Downy brome (*Bromus tectorum*) control in winter wheat in Wyoming

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**Summary** Many *Bromus* species are weed problems in cereal crops all over the world. In the Northern Great Plains of the United States, downy brome (*Bromus tectorum* L.) (BROTE) is the predominant species and is a significant weed problem in winter wheat production areas. Until sulfosulfuron was registered for brome control in 1999, producers had no affordable, viable options for controlling BROTE in winter wheat. Since that time, the Clearfield\textsuperscript{a} production system and BAY MKH 6561 have been developed which also provide control of *Bromus* species. The Clearfield production system requires growers to plant imi-tolerant wheat that is then treated with imazamox to provide weed control, presenting growers with additional costs to plant tolerant varieties. Imazamox cannot be applied to conventional wheat varieties. These systems vary in their ability to control brome particularly related to application timing. One concern with these control options is the residual life of the herbicides in the soil, when cropping patterns deviate from a wheat-fallow system. Producers in Wyoming are expanding wheat-fallow rotations to include sunflower, maize and millet. Carryover of BROTE herbicides is of particular concern for producers who want to plant sunflowers. Wyoming's relatively cool dry conditions along with relatively high soil pH's (>7.5) exacerbate this concern.

Studies were conducted from 1997 to 2003 to evaluate BROTE control with sulfosulfuron, BAY MKH 6561, and imazamox applied in early fall (mid to late October), late fall (November), and spring (mid March to mid April), at a range of rates, and to evaluate the potential for carryover following these applications. All studies included an untreated check as a basis for comparison for BROTE control and carryover. Plots were rated for BROTE control and crop response in May, and harvested for yield in July. The study area was then planted to rotation crops of maize, sunflower, proso millet, or grain sorghum the following year to determine carryover effects of the herbicide application from the previous year. All carryover studies were maintained under weed free conditions. All studies were established in a randomised complete block design.

BROTE control was more consistent with imazamox than sulfosulfuron and BAY MKH 6561 at all application timings. BROTE control with sulfosulfuron and BAY MKH 6561 was similar in the fall, however with the spring timing BAY MKH 6561 provided 10 to 15% greater control than sulfosulfuron. In general, carryover from one crop season to the next was greatest with sulfosulfuron and least with imazamox. At one site sulfosulfuron injured sunflower 47 months and grain sorghum 24 months following application. Maize or proso millet yields were not reduced by any herbicide treatment the year following application.

**Keywords** *Bromus tectorum*, sulfosulfuron, BAY MKH 6561, imazamox, re-crop.