

Chapter 25.

Cole Crop Production in Florida

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BOTANY

Nomenclature

Family - Brassicaceae (Cruciferae)

Broccoli - *Brassica oleraceae* Italica group

Cabbage - *Brassica oleraceae* Capitata group
(Fig. 25-1)

Cauliflower - *Brassica oleraceae* Botrytis group
(Fig. 25-2)

Collards - *Brassica oleraceae* Acephala group

Kale - *Brassica oleraceae* Acephala group

Mustard - *Brassica juncea*

Turnip - *Brassica rapa* Rapifera group (Fig. 25-3)

Origin

It is believed that all of the crops within *B. oleraceae* evolved from a wild cabbage-like plant that was native to the British Isles and to the Mediterranean area of Europe.

Related Species

Other vegetables in the Brassicaceae family are horseradish, rutabaga, Brussels sprouts, kohlrabi, Chinese cabbage, radish, and watercress. Many ornamental plants and oil-bearing plants also are included in this family.

VARIETIES

Florida cabbage varieties are shown in Table 1. Other cole crop varieties are shown in Table 2.

Table 1. Some cabbage varieties grown in Florida.

Green		Red
Atlantis (H)	Green Cup (H)	Cardinal (H)
Augusta (H)	Isalco (H)	Red Dynasty (H)
Blue Dynasty (H)	Matsuma (H)	Red Success (H)
Bravo (H)	Pruktor (H)	Red Rookie (H)
Cheers (H)	Ramada (H)	
Ducati (H)	Rio Verde (H)	
Emblem (H)	Royal Vantage (H)	
Gideon (H)	Solid Blue 790 (H)	
Gloria (H)	Tropicana (H)	
Savoy		
Savoy Ace (H)		
H = hybrid.		

SEEDING AND PLANTING

Seeding and planting information for cole crop production in Florida is given in Table 3.

FERTILIZER AND LIME

Soil test and fertilizer recommendations for cole crops grown on mineral soil are shown in Table 4.

For unmulched crops planted in single rows or beds, broadcast all P₂O₅, micronutrients, and 25 to 50% of N and K₂O before planting. Banding these fertilizers at planting might improve fertilizer efficiency. Sidedress remaining N and K₂O at 6 to 8-leaf stage.

For unmulched leafy cole crops planted in multi-row beds, broadcast P₂O₅, micronutrients, and 25 to 50% of the N and K₂O in the bed area. Topdress or band remaining N and K₂O when plants are 4 to 6 inches tall. Apply supplemental N and K₂O (as above) after leaching rain.

Table 2. Broccoli, cauliflower, collard, kale, mustard, and turnip varieties grown in Florida.

Broccoli:	Kale:
Arcadia (H)	Blue Ridge (H)
Marathon (H)	Vates
Major (H)	
Packman (H)	
Patriot (H)	Mustard:
Pirate (H)	Florida Broad Leaf
	Southern Giant Curled
Cauliflower:	Tendergreen
Majestic (H)	
White Passion (H)	Turnip:
Snow Crown (H)	Just Right (H)
Collards:	Purple Top
Blue Max (H)	Royal Crown (H)
Flash (H)	White Knight (H)
Georgia	
Top Bunch (H)	Turnip Greens:
Top Pick (H)	Seven Top
Vates	
H = hybrid.	

Table 3. Seeding and planting information for cole crops in Florida.

Planting dates	Broccoli¹	Brussels sprouts	Cabbage¹	Cauliflower¹
North Florida	Aug - Feb	Aug - Feb	Aug - Feb	Aug - Feb
Central Florida	Sept - Feb	Sept - Feb	Sept - Feb	Sept - Feb
South Florida	Oct - Jan	Oct - Jan	Sept - Jan	Sept - Jan
Seeding information				
Distance between rows (in)	24 - 40	24 - 40	24 - 40	24 - 40
Distance between plants (in)	10 - 15	18 - 24	9 - 16	12 - 18
Seeding depth (in)	0.25 - 0.5	0.25 - 0.5	0.25 - 0.5	0.25 - 0.5
Seeding per acre for field (lb)	1 - 2	1 - 2	1 - 2	1 - 2
Seeding per acre for transplant (lb)	1.25 - 1.5	1.25 - 1.5	1	1.25 - 1.5
Days to maturity from seed	75 - 90	90 - 120	85 - 110	75 - 90
Days to maturity from transplant	50 - 70	70 - 90	70 - 90	50 - 70
Plant populations ² (per acre)	26,136	15,520	29,403	29,040
Planting dates	Collards	Kale	Mustard	Turnip
North Florida	Aug - Feb	Aug - Feb	Aug - Feb	Aug - Feb
Central Florida	Sept - Feb	Sept - Feb	Sept - Feb	Sept - Feb
South Florida	Sept - Jan	Sept - Jan	Sept - Jan	Sept - Jan
Seeding information				
Distance between rows (in)	24 - 36	18 - 24	12 - 36	12 - 36
Distance between plants (in)	12 - 24	8 - 12	5 - 10	2 - 6
Seeding depth (in)	0.25 - 0.5	0.25 - 0.5	0.25 - 0.5	0.25 - 0.5
Seeding per acre for field (lb)	2 - 4	2 - 4	3 - 5	2 - 3
Seeding per acre for transplant (lb)	1.25 - 1.5	N/A ³	N/A ³	N/A ³
Days to maturity from seed	70 - 90	50 - 70	40 - 50	40 - 60
Days to maturity from transplant	50 - 70	—	—	—
Plant populations ² (per acre)	21,780	43,560	116,160	261,360

¹ Can be seeded in double rows per bed: 15 - 24 in between rows, 10 - 12 in within rows on 40 to 60-inch bed centers.
² Populations based on closest between and within row spacing,
³ Generally direct seeded.

For mulched crops with subsurface irrigation, incorporate all P₂O₅, micronutrients, and 20 to 25% of N and K₂O in the bed (Fig. 25-4). Apply remaining N and K₂O in a single groove (for twin-row) in bed center about 2 to 3 inches deep before mulching. Supplemental N and K₂O can be injected through mulch with a liquid fertilizer injection wheel.

For mulched crops with overhead sprinkler irrigation, incorporate all fertilizer in bed before mulching. Bed over fertilized soil with unfertilized soil so that fertilized soil will be deep enough (3 to 4 inches) to remain moist.

For Histosols, all P₂O₅, K₂O, and micronutrients can be broadcast just before planting, although banding P₂O₅ at planting might increase P efficiency. Some N might be needed for crops started under cool, winter conditions. A total of 40 to 50 lb N per acre might be needed at planting or as a sidedress early in the season (see Table 5).

For drip-irrigated crops, (broccoli, cauliflower, cabbage, collards) apply all P₂O₅, micronutrients, and up to 20 to 25% of N and K₂O in the bed at planting. Apply remaining N and K₂O through tube using schedules presented in Table 6a and 6b.

For leafy cole crops other than those listed here, follow recommendations for mustard.

PLANT TISSUE ANALYSIS

Plant tissue analysis for cole crops is listed in Table 7.

PETIOLE SAP TESTING

Fresh sap can be pressed from leaf petioles and analyzed for nitrogen and potassium concentrations. Results can be used to make adjustments in the fertilization program. Sufficiency ranges for sap testing broccoli and collards are presented in Table 8.

IRRIGATION

Slight variations exist in the water requirements of members of the cole crop family (see Chapter 8, *Principles and Practices of Irrigation Management for Vegetables*, Tables 4-6). Water use rates may approach ETo (see Chapter 8, Table 3) during the rapid growth and develop-

Table 4. Soil test results and fertilizer recommendations for cole crops on mineral soils.¹

Target pH	N lb/A	P ₂ O ₅					K ₂ O				
		VL	L	M	H	VH	VL	L	M	H	VH
Broccoli/Cauliflower/Brussels sprouts											
6.5	175	150	120	100	0	0	150	120	100	0	0
Cabbage/Collards/Chinese cabbage											
6.5	175	150	120	100	0	0	150	120	100	0	0
Kale/Turnip/Mustard											
6.5	120	150	120	100	0	0	150	120	100	0	0

¹ See Chapter 2 section on supplemental fertilizer application and best management practices, pg 11.

