



Is resistance to residual herbicides increasing in *Alopecurus myosuroides* (black-grass) populations?

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Introduction

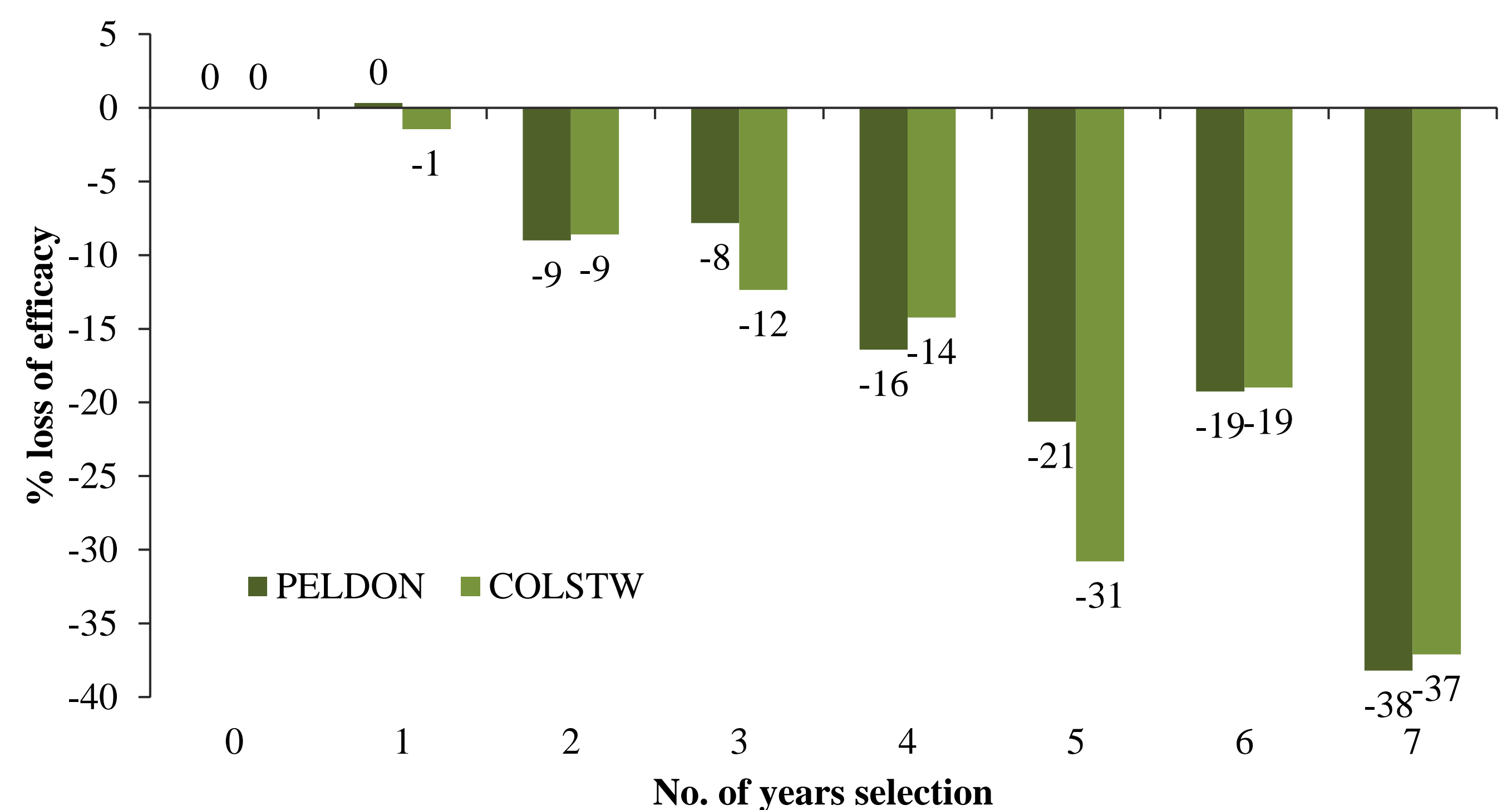
Residual pre-emergence herbicides (e.g. flufenacet) are now widely included in programmes for controlling *Alopecurus myosuroides* (black-grass) due to increasing resistance to post-emergence herbicides in the UK. Will the repeated use of these 'low risk' residual herbicides increase the risk of resistance developing?

Is there resistance to flufenacet?

