

Insect Management in Cotton¹

Richard K. Sprenkel²

Effective and economical cotton insect control involves the integration of many control techniques. These techniques include using beneficial insects and diseases and cultural control practices to the fullest extent possible. Chemical insecticides are still the most important suppression tool, but they should be used selectively and at the proper rate and time.

Thresholds

Beet Armyworm: Treat when 2 or more hatching egg masses ("hits") per 100 row feet are found.

Bollworms, Tobacco Budworms: In previously untreated fields, apply a recommended insecticide when an average of 10 small larvae per 100 plants or 30 eggs per 100 plants are present. In previously treated fields, when beneficials are absent, apply a recommended insecticide when an average of 5 small larvae or 25-30 eggs per 100 plants are present. For Bt transgenic cultivars, an application of a recommended insecticide is justified when an average of 8-9 larvae at least 1/4 inch in length per 100 plants are present. Several larvicides also have ovicidal

activity. These insecticides include Baythroid, Curacron, Karate, Lannate, and Larvin.

Cutworms: Control when worms are found destroying a stand. Cover plants and surface of ground along rows with insecticide.

Fall Armyworms: Treat when 15 to 20 or more small larvae per 100 plants are found.

Loopers: Economic damage seldom occurs; however, if chemical control is necessary, loopers should be controlled when they are small. A population of 4 or more loopers per foot of row justifies treatment.

Other Pests

Cotton Aphids: If necessary, apply controls when leaves appear sticky and heavy infestation develops. Repeat applications may be necessary for chemical control. Generally, chemical controls are not necessary because of the actions of parasites, predators, and disease.

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Use pesticides safely. Read and follow directions on the manufacturer's label. Check the label carefully as this information does change and our publications may not have the latest information. The use of trade names in this publication is solely for the purpose of providing specific information. UF/IFAS does not guarantee or warranty the products named, and references to them in this publication does not signify our approval to the exclusion of other products of suitable composition.

Fleahoppers, Plant Bugs: Make 1 or more applications when 1 adult or nymph is found per row foot before bloom. If pinhead square set is less than 80%, treat when 1 adult or nymph is found per 2 row feet. After first bloom, cotton that is not squaring normally should be treated if 30 or more are found per 100 terminals. If a sweep net is used, treat when there are an average of 7.5 or more plant bugs per 100 sweeps. NOTE: If Admire is used at planting or side dress for other insects, it should have a period of lasting control against plant bugs.

Spider Mites: Treat around field edges when mites first appear, this may prevent heavy infestation later. Treat entire field when leaves begin to redden and medium infestation occurs. Two or more applications at 5 to 7 day intervals may be needed.

Stink Bugs: Control is justified when there are 4 or more stink bugs per 100 sweeps or 1 stink bug per 6 feet of row.

Thrips: Apply spray when 2 or more thrips per plant are present when cotton comes to a stand. Repeat treatment in 7-10 days if needed.

Whiteflies: For active growing cotton, treat when 50% or more of the plant terminals have clusters of whiteflies on them. Two or three applications at 5-day intervals are usually needed to bring an infestation under control.

For mature or stressed cotton, make 2 applications 5 days apart when honeydew is accumulating and sooty mold appears on leaves.

Pyrethroid Resistance Management

In 1987, a pyrethroid-resistant population of tobacco budworms was documented in Brazos County, Texas. Since then, resistant tobacco budworms have been identified in several other states including Florida. Because of field control failures and an increase in the levels of resistance, most states have implemented a Pyrethroid Resistance Management Plan. The following management plan should be followed for non-Bt cotton in Florida.

1. Manage crop for earliness

2. From planting to first bloom:

- Do not use pyrethroids.
- Scout cotton and treat only on an as-needed basis.

3. From first bloom through the following 6 weeks:

- Scout cotton twice weekly.
- Treat on basis of bollworm/budworm eggs and small larvae.
- Use pyrethroid at mid-range rates in combination with *Bacillus thuringiensis* (B.t.) or non-pyrethroid ovicide.
- If control of a tobacco budworm generation using a pyrethroid plus B.t. or an ovicide is not satisfactory, use larvicidal rates of a carbamate or organophosphate insecticide for the next treatment of that generation.

4. During late season:

- Do not use pyrethroids.
- Use larvicidal rates of an organophosphate or carbamate for tobacco budworm control if treatment is justified.
- Terminate all insecticides as soon as possible.

Pesticide Restrictions

- **Admire 2F:** Do not apply more than 0.33 lb ai/a at planting.
- **Ammo 2EC:** Do not apply more than 0.6 lb ai/a/season. **
- **Asana XL:** Do not apply more than 0.5 lb ai/a/season. **
- **Assail 70WP:** Do not apply more than 0.4 lb ai/a/season, or 4 applications.
- **Baythroid 2:** Do not apply more than 32 fl oz/a/crop. **
- **Bidrin 8:** Do not exceed 3 applications/season.

