

WHEAT WEED CONTROL

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INTRODUCTION

Weeds are the major pest of wheat grown in Arizona. Moderate and heavy infestations of both broadleaf and grass weeds can cause significant reductions in yield and quality of the grain and are the major cause for rejection of seed crops. Wild oat (*Avena fatua*) and littleseed canarygrass (*Phalaris minor*) are the major troublesome grass weeds while a variety of broadleaf weeds occur statewide.

Early postemergence herbicides are registered for use in controlling both broadleaf and grass weeds and have been used effectively. Bromoxynil and 2, 4-D amine are the most commonly used broadleaf herbicides. Because wheat is a grass, the major challenge in wheat control has been the control of wild oat and canarygrass. Early postemergence herbicides are registered for this purpose although the timing and method of application are of great importance in determining the efficacy of these materials.

Wild oat and canarygrass are widespread in the major wheat producing areas of the state. One or the other of these will characteristically be the predominant weed in a wheat field although equal and heavy infestations of both can occur. The predominant species has been a major concern in the selection of a herbicide or combinations of herbicides.

Barban (Carbyne) is a wild oat herbicide that has proven to be most effective in the control of canarygrass when proper application is made. Very good control of canarygrass can be expected and acceptable control of wild oat has been achieved when the timing and volume of application has been good.

Diclofop (Hoelon) has been used effectively in Arizona for the control of wild oat. When the timing and volume of application is good for both wild oat and canarygrass, acceptable control of canarygrass can also be achieved.

Assert (formerly AC 222,293) is an experimental wild oat herbicide that has been developed recently by American Cyanamid Company. This herbicide has shown very good activity in controlling wild oat and more than 100 acres were treated in Arizona in 1985 under experimental use permit.

These three herbicides have been used successfully when properly applied and all show greater selectivity towards either wild oat or canarygrass. The major challenges in controlling these weeds has been where mixed populations of both exist in the same field.

The purpose of the four tests reported was to evaluate the efficacy of these 3 herbicides alone and in combination for controlling wild oat and canarygrass where they appeared in mixed populations and alone, and to evaluate the effect of aerial versus ground application and different volumes of spray mixtures.

TEST 1

Location: Sherill Farms, Tacna, Arizona.

Application: Date: 2-15-85

Equipment: Motorized ground strip sprayer with 20 ft. boom 800067,- 8004, 11002, tee-jet nozzles calibrated to apply 6, 7, 22 and 24 gallons per acre respectively.

Crop & Field Conditions: Wheat (Yecora rojo) 3-5 leaf; wind calm; 65 to 70 degrees F; Dry; Soil type: Silty loam.

Weed Characteristics: Wild oat (*Avena fatua*) 1-4 leaf, 0-10 sq. ft. No canarygrass.

Plot Size: 20' x 320' (4 replications)

Evaluation: Date: May 17, 1985 - Visual estimate of percent control wild oat.

Harvest: Yield data was not collected from this test.

Comments: The lower volume 800067 flat fan nozzles achieved an average of 9 percent lower levels of control than the higher volume nozzles. Control was spottier with the low volume nozzles as it was with the aerial applications. The twin jet nozzles neither improved nor decreased control. Assert achieved excellent control of the broadleaf weeds present in this test with both high and low volumes of spray. Hoelon provided negligible control of the broadleaf weeds.

TEST 1

TREATMENT				% WILD OAT CONTROL	% BROADLEAF* CONTROL
	Rate (Lbs/A)	Gallonage (Gal/A)	Nozzle Type & Size	(Average of) (4 reps.)	(Average of) (4 reps.)
Assert			800067 Single		
2.5L	.5	6	flat fan	87	97
Assert			8004 Single		
2.5L	.5	22	flat fan	98	99
Assert			11002 Twin		
2.5L	.5	24	flat fan	98	87
Assert			Fixed wing		
2.5L	.5	15	aerial applic.	88	80
Hoelon			800067 Single		
3EC	1.1	6	flat fan	87	21
Hoelon			110050 Twin		
3EC	1.1	7	flat fan	94	5
Hoelon			8004 Single		
3EC	1.1	22	flat fan	96	5
Hoelon			11002 Twin		
3EC	1.1	24	flat fan	91	5
Hoelon			Fixed wing		
3EC	1.1	15	aerial applic.	85	0
Check	-	-	-	0	0

* Broadleaf weeds included Lambsquarter (*Cenopodium album*), Silversheath knotweed (*Polygonum argrucolean*) and Sweetclover (*Melilotus indica*).

