Healthy Country

managing the land for healthy waterways

Living mulch factsheet #3

FarmFLOW
growth through good practice

Living mulch: Establishment

Experimentation with sowing rates will be needed to obtain a site-specific rate for your farm. To use past farmer experience as a guide, a starting point of 50 kg/ha for oats should provide adequate coverage of your plant-bed inter-rows.

Millets

Establishment success is normally 60–70% in loamy soil, often lower in heavy soils or in poor seedbed conditions (crusting). Millet is small-seeded and should preferably be sown 15–30 mm deep into a moist soil. Increased seeding rates on difficult to prepare heavy clay soils may be necessary to compensate for a lower establishment. Rolling may improve establishment, as can the use of press-wheels. All millets are damaged by frost, but Japanese millet is more cold-tolerant and can be sown when the risk of frost is over and the soil temperature is 14–16°C and rising. Siberian and pearl millet depend on warm soil for good growth and should not be sown until the soil temperature has reached 18°C and rising, (with a sowing window October–January). Japanese millet is the most successful to establish in waterlogged soils.

Sorghum

Seed sown at a depth of 30–75 mm into a moist soil is preferable. The main planting time for forage sorghum is early October through to late January with a range of September through to March. Soil temperatures should be 15–16°C and rising for quick, even germination.

Oats

The optimum planting time for forage oats is from mid-March to June in southern Queensland, and early April to June in central Queensland. Early plantings (January to early March) should be avoided to minimise the risk associated with leaf rust. The optimum soil temperature for the germination and establishment of oats is between 15°C and 25°C. High soil temperatures (greater than 25°C) during the period from January to March will reduce seed germination and result in poor establishment. The recommended planting rate for crops used for erosion control is 55-90 kg/ha and best sown at a 50-75 mm depth. If sowing is delayed until after the optimum date, use rates at the higher end of the range to compensate for reduced germination rates. Oats can be successfully grown on sandy soils if supplied with adequate moisture, can tolerate soil pH as low as 4.3 and water-logging for short periods.

Pinto peanut

There are several varieties of Pinto peanut suitable for use as living mulch.

Forage peanuts have a large seed (4–9 seeds/g) so preparation should aim for a firm, level and weed-free seed bed. Seed is expensive and emerging plants will die if they encounter hot or hard soil surfaces. Germination of 70–80% represents a good strike rate.

Forage peanut can be planted in rows or broadcast. Seed should be placed at 1–2 cm depth aiming for a population of 8–10 plants per metre row with 25–30 cm between rows. For Amarillo and 2320 sow 30–40 kg/ha of good quality seed and for ATF 495 sow 50–65 kg/ha.

Plant when soil temperatures are high and when there are good prospects for follow-up rain or irrigation. The first plants should emerge after five days.

Other Living Mulch fact sheets: #1 What is living mulch?
#2 Disease and erosion research

Healthy Country partners:

SEQ Catchments

Healthy Waterways — Because we're all in the same boat

Queensland Government

SEQTOA

Cover crop	Root-knot nematode resistance rating	Season
White French millet (*Panicum milaceaum*)	very high	spring/summer
Pearl millet (*Pennisetum glaucum*)	moderate	spring/summer
Foxtail or panorama millet (*Setaria italica*)	moderate-high	spring/summer
Japanese millet (*Echinochloa esculenta*)	moderate	spring
Jumbo/forage/sweet sorghum (*Sorghum bicolour, S. spp*)	high	spring/summer
Pinto peanut (*Arachis pintoi*)	high	summer
Oats (*Avena sativa*) (Panorama, Algerian, Culgoa 11, Amby 11)	high	autumn/winter
Oats (*Avena sativa*) (Condamine, Enterprise, Graza)	moderate	autumn/winter

Allelopathic properties of cover crops

Research has steadily increased within agricultural circles to harness the benefits of nature to reduce the reliance on pesticides and herbicides. One natural benefit is allelopathy.

Oats (*Avena sativa*) have been shown to have allelopathic properties that can limit or suppress weed emergence. Scientific literature suggests this occurs through specific chemical substances (toxins) the plant produces and releases through its pores and roots and also from the residues released when the plant tissue decays. Furthermore, oats, sorghum, wheat and rye appear to withhold these residues when sprayed out in farm experiments.

Sorgoleone, one of the important exudates from roots of *Sorghum bicolour* can persist in soil for eight weeks. These residues have been linked in reducing the density and biomass of broad-leaved weeds. This is one of many benefits of these crops as surface mulch for erosion control purposes in no-till farming systems.

Millet is another species that contains allelopathic properties; it releases toxic residues from its roots. Upon decay they have been shown to limit and reduce seed germination in problematic summer weed species.

Pineforce Pty Ltd have had great success using the Agritechno Yazaki seeder to sow living mulch in their inter-rows. The seeder is designed for easy fitting and removal.

For more information

- Allelopathy in Agroecosystems (2001). R.Kohli, H.Singh and D.Batish. The Hamworth Press, Oxford.
- Crops and their resistance to root-knot nematodes (*Meloidogyne spp.*) (1996). Sterling, G.R., West, L.M., Fanton, J.A and J.M Stanton. Department of Primary Industries and Fisheries, Queensland.

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