- **Capture 2EC:** Do not apply more than 0.5 lb ai/a/season.**
- **Centric 40WG:** Do not apply more than 0.1 lb ai/a/season.
- **Comite II:** Maximum of 3 applications/year. Apply before bolls open.
- **Confirm 2F:** maximum 16 fl oz/a. Rotational restrictions 30 days for crops not on label.
- **Courier:** Maximum of 2 applications/year.
- **Curacron 8E:** Do not apply more than 3 qt/a/season.
- **Danitol:** Do not apply more than 2.67 pt/a/season or 0.8 lb ai/a/season.**
- **Decis 1.5 EC:** Do not apply more than 0.3 lb ai/a/season.
- **Denim:** Do not apply at rates lower than indicated on label. Maximum 48 oz/a/crop.
- **Diamond 0.83 EC:** Do not apply more than 48 oz/a/season. Rotational restrictions 30 days after last spray for crops not on label.
- **Dimethoate 4 EC:** Do not use within 20 feet of edible food garden.
- **Dimilin 2L:** Do not exceed 6 applications/season & do not exceed 24 fl oz/season.
- **Di-Syston:** Allow 21 days between applications. Do not feed treated forage.
- **Fulfill:** 30 day plant back restriction, all crops. Max 5.5 oz/a/season.
- **Karate:** Do not apply more than 0.2 lb ai/a/season or 0.8 pt/a/season.**
- **Kelthane:** Maximum of 2 applications/year.
- **Knack:** Do not make more than 1 application/season. Do not apply more than 10 or less than 8 oz/a.
- **Lannate:** Do not apply more than 1.28 lb ai/a/crop. Do not make more than 8 applications/crop.
- **Larvin:** Do not apply more than 0.9 lb ai/a/application or 5.4 lb ai/a/season.
- **Leverage:** Do not apply more than 22.5 oz/a/season. **
- **Lorsban:** Do not make more than 6 applications/season.
- **Monitor:** Apply before bolls open.
- **Mustang Max:** Apply no more than 0.15 lb ai/season.
- **Orthene:** Do not apply more than 6 lb ai/a/season. This includes using Payload 15 granules as an in-furrow at planting treatment, all foliar spray, liquid in furrow application and seed treatment uses.
- **Penncap-M:** Do not apply if bees are foraging in the area to be treated. Max 16 pt/a/year.
- **Phaser:** Apply before bolls open. Do not exceed 3 lb ai/year.
- **Proaxis:** Apply no more than 0.1 lb ai/season.** Do not graze livestock in treated area.
- **Provado:** Do not reapply within 7 days. Maximum of 0.5 ai/a/season.
- **Steward:** • Do not apply more than 45 fl oz/a/crop or 0.44 lb ai/a/crop.
- **Telone II:** For use only on soils that restrict downward water movement to less than 6 feet. Additional restrictions prohibit use in many Florida counties.
- **Temik:** Maximum of 1 application at planting and 1 application post emergence. Do not apply more than 33 lb/a/season of 15G. Do not apply within 90 days of harvest.

- **Tracer:** Do not apply more than 14.4 fl oz or 0.45 lb ai/a/season.
- **Vydate L:** Do not apply more than 10 pt or 2.5 lb ai/a/season.
- **Warrior with Zeon:** Do not apply more than 1.6 pt or 0.2 lb ai/a/season. **
- **Zeal:** Do not apply more than one oz/a/season.

** **synthetic pyrethroids.** In one season do not make more than 10 applications of synthetic pyrethroid such as: Ambush, Ammo, Asana XL, Baythroid, Capture, Danitol, Fury Karate, Mustang Max, X-TRA, Warrior.

Additional Information

Crop Data Management Systems (Label Search)
<http://www.cdms.net/manuf/manuf.asp>

Cotton Insect Pests.
http://www.isis.vt.edu/~fanjun/text/Link_pest12.html

King, E.G., J.R. Phillips and R.J. Coleman 1996.
 Cotton Insects and Mites: Characterization and Management. 1008 pp. Cotton Foundation Reference Book Series #3. The Cotton Foundation (Publisher) Memphis, TN.

Table 1. Suggested chemicals for insect control in cotton.

Trade Name (Common Name)	lb ai/a	Formulation/a	a/gal or lb	Minimum Days to Harvest and Restrictions
BEET ARMYWORMS				
Baythroid 2 (cyfluthrin)	0.05	3.2 oz	40	0 Treat 1st and 2nd instars. Do not graze.
Capture 2EC (bifenthrin)	0.06-0.10	3.8-6.4 oz	33.6-20	14 Do not graze/feed
Confirm 2F (tebufenzoide)	0.06-0.12	8-16 oz	16-8	14
Curacron 8E (profenofos)	1	1 pt	8	14 Do not graze/feed.
Danitol 2.4 EC (fenpropathrin)	0.2-0.3	10.66-16 oz	12-8	21 Do not feed or graze.
Decis 1.5 EC (deltamethrin)	0.019-0.03	1.62-2.56 oz	79-50	21 For suppression only.
Denim (emamectin benzoate)	0.0075-0.01	6-8 fl oz	21-16	21 Target worms less than inch in length.
Diamond (novaluron)	0.04-0.08	6-12 oz	21-10	30
Dimilin 2L (diflubenzuron)	0.03-0.12	2-8 oz	64-16	14
Karate with Zeon (lambda-cyhalothrin)	0.25-0.04	1.6-2.56 fl oz	80-50	21 Treat first two instars.
Larvin 3.2F (thiodicarb)	0.6-0.9	24-36 oz	5.3-3.6	28
Lannate 2.4 LV (methomyl)*	0.45	1.5 pt	5.3	15 Do not graze/feed.
Lorsban 4E (chlorpyrifos)	0.75-1.0	1.5-2 pt	5.3-4	14 Do not graze/feed.
Monitor 4 (methamidophos)	0.5-1.0	1-2 pt	8-4	50 Do not feed or graze.
Proaxis (gamma-cyhalothrin)	0.0125-0.02	3.2-5.12 fl oz	40-25	21 Do not graze livestock in treated areas. For suppression only.

