

Centaurea solstitialis L., YELLOW STAR-THISTLE, BARNABY'S THISTLE. Annual, spinescent on heads only, rosetted, taprooted, with ascending branches, erect, in range 30–110 cm tall; shoots with basal leaves and cauline leaves but basal leaves withered at flowering, scabrous, gray-woolly. **Stems:** typically 4-winged and conspicuously ridged, wings 2 decurrent from each leaf, the vertical wings \pm leaflike, mostly 1–2.5 mm wide, very tough, cobwebby-tomentose, margins scabrous having short, stiff, hard teeth; axis surface with alternating fibrous stripes and green, photosynthetic tissue, grayish from cobwebby hairs. **Leaves:** helically alternate, 1–2-pinnately lobed (basal leaves) and unlobed (cauline leaves), sessile, without stipules; blade of lobed basal and lower leaves 50–150 mm long, of cauline leaves long-acuminate linear, $12\text{--}40 \times < 4$ mm, with minute hard teeth on margins, with only midrib evident and raised on lower surface, woolly. **Inflorescence:** heads, terminal on ascending branches in open, cymelike arrays, principal arrays with several heads, head discoid, 13–20 mm across, many-flowered, extending like a brush above involucre, with < 20 sterile peripheral flowers and many bisexual central flowers, forming a hemispheric tuft of bright yellow flowers, bracteate; peduncle long, sometimes > 100 mm long, winged like stem, having to 12 bracts, bracts leaflike, reduced upward, approaching head with hard point at tip; **involucre** ovoid, 13–17 mm wide, phyllaries many in 6+ series, rigid and tightly appressed, the outermost phyllaries 2 mm long increasing to 12 mm long at top, phyllary pale green to straw-colored and glossy on unexposed base, gray-green and \pm woolly on exposed upper part and also margins, internally glossy and glabrous; outer phyllaries broadly ovate with a palmately branched spine at tip having 2–4 short lateral spines and a longer central spine, intermediate phyllaries lanceolate and long-spined, the innermost phyllaries narrowly lanceolate to linear or oblanceolate and lacking spine, the long spines 10–25 mm long, stout, yellow to straw-colored, radiating beneath flowers, inner phyllaries with wide membranous margins and those with spines having scarious lobes at top below spines; receptacle of inflorescence without bractlets (paleae), between ovaries with pappuslike silky white bristles 4–6 mm long. **Peripheral flower:** neuter, radial, to 6 mm across; **calyx (pappus)** absent; **corolla** 4–5-lobed; tube (lacking throat) cylindrical becoming flattened, ca. 10 mm long, mostly colorless becoming yellowish 2–3 mm approaching lobes, inconspicuously (4–)5-veined; lobes spreading, narrowly elliptic-lanceolate, 4.5–5 mm long, bright yellow, each lobe 2–3-veined; **stamens** absent; **pistil** 1, sterile; ovary inferior, cylindrical, 1–1.2 mm long, glossy white, 1-chambered without ovule; style absent. **Central flower:** mostly bisexual (or having some pistillate flowers), radial, ca. 2 mm across; **calyx (pappus)** of ca. 50 capillary bristles in several whorls (bisexual flower) or absent (pistillate flower), 0.5– \pm 4 mm long, silky white, expanded slightly at base; **corolla** 5-lobed; tube narrowly cylindrical, 4.5–5.5 mm long; throat cylindrical, 4.5×0.7 mm; lobes ascending, narrowly elliptic-lanceolate, 4.5–5 mm long; **stamens** 5, fused to base of corolla throat; filaments \pm 3 mm long, papillate-hairy most of length, glabrous at base, anthers fused into cylinder surrounding style, basifixed, dithecal, \pm 6.5 mm long, yellow, with rigid sterile terminal appendage 2.5 mm long, longitudinally and inwardly dehiscent; pollen yellow; **pistil** 1; ovary inferior, obovoid, ca. 1.5 mm long, glossy white, 1-chambered with 1 ovule; style \pm 13 mm long, greenish yellow, 2-branched, with a ring of hairs below branches, the branches stigmatic, exerted, \pm 2 mm long, typically appressed, finely pubescent. **Fruits:** cypselae, easily dislodged when touched, narrowly barrel-shaped attached at 1 side, 2.5–3

mm long, glabrous, dull dark brown without pappus (pistillate flower) and glossy mottled brown and ivory (bisexual flower); pappus (bisexual flower) with spreading pappus bristles ca. 3 mm, white, central ones short. Early June–early September.

Naturalized. Annual weed appearing first in the vicinity of SMMNRA Paramount Ranch in the late 1990s and now widespread and invasive from that point. *Centaurea solstitialis* is a thistle but has its yellow to straw-colored spines only on phyllaries of the heads. This species begins to produce flowers when the flowering season of *C. melitensis* is ending.
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