

## **EARLY TOPPING**

Top tobacco as early as practical. Research has shown a 25 pound per acre decrease in yield for each day that topping is delayed. On-farm tests were conducted at several county locations to measure the effects of topping when fifty percent of the plants had reached the button stage, 1 week later, 2 weeks later, and 3 weeks later. The results are shown in the following table.

**ON-FARM TOPPING TEST 1985-88**

<b>TOPPING TIME</b>	<b>lb/A</b>	<b>\$/A</b>	<b>\$/lb</b>	<b>Q.I.</b>
50% button	2,430	4,149	1.71	51
1 week later	2,415	4,093	1.69	49
2 weeks later	2,288	3,839	1.68	49
3 weeks later	2,176	3,630	1.67	48

Highest yield and value per acre resulted when tobacco was topped early. Topping early produces larger upper leaves, less wind damage, decreased budworm pressure and better drought tolerance. Timely topping may also reduce chances for late season infection by Tomato Spotted Wilt Virus.

Proper use of contact sucker control agents allows early topping of tobacco. County agent surveys indicate that many producers could improve their yields and quality, as only 70% of the producers are topping at early flower or sooner.

## **SUCKER CONTROL**

In modern flue-cured tobacco production, it is often necessary to control suckers 10-12 weeks, which is longer control than expected with MH (maleic hydrazide). Prime<sup>+</sup> or Flupro, when combined with the proper use of contacts and MH, offer good season-long control of tobacco suckers.

Sucker control is necessary for high yields, good quality, reduced hand labor, and efficient use of harvesting equipment. With the chemicals and equipment available today, it is difficult to obtain 100 percent sucker control; however, good management techniques will result in reduced production costs through reduced hand suckering labor. It is important to keep the MH residue as low as possible to protect our markets. Growers are using new sucker control programs that offer excellent late-season sucker control while keeping MH residues to a minimum. A good sucker control program must utilize CONTACTS, LOCAL SYSTEMICS, and MH, for best results. Consider the following points in a sucker control program:

1. Strive to produce a uniform crop of tobacco. Uniformity improves sucker control efficiency. Be sure equipment is adjusted to match row widths. Avoid premature flowering. Greenhouse grown plants offer a very uniform crop of tobacco.
2. Avoid excessive rates of nitrogen! Nitrogen rates beyond the optimum 60-80 lb/A will increase sucker pressure as well as reduce the quality of the cured leaf.

3. Proper use of contacts helps reduce pressure on systemic materials. Contacts delay application date for systemics, thus allowing adequate levels of MH later into the season to help suppress late-developing suckers. Contacts must contact the small suckers as the material runs down the stalk. A good job with contacts is a must for good sucker control.
4. Start early with contact-type materials! Tests have shown that the first contact application should be applied when approximately 50 percent of the plants have reached the button stage. If application is delayed beyond this time, many suckers will be too large to control with contacts, and additional hand labor will be required. Tobacco should be topped as soon as practical after first application of contact.

**CAUTION:** Contacts (fatty alcohols) should have continuous agitation when mixed with water. If the solution is not agitated for a length of time, it should not be used since damage to tobacco may occur. Avoid using cold water.

5. Use the right concentration of contact! Mix 2 gal (4% solution) of contact (C8 - C10 fatty alcohol) with 48 gal water or mix 1.5 gal (3% solution) of contact (C10 fatty alcohol) with 48.5 gal for the first application. Increase the concentration to 2.5 gal (C8 - C10 fatty alcohol) with 47.5 gal water (5% solution) or use 1.5 gal of contact (C-10 fatty alcohol) in 48.5 gal water (3% solution) for the second application about 3-5 days after the first application. Many growers use concentrations that are too weak. If 5-10% of late plants in the field are not chemically topped, the concentration of solution is probably too weak for best sucker control. C-10 fatty alcohol (Antak, Royaltac, Fairtac) are hotter materials than C8-C10 fatty alcohols and, therefore, are used at lower concentrations.
6. Use enough spray solution with contacts, local systemics, combinations! Use the 3-nozzle arrangement with a TG-3 on either side and a TG-5 in the center and set pressure at 20 psi. Slow the travel speed so that 50-60 gal/A are used. Recent studies have shown that longer nozzles can effectively be used at faster speeds.

