



Preemergent Weed Control in Select Fern Species

Mark Andrew Czarnota
Department of Horticulture - Griffin
The University of Georgia

NATURE OF WORK: Hardy ferns are gaining in popularity as landscape plants. With this trend, many nursery operations are beginning to produce many species of ferns for the retail market. Unfortunately, little test has been performed to determine the tolerance of certain preemergent herbicides to specific fern species. The weed control spectrum of most of the common used preemergent herbicides is well known, thus the goal of this study is to evaluate the safety of several preemergent herbicides on 4 fern species.

MATERIAL AND METHODS: On August 15, 2002 at the Center for Applied Nursery Research, 81 one gallon pots of 4 fern species was assembled for the test. The ferns used in the study were the following:

Common Name	Botanical Name
Japanese Painted Fern	<i>Athyrium Goeringianum</i>
Autumn Fern	<i>Dryopteris erythrosora</i>
East Indian Fern	<i>Arachnoides simplicor variegata</i>
Holly fern	<i>Cyrtonium falcatum</i>

Herbicide treatments were then applied to a 6' x 12' area containing nine pots of each of the fern species. After the herbicide application was complete, the pots were carefully moved into a shade structure, and ranged in a randomized complete block (RCB) design containing three replications. This process continued for each of the herbicide treatments. Granular herbicides were uniformly applied with a cheese shaker jar, and sprays were applied with a CO₂ backpack sprayer calibrated to deliver 20 gallons per acer (GPA). Watering occurred on an as needed basis, and this represented approximately ½ to 1 inch of water per day. The treatment list was as follows:

Treatment#	Treatment	Rate
1	Factor 65 WG	2.0 (lb ai/A)
2	Surflan 4 SL	4.0 (lb ai/A)
3	Dimension 1 SL	0.5 (lb ai/A)
4	Snapshot 2.5 GR	200 (lb product/A)
5	Gallery 75 WP	1.0 (lb ai/A)
6	Goal 2 SL	2.0 (lb ai/A)
7	Regal O-O 3 GR	100 (lb product/A)
8	Ronstar 2 GR	200 (lb product/A)
9	Check	

Each fern species was rated for injury at 1, 4, 5, 6 and 10 weeks after treatment (WAT). Each treatment of each replication contained three ferns from each species. These samples were average together as one value when injury ratings were taken. Injury ratings were taken on a (0-100 scale) and numbers represented the following:

Value	Plant Symptoms
0	No visual injury present
10-30	Minimal injury to desirable plant. Less than 10% of the plant leaf surface area showing chlorosis and necrosis.
40-70	More noticeable plant injury or stunting. Greater than 50% of the leaf area showing symptoms of chlorosis and/or necrosis.
80-90	Plants severely injured. Most of the leaves and leaf surface showing signs of chlorosis and necrosis.
100	Plant appears dead. No signs of regrowth.

RESULTS: The Japanese painted ferns (*Athyrium Goeringianum*) fronds dried in the hot dry summer of 2002, thus it was difficult to determine what injury was caused by herbicides and what injury was physical. Other than the Goal treatments, which significantly injured the plants during all rating periods, no viable data was attained from the study with this species. The only significant injury that occurred to the autumn fern (*Dryopteris erythrosora*) was the Goal treatment. None of the other treatments caused significant injury. The East Indian fern (*Arachnoides simplicor variegata*) was only significantly injured by Goal during the first two rating periods (2 and 4WAT). Although significant injury occurred at 5, 6, and 10 WAT with many of the other treatment, none of the ratings exceeded 13.3% during those rating periods. At 2 and 4 WAT the holly fern (*Cyrtonium falcatum*), was only significantly injured by the Goal treatment. At 5 WAT, Gallery and Factor were showing significant injury rating (20.0% and 23.3%). At 6 WAT, all the treatments had caused significant injury. By 10 WAT, however, only the Surflan treatments had grown out of the injury. It should be noted that the holly ferns were extremely slow growing, and if the test was able to be rated for another 2 to 4 weeks, much of the injury displayed by the herbicide treatments would have most likely been negated by new growth. The plants were just beginning to grow when they were shut down by the cold! This plant proved to be difficult to rate at this stage of growth.

SIGNIFICANCE TO INDUSTRY: This test showed that many of the preemergent herbicides on the market cause significant injury to the fern species tested in the study. However, most of the ferns were able to grow out of injury, and much of the injury to the East Indian fern and the autumn fern would be considered acceptable to the industry. More testing is required to determine the tolerances of the other two fern species (Japanese painted fern and the holly fern) to the tested herbicides.

One important thing to note is that none of the herbicide treatments killed any of the ferns in the study. All of the Goal treated plants were beginning to grow out of the injury at the end of the rating period. This is not surprising as ferns such as the Hay Scented Fern (*Dennstaedtia punctilobula*), have proven to be difficult to control with herbicides. Fern species do present a challenge, in that they are difficult to kill but easy to injury! For this reason it appears that individual herbicides would have to be tailored to individual fern species.

Table 1. Injury to four fern species at 10 WAT 2002.

		Fern Injury (0-100) at 10 WAT			
Treatment	Rate	Japanese painted fern	Autumn fern	East Indian fern	Holly fern
1	Factor 65 WG 2.0 (lb ai/A)	50.0	6.7	6.7	50.0
2	Surflan 4 SL 4.0 (lb ai/A)	20.0	5.0	8.3	33.3
3	Dimension 1 SL 0.5 (lb ai/A)	23.3	11.7	10.0	53.3
4	Snapshot 2.5 GR 200 (lb product/A)	33.3	6.7	8.3	46.7
5	Gallery 75 WP 1.0 (lb ai/A)	23.3	5.0	6.7	43.3
6	Goal 2 SL 2.0 (lb ai/A)	66.7	76.7	20.0	83.3
7	Regal O-O 3 GR 100 (lb product/A)	43.3	3.3	10.0	66.7
8	Ronstar 2 GR 200 (lb product/A)	23.3	3.3	8.3	63.3
9	Check	0.0	0.0	0.0	0.0
	LSD	28.97	15.05	8.69	34.38