Pasture pest impact and control options used on dairy farms in south-eastern Australia

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Short title: Pasture pest impact on dairy farms

Abstract

To better understand the impact of pasture pests and their control measures used on dairy farms in south-eastern Australia, a survey of 76 farmers was conducted between November 2016 and July 2017. The survey covered true insects as well as other pests such as mites, slugs, snails and millipedes. Seventy percent of the survey respondents were from the state of Victoria, 16% from Tasmania, with the remainder from New South Wales and South Australia. There were few significant regional differences in farmer responses regarding impacts and the use of control measures, so these are not presented. Overall, 42% of dairy farmers surveyed reported they had resown a pasture at least once in the last five years as a response to insect damage. Beetles, including cockchafers and wireworms, were identified as the most common pest causing damage leading to pasture resowing. During the last 5 years, approximately half of the survey respondents did not use insecticide sprays or seed treatments, while approximately one quarter of respondents used these products every year. Insecticides were most commonly used in autumn months to protect establishing pastures, and the main pests targeted at this time were mites, lucerne flea, beetles, caterpillars and grasshoppers. Endophyte-infected pasture cultivars were used by approximately half of the respondents in at least 1 of the last 5 years, and were used every year by 15% of respondents. These results, combined with field survey and expert elicitation workshop data, will contribute to an estimate of the impact of pasture pests on dairy farm businesses.

Introduction

There is a lack of information on the occurrence, density, and level of damage caused by most pasture insect pests in Australian dairy regions. The impact of a small number of insect pest species has been investigated in a limited number of regions, and in these cases a substantial economic impact has been found. For example, the redheaded pasture cockchafer (RHPC - Adoryphorus couloni) has been estimated to cost annually $100/ha for lamb producers and $500/ha for dairying in Victoria (Berg et al. 1993), while in Tasmania, Pauley and Miller (1993) estimated losses due to RHPC, Corbies (Oncopera intricata), Winter Corbies (Oncopera rufobrunnea) and blackheaded pasture cockchafers (Accrossidius tasmaniae) at over $1M per annum. The sowing of pasture species resistant to pasture pests is recommended, but in perennial ryegrass (Lolium perenne)-based pastures widely used in the dairy industry, the use of cultivars infected with a selected endophyte has also been recognized as a potential strategy for managing pasture pests.
(Popay and Gerard 2007). A survey of dairy farmers in south-eastern Australia was conducted to determine the frequency that pests cause sufficient damage to warrant resowing of pastures, what pests caused the damage, and the use of insecticides and endophyte by farmers to control pest problems.

Materials and methods

The survey was conducted between November 2016 and June 2017, targeting dairy farms in south eastern Australia. Farmers were invited to participate in the survey through industry newsletters and other publications. The survey was completed online by 40 farmers, with a further 36 surveys completed by telephone calling. Producer survey results were summarised by region using the farm’s postcode. The regions and number of respondents in parenthesis were: Gippsland (22), Western Victoria (21), Murray (10), Tasmania (12), New South Wales (6) and South Australia (5). Due to sample size limitations (76 respondents), regional differences were analysed using only three categories rather than the 5-6 categories in the original questions. For example, questions that asked respondents to nominate how many years out of the last 5 years they have used insecticide treatments (0-5 years) were grouped as ‘never’ (0 years), ‘sometimes’ 1-3 years, and ‘nearly all the time’ (4-5 years). Regional differences in the survey responses were statistically analysed using maximum likelihood ratio chi-square test for categorical variables but were found to be not significant and are not reported.

Results and Discussion

On average, the producers surveyed managed farms of 270 ha in size ranging from 53 to 900 ha. Perennial pastures were sown by >80% of respondents in all regions except NSW. Annual/ short term pastures were most commonly sown in the Murray region of northern Victoria and in NSW.

Overall, 42% of survey respondents said they had resown a pasture due to insect damage. Of those producers resowing pastures, 45% had resown a pasture once in the last 5 years and a further 30% had resown a pasture twice in the last 5 years and one producer reported resowing pastures as a result of insect damage every year. The average area resown was 27 ha, varying from an average of 5 ha in Tasmania to 40 ha in the NSW and Murray regions. Beetles, including cockchafers and wireworms, were identified as the most common pest causing damage leading to resowing. The decline in sown pasture species leading to pasture resowing is generally considered to be a result of multiple interacting factors, including drought, soil constraints and grazing pressure (Chapman et al. 2011; Culvenor and Simpson 2014). This survey indicates that pasture pests also play an important role.

The use of insecticides on pastures and forage crops is shown in Fig. 1. In general, approximately half of respondents had not used insecticides over the last 5 years, another group used insecticides every year and a further group of producers occasionally used insecticides. Overall, insecticide was most commonly applied as treated seed (42 of 75 respondents to this question), followed by spraying the establishing pasture (<3 months old, 41 respondents), by spraying established pasture (38 respondents), spraying winter crop (30 respondents) and spraying summer crops (7 respondents). Insecticide use was generally highest in autumn months (April and May), reflecting the main uses as treated seed and spraying establishing pastures (Fig. 1).
Endophyte-infected pasture seed was used by approximately half of the respondents in at least 1 of the last 5 years and was used every year by 15% of respondents. Use of endophytes has been shown to effectively control pest populations (e.g. Popay and Hume 2011), so increasing use of endophytes may be warranted in south eastern Australia to reduce the relatively high rate of pasture resowing due to insect damage observed in this study.

**Figure 1.** Number of years in the last 5 that producers used insecticide treated seed or insecticide spray on established pasture, establishing pasture and winter or summer crop. Results are totals across all survey regions.

The survey also indicated pastures pests are often not controlled. Seventy percent of survey respondents reported that there are times when they observe insect pests but do not do anything to control the infestation. This suggests that producers are making tactical decisions whether to control the pests or not. Lucerne flea and mites were most commonly reported pasture pests that were observed but not treated, followed by caterpillars, beetles, grasshoppers, snails and slugs.

This survey is the first of its kind to focus on the damage caused by pasture pests in south eastern Australia, and the control options used by dairy farmers. These results will be combined with a field survey of pasture pests and expert elicitation, to describe the impact of pasture pests on dry matter production and provide an estimate of the economic impact of pasture pests on Australian dairy farm businesses.
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References


