identified as *V. chaixii* Villars (<http://plants.usda.gov>), but they perhaps are hybrids with *V. nigrum* as one of the parents (Dirk Albach, pers. comm.). The leaves are glabrate, the basal ones ovate-elliptic, subentire to shallowly crenate, and subpetiolate, the cauline ones mostly non-clasping; the inflorescences are stipitate-glandular, unbranched, with flowers in loosely overlapping clusters of 3--6; corollas are white to yellowish with pellucid glands; and staminal filaments all are villous with violet hairs. Without an unequivocal identification and evidence that they have become naturalized, they are not formally treated here.

SELECTED REFERENCES Karaveliogullari, F. A. and Z. Aytaç. 2008. Revision of the genus *Verbascum* L. (Group A) in Turkey. Bot. Res. J. 1: 9--32. Murbeck, S. 1933. Monographie der Gattung *Verbascum*. Acta Univ. Lund, n. 29: 1--630. Murbeck, S. 1936. Nachträge zur Monographie der Gattung *Verbascum*. Acta Univ. Lund, n. 32: 1--46. Murbeck, S. 1939. Weitere Studien über die Gattungen *Verbascum* und *Celsia*. Acta Univ. Lund, n. 35: 1--71.

1. Flowers solitary in axils at least distally.
 2. Corollas purple to violet; bracteoles 0; cauline leaves abruptly decreasing in size distally1. *Verbascum phoeniceum*
 2. Corollas usually yellow, sometimes white or pink (*V. blattaria*); bracteoles 2 or 0; cauline leaves gradually decreasing in size distally.
 3. Pedicels 5--11(--15) mm; bracteoles 0; stems and leaves glabrous or glabrate 2. *Verbascum blattaria*
 3. Pedicels (0--1)--3 mm; bracteoles 2; stems and leaves densely stipitate-glandular 3. *Verbascum virgatum*
1. Flowers mostly in axillary clusters of 2--10.
 4. Inflorescences usually unbranched, sometimes with a few branches from proximal nodes.
 5. Basal and proximal cauline leaves with blades basally cordate to nearly truncate; leaves sparsely tomentose to glabrate, quickly glabrescent abaxially, sometimes glabrate on both surfaces, thinly tomentose on abaxial leaf surface but not completely obscuring epidermis; all filaments villous with purple to violet hairs 9. *Verbascum nigrum* (in part)
 5. Basal and proximal cauline leaves with blades basally attenuate; leaves densely and persistently tomentose on both surfaces; proximal filaments villous or glabrous, distal pairs villous with yellowish to whitish hairs.
 6. Flower clusters loosely overlapping7. *Verbascum bombyciferum*

- 6. Flower clusters densely overlapping or becoming remote on proximal portions.
 - 7. Cauline leaves not decurrent 6. *Verbascum phlomoides*
 - 7. Cauline leaves decurrent.
 - 8. Corollas 14--20(--30) mm in diam., pellucid glands numerous; anthers yellow; stigmas capitate; pedicels mostly or completely adnate to rachis4. *Verbascum thapsus*
 - 8. Corollas 30--55 mm in diam., pellucid glands absent or few; anthers orange; stigmas spatulate, base decurrent; pedicels free or adnate to rachis only at base5. *Verbascum densiflorum* (in part)
- 4. Inflorescences usually freely branched, sometimes unbranched (*V. densiflorum*, *V. nigrum*) or with a few branches from proximal nodes and forming a panicle (*V. nigrum*).
 - 9. Leaves glabrate or sometimes thin-persistent adaxially or adaxial vestiture quickly glabrescent.
 - 10. Basal, proximal, and mid cauline leaves distinctly petiolate, blades basally cordate to nearly truncate, distal becoming sessile to subsessile and clasping; filaments villous with purple to violet hairs; inflorescences usually unbranched, sometimes with a few branches from proximal nodes, branches forming a narrowly conical panicle9. *Verbascum nigrum* (in part)
 - 10. Mid cauline leaves sessile to subsessile, blades clasping to subclasping (except *V. densiflorum*), basal and proximal leaves basally attenuate; filaments villous with yellow to whitish hairs; inflorescences freely branched, branches forming a conical to broadly cylindric panicle, sometimes unbranched.
 - 11. Cauline leaves not clasping, thinly tawny- to gray-tomentose, quickly glabrescent adaxially, persistent and closely adherent abaxially; bracts linear to narrowly lanceolate, 8--15 mm; pedicels 6--11 mm; corollas usually white, sometimes yellowish 8. *Verbascum lychnitis*
 - 11. Cauline leaves clasping or subclasping, densely and loosely white-floccose on both surfaces, easily separating and surfaces glabrescent especially abaxially, sometimes thin-persistent adaxially; bracts linear, 3--5 mm; pedicels (1--2--5(--7) mm; corollas yellow10. *Verbascum pulverulentum*
- 9. Leaves persistently and closely to loosely tomentose adaxially.
 - 12. Proximal filaments glabrous, distal pairs villous; cauline leaves long-decurrent5. *Verbascum densiflorum* (in part)
 - 12. All filaments villous; cauline leaves not decurrent or short-decurrent.
 - 13. Leaf margins sinuate to incised or incised-lobed; flowers distantly remote, clustered, or rarely solitary; pedicels 2--5 mm; filament hairs violet to purple 11. *Verbascum sinuatum*
 - 13. Leaf margins entire to minutely serrate-dentate; flowers loosely overlapping, clustered; pedicels (3--5--12 mm; filament hairs whitish to yellowish 12. *Verbascum speciosum*