Table 1. Suggested chemicals for insect control in cotton.

Trade Name (Common Name)	lb ai/a	Formulation/a	a/gal or lb	Minimum Days to Harvest and Restrictions
Steward (indoxacarb)	0.09-0.11	9.2-11.3 oz	14-11.5	14 Do not feed or graze.
Tracer (spinosad)	0.067-0.089	2.14-2.9 oz	60-45	28
Warrior with Zeon (lambda-cyhalothrin)	0.025-0.04	3.20-5.12 oz	40-25	21 Do not feed or graze. Treat first two instars only.
BOLLWORMS, TOBACCO BUDWORMS				
Ammo 2.5EC (cypermethrin)	0.04-0.1	2-5 oz	64-25.6	14 Do not graze/feed.
Asana XL 0.66E (esfenvalerate)	0.03-0.05	5.8-9.6 oz	22-13	21- Do not graze/feed.
Assail 70WP (acetamiprid)	0.025-0.05	0.6-1.1 oz	26-14.5	28
Baythroid 2 (cyfluthrin)	0.025-0.04	1.6-2.6 oz	80-49	0 Do not graze/feed.
<i>Bacillus thuringiensis</i> **	See individual labels for rates.			
Capture 2EC (bifenthrin)	0.04-0.1	2.6-6.4 oz	49-20	14 Do not graze/feed
Curacron 8E (profenofos)	0.75-1	0.75-1 pt	10-8	14 Do not graze/feed.
Danitol (fenpropathrin)	0.2- 0.3	10.67-16 oz	12-8	21 Do not graze/feed
Decis 1.5 EC (deltamethrin)	0.019-0.03	1.62-2.56 oz	79-50	21
Denim (emamectin benzoate)	0.01-0.015	8-12 fl oz	16-10.5	21 target worms less than inch in length.
Diamond (novaluron)	0.078-0.09	12-14 oz	10.6-9	30
Karate with Zeon (lambda-cyhalothrin)	0.025-0.04	1.6-2.56 oz	80-50	21 Do not graze/feed.
Lannate 2.4LV (methomyl)	0.45	1.5 pt	5.3	15 Do not graze/feed.
Larvin 3.2F (thiodicarb)	0.6-0.9	24-36 oz	5.3-3.6	28
Leverage (cyfluthrin + imidacloprid)	0.075-0.094	3-3.75 oz	42.7-34.1	14 Do not graze/feed.
Lorsban 4E (chlorpyrifos)	0.75-1.0	1.5-2 pt	5-4	14 Do not graze/feed.
Mustang Max (zeta-cypermethrin)	0.0165-0.0225	2.64-3.6 oz	48.5-35.5	14 Do not graze/feed.
Orthene 90S (acephate)	0.45-0.9	0.5-1 lb	2-1	21 Do not graze/feed.
Phaser 3EC (endosulfan)	1.0-1.5	1.3-2 qt	2-3	0 Do not graze/feed. Do not apply after bolls open.
Proaxis (gamma-cyhalothrin)	0.0125-0.02	3.2-5.12 fl oz	40-25	21 Do not graze livestock in treated areas.
Steward (indoxacarb) In Transgenic Bt cotton	0.09-0.11	9.2-11.3 oz	14-11.5	14 Do not feed or graze.

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Trade Name (Common Name)	lb ai/a	Formulation/a	a/gal or lb	Minimum Days to Harvest and Restrictions
Steward (indoxacarb)	0.11	11.3 oz	11.5	14 Do not feed or graze.
Tracer (spinosad)	0.045-0.089	1.4-2.9 oz	90-45	28
Warrior with Zeon (lambda-cyhalothrin)	0.025-0.04	3.20-5.12 oz	40-25	21 Do not feed or graze.
COTTON APHIDS				
Admire-2F (imidacloprid)			1.3 oz/1000 row ft	
Assail 70WP (acetamiprid)	0.025-0.05	0.6-1.1 oz	26-14.5	28
Baythroid 2 (cyfluthrin)	0.025-0.041	1.6-2.6 oz	80-49	0 Do not graze/feed.
Bidrin 8E (dicotophos)	0.2	1.6-3.2 oz	80-40	30 Use early season. Do not graze or feed.
Bidrin 8E (dicotophos)	0.25-0.5	4-8 oz	32-16	30 Use late season. Do not graze/feed.
Capture 2EC (bifenthrin)	0.04-0.10	2.6-6.4 oz	49-20	14 Do not graze/feed.
Centric 40WG (thiamethoxam)	0.03-0.05	1.25-2.0 oz	12.8-8	21 See rotational and grazing restrictions.
Curacron 8E (profenofos)	0.5	0.5 pt	16	14 Do not graze/feed.
Decis 1.5 EC (deltamethrin)	0.019-0.03	1.62-2.56	79-50	21 For suppression only.
Dimethoate 4EC (dimethoate)	0.125-0.25	0.25-0.5 pt	32-16	14 Do not graze/feed.
Di-Syston 15G (disulfoton)	0.6-1.0	4-6.7 lb		28 Rate depends on soil type and row spacing, read label.
Di-Syston 8 (disulfoton)			0.75-1.2 oz/1000 row ft	
Fulfill (pymetrozine)	0.086	2.75 oz	5.8	21 30 day plant back restriction.
Lannate 2.4 LV (methomyl)	0.22	0.75 pt	10.7	15 Do not graze or feed.
Leverage (cyfluthrin + imidacloprid)	0.075	3 oz	42.7	14 Do not graze/fee
Lorsban 4E (chlorpyrifos)	0.25-1	0.5-2 pt	16-4	14 Do not graze/feed.
Malathion 57EC (malathion)	0.94-1.25	1.5-2 pt	5.3-4	0
Monitor 4 (methamidophos)	0.5-1.0	1-2 pt	8-4	50 Do not feed or graze.
Orthene 90S (acephate)	0.45-0.9	0.5-1 lb	2-1	21 Do not graze/feed.
PennCap-M (methyl parathion)	0.25-1.0	1-4 pt	8-2	15 Do not apply if bees are foraging in the area.
Phaser 3EC (endosulfan)	0.375-0.75	0.5-1 qt	8-4	0 Do not graze/feed. Do not apply after bolls open.

