

Hooker-balsamroot.

Perennial with a carrot-like taproot and simple (sel-dom few-branched) crown, often also producing deep-seated, slender, shortly creeping roots from which new plants arise, so that the separate rosettes are connected underground; leaves 1-4 dm long, pinnatifid, the divisions entire to pinnatisect or even bipinnatisect, 1-5 cm long (or to 10 cm in var. *hirsuta*); stems lax, 0.6-5 dm tall, often with one or more inconspicuous, linear, entire or toothed-pinnatifid bracts near the base (in var. *hirsuta* with a pair of reduced but still fairly well developed, pinnatifid leaves borne several cm above the base of the otherwise scapiform stem); heads solitary; involucre bracts subequal or somewhat imbricate, long-hairy at least marginally, sometimes more or less woolly, especially toward the base; rays mostly 10-16 (or to 21 in var. *idahoensis*), 1.5-4.5 cm long; achenes glabrous; $2n = 38$.

Dry, rocky outcrops and dry meadows, mainly in the foothills and lowlands, but sometimes up to 2700 or even (on Wheeler Peak in Nev.) 2900 m elev.; c. Wash. to c. Calif., e. to w. and se. Idaho, sw. Wyo., nw. Colo., the Uinta Basin, the Wasatch and related mts., the Utah Plateaus, s. Nev., and the nw. corner of Ariz. Late Apr-July.

The species consists of about nine ill-defined varieties, these seemingly distinctive in their most characteristic forms, but morphologically confluent and geographically only very imperfectly segregated. In a previous (1955) treatment I maintained *B. hirsuta* as a separate species, but after further study both in the field and in the herbarium I am convinced that it is best treated as a variety of *B. hookeri*. In 1984 W. A. Weber annotated some Uinta Basin specimens at UTC as a new species, using the epithet *uintahensis*. In my opinion these constitute a woolly-bracted phase of var. *neglecta*. Status as a separate variety might be defended, but is not here proposed. Our four varieties, plus a fifth (*idahoensis*) that borders our range in western Idaho, may be characterized as follows, but not every specimen will fit nicely into its proper place:

- 1 Reduced cauline leaves relatively well developed and conspicuous, pinnatifid or bipinnatifid; principal leaves strongly dissected, with small ultimate segments, the primary segments sometimes as much as 10 cm long; middle and outer invo-

lucre bracts tending to have a more or less ovate base narrowed to an elongate, slender, usually reflexed tip; heads relatively large, the rays mostly 2.5-4.5 cm long; pubescence of var. *hispidula*, varying to nearly that of var. *neglecta*; e. Oregon (the only var. in ne. Oregon) to w. Nev. (Washoe Co., w. Humboldt Co., and the Wassuk Range in Mineral Co.) and adj. Lassen Co., Calif. var. *hirsuta* (Nutt.) A. Nelson

- 1 Reduced cauline leaves smaller and inconspicuous, generally mere linear bracts, sometimes toothed or subpinnatifid, or wanting; leaves variously dissected, often more coarsely so than in var. *hirsuta*, the primary segments rarely more than 6 (7) cm long; involucre bracts variously shaped, often narrower and without a clear distinction between body and tip; heads averaging smaller, the rays mostly 1.5-3.5 cm long.
- 2 Involucre bracts relatively broad, more or less ovate or ovate-oblong; leaves mostly sericeous-strigose, not much dissected; involucre not woolly; Harney Co., Oregon, to s. Washoe Co., Nev., e. to Elko Co., Nev., and w. to Siskiyou Co., Calif.; only marginally distinct from var. *neglecta*, with which it shares most of its range var. *platylepis* (W. M. Sharp) Cronquist
- 2 Involucre bracts narrower, more lanceolate or nearly linear.
- 3 Involucre conspicuously woolly, especially toward the base; plants relatively large and robust, with relatively broad, mostly uncut leaf-segments up to about 6 (7) cm long, thus somewhat approaching *B. macrophylla*, but intergradient with the vars. of *B. hookeri* and not with *B. macrophylla*; w. Idaho, bordering our range on the north var. *idahoensis* (W. M. Sharp) Cronquist
- 3 Involucre usually not woolly (except most notably in the phase of var. *neglecta* that occurs in the Uinta Basin); plants mostly smaller and with more dissected leaves.
- 4 Leaves strigose-puberulent to scabrous-puberulent, only inconspicuously or not at all glandular; se. Oregon to w. Nev. (vicinity of Reno and Carson City), e. across n. Nev. and adj. Idaho to nw. Utah; disjunct in the Uinta Basin, where more common than var. *hispidula*, and there often with an evidently woolly involucre var. *neglecta* (W. M. Sharp) Cronquist
- 4 Leaves glandular and hispidulous in varying proportions, the hairs more or less spreading; Snake River Plains of Idaho (and overlapping into n. Nev. and se. Oregon), e. to se. Idaho, sw. Wyo., nw. Colo., and the Uinta Basin of Utah, s. along the Wasatch front, and in w. Utah and adj. Nev. to sw. Utah, nw. Ariz., and s. Nev. var. *hispidula* (W. M. Sharp) Cronquist