1. **Verbascum phoeniceum** Linnaeus, Sp. Pl. 1: 178. 1753 * Purple mullein I
Varieties 2 (1 in the flora): introduced; Europe, Asia.

1a. **Verbascum phoeniceum** Linnaeus var. **phoeniceum** I

Biennials or perennials. Stems 30--100 cm, stipitate-glandular, without other vestiture or sparsely puberulent. Leaves stipitate-glandular, without other vestiture or sparsely puberulent; basal and proximal

cauline with petiole 5--40 mm; blade ovate to elliptic-ovate, ovate-lanceolate, or oblong, 5--15 x 3--7.5(--10) cm, base subrounded to broadly cuneate; cauline (if not all basal) not decurrent, not clasping, abruptly decreasing in size distally, (bracteate above proximal 1/3), margins crenate or sinuate to subentire, apex of distal cauline and floral bracts long-acuminate. **Inflorescences** usually unbranched, rarely with erect-ascending branches from proximal nodes, simple and narrowly cylindrical, flowers remote, solitary in axils at least distally; rachis stipitate-glandular, without other vestiture or sparsely puberulent; bracts lanceolate to narrowly lanceolate, 4--7 mm, base not decurrent, apex acute to acute-acuminate, stipitate-glandular, without other vestiture or sparsely puberulent. **Pedicels** free, 6--20(--25) mm; bracteoles 0. **Flowers:** calyx 4--7 mm, stipitate-glandular, without other vestiture or sparsely puberulent, lobes elliptic; corolla purple to violet, 20--30(--35) mm in diam., pellucid glands absent; all filaments villous with violet hairs; stigma capitate, base not decurrent. **Capsules** ovoid, 6--8 mm, glabrous or sparsely glandular. $2n = 32, 36$.

Flowering May--Aug. Fields, roadsides, disturbed sites; 100--300 m; introduced; Ky., N.Y., Ohio; Europe; Asia.

Plants of *Verbascum phoeniceum* with yellow corollas, mostly from Greece, have been named subsp. *flavidum* (Boissier) Bornmueller.

2. *Verbascum blattaria* Linnaeus, Sp. Pl. 1: 178. 1753 * Moth mullein, molène blattaire I W

Annuals or biennials. **Stems** 60--150 cm, glabrous or glabrate. **Leaves** glabrous or glabrate; basal and proximal cauline with subpetiole 1--2 mm; blade obovate to oblanceolate, oblong, or oblong-lanceolate, 4--12(--20) x 1.5--5 cm, base subrounded to broadly cuneate; cauline not decurrent, subclasping, gradually decreasing in size distally, margins coarsely and regularly crenate-dentate to dentate or pinnately dentate-lobed, apex of distal cauline and floral bracts acute. **Inflorescences** usually unbranched, rarely with erect-ascending branches from proximal nodes, simple and narrowly cylindrical, flowers remote, solitary in axils at least distally; rachis stipitate-glandular, without other vestiture; bracts ovate to lanceolate-ovate, 7--10(--15) mm, base decurrent, apex acute to short-acuminate, stipitate-glandular. **Pedicels** free or adnate to rachis only at pedicel base, 5--11(--15) mm; bracteoles 0. **Flowers:** calyx 5--7 mm, stipitate-glandular, lobes linear-lanceolate to narrowly oblong; corolla purple in bud, becoming yellow, yellow-orange, yellow with purple center, white, cream with red-tinged tips, or pink, 25--35 mm in diam., pellucid glands absent or few; proximal filaments with purple hairs, distal pair villous with white and purple or violet hairs; stigma spatulate, base decurrent. **Capsules** subglobose, 5--8 mm, sparsely stipitate-glandular apically. $2n = 18, 30, 32$.

