Response of Burley Tobacco to Sucker Control Chemicals

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Sucker control in Kentucky has not changed much in the last 40 years. Since the introduction of Maleic Hydrazide (MH), most tobacco producers have treated burley tobacco with a fine mist of spray material containing some formulation of MH. In the late 1970's, manufacturers changed the formulation to a potassium salt of MH. At about the same time new hybrid varieties were released contining the breeding line L8. These hybrids initiated sucker development earlier increasing the difficulty of controlling suckers. The change in formulation coupled with the wide spread use of L8 hybrids lowered the confidence that farmers had in MH, and contributed to the over application of MH.

Since its introduction, MH has had many critics due to the chemical residue left on the cured leaf. Although the Environmental Protection Agency evaluated the potential risk associated with MH residue and found it to be of little concern, many foreign customers still regard MH residue as a negative aspect of US grown tobacco.

MH residue in Kentucky's burley crop usually falls within the range of 40 to 60 ppm. However, years with unusual weather patterns may result in over application of MH by producers in an attempt to improve sucker control. Residue from the 1995 crop was twice the normal range. Drought stressed tobacco will have a thicker cuticle that inhibits MH absorption. Spray materials applied during hot, dry conditions dry rapidly reducing uptake. This leads to sucker control failure and reapplication.

Burley tobacco producers have been reluctant to use other labeled chemicals that may require multiple applications or more labor intensive application techniques. Other chemicals include the fatty alcohols and local systemics such as Prime+ or Butralin.

The objective of this research was to evaluate the effects of combinations of treatments including MH and Prime+ or Butralin on sucker control and yield of burley tobacco and to compare application methods for MH.

Methods

Studies were conducted during 1995 in eight locations across the State of Kentucky. Locations included Bath Co., Fleming Co., Jackson Co., Knox Co., Laurel Co., Lawrence Co., Nelson Co., and Pendleton Co. All locations included MH at 2 gal/ac (1.5 lb ai/gal formulation) applied as a fine spray and a coarse spray. The MH applied as a fine spray used 40 gal of spray solution per acre with 12x spray nozzles or a backpack sprayer with an adjustable nozzle. This treatment is used by most burley tobacco producers and was considered to be the check in these tests. All other treatments were applied as a coarse spray in 50 gal of spray solution per acre with the exception of Prime+ applied as a run down treatment in the Fleming, Lawrence, and Nelson locations that also include MH at 1.5 gal/ac + Prime+ at .5 gal/ac and MH at 1 gal/ac + Prime+ at .5 gal/ac. The Bath, Knox, Jackson and Pendleton locations included MH at 1.5 gal/ac + Prime+ at .5 gal/ac, MH at 1 gal/ac + Prime+ at .5 gal/ac, MH at 1.5 gal/ac + Butralin at .5 gal/ac, and MH at 1 gal/ac + Butralin at .5 gal/ac. Treatments were evaluated for sucker control and yield.

Results

In all locations a coarse spray of MH produced equal or better sucker control than a fine spray (Table 1). Yields were measurably higher at all locations where a coarse spray was used. When averaged across eight locations a coarse spray resulted in a statistically significant yield increase. Combinations of MH and either Prime+ or Butralin produced good sucker control and yield equal to or better than the standard fine spray of MH in Bath, Knox, Jackson and Pendleton County (Table 2). Rates of MH from 1 gal to 1.5 gal combined with either local systemic (Prime+ or Butralin) produce good to excellent sucker control and yield. Similar results were obtained in Fleming, Lawrence and Nelson Counties were Prime+ was the only local systemic used (Table 3). In these locations a run down treatment of Prime+ at 1 gal/ac produced excellent results.

Summary

Combinations of MH and either Prime+ or Butralin offer burley tobacco producers excellent sucker control that was as good or better than that obtained with conventional fine sprays of MH alone. Reduced rates of MH from 1 to 1.5 gal/ac should help reduce MH residue on cured tobacco leaves. There is further evidence that a coarse spray containing MH may tend to run away from the leaf surface to sucker buds. Artificial bronzing associated with MH use was visually reduced where a coarse spray was used. This may further reduce MH residue. Effects of application technique on MH residue need further evaluation.

Local systemics such as Prime+ and Butralin offer better rain fastness than MH alone and may extend sucker control for a longer period of time. This can be a significant advantage where harvest has to be delayed.