**1999-2001 SUCKER CONTROL TEST  
NOZZLE SIZE VS. SPEED OF APPLICATION  
(Average of 6 locations - 3 reps each)**

MATERIAL	NOZZLE SIZE	SPEED	NO. SUCKERS/A	SUCKERS/A (lb)
CONTACT/CONTACT/RMH	3-5-3	2.8 mph	10,628	1,087
CONTACT/CONTACT /RMH+P <sup>+</sup>	3-5-3	2.8 mph	2,975	402
CONTACT/CONTACT /RMH	6-8-6	4.6 mph	10,178	1,343
CONTACT/CONTACT /RMH+P <sup>+</sup>	6-8-6	4.6 mph	2,410	206

CONTACT = 2.0 gal/A / 2.5 gal/A  
 RMH = 1.5 gal/A (Royal MH)  
 P = 2.0 qts/A (Prime<sup>+</sup>)  
 SPRAY SOLUTION = 50 gal/A

7. Apply MH according to label instructions. Make only one application of MH per season unless significant rainfall occurs within four hours of first application, thus requiring reapplication. If rainfall occurs 4-10 hours after application, then reapply only 1/2 the recommended rate. After 10 hours, no reapplication is needed. Apply MH to the upper third of the plant using three nozzles.
  
8. Use enough water with MH materials! Some growers may not be getting the best control with MH materials because they may be using too little water. Research has shown that 50 gallons is better than 25 gallons.
  
9. Consider Using Prime<sup>+</sup> or Flupro in addition to MH. Growers concerned about maleic hydrazide residue and poor late-season control may choose to use Prime<sup>+</sup> or Flupro in addition to the recommended rate of MH. Approximately 65% of growers chose this option in 2005. Prime<sup>+</sup> or Flupro, combined with MH, gives excellent sucker control and, at the same time, keeps MH residues to a minimum. Consider using Prime<sup>+</sup> or Flupro in one of the following ways:
  - a. Use 2 qt/A Prime<sup>+</sup> or Flupro as a second or third contact, followed 1 week later with the recommended MH application.
  - b. Or, mix 2 qt/A of Prime<sup>+</sup> or Flupro with the recommended rate of MH and apply as a coarse spray at the regular MH application time.
  - c. Or, use 2 qt/A of Prime<sup>+</sup> or Flupro 3-4 weeks after the regular MH application as suckers begin to develop.
  - d. The application of Prime<sup>+</sup> or Flupro can be split into 2 applications of 1 qt each. Choose between using 1 qt of Prime<sup>+</sup> or Flupro at 2 of the following times: with the last contact, with MH or in 1-2 weeks after MH.

Prime<sup>+</sup> or Flupro is a local systemic material and must contact the sucker in the leaf axil as the material runs down the stalk. Data from tests indicate that a combination of Prime<sup>+</sup> or Flupro and MH gives better sucker control than applying additional MH which is illegal. Prime<sup>+</sup> and Flupro are dinitroanilines and may cause stunting to corn, small grain and tobacco grown in rotation. Most complaints have occurred following hand application. Break soil deep with turn plow after crop is harvested to prevent damage to next crop. The 2 quart rate of Prime<sup>+</sup> or Flupro should not result in soil residue problems.

**1991-2004 ON-FARM SUCKER CONTROL TEST-S.C.**  
**Average of 31 Tests - 3 reps**

TREATMENT	RATE (gal/A)	SUCKERS AT HARVEST* (number/A)	MH RESIDUES*** ppm	WEIGHT OF SUCKERS (lb/A)
C/C/MH	2/2.5/1.5	7857	77	1804
C/C/MH+P <sup>+</sup>	2/2.5/1.5+.5	1466	77	418
C/P <sup>+</sup> /MH	2/.5/1.5 ****	2243	88	655
C/C/MH/P <sup>+</sup>	2/2.5/1.5/.5 **	1096	74	236

\* Time final harvest conducted after MH application varied 5-9 weeks.

