



Dryland Systems Solutions

Producing More with Less

Pastoral and Agro-Pastoral Systems

Managing rangelands: promoting sustainable grass forage species

Birdwood grass (*Cenchrus setigerus*): A resilient, drought-tolerant perennial grass for pastures in hot, dry areas

In hot, arid and semi-arid rangelands livestock numbers are growing, putting pressure on grazing lands. In these dryland regions, ICARDA is promoting drought-tolerant species as a crucial means of assisting rangeland rehabilitation efforts, helping to conserve rapidly-depleting water resources, and maintain grazing at sustainable levels. The result: a win-win situation for the agropastoral communities and the environment.

Cenchrus setigerus, commonly known as Birdwood grass, is one of the most drought-tolerant perennial grasses. Native to East Africa and Western Asia between latitudes 30°N and 30°S, this grass occurs naturally in areas with average rainfall between 125 mm and 1250 mm. The tufted grass is very resilient, withstanding low and sporadic rainfall, long dry seasons, strong winds, high temperatures, frost, erosion, nutrient-poor soils, and salinity.

Cenchrus setigerus grows most vigorously in areas where average annual rainfall is between 300 mm and 600 mm and where temperatures are between 30°C and 35°C. In Rajasthan in northwest India, growth peaks from August to October. The grass flourishes in well-drained sandy loams and, although it tolerates a range of other soils from alkaline to heavy clay, it rarely grows in stony clay soils or near watercourses.

Once established, the grass is very hardy. Hardiness and strong roots mean that the grass responds quickly to rain even though it may appear to be dead. During prolonged droughts, livestock may graze the grass right down to the ground but, after a few showers, *Cenchrus setigerus* quickly recovers. This makes the grass a valuable forage in areas grappling with low and variable rainfall such as the hotter and drier parts of India, Pakistan, the Mediterranean region, and tropical and southern Africa.



Scientific name:

Cenchrus setigerus

Common names: Anjan, Modha dhaman, Heskaneit, Garbi.

Location: The species is native to East Africa and Western Asia.

Cenchrus Setigerus Benefits:

- Drought-tolerant.
- Resistant to heat and cold.
- Grows in a range of soils, from sandy, sandy loam, stony, murram (calcium carbonate), to alkaline.
- Can be cut for feed, hay or silage three to four times a year.
- Produces on average 1–1.5 tonnes/hectare dry forage.
- Highly nutritious, especially beneficial for livestock that produce milk.



Sown pasture of *C. setigerus* on sloppy gravelly land in Nagur district of Rajasthan



White coloured spikelets of *C. setigerus*



Purplish coloured spikelets of *C. setigerus*

Establishment and management

Freshly harvested *Cenchrus setigerus* seed has a germination rate of 10–20%. The seed fuzz contains toxic inhibitors. Soaking the seed for 8–12 hours before sowing removes this toxic fuzz. For direct seeding, 4–5 kg/ha seed mixed with moist sand is most successful. Sow seed 1–2 cm deep or broadcast when temperatures are around 30°C, just before or during showers. Cultivators are useful for furrowing large areas in preparation for planting. Three to four weeks after sowing, remove weeds.

In irrigated areas, pelleted seed – seed mixed with silt and cow dung – germinates more successfully than non-pelleted seed.

One-month old seedlings and root slips are most successfully planted just before rain. A hectare needs around 800–1000 kg root slips. The optimum spacing is 50 cm by 75 cm. Grazing may usually begin 4–5 months after sowing except in areas where conditions are more stressful, where grazing may not be advisable for 9–12 months. Allowing pastures to seed every two or three years encourages dense growth.

The grass is most nutritious at the pre-flowering stage when average values are 18.6% crude protein, 28.3% crude fiber, 11.9% ash, 1.9% ether extract, and 39.3% nitrogen free extract. In dry matter, digestibility and energy digestibility average 57.4% and 54.9% respectively. Cutting the grass 5 cm above ground level when 15% of the grass is in flower produces the maximum yield. Grass may be cut for feed, hay or silage three or four times a year. In India, a cut every 10 days produced 400 kg/dry matter/ha and every 60 days 2120 kg/dry matter/ha. Applying nitrogen and phosphorus fertilizer at rates of 40 kg/ha and 20 kg/ha respectively, either singly or together, increased yields by 15–38%.

Effective Maintenance:

- Establish pastures by direct seeding, by planting seedlings or by planting root slips.
- For irrigated areas, pellet seed by mixing with silt and cow dung.
- Remove weeds from pastures sown with seed after 3–4 weeks.
- Start grazing 4–6 months or, in harsh conditions, 9–12 months after sowing.
- Cut grass 5 centimeters (cm) above ground level when 15% is in flower for maximum yield.
- Allow pastures to seed every 2–3 years to develop dense growth.
- Apply 40 kilogram/hectare (kg/ha) nitrogen or 20 kg/ha phosphorus to increase yields by 15–38%.

Rangeland factsheets:

This series of flyers is designed to build awareness of sustainable rangeland management through best practices and well-adapted species among extension workers and those working in the agricultural research and policy sector.

ICARDA's Rangeland Ecology and Management Unit

ICARDA's Rangeland Ecology and Management Unit aims to address the unsustainable use of resources induced by mismanagement, the adverse effects of climate change, and an increasing demand for food and feed in the dry areas. ICARDA programs promote the enhanced quality and productivity of crop, forage, and livestock, and the improved management of water resources through close cooperation with farmers and national researchers.



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