Table 5. Soil test and fertilizer recommendations for cole crops grown on Histosols, with target pH 6.0 and N rate= 0 lb/A.

Crop	P and K index and fertilizer rate						
	P index	3	6	9	12	15	18
Broccoli, Cauliflower	P ₂ O ₅ (lb/A)	200	140	80	20	0	0
Cabbage	P ₂ O ₅ (lb/A)	200	140	80	20	0	0
Chinese cabbage	P ₂ O ₅ (lb/A)	280	220	160	100	40	0
	K index	50	80	110	140	170	200
Broccoli, Cauliflower	K ₂ O (lb/A)	200	140	80	20	0	0
Cabbage	K ₂ O (lb/A)	200	140	80	20	0	0
Chinese cabbage	K ₂ O (lb/A)	200	140	80	20	0	0

Table 6a. Injection schedule for N and K for cole crops planted two rows per bed on 6-foot centers on soils very low in K.

Crop	Total nutrients (lb/A) ³		Crop development		Injection (lb/A/day) ¹	
	N	K ₂ O	Stage	Weeks ²	N	K ₂ O
Broccoli	175	150	1	1	2.0	1.75
Cauliflower	175	150	2	9	2.5	2.25
Cabbage	175	150	1	3	2.0	2.0
Collards	175	150	2	6	2.5	2.5
Chinese cabbage	175	150	3	2	2.0	2.0

¹ All nutrients injected. Actual amounts may be lower depending on amount of N and K₂O placed in the bed, the K soil test result, and the crop N requirement.

² Starting from date of seedling emergence or transplanting. First two weeks worth of injecting can be omitted if 25% of total N and K₂O was applied preplant.

³ Seeds and transplants may benefit from applications of a starter solution at a rate no greater than 10 to 15 lbs/acre for N and P₂O₅, and applied through the plant hole or near the seeds.

ment period, decreasing to 85% of that value during final growth. Reductions in available water to the plants will result in reduced growth and development of leaves and shoots. Winter season water use in south Florida may average 0.10 inches per day (2700 gal/A/day), while in north Florida, requirements may average 0.06 inches per day (1600 gal/A/day), a 40% difference. Therefore, close attention to local climatic conditions is necessary for proper water management and irrigation scheduling.

WEED MANAGEMENT

Herbicides labeled for weed control in Cole crops are listed in Table 9.

DISEASE MANAGEMENT

Information on managing diseases of cole crops is given in Table 10.

INSECT MANAGEMENT

The key pest of cole crops in Florida is the diamond-back moth. Resistance to insecticides, particularly to pyrethroids, is very common. If diamondback moth larvae are present, growers should avoid pyrethroids and use *Bacillus thuringiensis* products (both *aizawa* and *kurstaki* strains) as their main insecticides and tank mix or alternate with spinosad or emamectin benzoate. If cabbage looper is present, in addition to diamondback moth larvae, an application of

methomyl may be necessary. Another choice is thiodicarb but this will be more damaging to beneficial insects than methomyl, which has a short residual effect. If diamondback moth is not present and cabbage looper is the main pest, a pyrethroid would be effective. Tebufenozide will also control cabbage looper but not diamondback moth larvae.

- Cauliflower - Table 13
- Collards - Table 14
- Kale - Table 15
- Mustard - Table 16
- Turnip - Table 17

The insecticides currently approved for use on insects attacking cole crops are outlined in the following tables:

- Broccoli - Table 11
- Cabbage - Table 12

PRODUCTION COSTS

Example breakeven production costs for cabbage are given in Table 18.

Table 6b. Supplemental fertilization recommendations for cole crops grown in Florida on sandy soils testing very low in Mehlich-1 potassium (K₂O).

Production System	Nutrient	Recommended-Supplemental fertilization ^z		
		Leaching rain ^{t,u}	Measured "low" plant nutrient content ^{x,w,u}	Extended harvest season ^{x,u}
Plasticulture	N	n/a	1.5 to 2 lbs/A/day for 7 days ^y	1.5 to 2 lbs/A/day ^{y,v}
	K ₂ O	n/a	1.5 to 2 lbs/A/day for 7 days ^y	1.5 to 2 lbs/A/day ^{y,v}
Bare ground	N	30 lbs/A ^s	30 lbs/A ^s	30 lbs/A ^v
	K ₂ O	20 lbs/A ^s	20 lbs/A ^s	20 lbs/A ^v

^z 1 A = 7,260 linear bed feet per acre (6-ft bed spacing); for soils testing "very low" in Mehlich 1 potassium (K₂O)

^y Fertilizer injections may be done daily or weekly. Inject fertilizer at the end of the irrigation event and allow enough time for proper flushing afterwards.

^x Plant nutritional status may be determined with tissue analysis or fresh petiole-sap testing, or any other calibrated method. The "low" diagnosis needs to be based on UF/IFAS interpretative thresholds.

^w Plant nutritional status must be diagnosed every week to repeat supplemental application.

^v Plant nutritional status must be diagnosed after each harvest before repeating supplemental fertilizer application.

^u Supplemental fertilizer applications are allowed when irrigation is scheduled following a recommended method (see chapter 8 on irrigation scheduling in Florida). Supplemental fertilization is to be applied in addition to base fertilization when appropriate. Supplemental fertilization is not to be applied "in advance" with the preplant fertilizer.

^t A leaching rain is defined as a rainfall amount of 3 inches in 3 days or 4 inches in 7 days.

^s Supplemental amount for each leaching rain.

Table 7. Plant tissue analysis for cole crops. Dry wt. basis.

Status	N	P	K	Ca	Mg	S	Fe	Mn	Zn	B	Cu	Mo
	Percent						Parts per million					
Broccoli - Most recently matured leaf sampled at heading												
Deficient	<3.0	0.3	1.1	0.8	0.23	0.2	40	20	25	20	3	0.04
Adequate range	3.0-4.5	0.3-0.5	1.5-4.0	0.8-2.5	0.23-0.40	0.2-0.8	40-300	25-150	45-95	30-50	5-10	0.04-0.16
High	>4.5	0.5	4.0	2.5	0.40	0.8	300	150	100	100	10	0.16
Cabbage - Most recently matured leaf sampled 8 weeks after planting												
Deficient	<3.0	0.3	2.0	0.5	0.20	0.3	30	20	30	20	3	0.3
Adequate range	3.0-6.0	0.3-0.6	2.0-4.0	0.8-2.0	0.25-0.60	0.3-0.8	30-60	20-40	30-50	20-40	3-7	0.3-0.6
High	>6.0	0.6	4.0	2.0	0.60	0.8	100	40	50	40	10	0.6
Cauliflower - Most recently matured leaf sampled at buttoning												
Deficient	<3.0	0.4	2.0	0.8	0.25	0.3	30	30	30	30	5	0.5
Adequate range	3.0-5.0	0.4-0.7	2.0-4.0	0.8-2.0	0.25-0.60	0.3-0.8	30-60	30-80	30-50	30-50	5-10	0.5-0.8
High	>5.0	0.7	4.0	2.0	0.60	1.0	100	100	50	50	10	0.8
Collards - Most recently matured leaf sampled at harvest												
Deficient	<4.0	0.3	3.0	1.0	0.40	0.3	40	40	25	25	5	0.3
Adequate range	4.0-5.0	0.3-0.6	3.0-5.0	1.0-2.0	0.40-1.00	0.3-0.8	40-100	40-100	25-50	25-50	5-10	0.3-0.8
High	>5.0	0.6	5.0	2.0	1.00	0.8	100	100	50	50	10	0.8

Table 8. Sufficiency ranges for petiole sap testing for broccoli and collard.