Flowering May--Jul(--Oct). Riverbanks, lake edges, ditches, dry hills, railroad rights-of-way, orchards, prairies, open oak woods, rocky meadows, roadsides, fields, disturbed sites; 0--1300 m; introduced; B.C., N.B., Ont., Que.; Ala., Ariz., Ark., Calif., Colo., Conn., Del., D.C., Fla., Ga., Idaho, Ill., Ind., Iowa, Kans., Ky., La., Maine, Md., Mass., Mich., Miss., Mo., Mont., Nebr., Nev., N.H., N.J., N.Mex., N.Y., N.C., N.Dak., Ohio, Okla., Oreg., Pa., R.I., S.C., S.Dak., Tenn., Tex., Utah, Vt., Va., Wash., W.Va., Wis.; Europe; Asia; introduced also in Pacific Islands (Hawaii, New Zealand), Australia.

3. *Verbascum virgatum* Stokes in W. Withering, Bot. Arr. Brit. Pl. ed. 2, 1: 227. 1787 * Wand mullein, molène en bague F I W

Biennials. **Stems** 50--100 cm, densely stipitate-glandular, sometimes also sparsely hirsute-villous with simple hairs. **Leaves** densely stipitate-glandular, sometimes also sparsely hirsute-villous with simple hairs; basal and proximal cauline with subpetiole 1--2 mm; blade elliptic to elliptic-obovate, 8--20(--30) x 2.5--8(--15) cm, base subrounded to broadly cuneate; cauline not decurrent, not clasping, gradually decreasing in size distally, margins coarsely crenate to crenulate, apex of distal cauline and floral bracts acute to obtuse. **Inflorescences** unbranched, simple and narrowly cylindrical, flowers remote, solitary in axils at least distally, sometimes 1(2--5) at proximal nodes; rachis densely stipitate-glandular, sometimes also sparsely hirsute-villous with simple hairs; bracts linear-lanceolate, 8--20 mm, base not decurrent, apex long-acuminate, densely stipitate-glandular, sometimes also sparsely hirsute-villous with simple hairs. **Pedicels** free, (0--)1--3 mm; bracteoles 2. **Flowers:** calyx 4--9 mm, densely stipitate-glandular, sometimes also sparsely hirsute-villous with simple hairs, lobes ovate-lanceolate to triangular or narrowly lanceolate; corolla yellow, (25--

)30--40 mm in diam., pellucid glands absent or few; proximal filaments glabrous at least distally, distal pair villous with purplish to violet or whitish hairs; stigma capitate, base not decurrent. **Capsules** ovoid-globose to subglobose, 6--10 mm, stipitate-glandular.

Flowering Apr--Jun(--Oct). Fields, roadsides, disturbed sites; 10--2000 m; introduced; B.C., N.S., Ont., Que.; Ala., Ariz., Calif., Fla., Ga., Idaho, Ill., Ind., La., Nev., N.Mex., N.Y., N.C., Ohio, Pa., S.C., Tex., Utah; Mexico (Coahuila); Europe; Asia; introduced also in South America (Argentina, Chile), Asia (India), Pacific Islands (Hawaii, New Zealand), Australia.

The distribution of *Verbascum virgatum* in Nova Scotia may be historic; Ruth collected specimens from 1940 through 1960 from Sydney, East Chester, and Wolfville, but it apparently has not been seen there subsequently. It also may be historic in British Columbia.

4. *Verbascum thapsus* Linnaeus, Sp. Pl. 1: 177. 1753 * Common mullein, grande molène I W

Subspecies 3 (1 in the flora): introduced; Europe.

