

Date:
March, 2014

Control of Group 2 Resistant Narrow-leaved hawk's-beard in CRF Seed Fields

Resources:

Mix It Up - website dedicated to preventing herbicide resistance.
www.mixitup.ca

Government of Saskatchewan
Weed Identification Guide
www.agriculture.gov.sk.ca/Default.aspx?DN=181ad268-c23d-463c-8952-65a502f57f2b

Herbicides tested for NLHB control:

2,4-D ester
Ally
Curtail M
Express
Express + 2,4-D
Frontline + 2,4-D
Frontline XL
Prestige
Spectrum

Contacts:

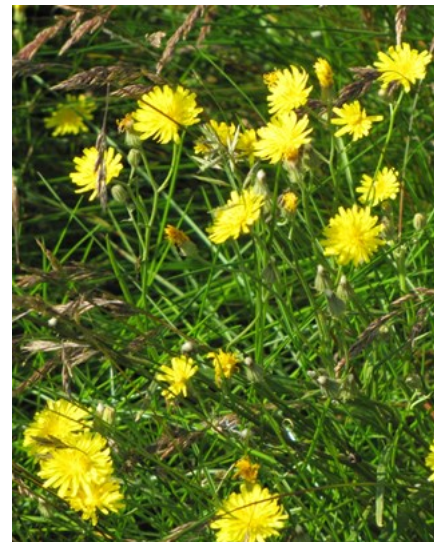
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Narrow-leaved hawk's-beard in creeping red fescue seed field



Upclose of narrow-leaved hawk's-beard plant

Introduction

Peace Region growers have reported increasing presence of narrow-leaved hawk's-beard in creeping red fescue seed fields. Narrow-leaved hawk's-beard is not a new weed to the Peace Region and grass seed growers are very familiar with it. Narrow-leaved hawk's-beard can grow as an annual or winter-annual. Seedlings emerging prior to mid-July grow as summer annuals while those that germinate after mid-July behave as winter annuals. Winter annual plants are difficult to control with spring applied herbicides on creeping red fescue seed fields since herbicides are applied the last two weeks of May. At this time narrow-

leaved hawk's-beard plants have large rosettes, are beginning to bolt and are very difficult to control with most herbicides. Previous studies have shown fall herbicide applications provide better and more consistent control over spring applications.

Trials were conducted over a three year period to evaluate the control of narrow-leaved hawk's-beard with fall applied herbicides in creeping red fescue seed fields. Seed was collected from narrow-leaved hawk's beard plants once resistance was suspected in various locations and grown in a greenhouse environment to confirm resistance to Group 2 herbicides.



The Seed Head

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more Seed Head fact sheets available soon on our website

www.peaceforageseed.ca

Field Study

Materials & Methods

Previous studies have shown that fall spraying of phenoxy type herbicides (2,4-D and MCPA) and products such as Ally provide excellent control of narrow-leaved hawk's beard. Three trials were conducted from 2011 to 2013 on creeping red fescue seed fields in the Beaverlodge and Hythe area. The sites were Beaverlodge 2010 to 2011, Hythe 2011 to 2012 and Hythe 2012 to 2013. All sites had uniform populations of narrow-leaved hawk's-beard plants which were in the seedling to rosette stage at time of herbicide application.

Experimental design for each study was a randomized complete block design with four replications and plots were 2 m x 10 m in size. Herbicides were applied with a hand held plot sprayer, calibrated to deliver 100 l/ha of water at 270 kPa. Herbicides were applied at recommended rates on September 23, 2010 (Beaverlodge), September 28, 2011 (Hythe) and September 20, 2012 (Hythe). Visual weed control ratings (percent control) were conducted the following spring.

Table 1. Visual percent control ratings of narrow-leaved hawk's-beard the year following FALL applied herbicides on creeping red fescue seed stands.

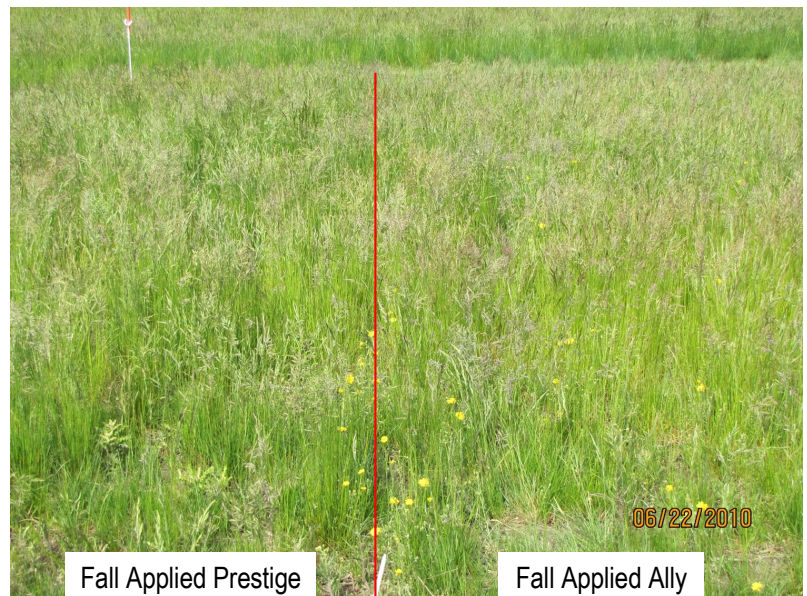
Treatment	Beaverlodge 2010 - 2011	Hythe 2011 - 2012	Hythe 2012 - 2013	Three Year Average
Check	0	0	0	0
Ally	0	0	0	0
Spectrum	100	84	97	94
Prestige	100	90	100	97
Express	0	0	0	0
Frontline 2,4-D	100	88	99	96
2,4-D ester	100	96	99	98
Express+2,4-D	100	76	88	88
Frontline XL	100	81	75	85
Curtail M	100	95	100	98



