

Perennial Pasture Establishment and Persistence in Dryland Organic Farming Systems in Northeast Victoria, Australia

Burnett, V.¹ & Dempsey, W.²

Abstract

Perennial pasture species are required in dryland farming systems in southeast Australia to ameliorate water imbalance, soil acidification, compete with annual weeds, and provide forage for livestock. If managed correctly, perennial pastures can offer forage for livestock throughout the year, which is essential to consolidate organic supply chains. Perennial pasture species are less competitive than annual species, and establishment can be problematic in an organic system where herbicides are not used. In organic farming, preparation for perennial pasture establishment has involved cultivation with no post emergent management for weed control. The objective of this research was to determine more sustainable methods of perennial pasture establishment for organic farming systems. This paper reports results from experiments conducted from 2005 to 2007 in northeast Victoria as part of the project, establishing perennial pastures: the foundation for sustainable organic farming systems.

*Experiments were conducted at two sites (cultivated seedbed at Rutherglen and direct drilled at Yarrowonga) to investigate the effect of sowing type and sowing rate on the establishment and persistence of pasture species. Both sites were located on certified organic properties (> 10 years certified). Three species mixes were devised: 1.) Phalaris (*Phalaris aquatica* L.) and subterranean clover (*Trifolium subterranean* L.); 2.) Fescue (*Festuca arundinaceae* Schreb.) and lucerne (*Medicago sativa* L.); and 3.) Lucerne and plantain (*Plantago lanceolata* L.). Sowing types included row sown, broadcast, or sowing under a cover crop of oats (*Avena sativa* L.). Sowing rate included the normal sowing rate for the species and a high sowing rate, which was double the normal rate. All treatments were sown with 20 kg/ha of phosphorus (P) each year (as Guano Gold™, P₂O₅) and rolled to ensure seed-soil contact. Measurements included soil analyses prior to sowing (0-10 cm), monthly rainfall (mm), emergence counts completed six weeks after sowing, and persistence counts in the year after sowing (5 quadrats (992 cm²)/plot).*

There were no significant interactions between sowing type and sowing rate with emergence or persistence of any species mix at either site. A cultivated seedbed provided good conditions for emergence, whereas establishment failed under direct drill. Row sowing was found to give the best establishment, providing moisture was adequate. Increasing sowing rate provided for better emergence, but had no effect on persistence. The research demonstrated that establishment of perennial pastures in organic systems in southeast Australia relies on the effective management of competition. Where competition from other plants was managed at Rutherglen, establishment and survival was good, irrespective of sowing type, and despite late sowing and less rainfall. Where direct drilling was used at Yarrowonga, and competition was not managed, emergence was very poor, with no survival of sown species. Perennial pasture establishment requires a cultivated seedbed, but it is not necessary to increase sowing rate in order to achieve adequate persistence density. Sowing under a cover crop should be avoided because of competition.

¹ Department of Primary Industries, Rutherglen Centre, RMB 1145 Chiltern Valley Road, Rutherglen, Victoria, Australia. Internet: www.dpi.vic.gov.au. e-mail: viv.burnett@dpi.vic.gov.au

² Ibid.