4a. *Verbascum thapsus* Linnaeus subsp. *thapsus* I W

Verbascum schraderi G. Meyer; *V. simplex* Hoffmann & Link

Annuals or biennials. **Stems** 30--200 cm, densely and persistently tomentose, eglandular. **Leaves** densely and persistently tomentose on both surfaces, eglandular; basal and proximal cauline with petiole 5--25 mm; blade broadly elliptic to elliptic-ovate, elliptic-obovate, or oblong, 7--30(--45) x 3.5--10(--14) cm, base gradually attenuate; cauline decurrent, not clasping, gradually decreasing in size distally, margins subentire to crenulate, apex of distal cauline and floral bracts acute to obtuse. **Inflorescences** usually unbranched, sometimes with a few ascending branches from proximal nodes, simple and narrowly cylindrical, flowers densely overlapping, in axillary clusters of 2--7; rachis densely and persistently tomentose, eglandular; bracts ovate to lanceolate, 12--18 mm, base decurrent, apex acuminate, densely and persistently tomentose, eglandular. **Pedicels** mostly or completely adnate to rachis, 1--5 mm; bracteoles 2. **Flowers:** calyx (5--8--12 mm, densely and persistently tomentose, eglandular, lobes lanceolate to triangular; corolla yellow, 14--20(--30) mm in diam., pellucid glands numerous; proximal filaments glabrous, distal pair villous with white or yellow hairs; (anthers yellow); stigma capitate, base not decurrent. **Capsules** elliptic-ovoid to ovoid, 7--10 mm, tomentose. $2n = 32, 36$.

Flowering May--Sep. Lake edges, stream banks, bottomland, prairies, pastures, fields, woods edges, rocky slopes, railroad embankments, roadsides; 0--2300(--2700) m; introduced; Greenland; Alta., B.C., Man., N.B., Nfld. and Labr. (Nfld.), N.S., Ont., P.E.I., Que., Sask.; Ala., Alaska, Ariz., Ark., Calif., Colo., Conn., Del., D.C., Fla., Ga., Idaho, Ill., Ind., Iowa, Kans., Ky., La., Maine, Md., Mass., Mich., Minn., Miss., Mo., Mont., Nebr., Nev., N.H., N.J., N.Mex., N.Y., N.C., N.Dak., Ohio, Okla., Oreg., Pa., R.I., S.C., S.Dak., Tenn., Tex., Utah, Vt., Va., Wash., W.Va., Wis., Wyo.; Europe; introduced also in South America (Argentina, Chile), Asia, Pacific Islands (Hawaii, New Zealand), Australia.

Subspecies *crassifolium* (Lamarck) Murbeck and subsp. *giganteum* (Willkomm) Nyman have densely villous abaxial stamens and occupy more restricted ranges in Europe.

5. *Verbascum densiflorum* Bertoloni, Rar. Lig. [Ital.] Pl. 3: 52. 1810 * Denseflower mullein I

Verbascum thapsiforme Schrader

Biennials. **Stems** 30--120 cm, densely and persistently tomentose, eglandular. **Leaves** densely and persistently tomentose on both surfaces, eglandular; basal and proximal cauline subsessile to subpetiolar or with petiole 10--30 mm; blade obovate to oblong-ovate, 5--25(--30) x 4--8(--12) cm, base attenuate; cauline long-decurrent, not clasping, gradually decreasing in size distally, margins crenate, apex of distal cauline and floral bracts long-acuminate. **Inflorescences** unbranched, simple and narrowly cylindrical, sometimes with ascending branches from proximal nodes, forming a panicle, flowers densely overlapping, in axillary clusters of 2--8; rachis densely and persistently tomentose, eglandular; bracts ovate, 15--40 mm, base decurrent, apex long-acuminate, densely and persistently tomentose, eglandular. **Pedicels** free or adnate to rachis only at pedicel base, 3--15 mm; bracteoles 2. **Flowers:** calyx 5--12 mm, densely and persistently

tomentose, eglandular, lobes ovate-lanceolate to lanceolate; corolla yellow, 30--55 mm in diam., pellucid glands absent or few; proximal filaments glabrous, distal pair villous with white or yellow hairs; (anthers orange); stigma spatulate, base decurrent. **Capsules** elliptic-ovoid, 5--8 mm, tomentose.

Flowering May--Aug. Fields, roadsides, disturbed sites; 50--300 m; introduced; Iowa, Mass., Mich., Mo., Wis.; Europe; Asia; introduced also in South America (Chile), Australia.

6. **Verbascum phlomoides** Linnaeus, Sp. Pl. 2: 1194. 1753 * Orange mullein, molène faux-phlomis F
I W

