

Aegilops cylindrica Host, JOINTED GOAT GRASS. Annual, fibrous-rooted, several–many-stemmed at base (a many-stemmed “plant” may actually be 2 individuals germinated from the same multiple fruit), ± erect, in range 30–65 cm tall; shoots with leaves dry at flowering; shoot and its adventitious roots often remaining attached to remnant of fruit with gapped glumes; weakly rooted. **Stems (culms):** cylindric, to 1.5 mm diameter, tough, green and photosynthetic aging straw-colored with or without purplish stripes, smooth, glabrous; internodes hollow. **Leaves:** alternate distichous, simple with sheath; sheath open, conspicuously ridged with raised veins, margins membranous becoming scarious, entire or 1 margin long-ciliate, glabrous or pilose approaching blade, sometimes with lobes (auricles) at top, auricles minute–1.5 mm long with several long hairs; ligule membranous, ± truncate to shallowly 2-lobed, 0.2–0.6+ mm long, sometimes minutely fringed; blade linear, in range 30–185 × 2–3 mm, the widest near the sheath, flat, dull, long-ciliate on margins, long-tapered to tip, parallel-veined on long leaves with midvein appearing on lower surface and veins raised, in range pilose or lower surface glabrous. **Inflorescence:** spikelets, in terminal, “spike,” spike cylindric, 40–115 mm long (excluding awns), hard, of alternate distichous, sessile spikelets, the lowest 1–3 spikelets rudimentary with highly reduced green or purple glumes, fertile spikelets 3–8, terminal spikelet tapered and typically sterile; axis conspicuously jointed with fertile spikelets breaking easily at each node into cylindric segments, spikelet with 0–2 sterile or fertile florets, bracteate, awned; peduncle stemlike with low ridges, 100–240 mm long, aging purplish, glabrous or minutely scabrous near inflorescence; inflorescence segment = rachis internode with cavity containing 1 tightly appressed spikelet, fertile segments 9–12 × 2.2–3(–3.6) mm, green drying brown, rachis internode conspicuously ridged, minutely scabrous along ridges and on margins. **Spikelet:** fertile florets or sterile florets (= lemma visible) on a flattened rachilla prolonged beyond the upper fertile floret, rachilla with or without a sterile floret, ciliate on rachilla margins; **glumes** 2, awned, tightly appressed, on well-developed spikelets covering 2/3–3/4 of internode, each glume oblong, 8–9 × 2–2.5(–4) mm, glumes partially overlapping, thick becoming hard and inflexible (indurate), strongly 5–7-ribbed, green (purple), ribs minutely scabrous, entire and membranous on margins, asymmetric at tip with 2 teeth, 1 tooth deltate and other tooth forming an awn, ciliate at tip; awn stiff, (2–)4–14(–22) mm long (fertile segment), purplish drying brown, the shortest on only the basal segment, appressed-erect or later ascending to spreading (upper segments), on terminal segment 30–50 mm long with 1 or 2 short lateral teeth or having shoulders at base; **lemma** (of fertile floret) membranous and somewhat tannish to pale yellow with a hard, green tip exposed beyond glume bodies, ovate, 8.5–10 mm long, 5-veined, at anthesis veins green and not converging at tip, inner surface short-pubescent, with short point at tip or short-awned (to 1.5 mm long), inner surface of exposed portion villous; of terminal segment awn > glume awns, 40–70 mm long with a pair of lateral teeth 0.5–1.5 mm long at the base (if second lemma present, its awn short and erect); **palea** membranous, elliptic, 7–8 mm long, slightly < lemma, 2-veined, 2-keeled abruptly along 2 veins, the keel at anthesis green, ciliate above midpoint to most of length, shallowly 2-lobed at tip; callus hairy. **Flower:** bisexual; **perianth (lodicules)** 2, irregularly obovate to elliptic with hairy margin, 1.3–1.5 mm long (including hairs), thin, colorless; **stamens** 3, free, included; filaments threadlike and fragile, ± 2.5 mm long, colorless; anthers dorsifixed, dithecal, linear, ± 3 mm, light yellow, longitudinally

dehiscent; pollen whitish; **pistil** 1; ovary superior, compressed-obovoid and 2-lobed with tapered base, 1.5–2.7 mm long, glabrous below midpoint, upper portion short-villous, 1-chambered with 1 ovule; styles 2, included, finely branched, colorless; stigmas touching basal portion of anthers. **Fruit:** multiple fruit including 1–2 achenes (caryopses) tightly enclosed by 2 glumes and persistent within the spikelet on a cylindrical rachis segment, of awned fertile spikelets 9–12 mm long, husk brown, conspicuously ribbed, minutely scabrous; achene covered by adherent lemma and palea, narrowly lanceolate-ellipsoid to oblong-ellipsoid compressed somewhat front-to-back, 6–8.7 × 1.6–2.2 mm, purplish to brownish, with longitudinal groove on side facing palea, having a dense tuft of hairs at tip; rachis internode attached to root after germination. Mid-May–late June.

Naturalized. Annual first recorded in June, 2006 along a hiking trail used by horses at Satwiwa SMMNRA (SMM, Ventura County). The spikelike inflorescence of *Aegilops cylindrica* shatters into extremely hard, cylindrical rachis segments, each segment containing up to two achenes. When germination occurs, the young roots and shoots must force their way past the inflexible glumes by spreading them apart, but the dry husk remains attached to the new plant throughout its lifetime. This Eurasian species is an extremely successful weed throughout North America. Fruits can germinate even in the driest spring (e.g., 2007), and *Aegilops cylindrica* is considered a serious invasive species especially around cultivated hexaploid wheat (*Triticum aestivum*), with which it can hybridize. Because of its potential to become a local invasive species, steps were taken by the National Park Service, beginning in 2007, to eradicate this species from our range. Vigilance is required because jointed goat grass may reappear elsewhere from, we presume, horse droppings contaminated with fruits. The husk of the multiple fruit persists with shoots and roots growing out between the spreading glumes. When a rachis segment has two viable achenes, both germinate, thus allowing roots of the two new plants to become intertwined during their lifetimes, typically with one plant being more vigorous than the other.

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