

Group 2 Herbicide Resistance: Narrow-Leaved Hawk's-Beard In Creeping Red Fescue Seed Fields

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Background:

Narrow-leaved hawk's-beard (*Crepis tectorum* L.) is a plant in the sunflower family that grows as an annual or biennial. A native of Europe, it was introduced as a contaminant in seed many years ago. Narrow-leaved hawk's-beard (NLHB) is considered to be a summer (Mid-May to Mid-June) or winter annual (Mid-August to Mid-Sept). It has a deep taproot and reproduces by seed. It is widespread in western Canada and has become an increasing problem in creeping red fescue seed fields in the Peace River Region of Alberta and British Columbia. NLHB can be controlled with phenoxy herbicides such as 2,4-D and Curtail M or sulfonylurea herbicides such as Ally. Control of NLHB with herbicides is consistently better when applied at the small rosette stage. Once NLHB plants begin to bolt they are very difficult to control. Winter annual NLHB populations are easily controlled by herbicide applications in the fall.

Materials and methods:

In 2009, Peace River Region growers reported increasing populations of NLHB in creeping red fescue seed fields. Several trials were conducted to evaluate the control of NLHB following mid to late September applications of herbicide (Ally, Express, Spectrum, Prestige, Curtail M, Frontline 2,4-D, 2,4-D ester, Express+2,4-D and Frontline XL). These trials were conducted on producer's fields west of Beaverlodge, AB (2010), Hythe, AB (2011) and Hythe, AB (2012). The NLHB plants were controlled effectively by fall applications of Prestige, Curtail M, 2,4-D ester, Frontline 2,4-D and Express+2,4-D. Ally and Express did not control any of the NLHB plants at any of the sites.

Seed was collected from NLHB plants that were not affected by the application of Ally at two sites (Beaverlodge 2011 and from Hythe 2012). NLHB seed was also collected in 2012 from a creeping red fescue field west of Spirit River that were not effectively controlled by a spring application of Refine SG. Seed was also collected in 2011 and 2012 from NLHB plants growing at the AAFC Research Station at Beaverlodge. Seed from all sites was transferred to a refrigerator and maintained at 4°C for 7 days to promote uniform germination. Seeds were planted in pots and grown in the greenhouse. Plants were actively growing at soil moisture near field capacity and at temperature 20 to 23 °C. Ally was sprayed on the NLHB plants at the 2 to 4 leaf stage at application rates of 0 (check), 0.25X, 0.5X, 0.75X, 1X, 1.5X and 2X of the recommended rate (0.0045 kg ai/ha). The NLHB plants were sprayed using Research Track Sprayer operation (Figure 1).

A screening trial on seed collected from the 2011 Beaverlodge site and AAFC Research Station at Beaverlodge was conducted in 2012. Screening trials on seed collected from Hythe 2012, Spirit River 2012 and AAFC Research Station at Beaverlodge 2012 was conducted in 2013.

Result and Discussion:

All rates of Ally sprayed on NLHB plants from seed collected in 2011 at the AAFC Research Station at Beaverlodge showed significant signs of damage and all plants were killed from all rates of Ally (Figure 3) while NLHB plants from seeds collected in 2011 from the creeping red fescue field at Beaverlodge were not showing damage (Figure 2) in the screening trial. In 2013 screening greenhouse trials, the susceptible NLHB plants from seed collected in 2012 at the Agriculture and Agri-Food Canada, Research Farm were showing significant signs of damage at Ally application rates of 0.75X, 1X, 1.5X and 2X of the recommended rate but not at 0.25 and 0.5X of the recommended rate (Figure 4). The NLHB plants from the seeds collected in 2012 from both the farmer field at Hythe, AB (Figure 5) and near Spirit River AB (Figure 6) were not showing damage from any of the Ally applications. It is evident that the NLHB plants collected in the field near Beaverlodge, Hythe and Spirit River were showing clear resistance to the Group 2 herbicide Ally and confirms results from trials conducted in the field.



Fig 1. Herbicide research track sprayer operation



Fig 2. Effect of Ally on narrow-leaved hawk's-beard plants grown from seed collected in 2011 from AAFC Beaverlodge Research Farm, AB (Picture date is March 13, 2012).



Fig 3. Effect of Ally on narrow-leaved hawk's-beard plants grown from seed collected in 2011 from a fescue field near Beaverlodge, AB (Picture date is March 13, 2012).



Fig 4. Effect of Ally on narrow-leaved hawk's-beard plants grown from seed collected in 2012 from AAFC Beaverlodge Research Farm, AB (Picture date is July, 19, 2013).



Fig 5. Effect of Ally on narrow-leaved hawk's-beard plants grown from seed collected in 2012 from a fescue field near Hythe, AB (Picture date is July, 19, 2013).



Fig 6. Effect of Ally on narrow-leaved hawk's-beard plants grown from seed collected in 2012 from a fescue field near Spirit River, AB (Picture date is July, 19, 2013).