Biennials. **Stems** (30--50--200 cm, densely and persistently tomentose, eglandular. **Leaves** densely and persistently tomentose on both surfaces, eglandular; basal and proximal cauline with petiole 4--8 cm; blade ovate-lanceolate to ovate-elliptic or oblong, (10--15--25(--35) x 4--10(--15) cm, base attenuate; cauline not decurrent, or rarely slightly so, subauriculate-clasping, gradually decreasing in size distally, margins entire to shallowly crenate, apex of distal cauline and floral bracts caudate-acuminate to short-acuminate. **Inflorescences** unbranched, simple and narrowly cylindrical, flowers densely overlapping or becoming remote on proximal portions, in axillary clusters of 2--9; rachis densely and persistently tomentose, eglandular; bracts ovate-lanceolate, 9--15 mm, base short-decurrent or not at all, apex acute to short-acuminate, densely and persistently tomentose, eglandular. **Pedicels** adnate to rachis only at pedicel base, 2--8(--15) mm; bracteoles 2. **Flowers:** calyx 5--12 mm, densely and persistently tomentose, eglandular, lobes lanceolate to triangular; corolla yellow, 30--55 mm in diam., pellucid glands absent or few; proximal filaments glabrous at least distally, distal pair villous with white or yellow hairs; stigma spatulate, base decurrent. **Capsules** elliptic-ovoid, 5--8 mm, tomentose. $2n = 32$.

Flowering Jun--Aug. Fields, roadsides, disturbed sites; 0--600 m; introduced; Alta., B.C., Man., Ont., P.E.I., Que., Sask.; Ark., Colo., Conn., Del., D.C., Ga., Ill., Ind., Iowa, Ky., Maine, Md., Mass., Mich., Minn., Mo., N.J., N.Y., N.C., Ohio, Oreg., Pa., R.I., S.C., Tenn., Vt., Va., Wash., W.Va., Wis.; Europe; Asia; introduced also in South America (Ecuador), Pacific Islands (New Zealand).

Verbascum phlomoides is known from a single location each in Saskatchewan (near Moose Jaw) and Manitoba (near Roseisle). The record for Washington possibly is only a waif (King County, Seattle, in waste ground, introduced from Europe, 12 Sep 1936, W.J. Eyerdam s.n., SMU), because it apparently has not been recorded there since.

7. **Verbascum bombyciferum** Boissier, Diagn. Pl. Orient. 1(4): 52. 1844 * Turkish or silver mullein I

Biennials. **Stems** 60--200 cm, densely and persistently tomentose on both surfaces, eglandular. **Leaves** densely and persistently tomentose on both surfaces, eglandular; basal and proximal cauline with subpetiole 15--40 mm; blade broadly elliptic to lanceolate-oblong, 25--35 x 15--25 cm, base attenuate; cauline not decurrent, slightly auriculate-clasping, gradually decreasing in size distally, margins obscurely crenate to entire, apex of distal cauline and floral bracts acute. **Inflorescences** unbranched or with a few long, ascending branches from proximal nodes, simple and narrowly cylindrical, flowers loosely overlapping and clearly discrete, in axillary clusters of 2--8; rachis densely and persistently tomentose, eglandular; bracts ovate to lanceolate-triangular, 7--12 mm, base not decurrent, apex acuminate, densely and persistently tomentose, eglandular. **Pedicels** free, 2--5 mm; bracteoles 2. **Flowers:** calyx 6--10 mm, densely and persistently tomentose, eglandular, lobes lanceolate to narrowly lanceolate; corolla yellow, (20--30--40 mm in diam., pellucid glands absent; all filaments villous with yellowish to yellowish white hairs or 2 proximal glabrous distally or completely; stigma spatulate, base decurrent. **Capsules** ovoid to subglobose, 5--8 mm, tomentose.

Flowering Jun--Sep. Grassy, rocky benches, creek beds; 300--500 m; introduced; Calif.; Asia (Turkey); introduced also in Europe (England, Germany).

Verbascum bombyciferum is naturalized in Sonoma County, escaped from ornamental plantings in 1976 at a residence on the Pepperwood Preserve (F. Hrusa et al. 2002). Photos of the population (<http://www.calflora.org>) show plants (intermixed with typical *V. thapsus*) with a dense, persistent, bright white vestiture, spikes unbranched or proximally few-branched and 1--2 m, the floral clusters thick and somewhat remotely arranged, yellow flowers with yellowish to yellowish white filament hairs, and broadly

elliptic, basally attenuate leaves densely and persistently tomentose on both surfaces. Numerous internet photos confirm the identification as *V. bombyciferum* and indicate that the Calflora photos show plants just beginning to flower, as the plants potentially elongate proximally and the spikes may develop lateral branches, although the central one usually remains dominant.

Verbascum bombyciferum of Sonoma County has been identified previously (F. Hrusa et al. 2002) as *V. olympicum* Boissier, and that name has correspondingly been registered in other literature. *Verbascum bombyciferum* (as well as *V. olympicum*) is endemic in native range to Mount Olympus (now known as Uludag) in northwestern Turkey.

