

Eastern star clover

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delayed seed-softening pattern, combined with delayed seed imbibition.



Introduction

Eastern star clover (*Trifolium dasyurum* C. Presl.) is a self-regenerating annual pasture legume, native to the eastern Mediterranean region of Europe. It is also known as *Trifolium formosum*. It germinates in late autumn to early winter, and grows until mid-spring. It produces purple flower heads that mature to form a star-like seed head.

Adaptation

Eastern star clover is suitable for use on mildly acid to neutral soils (pH 4.5-8.0 in CaCl₂), in the low-medium rainfall areas (350–500 mm) of Western Australia, South Australia and New South Wales. It is suited to regions that have a predominantly winter rainfall pattern, and a relatively short growing season extending from autumn through to mid-spring. In NSW, it is best suited to lower rainfall wheat belt areas.

Description

Eastern star clover is an erect annual legume that produces high-quality forage over autumn, winter and spring. It can be grazed or cut for forage conservation.

It has a delayed seedling emergence compared with other annual legumes, with the majority of seedlings typically germinating in late autumn (May–June), about 3–6 weeks after the autumn break. This later germination is the result of a

Use

The characteristic late germination, which occurs following autumn rains, allows weeds to be controlled through the application of non-selective herbicides in early autumn, before the bulk of the eastern star clover seedlings have emerged. In Western Australia, this is seen as a useful strategy for controlling herbicide-resistant weeds.

This strategy is not possible with annual legumes that germinate earlier, with the first autumn rains.

Eastern star's delayed germination could be a disadvantage where early autumn feed is required, as it would not germinate as quickly as other species, such as subterranean clover. In northern NSW, the autumn break is often not well-defined. In this environment, it is critical that clover germinate



and grow on rain occurring from late summer to autumn. Eastern star clover germinates late, and may be at a considerable disadvantage in this environment, as most available space and light will be occupied by early-germinating species.

Varieties

AGWEST® Sothis is the first cultivar of eastern star clover that has been developed. It is an early-flowering cultivar, flowering about 100 days after seedling emergence. Its growing season is of a similar length to that of the early-flowering subterranean clover cultivar Dalkeith. At Tamworth, its maturity was similar to Jester barrel medic and Prolific Persian clover.

Establishment and management

Sowing

Seed should be sown in autumn, at a depth of about 5–10 mm into a well-prepared, cultivated seed bed. Sowing rates of 7–10 kg/ha are recommended. Thereafter, it will regenerate naturally from seed in late autumn each year, if allowed to flower and set seed in the preceding spring.

Inoculum

Group C inoculant should be used. This is the same as for subterranean clover.

Fertiliser

Eastern Star clover has a similar fertiliser requirement to other annual legumes, such as subterranean clover.

Grazing

In studies conducted in Western Australia, plots of eastern star clover have been grazed at 14 DSE/ha from August to February. Sheep gained weight until December, and thereafter lost weight, as herbage quality declined.

Herbicide sensitivity

Field studies conducted in Western Australia by Ferris and Valentine (2004) suggest that eastern star clover may be more sensitive to the herbicides Spinnaker®, Raptor® and Broadstrike® than subterranean clover. They found eastern star clover to be tolerant of Brodal®, Simazine® and Verdict®. Herbicides should be applied before the eastern star clover has germinated. See herbicide product labels for further information, as only products registered for use on annual pasture legumes can be applied.

Seed

Eastern star clover produces relatively large, yellow-coloured seeds, weighing about 5–6 mg each (185,000 seeds/kg). Seed germinates later than most other annual legumes, typically in late May or June. About 50% of seed remains hard at the end of autumn–winter, and will carry over to the next year. Soil hard seed reserves can last for 2–3 years.

Pests and diseases

Eastern star clover has moderate sensitivity to red-legged earth mites (*Halotydeus destructor*), which should be controlled if present during establishment. It is sensitive to cowpea aphids (*Aphis craccivora*), which will reduce seed set unless controlled. It is moderately tolerant of blue-green aphids (*Acyrtosiphon kondi*) and lucerne flea (*Sminthurus viridus*).

AGWEST® Sothis is very susceptible to clover scorch disease (*Kabatiella caulivora*), and should not be grown where this disease commonly occurs in susceptible subterranean clover cultivars. In southern NSW, clover scorch is most common in regions receiving more than 450 mm rainfall.

AGWEST® Sothis is also susceptible to chocolate spot (*Botrytis fabae*) and grey mould (*Botrytis cinera*), and thus should not be grown after grain legume crops.

Herbage production and nutritional quality

Eastern star clover can grow rapidly in late winter–spring, and produce a productive, legume-dominant pasture for grazing or forage conservation.

Studies conducted by Norman *et al.* (2005) in Western Australia found that eastern star clover was slightly more productive than Dalkeith subterranean clover, producing up to 7 t DM/ha by mid-October. They found that eastern star clover herbage has lower *in vitro* digestibility and crude protein, as well as higher fibre content than Dalkeith. Despite these differences, there were no differences in live weight change, condition, and wool growth between sheep grazing eastern star clover and subterranean clover over a 10 week period. The studies indicated that eastern star clover has the same feeding value as Dalkeith. *In vitro* digestibility is typically about 71% in August, 55% in October and about 40% in late November, once the feed dries off.

Studies have shown no differences in the eating quality of meat, or vegetable contamination of the wool, of sheep grazing eastern star clover, compared with those grazing subterranean clover pasture (Norman *et al.* 2005).

Other studies on the performance of eastern star clover, conducted at Moombooldool and Wagga Wagga in southern NSW, found it to be less productive than Hykon rose clover and Dalkeith subterranean clover.

At Tamworth, by the end of September, eastern star clover produced over 3 t DM/ha in the first year, and 7 t DM/ha in the second year; however, this was still over a tonne less than purple clover produced in both years. Due to its later maturity, purple clover produced much more dry matter later in the season.

Seed production

Eastern star clover will still set sufficient seed to regenerate if grazed during spring. Seed crops should not be grazed once flowering commences. Seed can be harvested with a conventional header, with seed yields of 670 kg/ha being achieved. Seed recovery will be greater if the pasture is swathed, as this will ensure even drying of the crop.

Seed availability

Seed of AGWEST® Sothis will be commercially available in 2008, from seed licencees Ballard Seeds and Seed Distributors, as well as the Pasture Producers Association.

Acknowledgements

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Photographs were kindly provided by Angelo Loi.

References and further reading

Norman HC, Masters DG, Rintoul AJ *et al.* 2005, 'The relative feeding value of a new pasture legume, eastern star clover (*Trifolium dasyurum*) compared with subterranean clover (*Trifolium subterraneum*)', *Australian Journal of Agricultural Research* no. 56, pp. 637-644.

Ferris D & Valentine C 2004, 'Herbicide tolerance of new annual pasture legumes', Research updates for growers, http://www.grdc.com.au/growers/res_upd/west/w04/ferris.htm

Loi A, Nichols P, Revell C & Ferris D 2004, 'New annual pasture legumes for Mediterranean farming systems', Research updates for growers, http://www.grdc.com.au/growers/res_upd/west/w05/loi.htm

Warnings

Pasture improvement may be associated with an increase in the incidence of certain livestock health disorders. Livestock and production losses from some disorders are possible. Management may need to be modified to minimise risk. Consult your veterinarian or adviser when planning pasture improvement.

Legislation covering conservation of native vegetation may regulate some pasture improvement practices where existing pasture contains native species. Inquire through your office of the Department of Natural Resources for further information.

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