Photo below:
Effects of fall applied
Prestige and Ally on narrow-
leaved hawk's beard
control, Beaverlodge 2010.

Results & Discussion

Percent visual control ratings conducted on narrow-leaved hawk's-beard plants the spring following fall herbicide applications proved to be very interesting at all three sites, in all three years. Fall applications of Prestige, Curtail M, Frontline 2,4-D and 2,4-D ester alone provided excellent control of narrow-leaved hawk's-beard in all three years. Spectrum, Express+2,4-D and Frontline XL provided satisfactory control. Ally and Express applied alone did not provide any control of narrow-leaved hawk's-beard. Previous studies had shown fall applied Ally to be very effective at controlling narrow-leaved hawk's-beard.



Greenhouse Study

Materials & Methods

Seed was collected from narrow-leaved hawk's beard plants that were not affected by the application of Ally and Express plots at two sites (Beaverlodge 2011 and Hythe 2012). Narrow-leaved hawk's beard seed was also collected in 2012 from a creeping red fescue field west of Spirit River that was not effectively controlled by a spring application of Refine SG. Seed was also collected in 2011 and 2012 from narrow-leaved hawk's beard 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 narrow-leaved hawk's beard 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 narrow-leaved hawk's beard plants were sprayed using Research Track Sprayer operation.

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.

Results & Discussion

All rates of Ally sprayed on narrow-leaved hawk's beard plants from seed collected in 2011 at the Beaverlodge Research Station showed significant signs of damage and all plants were killed. Plants from seeds collected in 2011 from the creeping red fescue field at Beaverlodge were not showing damage in the screening trial.

In 2013 screening greenhouse trials, the susceptible plants from seed collected in 2012 at the AAFC Research Station 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 (Fig 1). The narrow-leaved hawk's beard plants from the seeds collected in 2012 from both the farmer field at Hythe, AB (Fig 2) and near Spirit River, AB (Fig 3) were not showing damage from any of the Ally applications.



Fig 1. Effect of Ally on narrow-leaved hawk's beard plants grown from seed collected in 2012 from AAFC Research Farm, AB.



Fig 2. Effect of Ally on narrow-leaved hawk's beard plants grown from seed collected in 2012 from a CRF field near Hythe, AB.



Fig 3. Effect of Ally on narrow-leaved hawk's-beard plants grown from seed collected in 2012 from a CRF field near Spirit River, AB .



Narrow-leaved hawk's beard plants sprayed with Ally at six different rates. Left: Plants grown from seed collected from 2010/2011 trial in the field. Right: Plants grown from seed collected from Beaverlodge Research Station.

Conclusions

Field Study:

Results from this three year study showed fall applications of Curtail M, Prestige, Frontline 2,4-D and 2,4-D ester effectively controlled narrow-leaved hawk's-beard plants. The study also identified the presence of narrow-leaved hawk's-beard populations resistant to Group 2 herbicides such as Ally, Express and Refine SG. Group 2 herbicides are used on seedling and established creeping red fescue seed fields throughout the Peace River Region. Growers must be aware of this issue and should rotate among different herbicide groups to prevent the appearance of additional herbicide resistant weeds.

Greenhouse study:

It is evident that the narrow-leaved hawk's beard 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.

Cultural Control Methods

Excerpts found in Government of Saskatchewan Weed Identification Guide:

“Good tillage will control this weed on cultivated land. Where possible, infested fields should be tilled in the fall because of plants which lie over winter are difficult to control. Where spring tillage is necessary to control over-wintered plants, it must be early and thorough. Plants which have not been thoroughly uprooted often continue to grow.”

“The weed may readily become established in thin stands of forage crops, therefore, it is important that forage stands be kept as vigorous as possible. Good seeding practices, good quality seed, recommended varieties and the use of fertilizer are important. Early mowing of hay and forage on infested areas is necessary to prevent seed production.”

“Plants on uncultivated land should be mowed to prevent seed production. this must be done early to ensure that plants which are cut off do not produce seed from sap remaining in the stem.”

Weeds in Western Canada with Group 2 Resistance :

- Ball Mustard
- Chickweed
- Cleavers
- Cow cockle
- Green foxtail
- Hemp-nettle
- Kochia
- Lamb's-quarters
- Narrow-leaved hawk's beard
- Pale smartweed
- Powell amaranth
- Redroot pigweed
- Russian thistle
- Shepherd's purse
- Spiny sowthistle
- Stinkweed
- Wild buckwheat
- Wild mustard
- Wild oats

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