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Trade Name (Common Name)	lb ai/a	Formulation/a	a/gal or lb	Minimum Days to Harvest and Restrictions
Proaxis (gamma-cyhalothrin)	0.0125-0.02	3.2-5.12 fl oz	40-25	21 Do not graze livestock in treated areas. For suppression only.
Provado 1.6F (imidacloprid)	0.025-0.047	2-3.75 oz	64-34	14 Do not graze/feed.
Temik 15G (aldicarb)	0.5-0.75	4.5-6 oz/1000 ft row , or 3.5-5 lb/a		
Thimet 20G (phorate)	1.64 Maximum	6-9 oz/1000 ft of row, 8.2 lb/a max		
Warrior with Zeon (lambda-cyhalothrin)	0.025-0.04	3.20-5.12 oz	40-25	21 Do not feed or graze. For suppression only.
CUTWORMS				
Ammo 2.5EC (cypermethrin)	0.025-0.1	1.3-5 oz	98.5-25.6	14 Do not graze/feed.
Asana XL 0.66 (esfenvalerate)	0.03-0.05	5.8-9.6 oz	22-13	21 Do not graze/feed.
Baythroid 2 (cyfluthrin)	0.0125-0.025	0.8-1.6 oz	160-80	0 Do not graze/feed.
Capture 2EC (bifenthrin)	0.04-0.10	2.6-6.4 oz	49-20	14 Do not graze/feed.
Decis 1.5 EC (deltamethrin)	0.13-0.019	1.11-1.62 oz	115-79	21
Karate with Zeon (lambda-cyhalothrin)	0.015-0.02	0.96-1.28 oz	133-100	
Larvin 3.2 F (thiodicarb)	0.06	24 oz	5.3	28
Leverage (cyfluthrin + imidacloprid)	0.075	3oz	42.7	14 Do not graze/feed.
Lorsban 4E (chlorpyrifos)	0.75-1	1.5-2 pt	5.3-4	14 Do not graze/feed.
Mustang Max (zeta-cypermethrin)	0.008-0.012	1.28-1.92 oz	100-66.7	14 Do not graze/feed.
Orthene 90S (acephate)	0.72	0.8 lb	1.25	21 Do not graze/feed.
Proaxis (gamma-cyhalothrin)	0.0075-0.01	1.92-2.56 fl oz	66-50	21 Do not graze livestock in treated areas.
Warrior with Zeon (lambda-cyhalothrin)	0.15-0.02	1.92-2.56 fl oz	66.7-50	2 Do not feed or graze.
FALL ARMYWORMS				
Ammo 2.5 EC (cypermethrin)	0.04-0.1	2-5 oz	64-25.6	14 Do not graze/feed.
Baythroid 2 (cyfluthrin)	0.05	3.2 oz	40	0 Treat 1st and 2nd instars.
Capture 2EC (bifenthrin)	0.04-0.10	2.6-6.4 oz	49-20	14 Do not graze/feed
Confirm 2F (tebufenzoide)	0.06-0.12	8-16 oz	16-8	14
Curacron 8E (profenofos)	0.75-1	0.75-1 pt	10.6-8	14 Do not graze/feed.

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Decis 1.5 EC (deltamethrin)	0.019-0.03	1.62-2.56 oz	79-50	21 For suppression only
Denim (emamectin benzoate)	0.01-0.015	8-12 fl oz	16-10.5	21 Target worms less than inch in length.
Diamond (novaluron)	0.04-0.08	6-12 oz	21-10	30
Dimilin 2L (diflubenzuron)	0.06-0.125	4-8 oz	32-16	14 Apply to early larval stages.
Karate with Zeon (lambda-cyhalothrin)	0.25-0.04	1.6-2.56 fl oz	80-50	21 Do not graze livestock in treated area.
Lannate 2.4LV (methomyl)*	0.45	1.5 pt	5.3	15 Do not graze/feed.
Larvin 3.2F (thiodicarb)	0.6-0.9	24-36 oz	5.3-3.6	28
Lorsban 4E (chlorpyrifos)	0.2-0.4	0.5-1 pt	16-8	14 Do not graze/feed.
Mustang Max (zeta-cypermethrin)	0.0165- 0.0225	2.64-3.6 oz	48.5-35.5	14 Do not graze/feed.
Orthene 90S (acephate)	0.9	1 lb	1	21 Do not graze/feed.
Proaxis (gamma-cyhalothrin)	0.0125-0.02	3.2-5.12 fl oz	40-25	21 Do not graze livestock in treated areas.
Steward (indoxacarb)	0.09-0.11	9.2-11.3 oz	14-11.5	14 Do not feed or graze.
Tracer 4SC (spinosad)	0.067-0.089	2.14-2.9 oz	60-45	28
Warrior with Zeon (lambda-cyhalothrin)	0.025-0.04	3.20-5.12 oz	40-25	21 Do not feed or graze.
FLEAHOPPERS				
Ammo 2.5 EC (cypermethrin)	0.04-0.1	2-5 oz	64-25.6	14 Do not graze/feed.
Asana XL 0.66 (esfenvalerate)	0.03-0.05	5.8-9.6 oz	22-13	21 Do not graze/feed.
Assail 70WP (acetamiprid)	0.025-0.05	0.6-1.1 oz	26-14.5	28
Baythroid 2 (cyfluthrin)	0.025-0.041	1.6-2.6 oz	80-49	0 Do not graze/feed.
Bidrin 8E (dicrotophos)	0.1-0.2	1.6-3.2 oz	80-40	30 Use early season. Do not graze/feed
Bidrin 8E (dicrotophos)	0.25-0.5	4-8 oz	32-16	30 Use late season. Do not graze/feed.
Capture 2EC (bifenthrin)	0.04-0.10	2.6-6.4 oz	49-20	14 Do not graze/feed.
Centric 40WG (thiamethoxam)	0.05	2.0 oz	8	21 See rotational and grazing restrictions.
Decis 1.5 EC (deltamethrin)	0.13-0.019	1.11-1.62 oz	115-79	21

