

Trichostema lanceolatum Benth, VINEGAR WEED. Annual, taprooted, 1–several-stemmed near base, with unbranched main branches, ascending, 10–60 cm tall; shoots pilose to villous and capitate-glandular, the villous hairs curved upward at the middle, strongly odorous like propionic acid. **Stems:** 4-sided with rounded angles on narrower stems, becoming \pm cylindrical on larger stems, to 4 mm diameter, internodes < 20 mm long, becoming red-dotted (around stomates) and later more evenly reddish pink on exposed sides. **Leaves:** opposite decussate, simple, short-petiolate to sessile, without stipules; petiole $< 0.7(-2)$ mm long; blade lanceolate to lanceolate-ovate, $17-55 \times 4-20$ mm, broadly tapered at base, entire (of large leaves, rarely with 1 tooth on each side), acute to acuminate at tip, pinnately veined with principal veins sunken on upper surface and raised on lower surface, long-pubescent to short-pilose and also capitate-glandular on both surfaces (denser on lower surface). **Inflorescence:** leafy racemelike array of axillary cymes of 2 per node (not verticils), terminal, each cyme 10–35 mm long and 4–12-flowered, bracteate, pilose and densely capitate-glandular; peduncle 1.5–4 mm long; bract subtending cyme leaflike; bractlet subtending pedicel narrowly lanceolate, 2–3 mm long; pedicel slightly flattened, 1.5–3.5 mm long. **Flower:** bisexual, bilateral, 10–15 mm across; **calyx** 5-lobed, bell-shaped, $4-5.5 \times 2.8-4.5$ mm, green, 10-veined with 1 vein to each lobe and sinus, pilose to villous and capitate-glandular; tube 1.8–2.5 mm long; lobes erect, subequal, lanceolate to triangular, $2.3-3.2 \times 0.8-1.8$ mm, acute to acuminate at tip, purplish on margins and sometimes along midvein; **corolla** 2-lipped, mostly violet aging bluish at lobe tips, finely pilose on lips; tube $6-11 \times 1.3-1.6$ mm, sharply recurved and compressed approaching tip (1.5–3 mm), erect-pubescent, internally pubescent below lower lip; upper lip 3-lobed with a bannerlike upper lobe and 2 winglike lateral lobes, the bannerlike lobe arching backward, oblong, $4.2-6.5 \times 1.7-2$ mm, white with deep violet spots below midpoint, deep blue-violet approaching tip, upcurved on margins, winglike lobes reflexed, ovate to obovate, $3.7-5 \times 1.9-2.8$ mm, violet, acute at tip; lower lip 2-lobed, lobes typically spreading widely but initially \pm keel-like and appressed to each other or sometimes also appressed to filaments and style, \pm sickle-shaped to oblanceolate, $4.5-6.5 \times 1.1-2.5$ mm; **stamens** 4, fused to corolla tube ca. 0.7 mm below orifice, dimorphic, 2 short and 2 longer, the lower pair with a stamen opposite each lobe of lower lip, the upper pair with a stamen opposite each winglike lobe of upper lip, long-exserted; filaments arching upward, 13–18 mm long and 17.5–22 mm long, entirely violet or mostly white with violet at base and just below anthers, papillate at base of lower stamens, glabrous or sparsely glandular-hairy at base of upper stamens; anthers dorsifixed, dithecal, 0.9–1.4 mm long, yellow tinged reddish on margin of slit, dehiscent across top; pollen light yellow; **pistil** 1; ovary superior, 4-lobed, 1.1×0.8 mm, yellowish green, pubescent, 2-chambered, each lobe with 1 ovule; style attached to ovary base at center of ovary lobes (gynobasic), 28–34 mm long, blue-violet, 2-branched, the branches stigmatic and positioned close to level of long stamens, unequal, 1.2–3 mm long, tapered to purple tip, flat and \pm smooth on inner face. **Fruits:** nutlets, 2–4, \pm obovoid, ca. 2 mm long, brown, densely pubescent and capitate-glandular, crudely netlike, with radial walls irregularly winged and culminating in several flat points or compressed bumps (tubercles), the base with a \pm oblong attachment scar with whitish, crystallinelike pubescence. Late May–early November.

Native. Annual observed in full sun, typically in dry, often disturbed places along trails, growing in heavy soil. *Trichostema lanceolatum* has hairy leaves with a very strong, somewhat disagreeable odor of propionic acid, hence the name vinegar plant. This is one of the few species in range that tends to begin its flowering in late summer, so it is showy when most neighboring herbaceous plants have dried up. The nutlets are peculiar in form, being somewhat irregular and covered with whitish pubescence.

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