Crop Development Stage	Fresh Petiole Sap Concentration (ppm)	
	NO ₃ -N	K
Six-leaf stage	800-1000	NR ²
One week prior to first harvest	500-800	
First harvest	300-500	

² NR-No recommended ranges have been developed.

Table 9. Chemical weed controls: broccoli, cabbage, cauliflower, collards, mustard, turnips and kale.

Herbicide	Labeled crops	Time of application to crop	Rate (lbs. AI./Acre)	
			Mineral	Muck
Bensulide (Prefar 4E)	Brassica (cole) leafy vegetables Cabbage, Chinese cabbage (Napa, bokchoy), broccoli, Chinese broccoli, Brussel sprouts, cauliflower, all Chinese brassica crops collards, kale, kohlrabi, mezuna, mustard greens, rape greens	Preplant incorporate, Preemergence	5-6	--
Remarks: Preplant incorporate using power driven rotary cultivations or apply preemergence and incorporate with irrigation. Controls many grass weeds. Provides fair to good control of lambsquarter, purslane, and some amaranths. May be applied under polyethylene mulch.				
Clethodim (Select)	Head and Stem Brassicas Brassica Leafy Vegetables (See definition)	Postemergence	0.1-0.125	0.1-0.125
Remarks: Apply Select at 6-8 fl. oz. For the control of emerged annual and perennial grasses. Use a 1% v/v crop oil concentrate rate in the finished spray volume. Consult the label for rates on specific grass species. Do not apply more than 32 fl. oz. per acre per season. There is a 30 day PHI for the head and stem Brassicas and a 14 day PHI for the leafy Brassica greens.				
Carfentrazone (Aim)	Brassica Leafy Vegetables (All)	Preplant Directed-Hooded Row-middles	0.031	0.031
Remarks: Aim may be applied as a preplant burndown treatment and/or as a post-directed hooded application to row middles for the burndown of emerged broadleaf weeds. May be tank mixed with other registered herbicides. May be applied at up to 2 oz (0.031 lb ai). Use a quality spray adjuvant such as crop oil concentrate (coc) or non-ionic surfactant at recommended rates.				
DCPA (Dacthal W-75)	Broccoli, Brussels Sprouts, Cabbage, Cauliflower and all other BRASSICA (cole) leafy vegetables*	At seeding or Transplanting	6-8	---
* Including: Chinese broccoli, Broccoli raab (rapini), Chinese cabbage (bok choy, napa), Chinese mustard cabbage (gai choy), collards, kale, kohlrabi, mustard greens and rape greens.				
Remarks: Can be sprayed directly over transplants without injury. Application should be made prior to weed seed germination. If weeds have emerged, soil should be clean cultivated or weeded prior to application. Can be preplant incorporated.				
Glyphosate (Roundup, Durango Touchdown, Glyphomax)	Brassica Leafy Vegetables	Chemical fallow Preplant, pre emergence, Pre transplant	0.3 - 1.0	---
Remarks: Roundup, Glyphomax and Touchdown have several formulations. Check the label of each for specific labeling directions.				
S - Metolachlor (Dual Magnum)	Transplanted Cabbage (tight-headed)	Posttransplant	0.64	1.91
Remarks: Label is a third party registration by TPR, Inc. The label is issued by TPR and is valid only when a grower indemnification agreement is signed. Application should be made immediately after transplanting to plants that are at least 5 weeks old or grown in 1" diameter cells or larger. Use 0.64 lb ai (.67 pints) on soils relatively course-textured or low in organic matter. Use higher rate (2 pints) on fine textured soils or high in organic matter. In order to protect ground water resources, do not apply more than 1.91 lb ai (2.0 pints) of Dual Magnum per crop on sandy soils or 3.81 lb ai (4.0 pints) of Dual Magnum per crop on organic soils. Chinese varieties are more sensitive to Dual Magnum injury. Use lower rates as determined for soil type.				

Table 9. Continued.

Herbicide	Labeled crops	Time of application to crop	Rate (lbs. AI./Acre)	
			Mineral	Muck
S-Metolachlor (Dual Magnum)	Direct-seeded cabbage	Preemergence Postemergence (direct-seeded)	0.76 - 1.26	1.91 - 3.82
Remarks: Label is Third Party Registration by TPR, Inc. May be applied preemergence or postemergence to direct seeded tight-headed cabbage. Preemergence applications should be made immediately after seeding at 0.8 to 1.33 pints/A on sandy soils or 2.0 to 4.0 pints or organic soils. Postemergence applications should be made at least 20 days after seeding. Apply once per crop season. Chinese varieties are more sensitive to Dual Magnum injury. Use the lower rates. The use of Dual Magnum may result in leaf crumbling or cupping and twisting. Delayed maturity can be anticipated at higher rates. Climatic conditions during the growing season will affect efficacy and phytotoxicity. Postemergence application should be made at least 20 days after seeding. Apply once per crop season.				
Paraquat (Gramoxone Intron)	Cabbage (including tight headed Chinese Cabbage)	Postemergence Directed/shielded	0.312-0.47	0.312-0.47
Remarks: Apply as a postemergence directed spray/shielded to control emerged annual broadleaf weeds and grasses and for top kill and suppression of emerged perennial weeds after crop emergence or establishment. Apply as a directed spray using 1.2 pts/acre in 40 to 70 gals. spray mix. Do not allow spray to contact cabbage plants as injury or excessive residue may result. Outer leaves should be stripped at time of harvest. Add a nonionic surfactant or crop oil to spray volume.				
Pelargonic acid (Scythe)	Brassica crops (broccoli, cabbage, cauliflower, collards, kale, greens (mustard and turnip)	Preplant, Preemergence, Directed-Shielded	3-10% v/v	3-10% v/v
Remarks: Product is a contact, non-selective, foliar applied herbicide. There is no residual control. May be tank mixed with soil residual compounds. Consult label for rates and other information.				
Oxyfluorfen (Goal 2XL) (Goaltender)	Broccoli, Cabbage, Cauliflower	Pretransplant	0.25 - 0.50	---
Remarks: Controls certain annual broadleaf weeds such as: carpetweed, redroot pigweed, common purslane and Pennsylvania smartweed. May provide suppression of galingosa, common lambsquarter and wild mustard. Note: Crop injury may result with the use of transplants less than 5 weeks old and grown in containers less than 1 inch square. Do not apply to fields that have had acetanilide (Dual, Lasso, Ramrod) application during the current growing season. Severe crop injury may occur.				
Paraquat (Gramoxone Intron) (Firestorm)	Broccoli, Cabbage, Chinese cabbage, Collards, Turnip, Cauliflower	Preplant Preemergence	0.5 - 0.1	0.5 - 0.1
Remarks: Apply as a band treatment over the crop row or as a broadcast treatment before, during or after planting, but before the emergence of the crop. Weeds emerging after the application will not be controlled. Crop plants emerged at the time of application will be killed. Use a non-ionic surfactant in the spray mixture.				
Sethoxydim (Poast)	Broccoli, Cabbage, Cauliflower, and all other Brassica (cole) leafy vegetables*	Postemergence	0.188-0.28	0.188-0.28
* Including: Chinese broccoli, Broccoli raab (rapini), Chinese cabbage (bok choy, napa), Chinese mustard cabbage (gai choy), collards, kale, kohirabi, mustard greens and rape greens. Remarks: Controls actively growing grass weeds. A total of 3 pts. product per acre may be applied in one season. Do not apply within 30 days of harvest. Apply in 5 to 20 gallons of water adding 2 pts. of crop oil concentrate per acre. Unsatisfactory results may occur if applied to grasses under stress. Use 0.188 lb. ai. (1 pt.) on seedling grasses and up to 0.28 lb. ai. (1.5 pts.) on perennial grasses emerging from rhizomes, etc. Consult label for grass species and growth stage for best control.				
Trifluralin (Treflan TR-10) (Treflan EC) (Treflan MTF) (Treflan 5)	Broccoli, Cabbage, Brussels Sprouts, Cauliflower Turnip Greens (for processing), Collard, Mustard, Kale	Preplant incorporated (Direct-seeded and Transplanted) Preplant incorporated (Direct-seeded)	0.5 - 0.75 0.5 - 0.75	--- ---
Remarks: Controls germinating annuals, especially grasses. Incorporate 4 inches or less within 8 hours. Results in Florida are erratic on soils with low organic matter and clay contents. Note precautions of planting non-registered crops within 5 months.				

