

TOBACCO INSECT MANAGEMENT PROGRAM

A tobacco insect management program consists of the periodic monitoring (scouting) of insect populations in fields so that control decisions can be made, based on the kinds and numbers of insects found. All fields should be checked at least once a week from the time tobacco is transplanted until final harvest.

SCOUTING THE FIELD

Insects are not usually distributed uniformly in a field. All parts of the field must be covered each time a field is scouted. The pattern followed as the field is walked is not as important as being sure all parts of the field are covered. A "zig zag" pattern or "X" pattern is most satisfactory in fields where the tobacco plants are small to medium sized. Walking across the rows in fields where the tobacco plants are large is impractical because of the danger of breaking off leaves. A "U" pattern is more practical in such fields.

TAKING SAMPLES

A good sampling method is to carefully inspect 10 consecutive plants at 10 different locations (sample points) in each field. In fields larger than 10 acres, increase the number of sample points proportionately to the acreage in the field. Inspecting more plants will give a more accurate estimate of the insect populations in the field. Samples should not be taken from the outside rows and end plants because these areas are usually more susceptible to insect damage. Insect populations sampled from these areas will appear to be higher than they actually are. Make a practice of entering the field from a different point and direction each time the field is sampled.

INSPECTING PLANTS

Aphids, flea beetles, hornworms and budworms are the major foliage feeding insect pests of tobacco in Georgia. Plants should be examined by checking the buds and upper third of the plant for flea beetles, hornworms and budworms. The undersides of the leaves on the upper to middle part of the plant should be examined for hornworm eggs and aphids. The lower leaves should be examined for honeydew secreted by aphids. When other insects are found, note their numbers and damage.

If an unidentified insect is observed and appears to be causing serious damage to the crop, the insect and samples of its damage should be collected and taken to the County Extension office for assistance in identification and possible control. This is important because beneficial insects are often misidentified as pests. Tobacco fields should be treated when one or more insect pests meet or exceed the treatment thresholds listed below.

Table 3. Treatment Thresholds for Various Insects on Tobacco Based on 100 Plants Sampled.

INSECT	TREATMENT THRESHOLD
Aphids (Plant Lice)	Treat when 10% of the plants have 50 or more aphids on at least one leaf.
Budworms	Treat when 10% of the plants are infested with larvae.
Cutworms	Treat when 5% of the plants are injured or cut off.
Flea Beetles	Treat young plants when 10% of the buds show damage. Treat large plants when leaves begin to look ragged or lacy.
Hornworms	Treat when 10% of the plants are infested with larvae. Do not include worms with parasitic wasp cocoons on their backs in the counts.

MAJOR FOLIAGE FEEDING INSECTS OF TOBACCO

TOBACCO BUDWORMS Tobacco budworms damage tobacco by feeding in the buds, causing ragged or distorted leaves and at times complete destruction of the buds. When the bud is destroyed, early sucker growth occurs. This may cause plant stunting and greater difficulty in controlling suckers. Budworms are particularly hard to kill when they feed inside the bud. To be effective, an insecticide must be concentrated in the buds. The best time to spray an insecticide is early in the morning or during cloudy weather when the buds are open and the larvae are more likely to feed on the leaves. Budworms will also feed and tunnel into stalks and the midribs of leaves. After tobacco is topped, budworms rarely cause economic damage. Tobacco should be treated when 10 percent of the plants are infested with budworms. See Table 4 for recommended insecticides.

HORNWORMS

Both tobacco and tomato hornworms feed on tobacco. The tobacco hornworm is more common in Georgia and is potentially the most destructive insect pest because of its ravenous appetite. Because of its large size and the length of the larval stage, they are capable of completely destroying entire leaves, leaving only the midrib on mature plants. A field should be treated when 10 percent of the plants are infested with hornworms. Until recently, hornworms were easily controlled with low rates of standard insecticides, such as acephate, endosulfan, and methomyl. Now it takes the highest labeled rate of these insecticides or the use of carbaryl, spinosad or one of the *Bacillus thuringiensis* insecticide to give adequate control. See Table 4.

APHIDS

The tobacco aphid has in recent years become one of the most important pests of tobacco in Georgia. Aphids damage tobacco by sucking plant juices from the undersides of young tobacco leaves. As more and more aphids congregate or are born on the leaves, their waste, called honeydew, drops onto lower leaves. Leaves will become very shiny and sticky. This honeydew, which has a high sugar content, promotes the growth of a fungus called sooty mold. Sooty mold lowers leaf quality because the moldy tobacco will not mature and cure properly. Aphids should be treated when 10 percent of the plants have 50 or more aphids on at least one leaf. There is also evidence that tobacco aphids have become resistant to some of the insecticides growers have used in the past. Good coverage with a recommended insecticide is suggested (Table 4).