Prime+ or Butralin alone can produce excellent sucker control and yield. However, application techniques required for good control with these products alone are not economical and sucker skips are common. However, when combined with reduced rates of MH, the combinations offer the advantages of both chemicals.

For burley tobacco producers that wish to continue to use MH alone, a switch to coarse spray nozzles should improve sucker control. Better sucker control will help reduce the practice of over application or double application of MH.

MH residue levels below the normal range of 40 to 60 ppm is a realistic goal that should improve the marketability of US grown burley tobacco.

Table 1. Effects of MH Application Method on Yield and Sucker Control of Burley Tobacco.

Location	Spray Type	Flyings	Lugs	Leaf	Total	Sucker Control
		----------lb/ac----------				No./20 Plants
Bath	Fine	549	1091	758	2398	-
	Coarse	642	1186	789	2617	-
Fleming	Fine	685	1783	636	3105	17.2
	Coarse	701	2074	699	3474	14.0
Jackon	Fine	453	766	494	1713	41.5
	Coarse	535	957	506	1998	26.0
Knox	Fine	210	1136	1006	2352	53.0
	Coarse	323	1148	1027	2498	7.8
Laurel	Fine	420	1177	477	2074	-
	Coarse	585	1404	502	2491	-
Lawrence	Fine	598	1310	789	2697	7.2
	Coarse	654	1423	872	2949	2.2
Nelson	Fine	407	1254	533	2194	-
	Coarse	540	1313	544	2397	-
Pendleton	Fine	874	1491	546	2911	2.0
	Coarse	794	1555	665	3014	5.2
Average*	Fine	501	1177	677	2355	20.0
	Coarse	541	1255	727	2524	8.4
**LSD 0.05*		*44*	*115*	*45*	*160*	*13.7*

Table 2. Comparison of the Effects of Prime+ or Butralin in Combination with MH on Yield and Sucker Control in Burley Tobacco.

Treatment(Rate)	Spray Type	Bath		Knox		Jackson		Pendleton		Average
		lb/ac	rating*	lb/ac	No.**	lb/ac	No.**	lb/ac	No.**	lb/ac
MH(2 gal/ac)	Fine	2398	4.00	2352	53.00	1713	41.5	2911	2.00	2380
MH(2 gal/ac)	Coarse	2617	3.50	2498	7.75	1998	26.0	3014	5.25	2507
MH(1.5 gal/ac) + Prime+(.5 gal/ac)	Coarse	2553	1.75	2462	2.00	2311	2.0	2879	3.50	2557
MH(1 gal/ac) + Prime+(.5 gal/ac)	Coarse	2503	1.25	2493	2.00	1974	2.0	2755	2.75	2411
MH(1.5 gal/ac) + Butralin(.5 gal/ac)	Coarse	2691	3.25	2402	2.25	2061	3.0	3307	7.75	2578
MH(1 gal/ac) + Butralin(.5 gal/ac)	Coarse	2611	2.25	2504	0.75	1964	22.0	3072	7.25	2546
LSD 0.05		267	1.04	372	37.85	703	20.0	177	7.24	193

** Rating : 1 = heavy pressure to 4 = No Suckers.*
*** Sucker No./20 Plants*

Table 3. Comparison of the Effects of Prime+ in Combination with MH on Yield and Sucker Control in Burley Tobacco.

Treatment(Rate)	Spray Type	Fleming		Lawrence		Nelson		Average
		lb/ac	suckers*	lb/ac	suckers*	lb/ac	suckers**	lb/ac
MH(2 gal/ac)	Fine	3105	17.25	2697	7.25	2194	2.75	2666
MH(2 gal/ac)	Coarse	3474	14.00	2949	2.25	2397	1.00	2940
MH(1.5 gal/ac) + Prime+(.5 gal/ac)	Coarse	3067	11.00	2835	2.50	2691	1.25	2871
MH(1 gal/ac) + Prime+(.5 gal/ac)	Coarse	3274	18.25	3305	1.00	2334	1.25	2971
Prime+(1 gal/ac)	Run Down	3324	9.00	3171	0.75	2625	1.00	3040
LSD 0.05		683	14.64	332	2.98	709	1.41	331

** Suckers/20 Plants*
*** Rating : 1 = No Suckers to 4 = heavy pressure.*