Control of Hairy Fleabane with Saflufenacil Can Vary by Season and Growth Stage

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Abstract:
Experiments were conducted in fall and spring at Fresno, CA to determine the efficacy of glyphosate, saflufenacil, and a tank-mixture of saflufenacil + glyphosate on glyphosate-susceptible (GS), glyphosate-resistant (GR), and glyphosate-paraquat-resistant (GPR) biotypes of hairy fleabane (Conyza bonariensis) at various growth stages (5- to 8-leaf seedling, rosette, and bolting). Seasonal effects were noticed in the control of the hairy fleabane plants with the selected herbicides. All GS, GR and GPR plants were controlled by saflufenacil-alone up through the rosette stage, but control declined at the bolting stage. Saflufenacil-alone was more effective in the fall than in the spring, but control with saflufenacil + glyphosate was excellent during both seasons. Glyphosate-alone provided good control of all three biotypes at the 5- to 8-leaf stage in the fall, but control was poor in spring. Therefore, saflufenacil-alone can provide excellent control of hairy fleabane prior to the bolting stage in the fall; but in spring, it will be more effective when tank-mixed with glyphosate.

Introduction:
Hairy fleabane (Conyza bonariensis) remains a problematic weed in California even after several years of research (Figure 1). Although this weed has been present in the state for decades, it gained more prominence after the discovery of a glyphosate-resistant (GR) biotypes in 2008 and subsequently a glyphosate and paraquat resistant (GPR) biotype in 2010. Glufosinate was identified as an immediate alternative for successful control of these herbicide-resistant biotypes but research has continued to identify other herbicide modes of action and management strategies for a good resistance management plan. One herbicide introduced fairly recently in California is saflufenacil, a protoporphyrinogen oxidase (PPO) inhibiting herbicide. Saflufenacil has been registered for postemergence control of broadleaf weeds in citrus, nuts, and pome fruits.

Several studies have shown that glyphosate was more effective when sprayed during cooler parts of the year (Moretti et al., 2013) and control was affected by the...
growth stage of the plant (Shrestha et al.). Therefore, we wanted to evaluate if the efficacy of saflufenacil on GR, GPR, and glyphosate-susceptible (GS) hairy fleabane was also affected by season and growth stage.

**Methods:**

The experiments were conducted at California State University, Fresno, CA. Seeds from previously confirmed GR, GS, and GPS were used for the study. Plants grown in pots from these seeds were treated at the 5- to 8-leaf stage, rosette stage, and initial bolting with 0.25x, 0.5x, 1x, and 2x of saflufenacil (where x = 1 oz/ac), 28 fl oz/ac of glyphosate and a tank-mixture of 28 fl oz/ac of glyphosate + 1 oz/ac of saflufenacil. A surfactant, methylated seed soil (MSO) 1% v/v, was added to the saflufenacil treatments. Ammonium sulfate was added to all herbicide applications at the rate of 2% w/v as recommended by the label. An untreated control treatment was also included. Each treatment was replicated five times and the experiment was conducted in fall and spring. Herbicide spray volume was 40 gallons per acre. The plants were evaluated for mortality periodically and finally at 30 days after treatment (DAT).

**Results:**

**Applications at 5- to 8-leaf stage of hairy fleabane**

Control of 5- to 8-leaf stage hairy fleabane plants with the various herbicide treatments was influenced by the season (Figure 2). Better control of all three biotypes (GR, GS, and GPR) of hairy fleabane were obtained in
In conclusion, the efficacy of saflufenacil on hairy fleabane can be affected by the season. In the Fall, saflufenacil alone at the label rate may provide good control of all three biotypes of hairy fleabane provided the applications are made at or prior to the rosette stage. In the Spring, it may be advisable to apply a tank-mix of saflufenacil + glyphosate prior to the rosette stage because during this season inconsistent control may be obtained on bigger hairy fleabane plants.

**Reference:**
Complete details of this study are available in Dennis et al. (2016).