FLEA BEETLES

Adult flea beetles damage tobacco by chewing small round holes into or through the leaves, especially from the underside. The larvae feed on the roots of tobacco, leaving entry points for soilborne diseases. After transplanting, they may weaken plants or kill the bud with their feeding. Although damage is more severe on young transplants, it may continue until the crop is harvested. Mature leaves spotted with holes may lessen the quantity of the leaf. Young plants should be treated when 10 percent of the buds show damage. Large plants should be treated when the leaves begin to look ragged or lacy. While both transplant water treatments and foliar sprays give good control of flea beetles on young plants, only foliar sprays are recommended for larger, older plants (Table 4).

TOBACCO SPLITWORM

The tobacco splitworm, also called the potato tuberworm, can cause severe damage to both recently transplanted tobacco and late season tobacco (after it has been topped). The tobacco splitworm feeds and tunnels between the upper and lower surfaces of leaves causing papery, grayish blotches which become brownish and very brittle. On recently transplanted tobacco, they may even tunnel into the bud of the plant. Late in the season injury is usually concentrated on the older, lower leaves. If not controlled, they will progressively move from the lower leaves to the upper leaves of the tobacco plant. No insecticides are labeled specifically for tobacco splitworms. However, methomyl, labeled at the highest rate, has given the best control. Late season control depends upon good coverage of the lower leaves. Use drop nozzles and use enough spray solution to soak the leaves. Using acephate (Orthene 75 S or 97) in the transplant water usually suppresses early season infestations.

Table 4. Control of Foliar Insects on Field Tobacco

INSECT	CHEMICAL AND FORMULATION¹	PRODUCT RATE/ACRE	LBS A.I.	REMARKS AND PRECAUTIONS
Aphids	acephate (Orthene 75S)	0.67 - 1.0 lb	0.5 - 0.75	Good coverage is essential for control. The use of drop nozzles will improve control by depositing insecticides on the underside of the leaves where aphids feed. To limit residues, use endosulfan only prior to topping. Apply as broadcast or directed spray to foliage. Apply before pests reach damaging levels. Apply higher rates for heavy infestations.
	(Acephate 75 SP)	0.67 - 1.0 lb		
	(Orthene 97 PE)	8-12 oz	0.5 - 0.73	
	endosulfan		0.5 - 1	
	(Phaser 3EC)	0.67 - 1.33 qts		
	(Thiodan 3EC)	0.67 - 1.33 qts		
	imidacloprid		0.025- 0.05	
	(Provado 1.6F & other generic formulations)	2 - 4 ozs	0.45	
	methomyl			
	(Lannate 90SP)			
	(Lannate 2.4LV)	0.5 lb		
	pymetrozine	1.5 pts		
(Fulfill 50 WG)		0.09		
thiamethoxam	2.75 ozs			
(Actara 25 WG)		0.03-0.05		
		2-3 ozs		
Aphids (transplant water treatment)	imidacloprid		0.01 - 0.02	Apply in transplant water. Mix thoroughly.
	(Admire 2F & other generic formulations)	1 - 1.8 ozs / 1000 plants	per 1000 plants	
	(Admire PRO 4.6 SC)	0.6 oz / 1000 plants		
	thiamethoxam		0.01-0.02 per	
	(Platinum 2 SC)	0.8-1.3 ozs / 1000 plants	1000 plants	
	(T-Moxx 2SC)		0.75	
acephate				
(Orthene 75S)	1 lb			
(Acephate 75 SP)	1 lb	0.5 - 0.73		
(Orthene 97 PE)	8-12 ozs			

