Herbicide Efficacy and Residue Persistence in Peppermint Grown for Tea Leaves

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Abstract

Two field trials were conducted in commercial mint fields to determine herbicide rates and timings in mint grown for tea leaves that would result in adequate weed control without resulting in detectable herbicide residues in the harvested leaves. The herbicide residue data are not reported here. Peppermint injury was minimal from the herbicide treatments at both locations and most treatments controlled the weeds present.

Introduction

Buyers of mint grown for tea leaves have lower tolerances for pesticide residues than what is accepted in mint grown for oil. Two herbicides that buyers find particularly objectionable are terbacil (Sinbar®) and paraquat (Gramoxone®). These two herbicides have traditionally been essential tools for weed management in mint. Unfortunately, terbacil and paraquat persist in the field at higher than acceptable levels for tea leaves. Several herbicides that are less persistent have recently been registered for use in mint. However, it is not entirely clear what rate, application timing, and combination of these herbicides will be sufficient for weed control without persisting in the harvested leaves. The objective of these studies was to determine herbicide rates and timings in mint grown for tea leaves that would be sufficient for weed control and not result in detectable herbicide residues in the harvested leaves.

Methods and Materials

Two field trials were conducted in commercial mint fields, one with each of the current mint leaf contractors. Herbicides were applied at two timings: fall, when the mint was entering dormancy, and spring, just before the mint broke dormancy. Plots were 10 ft by 30 ft with two replications arranged as randomized complete blocks. Treatments were applied with a CO_2 backpack sprayer delivering 20 gal/acre operating at 20 psi and 3 mph. Crop injury and weed control were determined visually on a percentage scale. Each contractor sampled the plots in his or her field and conducted residue analysis; those data were reported within the respective company and to growers contracting with that company.

Results and Discussion

The treatments differed between trials because they were chosen by the contractor for that field. The trial near Madras was conducted in cooperation with Central Oregon Seeds, Inc. and the trial near Powell Butte was conducted in cooperation with the Wilbur-Ellis Company. Peppermint injury was minimal from the herbicide treatments at both locations (Tables 1 and 2).

At Madras, all the fall treatments included paraquat and completely controlled common groundsel (*Senecio vulgaris*) and prickly lettuce (*Lactuca serriola*) (Table 1). Common dandelion (*Taraxacum officinale*) population was variable across the trial and the control ratings seem to reflect this variability. Redroot pigweed (*Amaranthus retroflexus*) is a summer-annual weed that germinated sometime in early July, but was only present in one replication of the trial. Redroot pigweed populations were too low for a percentage evaluation. At Powell Butte all the treatments except sulfentrazone (Spartan®) alone in the fall controlled 100 percent of redstem filaree (*Erodium cicutarim*) and tumble mustard (*Sisymbrium altissimum*).

Table 1. Peppermint response and weed control from herbicides near Madras, Oregon, 2006-2007.

Treatment[1]	Rate	21 Feb 2007 Common groundsel	21 Feb 2007 Prickly lettuce	26 Apr 2007 Common dandelion	24 Jul 2007 Redroot pigweed[2]	Peppermint 26 Apr 2007	Peppermint 15 Jun 2007
	lb/acre	---------- % control ----------			present	------- % injury ------	
Check	---	0	0	0	Yes	0	0
Terbacil + paraquat	1.2 + 0.375	100	100	100	Yes	3	0
Terbacil + paraquat fb sulfentrazone	1.2 + 0.375 fb 0.25	100	100	100	Yes	3	0
Terbacil + paraquat fb flumioxazin	1.2 + 0.375 fb 0.125	100	100	50	Yes	10	0
Terbacil + paraquat fb clomazone	1.2 + 0.375 fb 0.5	100	100	50	Yes	13	0
Terbacil + paraquat fb sulfentrazone + clomazone	1.2 + 0.375 fb 0.25 + 0.5	100	100	50	Yes	5	0
Terbacil + paraquat fb flumioxazin + clomazone	1.2 + 0.375 fb 0.125 + 0.5	100	100	50	Yes	13	0
Terbacil + paraquat fb flumioxazin + sulfentrazone	1.2 + 0.375 fb 0.125 + 0.25	100	100	95	No	5	0
Flumioxazin + paraquat	0.125 + 0.375	100	100	95	Yes	3	0
Flumioxazin + paraquat fb oxyfluorfen + sulfentrazone	0.125 + 0.375 fb 0.25 + 0.25	100	100	100	No	13	0
Flumioxazin + paraquat fb oxyfluorfen + clomazone	0.125 + 0.375 fb 0.25 + 0.5	100	100	50	Yes	10	0
Oxyfluorfen + paraquat fb flumioxazin	0.25 + 0.375 fb 0.125	100	100	50	Yes	3	0
Oxyfluorfen + paraquat fb flumioxazin + sulfentrazone	0.25 + 0.375 fb 0.125 + 0.25	100	100	50	Yes	8	0
Oxyfluorfen + paraquat fb flumioxazin + clomazone	0.25 + 0.375 fb 0.125 + 0.5	100	100	75	Yes	10	0
Oxyfluorfen + paraquat fb flumioxazin + bromoxynil	0.25 + 0.375 fb 0.125 + 0.25	100	100	50	Yes	8	0

[1]Fall applications followed by (fb) spring applications. Fall applications on 28 Nov 2006 included non-ionic surfactant at 0.25% v/v; common groundsel was 3 inches tall, prickly lettuce was 3 inches in diameter, and common dandelion was dormant. Spring applications on 21 Feb 2007.
[2]Redroot pigweed was present in one of the replications, but not enough to evaluate on a percentage scale.

Table 2. Peppermint response and weed control from herbicides near Powell Butte, Oregon, 2006-2007.

Treatment[1]	Rate	30 Apr 2007		Peppermint injury		
		Redstem filaree	Tumble mustard	5 Apr 2007	30 Apr 2007	21 Jun 2007
	lb/acre	---------- % control ----------		---------- % injury ----------		
Check	---	0	0	0	0	0
Terbacil	0.8	100	100	0	0	0
Terbacil + sulfentrazone	0.8 + 0.25	100	100	0	0	0
Terbacil + clomazone	0.8 + 0.5	100	100	0	8	0
Terbacil + flumioxazin	0.8 + 0.125	100	100	0	0	0
Terbacil + sulfentrazone + clomazone	0.8 + 0.25 + 0.5	100	100	0	0	0
Bromoxynil + sulfentrazone + clomazone	0.25 + 0.25 + 0.5	100	100	0	0	0
Sulfentrazone	0.25	50	45	0	0	0
Terbacil + pendimethalin	0.8 + 0.95	100	100	0	0	0
Terbacil fb sulfentrazone	0.8 fb 0.25	100	100	0	8	0
Terbacil fb clomazone	0.8 fb 0.5	100	100	5	10	0
Terbacil fb flumioxazin	0.8 fb 0.125	100	100	0	3	0
Terbacil fb sulfentrazone + clomazone	0.8 fb 0.25 + 0.5	100	100	5	10	0
Terbacil fb sulfentrazone + clomazone	0.8 fb 0.188 + 0.5	100	100	0	5	0

[1] Fall applications followed by (fb) spring applications. Fall applications on 4 Dec 2006 included non-ionic surfactant at 0.25% v/v. Spring applications on 21 Feb 2007.