8. *Verbascum lychnitis* Linnaeus, Sp. Pl. 1: 177. 1753 * White mullein I W

Subspecies 2 (1 in the flora): introduced; Europe, Asia.

Verbascum lychnitis is recognized by its bicolor leaves, non-clasping cauline leaves, freely branched inflorescence with loosely overlapping flower clusters, long pedicels, and small white corollas. Subspecies *moenchii* (C. F. Schultz) Holub & Mlady was recognized in 1978, referring to a white-flowered variant in central Europe.

8a. *Verbascum lychnitis* Linnaeus subsp. *lychnitis* I W

Biennials. **Stems** 50--150 cm, thinly tawny- to gray-tomentose, glabrescent, persistent and closely adherent on abaxial leaf surfaces but not completely obscuring epidermis, eglandular. **Leaves** thinly tawny- to gray-tomentose, quickly glabrescent adaxially, persistent and closely adherent on abaxial leaf surfaces but not completely obscuring epidermis, eglandular; basal and proximal cauline with petiole 10--50 mm; blade obovate to elliptic-obovate, (8--10--15(--30) x 3--7(--11) cm, base attenuate; cauline not decurrent, not clasping, gradually decreasing in size distally, margins coarsely to shallowly crenate-serrate to subentire, apex of distal cauline and floral bracts long-acuminate. **Inflorescences** usually freely branched with ascending branches, sometimes unbranched, forming loosely conical to broadly cylindric panicle, flowers loosely overlapping, sometimes barely remote, in axillary clusters of 2--5; rachis thinly tawny- to gray-tomentose, glabrescent, persistent and closely adherent on abaxial leaf surfaces but not completely obscuring epidermis, eglandular; bracts linear to narrowly lanceolate, 8--15 mm, base not decurrent, apex acute, thinly tawny- to gray-tomentose, glabrescent, persistent and closely adherent on abaxial leaf surfaces but not completely obscuring epidermis, eglandular. **Pedicels** free, 6--11 mm; bracteoles 2. **Flowers:** calyx 2.5--4 mm, thinly tawny- to gray-tomentose, glabrescent, persistent and closely adherent on abaxial leaf surfaces but not completely obscuring epidermis, eglandular, lobes lanceolate; corolla white, less commonly yellowish, 12--20 mm in diam., pellucid glands absent; all filaments villous with yellow to whitish hairs; stigma capitate, base not decurrent. **Capsules** ovoid-ellipsoid, 4--5 mm, tomentose. $2n = 32, 34$.

Flowering Jun--Aug. Sandy fields, vacant lots, roadsides, disturbed sites; 50--300 m; introduced; Ont.; Colo., Conn., Del., Iowa, Md., Mass., Mich., Mo., N.H., N.J., N.Y., Pa., R.I., Vt., Va., W.Va.; Europe; Asia.

J. K. Small (1933) listed *Verbascum lychnitis* as occurring in North Carolina, but no specimen has yet been located.

9. *Verbascum nigrum* Linnaeus, Sp. Pl. 1: 178. 1753 * Black mullein I

Perennials. **Stems** 50--120 cm, sparsely tomentose to glabrate, glabrescent, thinly tomentose on abaxial leaf surfaces but not completely obscuring epidermis, sometimes glabrate on both surfaces, eglandular. **Leaves** sparsely tomentose to glabrate, quickly glabrescent abaxially, thinly tomentose on abaxial leaf surfaces but not completely obscuring epidermis, sometimes glabrate on both surfaces, eglandular; basal and proximal cauline with petiole 5--15(--20) mm, (distal becoming sessile to subsessile and clasping); blade lanceolate to ovate or oblong, 12--30 x 5--12(--15) cm, base shallowly cordate to nearly truncate; cauline not decurrent, not clasping or distal ones clasping, gradually decreasing in size distally, margins crenate, apex of distal cauline and floral bracts acute. **Inflorescences** usually unbranched, sometimes with a few suberect to ascending branches from proximal nodes, forming a narrowly conical panicle, flowers loosely overlapping,

in axillary clusters of 5--10; rachis sparsely tomentose to glabrate, glabrescent, thinly tomentose on abaxial leaf surfaces but not completely obscuring epidermis, sometimes glabrate on both surfaces, eglandular; bracts linear, 4--7(--15) mm, base not decurrent, apex acute, sparsely tomentose to glabrate, glabrescent, thinly tomentose on abaxial leaf surfaces but not completely obscuring epidermis, sometimes glabrate on both surfaces, eglandular. **Pedicels** free, 5--12(--15) mm; bracteoles 2. **Flowers:** calyx 3--4.5 mm, sparsely tomentose to glabrate, glabrescent, thinly tomentose on abaxial leaf surfaces but not completely obscuring epidermis, sometimes glabrate on both surfaces, eglandular, lobes linear-oblong to linear-lanceolate; corolla yellow to creamy, 18--25 mm in diam., pellucid glands numerous; all filaments villous with purple to violet hairs; stigma capitate, base not decurrent. **Capsules** ovoid-ellipsoid to ellipsoid-obovoid, 4--5 mm, tomentose.

