

Using Transline® Herbicide to Control Invasive Plants

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Transline® is a selective, broadleaf herbicide that provides excellent control of many tough broadleaved invasive plants, yet is tolerant to a wide variety of herbaceous and woody plants, including grasses (Table 1). It is applied as a foliar spray and translocates throughout the plant to the root system, thereby reducing the potential for re-sprouting in perennial plants. It is active in controlling many invasive plants, particularly in the Asteraceae and Fabaceae families. This paper will provide background information on Transline® and report its activity on yellow and purple starthistles (*Centaurea solstitialis*, *C. calcitrapa*) and artichoke thistle (*Cynara cardunculus*).

Table 1. Plant Sensitivity to Transline®

Plants Sensitive to Transline®					
Bull thistle	Buckwheat	Burdock	Canada thistle	Clovers	Cocklebur
Cornflower	Crupina	Curly dock	Dandelion	Fireweed (Erechites)	Groundsel
Hawkweeds	Knapweeds	Kudzu	Mayweed	Musk thistle	Nightshades
Oxeye daisy	Pineapple weed	Prickly lettuce	Ragweed	Salsify	Scotch thistle
Sow thistle	Sunflower	Teasel	Vetch	Yellow starthistle	

Plants Not Sensitive to Transline®

Conifers	Grasses
- Douglas-fir	Cottonwood
- Ponderosa pine	Poplar
- True firs	Willow
- Redwood	Dogwood
- Scotch pine	Oaks
Filaree	Rabbitbrush
Small burnet	Service-berry

The active ingredient in Transline® herbicide, clopyralid, was discovered to have herbicidal activity in the 1950s. Even though clopyralid provided excellent selectivity, further development of the material was not pursued because its spectrum of activity was deemed to be too narrow at that time. As vegetation managers began to understand the benefits of Integrated Pest Management (IPM) programs, DowElanco began development of more selective herbicides including clopyralid.

Transline® has been registered by both the Federal Environmental Protection Agency (EPA) and the California Department of Pesticide Regulation (CA DPR) for use on the following:

- wildlife openings;
- non-cropland areas;
- rights-of-way, including grazed areas on these sites; and
- rangeland and pastures.

During the registration process more than 120 tests have been completed on Transline[®] and reviewed by EPA and CA DPR. Transline[®] has been found to be non-carcinogenic, non-mutagenic, non-teratogenic, and is not a reproductive hazard. It degrades in the environment through the activity of soil microbes.

Three efficacy trials will be reported here, two on yellow starthistle and one trial on both artichoke thistle and purple starthistle.

Material and Methods

Yellow starthistle

Applications were made to plants at these developmental stages - spring rosette, bud and fall rosette. Broadcast applications were made at each stage in 20 gallons per acre (GPA) water. Transline[®] was applied at 2.6 fl. oz., 0.33, 0.66, 1, and 1.33 pt./acre and Tordon[®] 22K at 1.5 pt./acre. Dates of application were: spring rosette, March 30 and April 14, 1996; bud, June 4 and 13, 1996; and fall rosette, November 11, 1996. Evaluations were made at 6 weeks, and 3, 4, 5, 7, 12, or 14 months after applications depending on application timing.

Artichoke thistle and purple starthistle

Applications were made to plants at rosette (February 26, 1997) and bud (April 15, 1997) stages of development. At rosette, broadcast applications were made in 20 GPA water of Transline[®] at 0.33, 0.66, 1, and 1.33 pt./acre and of Banvel at 2 pt./acre. At bud stage, broadcast applications were made in 50 GPA water of Transline[®] and Banvel at the same rates. A new treatment of Transline[®] at 0.25% volume to volume (v/v) was applied spray-to-wet on all plants in the assigned plots. Evaluations were made approximately 2.5, 4 or 6 months after application depending on application timing.

Results and Discussion

Yellow starthistle

Transline[®] applied at spring rosette stage provided 95-100% control of yellow starthistle in the season of application (Fig. 1). Grass cover increased in plots treated with Transline[®] compared to grass cover in untreated areas (data not shown). Control from treatments applied at bud stage was 80-98% (Fig. 1). Plants not completely controlled did not flower or produce seeds.

Control of germinating yellow starthistle through the winter season was 45-78% for spring rosette treatments where few other plants were present to compete with new seedlings (Fig. 2). Control was 95-100% where perennial grasses were established. Bud stage applications gave excellent (95-99%) control at both sites at one year after treatment.

Results from fall applications on new seedlings varied by site. Control at the cool location was 65-90% versus 98-100% control at the woodland site (Fig. 3). The difference may have been due to the presence of perennial grasses at the Woodland site.