Table 10. Disease management cole crops.

Chemical	Fungicide Code ⁴	Max. Rate/ Acre /		Min. Days to Harvest	Diseases or Pathogens	Remarks ⁵
		Applic.	Season			
Cole Crops						
Switch 62.5 WG (cyprodinil+fludioxonil)	9+12	14 oz	56 oz	7	Alternaria leaf spot (Alternaria spp.) Powdery mildew (Erysiphe polygoni)	Use on some cole crops. See label for specific information
Endura 70 WG (Boscalid)	7	9 oz	18 oz	0 (Head and stem brassica) 14 (Leafy brassica greens)	Alternaria leaf spot (Alternaria spp.) Sclerotinia stem rot (Sclerotinia spp.) Gray Mold (Botrytis cinerae)	Use on some cole crops. See label for specific information
Acrobat 50 WP (Dimethomorph)	15	6.4 oz	32 oz	0	Downy mildew (Peronospora parasitica)	Use only on leafy brassica greens, see label for details
Amistar (azoxystrobin)	11	5 oz	1.88 lb	0	Alternaria leaf spot (Alternaria spp.) Downy mildew (Peronospora parasitica)	Head and stem brassicas, see label for details Limits are no more than 1 sequential appl. or 3 total appl.
					White rust (Albugo candida) Alternaria leaf spot (Alternaria spp.) Cercospora leaf spot (Cercospora spp.)	Leafy green brassicas, see label for details. Limits are no more than 1 sequential appl. or 3 total appl.
K-Phite (Mono- and di-potassium salts of phosphorous acid)	33	1-2 qts		0	Downy mildew (Peronospora parasitica) Pythium and Phytophthora diseases	Do not apply K-Phite with copper based fungicides. Apply at 2-4 week intervals. See label for restrictions and details.
Copper products	M1				Alternaria leaf spot Downy mildew Black rot	Several copper products are available on some cole crops. See label for specific information
Broccoli (includes Chinese broccoli)						
Equus, Echo 720 or Chlorogold 6 FLS (chlorothalonil)	M5	1 ½ pts	16 pts	7	Alternaria leaf spot Downy mildew	See label for details
Echo 90DF or Equus DF (chlorothalonil)		1 ¼ lb		7		
Bravo Ultrex 82.5WDG (chlorothalonil)		1.4 lbs	14.5 lbs	7		
Bravo Weather Stik 6F (chlorothalonil)	M3	1.5 pts	16 pts	7		
Maneb 80WP (maneb)		2 lbs	12 lbs	0		
Maneb 75DF (maneb)		2 lbs	12.8 lbs	7		
Manex 4F (maneb)		1.6 qt	9.6 qts	7		
Ridomil Gold Bravo 76.4 WP (chlorothalonil + mefenoxam)	M5 + 4	2 lbs	8 lbs	7	Alternaria leaf spot Downy mildew	Limit is 4 applications per crop
Aliette 80WG (fosetyl-al)	33	5 lbs	35 lbs	3	Downy mildew	Limit is 7 appl/crop. Do not tank mix with copper fungicides.
Ridomil Gold 4EC (mefenoxam)	4	2 pts/trtd acre			Pythium seedling blight	Apply at seeding in 7-12 in. band in soil over seed furrow
Rovral 4F (iprodione)	2	2 pts	4 pts	0	Black leg (Leptosphaeria maculans)	See label for restrictions and details
Kocide 2000, Kocide DF (copper hydroxide)	M1	0.75-2 lbs		1	Alternaria leaf spot Black rot Downy mildew	See label for details
Cuprofix Disperss (copper sulfate)						

Table 10. Continued.

Chemical	Fungicide Code ⁴	Max. Rate/ Acre /		Min. Days to Harvest	Diseases or Pathogens	Remarks ⁵
		Applic.	Season			
Broccoli (includes Chinese broccoli) continued.						
Endura (boscalid)	7	6-9 oz		0	Alternaria blight Gray mold Sclerotinia rot Powdery mildew Rhizoctonia rot	Limit is 2 appl/crop. See label for details.
Switch 62.5WG (cyprodinil + fludioxonil)	9 + 12	10-14 oz		7	Alternaria blight Cercospora leaf spot Powdery mildew	See label for details
Terraclor 75WP, Terraclor 15G (PCNB)	14	See label		30 lbs a.i.	Clubroot Rhizoctonia rot	See label for details
Brussels sprouts						
Equus FL, Chlorogold or Echo 720 6FLS (chlorothalonil)	M5	1 ½ pts	16 pts	7	Alternaria leaf spot Downy mildew	See label for details
Echo 90DF or Equus 82.5DF or Bravo Ultrex 82.5 WDG (chlorothalonil)	M3	1.3 lbs	14.5 lbs	7		
Manex 4F (maneb)		1.6 qts	9.6 qts	7		
Maneb 80WP (maneb)		2 lbs	12 lbs	7		
Maneb 75DF (maneb)		2 lbs	12.8 lbs	7		
Aliette 80WG (fosetyl-al)	33	5 lbs	35 lbs	3	Downy mildew	Limit is 7 appl / crop. Do not tank mix with copper fungicides.
Bravo Weather Stik 6F (chlorothalonil)	M5	1.5 pts	16 pts	7	Alternaria leaf spot	See label for details
Kocide 2000, Kocide DF (copper hydroxide)	M1	0.75-2 lbs		1	Alternaria leaf spot Black rot Downy mildew	See label for details
Cuprofix Disperss (copper sulfate)		1.5-2.5 lbs				
Endura (boscalid)	7	6-9 oz	18 oz	0	Alternaria blight Gray mold Sclerotinia rot Powdery mildew Rhizoctonia rot	Limit is 2 appl/crop. See label for details.
Switch 62.5WG (cyprodinil + fludioxonil)	9 + 12	10-14 oz	56 oz	7	Alternaria blight Cercospora leaf spot Powdery mildew	See label for details
Terraclor 75WP, Terraclor 15G (PCNB)	14	See label	30 lbs a.i.		Clubroot Rhizoctonia rot	See label for details
Cabbage (also see Chinese cabbage)						
Bravo Ultrex 82.5WDG (chlorothalonil)	M5	1.4 lbs	14.5 lbs	7	Alternaria leaf spot Downy mildew	See label for details
Bravo Weather Stik 6F (chlorothalonil)		1.5 pts	16 pts	7		
Ridomil Gold Bravo 76.4WP (chlorothalonil + mefenoxam)	M5+4	1.6 lbs	6 lbs	7		
Equus 82.5DF or Echo 90DF (chlorothalonil)	M5 M3	1 5/8 lbs	13.3 lbs	7		
Manex 4F (maneb)		1.6 qts	9.6 qts	7		
Maneb 80WP (maneb)		2 lbs	12 lbs	7		
Ridomil Gold 4EC (mefenoxam)	4	2 pts/trtd acre				

Table 10. Continued.

