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Herbage Development Fact Sheet 1 • By Eric Hall and Andrea Hurst

Arrowleaf clover cv.Arrotas(þ)

(*Trifolium vesiculosum* Savi.)

Origin
Developed from an accession, CPI 28583, collected in Italy in 1960. Breeders: R.S. Smith (Department of Primary Industry and Fisheries, Tasmania), E.J. Hall and R. Reid (Tasmanian Institute of Agriculture).

Description
Plant: diploid.

Major attributes
Arrotas(þ) has been developed in Tasmania to take advantage of the long growing season. It is a late maturing, high yielding, bloat safe, self-reseeding annual legume with a deep taproot able to extend the growing season well into summer. With adequate moisture Arrotas(þ) will provide an extra four weeks of high quality feed compared to any other variety of Arrowleaf clover available in Australia. It is an aerial seeder producing large quantities of easily harvested seed (figure 1)

Seasonal production
Although Arrotas(þ) is slow to establish and yields are low over winter, it can produce tremendous yields of high quality forage in favourable environments in late spring/summer with herbage yields of well over 10 tDM/ha attainable.

Drought tolerance
Moderate tolerance due to its deep taproot.

Cold tolerance
Moderate. Tolerant to at least –5C.

Waterlogging tolerance
Poor. Susceptible to root diseases in poorly drained soil.

Salt tolerance
Poor.

Soil and climate requirements
Suitable for sowing in well-drained soils, pH 5.0 to 7.0 in temperate areas receiving 600mm or more average annual rainfall. Can be sown in drier areas if irrigation is available.

Maturity
Very late. Flowers 29 days later than any other arrowleaf clover cultivar currently available. Seed matures in March.

Seed size
Thousand seed weight 1.421gms (white clover 0.636gms).

Hard seed
Very high, 96% hard seed.

Seed treatment
Seed must be scarified and inoculated with appropriate rhizobia prior to sowing.

Rhizobium
Group C (WSM 1325).

Sowing methods
Drilled, direct drilled or broadcast.

Sowing depth
Best sown at a depth of about 5mm. Seed which is sown deeper than 10mm is unlikely to emerge.

Sowing time
Preferably late summer to early autumn for sufficient seedling development prior to winter but can be sown in spring if area receives summer rainfall or irrigation is available over summer.

Land preparation
Well-cultivated firm seedbed required for best results. For direct drilling or broadcasting there should be as little vegetation as possible and adequate soil moisture prior to sowing.

Compatibility with other species
Has performed well when broadcast on cocksfoot and other pastures, also compatible in mixes with oats or short-lived ryegrass (figure 1).

Suggested mix
Arrotas(þ) and a short lived or annual ryegrass (figure 2).

Seedling vigour
Low to moderate. Late autumn sown seedlings are slow to establish over winter, but show strong vigour once plants are well established.

Grazing management
Plants may be grazed when they have developed a strong root system at about 10 weeks of age. Paddocks can be set stocked during late winter up to the first sign of flowering. For the first year and for commercial seed production exclude livestock and do not cut for hay once flowering has commenced. In late February when the seed heads have dried off and when feed quality is still high, Arrotas(þ) clover paddocks must be heavily grazed to remove residual dry matter. The optimal level of residual dry matter is zero for the start of the autumn rains to achieve the best possible regeneration. Grazing hard in summer should not affect the seed bank as a large percentage of the seed can survive passage through the digestive tract of herbivores and will be returned to the paddock undamaged.

Dry matter yield
Over 10 t/ha DM achievable in a dryland situation.

Feed value
Arrotas(þ) has excellent nutritive value with protein levels in excess of 20% and high levels of digestibility, remaining high well in to summer.

Typical feed test figures

Crude protein (%DM)	22.2
Digestibility (%digestible DM)	77.5
Metabolizable energy (MJ/kg DM)	11.4

Anti-quality factors
None known. Arrowleaf clovers are considered to be a "bloat safe" legume and may be grazed with sheep or cattle with little to no risk of legume pasture bloat.

Pollination requirements
Arrotas(þ) is self-incompatible and requires honey or bumblebees for successful pollination

Seed harvest methods
Direct heading or cutter rowing.

Seed yields
Yields above 1 t/ha are achievable.

Diseases
It is relatively resistant to clover scorch disease (*Kabatiella caulivora*) but is susceptible to root pathogens if grown in soils prone to waterlogging.

Pests
Highly susceptible to red legged earth

mite attack as seedlings, but established swards appear more resistant.