TEST 2

Location: Bruce Church Ranch, Gila Valley, Arizona.

Application: Date: 2-11-85

Equipment: Motorized group strip sprayer with 20 ft. boom, 800067, and 8002 tee jet nozzles calibrated to apply 6 and 13 GPA respectively.

Crop and Field Conditions: Wheat (Yecora rojo) 3-5 leaf; calm; 60-70 degrees F.; Dry.

Soil Type: Silty loam.

Weed characteristics: Wild oat (Avena Fatua) 2-3 leaf, < 1 sq. ft. Canarygrass 1-2 leaf; 3-4 sq. ft. Broadleaf weeds: Silversheath knotweed, Nettleleaf Goosefoot, Little Malva, Sunflower, Yellow Sweetclover.

Evaluation: Plot size: 20' X 20' - 4 replications. 4-23-85. Visual estimate of percent control wild oat and canarygrass.

Harvest: Yield data was not collected from this test.

Comments: The treatments containing Assert at both the .5 and .375 levels provided significantly better control on wild oat than Carbyne. Old material was used in the Hoelon treatments and was thought to produce unrepresentative results. Assert had no activity on canarygrass except when mixed with Carbyne. Carbyne alone produced 30% to 80% control of wild oat in addition to its control of canarygrass, and Hoelon produced 50% to 80% control of canarygrass in addition to its control of wild oat.

TEST 2

TREATMENT	Rate (Lbs/A)	% WILD OAT CONTROL (Average of 4 reps.)	% CANARYGRASS CONTROL (Average of 4 reps.)
Assert 2.5L	.5	94	3
Hoelon 3EC**	1.25	72	67
Carbyne 2EC	.375	53	90
Assert + Carbyne	.5 .375	93	85
Hoelon* + Carbyne	1.25 .375	83	79
Assert + Carbyne	.375 .25	95	73
Assert + Carbyne	.375 .375	90	53
Hoelon* + Carbyne	1.0 .25	76	75
Control	0	0	0

*8002 flat fan nozzles-13GPA. All other treatments 800067 flat fan nozzles-6 GPA.

**Old material was used in this test. This may have significantly reduced weed control.

Test 3

Location: McElhane Farms, Wellton, Arizona

Application: Date: 1-18-84

Equipment: Compressed air hand sprayer with 5 ft. boom. 8001 tee jet flat fan nozzles calibrated to apply 10 gallons per/A.

Crop and Field Conditions: Wheat (Yecora Rojo) 6-8"ht. Calm wind, 30 degrees to 50 degrees F., Frost. Soil: Sandy loam.

Weed characteristics: Wild oat (*Avena fatua*) 2-5 leaf, less than 1 sq. ft. Canarygrass (*Phalaris minor*) 1-4 leaf, less than 1 sq. ft.

Plot size: 15' x 150' (4 replications).

Evaluation: Date: May 21, 1984 - Visual estimate of percent control of canarygrass.

Harvest: 15' x 150' plots harvested with conventional John Deere 18' combine and weighed with Arkfield grain weigh wagon. Wild oat hand rogued on May 1, 1984.

Comments: Assert did not control canarygrass at any rate. All treatments containing Carbyne provided acceptable control of canarygrass. Carbyne alone at .375 provided the highest level of control.

TEST 3

TREATMENT	Rate (lbs./A)	% CANARYGRASS CONTROL* (Avg. of 4 reps.)	YIELD (LBS./PLOT) (Avg. of 4 reps.)
Assert 2.5L	.375	5	6980
Assert 2.5L	.50	0	7380
Assert 2.5L	.625	10	6740
Assert 2.5L	.25	12	7420
Assert + Carbyne	.50 .375	83	7400
Assert + Carbyne	.625 .375	80	7820
Assert + Carbyne	.25 .375	78	7320
Assert + Carbyne	.50 .25	80	7460
Assert + Carbyne	.25 .25	73	7600
Carbyne 3EC	.375	91	7420
Check	0	0	7080

*Wild oat hand rogued May 1. Final evaluation did not include wild oat control.

