WEED CONTROL EFFICACY AND ROOTSTOCK SAFETY TO HERBICIDES IN FRUIT AND NUT TREE NURSERY PRODUCTION

M.J.M. Abit, and B.D. Hanson

Department of Plant Sciences, University of California, Davis

Weed control is an ongoing management problem facing nursery growers of fruit and nut trees. Control strategies currently rely on methyl bromide fumigation, preemergence herbicides, hand labor, and multiple tillage operations. As methyl bromide is slowly phased out and fuel and labor cost continue to increase, herbicides are likely to become a more important weed management tool in the tree nursery industry. Several new herbicides have been registered in orchard crops for control of a broad spectrum of weeds. However, these herbicides are not currently labeled for tree nursery production. Evaluation and demonstration of weed control efficacy and rootstock safety using new herbicides is an important aspect in broadening alternative weed management options in tree nurseries.

Field trials were conducted in 2009-10 and 2010-11 at commercial nurseries with various rootstocks including Nemaguard peach (seeded), Krymsk86 plum/peach hybrid (cuttings), and M2624 plum (cuttings). The nursery blocks were fumigated with either methyl bromide or a dual application of Telone II. Several pre- (PRE) and post-emergence (POST) applications of registered and unregistered herbicides were applied as directed applications at the base of the cuttings and or as a band over the seeded rootstock with a CO_2-pressurized backpack sprayer. Crop injury and weed control were monitored throughout the 14 months growing season.

In 2009-10, low weed populations were observed due to either effective fumigation or handweeding operations in all sites. Overall grass weed control was effective in all treatments except those treated with isoxaben or oxyfluorfen while overall broadleaf weed control was generally poor with low rates of isoxaben, oxyfluorfen, and thiazopyr and both rates of pendimethalin (Table 1). Slight to no injury or tree caliper reductions were observed to all rootstock cuttings except with Krymsk86 treated with higher rates of oxyfluorfen.

In 2010-11, all treatments except oryzalin and low rates of indazaflam and penoxsulam provided good to excellent control of broadleaf weeds at both sites. Among the herbicide treatments, foramsulam at all rates caused the least injury to emerged Nemaguard peach seedlings (Table 2). Slight to no injury on M2624 plum cuttings in all treatments were observed at both sites.

The study showed that application of PRE and POST herbicides provided good to excellent weed control in fruit and nut tree rootstocks and caused no critical injury to rootstock cuttings. However, a considerable work on herbicide rates, timing, and method of application are needed before these materials can be safely applied to newly planted rootstock on a more broad scale.

Table 1. Effects of POST herbicide applications on Krymsk86 cuttings in a tree nursery trial in 2009-10.

Herbicide[a]	Rate	Crop injury[b]	Grass control[b]	Broadleaf control[b]	Trunk caliper[c]
	lbs ai/A	---------- % ----------			mm
untreated	-	0	0	0	15.3
isoxaben (Gallery T&V)	1.0	5	63	28	17.1
isoxaben (Gallery T&V)	1.3	1	82	71	15.8
dithiopyr (Dimension)	1.0	14	98	96	16.9
dithiopyr (Dimension)	2.0	6	97	97	17.4
pendimethalin (Prowl H_20)	1.0	0	88	62	16.6
pendimethalin (Prowl H_20)	2.0	0	94	84	16.0
oxyfluorfen (Goal Tender)	0.5	6	71	79	17.0
oxyfluorfen (Goal Tender)	1.0	28	97	91	18.0
thiazopyr (Visor)	0.5	0	99	84	16.7
thiazopyr (Visor)	1.0	8	99	97	16.7
pendimethalin + oxyfluorfen	2.0 + 0.5	0	97	89	16.4
pendimethalin + oxyfluorfen	2.0 + 1.0	15	99	98	18.3
rimsulfuron (Matrix)	0.016	5	99	92	15.4
LSD (0.05)		15	19	24	1.9

[a]Treatments applied: 3/5/2009
[b]Evaluated: 5/24/2009
[c]Measured: 10/30/2009

Table 2. Effects of PRE herbicide applications on Nemaguard seedlings in a tree nursery trial in 2010-11.

Herbicide[a]	Rate	Broadleaf weeds[b]	Seedling emergence[b]	Crop injury[b]
	lbs ai/A	no./plot[c]	%	%
untreated	-	13	-	-
indazaflam (Alion)	0.0325	10	74	9
indazaflam (Alion)	0.065	3	69	48
indazaflam (Alion)	0.085	2	50	43
indazaflam (Alion)	0.170	1	40	71
oryzalin (Farm Saver)	2.0	11	100	13
rimsulfuron (Matrix)	0.016	5	92	53
penoxsulam (Pindar)	0.015	9	96	49
penoxsulam (Pindar)	0.030	3	91	48
penoxsulam (Pindar)	0.060	4	70	74
oxyfluorfen (Goal Tender)	0.250	4	100	20
penoxsulam + oxyfluorfen	0.03 + 0.025	4	90	53
dithiopyr (Dimension)	2.20	3	79	55
Foramsulfuron (Option)	0.022	4	97	0
Foramsulfuron (Option)	0.044	2	97	0
Foramsulfuron (Option)	0.088	1	96	3
LSD (0.05)		4	19	24

[a]Treatments applied: 1/8/2011
[b]Evaluated: 4/8/2011
[c]Plot size: 3 x 25 ft