3. VIGUIERA Humb., Bonpl. & Kunth

Herbs (all ours) or shrubs or even small trees; leaves simple, the lower opposite, the upper generally alternate at least in well developed plants; heads radiate, the rays yellow, neutral; involucre bracts obscurely to evidently 2- to several-seriate, subequal to evidently imbricate, generally green and more or less herbaceous, at least distally; receptacle convex, varying to low-conic or nearly flat, chaffy throughout, its bracts clasping the achenes; disk-flowers perfect and fertile; anthers sagittate at the base; style-branches flattened, varying from hispidulous on both sides and without a distinct appendage to sometimes (as in our species) virtually glabrous except for the well marked, short, externally short-hairy appendage, the stigmatic lines in either case obscure; achenes thick, somewhat compressed at right angles to the involucre bracts, with 2 evident and usually 2 obscure angles, glabrous (as in our species) or often hairy; pappus usually of 2 awns and several shorter, distinct or connate scales, all generally persistent, or in some species (including ours) the pappus wanting. (*Heliomeris*; *Gymnolomia*, misapplied)

About 150 species, native from w. U.S. to S. Amer., one species in se. U.S. (Named for Alexandre L. G. Viguier, 1790-1867, physician and botanist of Montpellier.)

Our species belong to the small section *Heliomeris*, marked by its narrow, wholly herbaceous, only obscurely 2- or 3-seriate involucre bracts and glabrous achenes without a pappus. These features can be found also in other species of *Viguiera*, but mostly not in combination.

Heiser and his student W. F. Yates propose to revive the genus *Heliomeris* Nutt. for a few epappose species of *Viguiera* with a basic chromosome-number (in the three species counted) of $x = 8$. The status of *Heliomeris* as an integral part of *Viguiera* on morphological grounds was fully expounded by S. F. Blake, who pointed out that a number of other species of *Viguiera* also lack a pappus. Contrary to the statement by Yates and Heiser, there is nothing distinctive about the involucre of *Heliomeris* in the context of the genus *Viguiera* as a whole. It is true that most species of *Viguiera* have a more imbricate involucre with the bracts basally firmer and less herbaceous, but not all of them do. Compare, for example, the Mexican species *V. hypargyrea* Greenm. and the Brazilian species *V. aspidioides* Baker.

The position of the southeastern species *Viguiera porteri* (A. Gray) S. F. Blake bears on the status of *Heliomeris*. This species was included in the section *Heliomeris* by Blake, and in the genus *Heliomeris* by Yates in his thesis. It certainly has the aspect and technical morphological characters of *Heliomeris*. Unlike other species of the *Heliomeris* group, however, *Viguiera porteri* has $2n = 34$ chromosomes, as in typical

Helianthus. The few counts in *Viguiera* (excluding *Helimeris*) to date indicate x numbers of 12 (1 species only), 17, and 18. We don't know what numbers may turn up in the future.

Thus we have the dilemma that the inclusion of *V. porteri* in *Helimeris* robs that segregate of its cytological distinctiveness, whereas its retention in *Viguiera* leaves a small segregate genus that can be distinguished from *Viguiera* only by its chromosome number. Heiser now tries to resolve this dilemma by transferring *V. porteri* to *Helianthus* as a morphologically aberrant, epappose species. He further suggests a possible relationship to another southeastern annual sunflower, *H. agrestis* Pollard, with which largely sterile (19 percent pollen stainability) hybrids have been produced. To me this proposal suggests an undue determination to retain a small segregate genus that is unmistakably allied to *Viguiera*.

