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Reviewed Research Paper

Weed Control in Northcountry Blueberry, with Preemergence Herbicides¹

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Abstract

Several herbicides were evaluated over a 3-year period on Northcountry blueberry (*Vaccinium angustifolium* Ait. x *V. corymbosum* L.) a new low-statured hybrid. Good to excellent control of quackgrass (*Agropyron repens* (L.) Beauv) was obtained with a mixture of terbacil [3-tert-butyl-5-chloro-6-methyluracil] plus either hexazinone [3-cyclohexyl-6-(dimethylamino)-1-methyl-1,3,5-triazine-2,4 (1H,3H)-dione] or simazine [2-chloro-4,6-bis-(ethylamino)-s-triazine] and terbacil or hexazinone alone. The broadleaf weed complex was controlled effectively by tank mixtures of terbacil plus simazine or hexazinone. Terbacil and hexazinone caused injury to blueberry plants.

Introduction

New plantings of blueberries may be overgrown quickly with both annual and perennial weeds unless proper control measures are used (9). Intensive and repeated hand weeding and cultivation will eliminate weeds but the costs often are greater than for equally effective herbicides. Furthermore, the shallow rooting habit of the blueberry dictates shallow cultivation (2).

A number of herbicides have been used for preemergence control of broadleaf weeds in blueberry plantings. Terbacil, at .56 kg/ha, gave excellent control of annual weeds but caused slight to serious injury at 1.12 to 2.7 kg/ha (1, 4). The annual use of simazine and diuron [3-(3,4-dichlorophenyl) - 1,1 - dimethylurea] applied preemergence provided satisfactory weed control to highbush blueberries (13). Oryzalin [3,5-dinitro-N⁴,N⁴-dipropylsulfanilamide] at 1.12 kg/ha and napropamide [2-(naphthoxy)-N, N-diethylpropionamide] at 4.48 kg/ha gave acceptable weed control without seriously damaging blueberries (1, 11). At 2x and 3x rates, napropamide and oryzalin caused excessive injury to the blueberries (1).

Terbacil has been shown to control perennial grasses adequately, with some margin of safety to highbush blueberries (3, 10, 12). No crop injury occurred when the terbacil was applied to lowbush blueberries at rates

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of 1.8 to 3.6 kg/ha (5). However, a spring application of terbacil to lowbush blueberry selections resulted in slight foliar injury, ranging from 0-25% (7).

In both highbush and lowbush blueberry, spring applications of hexazinone were more effective against quackgrass than were fall applications (6, 8). Less injury was observed at 2 than at the 4 kg/ha rate (8). Midsummer applications caused severe foliar injury.

This report summarizes results obtained with several herbicides applied to Northcountry a new blueberry being introduced from the University of Minnesota fruit breeding program. The plant produces large, firm, attractive, dark blue fruit with good blueberry flavor and which is superior to several popular highbush cultivars. The plants grow to a height of 20-25 inches and have survived winter temperatures of -30°F , although production is maximized when snow protection is adequate.

Northcountry is suggested for use as a commercial pick-your-own or home garden cultivar for northern regions of the U.S., when productivity of normal high bush cultivars is poor due to cold winter temperatures.

Materials and Methods

Northcountry blueberry plants were planted May 4, 1979, into a Rose sandy loam soil (organic matter 3%) at the North Central Experiment Station, Grand Rapids, Minnesota. Nine rows of 12 plants each were planted 2.4 m apart with 1.2 m between plants.

Herbicides were applied as directed sprays in 1980 and repeated on the same plots in 1981 and 1982, at the rates shown in Table 2. The treatments were applied in 400 liter/ha water by use of a CO_2 powered sprayer. Each treatment area consisted of 3 bushes in a single row, 3.65 m long and 1 m wide, replicated 4 times in a randomized complete block design. Treatments were applied on May 2,

1980, April 28, 1981, and April 30, 1982. Combinations were applied as tank mixtures.

Weed control was rated visually each year. Control of grass and broadleaf weeds was rated separately 4 months after treatments using the following rating scale: 0 = no control and 100 = complete control of all weeds. Because approximately 80% of the grass weeds consisted of quackgrass in 1981 and 1982, grass control essentially means quackgrass control. Herbicide injury was determined by visually rating each plant using the following scale: 0 = no injury and 100 = plants dead, and determining plant stand.

Weed populations, by species were established each year in the weedy check plots (Table 1).

Results and Discussion

Weed Control. Good to excellent quackgrass control (72-100%) was obtained with a mixture of terbacil plus hexazinone or terbacil plus simazine, or with hexazinone alone (Table 2). Pronamide and norflurazon did not afford acceptable control of quackgrass.

Table 1. Weed population in the untreated blueberry plots.

