

Biological-based weed management, past successes and future opportunities

Andy W. Sheppard

CSIRO, GPO Box 1700, Canberra, Australian Capital Territory 2601, Australia

(andy.sheppard@csiro.au)

Summary Beyond the historical use of grazing animals, biologically based solutions to widespread weeds started over 100 years ago with the first classical biological control programs against *Opuntia* cacti and lantana. These two programs illustrated the fickle nature of biological control and weed management. The first was largely under complete control within a generation while the second still remains a problem without highly effective agents. Nonetheless biological control was the main form of ecological weed management until the arrival of chemical herbicides in the 1950s and its application continued grow until a peak into the 1990s, despite chemicals becoming the main basis for weed management in agricultural settings. 16 years into the new millennium, it is now the turn of chemical options to fade as understanding of their

environmental and health impacts are recognized and as widespread weeds evolve resistance to most of the remaining active ingredients. This could be the new dawn for biological-based weed management as even agrochemical companies push all new investments into biopesticide options. Biological control continues to generate benefits, not limited by resistance, and ground breaking new genetic approaches like RNAi and gene-drive open new possibilities for tackling the current generation of intractable weeds species and resistant genotypes. I look back at past successes in bio-based weed management and also look to the future and the possibilities for managing weeds in ways we wouldn't have dreamed of even at the start of this millennium... a chance for biologists to control the weeds once and for all?