

Lifecycle studies on Malvaceae weeds in cotton farming systems

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Summary Malvaceae weeds are becoming an increasingly significant problem in cotton farming systems in eastern Australia. Species-specific control of these weeds is difficult to achieve because of their genetic, physiological and phenological similarities to cotton. For this reason, specific lifecycle studies were conducted on four target Malvaceae weeds, *Hibiscus trionum* var. *trionum* L. (bladder ketmia), *H. trionum* var. *vesicarius* Hochr. (bladder ketmia), *Anoda cristata* (L.) Schldtl. (anoda weed) and *Abutilon theophrasti* Medik. (swamp Chinese lantern/velvetleaf) to identify weaknesses that could be exploited by specific management.

The studies revealed substantial emergence of all species after rainfall and irrigation events during spring, summer and autumn. Mature seed was set within five weeks of emergence for both varieties of *H. trionum*, with continual production of seed by

both individual plants and plants from successive emergence events throughout summer and autumn. Mature seed was set within five weeks for *A. cristata* and ten weeks for *A. theophrasti*, although the bulk of seed production only occurred after twelve weeks in both species, again during summer and autumn. These results indicate that continual season-long management of both varieties of *H. trionum* is needed to prevent seed set. There is potentially a larger window of opportunity for management tools to be implemented against *A. cristata* and *A. theophrasti*. Some of the best management options for these weeds in cotton farming systems are presented. These include the timely use of residual and 'over-the-top' herbicides, chipping and good field and channel hygiene. It is proposed that lifecycle studies on troublesome species will always be needed.

Can the timely use of tillage reduce the prevalence of perennial weeds? A case study on the native weed *Polymeria longifolia* in cotton farming systems

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Summary *Polymeria longifolia* Lindl. is a native Australian plant that is a particularly troublesome weed throughout the Australian cotton industry. This species is extremely difficult to control using the range of existing control options possible under the current reduced tillage, permanent bed systems. For example, single applications of the most effective herbicides against this weed, glyphosate and fluroxypyr, while decreasing the shoot growth of *P. longifolia* did not increase cotton yields. Chipping once per month for four months actually increased the dry weight of *P. longifolia* shoots but did not increase cotton production. Results show that

simply destroying shoot material by single herbicide applications or chipping, both of which remove shoot material but do not kill the rhizomes does not provide effective control. In contrast, repeated soil disturbance, for example rotary hoeing under dry conditions in fallow, reduced the growth of the shoots and rhizomes of *P. longifolia*. The results suggest that a number of severe cultivation events or herbicide applications within patches of the weed may provide effective control in summer fallows and that further research is warranted. The current best management practices for *P. longifolia* have been outlined.