Flowering Jun--Aug. Fields, roadsides, disturbed sites; 100--300(--700) m; introduced; Alta., Ont., Sask.; Ill., Mass., Minn., N.H., N.J., Pa., Wis.; Europe; Asia.

Verbascum nigrum is recognized by its petiolate, basally cordate to truncate basal leaves, bicolored or dark on both surfaces, dark-colored stems, usually unbranched inflorescences, small flowers, and narrow calyx lobes. Plants in the flora area appear to be subsp. *nigrum*, with a mostly unbranched inflorescence; subsp. *abietinum* (Borbás) I. K. Ferguson, found in Germany, has a freely branched inflorescence.

10. *Verbascum pulverulentum* Villars, Prosp. Hist. Pl. Dauphiné, 22. 1779 * Broad-leaf mullein I

Verbascum floccosum Waldstein & Kitaibel

Biennials. **Stems** 50--150(--200) cm, densely and loosely white-floccose on both surfaces, easily separating, glabrescent, eglandular. **Leaves** densely and loosely white-floccose on both surfaces, vestiture easily separating and surfaces glabrescent especially abaxially, sometimes thin-persistent adaxially, eglandular; basal and proximal cauline sessile to subsessile; blade obovate to oblong-ovate, 12--30(--40) x 5--10(--15) cm, base attenuate; cauline not decurrent, clasping or subclasping, gradually decreasing in size distally, margins crenate to subentire, apex of distal cauline and floral bracts acuminate. **Inflorescences** freely branched with ascending branches, forming a broad panicle, flowers becoming remote in fruit, in axillary clusters of 2--5; rachis densely and loosely white-floccose on both surfaces, easily separating, glabrescent, eglandular; bracts linear, 3--5 mm, base not decurrent, apex acute, densely and loosely white-floccose on both surfaces, easily separating, glabrescent, eglandular. **Pedicels** free, (1--)2--5(--7) mm; bracteoles 2. **Flowers:** calyx 2--3.5 mm, densely and loosely white-floccose on both surfaces, easily separating, glabrescent, eglandular, lobes linear-lanceolate; corolla yellow, 18--20 mm in diam., pellucid glands numerous; all filaments villous with white hairs; stigma capitate, base not decurrent. **Capsules** ellipsoid-globose, 3--5(--8) mm, glabrescent.

Flowering Jul--Sep. Fields, roadsides, disturbed sites; 20--30 m; introduced; Wash.; Europe; introduced also in Pacific Islands (New Zealand).

Verbascum pulverulentum is recognized by its densely white-floccose vestiture (separating easily in clumps from the stems and leaf surfaces), non-decurrent cauline leaves, freely branched inflorescence with remote fruiting clusters, and small flowers.

Verbascum pulverulentum was discovered in 1999 as a weed in the Washington Park Arboretum, Seattle (A. L. Jacobsen et al. 2001). These plants were clearly seen as growing outside of cultivation at the time and were collected again in 2005, suggesting that the species persists at the arboretum site.

SELECTED REFERENCE Jacobsen, A. L., F. C. Weinmann, and P. F. Zika. 2001. Noteworthy collections in Washington. *Madroño* 48: 213--214.

11. *Verbascum sinuatum* Linnaeus, Sp. Pl. 1: 178. 1753 * Wavy-leaf mullein I

Varieties 2 (1 in the flora): introduced; Europe, Asia.