Chemical	Fungicide Code ⁴	Max. Rate/ Acre /		Min. Days to Harvest	Diseases or Pathogens	Remarks ⁵
		Applic.	Season			
Cabbage (also see Chinese cabbage) continued.						
Kocide 2000, Kocide DF (copper hydroxide)	M1	0.75-2 lbs		1	Alternaria leaf spot Black rot Downy mildew	See label for details
Cuprofix Disperss (copper sulfate)		1.5-2.5 lbs				
Endura (boscalid)	7	6-9 oz	18 oz	0	Alternaria blight Gray mold Sclerotinia rot Powdery mildew Rhizoctonia rot	Limit is 2 appl/crop. See label for details
Switch 62.5WG (cyprodinil + fludioxonil)	9 + 12	10-14 oz		7	Alternaria blight Cercospora blight Powdery mildew	See label for details
Terraclor 75WP, Terraclor 15G (PCNB)	14	See label	30 lbs a.i.		Clubroot Rhizoctonia rot	See label for details
Chinese Cabbage						
Equus 82.5DF or Echo 90DFS (chlorothalonil)	M5	1 ¼ lbs	13.3	7	Alternaria leaf spot Downy mildew	See label for details
Equus, Echo 720 or Chlorogold 6 FLS (chlorothalonil)		1 ½ pts	16 pts	7		
Manex 4F ^{1,2} (maneb)	M3	1.6 qts	9.6 qts	7		
Maneb 80WP ¹ (maneb)		1.5 lbs	12 lbs	7		
Maneb 75DF (maneb)		2 lbs	12.8 lbs	7		
Aliette 80WDG ³ (fosetyl-al)	33	5 lbs	35 lbs	3	Downy mildew	Limit is 7 appl/crop. Do not tank mix with copper fungicides.
Ridomil Gold 4EC ¹ (mefenoxam)	4	2 pts/trtd acre			Pythium diseases	Apply at seeding in 7-12 in. band on soil over seed furrow
Ridomil Gold Bravo 76.4 WP (chlorothalonil + mefenoxam)	M5+4	1.6 lbs		7	Alternaria leaf spot	Limit is 4 appl/crop
Endura ³ (boscalid)	7	6-9 oz		0 (Napa) 14 (Bok Choy)	Alternaria blight Gray mold Sclerotinia rot Powdery mildew Rhizoctonia rot	Limit is 2 appl/crop. See label for details.
Switch 62.5WG (cyprodinil + fludioxonil)	9+ 12	10-14 oz		7	Alternaria blight Cercospora leaf spot Powdery mildew	See label for details
Terraclor 75WP, Terraclor 15G (PCNB)	14		30 lbs a.i.	See label	Clubroot Rhizoctonia rot	See label for details
¹ Tight headed varieties only.						
² For loose headed types, maximum is 1.2 qts/application and 7.2 qts/crop						
³ Bok Choy and Napa Cabbage						
Cauliflower						
Maneb 75DF (maneb)	M3	2 lbs	17.1 lbs	7	Alternaria leaf spot Downy mildew	See label for details
Maneb 80WP (maneb)		2 lbs	12 lbs	7		
Manex 4F (maneb)		1.6 qts	9.6 qts	7		
Equus or Echo 720 FLS (chlorothalonil)	M5	1 ½ pts	16 pts	7		
Bravo Ultrex 82.5 WDG (chlorothalonil)		1.4 lbs	14.5 lbs	7		
Bravo Weather Stik 6F (chlorothalonil)		1.5 pts	16 pts	7		
Ridomil Gold Bravo76.4WP (chlorothalonil + mefenoxam)	M5+4	1.6 lbs	6 lbs	7	Alternaria leaf spot Downy mildew	Limit is 4 appl/crop

Table 10. Continued.

Chemical	Fungicide Code ⁴	Max. Rate/ Acre /		Min. Days to Harvest	Diseases or Pathogens	Remarks ⁵
		Applic.	Season			
Cauliflower (continued)						
Aliette 80WDG (fosetyl-al)	33	5 lbs	35 lbs	3	Downy mildew	Limit is 7 appl/crop. Do not tank mix with copper fungicides.
Ridomil Gold 4EC (mefenoxam)	4	2 pts/trtd acre			Pythium seedling blight	Apply at seeding in 7-12 in. band on soil over seed furrow
Kocide 2000, Kocide DF (copper hydroxide)	M1	0.75-2 lbs		1	Alternaria leaf spot Black rot Downy mildew	See label for details
Cuprofix Disperss (copper sulfate)		1.5-2.5 lbs				
Endura (boscalid)	7	6-9 oz	18 oz	0	Alternaria blight Gray mold Sclerotinia rot Powdery mildew Rhizoctonia rot	Limit is 2 appl/crop. See label for details.
Switch 62.5WG (cyprodinil + fludioxonil)	9+ 12	10-14 oz		7	Alternaria blight Cercospora leaf spot Powdery mildew	See label for details
Terraclor 75WP, Terraclor 15G (PCNB)	14	See label	30 lbs a.i.		Clubroot Rhizoctonia rot	See label for details
Collards						
Aliette 80WDG (fosetyl-al)	33	5 lbs	35 lbs	3	Downy mildew	Limit is 7 appl/crop. Do not tank mix with copper fungicides.
Switch 62.5WG (cyprodinil + fludioxonil)	9+ 12	10-14 oz	56 oz	7	Alternaria blight Cercospora blight Powdery mildew	See label for details
Acrobat 50WP (dimethomorph)	15	6.4 oz	32 oz	0	Powdery mildew	Tank mix with other fungicides. Limit is no more than 2 sequential appl. and 5 total appl/crop.
Amistar (azoxystrobin)	11	2-5 oz	0.93 lb	0	White rust Black spot Cercospora leaf spot	See label for details
Quadris (azoxystrobin)		6.2-15.4 oz	1.44 qts			
Various brands of Sulfur	M2				Powdery mildew Rust	See labels for details
Kale						
Maneb 4F (maneb)	M3	1.6 qts	3.2 qts	10	Alternaria leaf spot	See label for details
Maneb 80WP (maneb)		2 lbs	4 lbs	10	Downy mildew	
Maneb 75DF (maneb)		2 lbs	4.2 lbs	7		
Champ 57.6DP (copper hydroxide)	M1	2/3 lbs		1	Downy mildew	See label for details
Champ Formula 2 4.6F (copper hydroxide)		2/3 pts		1		
Aliette 80WDG (fosetyl-al)	33	5 lbs		3	Downy mildew	Limit is 7 appl/crop. Do not tank mix with copper fungicides.
Endura (boscalid)	7	6-9 oz	18 oz	14	Alternaria blight Gray mold Sclerotinia rot Powdery mildew Rhizoctonia rot	Limit is 2 appl/crop. See label for details
Switch 62.5WG (cyprodinil + famoxonil)	9+ 12	10-14 oz	56 oz	7	Alternaria blight Cercospora leaf spot Powdery mildew	See label for details
Acrobat 50WP (dimethomorph)	15	6.4 oz	32 oz	0	Powdery mildew	Tank mix with other fungicides. Limit is no more than 2 sequential appl. and 5 total appl/crop.

Table 10. Continued.