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INSECT	CHEMICAL AND FORMULATION¹	PRODUCT RATE/ACRE	LBS A.I.	REMARKS AND PRECAUTIONS
Budworms	acephate		0.75	Use 8-10 gallons of spray per acre, using one hollow cone nozzle per row when tobacco is less than 12-14 inches high. For the remainder of the season, apply 20-40 gallons of spray using 3 hollow cone nozzles per row. Operate equipment at 60 pounds pressure and do not exceed 4 miles per hour. To limit residues, use endosulfan only prior to topping. For best results, apply when worms are very small (less than 1/4 inch long). The material must be eaten by the insect to be effective. Worms will die several days after feeding.
	(Orthene 75S)	1 lb		
	(Acephate 75SP)	1 lb		
	(Orthene 97PE)	8-12 ozs	0.5 - 0.73	
	emanmectin benzoate		.01 - .015	
	(Denim .16EC)	8 - 12 oz		
	methomyl		0.45	
	(Lannate 90SP)	0.5 lb		
	(Lannate 2.4LV)	1.5 pts		
	spinosad		.045 - .089	
	(Tracer 4SC)	1.4 - 2.9 ozs		
	<i>Bacillus thuringiensis</i>			
	(Dipel ES)	2 pts		
	(Dipel DF)	0.5-1 lbs		
	(Agree S)	1-2 lbs		
	(Biobit XL)	3 pts		
	(Biobit HP)	1 lb		
	(Condor OF)	1.63 qts		
	(Crymax WG)	0.5-1.5 lbs		
(Javelin WG)	1 - 1.25 lbs			
(Lepinox WG)	1-2 lbs			
Cabbage looper	acephate		0.75	Apply thoroughly. Good lower leaf coverage is essential for control. See remarks under Budworms. For best results, apply when worms are small (1/2 inch long or less). The material must be eaten by the insect to be effective. Worms will die several days after feeding.
	(Orthene 75S)	1 lb		
	(Acephate 75SP)	1 lb		
	(Orthene 97PE)	12 ozs	0.73	
	emanmectin benzoate		.01 - .015	
	(Denim .16EC)	8 - 12 oz 1 lb		
	methomyl		0.45	
	(Lannate 90SP)	0.5 lb		
	(Lannate 2.4LV)	1.5 pts		
	spinosad		0.045-0.089	
	(Tracer 4SC)	2 - 2.9 ozs		
	<i>Bacillus thuringiensis</i>			
	(Dipel ES)	1-2 pt		
	(Dipel DF)	0.5-1 lbs		
	(Agree S)	1-2 lbs		
	(Biobit XL)	3 pts		
	(Biobit HP)	1 lb		
	(Condor OF)	1.67 qts		
	(Crymax WG)	0.5-1.5 lbs		
(Lepinox) WG)	1-2 lbs			

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Cutworms (foliar and transplant water treatments)	acephate (Orthene 75S)	1 lb	0.75	Apply 25-50 gallons of spray as needed. If acephate was used in the transplant water, a foliar spray may not be needed.
	(Acephate 75 SP)	1 lb		
	(Orthene 97 PE)	12 ozs	0.73	
Flea Beetles (transplant water treatments)	acephate (Orthene 75S)	1 lb	0.75	Apply in transplant water. Mix thoroughly. Use a minimum of 100 gallons of transplant water per acre.
	(Acephate 75SP)	1 lb	0.75	
	(Orthene 97PE)	12 ozs	0.73	
	imidacloprid (Admire 2F & other generic formulations)	1-1.4 ozs / 1000 plants	0.01 - 0.02 per 1000 plants	
	(Admire PRO 4.6 SC)	0.6 ozs / 1000 plants		
	thiamethoxam (Platinum 2 SC)	0.8-1.3 ozs / 1000 plants	0.01 - 0.02 per 1000 plants	
	(T-Moxx 2SC)	1000 plants		
Flea Beetles (foliage control)	acephate (Orthene 75S)	0.67 lb	0.5	Use lower rates for small plants. Use higher rates for large plants and thoroughly cover the lower leaves.
	(Acephate 75SP)	0.67 lb	0.5	
	(Orthene 97PE)	8 ozs	0.5	
	carbaryl (Sevin 80S)	1.25 - 2.5 lbs	1-2	To limit residues, use endosulfan only prior to topping.
	(Sevin XLR Plus)	1 - 2 lbs		
	methomyl (Lannate 90SP)	0.25 - 0.5 lb	0.5-1	
	(Lannate 2.4LV)	0.75 - 1.5 pts		
	imidacloprid (Provado 1.6F & other generic formulations)	2 - 4 ozs	0.025 - 0.05	
	thiamethoxam (Actara 25 WG)		0.03-0.05	
		2-3 ozs		
Grass- hoppers	acephate (Orthene 75S)	0.33 - 0.67 lb	0.25 - 0.5	Apply thoroughly. Spraying around field borders may aid in preventing infestations.
	(Acephate 75SP)	0.33 - 0.67 lb	0.25 - 0.5	
	(Orthene 97PE)	4 - 8 ozs	0.2 - 0.5	
	carbaryl (Sevin 80S)	1-3 lbs	0.5 - 1.5	
	(Sevin 4F)	0.6 - 1.9 lbs		
	(Sevin XLR Plus)	0.5 - 1.5 qts		