References:

- Blake, S. F. 1918. A revision of the genus *Viguiera*. Contr. Gray Herb. 54: 1-205.
Yates, W. F. 1967. Taxonomic studies in the genus *Helimeris* (Compositae). Ph.D. thesis, Indiana Univ., Bloomington. 97 pages.
———, and C. B. Heiser. 1979. Synopsis of *Helimeris* (Compositae). Proc. Indiana Acad. Sci. 88: 364-372.

- 1 Pappus of a pair of short awns and several scales; achenes hairy; brittle shrub or half-shrub with conspicuously woolly-villous, strongly reticulate-veiny, evidently petiolate, deltoid-ovate or subcordate leaf-blades less than twice as long as wide; s. Calif. and s. Nev., approaching our range in s. Nye Co. (*Viguiera*) *V. reticulata* S. Watson
- 1 Pappus wanting; achenes glabrous; herbs, seldom somewhat suffrutescent at the base; leaves neither conspicuously woolly-villous nor strongly reticulate-veiny (*Helimeris*).
 - 2 Perennial; common and widespread in most of our range 1. *V. multiflora*
 - 2 Annual; more local.
 - 3 Leaves linear or linear-oblong to lance-linear, up to about 5 mm wide; peduncles not much elongate, constituting less than a third of the height of the plant.
 - 4 Leaves and involucre hispid or scabrous-hispid (often thinly so), many of the hairs long, stiff, and spreading, the leaves appearing rough-ciliate 2. *V. ciliata*
 - 4 Leaves and involucre strigose or strigose-puberulent or sericeous-strigose with short, mostly more or less appressed hairs, the leaves not evidently ciliate 3. *V. annua*
 - 3 Principal leaves ovate or rhombic-ovate, 6-25 mm wide; peduncles notably elongate, constituting more than a third of the height of the plant 4. *V. soliceps*

1. *Viguiera multiflora* (Nutt.) S. F. Blake

Helimeris multiflora Nutt. J. Acad. Nat. Sci. Philadelphia, II, 1: 171. 1848. *Gymnolomia multiflora* Rothr. Rep. U.S. Geogr. Surv., Wheeler 6: 160. 1878 [1879]. *Viguiera multiflora* S. F. Blake, Contr. Gray Herb. 54: 108. 1918. (*Gambel s.n.*, Rocky Mts.; lectotype by S. F. Blake, at GH!)
Gymnolomia nevadensis A. Nelson, Bot. Gaz. 37: 271. 1904. *Viguiera multiflora* var. *nevadensis* S. F. Blake, Contr. Gray Herb. 54: 110. 1918. *Helimeris multiflora* var. *nevadensis* W. F. Yates, Proc. Indiana Acad. Sci. 88: 368. 1979. (*Goodding 968*, Meadow Valley Wash, Nev.; holotype at RM!)
Gymnolomia linearis Rydb. Bull. Torrey Bot. Club 37: 327. 1910. (*Palmer 241*, St. George, Utah, in 1877; holotype at NY!) = var. *nevadensis*.
Gymnolomia brevifolia Greene ex Wootton & Standl. Contr. U.S. Natl. Herb. 16: 190. 1913. *Viguiera ovalis* S. F. Blake, Contr. Gray Herb. 54: 110. 1918; not *V. brevifolia* Greenm. 1903. *Helimeris brevifolia* Cockerell, Torrey 18: 183. 1918. *Helimeris multiflora* var. *brevifolia* W. F. Yates, Proc. Indiana Acad. Sci. 88: 368. 1979. (*Metcalf 511*, West Fork of Gila River, Mogollon Mts., Socorro Co., N.M.; holotype at NDG!) An unusual form of var. *multiflora* with elliptic, slightly toothed leaves.

Showy goldeneye.