Chemical	Fungicide Code ⁴	Max. Rate/ Acre /		Min. Days to Harvest	Diseases or Pathogens	Remarks ⁵
		Applic.	Season			
Kale (continued)						
Amistar (azoxystrobin)	11	2-5 oz		0	White rust Black spot	See label for details
Quadris (azoxystrobin)		6.2-15.4 oz	1.44 qts	0	Cercospora leaf spot	
Mustard						
Rovral 4F (iprodione)	2	1pt	4 pts	10	Alternaria leaf spot	Chinese mustard only. Limit is 4 appl/crop.
Aliette 80 WDG (fosetyl-al)	33	5 lbs		3	Downy mildew	Limit is 7 appl/crop. Do not tank mix with copper fungicides.
Kocide 2000, Kocide DF (copper hydroxide)	M1	0.75-2 lb		1	Alternaria leaf spot Black rot Downy mildew	See label for details
Endura (boscalid)	7	6-9 oz	18 oz	14	Alternaria blight Gray mold Sclerotinia rot Powdery mildew Rhizoctonia rot	Limit is 2 appl/crop. See label for details.
Switch 62.5WG (cyprodinil + fludioxonil)	9+ 12	10-14 oz	56 oz	7	Alternaria blight Cercospora leaf spot Powdery mildew	See label for details
Acrobat 50WP (dimethomorph)	15	6.4 oz		0 0	Powdery mildew	Tank mix with other fungicides. Limit is no more than 2 sequential appl. and 5 total appl/crop
Amistar (azoxystrobin)	11	2-5 oz	0.93 lb	0	White rust Black spot Cercospora leaf spot	See label for details
Quadris (azoxystrobin)		6.2-15.4 oz	1.44 qts			
Turnip						
Ridomil Gold 4EC (mefenoxam)	4	2 lb/trtd acre			Pythium seedling blight	Apply at seeding in 7-10 in. band or in seed furrow
Amistar (azoxystrobin)	11	2-5 oz	2 lbs	0	Alternaria leaf spot Aschoyia leaf spot Rust Cercospora leaf spot Powdery mildew	See label for details
Quadris (azoxystrobin)		6.2-15.4 oz	3.75 qts			
Various brands of sulfur	M2				Powdery mildew	See labels for details
Watercress						
Switch 62.5 WG (cyprodinil + fludioxonil)	9+12	14 oz	56 oz	0	Cercospora leaf spot Sclerotinia white mold Rhizoctonia rot	See label for details
Various copper fungicides	M1				Cercospora leaf spot	See labels for details
<p>⁴ FRAC code (fungicide group): Numbers (1-37) and letters (M, U, P) are used to distinguish the fungicide mode of action groups. All fungicides within the same group (with same number or letter) indicate same active ingredient or similar mode of action. This information must be considered for the fungicide resistance management decisions. M = Multi site inhibitors, fungicide resistance risk is low; U = Recent molecules with unknown mode of action; P = host plant defense inducers. Source: http://www.frac.info/ (FRAC = Fungicide Resistance Action Committee). Be sure to read a current product label before applying any chemicals.</p> <p>⁵ Information provided in this table applies only to Florida. Be sure to read a current product label before applying any chemical. The use of brand names and any mention or listing of commercial products or services in the publication does not imply endorsement by the University of Florida Cooperative Extension Service nor discrimination against similar products or services not mentioned.</p>						

Table 11. Selected insecticides approved for use on insects attacking broccoli.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
Admire 2F (imidacloprid)	10-24 fl oz	12	21	aphids, leafhoppers, thrips, whiteflies	4A	Do not apply more than 0.38 lb ai per acre per year.
Admire Pro	4.4-10.5 fl oz					
Agree WG (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	0.5-2.0 lb	4	0	lepidopteran larvae (caterpillar pests)	11B1	Apply when larvae are small for best control. Can be used in greenhouse. OMRI-listed ³ .
*Ambush 25W³ (permethrin)	3.2-6.4 oz	12	1	cabbage aphid (suppression), cabbage looper, diamondback moth, imported cabbageworm	3	Do not apply more than 51.2 oz/acre per season.
*Ammo 2.5 EC³ (cypermethrin)	2.5-5.0 fl oz	12	1	armyworms, crickets, cutworms, corn earworm, loopers, Lygus bug, flea beetles, imported cabbage worm, leafhoppers, saltmarsh caterpillar, stink bugs, aids in control of aphids and whiteflies	3	Maximum of 30 oz of product/acre per season.
*Asana XL (0.66 EC)³ (esfenvalerate)	2.9-9.6 fl oz	12	3	beet armyworm (aids in control), cabbage looper, cutworms, flea beetles, grasshoppers, imported cabbageworm	3	Do not apply more than 0.4 lb ai/acre per season.
Assail 70WP Assail 30 SG (acetamiprid)	0.8-1.7 oz 2.0-4.0 oz	12	7	aphids, thrips, whiteflies	4A	Begin applications for whiteflies when first adults are noticed. Do not apply more than 5 times per season or apply more often than every 7 days.
Avaunt (indoxacarb)	2.5-3.5 oz	12	3	beet armyworm, cabbage looper, cabbage webworm, cross-striped cabbage-worm, diamondback moth, imported cabbageworm	22	Do not apply more than 14 oz per acre per crop. Add a wetting agent to improve coverage.
Aza-Direct (azadirachtin)	1-2 pts, up to 3.5 pts, if needed	4	0	aphids, beetles, caterpillars, leafhoppers, leafminers, thrips, weevils, whiteflies	26	Antifeedant, repellent, insect growth regulator. OMRI-listed ² .
Azatin XL (azadirachtin)	5-21 fl oz	4	0	aphids, beetles, caterpillars, leafhoppers, leafminers, thrips, weevils, whiteflies	26	Antifeedant, repellent, insect growth regulator.
*Baythroid 2³ (cyfluthrin)	0.8-3.2 fl oz	12	0	beet armyworm (1 st & 2 nd instar), cabbage looper, cabbage webworm, cutworms, diamondback moth larvae, flea beetle, grasshoppers, imported cabbageworm, potato leafhopper, southern armyworm (1 st & 2 nd instar), thrips, yellowstriped armyworm	3	Maximum number of applications = 4.
Biobit HP (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5-2.0 lb	4	0	caterpillars (will not control large armyworms)	11B2	Treat when larvae are young. Good coverage is essential. Can be used in the greenhouse. OMRI-listed.

Table 11. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
BotaniGard 22 WP, ES (<i>Beauveria bassiana</i>)	WP: 0.5-2 lb/100 gal ES: 0.5-2 qts/100 gal	4	0	aphids, thrips, whiteflies	--	May be used in greenhouses. Contact dealer for recommendations if an adjuvant must be used. Not compatible in tank mix with fungicides.
*Capture 2 EC³ (bifenthrin)	2.1-6.4 fl oz	12	7	aphids, armyworms, corn earworm, crickets, cucumber beetles, cutworms, diamondback moth, flea beetles, ground beetles, imported cabbageworm, leafhoppers, loopers, mites, saltmarsh caterpillar, stink bugs, thrips, tobacco budworm	3	Do not apply more than 1 quart of product per acre per season.
Checkmate DBM-F (pheromone)	3.1-6.2 fl oz	0	0	diamondback moth	--	For mating disruption. Does not affect larvae and eggs already on plants.
Confirm 2F (tebufenozide)	6-8 fl oz	4	7	armyworms, cabbage looper, cabbage webworm, cross-striped cabbageworm, garden webworm, imported cabbageworm	18	If diamondback moth is also present another, or an additional, insecticide should be considered. Do not exceed 56 ounces of product per season.
Crymax WDG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5-2.0 lb	4	0	caterpillars	11B2	Use high rate for armyworms. Treat when larvae are young.
*Danitol³ (fenpropathrin)	10.67-16 fl oz	24	7	cabbage looper, imported cabbageworm, yellow-striped armyworm	3	Do not apply more than 42.67 fl oz per acre per season.
Deliver (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.25-1.5 lb	4	0	caterpillars	11B2	Use higher rates for armyworms. OMRI-listed ² .
*Diazinon AG-500 (4EC), *50 W (diazinon)	AG500 (4EC) foliar: 0.5-1 pt 50W: 0.5-1 lb AG500 (4EC) preplant: 1-4 qts 50W: 2-8 lb	24	7	aphids, diamondback moth, dipterous leafminers, imported cabbageworm preplant cutworms, mole crickets, root maggots, wireworms	1B 1B	No more than 5 foliar applications per season. See label for depth to incorporate.
Dibrom 8 EC (naled)	1 pt	48	1	aphids, diamondback moth, imported cabbageworm	1B	Apply no more than 1 pt per acre in Florida. Do not apply more than 10 pt per acre per season.
Dimethoate 4 EC; 2.67 (dimethoate)	4EC: 0.5-1 pt 2.67: 0.75-1.5 pt	48	7	aphids	1B	Highly toxic to bees.
DiPel DF (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5-2.0 lb	4	0	caterpillars	11B2	Treat when larvae are young. Good coverage is essential. OMRI-listed ² .
*Di-Syston 8 EC; *15G (disulfoton)	8EC: 1 pt 15G: 6.7 lb	48	14	aphids, flea beetles, leafhoppers	1B	
Endosulfan 3EC (endosulfan)	1-1.33 qt	24	7	aphids, armyworms, cabbage looper, cross-striped cabbageworm, cutworms, diamondback moth, flea beetles, harlequin bug, imported cabbageworm, leafhoppers, stink bugs, whiteflies	2	Do not make more than 4 applications per year or exceed 3.0 lb active ingredient per acre per year.