Weed Species	Weed population (%)		
	1980	1981	1982
Barnyardgrass (<i>Echinochloa crusgalli</i> (L.) Beauv.)	5	5	5
Kentucky bluegrass (<i>Poa pratensis</i> L.)	0	3	4
Quackgrass (<i>Agropyron repens</i> (L.) Beauv.)	5	32	35
Lambsquarters (<i>Chenopodium album</i> L.)	10	6	0
Redroot pigweed (<i>Amaranthus retroflexus</i> L.)	5	3	45
Shepherds purse (<i>Capsella bursa-pastoris</i> (L.) Medic)	60	38	0
White cockle (<i>Lychnis alba</i> (Mill.)	10	9	8
Tansy (<i>Tanacetum vulgare</i> L.)	5	4	3
Total	100	100	100

Control of the broadleaf weed complex was variable and often poor (Table 2). Pronamide and norflurazon were not effective against common lambsquarters and tansy. Terbacil and hexazinone alone gave poor control of redroot pigweed and white cockle. Tank mixtures of terbacil plus simazine or hexazinone, gave good control of the broadleaf weed complex, although they gave poor control of redroot pigweed.

Blueberry Injury. In this study, both terbacil and hexazinone, alone and as a mixture caused injury to blueberry plants (Table 2). Injury consisted of leaf chlorosis and drop and stunted plants. Plants in plots treated with a mixture of terbacil plus hexazinone had a 26% reduction in stand when compared to the hand weeded check (Table 2). Symptoms, except for stunting, disappeared by the third year. Pronamide, norflurazon, and simazine did not cause injury.

The results indicate that although terbacil and hexazinone are suitable for control of annual grasses, quack-

grass and broadleaf weeds, they do cause injury to blueberries. A tank mix of the 2 herbicides is a particularly effective weed control treatment, but a low rate of hexazinone is required on light textured soils for plants established less than 3 years.

Neither terbacil nor hexazinone are completely effective for control of redroot pigweed. Pronamide, at the high rate, gave fair control of quackgrass, but did not control the broadleaf complex satisfactorily. A tank mix of simazine plus pronamide should be evaluated for broad spectrum weed control.

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Table 2. Weed control and injury to blueberries from herbicides applied over a 3-year period, at Grand Rapids, Minnesota.

Treatment	Weed control 4 months after treatment (%)							Plant injury 1980 (%)	Plants/ plot 1982
	Rate (kg/ha)	1980		1981		1982			
		Grass	Bl [†]	Qugr [‡]	Bl	Qugr	Bl		
Promanide ^w	2.24	60a [*]	22a	—	—	—	—	0a	3.0
Pronamide ^w	4.48	80ab	45b	—	—	—	—	0a	3.0
Norflurazon ^v	2.24	—	—	70ab	22a	45a	50ab	—	3.0
Norflurazon ^v	4.48	—	—	50a	48b	65ab	40a	—	3.0
Terbacil + simizine	0.56 + 4.48	78ab	78cde	72ab	70c	90ab	85de	10a	2.8
Terbacil	0.84	100b	75cd	96b	50b	75ab	72bcd	35b	3.0
Terbacil	1.12	100b	92def	92b	68c	88ab	78cde	30b	3.0
Terbacil hexazinone	0.56 + 0.56	100b	98f	100b	92d	100b	88de	71c	2.2
Hexazinone	0.56	100b	85def	82b	50b	72ab	52ab	44bc	3.0
Hexazinone	0.84	100b	95ef	95b	62c	82ab	60abc	58c	2.8
Hand weeded	—	85b	65c	82b	95d	95b	100e	0a	3.0

[†]=broadleaf weeds

[‡]Qugr=quackgrass

^{*}Means within each column followed by the same letter(s) are not significantly different at the 5% level as determined by Duncan's Multiple Range Test.

^wTreatment not applied in 1981 and 1982.

^vTreatment not applied in 1980.

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Reviewed Research Paper

The Marshall McIntosh Apple

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Abstract

The Marshall strain of McIntosh apple was evaluated in comparison with six other McIntosh strains in a replicated block of trees planted in 1979 in a commercial orchard. Based on two years of evaluation we consider Marshall to be an earlier and more intensively coloring strain which ripens slightly earlier than the other strains and appears to have good storage quality.

The Marshall McIntosh is a non-spur strain that originated as a branch mutation in a commercial orchard in Massachusetts (2). Initial observations indicated that it colored earlier than conventional McIntosh strains. Based on firmness and soluble solids measurements of fruit from a small planting of young trees, it appeared to ripen no earlier than conventional strains (2). Due to its early coloration, Marshall McIntosh is being extensively planted, and a thorough evaluation of its properties is needed.

In 1979 we established a planting of Marshall and 6 other strains, including the spur types Morspur and Mac-

spur and the semi-spur type Gatzke (Starkspur McIntosh) (1). The planting was replicated 8 times in a randomized complete block design. It is located in a commercial orchard in Wilbraham, Massachusetts, and is cared for by the grower in a conventional commercial manner.

In 1983 the trees for the first time bore sufficient fruit for some evaluations. On 3 dates (September 1, 7, and 14) fruit on trees of all 7 strains were visually evaluated for red color. In that year August and early September were very hot and red coloration was slow. Nevertheless, on September 1 and 7 two-thirds of the Marshall McIntosh had sufficiently intense red color for U.S. Extra Fancy grade, far more than any other strain (Table 1). On September 14, 84% of the Marshall were Extra Fancy while only 1 other strain approached that degree of coloration.

On September 7 and 14, 10-fruit samples were picked from these trees

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