Effects of Irrigation Water on Weed Seed Populations in Cotton Fields in the Macquarie Valley

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Abstract

Much time, effort and money are spent each year in controlling weeds in Australian cotton. Despite these efforts to control cotton weeds, observations of many fields suggest that the problem does not seem to be improving. Observations, however, fail to consider that many weeds in fields exist as seeds in the soil and are hidden from view. Without taking into consideration these seeds it is not possible to determine if present management practices are changing the weed problem. One method of assessing the extent of the weed problem in a field is to examine the weed seed banks. If these seed banks show that the problem is not improving, and assuming that there are no new inputs of seeds from weeds within the crop, then it is likely that there is another source of infestation. A source of infestation about which many growers have anecdotal evidence is irrigation water.

Two fields of cotton on two nearby farms in the Macquarie Valley of NSW which had different histories of weed management were studied to determine if weed seeds were being introduced via irrigation water. The experiment was set up as a randomised block design with five rows on each farm studied. At the beginning of each irrigation, traps constructed from wire gauze with holes of approximately 1.5 mm diameter were placed over the outflow end of each of the siphons feeding the selected rows. At the beginning of the season soil samples were taken from the furrows of the selected rows to determine the size of the weed seed bank in each field prior to irrigation.

Irrigation water was found to contribute weed seeds, often in quite large numbers, to the seed banks of the two fields. The numbers of seeds introduced were low at the beginning of the season but rapidly increased towards the end. The species mix was different between the two fields which suggested that there was an influence of the management of the fields and that the majority of the seeds in the water were added in the on-farm channels. Irrigation water in one season was found to contribute the equivalent of about 5% of the weed seed bank to one of the fields. The findings of this study, implicate that there is need to prevent these weed seeds from entering the cotton fields, particularly towards the end of the season.