Artichoke thistle and purple starthistle

Artichoke thistle control was excellent (100%) when Transline[®] was applied at the rosette stage (Fig. 4). Plants at the bud stage (Fig. 5) were more difficult to control even with increased coverage. At California label rates, the control was 78-86% at bud stage. Control was increased to 93% with the spray-to-wet application (0.25% v/v) of Transline[®].

Purple starthistle control was excellent (100%) at rosette stage with all treatments but was poor (5%) at bud stage (Fig. 6).

Conclusions

Transline[®] has excellent activity on yellow starthistle when applied as low as 0.33 pt./A at the rosette stage. Control of yellow starthistle into the next season was optimal when perennial grasses or other species compete with new yellow starthistle seedlings.

Control of artichoke thistle and purple starthistle is optimal when applied at rosette stages. Purple starthistle will not be effectively controlled after that stage of growth. Populations of artichoke thistle can be suppressed

with applications of Transline® at the bud stage, but programs will need to re-treat with Transline® in subsequent years if complete control is the management objective.

Transline® can be used to control other invasive species, especially bull, Canada, milk, and musk thistles, kudzu, spotted, diffuse, and squarrose knapweeds, and orange and yellow hawkweeds.

The selectivity of Transline® means that it does not control certain plants including filaree, small burnet, rabbitbrush, service-berry, dogwood, oaks, grasses (such as crested wheatgrass, bluebunch wheatgrass, and Idaho fescue), cottonwoods, poplars, and conifers. Transline® should be used if management objectives call for the following:

- 1) effective control of yellow starthistle, Canada thistle, spotted and diffuse knapweeds, hawkweeds, or other invasive plants, especially for habitat management; and
- 2) applications over or around desirable, non-sensitive vegetation.

Yellow starthistle Control with Transline® Treatments at Rosette and Bud Stages

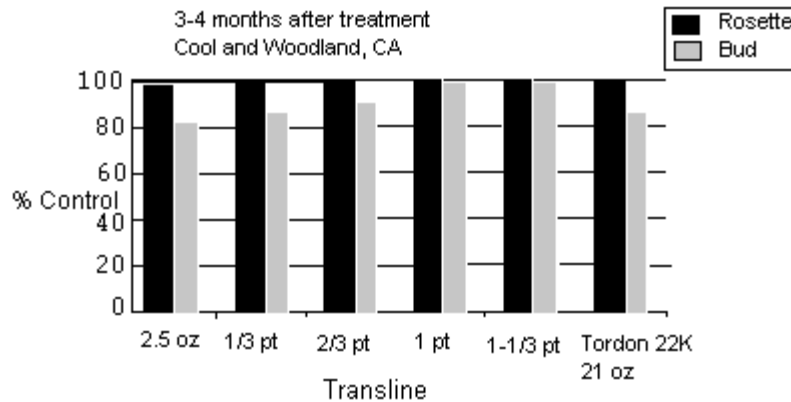


Fig. 1. Yellow starthistle control 3 and 4 months after treatment with Transline® applied at rosette and bud stages.

Yellow starthistle Control with Transline® Treatments at Rosette and Bud Stages

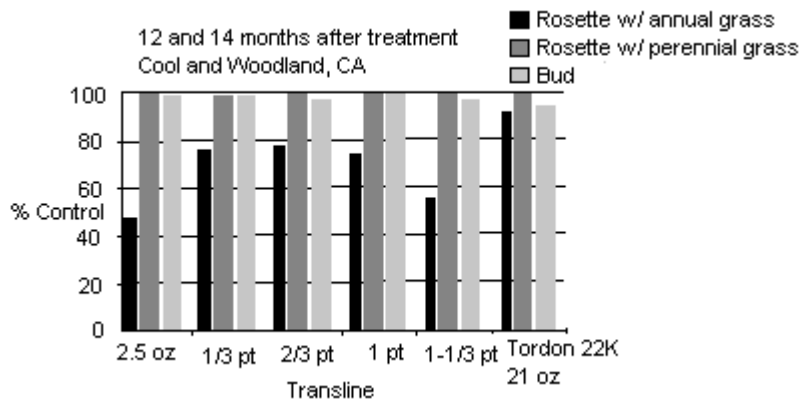


Fig. 2. Yellow starthistle control 12 and 14 months after treatment with Transline® applied at rosette and bud stages.