11a. *Verbascum sinuatum* Linnaeus var. *sinuatum* I

Biennials. **Stems** 50--100 cm, persistently and loosely tawny-tomentose, abaxial leaf epidermis evident, usually eglandular. **Leaves** persistently and loosely tawny-tomentose on both surfaces, abaxial leaf

epidermis evident, usually eglandular; basal and proximal cauline with petiole 5--25 mm; blade oblong to obovate, oblong-obovate, or broadly lanceolate, (10--15--25(--35) x 4--8(--12) cm, base attenuate; cauline short-decurrent, subauriculate-clasping, gradually decreasing in size distally, margins sinuate to incised or incised-lobed, apex of distal cauline and floral bracts acute. **Inflorescences** freely branched with erect-ascending branches, forming a broad panicle, flowers distantly remote, in axillary clusters of 2--7, or rarely solitary; rachis persistently and loosely tawny-tomentose, abaxial leaf epidermis evident, usually eglandular; bracts cordate-deltate, 3--8 mm, base not decurrent, apex cuspidate, persistently and loosely tawny-tomentose, abaxial leaf epidermis evident, usually eglandular. **Pedicels** free, 2--5 mm; bracteoles 2. **Flowers:** calyx 3--5 mm, persistently and loosely tawny-tomentose, abaxial leaf epidermis evident, usually eglandular, lobes ovate-lanceolate to lanceolate; corolla yellow, 15--30 mm in diam., pellucid glands numerous; all filaments villous with violet to purple hairs; stigma capitate, base not decurrent. **Capsules** broadly elliptic to subglobose, 3--5 mm, tomentose. $2n = 30$.

Flowering Jun--Sep. Fields, roadsides, disturbed sites; 100--300 m; introduced; Md., N.J., N.Y., Pa.; Europe; Asia; introduced also in Africa (Tunisia), Australia.

Verbascum sinuatum is recognized by its persistent tomentum, sinuate to lobed leaf margins, subauriculate and short-decurrent cauline leaves, and freely branched inflorescences with distantly remote flower clusters. Plants recognized as var. *adenosepalum* Murbeck occur from Turkey to Iran; they differ from the typical expression in having non-decurrent cauline leaves and glandular calyx lobes. Subspecies *gaillardotii* (Boissier) Bornmueller of the eastern Mediterranean region (Lebanon, Palestine, Syria, Turkey) has narrower bracts and bracteoles, slightly smaller corollas, and 4(--5) stamens (versus 5(--4) in subsp. *sinuatum*).

12. Verbascum speciosum Schrader, Index Seminum (Göttingen) 2: 22, plate 16. 1811 * Showy mullein **I**

Subspecies 2 (1 in the flora): introduced; Europe.

It is not clear that subsp. *speciosum* is the best identification for plants in the flora area, if the infraspecific distinction is to be made. Subspecies *speciosum* is characterized by leaves with grayish, rather harsh tomentum and capsules 3--6 mm; subsp. *megaphlomos* (Boissier & Heldreich) Nyman is characterized by leaves with a white or yellowish, soft, thick tomentum and capsules 5--7 mm. Distinctly elongate basal and proximal cauline leaves are often found in this species.

12a. Verbascum speciosum Schrader subsp. *speciosum* **I**

Biennials. Stems 50--200 cm, closely and persistently tomentose, often yellowish, densely obscuring abaxial leaf epidermis, eglandular. **Leaves** closely and persistently tomentose on both surfaces, often yellowish, densely obscuring abaxial leaf epidermis, eglandular; basal and proximal cauline with petiole 15--50 mm; blade broadly oblanceolate to elliptic-obovate or oblong-lanceolate, (12--25--42 x 4--10) cm, base attenuate; cauline not decurrent, auriculate-subclasping, gradually decreasing in size distally, margins entire to minutely serrate-dentate, apex of distal cauline and floral bracts caudate to long-acuminate. **Inflorescences** freely branched with erect-ascending branches, forming a broad panicle, flowers loosely overlapping, in axillary clusters of 5--8; rachis closely and persistently tomentose, often yellowish, densely obscuring abaxial leaf epidermis, eglandular; bracts broadly ovate-lanceolate to lanceolate, (5--8--15(--20) mm, base not decurrent, apex acuminate, closely and persistently tomentose, often yellowish, densely obscuring abaxial leaf epidermis, eglandular. **Pedicels** free, (3--5--12) mm; bracteoles 2. **Flowers:** calyx 3--5 mm, closely and persistently tomentose, often yellowish, densely obscuring abaxial leaf epidermis, eglandular, lobes narrowly lanceolate; corolla yellow, 18--30 mm in diam., pellucid glands absent; all filaments villous with whitish to yellowish hairs; stigma spatulate, base decurrent. **Capsules** ovoid-oblong to oblong-ovate, 4--7 mm, tomentose. $2n = 36$.

Flowering May--Aug. Fields, roadsides, disturbed sites; 100--600 m; introduced; Calif., Ill., Oreg.; Europe.

The Oregon occurrence of *Verbascum speciosum* is based on a 1909 collection (*Suksdorf s.n.*, WS) from Portland.