\*\* Prime<sup>+</sup> applied 3-4 weeks after MH application.

\*\*\* 1991-92 average only

\*\*\*\* 1991-1997 only.

**2002-2003 COMPARISON OF PRIME<sup>+</sup> AND FLUPRO  
 SUCKER CONTROL MATERIALS (5 LOCATIONS)**

TREATMENT*	# SUCKERS/A	SUCKER WEIGHT (LB/A)
<b>Flupro</b>	4670	2387
<b>RMH + Flupro</b>	2580	624
<b>Prime<sup>+</sup></b>	4100	2791
<b>RMH + Prime<sup>+</sup></b>	1680	492
<b>RMH</b>	8420	2764

**\*All treatments received 2 contacts. Flupro and Prime<sup>+</sup> applied at 2 qts/A. RMH at 1.5 gal/A.**

10. Hold MH Residues to a Minimum.

- Avoid excess nitrogen rates.
- Use labeled rates of MH.
- Do not apply MH more than one time.
- Allow seven days or more between MH application and harvest. (**Harvesting too soon after MH application is a major reason for high MH residues!**) If harvest and application are needed at the same time, harvest first!
- Do not apply MH when tobacco is drought stressed.
- Use Prime<sup>+</sup> or Flupro along with recommended rate of MH.
- Consider using a non-flowering variety.
- Higher MH residues are likely to occur in a dry year.

11. Consider using a non-flowering variety to improve sucker control. Non-flowering tobacco does not premature flower, and when topped as soon as 20 harvestable leaves are present, has small, immature suckers easily controlled by sucker agents.

## MEAN MALEIC HYDRAZIDE (MH) RESIDUES (PPM) FOR FLUE-CURED TOBACCO BY BELT AND YEAR

TYPE	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
14 (GA/FL)	200	118	139	128	119	120	130	194	95	139	125	130	210	173
13 (SC)	183	143	131	124	94	96	140	164	91	100	76	135	127	125
13 (NC)	210	137	148	128	120	90	140	194	98	66	72	115	103	117
12 (NC)	138	135	141	117	114	89	153	140	95	80	109	100	130	81
11 (NC)	103	124	104	112	114	75	93	118	42	64	74	70	76	37
11 (VA)	76	38	48	34	39	41	41	42	29	39	39	39	19	33
<b>AVG.</b>	<b>140</b>	<b>115</b>	<b>117</b>	<b>103</b>	<b>101</b>	<b>85</b>	<b>120</b>	<b>133</b>	<b>79</b>	<b>80</b>	<b>86</b>	<b>100</b>	<b>118</b>	<b>89</b>

