

Emex spinosa (L.) Campd., DEVIL'S THORN, LITTLE JACK, SPINY THREECORNERJACK.

Annual, thick-taprooted, rosetted, several-stemmed at base, having unequally forked branching with flowers at every node (including at ground level), ascending to prostrate, 30–60 cm tall; monoecious; shoots glabrous; taproot to 30 mm diameter, tannish. **Stems:** initially low-ridged soon becoming cylindrical, to 8 mm diameter, green with lighter green veins, often becoming rose-red on exposed surfaces and at shoot bases, internodes to 145 mm long, slightly swollen or bent at nodes. **Leaves:** helically alternate, simple, petiolate, with stipules; stipules (2) completely fused sheathing stem (ocrea), extending from base of petiole, to 12 mm long, pale green to whitish membranous (with dark red veins), delicate and soon fracturing or ripping but usually leaving some remnant at base; petiole channeled, in range 10–140 mm long, flared at base, with low ridges and sometimes a midridge in channel; blade long-triangular to ovate, 20–130 × 12–85 mm, dull, truncate and sometimes having perpendicular lobes at base (tapered), entire to subentire and somewhat wavy on margins, acute or obtuse to rounded at tip, pinnately veined with principal veins raised on lower surface. **Inflorescence:** pistillate and mixed; pistillate inflorescence = condensed clusters, 2 clusters at each node and lateral to petiole, with (1–)3–6 flowers per cluster, often merging together as fruits develop and appearing as one cluster, flowers sessile or becoming subsessile with short pedicel in fruit; mixed inflorescence = a raceme or a 1-forked panicle with each branch = raceme, terminal or arising opposite leaf and between pistillate flower clusters, to 85 mm long, with flower clusters on 1 side of rachis at lower nodes, whorled at upper nodes, typically of only pistillate flowers (5–9 flowers per node) at the lowest node, mostly staminate flowers above midpoint on inflorescence (6–22 staminate flowers, 0–2 pistillate flowers); peduncle conspicuously ridged, to 35 mm long; bract ocrealike but shorter and ripping as flowers emerge; pedicel of staminate flower lax and arching, at anthesis 1.5–2 mm long increasing 2–3× after discharging pollen, abscising 1–2 mm above base; pedicel of pistillate flower rigid, < 1 mm long. **Staminate flower:** radial, 3–4 mm across, dishlike, nodding at anthesis; **perianth** 6-lobed, lobes (tepals) in 2 different whorls with (2)3 in outer whorl and 2–3 in inner whorl; lobes of outer whorl (calyx) ovate, 1.3–2.8 × 0.7–1.3 mm; lobes of inner whorl (corolla) elliptic to lanceolate, 1.1–2.1 × 0.5–0.9 mm, green but colorless on margins, acute at tip, faintly pinnately veined; **stamens** (4–)6, free, arising at bases of perianth lobes; filaments ascending, equal, 0.5–1.5 mm long, whitish to pale yellow, persistent; anthers basifixed, conspicuously dithecal, sacs subequal and oblique, 1.1–2.2 mm long, fused below midpoint, pale yellow (with rose-red tips), longitudinally dehiscent; pollen cream. **Pistillate flower:** radial, at anthesis 2–3 × 1.5–3 mm; **perianth** 6-lobed, lobes (tepals) in 2 different whorls; tube 6-ribbed, 0.8–1.7 × 0.8–1.8 mm, fleshy, green; lobes of outer whorl initially erect later spreading, awl-like (± ovate and compressed side-to-side), 1.4–1.7 mm long, spine-tipped; lobes of inner whorl erect and appressed to pistil, triangular to lanceolate, 0.6–1 × 0.3–0.7 mm, swelling to form a medial callus after anthesis; **stamens** absent; **pistil** 1, at anthesis 1.5–2.5 mm long; ovary superior, 3-sided ovoid, ± 1 mm long, whitish, sharply 3-angled, 1-chambered with 1 ovule; styles 3, ascending, whitish, expanded toward the tip; stigmatic surfaces exerted to midpoint or below, tentaclelike, to 0.5 mm long, whitish or colorless sometimes aging pink to deep rose, the stigmatic hairs on margins and upper face of style, appearing ± crystalline from small, bladderlike cells. **Fruit:** achene embedded within an extremely hard perianth tube forming a burr with the outer 3 lobes having spreading

spines, indehiscent, burrs dimorphic; cauline burr polyhedral, 5–8 × 5–6 mm, ± hexagonal in ×-section, inversely pyramidal on basal 1/3, ± pyramidal on upper 2/3, with trapezoidal faces, with 6 rounded ridges (3 terminating as spines) each swollen at base, deeply dimpled between ridges, the spines 2–3(–4) mm long and keeled, the lobes of inner perianth erect with an elongate, medial tubercle at base; achene of cauline burr 3-sided with rounded edges, ovoid and triangular in ×-section, ca. 4 × 2 mm, glossy, light brown; burr of basal leaf (at crown of taproot) larger, 8–10 × 6–7.5 mm, commonly compressed, often bumpy between ridges, outer lobes 2.3–3 mm long, short-spined or spineless, inner lobes linear, ca. 2.5 × 1 mm long, acute at tip; achene of basal burr ovoid to lanceoloid, to 8.5 mm long, ± biconvex or compressed triangular in ×-section. Mid-December–April.

Naturalized. Annual to date only collected at Zuma Beach behind the dunes, where it is an unwanted, potentially noxious weed. *Emex spinosa* has small, nonshowy flowers; copious pollen from the nodding staminate flowers dusts the stigmas of the pistillate flowers at the same node. The female flower develops into an exceedingly hard (indurate), spiny, burrlike fruit with three spine-tipped lobes on the outer perianth. The three-angled achene is entrapped and difficult to remove; it resembles the characteristic achene of *Rumex*, to which it was initially assigned by Linnaeus. One curious feature is that *E. spinosa* forms larger, spineless fruits at ground level, axillary to basal leaves, and so they appear like bulblets after the basal leaves have abscised.

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