Xanthium strumarium L., COCKLEBUR. Annual, coarse, taprooted, 1-stemmed at base, the largest individuals often with an ascending branch at each node along main axis, branches decreasing in length base to tip, erect, 25–190 cm tall; monoecious; shoots with only cauline leaves, unarmed, scabrous throughout from short, stiff, upward-pointing hairs (short-hirsute), the hairs with 2–3 cells and sharply bent above a large basal cell, glandular-hairy with minutely spheric, short-stalked or sessile hairs, with medicinal scent. **Stems:** shallowly ridged becoming ± cylindric, to 18 mm diameter, with ridge descending from each leaf, tough, light green and conspicuously marked with longitudinally elongate purple-red spots (maculate) having minute bumps, short-strigose and with glandular hairs, aging glabrate but without periderm, main stem not straight, often woody; solid, pith wide. **Leaves:** helically alternate (at basal nodes sometimes opposite decussate), unlobed or shallowly palmately lobed, long-petiolate, without stipules; petiole narrowly channeled, 25–180 mm long, tough, often becoming purplish red on upper side; blade broadly ovate to deltate or pentagonal, 40–180 × 30–180 mm, blade = petiole, often shallowly 3-lobed or weakly 5-lobed, shortly tapered for < 15 mm at base then ± truncate, broadly serrate to scabrous-toothed on margins, when immature with purplish glands on some teeth, acute to obtuse at tip, ± pinnately veined with 3 major veins at base and principal veins raised on lower surface, dull, distinctly scabrous with hairs mostly along veins. **Inflorescences:** unisexual heads, in terminal paniclelike arrays and axillary cymelike arrays (2 arrays per node) with pistillate heads burlike present only at base of larger terminal arrays and staminate heads above, 2-headed axillary arrays having either 2 pistillate heads or 1 pistillate and 1 staminate head, burlike pistillate head containing 2 highly modified discoid flowers, staminate head with many discoid flowers, bracteate, with soft nonglandular and glandular hairs; bract subtending peduncle of staminate head acuminate, 4–6 mm long; bract subtending peduncle of pistillate head diminutive leaflike with petiole and partially sheathing; peduncle of staminate head stemlike and 0–8 mm long, of pistillate head at anthesis ca. 0.5 mm long elongating 3× in fruit, maculate with purple-red spots. **Staminate head:** hemispheric to conic, 4.5–6 mm wide; **involucre** dish-shaped, of 6 or more phyllaries in 1 series, phyllaries lanceolate to awl-shaped, 3.5–4.5 × 0.7–1.2 mm, green aging whitish, with swollen base, ciliate-pubescent and glandular-hairy; receptacle domed to conic or cylindric, with bractlets (paleae), palea subtending flower lanceolate to awl-shaped and flat (the outermost flowers) to trowel-shaped or spatulate and thickened at tip (inner flowers), 2.5–3.5 × 0.5–1 mm, > corolla and projecting in bud, green often with purplish tip aging whitish, exposed surface short-strigose to ± tomentose. **Staminate flower:** radial, ca. 0.8 mm across; **calyx (pappus)** absent; **corolla** 5-lobed, inversely conic to funnel-shaped, 2.3–2.7 × 0.6–0.9 mm; tube + throat transparent pale green with 5 veins to sinuses, sparsely puberulent; lobes ± erect, triangular, 0.4–0.5 mm long, dark green on margins, outer surface with short, thick-based hairs; **stamens** (4–)5, fused to top of corolla tube; filaments fused into column surrounding style, 1.4–1.7 mm long, expanding slightly from base upward, colorless; anthers free, exserted and spreading, basifixed, dithecal, linear, ± 1.2 mm long, light yellow, longitudinally dehiscent; pollen light yellow; **pistil** 1, sterile; ovary inferior, diminutive, ca. 0.2 mm long; style exserted with anthers or included, 1.4–1.7 mm long, unbranched, colorless or aging reddish at tip, without stigma. **Pistillate head:** bracts subtending involucre 5–8 in 1 series (calyculuslike), initially awl-shaped to acuminate, 3–6 mm long, green aging whitish, short-hirsute on surface and stiff short-

ciliate on margins; **involucre** ovoid to ellipsoid, ca. 3 × 1.5 mm, at anthesis densely covered by > 200 ± appressed and ascending, helically alternate bristles (= modified phyllaries, also interpreted as paleae), lower bristles short increasing in length toward tip, flexible when short aging longer and rigid, the longer ones at anthesis hooked at tip while others aging hooked after elongating, surface of involucre and bristle axes below midpoint with swollen short hairs and glandular hairs, the bristles aging with spreading short hairs but without glandular hairs; beaks 2 = extensions of containers for the 2 flowers (= highly modified, spinelike bractlets), co-terminal, erect, narrowly conic and sharp-tipped, 3–3.5 mm long increasing 2.5× in fruit, with abundant hairs except approaching sharp tip, each beak paired with a shorter tooth 1.5 mm long, between beak and tooth with a chamber pore through which style exserted on inner side of beak. **Pistillate flower:** hidden except style; **perianth** absent; **stamens** absent; **pistil** 1, ovary inferior, ovoid, ca. 1.7 × 1.9 mm, at anthesis green, flattened on inner side, 1-chambered with 1 ovule; style 2.5–5 mm long, 2-branched at base, stigmatic on upper 2/3. **Fruits:** 2 cypselae, enclosed in solid, burlike involucre, ovoid to ellipsoid, 25–30 × 10–12 mm (including projections), with > 200, helically alternate, hooked bristles (phyllaries) and 2 terminal beaks (bractlets), yellow-brown to brown; bristles 3–4 mm long with sharp-pointed, incurved hooks; beaks 2, spreading 90°, pubescent except on curved tip; cypsela narrowly fusiform compressed front-to-back, 17–18 × 4.5–5 mm, dark gray-brown, with persistent style; seeds germinating in successive years from each bur. Mid-July–late October.

Naturalized. A large-leaved annual weed common throughout the range in many types of disturbed habitats, from ditches and roadside situations to non-native grasslands, but especially abundant along certain wetlands or where there is a depression where water was standing for an extended time. *Xanthium strumarium* is one of a handful of weedy species that occurs in all states of the United States and is transported around via its burlike fruits, which have hooked bristles. The fruit of cocklebur is an involucre containing two fruits; the radiating bristles are typically interpreted as modified phyllaries, and the two beaks containing the fruits are modified bractlets (probably phyllaries but possibly paleae), and the sharp hooks catch easily in animal hair or fur and also interlock with other burs. This species is well-known in biology because initially only one seed germinates, and the other seed germinates during the following year, and this species has a well-studied mechanism of utilizing length of daylight versus darkness to begin its flowering cycle.
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