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Trade Name (Common Name)	lb ai/a	Formulation/a	a/gal or lb	Minimum Days to Harvest and Restrictions
Dimethoate 4EC (dimethoate)	0.25	0.5 pt	16	14 Do not graze/feed.
Karate with Zeon (lambda-cyhalothrin)	0.02-0.03	1.28-1.92 oz	100-66	21 Do not graze/feed.
Leverage (cyfluthrin + imidacloprid)	0.075	3 oz	42.7	14 Do not graze/feed.
Lorsban 4E (chlorpyrifos)	0.1875-0.4	0.375-1 pt	21-8	
Monitor 4 (methamidophos)	0.2	0.4 pt	20	50 Do not feed or graze.
Mustang Max (zeta-cypermethrin)	0.0165- 0.0225	2.64-3.6 oz	48.5-35.5	14 Do not graze/feed.
Orthene 90S (acephate)	0.225	0.25 lb	4	21 Do not feed/graze.
PennCap-M (methyl parathion)	0.125-0.25	0.5-1 pt	16-8	15 Do not apply if bees are foraging in the area.
Phaser 3EC (endosulfan)	1.0-1.5	1.3-2 qt	3.1-2	0 Do not graze/feed. Do not apply after bolls open.
Proaxis (gamma-cyhalothrin)	0.01-0.015	2.56-3.84 fl oz	50-33	21 Do not graze livestock in treated areas.
Provado 1.6F (imidacloprid)	0.025-0.047	2-3.75 oz	64-34	14 Do not graze/feed.
Steward (indoxacarb)	0.09-0.11	9.2-11.3 oz.	14-11.5	14
Temik 15G (aldicarb)	0.6-1	5-8.5 oz/1000 ft row , or 4-7 lb/a		
Vydate L (oxamyl)	0.12-0.25	0.5-1 pt	16-8	21 Do not graze/feed.
Warrior with Zeon (lambda-cyhalothrin)	0.02-0.03	2.56-3.84 fl oz	50-33	21 Do not feed or graze.
LOOPERS				
Ammo 2.5EC (cypermethrin)	0.04-0.1	2-5 oz	64-25.6	14 Do not graze/feed. For cabbage looper.
Asana XL 0.66 (esfenvalerate)	0.03-0.05	5.8-9.6 oz	22-13	21 Do not graze/feed. For cabbage looper.
<i>Bacillus thuringiensis</i> **	See individual labels for rates.			
Baythroid 2 (cyfluthrin)	0.05	3.2 oz	40	0 Do not graze/feed.
Capture 2EC (bifenthrin)	0.04-0.10	2.6-6.4 oz	49-20	14 Do not graze/feed. For cabbage looper only.
Confirm 2F (tebufenozide)	0.06-0.12	8-16 oz	16-8	14 For cabbage looper.
Decis 1.5 EC (deltamethrin)	0.019-0.03	1.62-2.56 oz	79-50	21 Suppression only of soybean looper.
Denim (emamectin benzoate)	0.01-0.015	8-12 fl oz	16-10.5	21 Target worms less than inch in length.
Diamond (novaluron)	0.04-0.08	6-12 oz	21-10	30

Table 1. Suggested chemicals for insect control in cotton.