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INSECT	CHEMICAL AND FORMULATION¹	PRODUCT RATE/ACRE	LBS A.I.	REMARKS AND PRECAUTIONS
Hornworms	acephate		0.5	Apply thoroughly. Good coverage is essential for control. If control has been or is poor with either acephate or methomyl, use carbaryl, spinosad or one of the <i>Bts</i> .
	(Orthene 75S)	0.67 lb		
	(Acephate 75SP)	0.67 lb		
	(Orthene 97PE)	8 oz	0.5	
	carbaryl		1 - 2	
	(Sevin 80S)	1.25 - 2.5 lbs		
	(Sevin XLR Plus)	1 - 2 lbs		
	emanmectin benzoate		.01 - .015	
	(Denim .16EC)	8 - 12 oz 1 lb		
	methomyl		0.23 - 0.45	
	(Lannate 90SP)	0.25 - 0.5 lb		
	(Lannate 2.4LV)	0.75 - 1.5 pts		
	spinosad		.045 - .089	
	(Tracer 4SC)	1.4 - 2.9 ozs		
	<i>Bacillus thuringiensis</i>			The material must be eaten by the insect to be effective. Worms will die several days after feeding.
	(Dipel ES)	0.5-1 pt		
(Dipel DF)	0.25-0.5 lbs			
(Agree S)	1-2 lbs			
(Biobit XL)	0.5-1 pts			
(Biobit HP)	0.25-0.5 lb			
(Condor OF)	0.67-1 qt			
(Crymax WG)	0.5-1.5 lbs			
(Javelin WG)	0.125 - 0.25 lb			
(Lepinox) WG)	1-2 lbs			
Mole Crickets	chlorpyrifos		2 - 3	Apply broadcast to the soil surface one week before transplanting and mix into the top 3-6 inches of soil immediately.
	(Lorsban 4E)	2 - 3 qts		
	ethoprop		6 - 12	
	(Mocap 6EC)	1 - 2 gals		
Stink Bugs	acephate		0.5 - 0.75	
	(Orthene 75S)	0.67 - 1.0 lb		
	(Acephate 75SP)	0.67 - 1.0 lb		
	(Orthene 97PE)	8-12- ozs	0.5 - 0.73	
Thrips	Foliar treatments for flea beetles give helpful control			
Wireworms or Mole Crickets	imidacloprid		0.02 - 0.04	Apply in transplant water. Mix thoroughly. Use a minimum of 100 gallons of transplant water per acre.
	(Admire 2F & other generic formulations)	1.4 - 2.8 oz./ 1000 plants	per 1000 plants	
	(Admire PRO 4.6 SC)	0.6-1.2 ozs / 1000 plants		
	(transplant water treatment)			
Wireworms	thiamethoxam	1.3 oz. per	0.01 - 0.02	
	(Platinum 2 SC)	1000 plants	per 1000 plants	
	(T-Moxx 2SC))			
	(transplant water treatment)			

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INSECT	CHEMICAL AND FORMULATION ¹	PRODUCT RATE/ACRE	LBS A.I.	REMARKS AND PRECAUTIONS
<u>Precautions</u>				
Workers should wear protective clothing when they handle treated tobacco. Schedules for insecticides with restrictions on field reentry and tobacco harvest are:				
INSECTICIDE			HOURS BEFORE FIELD REENTRY	DAYS FROM LAST APPLICATION TO HARVEST
acephate (Orthene/Acephate)			24	3
acetamiprid	(Assail)		12	7
<i>Bacillus thuringiensis</i>				
	(Dipel, Agree, Biobit,		4	0
	Condor, Crymax, Javelin, Lepinox)		4	0
carbaryl	(Sevin)		12	0
emamectin benzoate	(Denim)		48	14
imidacloprid	(Admire/Provado)		12	14
methomyl	(Lannate)		48	5
pymetrozine	(Fulfill 50 WG)		12	14
Spinosad	(Tracer 4SC)		4	3
thiamethoxam	(Actara/Platinum, (T-Moxx 2SC)		12	14