Two *A. myosuroides* populations which had been previously shown to have resistance to pendimethalin, were sown in outdoor containers and sprayed for 7 consecutive years with 180g ai/ha of flufenacet. Seeds from surviving plants were collected and resown in new containers each autumn. Container and glasshouse assays demonstrate:

- clear evidence of partial resistance to flufenacet in UK populations
- repeated use of flufenacet resulted in a progressive decrease in efficacy of 5-6% per year

% loss in efficacy between flufenacet selected material and parent baseline populations

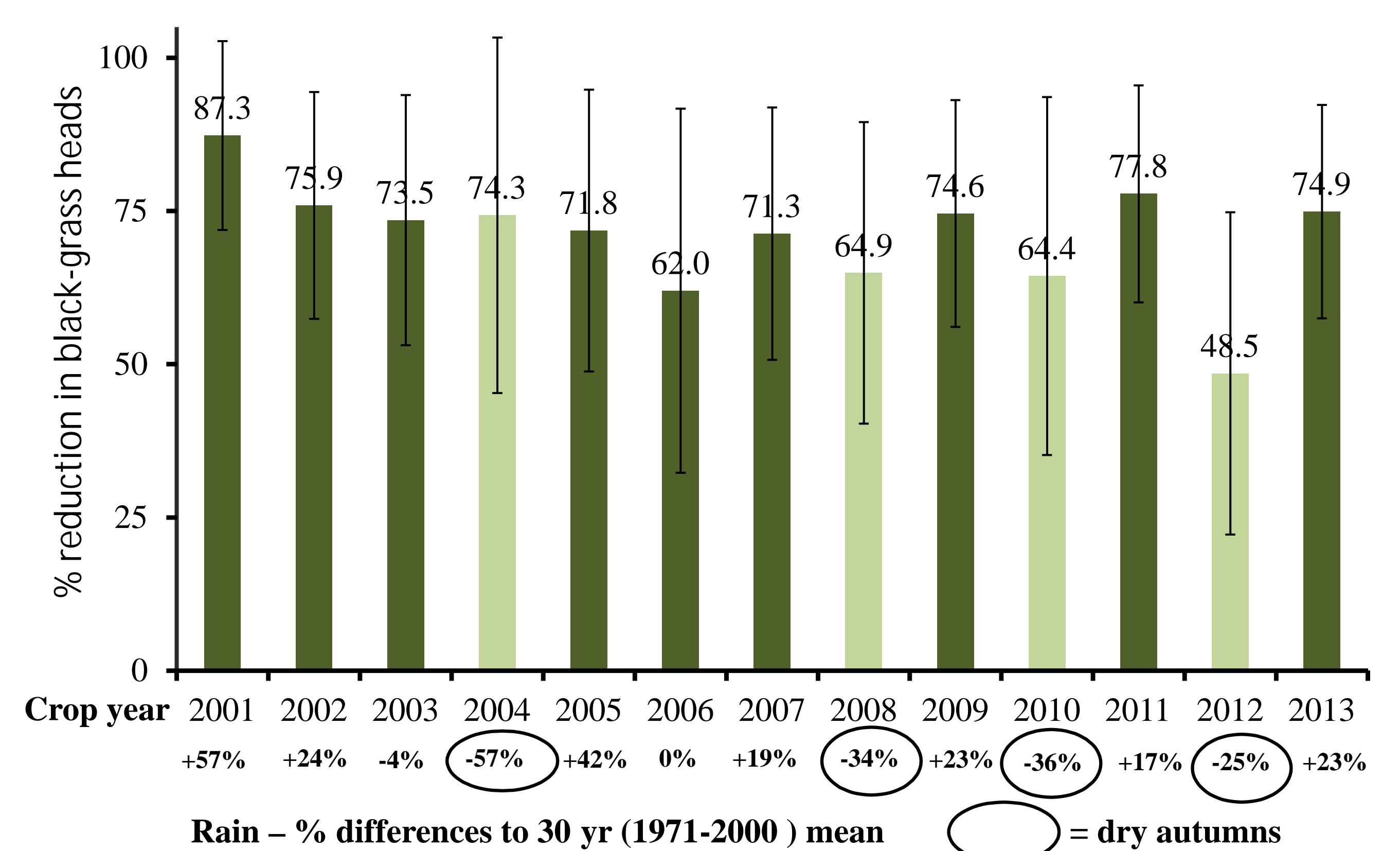


Is resistance affecting flufenacet field efficacy?

To determine whether resistance had increased to flufenacet based herbicides on a wider scale, UK field trial data was obtained from four major agrochemical companies. This data set consisted of 379 field trials in which flufenacet was applied pre-emergence in combination with either diflufenican or pendimethalin between 2001 and 2013.

- Efficacy varied greatly between the individual trials (0 – 100% control) with an average 70% control achieved
- There was no significant reduction in overall mean efficacy over the thirteen year period
- The last six years data showed a big difference in control between three wetter (74% mean control) and three drier (59% mean control) autumns
- Control was not just lower, but also more variable in drier autumns

% reduction in *A. myosuroides* heads treated with field rate of flufenacet based herbicides (2001–2013 data)



Conclusions

- This research shows there is the potential for greater resistance to 'low risk' residual actives, such as flufenacet, yet in the field there is little evidence that this has occurred on a wide scale.
- The use of a combination of different modes of action pre-emergence appears to effectively slow up the development of resistance.