Trade Name (Common Name)	lb ai/a	Formulation/a	a/gal or lb	Minimum Days to Harvest and Restrictions
Dimilin 2L (diflubenzuron)	0.06-0.125	4-8 oz	32-16	14 Apply to early stages of larvae. For suppression only.
Karate with Zeon (lambda-cyhalothrin)	0.02-0.03	1.28-1.92 oz	100-66	21 Do not graze/feed.
Larvin 3.2F (thiodicarb)	0.6-0.9	24-36 oz	5.3-3.6	28
Leverage (cyfluthrin + imidacloprid)	0.075	3 oz	42.7	14 Do not graze/feed. For cabbage looper only.
Monitor 4 Spray (methamidophos)	0.5-1.0	1-2 pt	8-4	50 Do not graze/feed. For cabbage looper only.
Mustang Max (zeta-cypermethrin)	0.0165- 0.0225	2.64-3.6 oz	48.5-35.5	14 Do not graze/feed. For cabbage looper only.
Orthene 90S (acephate)	0.9	1 lb	1	21 Do not graze/feed. For cabbage looper only.
Steward (indoxacarb)	0.065-0.09	6.7-9.2 oz.	19.4-14	14 Do not graze livestock on treated field.
Tracer (spinosad)	0.067-0.089	2.14-2.9 oz	60-45	28
Warrior with Zeon (lambda-cyhalothrin)	0.02-0.03	2.56-3.84 fl oz	50-33	21 Do not feed or graze. For cabbage looper only.
PLANT BUGS				
Admire-2F (imidacloprid)		1.3 oz/1000 row ft		
Ammo 2.5 EC (cypermethrin)	0.04-0.1	2-5 oz	64-25.6	14 Do not graze/feed.
Asana XL 0.66 (esfenvalerate)	0.03-0.05	5.8-9.6 oz	22-13	21 Do not graze/feed. For cabbage looper only.
Assail 70WP (acetamiprid)	0.05	1.1 oz	14.5	28
Baythroid 2 (cyfluthrin)	0.025-0.041	1.6-2.6 oz	80-49	0 Do not graze/feed.
Bidrin 8E (dicrotophos)	0.1-0.2	1.6-3.2 oz	80-40	30 Use early season. Do not graze/feed.
Bidrin 8E (dicrotophos)	0.25-0.5	4-8 oz	32-16	30 Use late season. Do not graze/feed.
Capture 2EC (bifenthrin)	0.04-0.10	2.6-6.4 oz	49-20	14 Do not graze/feed.
Centric 40WG (thiamethoxam)	0.05	2.0 oz	8	21 See rotational and grazing restrictions.
Curacron 8E (profenofos)	0.25-0.5	0.25-0.5 pt	32-16	14 Do not graze/feed.
Danitol 2.4 EC (fenpropathrin)	0.2-0.3	10.66-16 oz	12-8	21 Do not feed or graze.
Decis 1.5 EC (deltamethrin)	0.13-0.019	1.11-1.62 oz	115-79	21
Diamond (novaluron)	0.05-0.07	9-12 oz	14-10	30

Table 1. Suggested chemicals for insect control in cotton.

Trade Name (Common Name)	lb ai/a	Formulation/a	a/gal or lb	Minimum Days to Harvest and Restrictions
Dimethoate 4EC (dimethoate)	0.25	0.5 pt	16	14 Do not graze/feed.
Karate with Zeon (lambda-cyhalothrin)	0.02-0.03	1.28-1.92 oz	100-66	21 Do not graze/feed.
Lannate 2.4 LV (methomyl)	0.45	1.5 pt	5.3	15 Do not graze/feed.
Leverage (cyfluthrin + imidacloprid)	0.075-0.094	3-3.75 oz	42.7-34.1	14 Do not graze/feed.
Lorsban 4E (chlorpyrifos)	0.1875-0.4	0.375-1 pt	21-8	14 Do not graze/feed.
Lorsban 4E (chlorpyrifos)	0.5	1 pt	8	14 Do not graze/feed.
Mustang Max (zeta-cypermethrin)	0.0165- 0.0225	2.64-3.6 oz	48.5-35.5	14 Do not graze/feed.
Orthene 90S (acephate)	0.225-0.9	0.25-1.0 lb	4-1	21 Do not graze/feed.
PennCap-M (methyl parathion)	0.125-0.25	0.5-1 pt	16-8	15 Do not apply if bees are foraging in the area.
Phaser 3EC (endosulfan)	1.0-1.5	1.3-2 qt	2-3	0 Do not graze/feed. Do not apply after bolls open.
Proaxis (gamma-cyhalothrin)	0.01-.015	2.56-3.84 fl oz	50-33	21 Do not graze livestock in treated areas.
Provado 1.6F (imidacloprid)	0.025-0.047	2-3.75 oz	64-34	14 Do not graze/feed.
Steward (indoxacarb)	0.09 -0.11	9.2-11.3 oz	14-11.5	14 Do not feed or graze.
Temik 15G (aldicarb)	0.6-1	5-8.5 oz/1000 ft row or 4-7 lb/a		
Vydate L (oxamyl)	0.12-0.25	0.5-1 pt	16-8	21 Do not graze/feed.
Warrior with Zeon (lambda-cyhalothrin)	0.02-0.03	2.56-3.84 fl oz	50-33	21 Do not feed or graze.
SPIDER MITES				
Bidrin 8E (dicrotophos)	0.1 - 0.2	1.6-3.2 oz	80-40	30 Use early season. Do not graze/feed.
Bidrin 8E (dicrotophos)	0.25-0.5	4-8 oz	32-16	30 Use late season. Do not graze/feed.
Capture 2EC (bifenthrin)	0.06-0.10	3.8-6.4 oz	33.6-20	14 Do not graze/feed.
Comite II (propargite)	0.065-0.1	1.5-2.25 pt	85-57	50 Do not graze/feed.
Curacron 8E (profenofos)	0.5-0.751	0.5-0.75 pt	16-10.5	14 Do not graze/feed.
Danitol 2.4 EC (fenpropathrin)	0.2-0.3	10.66-16 oz	12-8	21 Do not feed or graze. For two spotted spider mites.
Decis 1.5 EC (deltamethrin)	0.019-0.03	1.62-2.56 oz	79-50	21 For suppression only.

Table 1. Suggested chemicals for insect control in cotton.

