SEED BANK DYNAMICS OF BROME GRASS IN A LUPIN-WHEAT ROTATION

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Abstract.. *Bromus diandrus* and *B. rigidus*, collectively referred to as brome grass, are causing much concern in parts of the West Australian wheatbelt because of their rapid increase and yearly recurrence in modern farming systems. Although the distribution of *B. rigidus* is presently more limited than *B. diandrus*, it has adapted well to sandy soils in the northern wheatbelt where it appears to be a more serious weed than *B. diandrus*. In cereals, it is difficult to control brome grass because of the lack of a selective, registered herbicide that gives consistent control. The use of lupins as a cleaning crop has been met with variable success despite the availability of selective herbicides.

Accordingly, to gain some insight into the opportunities for improved use of integrated control measures against brome grass, a four year project was initiated in 1986, to determine the effects of various rotations and herbicides on the brome grass population dynamics. In particular, its seed bank dynamics in a lupin/wheat cropping rotation were investigated as part of the project. The project was sited in an area heavily infested with *B.rigidus* at East Chapman, Western Australia.

In the first rotation cycle, the brome grass density was reduced to 5 plants/m^2 from an initial density of 148 plants/m^2 when simazine and fluazifop-P (Fusilade) were used sequentially in lupins, compared with 75 plants/m^2 when simazine alone was used. Despite the excellent control of brome grass with simazine followed by Fusilade, the surviving 5 plants/m^2 produced on average 50 viable seeds. The new seeds together with the existing seeds (30 seeds/m^2) in the soil contributed to the brome grass infestation in the following wheat crop. As there is no selective herbicide for its control in the cereal phase, this led to increases in the size of the seed bank. However, there was virtual exhaustion of the brome grass seed reserves by the time of crop anthesis during the wheat cropping phase. This suggests that the key to the long term control of brome grass lies in the prevention of seed production in the wheat year after lupins. By the second rotation cycle however, there was a further reduction in the brome grass seed reserves despite the lack of control of the small brome grass population in the wheat crop. With the gradual depletion of the seed reserves, it is predicted that it takes at least five years to completely exhaust the seed bank.

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