Table 11. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
Entrust (spinosad)	0.5-3 oz	4	1	armyworms, cabbage looper, diamondback moth, imported cabbageworm, leafminers, thrips	5	See label for resistance management. Do not apply more than 9 oz per acre per crop. OMRI-listed ² .
Esteem Ant Bait (pyriproxyfen)	1.5-2.0 lb	12	1	red imported fire ant	7D	Apply when ants are actively foraging.
Extinguish ((S)-methoprene)	1.0-1.5 lb	4	0	fire ants	7A	Slow-acting IGR (insect growth regulator). Best applied early spring and fall where crop will be grown. Colonies will be reduced after three weeks and eliminated after 8 to 10 weeks. May be applied by ground equipment or aerially.
Fulfill (pymetrozine)	2.75 oz	12	7	cabbage aphid, green peach aphid, turnip aphid, whiteflies	9B	Apply when aphids and whiteflies first appear. Provides suppression of whiteflies. Maximum of 2 applications per crop.
Intrepid 2F (methoxyfenozide)	4-16 fl oz	4	1	beet armyworm, cabbage looper, cabbageworm, cross-striped cabbageworm, fall armyworm garden webworm, imported cabbageworm, southern armyworm, true armyworm, yellowstriped armyworm	18	Do not apply more than 64 oz per acre per season.
Javelin WG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.12-1.50 lb	4	0	most caterpillars, but not <i>Spodoptera</i> species (armyworms)	11B2	Treat when larvae are young. Thorough coverage is essential. OMRI-listed ² .
Knack (pyriproxyfen)	8-10 fl oz	12	7	whiteflies (immatures)	7D	Limited to 2 applications per season.
Kryocide (cryolite)	8-16 lb	12	7	cabbage looper, cutworms, diamond back moth, flea beetles, imported cabbageworm, yellowstriped armyworm	9A	Do not exceed 96 lb per acre per season.
*Lannate LV; *SP (methomyl)	LV: 0.75-3.0 pt SP: 0.25-1 lb	48	3	diamondback moth, imported cabbageworm, loopers	1A	Do not make more than 10 applications per crop.
*Larvin 3.2 (thiodicarb)	16-40 fl oz	48	7	beet armyworm, cabbage looper, diamondback moth, flea beetles, imported cabbageworm	1A	Do not exceed more than 4.0 lb active ingredient per acre per season. (160 fl oz)
Lepinox WDG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	1.0-2.0 lb	12	0	for most caterpillars, including beet armyworm (see label)	11B2	Treat when larvae are small. Thorough coverage is essential.
Lorsban 50 W, 75WG (chlorpyrifos)	50W: 2 lb 75WG: 0.67-1.33 lb	24	21	armyworms, beet armyworm, cabbage aphid, cutworms, flea beetles, imported cabbageworm	1B	No more than 3 foliar applications per season of 75WG. Soil application at planting for root maggot.
15G	See labels for rates	24	at planting or 30 for side dress	root maggots	1B	Only one application per season. See label for restrictions.
Malathion 8F (malathion)	1.5-2.5 pt	12	3	aphids, cabbage looper, imported cabbageworm	1B	

Table 11. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
*MSR Spray Concentrate (oxydemeton-methyl)	1.5-2 pt	48	7	aphids	1B	Do not apply more than 3 times per season.
M-Pede 49% EC (soap, insecticidal)	1-2 % V/V	12	0	aphids, leafhoppers, mites, thrips, whiteflies	--	OMRI-listed ² .
*Mustang Max (zeta-cypermethrin)	2.24-4.0 oz	12	1	aphids (some), armyworms, cabbage looper, cabbage webworm, corn earworm, crickets, cucumber beetles, cutworm, flea beetles, grasshoppers, imported cabbageworm, leafhoppers, saltmarsh caterpillar, southern cabbageworm, stink bugs	3	Do not make applications less than 7 days apart. Diamondback moth populations in Florida have been found to be resistant to pyrethroids.
Neemix 4.5 (azadirachtin)	4-16 fl oz	12	0	aphids, armyworms, cabbage looper, caterpillars, cutworms, diamondback moth, dipterous leafminers, leafminers, imported cabbageworm, thrips, whiteflies	26	IGR and feeding repellent. Greenhouse and field. OMRI-listed ² .
Oberon 2SC (spiromesifen)	7.0-8.5 fl oz	12	7	whiteflies	23	Maximum amount per crop: 25.5 fl oz/acre. No more than 3 applications.
*Pounce 3.2 EC³ (permethrin)	2-4 oz	12	1	cabbage aphids (suppression), armyworms, beet armyworm, cabbage looper, diamondback moth, imported cabbageworm, plant bugs, thrips	3	
*Proaxis Insecticide³ (gamma-cyhalothrin)	1.92-3.84 fl oz	24	1	aphids ⁽²⁾ , armyworm, beet armyworm ⁽¹⁾ , cabbage looper, cabbage webworm, corn earworm, cutworms, diamondback moth, fall armyworm ⁽¹⁾ , flea beetles, grasshoppers, imported cabbageworm, leafhoppers, southern cabbageworm, spider mites ⁽²⁾ , stink bugs, thrips ⁽²⁾ , vegetable weevil (adult), whiteflies ⁽²⁾ , yellow-striped armyworm	3	⁽¹⁾ First and second instars only. ⁽²⁾ Suppression only. Do not apply more than 1.92 pints per acre per season.
*Proclaim (emamectin benzoate)	2.4-4.8 oz	48	7	beet armyworm, cabbage webworm, corn earworm, cross-striped cabbageworm, diamondback moth, fall armyworm, imported cabbageworm, loopers, suppression of leafminers	6	Do not make more than 2 sequential applications without rotating to another product with a different mode of action. Do not apply by aircraft.
Provado 1.6F (imidacloprid)	3.8 oz	12	7 - foliar	aphids, whiteflies	4A	Do not apply more than 0.5 lb ai per year.
Pyrellin EC (pyrethrins + rotenone)	1-2 pt	12	12 hours	aphids, dipterous leafminers, flea beetles, leafhoppers, leafminers, loopers, lygus bug, mites, plant bugs, thrips, whiteflies	3, 21	