Trade Name (Common Name)	lb ai/a	Formulation/a	a/gal or lb	Minimum Days to Harvest and Restrictions
Denim (emamectin benzoate)	0.01-0.015	8-12 fl oz	16-10.5	21 For suppression only.
Di-Syston 15G (disulfoton)	0.6-1.0	4-6.7 lb	0.25-0.15	28 Rate depends on soil type and row spacing, read label.
Di-Syston 8 (disulfoton)			0.75-1.2 oz/1000 ft	
Dimethoate 4EC (dimethoate)	0.125-0.25	0.25-0.5 pt	32-16	14 Do not graze/feed.
Kelthane MF 4E (dicofol)	0.75-1.5	1.5-3 pt	5.3-2.7	30 Do not graze/feed.
Lorsban 4E (chlorpyrifos)	0.4	1 pt	8	14 Do not graze/feed.
Monitor 4 Spray (methamidophos)	0.5-1.0	1-2 pt	8-4	50 Do not graze/feed.
Proaxis (gamma-cyhalothrin)	0.0125-0.02	3.2-5.12 fl oz	40-25	21 Do not graze livestock in treated areas. For suppression only.
Temik 15G (aldicarb)	0.6-1		5-8.5 oz/1000 ft of row or 4-7 lb/a	
Thimet 20G (phorate)	1.64 Maximum		6-9 oz/1000 ft of row, 8.2 lb/a max	
Zeal (etoxazole)	0.0037- 0.0056	0.66-1 oz	194-128	28
STINK BUGS				
Asana XL 0.66 (esfenvalerate)	0.03-0.05	5.8-9.6 oz	22-13	21 Do not graze/feed. For green stink bug.
Baythroid 2 (cyfluthrin)	0.025-0.04	1.6-2.6 oz	80-49	0 Do not graze/feed.
Bidrin 8E (dicrotophos)	0.25-0.5	4-8 oz	32-16	30 Do not graze/feed.
Capture 2EC (bifenthrin)	0.04-0.10	2.6-6.4 oz	49-20	14 Do not graze/feed.
Danitol (fenpropathrin)	0.15-0.3	8-16 oz	16-8	21 Do not graze/feed. Tank mix with Orthene 90 S (9-16 oz.)
Decis 1.5 EC (deltamethrin)	0.019-0.03	1.62-2.56 oz	79-50	21
Diamond (novaluron)	0.05-0.07	9-12 oz	14-10	30
Karate with Zeon (lambda-cyhalothrin)	0.025-0.04	1.6-2.56 oz	80-50	21 Do not graze/feed.
Leverage (cyfluthrin + imidacloprid)	0.075	3 oz	42.7	14 Do not graze/feed.
Methyl 4 EC (methyl parathion)	1.25-3	2.5-6 pt	3.2-1.33	0; 5-if hand picked
Mustang Max (zeta-cypermethrin)	0.0165-0.0225	2.64-3.6 oz	48.5-35.5	14 Do not graze/feed.
Orthene 90S (acephate)	0.72	0.8 lb	1.25	21 Do not graze/feed.

Table 1. Suggested chemicals for insect control in cotton.

Trade Name (Common Name)	lb ai/a	Formulation/a	a/gal or lb	Minimum Days to Harvest and Restrictions
Penncap-M (methyl parathion)	0.25-1.0	1-3 pt	8-5.3	15 Do not apply if bees are foraging in the area.
Phaser 3EC (endosulfan)	1.0-1.5	1.3-2 qt	3.1-2	0 Do not graze/feed. Do not apply after bolls open.
Proaxis (gamma-cyhalothrin)	0.0125-0.02	3.2-5.12 fl oz	40-25	21 Do not graze livestock in treated areas.
THRIPS				
Admire-2F (imidacloprid)			1.3 oz/1000 row ft	
Ammo 2.5EC (cypermethrin)	0.025-0.1	1.3-5 oz	98.5-25.6	14 Do not graze/feed. For tobacco and soybean thrips.
Asana XL 0.66 (esfenvalerate)	0.03-0.05	5.8-9.6 oz	22-13	21 Do not graze/feed.
Baythroid 2 (cyfluthrin)	0.0125-0.025	0.8-1.6 oz	160-80	0 Do not graze/feed.
Bidrin 8E (dicrotophos)	0.1 - 0.2	1.6-3 oz.	80-42	30 Do not graze/feed.
Capture 2EC (bifenthrin)	0.02-0.10	1.3-6.4 oz	98-20	14 Do not graze/feed.
Centric 40WG (thiamethoxam)	0.05	2.0 oz	8	21 See rotational and grazing restrictions.
Decis 1.5 EC (deltamethrin)	0.13-0.019	1.11-1.62 oz	115-79	21
Diamond (novaluron)	0.06-0.09	9-14 oz	14-9	30
Dimethoate 4EC (dimethoate)	0.125-0.25	0.25-0.5 pt	32-16	14 Do not graze/feed.
Di-Syston 15G (disulfoton)	0.6-1.0	4-6.7 lb	0.25-0.15	28 Not for western flower thrips. Rate depends on soil type and row spacing, read label.
Di-Syston 8 (disulfoton)			0.75-1.2 oz/1000 row ft	
Karate with Zeon (lambda-cyhalothrin)	0.015-0.02	0.96-1.28 oz	133-100	21 Do not graze/feed. For tobacco and soybean thrips.
Leverage (cyfluthrin + imidacloprid)	0.075	3 oz	42.7	14 Do not graze/feed.
Lorsban 4E (chlorpyrifos)	0.25-0.5	1-2 pt	8-4	14 Do not graze/feed.
Monitor 4 (methamidophos)	0.5-1.0	1-2 pt	8-4	50 Do not feed or graze.
Mustang Max (zeta-cypermethrin)	0.008-0.012	1.28-1.92 oz	100-66.7	14 Do not graze/feed. For tobacco and soybean thrips.
Orthene 90S (acephate) Foliar	0.18	3.2 oz	5	21 Do not graze/feed.
Orthene 90 S (acephate) Planter box	0.14-0.18	2.5-3.25 oz	6.4-4.9	21 Do not graze/feed.
Penncap-M (methyl parathion)	0.125-0.25	0.5-1 pt	16-8	15 Do not apply if bees are foraging in the area.