TEST 4

Location: Sherill Farms, Tacna, Arizona.

Application: Date: 2-13-84.

Equipment: Compressed air hand sprayer with 5 ft. boom. 8001 tee jet flat fan nozzles calibrated to apply 10 gallons per/A.

Crop and Field Conditions: Wheat (Yecoro rojo) 6" ht., Dry - 50 to 60 degrees F., Wind: 3-5 mph from west. Soil: Sandy loam.

Weed Characteristics: Wild oat 2-3 leaf, 5-10 sq. ft. Canarygrass 2 leaf, negligible infestation level. Plot size: 20' x 40' (4 reps.).

All treatments except 8 & 9 received .5 oz. PM 710 surfactant.

Evaluation: Date: May 25, 1984. Visual estimate of percent control wild oat.

Harvest: Date: May 31, 1984. Plot size: 26" x 26" grid = .0001071 acre subsample thrashed with vokal thrasher.

Comments: All treatments containing Assert provided good control of wild oat. Slightly lower levels of control were achieved at the .25 lb. rate. Hoelon provided slightly lower levels of control at the 1.25 lb. rate. Carbyne alone provided acceptable but significantly lower levels of control of wild oat at the .375 level. Yields were reduced significantly in the untreated check at this infestation level.

TEST 4

TREATMENT	Rate (lb/A)	% WILD OAT CONTROL (Avg. of 4 reps.)	% YIELD (LBS/A) (Avg. of 4 reps.)
Assert 2.5L	.375	98	6970
Assert 2.5L	.50	100	7687
Assert + Carbyne	.50 .375	100	7687
Assert + Carbyne	.625 .325	99	7115
Assert + Carbyne	.25 .375	99	7203
Assert + Carbyne	.50 .25	99	7401
Assert + Carbyne	.25 .25	93	6784
Carbyne 2EC	.375	78	7225
Hoelon 3EC	1.25	90	7247
Check	-	0	5793

Summary and Conclusions: Wild oat and canarygrass can be controlled effectively in wheat with the three early postemergence herbicides used in these tests. The choice of the herbicide or combination of herbicides and the application technique will be important factors.

Carbyne can produce excellent control of canarygrass and marginal to acceptable control of wild oat when applied at the proper time for both weeds and in the recommended volume of spray solution. Lower volumes of spray solution (i.e. less than 10 GPA) can be difficult to apply by ground. If poor application is made, decreases in control can be expected.

Hoelon can produce excellent control of wild oat and some control of canarygrass when the timing is proper for both weeds and a sufficient volume of spray solution is used. Lower volumes of spray solution (i.e. less than 10 GPA) will sometimes result in decreased control.

Assert can produce excellent control of wild oat and has negligible activity against canarygrass. Volume of spray solution and timing are also important factors in using this herbicide. Lower volume applications by ground resulted in decreased activity. The control of certain broadleaf weeds can be achieved with this herbicide when timely application is made. This should be considered an added benefit of this herbicide when the proper application timing for wild oat control coincides with the proper timing of application for these broadleaf weeds.

Herbicide combinations have been used successfully to increase the spectrum of weeds controlled. Tests previously conducted in Arizona indicate that combinations of Carbyne and Avenge and Carbyne and Hoelon can have a deleterious effect upon a wheat yield. The combinations of Carbyne and Assert utilized in these tests indicate that they can safely be used to control mixed populations of canarygrass and wild oat.

Where heavy infestations of both weeds are present, a combination of Assert and Carbyne can produce superior results to Hoelon, Carbyne or Assert used alone.

Application continues to be a serious concern in applying herbicides. Fixed wing aerial applications of Hoelon and Assert were less effective than the same rate of these herbicides applied by ground equipment in 20 GPA water or more. Lower volume ground applications were found to result in decreased control. There was little difference in control achieved using twin jet flat fan nozzles over single jet flat fan nozzle at the same volume of water.