### SUCKER CONTROL CHEMICALS GUIDE\*

CONTACTS				
Product Name	Active Ingredient	Use Rate	REI	PHI
Off-Shoot T EC Sucker Plucker EC Fair 85 EC Royaltac M EC	1 octanol and 1 decanol mixture 6.01 to 6.04 lb/gal	2.0 gal/A	24 hours	7 days
<b>Remarks:</b> Mix with 48 gal water and apply 50 to 60 gal mixture/A. Use two TG-3 nozzles and a TG-5 nozzle in center or equivalent at 20-25 psi pressure. Apply at early button stage before suckers are 1-2 inches long. Second application may be made 3-5 days later. Use 2.5 gal in 47.5 gal of water. Tobacco should be topped as soon as is practical after first application. Mixing of other pesticides and surfactants with fatty alcohols is prohibited.				
Antak EC Royaltac EC Fairtac EC	N-decanol 5.7 to 5.72 lb/gal	1.5 gal/A	24 hours	7 days
<b>Remarks:</b> Mix with 48.5 gal water and apply 50 to 60 gal of solution/A. Use two TG-3 nozzles and a TG-5 nozzle in center or equivalent at 20-25 psi pressure. Apply at early button stage before suckers are 1-2 inches long. Second application may be made 3-5 days later using same concentration of solution. Top tobacco as soon after first application as is practical. Mixing of other pesticides and surfactants with fatty alcohols is prohibited.				
SYSTEMICS				
Product Name	Active Ingredient	Use Rate	REI	PHI
Royal MH-30 EC Super Sucker Stuff EC Fair Plus EC	maleic hydrazide (21.7% potassium salt) 1.5 lb/gal	1.5 gal/A	12 hours	7 days
<b>Remarks:</b> Apply with 40 to 50 gal of water/A using 40 psi pressure and TX-18 nozzles or equivalent. (Royal MH-30 is labeled for coarse or fine spray. Coarse application would be as fatty alcohols are applied.) Apply after tobacco has reached the full flower stage or 7-10 days after application of the last contact material. Application of systemics during periods of drought or when plants are wilted may result in poor sucker control. Applications made in the morning are best after dew has dried. Make only 1 application unless rainfall occurs within 6 hours of application. Wait at least 7 days before harvest.				
Sucker Stuff EC Fair 30 EC Royal MH-30 XTRA	maleic hydrazide (30.2% potassium salt) 2.25 lb/gal	1.0 gal/A	12 hours	7 days
<b>Remarks:</b> Apply with 40 to 50 gal of water/A using 40 psi pressure and TX-18 nozzles or equivalent. (Royal MH-30 XTRA is labeled for coarse or fine spray. Coarse application would be as fatty alcohols are applied.) Apply after tobacco has reached the full flowering stage or 7-10 days after application of the last contact material. Application of systemics during periods of drought or when plants are wilted may result in poor sucker control. Applications made in the morning are best after dew has dried. Make only 1 application unless rainfall occurs within 6 hours of application. Wait at least 7 days after application before harvest.				

<b>SYSTEMICS</b> (continued)				
<b>Product Name</b>	<b>Active Ingredient</b>	<b>Use Rate</b>	<b>REI</b>	<b>PHI</b>
<b>Sucker Stuff 80 WS</b> <b>Royal MH-30 SG WS</b> <b>Fair 80 SP WS</b>	Maleic hydrazide (79.6% potassium salt) 60%	3.75 lb/A	12 hours	7 days
Remarks: Apply with 40 to 50 gal of water/A using 40 psi pressure and TX-18 nozzles or equivalent. (Royal MH-30 SG is labeled for coarse or fine spray. Coarse spray would be as fatty alcohols are applied.) Apply after tobacco has reached full flowering stage or 7-10 days after application of the last contact material. Application of systemics during periods of drought or when plants are wilted may result in poor sucker control. Applications made in the morning are best after dew has dried. Make only 1 application unless rainfall occurs within 6 hours of application. Wait at least 7 days after application before harvest.				
<b>LOCAL SYSTEMICS</b>				
<b>Product Name</b>	<b>Active Ingredient</b>	<b>Use Rate</b>	<b>REI</b>	<b>PHI</b>
<b>Prime<sup>+</sup> EC</b> <b>Flupro EC</b>	flumetralin 1.2 lb/gal	1.0 gal/A	24 hours	7 days
<b>Remarks:</b> Machine application: Mix with 49 gal water and apply 50 gal mixture/A. Use two TG-3 nozzles and a TG-5 nozzle in center at 20-25 psi pressure. Hand application: Using the previously mentioned solution apply 1/3 to 2/3 oz/plant using a hand-held drop line. Apply 5 days after application of contact material or at elongated button stage to early flower. Suckers missed will continue to grow and should be removed by hand. Some phytotoxicity may occur on small upper leaves. Stunting of small grain, corn, and tobacco may occur the next season. Avoid over-application. Wait at least 7 days after application before harvest.				
<b>SEQUENTIAL</b> (local systemic + systemic)				
<b>Product Name</b>	<b>Active Ingredient</b>	<b>Use Rate</b>	<b>REI</b>	<b>PHI</b>
<b>Prime<sup>+</sup> and maleic hydrazide EC</b> <b>Flupro EC and maleic hydrazide</b>	flumetralin (1.2 lb/gal) + maleic hydrazide (various formulations)	2.0 qt + MH (recommended rate)	24 hours	7 days
<b>Remarks:</b> Mix Prime <sup>+</sup> or Flupro EC with adequate water to make 50 gal of solution. Apply 50 gal of mixture/A. Use two TG-3 nozzles with TG-5 nozzle in center at 20-25 psi pressure. Apply Prime <sup>+</sup> or Flupro EC 5 days after first contact or at elongated button to early flower stage. Apply maleic hydrazide one week later according to manufacturer's directions. The use of Prime <sup>+</sup> may result in some phototoxicity to small upper leaves. Also, avoid over-application as stunting of rotational crops may occur in the following season. Wait at least 7 days after application before harvest.				
<b>SEQUENTIAL</b> (late application contact)				
<b>Product Name</b>	<b>Active Ingredient</b>	<b>Use Rate</b>	<b>REI</b>	<b>PHI</b>
<b>Fair 85 EC</b> <b>Off-Shoot T EC</b> <b>Sucker Plucker EC</b>	1 octanol and 1 decanol mixture 6.01 lb/gal	2.5 gal/A	24 hours	7 days
<b>Remarks:</b> Mix 2.5 gal contact with 47.5 gal water and apply as for contacts. Make application 3 to 4 weeks after MH application if suckers are beginning to grow.				
<b>SEQUENTIAL</b> (late application of local systemic)				
<b>Product Name</b>	<b>Active Ingredient</b>	<b>Use Rate</b>	<b>REI</b>	<b>PHI</b>
<b>Prime<sup>+</sup> EC</b> <b>Flupro EC</b>	flumetralin 1.2 lb/gal	2.0 qt/A	24 hours	7 days
<b>Remarks:</b> Mix with adequate water to make 50 gal of solution. Then, apply 50 gal solution per acre. Use 2 TG-3 nozzles and one TG-5 nozzle in center at 20-25 psi pressure. Apply Prime <sup>+</sup> 3-4 weeks after MH application if suckers are beginning to grow. Wait at least 7 days after application before harvest.				