Table 1. Suggested chemicals for insect control in cotton.

Trade Name (Common Name)	lb ai/a	Formulation/a	a/gal or lb	Minimum Days to Harvest and Restrictions
Phaser 3EC (endosulfan)	1.5	2 qt	2	0 Do not graze/feed. Do not apply after bolls open.
Proaxis (gamma-cyhalothrin)	0.0075-0.01	1.92-2.56 fl oz	66-50	21 Do not graze livestock in treated areas.
Temik 15G (aldicarb)	0.5-0.75	4.5-6 oz/1000 ft of row or 3.5-5 lb/a		
Thimet 20G (phorate)	1.64 Maximum	6-9 oz/1000 ft of row, 8.2 lb/a max		
Tracer (spinosad)	0.067-0.089	2.14-2.9 oz	60-45	28
Warrior with Zeon (lambda-cyhalothrin)	0.15-0.02	1.92-2.56 fl oz	66.7-50	21 Do not feed or graze.
WHITEFLIES				
Admire-2F (imidacloprid)		1.3 oz/1000 row ft		
Ammo 2.5 EC (cypermethrin)	0.04-0.1	2-5 oz	64-25.6	14 Do not graze/feed. For suppression only.
Assail 70WP (acetamiprid)	0.075-0.1	1.7-2.3 oz	9.4-6.9	28
Baythroid 2 (cyfluthrin)	0.05	3.2 oz	40	0 Do not graze treated fields. For suppression only.
Capture 2EC (bifenthrin)	0.04-0.10	2.6-6.4	49-20	4 Do not graze/feed.
Centric 40WG (thiamethoxam)	0.05	2.0 oz	8	21 See rotational and grazing restrictions.
Courier (buprofezin)	0.35	8.0 oz	2	14
Curacron 8E (profenofos)	0.751	0.75 pt	10.5	14 Do not graze/feed.
Danitol 2.4 EC (fenpropathrin)	0.15-0.3	8-16 oz	16-8	21 Do not graze/feed. Tank mix with Monitor 4 (16-32 oz) or Orthene 90 S (0.5 lb).
Decis 1.5 EC (deltamethrin)	0.019-0.03	1.62-2.56 oz	79-50	21 For suppression only.
Diamond (novaluron)	0.04-0.08	6-12 oz	21-10	30 For suppression only.
Fulfill (pymetrozine)	0.086	2.75 oz	5.8	21 30 day plant back restriction. For suppression only.
Knack (pyriproxyfen)	0.07-0.06	8-10 oz	16-12.8	14 Do not graze/feed. Not for sweetpotato whitefly.
Leverage (cyfluthrin + imidacloprid)	0.075-0.094	3-3.75 oz	42.7-34.1	14 Do not graze/feed. Not for sweetpotato whitefly.
Monitor 4 Spray (methamidophos)	0.25-0.5	0.5-1 pt	16-8	50 Do not graze/feed.
Orthene 90S (acephate)	0.45-0.9	0.5-1 lb	2-1	21 Do not graze/feed. Not for sweetpotato/silverleaf whitefly.
Penncap-M (methyl parathion)	0.5-1.0	2-4 pt	4-2	15 Do not apply if bees are foraging in the area.
Phaser 3EC (endosulfan)	1	1.3qt	3	0 Do not graze/feed. Do not apply after bolls open.

Table 1. Suggested chemicals for insect control in cotton.

Trade Name (Common Name)	lb ai/a	Formulation/a	a/gal or lb	Minimum Days to Harvest and Restrictions
Proaxis (gamma-cyhalothrin)	0.0125-0.02	3.2-5.12 fl oz	40-25	21 Do not graze livestock in treated areas. For suppression only.
Provado 1.6F (imidacloprid)	0.025-0.047	2-3.75 oz	64-34	14 Do not graze/feed.
Temik 15G (aldicarb)	2.1-3.0	17-24 oz/1000 ft of row or 14-20 lb/a		
Thimet 20G (phorate)	1.64 Maximum	6-9 oz/1000 ft of row, 8.2 lb/a max		
Warrior with Zeon (lambda-cyhalothrin)	0.025-0.04	3.20-5.12 oz	40-25	21 Do not feed or graze. For suppression only.
*CAUTION: Methomyl (Lannate) may be phytotoxic to cotton under stress. Use in late season and Do not exceed 3 applications, applied a minimum of 10 days apart. E = Emulsifiable concentrate, F = Flowable, G = Granules, L = Liquid, SP = Soluble Powder				
For cost per acre, divide your cost per gallon or pound of material by acres covered.				
** Several products containing <i>Bacillus thuringiensis</i> are registered for use on cotton.				