Control of English Lawn Daisy *(Bellis perennis)* in Cool Season Turf

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Introduction

English lawn daisy or English daisy (*Bellis perennis L.*) is the most troublesome and difficult to control broadleaf turfgrass weed in California. English daisy continues to flourish in turf stands and frustrate turf managers due to its ability to adapt to a wide range of cultural practices, and to resist and tolerate many of the presently registered broadleaf herbicides.

English daisy is a fibrous rooted perennial with basal leaves and a prostrate, spreading growth habit. The leaves are nearly smooth or loosely hairy, entire margined or variably toothed, broad above, and narrowed at the base to a long stalk. Flower heads are white or pinkish with yellow centers. Flower stalks generally exceed the leaves in length.

This aggressive and troublesome weed spreads through a rapidly advancing rhizome system, and exhibits the potential to root and produce new plants at each node along individual rhizomes. English daisy also appears to be a prolific seed producer. Germinating seedlings have been observed at the Rancho Cañada Golf Club in Carmel Valley, CA from April until late September. Once established in turf this dual propagation system contributes to the rapid spread and invasion of English daisy in adjacent turfgrass areas.

English lawn daisy was introduced from Europe as a garden plant, and today there are approximately six species present in California.

Material and Methods

Field studies were conducted in rough and fairway setting at the Rancho Cañada Golf Club in Carmel, California during 1992-93, and Peter Hay Golf Course in Pebble Beach, California during 1997. These locations presents a specific California central coast micro-climate characterized by early morning fog, low clouds, and moderate temperatures (60-75° F) from April through August. Temperatures rarely exceed 85° F. Treatments were applied to representative stands of English daisy. Percent English daisy cover ratings were conducted on the day of initial treatment, and the randomization pattern established to reflect equal percentages of English daisy in each treatment. English daisy percent cover for each replication ranged from 34 to 64 percent with an average of 49 percent. The cool season grass rough area consisted of annual bluegrass (*Poa annua*), creeping bentgrass (*Agrostis palustris*), perennial

ryegrass (*Lolium perenne*), and Kentucky bluegrass (*Poa pratensis*). Fairway areas consisted of perennial ryegrass and annual bluegrass. Rough areas were mowed at 1.5 inches and fairway areas at 0.625 inches, and were irrigated to prevent moisture stress.

In the rough field trial sequential applications of Confront* (triclopyr+clopyralid), Turflon Ester (triclopyr), and Trimec Amine Lawn Applicators Formula (2,4-D, MCPP, dicamba) were applied at four week intervals on April 30 and May 29, 1992. Single applications of Gallery 75 Dry Flowable (Isoxaben) were applied April 30 and November 13, 1992.

In the fairway field trial sequential applications of Confront, clopyralid, Turflon 4E, Dissolve, Triamine II, MCDA, DCDA, and Triplet were applied at the described rates and dates presented in Table 2. Two sequential applications of DOWXDE-565 at the described rates were applied on April 23 and May 14, 1997.

Treatments were applied using a CO2 propelled backpack sprayer equipped with a Tee-Jet 11004LP nozzle operating at 21 psi to deliver a spray volume of 1.5 gallons per thousand square feet. Field plots measured 5′ x 10′ with 2′ borders. Field plots were evaluated for turf injury, percent weed cover, and resulting percent weed control. Turf injury was rated on a 0 to 9 scale with 0 representing no injury, 3 minimally acceptable injury, and 9 dead turf. Percent weed control was computed by calculating the difference in weed cover on the day of application versus specific rating dates, dividing that difference by the percent cover day of application, and multiplying by 100.

Results of English Daisy Rough Trials

English daisy percent control ratings 45 weeks after the final sequential treatment are presented in Table 1.

Table 1. English daisy control in rough areas. Application dates 4/30 & 5/30/92. Rancho Canada Golf Club, Carmel, CA. MMM & Associates.

