Schoenoplectus americanus (Pers.) Schinz & R. Keller, AMERICAN TULE, THREE-SQUARE BULRUSH, SWORD-GRASS. Perennial herb, emergent aquatic in dense patches, clonal, with photosynthetic stems, rhizomatous, fibrous-rooted, appearing tufted with 1–several-stemmed at base at intervals along a creeping rhizome, shoots unbranched above substrate, erect to ascending, in range 75–250 cm tall; shoots with ca. 4 basal leaves and dark-green, sharply 3-angled (trigonous) stems, the lower 2 leaves = nongreen sheaths (cataphylls), the upper 2 leaves with longer sheaths and green blades, glabrous; rhizomes radiating in 1–several directions from mother plant, horizontal 15–35 mm deep in substrate, often > 150 mm long, ± straight, in ×-section elliptic to circular, in range to 4–9 mm diameter, internodes to 55 mm long, white to beige aging pinkish red or orangish red often with fine, dark purple-red streaks, rhizome covered with membranous scales having purple-red veins (= sheath closed-tubular most of length) and > internode, scales ± persistent, most nodes without shoots and lacking roots but eventually forming a swollen tip to become the next shoot or shoot cluster and producing many adventitious roots on swelling, rhizome internally with a white cylinder surrounding a tan core of vascular tissues. **Stems:** 3-ribbed, in range 6–10 mm diameter, on each stem ± even diameter but tapering below inflorescence and sometimes somewhat narrower at base, dark green (white at base where covered with leaf sheaths), ribs narrowly triangular with thin edges and deeply concave sides, rib in ×-section 3.5–5 mm high × 1.3–2.5 mm wide, green surface finely striped from many parallel rows of stomates; solid (white base) or with tough stem cover (green stem) having spongy internal tissue whitish with large air spaces (aerenchyma). **Leaves:** alternate tristichous, sheath with or without simple blade; sheath closed, increasing in length lower leaf to upper leaf, sheath of lower 2 cataphylls to 65 mm long, closed > 2/3 length, acute at free tip, membranous with purple-red veins, vein bridges horizontal forming rectangular pattern, sheath splitting as stem expands; sheath of upper 2 basal leaves to 280 mm long, closed to top, the uppermost sheath green, strongly 3-angled, and ± truncate at top, veins mostly not pigmented; ligule absent (cataphylls) or present (upper 2 leaves), membranous, 1 mm high and Λ-shaped terminating sheath; blade long-tapered, 15–160 mm long, entire, acuminate at tip, parallel-veined, the first blade appressed, short, somewhat inrolled, and stiff, the second blade conspicuous, ascending, strongly keeled, and flexible with upper surface pale green with conspicuous rectangular venation pattern and lower surface bright green finely striped from many parallel rows of stomates. **Inflorescence:** headlike panicle of 4–8+ subsessile spikelets on a condensed peduncle < 1 mm long, terminal but appearing lateral due to presence of the erect, stemlike inflorescence bract extending above panicle, base of head arising from a small opening in bract base, spikelets in a tight, hemispheric array to 20 mm across; inflorescence bract subtending panicle erect, V-shaped 3-ribbed tapered to acute, flat tip compressed side-to-side, 10–25(–40) mm long, upper surface grayish, 2 green surfaces finally striped with stomates, glabrous; primary prophyll of panicle brown-membranous, hidden internally, and diminutive. **Spikelet:** ovoid to narrowly ovoid, 4–12 × 3–5 mm, mostly 20+-flowered, flowers sessile, bracteate; bracts subtending spikelet (= lacking flowers) 1–several, difficult to distinguish from bractlets, cupped and broadly ovate to obovate, 3–3.5 mm long, scarious with orange-red to red-brown or purplish red markings, lacking midvein or with midvein only partially formed, short-ciliate on margins at least above midpoint, tip notched 0.3–0.4 mm, with or without short awn in notch; bractlet subtending each flower,

bracts ± helically alternate, closely overlapping and tightly appressed, strongly permanently cupped, broadly ovate to broadly obovate, 2.5–4 mm long, scarious with orange-red to red-brown or purplish red markings, keeled with a stiff, whitish midvein, short-ciliate on margins at least above midpoint, tip notched 0.3–0.4 mm, with awn in notch, the awn 0.3–0.5 mm long and often pinkish. **Flower:** bisexual; **perianth segments** in range ca. 4 threadlike bristles, unequal, 1.5–2.5 mm long, colorless, with mixed spreading, deflexed, and reflexed short hairs (partially retrorsely barbed) but hairs absent on basal 0.5 mm, often 1 in middle of rachilla side and 1 on each edge of ovary, persistent around developing fruit, aging whitish to orange-brown, with at least 2 bristles > fruit; **stamens** 3, free, ± opposite bristles on bractlet side of ovary, exserted; filaments subequal, flat-linear, 3–3.5 mm long, whitish or with reddish stripe to or above midpoint, often narrowly flaring above midpoint; anthers basifixed, dithecal, linear, 2–2.5 mm long, pale yellow, longitudinally dehiscent; pollen white; **pistil** 1, ovary superior, compressed-obovoid to trowel-shaped flattened on rachilla side, ± 1.3 mm long with short callus at top, white to pale green, 1-chambered with 1 ovule; style exserted from bractlet, ca. 1.5 mm long, white, 2-branched from near base. **Fruit:** achene, obovoid or rhomboid and mostly flattened on rachilla side (never 3-sided), in range 1.8–2 mm long + knob 0.1–0.3 mm long, dark brown, surfaces minutely beaded. Late April–early October.

Native. Emergent aquatic perennial herb growing as a dense clone in permanently wet shoreline, in sand or mud along creeks and ponds. *Schoenoplectus americanus* forms dark green, three-ribbed stems having deeply concave sides. A clone of three-square bulrush forms shoots of different heights, up to 250 centimeters tall, and near the top of each stem is a tight hemispheric cluster of spikelets, usually about 20 millimeters from the tip. A rhizome from the mother plant forms several nodes before the tip is converted into a new plantlet, and that swollen tip eventually forms adventitious roots; as the first shoots grows, axillary buds expand at the base to form a cluster of new shoots supplied by the tuft of adventitious roots.

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