

Centaurea L. STAR-THISTLE

Centaurea melitensis L., TOCALOTE, MALTESE STAR-THISTLE. Annual, spinescent (heads only), taprooted, flat-rosetted, 1(–several)-stemmed at base, erect with ascending branches, 10–100 cm tall; shoots with basal leaves and cauline leaves, basal leaves mostly withered at flowering, finely gray-woolly, pubescent and scabrous, resin-dotted, the pubescent hairs multicellular and crisped, the resin dots superficial, spheroid, and transparent. **Stems:** typically winged and conspicuously ridged, to 6 mm diameter, ridges fibrous alternating alternating with green, photosynthetic tissue, tough, woolly and pubescent, resin-dotted, wings decurrent from leaf margins, 3–50 mm long, 0.5–6 mm wide, eventually tapering into stem, scabrous from short, stiff, hard teeth on margins. **Leaves:** helically alternate, pinnately lobed with to 5 lobes per edge and petiolate (basal and lower cauline leaves) and unlobed, sessile and clasping (upper cauline leaves), without stipules; petiole mostly winged, to 20 mm long, expanded at base; blade of lobed leaves oblanceolate in outline (lyrate), 30–110(–150) × 12–30(–40) mm (basal leaves), terminal lobe elliptic, 15–34 × 12–23 mm, unlobed (sometimes to 3-lobed), dentate to dentate-crenate, lateral lobes 1–14 × 2–7 mm, 2–6.5 mm apart, short and deltate at base increased and oblong above, remotely dentate on margins, rounded to obtuse or shallowly notched with point at tip. pinnately veined with principal veins raised on lower surface; blade of unlobed leaves oblanceolate to oblong or linear to acuminate-linear, 10–65 × 3–12 mm, long-decurrent at base, entire to toothed with minute hard teeth on margins, acute to obtuse or rounded to shallowly notched with point at tip. **Inflorescence:** heads, terminal on ascending branches in open, cymelike arrays, principal array with several, erect heads, head discoid, 9–12 mm across (excluding spines), with ca. 10 sterile peripheral flowers and 60–70 bisexual central flowers, flowers exerted 4–7 mm beyond involucre, bent outward (peripheral flowers) to straight central flowers, bracteate, woolly and pubescent like shoot, spinescent; peduncle (0–)2–105 mm long (head sessile if axillary), with 2–6(–12) bracts, bracts ascending, narrowly oblanceolate to linear, 2–12 × 0.3–2 mm, commonly with 3 bracts subtending and appressed to head, woolly and resin-dotted; **involucre** urn-shaped to ovoid, 10–12 mm long, at base, 2.5–4 mm wide below slightly expanded top, phyllaries 47–53 in 6–8 series, tightly rigid, tightly appressed but with spreading spinose tips, finely woolly, outer phyllaries deltate-ovate, 3–3.5 × 1–1.6 mm (including short spine 1.2–2 mm long), with 1–2 shorter spines per margin, the spines light yellow to tannish, middle phyllaries lanceolate, 13–15.5 × 3.3–3.7 mm (including spines 7.5–9.6 mm long), green at base with thin tough (chartaceous) and ciliate with club-shaped hairs on margins, the long spine sometimes slightly channeled, with 3–5 shorter spines per margin below midpoint, spines dark reddish to purplish red at base or base to tip or straw-colored above, the innermost phyllaries lanceolate, 12.6–13 × 2.8–3.5 mm, the body green but dark purplish red at tip, parallel-veined with 3–5 veins, with membranous margins sparsely ciliate or not, with terminal spine and lacking lateral spines, the spine to 1.5 mm long, purplish red or straw-colored; receptacle flat, without bracteate (paleae), densely bristly with white bristles 4.5–6.5 mm long. **Peripheral flower:** ± radial but bent outward below orifice with corolla lobes pointing outward and slightly spreading to 2 mm wide; **calyx (pappus)** absent or with < 6 narrow scales < 0.6 mm long; **corolla** 3–5-lobed, 10–11.5 mm long, resin-dotted; tube cylindric, 7.5–8.5 mm long, mostly colorless becoming yellowish above; throat

absent; lobes subequal, narrowly triangular to narrowly elliptic-lanceolate, $2.5\text{--}3.3 \times 0.3\text{--}0.5$ mm, bright yellow; **stamens** absent; **pistil** 1, sterile; ovary inferior, cylindrical, $1.7\text{--}2 \times 0.3$ mm, glossy white, 1-chambered without ovule; style absent. **Fertile flower:** bisexual, radial, to 2 mm across; **calyx (pappus)** of many short and long, flat bristles in several whorls, $0.3\text{--}3.5$ mm long, white, minutely barbed; **corolla** 5-lobed, $10\text{--}13$ mm long, resin-dotted, tube narrowly cylindrical, $5.5\text{--}6.5 \times 0.4$ mm, mostly colorless; throat cylindrical, $4\text{--}4.5 \times 0.7\text{--}0.8$ mm, yellowish; lobes ascending, narrowly triangular to narrowly elliptic-lanceolate, $1.5\text{--}2.5$ mm long, bright yellow; **stamens** 5, fused to base of corolla throat; filaments $2\text{--}3.5$ mm long, yellowish, glabrous at base but short papillate-hairy most of length; anthers fused into cylinder surrounding style, $3/4$ -exserted, basifixed, dithecal, $3.8\text{--}4.4$ mm long, yellow, with basal tails and sterile terminal appendages, tails < 0.4 mm long, appendages rigid, $1.5\text{--}1.7$ mm long and light yellow, longitudinally and inwardly dehiscent; pollen yellow; **pistil** 1; ovary inferior, obovoid, $1.5\text{--}2$ mm long, white, finely pubescent, 1-chambered with 1 ovule; narrowly at base of style narrowly barrel-shaped, ca. 0.5×0.3 mm, constricted at base and cupped at top, light greenish yellow to deep yellow; style $10\text{--}14.5$ mm long, 2-branched, glabrous, the branches exserted to 1.5 mm beyond anthers, stigmatic, ± 0.5 mm long, deep yellow, typically appressed but with tips divergent, minutely pubescent on outer faces and at base. **Fruits:** cypselae; \pm oblong and compressed side-to-side, $2.5\text{--}3.1 \times 1.6\text{--}2 \times 1.2\text{--}1.5$ mm, hooked and laterally attached at base, with an elaiosome within hooked base, truncate at top, finely pubescent, some individuals with smooth cypselae and light grayish brown with $12\text{--}18+$ paler veins, other individuals with ribbed cypselae with $(12\text{--})16\text{--}21$ ribs and dark brown and smooth on ribs, pale greenish yellow or grayish green in grooves; pappus of $125\text{--}135$ spreading, peripheral bristles in $5\text{--}6$ series + $15\text{--}20$ erect, central bristles in 1 whorl, the peripheral bristles flattened, $0.3\text{--}4.4$ mm long, progressively longer from outside inward, whitish or tawny, densely barbed, the central bristles, erect, $0.5\text{--}1$ mm long, tapered, whitish to brownish or dark purplish red. Early April–mid-July.

Naturalized. Annual weed present throughout the range and often a dominant herb in full-sun patches on burns, covering the ground with flat basal rosettes and outcompeting native annuals. *Centaurea melitensis* has reddish purple spines on phyllaries of the heads. This species produces flowers during midspring to early summer and mostly finishes flowering before *C. solstitialis*, which in general is a taller plant with larger heads during summer drought.

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