Herbicide tolerance

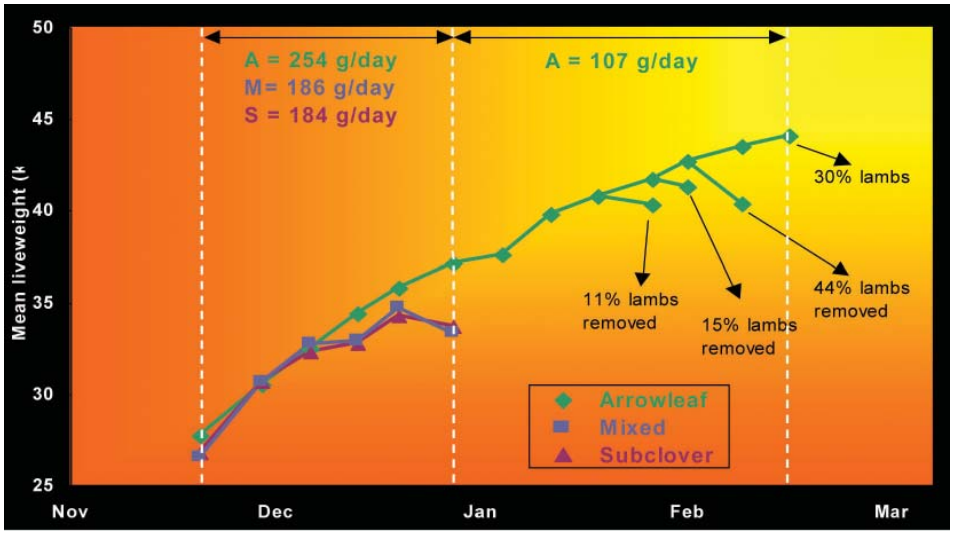
Highly susceptible to 2 4D-amine.

Figure 1. Arrotas(þ seed crop.

Figure 2. Arrotas(þ and annual ryegrass mix.

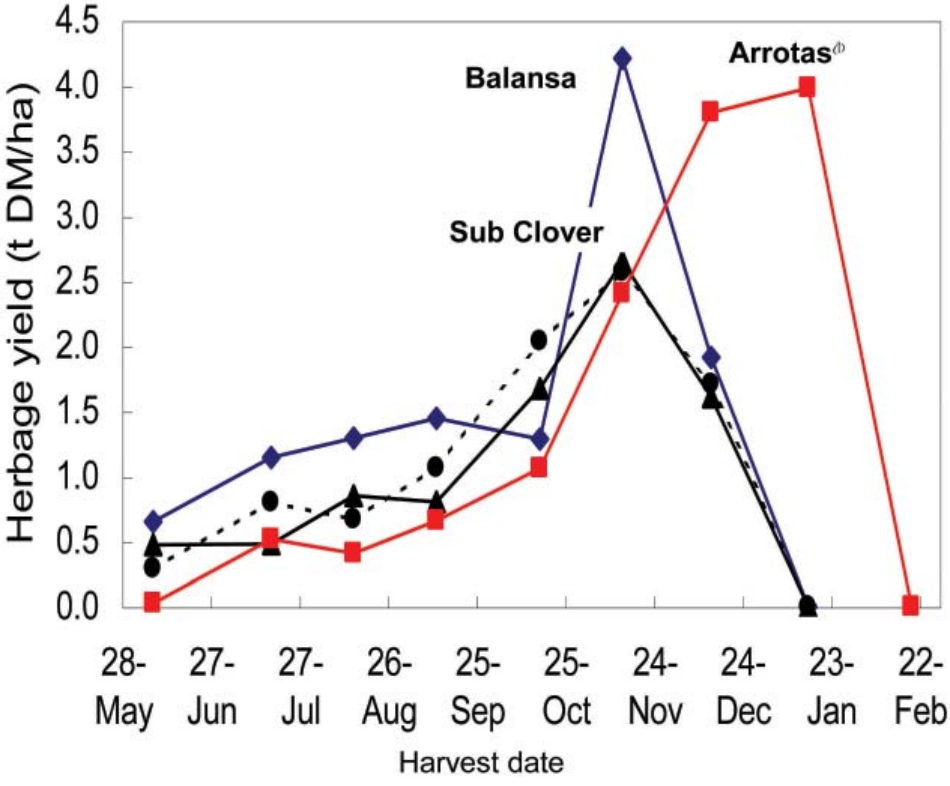
Animal performance data

DPI Victoria: Lamb production of subclover based pastures vs Arrotas(þ arrowleaf clover during November–February



Lamb Growth Rates: November to January (data courtesy DPI Victoria). Arrotas(þ monocultures 254g/day, compared to sub clover monocultures 184g/day, sub clover/perennial ryegrass mixes 186g/day. Lambs grazing Arrotas(þ continued to grow at more than 100g/day from January to mid February.

Herbage production data: Seasonal herbage production of 4 annual clovers at Streatham, Victoria (average over 3 years). Data courtesy of Pedro Evans ex DPI Victoria



(þ Variety is protected by Plant Breeders Rights