Yellow starthistle Control with Transline® Treatments at Fall Rosette Stage

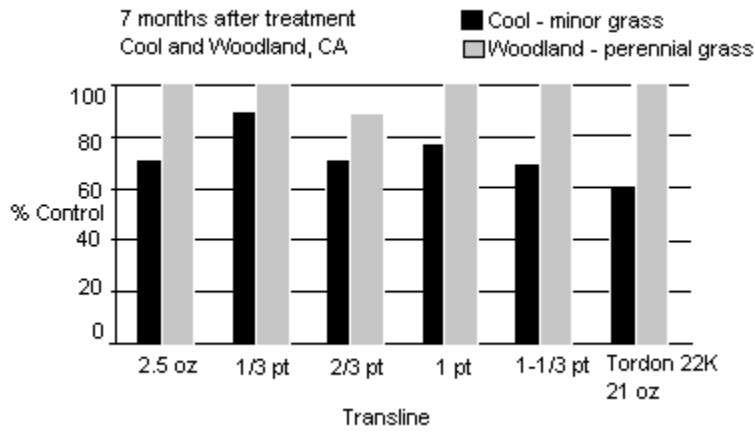


Fig. 3. Yellow starthistle control 7 months after treatment with Transline® applied at fall rosette stage.

Artichoke thistle Control with Transline® Treatments at Rosette Stage

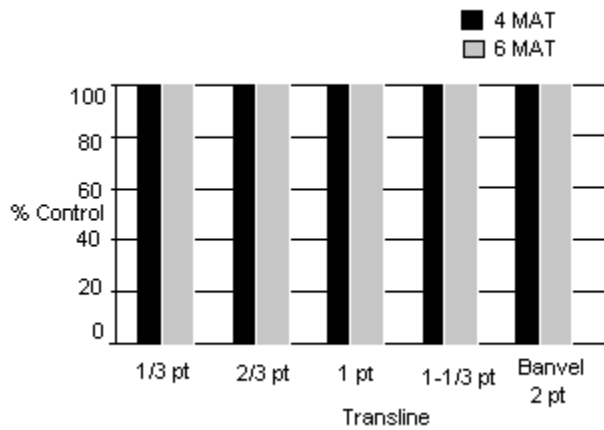


Fig. 4. Artichoke thistle control 4 and 6 months after treatment with Transline® applied at rosette stages.

Artichoke thistle Control with Transline® Treatments at Bud Stage

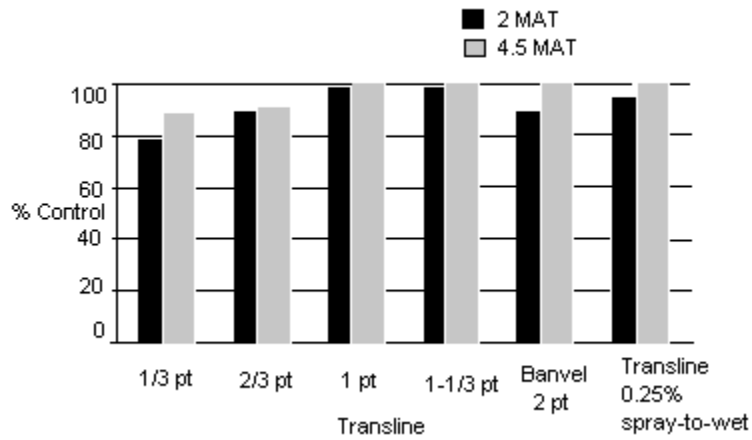


Fig. 5. Artichoke thistle control 2 and 4.5 months after treatment with Transline® applied at the bud stage.

Purple starthistle Control with Transline® Treatments

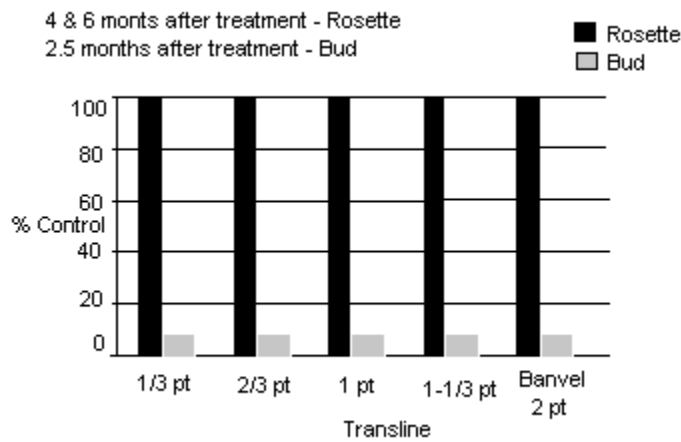


Fig. 6. Purple starthistle control 2.5, 4, and 6 months with Transline® applications at rosette and bud stages.