Opportunities for weed management using virtual fencing technology

Rick Llewellyn[1], Danila Marini[2], Marta Monjardino[1], Sue Belson[2], Jackie Ouzman[1] and Caroline Lee[2]

[1] CSIRO, Waite Campus, Urrbrae, South Australia 5064, Australia

[2] CSIRO, Armidale, New South Wales 2351, Australia

(rick.llewellyn@csiro.au)

Summary   Grazing is a well-recognised tool for the management of many major weeds. However, fencing costs and the limitations of temporary electric fencing constrain its potential application and effectiveness. New fenceless spatial grazing technology offers the opportunity for grazing to be applied more effectively and more often by Australian land managers. After more than a decade of development, the GPS-based technology to facilitate spatially targeted grazing using 'virtual fencing' is nearing commercial availability for use with cattle. The technology essentially locates animals in relation to a user-defined 'virtual fence' and trains animals to respond to an audio cue when they approach the virtual fenceline. This can be used to focus grazing pressure within a targeted area, exclude livestock from sensitive areas and/or to manage livestock 'herding'. In this paper we present results from recent trials in Southern Australia testing the potential for virtual fencing to be used to target sheep grazing. Results demonstrate the ability to use virtual fencing within a paddock to focus grazing pressure on a weedy area while successfully excluding livestock from areas where high stocking density would cause environmental damage and usually prevent the use of high grazing pressure as a weed control tool. The potential economic and weed control benefits from being able to target increased grazing pressure on sub-paddock areas is also shown using bio-economic modelling. The results demonstrate the potential benefits of the development of virtual fencing technology for use with sheep. Further opportunities for environmental and agricultural production benefits are presented.

Keywords   Virtual fencing, spatial grazing, weed control, livestock, precision agriculture.