Non-chemical control of *Chloris virgata* (feathertop Rhodes grass)

Andrew R. McLean, Michelle D. Keenan and Michael J. Widderick
Agri-Science Queensland, Department of Agriculture, Fisheries and Forestry Queensland,
PO Box 2282, Toowoomba, Qld 4350, Australia
(andrew.mclean@daff.qld.gov.au)

Summary Feathertop Rhodes grass (*Chloris virgata* Sw.) is a difficult to control weed in the northern grains region and requires an integrated and intensive management approach. There are limited chemical options for its control, therefore non-chemical approaches have an important role to play to break the life cycle and reduce future weed burdens. As a result of our work, we have identified viable and effective non-chemical options for the control of feathertop Rhodes grass.

Three field experiments (tillage) and one pot experiment (seed burial) have been initiated to define the impact of seed burial depth on feathertop Rhodes grass emergence. An additional field experiment was established to examine burning effects on feathertop Rhodes grass and the impact of burning on seed viability.

In the three field experiments, different tillage types (zero tillage, harrow, gyral, off-set discs and one-way disc) were compared. Prior to tillage being imposed feathertop Rhodes grass seeds and small beads (to mimic weed seeds) were placed in fixed quadrats. Following tillage, emergence of feathertop Rhodes grass was counted and the beads were recovered through soil coring to show the depth of burial under the different tillage types.

Tillage type greatly impacted the buried depth of beads. Depth of bead burial was least under harrows and greatest in one-way disc plots with 75–90% and <20% of the beads remaining in the top 2 cm of soil respectively. Burial of beads was less under the gyral treatment than the off-set disc treatment with <5% and 10–15% of beads buried below 5 cm respectively.

All forms of tillage greatly reduced the emergence of feathertop Rhodes grass when compared to zero tilled plots. Tillage that caused deeper seed burial resulted in less emergence. The greatest reduction in emergence was generally under the one-way disc which inverts large amounts of soil and buries seed below 10 cm depth.

Over the course of the three experiments the trend in reduction of emergence of feathertop Rhodes grass was consistent with all forms of tillage. However, the magnitude of reduction in emergence differed between experiments due to the interacting factors of rainfall, temperature and soil conditions.

The pot experiment was set up placing feathertop Rhodes grass seed at 0, 2 and 10 cm below the soil surface to assess the impact of seed burial on emergence. Emergence of feathertop Rhodes grass was greatest from seed on the soil surface (35% of viable seed), with <5% from 2 cm and no emergence from 10 cm.

The pot experiment has shown that the depth of seed burial has a significant impact on the emergence of feathertop Rhodes grass and that the difference in the emergence in the tillage trials is due to differences in the depth of seed burial.

Burning patches of feathertop Rhodes grass significantly reduced the numbers of viable feathertop Rhodes grass seeds on the soil surface by an average of 93%, from 7490 to 500 seeds m^{-2} as reflected in seedling emergence data. In this experiment, the timing of the burn was such that there were few viable seeds remaining in the inflorescences, most seed having already been dispersed, so the treatment had little impact on reducing seed set.

Our research has identified non-chemical tactics which are effective for the management of feathertop Rhodes grass by reducing emergence (tillage) and depleting the seed bank (burning).

Keywords Tillage, feathertop Rhodes grass, emergence, burial.

ACKNOWLEDGMENTS

This work was funded by the Grains Research and Development Corporation.