Biology and management of the 'take-all' weed, Polymeria longifolia (Peaks Downs curse), in cotton

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Polymeria longifolia

Abstract

Polymeria longifolia (Lindley) is a native species, behaving as a weed throughout many areas of the Australian cotton industry. Seeds are a relatively minor method of reproduction and dispersal compared with the production of underground rhizomes, which are concentrated in the top 40 cm of the soil profile but found to depth of at least 1.5 m. These rhizomes may be dispersed by cultivation and their success in producing new plants is directly proportional to increasing fragment size.

Polymeria longifolia grows concurrently with the cotton crop making management very difficult. Active shoot growth of *P. longifolia* can occur at any time of the year in uncultivated areas and is probably linked to soil water status. *Polymeria longifolia* competes strongly with cotton, and is particularly detectable at soil moisture levels found immediately prior to irrigation. Although competition for major nutrients was suspected, no evidence was found in this study. Anatomical studies suggested there was some evidence that *P. longifolia* interfered with cotton through the production of allelochemicals but this requires further investigation. Densities of over 100 stems per square metre that are commonly found in weed patches reduced the yield of cotton lint and seed below 50%.

Existing control measures based on herbicides and shallow cultivation are largely ineffective and inconsistent in their results, probably due to the large below-ground biomass of the weed. Shallow hand chipping appeared to stimulate shoot recruitment and it was hypothesised that herbicides did not translocate to a sufficient enough depth down the rhizome to prevent further shoot recruitment. The findings from this thesis suggest that intensive and repeated cultivation may reduce the size of *P. longifolia* infestations in the field.