

Comparing herbicide selectivity in field- and pot-grown grass seed crops

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Effective chemical weed control measures are a prerequisite for producing high quality grass seeds. Very few herbicides are registered for use in grass seed crops and weed control relies to a large extent on so-called off-label approvals that are not supported by the pesticide manufactures, i.e. the use is on the risk of the user. New weed problems are emerging continuously and particularly grass weeds are becoming an increasing problem in the grass seed production. Selectivity is the main issue when looking for new chemical solutions for weed control in grass seed crops. The documentation required for off-label approvals originates from field experiments paid for by the growers. The objective of the present study was to examine whether regular field experiments where yields are taken could be fully or partly replaced by a less costly and less time-consuming testing procedure based on pot experimentation and field experiments with logarithmic sprayers.

Experiments were conducted in the field with a range of broadleaved and grass weed herbicides using a logarithmic sprayer delivering an exponential decrease in the dose in response to time or applying 6 herbicide doses using a plot sprayer. Concurrently with the field trials we conducted pot experiments out-doors and in glasshouses examining the selectivity of the same herbicides under contrasting conditions by varying climatic conditions, soil type, growth stage of application etc. The hypothesis we would like to test was the following: by using a test protocol taking into account the parameters known to affect herbicide selectivity it is possible to predict field performance based on results from pot experiments or alternatively from field experiments with logarithmic sprayers. If confirmed this would allow a faster and less costly test procedure because non-selective herbicides could be omitted from the tests at an early stage and field testing of potential candidate herbicides could be reduced.

Two of the herbicides tested were Atlantis WG (30g/kg mesosulfuron-methyl+6 g/kg iodosulfuron-methyl-Na+90 g/kg mefenpyr-diethyl) and Agil 100 EC (100 g/L propaquizafop). Application of 10 g/ha Atlantis WG resulted in more than 80% crop damage on *Lolium perenne* L., *Festuca arundinacea* Shreb. and *Poa pratensis* L. while *Festuca rubra* L. and *Dactylis glomerata* L. were more tolerant (20-40% crop damage). The ranking of the 5 grass seed crops was similar in the field trials with the logarithmic sprayer but, in general, crop tolerance was higher in the field compared to the pots. In the regular field experiments application of 200 g/ha Atlantis WG caused yield reductions of 10 and 22% in *D. glomerata* and *F. rubra* whereas yield losses in the 3 other grass species ranged from 50 to 100%.

In the pot experiments Agil 100 EC caused no damage to F. rubra, L. perenne was tolerant to low doses while D. glomerata, F. arundinacea and P. pratensis were severely damaged. A very good correlation was found between field experiments with a logarithmic sprayer and pot experiments regarding the ranking of the species as well as the dose rates tolerated by the crop. In the regular field experiments Agil 100 EC did not significantly reduce the yield of F. rubra, F. arundinacea, P. pratensis and L. perenne while D. glomerata yields were reduced to 0.

It is concluded that pot experiments can be used to establish the ranking of susceptibility of the grass species to the herbicides but not the actual doses that can be tolerated by the crop under field conditions.