

Tropical Forages

Astrebla spp.

Scientific name



Astrebla elymoides F. Muell. ex F.M. Bailey

Astrebla lappacea (Lindl.) Domin

Astrebla pectinata (Lindl.) F. Muell.

Astrebla squarrosa C.E. Hubb.

Subordinate taxon:

Astrebla pectinata (Lindl.) F. Muell. var. *curvifolia* F.M. Bailey

Synonyms

A. lappacea: Basionym: *Danthonia lappacea* Lindl.; *Astrebla triticoides* (Lindl.) F. Muell.; *Danthonia triticoides* Lindl.

A. pectinata: Basionym: *Danthonia pectinata* Lindl.

Family/tribe

Family: *Poaceae* (alt. *Gramineae*) subfamily: *Chloridoideae* tribe: *Cynodonteae*.

Morphological description

Strongly tufted perennial grasses growing to 1 m tall, culms erect or ascending, arising from scaly bases. Rhizomes short or absent. Ligule a ciliolate membrane or fringe of hairs; leaf blades rolled in bud, narrow. Inflorescence a terminal spike or spike-like raceme, solitary or paired. Roots wiry, dual system comprising shallow roots to utilise surface moisture from lighter rainfall and a deep (>200 cm) system to access subsoil moisture.

Species

A. elymoides (hoop Mitchell): tussock to 50 cm. Stems thin, palatable. Leaf blades linear, attenuate, 12–35 cm × 0.3–0.5 cm, glabrous, glaucous, surface ribbed, margins scaberulous, not curling as plant hays off. Spike-like racemes solitary, 12–35 cm long, narrow, straight, or arcuate, hooping (weeping) towards the ground when mature. Spikelet >4 mm wide, appressed to rachis.

A. lappacea (curly Mitchell): tussock to 50 cm, erect, or decumbent. Stems thin, palatable. Leaf blades linear-oblong, acute, 10–20 cm × 0.4–0.5 cm, mostly glabrous, glaucous, curling distinctly as plant hays off. Spike-like racemes single or paired, straight or slightly arcuate; unilateral, 5–30 cm long, usually held within the foliage. Spikelet >4 mm wide, bristly and loosely arranged along the seed head in an alternate pattern.

A. pectinata (barley Mitchell): tussock to 80 cm. Stems coarse, moderately palatable. Leaf blades linear, attenuate, 7.5–25 cm × 0.3–0.6 cm, flat, glaucous, often twisted, surface ribbed, sparsely pubescent with



Bull Mitchell grass (*A. squarrosa*)



Bull Mitchell grassland, Longreach, Australia



Mature plants



Inflorescence Bull Mitchell grass (*A. squarrosa*)



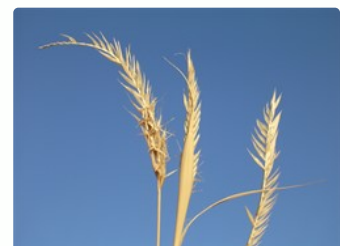
Inflorescence Bull Mitchell grass



Curly Mitchell grass (*A. lappacea*)



Inflorescence Curly Mitchell grass (*A. lappacea*)



Inflorescence Barley Mitchell grass (*A. pectinata*)



Inflorescence Barley Mitchell grass (*A. pectinata*)



Hoop Mitchell grass (*A. elymoides*)

tubercular-based hairs; margins scaberulous. Spike-like racemes single, straight, 4–13 cm long, held above foliage on long, erect culm. Spikelet >4 mm wide, tightly packed in 2 distinct rows against straight rachis.

A. squarrosa (bull Mitchell): tussock to 100 cm. Stems coarse, relatively unpalatable. Leaf-blades 15–30 cm × 0.3–0.6 cm, scabrous, rough adaxially, margins scaberulous; distinct, whitish mid-vein on the upper surface. Racemes single, unilateral, straight, 7–18 cm long, Spikelets >4 mm wide, long silky hairs at base, prickly by virtue of distinct hooks at end of awn.



Inflorescence Hoop Mitchell grass (*A. elymoides*)



Seed units

Common names

English: *A. elymoides*: hoop Mitchell grass, slender Mitchell grass, weeping Mitchell grass, wire Mitchell grass

A. lappacea: curly Mitchell grass, common Mitchell grass, wheat Mitchell grass, wheat-ear Mitchell grass

A. pectinata: barley Mitchell grass

A. squarrosa: bull Mitchell grass, wheat-ear Mitchell grass

Distribution

Native:

Australasia: Australia – *A. lappacea*, *A. pectinata* (New South Wales, Northern Territory, Queensland, South Australia, Western Australia)

– *A. elymoides*, *A. squarrosa* (New South Wales, Northern Territory, Queensland, Western Australia)

Uses/applications

Forage

Valuable native pasture over large areas on clay soils of arid northern and mid-latitude Australia. Acts as standing hay preserved by the dry atmosphere and absence of rainfall during the cool dry season. Winter rain in southern *Astrelba* grasslands leads to fungal blackening of the dry leaf and deterioration of nutritive value.

Environment

Seed has been harvested to restore Mitchell grasslands after cropping. *Astrelba pectinata* seed advertised for sale in India.

Ecology

Soil requirements

Native of heavy cracking clay soils in the arid zone of northern Australia, usually with high pH and free limestone. Some tolerance to salinity.

