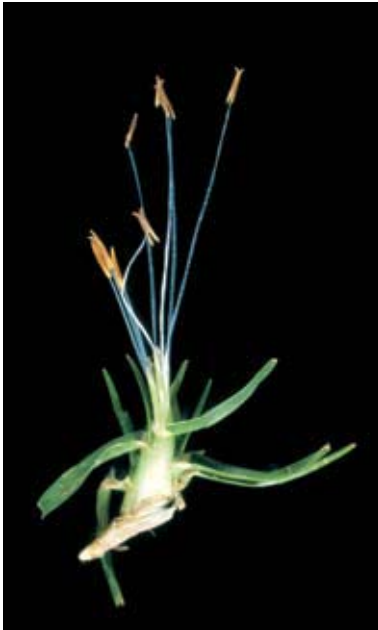


Kikuyu (*Pennisetum clandestinum*)

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Features

- creeping grass which forms a dense turf
- highly productive pasture, especially when grown with annual legumes
- tolerant of heavy grazing
- needs to be well managed to maintain feed quality
- excellent for stabilising soil and erosion control.

Kikuyu is a creeping sub-tropical grass that forms a dense turf and is tolerant of heavy grazing. It is widely used as a highly productive pasture for dairying and as a turf or lawn grass.

Kikuyu is native to the highlands of east and central Africa (i.e. Kenya, Ethiopia) where it grows on deep, red loams of volcanic origin. This region has high rainfall (1,000-1,600 mm), mild temperatures and occasional frosts. The common name 'kikuyu' comes from the tribe in Kenya where it was first collected.

Kikuyu was introduced into WA in the early 1920s. Compared with many other sub-tropical grasses the area suitable for growing kikuyu is well defined. It is largely confined to the high rainfall south-west, west coast and the south coast, although it may have a role in the West Midlands. There are currently about 60,000-90,000 ha of kikuyu based pastures in WA, mainly on the south coast. Kikuyu is competitive and has naturalised in moist disturbed areas from Dandaragan to Albany and along roadsides in high rainfall districts. Can be invasive in riparian zones so avoid planting near these areas.

A kikuyu-subterranean clover pasture enabled stocking rates to be increased by 65-95% and wool production by 70-103% compared with a subterranean clover pasture on the south coast of WA. It is suitable for fine wool production.

Description

- prostrate, creeping grass that spreads via rhizomes (underground stems) and stolons (runners) that readily root from the nodes
- left ungrazed it forms a loose, rank sward, but under grazing forms a dense turf
- leaf sheaths overlap and the leaf blades (5-20 cm) have a prominent mid-rib
- flowering is inconspicuous. The seed heads are mainly concealed within the leaf sheath and only white filaments are exposed for short periods.



Kikuyu showing stoloniferous growth habit

Seasonal growth pattern

The optimum temperature for growth is lower than for most sub-tropical grasses due to its origin (i.e. high altitude near the equator), where the mean maximum and minimum temperatures range from 16-22°C and 2-8°C respectively.

In areas with a low incidence of frost, kikuyu starts growing rapidly in early spring and it can respond rapidly to summer or autumn rains. Very low growth rates are measured in winter. In more frost-prone areas it grows actively after the last frost in spring and in autumn until the first frost in late autumn or early winter.

Establishment

Kikuyu is normally sown alone and the suggested seeding rate is 1-2 kg/ha, resulting in 30-40 plants/m². It is often sown at 1 kg/ha or less because of the high seed cost. Seed should be sown at a depth of 10-20 mm. Seedlings are slow to establish and susceptible to moisture stress and waterlogging. Under controlled conditions, the optimum temperature for germination was 19-29°C, but at 14°C about 50% of the seed still germinated.

Kikuyu will readily spread through animal dung. As a result, animals can be used to spread seed to new paddocks as a low cost method of establishment. Conversely animal movement from kikuyu paddocks into paddocks that are regularly cropped should be controlled.

Livestock disorders

A number of livestock disorders associated with kikuyu are reported in the literature, however they are not common.

Soil-climate adaptation

Rainfall (est.): >500 mm
(south coast >400 mm)

Drought tolerance: Moderate to high

Frost tolerance: Moderate. The first frost in autumn results in leaves turning yellow and the plant becomes dormant. Stolons/ rhizomes are unaffected and will regrow when temperatures exceed minimum for growth

Soil type: A wide range, including deep sands. It will grow on fine-textured soils, but spreads more rapidly on coarse-textured soils. Not suited to shallow soils and waterlogged-saline soils

Soil fertility requirements: High, very responsive to N fertiliser

Soil pH_{Ca}: >4.0

Aluminium tolerance: Good

Waterlogging tolerance: Moderate

Salt tolerance: Slight to moderately low (if not waterlogged)

Ability to spread naturally: Very good from stolons, rhizomes and seed spread in animal dung

Nutritive value

DMD: 59-63% (monthly cuts)

Crude protein: 10.4-14.3% (low to high fertiliser N with monthly cuts)

Environmental benefits

Groundwater recharge control: Good, roots were measured to 3 m on a sand over laterite soil

Soil erosion control: Very good

Weed control: Competitive and suppresses summer weeds



Kikuyu showing frost damage

Kikuyu contains low to moderate levels of oxalic acid (0.039-2.4%), but no problems have been reported.