<b>COMBINATION</b> (contact + systemic type fatty alcohol)				
<b>Product Name</b>	<b>Active Ingredient</b>	<b>Use Rate</b>	<b>REI</b>	<b>PHI</b>
<b>FST-7 EC</b> <b>Leven 38 EC</b>	n-decanol (38.3%) 3.12 lb/gal + maleic hydrazide (11.1% potassium salt) 0.66 lb/gal	3.0 gal/A	24 hours	7 days
<b>Remarks:</b> Mix with 47 gal water/A and apply at 20 psi pressure using two TG-3 nozzles and a TG-5 nozzle in center. For best results, apply a contact-type chemical at the button stage and apply FST-7 or Leven 38 7-10 days later. Leaf injury may occur if rate is exceeded. Wait at least 7 days after application before harvest.				
<b>TANK MIX COMBINATION</b>				
<b>Product Name</b>	<b>Active Ingredient</b>	<b>Use Rate</b>	<b>REI</b>	<b>PHI</b>
<b>Prime<sup>+</sup> and maleic hydrazide</b> <b>Flupro and maleic hydrazide</b>	flumetralin (1.2 lb/gal) + maleic hydrazide (various formulations)	2.0 qt/A + maleic hydrazide (recommended rate)	24 hours	7 days
<b>Remarks:</b> Mix 2 qt of Prime <sup>+</sup> or Flupro with recommended rate of maleic hydrazide (follow manufacturer's recommendation) in sufficient water to make 50 gal of solution. Apply 50 gal of mixture/A. Apply as a coarse spray using 2 TG-3 nozzles and 1 TG-5 nozzle in center. Apply after tobacco has reached full flower stage or 7-10 days after last contact. The use of Prime <sup>+</sup> or Flupro may result in some phytotoxicity to small upper leaves. Avoid over application as stunting to rotational crops may occur the following season. Wait at least 7 days after application before harvest.				

\*All sucker control agents listed here are intended for commercial use only.