



SORGHUM HALEPENSE

Johnson Grass

A strongly rhizomatous perennial, moderately stout, 50–200 cm tall. *Culms* arising from a stout, extensively creeping, scaly rhizome, which is well rooted at the nodes; also prop roots arising from the lower, above-ground nodes. *Nodes* prominent and numerous, usually hairless. *Leaves* mostly on the culms. *Leaf sheaths* with short, silky hairs at the nodes, otherwise smooth, hairless, striate, persisting at the base, shorter than the internodes in the upper part. *Ligule* about 2.5 mm long, truncate, membranous and jagged along the margin. *Leaf blades* usually long and broad, up to 45 cm long and 0.5–2 cm wide, hairless, tapering gradually from below the middle to a fine point, flat, rounded at the base and often almost clasping the culm, the mid-rib prominently white, the margins also white and very rough.

Inflorescence a somewhat open panicle, pyramidal in shape, up to 35 cm long, spreading somewhat at maturity, the branches up to 15 cm long, fairly slender, very rough, often several together in whorls or clusters, but some singly in the upper part; secondary branches bearing 1 to several racemes of 2–5 spikelet pairs 1–2.5 cm long. *Spikelets* (S_1 , S_2) in pairs, one sessile, the other pedicellate, both dorsally flattened, at maturity falling entire, together with the subtending joint and pedicellate spikelet. *Florets* 2 in each spikelet; in both S_1 and S_2 , the lower floret reduced to a lemma only and neuter, with the upper floret bisexual in S_1 , and male or neuter in S_2 , in which case it is reduced to a small lemma. *Sessile spikelet* (S_1) 4.5–5.5 mm long, fertile, often awned, mostly greenish, but sometimes brown or reddish-coloured, the callus at the base tufted with short hairs. *Glumes* (G_1 , G_2) equal, the length of the spikelet, somewhat toughened; the lower glume (G_1) broader than the upper, strongly 2-keeled along the lateral nerves, 11–13-nerved, covered on the back with short, pale, close hairs; the upper (G_2) somewhat rounded on the back, but becoming 1-keeled in the upper half, 7-nerved with obvious transverse veins, the tip blunt, slightly hairy on the back and margins in the upper part. *Lemma* (L_1) of the lower sterile floret almost the length of the glumes, thinly membranous and transparent, the margin of the upper part fringed with hairs, faintly 2-nerved. *Palea* absent. *Lemma* (L_2) of the upper fertile floret broad and thinly membranous in the lower part, which is a little more than half the length of L_1 , 2-lobed when awned, pointed when awnless, the upper margins fringed with hairs, awned from between the lobes, the awn 8–16 mm long, firm, twisted in the lower part below the knee. *Palea* (P_2) when present, about $\frac{3}{4}$ the length of L_2 , thinly membranous, nerveless, fringed with hairs along the top margin. *Anthers* 3, 3.75 mm long. *Pedicellate spikelet* (S_2) 5–7 mm long, male or neuter, not awned, narrow and pointed, greenish or purplish. *Glumes* (G_1 , G_2) dissimilar, both about the length of the spikelet, membranous; the lower glume (G_1) 6–7-nerved, slightly keeled along the lateral nerves with a row of spines along the keels on the back; the upper (G_2) broader than G_1 , 5-nerved, slightly hairy along the margins. *Lemmas* (L_1 , L_2) thinly membranous, faintly 1-nerved; the lower (L_1) about $\frac{2}{3}$ the length of G_2 ; the upper (L_2) about $\frac{1}{2}$. *Palea* absent. *Anthers*, when present, 3, 2 mm long.

Although fairly readily eaten by stock, this is a weed species, becoming a serious pest of cultivation and waste places, ditches, etc., and because of its strongly rhizomatous habit, it is difficult to eradicate. It also is known to be cyanogenetic. The genus contains a number of important species, which include the forage and grain sorghums. *Sorghum sudanense* (Sudan grass) was once widely grown as a short-term pasture species, but there are now a number of varieties of hybrid derivation such as Krish (derived from *S. halepense* x *S. roxburghii*) and sweet Sudan (derived from *S. sudanense* x *S. bicolor*). *S. almum* (Columbus grass) is now widely grown in areas of 500–900 mm rainfall. The fodder sorghums Sudax and Zulu are F₁ hybrids involving the *S. bicolor* complex.

REFERENCES

Bailey (1902),¹ pp. 1868–70; Hubbard (1938);² Gardner (1952),³ pp. 314–20; Vickery (1961),⁴ pp. 29–33; C.S.I.R.O. Australia (1967),⁵ pp. 59–76; Barnard (1969),⁶ pp. 68–71; Burbidge and Gray (1970),⁷ pp. 72–73; Willis (1970),⁸ pp. 209–10; Beadle *et al.* (1972),⁹ pp. 674–75; Black (1978),¹⁰ pp. 247–48; Simon (1979);¹¹ Jessop (1981),¹² p. 490.

KEY TO SPECIES

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| 1. Nodes conspicuously bearded. Panicle branches usually simple; racemes and spikelets clothed in brown hairs. | 2 | |
| Nodes almost or completely hairless. Primary branches of panicle divided with terminal and lateral racemes; racemes and spikelets without brown hairs. | 4 | |
| 2. Plants forming strong tussocks, leaves long, narrow, usually less than 3.5 mm wide, very rough downwardly. Spikelets 6–9 mm long (wild sorghum) | | <i>S. leiocladum</i> ^{2,4,7,8,9} |
| Plants tufted, but not forming strong tussocks; leaves usually more than 6 mm wide, less rough on surface. | 3 | |
| 3. Sessile spikelets 4–5.5 mm long (brown sorghum) | | <i>S. nitidum</i> ² |
| Sessile spikelet 6–9 mm long (plume sorghum) | | <i>S. plumosum</i> ^{1,2,3,12} |
| 4. Perennials with long, creeping rhizomes. | 5 | |
| Annuals or perennials without creeping rhizomes. | 6 | |
| 5. Plants aggressively rhizomatous, rather robust. Seeds readily shattering at maturity (Johnson grass) | | <i>S. halepense</i> ^{1,3,4,7,8,9,10,11} |
| Plants rhizomatous, but not aggressively so; taller than <i>S. halepense</i> with coarser culms and broader leaves. Seeds not readily shedding (Columbus grass) | | <i>S. almum</i> ^{5,11,12} |
| 6. Racemes fragile, joints breaking up at maturity. | 7 | |
| Racemes not fragile, sessile spikelets persisting at maturity (grain, sweet or forage sorghum) | | <i>S. bicolor</i> ^{3,4,5,8,12}
(<i>vulgare</i>) |
| 7. Spikelets about 4 mm long, pedicellate spikelet reduced to a lower glume or a naked pedicel. | | <i>S. laxiflorum</i> ^{1,2} |
| Spikelets more than 5 mm long, pedicellate spikelet well-developed. | 8 | |

8. Perennial (sometimes annual). Sessile and pedicellate spikelets at maturity falling free from pedicels. Root stocks with scaly buds at bases of old culms (Rhodesian Sudan grass)

S. verticilliflorum^{2,4,11}

- Annual. Sessile spikelet at maturity falling with its short pedicel attached, pedicelled spikelet persistent. Root stocks with scaly buds (Sudan grass)

S. sudanense^{2,3,4,6,11}