Occasional deaths due to kikuyu poisoning have been reported with cattle, sheep, goats and horses from New Zealand, South Africa and Australia. The cause of death is unknown, but it may be associated with the army worm caterpillar. The incidence in WA is low, but deaths have been recorded, so it is useful to outline the symptoms.

Poisoning is normally associated with hungry stock grazing lush, rapidly growing kikuyu following rain (or nitrogen fertilisation). Typically, stock show symptoms one to two days after consuming toxic pasture. These symptoms include depression, inappetence, sham drinking, rumen distension, dehydration, staggering and collapse. If symptoms occur, remove stock immediately and either feed hay or move to a paddock with no kikuyu grass. Unfortunately, poisoned stock are likely to die.

Kikuyu can accumulate nitrogen compounds in excess of animal requirements when heavily fertilised with N, and this can reduce animal performance. The solution is to avoid large single applications of N (>50 kg/ha/month). Apply as split applications to avoid excessive nitrogen levels in the pasture.

Management

New stands should not be grazed until the runners are >20 cm and the plants are strongly anchored. When grazing, monitor the paddock regularly to ensure stock are not pulling out runners.

Managing for quality is the key to success with a kikuyu pasture. Kikuyu produces stem material throughout the year, so feed quality is strongly influenced by the stage of regrowth (i.e.

the proportion of leaf to stem). Kikuyu pastures are most productive when kept short, 2-5 cm (depending on density), which corresponds to about 1400 kg green DM/ha. This promotes new leaf growth, which is more nutritious than older growth.

A high stocking rate is required after the break in autumn to maintain kikuyu at 1400 kg DM/ha. This stocking rate enables the annual clovers and grasses to germinate. Kikuyu provides a good refuge for redlegged earth mite, which can drastically reduce the number of clover seedlings. Control RLEM with strategic sprays in spring (e.g. Timerite®).

In winter the pasture should contain about 30-40% kikuyu with the rest being annual grasses and legumes, which will increase the winter production. In spring, when the kikuyu starts growing actively, graze the pasture to 1400 kg DM/ha and do not let the kikuyu exceed 3,000 kg DM/ha (this amount resembles a well-mown lawn with one to two weeks regrowth). Graze hard in late spring to avoid rank growth.

Over summer use a high stocking rate to graze the pasture to ~800 kg DM/ha (about 1 cm or less) to maintain the pasture quality. If there is prolonged drought, defer summer grazing particularly if stock are pulling up kikuyu runners.

Kikuyu is very tolerant of heavy grazing and can tolerate set-stocking. However, in some cases, set-stocking has reduced the carrying capacity compared with rotational grazing. If growth is rank, then slashing old growth to 5 cm will promote new leaf growth and will also promote the growth of annual legumes and grasses.

In a kikuyu dominant pasture, energy may be limiting resulting in a protein to energy imbalance, due to the low content of readily digestible (i.e. non-structural) carbohydrates. Also, kikuyu is low in sodium, which could be a problem in kikuyu-dominant pastures.

'Kikuyu yellows' is a fungal disease where affected yellow patches spread out leaving bare areas which are invaded by weeds. It occurs mainly in the sub-tropics and is unlikely in south-western WA.

Companion species

Kikuyu combines well with subterranean clover, although in years with a dry autumn the annual legume can struggle to establish. On deep duplex soils and deep sands kikuyu combines well with yellow serradella.

On summer moist sites it combines well with perennial legumes like strawberry clover or

possibly greater lotus. It is not normally sown with other perennial grasses, although can be sown with Rhodes grass.

There is some evidence that decaying stolons release compounds that can be allelopathic, i.e. reduce germination of other species.

Cultivars

'Common' kikuyu is a non-seeding type that is propagated by runners. It is narrow-leafed and forms a dense sward.

'Whittet' (public variety) is the main variety sown in WA. Compared with the 'common' type, it is a comparatively taller variety characterised by broad leaves, thicker stems and longer internodes on the stolons. It persists well under lower fertility conditions and is free-seeding, but is susceptible to 'kikuyu yellows'.

Three other varieties have been released, but seed may be difficult to obtain.

'Breakwell' (public variety) is similar to the common type, but is a seeding type as 80% of the plants are bisexual. It is more densely tillered than Whittet and spreads more quickly, but is less productive. Recommended for soil conservation and turf, but not pastures.

'Noonan' (public variety) was developed from Whittet and Breakwell for tolerance to the disease kikuyu yellows. Will set seed without the regular cutting that is required to stimulate seed production in other cultivars.

'Crofts' (public variety) is a taller variety with more upright, narrower leaves and has better cold tolerance than Whittet, but is susceptible to kikuyu yellows.



These kikuyu plants are the result of seed spread in dung