Perennial herb (sometimes suffrutescent at the base) from a short taproot, or sometimes nearly fibrous-rooted from a compact caudex; stems several, slender, 2-13 dm tall; herbage strigose to scabrous-puberulent; leaves linear to lance-ovate or seldom elliptic, weakly triplinerved (or scarcely so when very narrow), entire or occasionally obscurely toothed, all but the uppermost ones opposite, the principal ones mostly 3-8 (10) cm long and 2-25 (30) mm wide, shortly petiolate or subsessile; heads medium-sized, the yellow disk commonly 6-15 mm wide; involucre 5-10 mm high, its bracts linear or lanceolate, wholly herbaceous, obscurely 2- or 3-seriate, the outer from a little shorter to a little longer than the inner; rays mostly (8) 10-16, 1-

2 cm long and 3-5 mm wide; achenes glabrous, black, narrowly turbinate, 2.5-3 mm long; pappus none; $2n = 16$, seldom 32.

Open, dry to moderately moist slopes, 900-3600 m elev.; sw. Mont. to N.M. and n. Mex., w. to e. Idaho, w. and s. Nev., and se. Calif. June-Sept.

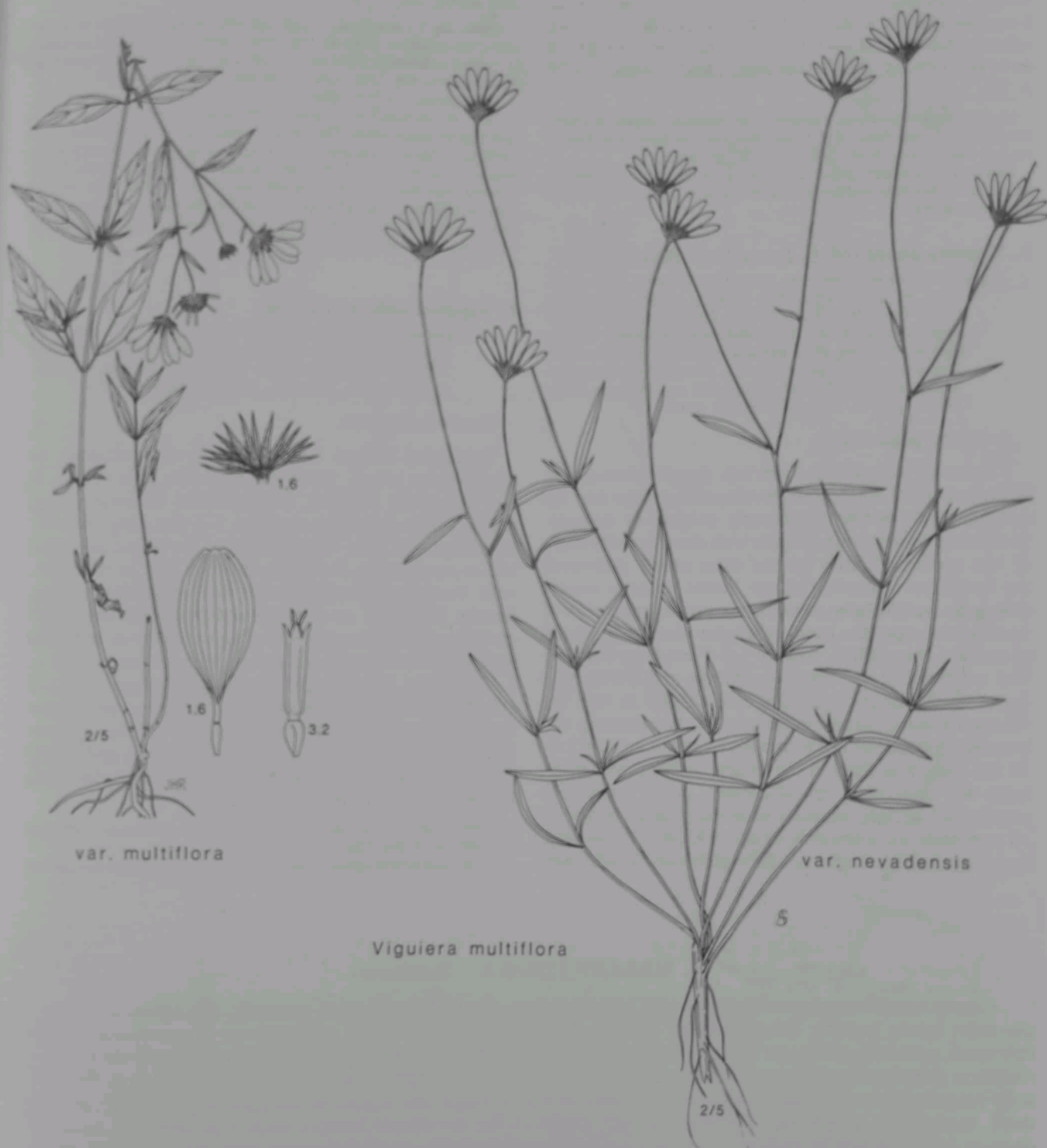
The species consists mainly of two well marked but wholly intergradient varieties with different but widely overlapping geographic ranges. A third variety, with somewhat larger heads, has been described from Mexico. Our two varieties may be characterized as follows:

- 1 Leaves relatively broad, the principal ones mostly 8-25 (30) mm wide and (2) 3-8 times as long as wide, usually not markedly revolute; mostly at 1500-3600 m, from the pinyon-juniper zone to sometimes even above timberline, commonly growing at higher elev. or in moister habitats than var. *nevadensis* where their ranges overlap; sw. Mont. and e. Idaho (as far w. as Power and Oneida cos.), s. through Wyo. and Colo. to N.M. and reputedly n. Mex., w. as far as the Stansbury Mts. (Tooele Co.) and Pine Valley Mts. (Washington Co.) in Utah and the White Pine Range (White Pine Co.) in Nev.; irregularly throughout much of Ariz., including the Arizona Strip var. *multiflora*
- 1 Leaves narrower, the principal ones mostly 2-8 mm wide and (5) 7-20 times as long as wide, more or less strongly revolute; mostly at 900-2500 m, commonly in the pinyon-juniper or sagebrush zone, but extending up into the ponderosa pine zone and down to the *Coleogyne* zone, sometimes even with *Atriplex*; se. Calif. (San Bernardino and Inyo cos., as far n. as the White Mts.) and s. and ec. Nev. (n. as far as Esmeralda, ne. Nye, and s. White Pine cos.) to Utah (n. as far as the Deep Creek Mts., and throughout the Colorado Plateau Division of our range) and w. Colo.; scattered localities in Ariz. (including the Arizona Strip) and N.M. var. *nevadensis* (A. Nelson) S. F. Blake

2. *Viguiera ciliata* (B. L. Rob. & Greenm.) S. F. Blake

Helimeris multiflora var. *hispida* A. Gray, Pl. Wright. 2: 67. 1853. *Gymnolomia hispida* B. L. Rob. & Greenm. Proc. Boston Soc. Nat. Hist. 29: 93. 1899; not *Viguiera hispida* Baker, 1884. *Helimeris hispida* Cockerell, Torrey 18: 183. 1918. *Viguiera ciliata* var. *hispida* S. F. Blake, Contr. Gray

VIGUIERA



var. multiflora

Viguiera multiflora

var. nevadensis

Herb. 54: 114. 1918. (Wright 1222, near Santa Cruz and San Bernardino, Sonora, Mex.; holotype at GH!)
Gymnolomia hispida var. *ciliata* B. L. Rob. & Greenm. Proc. Boston Soc. Nat. Hist. 29: 93. 1899. *Viguiera ciliata* S. F. Blake, Contr. Gray Herb. 54: 113. 1918. *Heliomeris hispida ciliata* Cockerell, Torreya 18: 183. 1918. (Palmer 245, Beaver, Utah; lectotype by S. F. Blake, at GH!)

Hairy goldeneye.

Taprooted annual 1–6 dm tall, branched above (or throughout) when well developed, or simple when small;

herbage thinly to seldom densely hispid (the hairs in the range of 1–2 mm long) and scabrous, or the stem merely strigose or nearly smooth, the leaves appearing hispid-ciliate especially below the middle; leaves linear or nearly so, mostly 2–8 cm long and 1.5–5 mm wide, only the lower opposite; heads hemispheric, few to rather numerous, terminating the branches, the peduncles up to about 10 cm long; disk 6–15 mm wide, yellow; involucre 5–8 mm high, its firm, narrow, green bracts obscurely biseriate, scarcely or not at all imbricate.