COMPARATIVE ECOLOGY OF WILD OATS  
(AVENA FATUA AND AVENA STERILIS SUBSP. LUDOVICIANA)

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With the increase in cropping intensity across much of Australia, two species of wild oats (Avena fatua and A. sterilis subsp. ludoviciana) continue to be a major weed problem. A. fatua is reported to predominate in southern and Western Australia, while A. sterilis subsp. ludoviciana is more prevalent in subtropical regions of northern New South Wales and Queensland (Whalley and Burfitt, 1972, Paterson, 1976). Data presented from a 1998 Victorian survey and anecdotal reports (Medd, 1996) suggest that the species distribution is changing. If the species distributions are changing, what biological and/or management factors are determining this. Unfortunately, the majority of detailed ecological studies have been in temperate systems of Canada and Europe, with research concentrating on A. fatua. As a consequence much of the basic ecology of wild oats under Australian conditions remains unknown. The objectives of the study was to compare the growth and development of A. fatua and A. sterilis spp. ludoviciana under Australian conditions.

The experiment was a randomised complete block design with five replicates. Plots consisted of plastic containers (50 cm long × 40 cm wide × 50 cm deep). Primary seed of A. fatua and A. sterilis spp. ludoviciana from a single location (Rupanyup, Victoria), were used to establish monocultures of each species at La Trobe University, Victoria in 1998. Wild oat seeds were sown 8 cm apart in rows and 4 cm between rows. Plant phenology, canopy height, and tiller number was measured on nine plants from each plot at 1-2 week intervals. At panicle emergence (ear peep), four plants from each plot were taken, divided into leaves (live and dead), stems and inflorescence. The area of all plant components and their dry weights recorded. Panicle emergence and timing of seed dispersal were measured on the remaining five plants at 1-2 week intervals.

Significant differences between the two wild oat species in canopy height were recorded. Before tillering, canopy height was greatest in A. fatua. Following tillering, the canopy of A. sterilis spp. ludoviciana became taller. However, at panicle emergence canopy height in both species was similar. A. fatua had a greater leaf number and rate of leaf appearance on the mainstem. Flag leaf appearance and panicle emergence in A. sterilis spp. ludoviciana occurred approximately six days before A. fatua. The duration of seed dispersal was similar in both species. Tillering and seed production was greater in A. fatua.

The results show that in monoculture the growth and development of A. fatua and A. sterilis spp. ludoviciana differ significantly. The ecological significance of these differences when grown in competition with each other and/or with a crop is still unknown. In addition, the way these differences interact with the emergence of each species needs to be determined for future management strategies of this intractable weed.

ACKNOWLEDGMENTS

This research is part of a project funded by the Grains and Research Development Corporation.

REFERENCES

