

*Emex* Campd. THREECORNERJACK, SPINY EMEX

*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 cylindric, 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 and forming an ocrea, extending from base of petiole and sheathing developing shoot, to 12 mm long, pale green to whitish, (with dark red veins), membranous, delicate, 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 and 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 (tepals)** 6-lobed, in 2 whorls with (2)3 in outer whorl and 2–3 in inner whorl, dimorphic; **sepals** (outer tepals) ovate, 1.3–2.8 × 0.7–1.3 mm; **petals** (inner tepals) 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 tepals; 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 (rose-red tips), longitudinally dehiscent; pollen cream. **Pistillate flower:** radial, at anthesis 2–3 × 1.5–3 mm; **perianth (tepals)** 6-lobed, in 2 whorls of 3, dimorphic; **calyx** tube 6-ribbed, 0.8–1.7 × 0.8–1.8 mm, fleshy, green; lobes initially erect later spreading, awl-like (± ovate and compressed side-to-side), 1.4–1.7 mm long, spine-tipped; **petals** (inner tepals) fused to calyx tube, 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  $\pm$  crystalline from small, bladderlike cells.

**Fruit:** achene embedded within an extremely hard perianth tube forming a burr with outer 3 lobes (tepals) spreading and spiny, indehiscent, burrs dimorphic; cauline burr polyhedral,  $5-8 \times 5-6$  mm,  $\pm$  hexagonal in  $\times$ -section, inversely pyramidal on basal  $1/3$ ,  $\pm$  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 petals (inner tepals) erect with an elongate, medial tubercle at base; achene of cauline burr 3-sided with rounded edges, ovoid and triangular in  $\times$ -section, ca.  $4 \times 2$  mm, glossy, light brown; burr of basal leaf (at crown of taproot) larger,  $8-10 \times 6-7.5$  mm, commonly compressed, often bumpy between ridges, outer lobes 2.3–3 mm long, short-spined or spineless, inner lobes linear, ca.  $2.5 \times 1$  mm long, acute at tip; achene of basal burr ovoid to lanceoloid, to 8.5 mm long,  $\pm$  biconvex or compressed triangular in  $\times$ -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 3 spine-tipped lobes on the outer perianth. The 3-angled achene is entrapped and difficult to remove; it resembles achenes 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.

B. A. Prigge & A. C. Gibson