Moisture

Best development occurs in areas receiving between 250 and 550 mm annual rainfall. Very drought-tolerant due to their robust root system, although many plants die in extremely dry periods. *A. elymoides* is found on moister depressions; the coarse *A. squarrosa* is dominant in seasonally flooded country usually in northern Australia; *A. pectinata* is susceptible to flooding and is common in more arid areas where soils do not crack as severely; and *A. lappacea* is more common in eastern Mitchell grass downs of Queensland.

Temperature

They produce most of their growth in the warm season, requiring temperatures between 25 °C and 35 °C for optimum germination and growth. They make limited growth following effective winter rainfall, but no growth below 15 °C. Their natural environment extends from about 18° to 28°30' S and to 1,000 m asl. *A. pectinata* is susceptible to frost. Growth has usually ceased before frosts are experienced because summer soil moisture is usually exhausted.

Light

Full sunlight.

Reproductive development

Flowering is independent of photoperiod, occurring at almost any time of year in response to rainfall.

Defoliation

Astrelba spp. respond well to moderate grazing or cutting which tends to stimulate tillering and seed production. As they age, both the number and size of inflorescences are reduced, although cutting and irrigation may help to promote new growth. *Astrelba* spp. are generally tolerant of heavy grazing, although heavy grazing during prolonged drought can result in tussock death. Large scale seedling recruitment is rare.

Fire

Mitchell grass is rarely burned, being too valuable as a reserve of feed in an arid climate. However, it will recover well from fire in the absence of grazing following rain.

Agronomy

Guidelines for establishment and management of sown forages.

Establishment

Astrelba spp. are not easy to establish from seed, and sowings must be made on a full profile of soil moisture after a fallow. Seed can be sown into a seedbed or oversown and trampled in by livestock.

Fertilizer

While responses to nitrogenous fertilizer have been obtained, the use of any fertilizer on an *Astrelba* sward would not be economical in the arid environments where it grows.

Compatibility (with other species)

Robust tussocks growing in an arid zone result in strong competition, but the inter tussock spaces may be occupied by other grasses (perennial species *Aristida* spp., *Dichanthium* spp. and annual species of *Iseilema*, *Dactyloctenium* and *Panicum*). Some native legumes (e.g. *Glycine* spp. and *Indigofera* spp.) co-exist and a large range of C4 dicotyledoneous species. Winter rainfall in more southerly regions results in growth of a wide range of C3 forbs.

Companion species

Desmanthus spp. in lower latitudes, and in the higher latitudes with more winter rainfall, *Medicago* spp. have naturalized.

Pests and diseases

No information available.

Ability to spread

Large scale seedling recruitment is rare but localised spread does occur when seed is present.

Weed potential

Low.

Feeding value

Nutritive value

Moderate nutritional value, often limited by low available soil nitrogen after a wet year.

Palatability/acceptability

Mitchell grasses are not particularly palatable during the wet season. Livestock preferentially select other accompanying species during the summer growing period. However, the Mitchell grasses retain their leaf during the dry season and are eaten then (there being little other feed). Feeding value varies among the species, with *A. elymoides* and *A. lappacea* being more acceptable to livestock in the green state than the other two species. Winter rainfall events sometimes experienced in southern *Astrelba* grasslands lead to deterioration of nutritive value.

Toxicity

A fungus (*Corallocytophthora* spp.) sometimes found on the stems of Mitchell grass in the Kimberley Region of northern Western Australia has caused 'black soil blindness'. Up to 5% of stock grazing affected Mitchell grass may die. The fungus is a hard rough body about 10–20 mm diameter and grows on the grass stem at a node or axillary shoot.

Production potential

Dry matter

Yields of 2 t/ha are common in well grazed pastures during good seasons. Under good conditions of moisture and N fertility, *A. lappacea* can produce over 6 t dry matter/ha in a season.

Animal production

Highly variable depending on rainfall.

Genetics/breeding

Astrelba spp. are autogamous, and although hybrids do occur, they are sterile. $2n = 4x = 40$ in *A. lappacea* and *A. pectinata*.

Seed production

Flowering and seeding is triggered by a minimum of 50–75 mm of rainfall in one rainfall event, with seed ripening 5–6 weeks after that rainfall. Seed dispersal is rapid and usually complete within 7 weeks. Fresh seed is dormant for 8 months after ripening.

Natural stands of *Astrelba* produce abundant seed heads that can be harvested with conventional headers or with brush harvesters. Seed yields have varied from 50 to 100 kg/ha (naked caryopses) for wild stands, and spikelet yields of up to 200 kg/ha in curly Mitchell grass (*Astrelba lappacea*) have been measured. Seed production can be improved 3-fold by applications of 100–150 kg/ha N through increasing the number of inflorescences per square metre and the number of spikelets per inflorescence.

Herbicide effects

Diuron is registered in Australia for control of selected broadleaf and grass weeds in seed crops of *A. lappacea*, applied as a single pre-emergent or early post-emergent treatment to weeds only.

Strengths

- Very drought tolerant.
- Tolerant of heavy grazing.
- Grow well on heavy cracking clay soils.
- Good stand-over feed.

Limitations

- Not very palatable.
- Generally restricted to alkaline clay soils with summer dominant rainfall.

Selected references

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Cultivars

'Yanda' (*A. lappacea*) Australia (1996) Selected from 289 specimens collected in the wild throughout eastern Australia for high seed yield, improved cool season green leaf growth, dry matter production and a high proportion of warm season leaf production.

'Turanti' (*A. pectinata*) Australia (1996) Selected from 166 wild populations for improved cool season green leaf growth, dry matter production and a high proportion of warm season leaf production. It grows about 30 cm high with 67 mm flowerheads.

Promising accessions

None reported.

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Alliance

