

THE EFFECT OF PASTURE AND CROP ROTATIONS ON GREAT BROME
POPULATIONS AND SEED RESERVESA.H. Cheam¹, C. Ralph², J. Hamblin² and P. Nelson²¹Department of Agriculture, Baron-Hay Court, South Perth W.A. 6151²Department of Agriculture, Marine Terrace, Geraldton W.A. 6530

Abstract. A field experiment involving 16 crop rotation systems commenced in May 1986 at East Chapman, W.A., in an area heavily infested with great brome, *Bromus diandrus*. Serena medic, *Medicago polymorpha* cv. Serena, or lupins was used in rotation with wheat to enable the use of selective herbicides against great brome.

Great brome was most effectively controlled when simazine and fluazifop were used sequentially in lupins. Only 4-5 plants/m² were present at crop anthesis compared with 75 plants/m² when simazine alone was used. The great brome seed reserves in the soil at the end of the first year in the lupin crop treated with simazine and fluazifop averaged 79 seeds/m². At this low density it was predicted that the magnitude of the emerged great brome population in the following wheat crop receiving one kill before sowing will be in the region of 8 to 10 plants/m², a density which is unlikely to be competitive.

Great brome was also effectively controlled in the pasture phase, with fluazifop effecting a seven to eight fold decrease in density, compared to the untreated control. At crop anthesis the seed reserves in the soil were reduced by 97% and by the end of the season despite the influx of new seeds, an average of 755 seeds/m² remained, compared to the initial density of 1742 seeds/m².

However, great brome was poorly controlled in the wheat crop. One kill before seeding was inadequate and on average, there was a doubling in the soil seed reserves by the end of the season. Even two kills did not prevent the emergence of seedlings producing enough seeds to compensate for those lost in the soil; the seed reserves increased 59%.

Significant differences in crop yields have occurred between management systems. The best lupin yield, 1201 kg/ha, occurred following sequential applications of formulated paraquat/diquat, simazine and fluazifop while the cheap option using simazine alone yielded 997 kg/ha. A five fold increase in medic burr yield in plots treated with fluazifop was recorded. The average wheat yields were 545 and 581 kg/ha in treatments receiving one and two kills respectively. The poor yields were due to great brome competition. However, more crop yield data and a better understanding of the dynamics of the brome grass populations are required before one can consider the costs and benefits of the various systems.

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