Treatments	Rate	45 WAT % Control
Confront/Gallery	0.5/0.75 lb AI/A	81.5
Confront	0.5 lb AI/A	71.2
Trimec Amine	1.0 lb/AI/A	48.8
Trimec/Gallery	1.0/0.75 AI/A	29.0
Turflon/Gallery	0.5/0.75 lb AI/A	16.3
Turflon 4E	0.5 lb AI/A	14.3
Gallery 75 DF	0.75 lb/AI/A	0.0
Check	*	0.0

Results of English Daisy Fairway Trials

Table 2. English daisy fairway protocol. Peter Hay Golf Course. Pebble Beach, CA. 1997. MMM & Associates.

	Treatments	Rate	Application
1)	Untreated Check	*	*
2)	Confront Liquid	2 pints/A	A: April 23, 1997
2)	Confront Liquid	2 pints/A	B: May 14, 1997
3)	Confront Granular	0.75 lb AI/A	A: April 23, 1997
3)	Confront Granular	0.75 lb AI/A	B: May 14, 1997
4)	Clopyralid	0.25 lb AI/A	A: April 23, 1997
4)	Clopyralid	0.25 lb AI/A	B: May 14, 1997
5)	Clopyralid	0.5 lb AI/A	A: April 23, 1997
6)	Dissolve + Turflon	40.0 oz/1.0 pints/A	A: April 23, 1997
6)	Dissolve + Turflon	40.0 oz/1.0 pints/A	B: May 14, 1997
6)	Triamine II + Turflon	4.0 pints/1.0 pints/A	C: June 4, 1997
7)	Triamine II + Turflon	4.0 pints/1.0 pints/A	A: April 23, 1997
7)	Triamine II + Turflon	4.0 pints/1.0 pints/A	B: May 14, 1997
7)	Triamine II + Turflon	4.0 pints/1.0 pints/A	C: June 4, 1997
8)	MCDA	2.66 pints/A	A: April 23, 1997
8)	MCDA	2.66 pints/A	B: May 14, 1997
8)	MCDA	2.66 pints/A	B: June 4, 1997
9)	DCDA	2.66 pints/A	A: April 23, 1997
9)	DCDA	2.66 pints/A	B: May 14, 1997
10)	Triplet + Turflon	4.0/1.0 pints/A	A: April 23, 1997
10)	Triplet + Turflon	4.0/1.0 pints/A	B: May 14, 1997
11)	DOW 565 + X-77	52.5 g/ha/0.25% VV	A: April 23, 1997
11)	DOW 565 + X-77	52.5 g/ha/0.25% VV	B: May 14, 1997

Sequential applications of Confront, clopyralid, Dissolve, Turflon, Triamine II, MCDA, DCDA, Triplet resulted in absolutely no control of English daisies under fairway settings. English daisy percent cover evaluations were actually greater at the end of the trial than on the first herbicide deployment date.

DowElanco XDE-565 eliminated flowering 7-14 DAT and induced a limp off color leaf tissue 21 DAT. At 21-28 DAT leaf necrosis appeared and plant tissue dissipated in the turf stand. Two sequential applications of XDE-565 (52.5 g/HA) resulted in 94% control of English daisy 63 days after treatment (DAT) and 77% control 120 DAT. Newly germinating English daisy seedlings were observed in treatment plots throughout the course of the field trial. To date DowElanco XDE-565 is the most promising postemergent herbicide ever reviewed for control of English daisy.

Take Home Message Rough Areas

- Maintain turf density.
- Utilize sequential spring applications of a three way herbicide mixture (eg. Trimec, Dissolve, Triplet + Turflon) when soil temperatures reach 55-60° F or utilize Confront when it receives registration in California.
- Utilize Dissolve when enhanced flower knockdown is desired.
- Spring applications appear to be more effective than fall applications.

Take Home Message Fairway Areas

- Maintain turf density.
- When plants first appear and plant populations are low physical removal is still the best control practice.
- Utilize Dissolve when enhanced flower knockdown is desired.
- With severe infestations herbicide performance in replicated field trials has been very poor. No herbicide programs with currently registered products can be recommended at this time.
- To date DowElanco XDE-565 is the most promising postemergent herbicide ever reviewed for control of English daisy. Research will continue with DowElanco XDE-565 during 1998.

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