Table 11. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
Pyronyl Crop Spray (pyrethrins + piperonyl butoxide)	1-12 oz	12	0	ants, aphids, army- worms, cabbage looper, caterpillars, crickets, cross-striped cabbage- worm, cucumber beetles, diamondback moth, flea beetles, harlequin bug, imported cabbageworm, leafhoppers, thrips, white- flies	3	
Rimon 0.83 EC (novaluron)	6-12 fl oz	12	7	armyworms, cabbage looper, cabbage webworm, corn earworm, cucumber beetles, diamondback moth, imported cab- bageworm, lepidopteran and dipteran leafminers, suppression of: thrips, whiteflies	15	No more than 3 applications per season.
Sevin 80S; XLR, 4F (carbaryl)	80S: 0.63-2.5 lb XLR, 4F: 0.5-2 qts	12	3	armyworms, corn ear- worm, diamondback moth, flea beetles, harlequin bug, imported cabbage worm, leafhoppers	1A	Up to 4 applications, at least 7 days apart.
SpinTor 2 SC (spinosad)	1.5-10 fl oz	4	1	armyworms, cabbage looper, diamondback moth, imported cabbage- worm, leafminers, thrips	5	Do not apply to cole crops grown within a greenhouse or screen- house for transplant.
SunSpray 98.8%, others (Oil, insecticidal)	1-2 gal/100 gal	4	up to day of harvest	aphids, leafhoppers, mites, thrips, whiteflies	--	
*Telone C-35 (dichloro- propene + chloropicrin)	See label	5 days - See label	preplant	symphylans, wireworms	--	See supplemental label for use restrictions for south and central Florida.
*Telone II (dichloropropene)						
Trigard (cyromazine)	2.66 oz	12	7	leafminers	17	Limited to 6 applications.
Trilogy (extract of neem oil)	0.5-2% V/V	4	0	aphids, mites, suppression of thrips and whiteflies	26	Apply morning or evening to reduce potential for leaf burn. Toxic to bees exposed to direct treatment. OMRI-listed ² .
Venom (dinotefuran)	foliar: 1-4 oz soil: 5-6 oz	12	foliar - 1 soil - 21	cabbage aphid, green peach aphid, leafminer, whiteflies	4A	Use one application method, not both (soil or foliar). Foliar: Do not apply more than 6 oz per acre per season. Soil: Do not apply more than 12 oz per acre per season.
*Warrior³ (lambda-cy- alothrin)	1.92-3.84 fl oz	24	1	aphids, armyworms, beet armyworm, cabbage looper, corn earworm, cutworms, diamondback moth, flea beetles, grass- hoppers, imported cab- bageworm, leafhoppers, mites, plant bugs, stink bugs, thrips	3	Do not apply more than 0.24 lb ai/acre per season.

Table 11. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
Xentari DF (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	0.5-2.0 lb	4	0	caterpillars	11B1	Treat when larvae are young. Thorough coverage is essential. May be used in the greenhouse. Can be used in organic produc- tion.
<p>The pesticide information presented in this table was current with federal and state regulations at the time of revision. The user is responsible for determining the intended use is consistent with the label of the product being used. Use pesticides safely. Read and follow label instructions.</p> <p>¹ Mode of Action codes for vegetable pest insecticides from the Insecticide Resistance Action Committee (IRAC) Mode of Action Classification v.3.3 October 2003. 1A. Acetylcholine esterase inhibitors, Carbamates 1B. Acetylcholine esterase inhibitors, Organophosphates</p> <p>2A. GABA-gated chloride channel antagonists 3. Sodium channel modulators 4A. Nicotinic Acetylcholine receptor agonists/antagonists, Neonicotinoids 5. Nicotinic Acetylcholine receptor agonists (not group 4) 6. Chloride channel activators 7A. Juvenile hormone mimics, Juvenile hormone analogues 7D. Juvenile hormone mimics, Pyriproxifen 9A. Compounds of unknown or non-specific mode of action (selective feeding blockers), Cryolite 9B. Compounds of unknown or non-specific mode of action (selective feeding blockers), Pymetrozine 11B1. Microbial disruptors of insect midgut membranes, <i>B.t. var aizawai</i> 11B2. Microbial disruptors of insect midgut membranes, <i>B.t. var kurstaki</i> 12B. Inhibitors of oxidative phosphorylation, disruptors of ATP formation, Organotin miticide 15. Inhibitors of chitin biosynthesis, type 0, Lepidopteran 16. Inhibitors of chitin biosynthesis, type 1, Homopteran 17. Inhibitors of chitin biosynthesis, type 2, Dipteran 18. Ecdysone agonist/disruptor 20. Site II electron transport inhibitors 21. Site I electron transport inhibitors 22. Voltage-dependent sodium channel blocker 23. Inhibitors of lipid biosynthesis 25. Neuroactive (unknown mode of action) 26. Unknown mode of action, Azadirachtin</p> <p>² OMRI listed: Listed by the Organic Materials Review Institute for use in organic production. ³ Avoid pyrethroids if diamondback moth is a problem. Larvae have been shown to be resistant.</p> <p>* Restricted Use Only.</p>						

Table 12. Selected insecticides approved for use on insects attacking cabbage.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
Admire 2F (imidacloprid) Admire Pro	10-24 fl oz 4.4-10.5 fl oz	12	21	aphids, leafhoppers, thrips, whiteflies	4A	Do not apply more than 0.38 lb ai per acre per year.
Agree WG (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	0.5-2.0 lb	4	0	lepidopteran larvae (cater- pillar pests)	11B1	Apply when larvae are small for best control. OMRI-listed ² .
*Ambush 25W³ (permethrin)	3.2-12.8 oz	12	1	cabbage aphid (suppres- sion), cabbage looper, dia- mondback moth, imported cabbageworm	3	Do not apply more than 64 oz/ acre per season.
*Ammo 2.5EC³ (cypermethrin)	2.5-5.0 fl oz	12	1	aphids (aids in control), armyworms, crickets, cutworms, flea beetles, imported cabbageworm, leafhoppers, loopers, Lygus bug, saltmarsh caterpillars, stink bugs, thrips, whiteflies (aids in control)	3	Maximum of 30 oz product per acre per season.
*Asana XL (0.66 EC)³ (esfenvalerate)	2.9-9.6 fl oz	12	3	beet armyworm (aids in control), cabbage looper, cutworms, flea beetles, grasshoppers, imported cabbageworm	3	Do not apply more than 0.4 lb ai/acre per season (8 applications at high rate).
Assail 70WP (acetamiprid) Assail 30 SG	0.8-1.7 oz 2.0-4.0 oz	12	7	aphids, thrips, whiteflies	4A	Begin applications for whiteflies when first adults are noticed. Do not apply more than 5 times per season or apply more often than every 7 days.
Avaunt (indoxacarb)	2.5-3.5 oz	12	3	beet armyworm, cabbage looper, cabbage webworm, cross-striped cabbage- worm, diamondback moth, imported cabbageworm	22	Do not apply more than 14 oz acre per crop. Add a wetting agent to improve coverage.
Aza-Direct (azadirachtin)	1-2 pts, up to 3.5 pts, if needed	4	0	aphids, beetles, caterpil- lars, leafhoppers, leafmin- ers, mites, stink bugs, thrips, weevils, whiteflies	26	Antifeedant, repellent, insect growth regulator. OMRI-listed ² .
Azatin XL (azadirachtin)	5-21 fl oz	4	0	aphids, beetles, caterpil- lars, leafhoppers, leafmin- ers, thrips, weevils, whiteflies	26	Antifeedant, repellent, insect growth regulator.
*Baythroid 2³ (cyfluthrin)	0.8-3.2 fl oz	12	0	beet armyworm (1 st & 2 nd instar), cabbage looper, cabbage webworm, cut- worms, diamondback moth larvae, grasshop- pers, imported cabbage worm, southern army- worm (1 st & 2 nd instar), thrips, yellowstriped armyworm	3	Limit 4 applications per crop.
Biobit HP (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5-2.0 lb	4	0	caterpillars (will not con- trol large armyworms)	11B2	Treat when larvae are young. Good coverage is essential. Can be used in the greenhouse. OMRI-listed ² .

Table 12. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
BotaniGard 22 WP, ES (<i>Beauveria bassiana</i>)	WP: 0.5-2 lb/100 gal ES: 0.5-2 qts/100 gal	4	0	aphids, thrips, whiteflies	--	May be used in greenhouses. Contact dealer for recommendations if an adjuvant must be used. Not compatible in tank mix with fungicides.
*Capture 2 EC³ (bifenthrin)	2.1-6.4 fl oz	12	7	aphids, armyworms, corn earworm, crickets, cucumber beetles, cutworms, diamondback moth, flea beetles, ground beetles, imported cabbageworm, leafhoppers, loopers, mites, saltmarsh caterpillar, stink bugs, thrips, tobacco budworm, whiteflies	3	Do not apply more than one quart of product per acre per season.
Checkmate DBM-F (pheromone)	3.1-6.2 fl oz	0	0	diamondback moth	--	For mating disruption. Does not affect eggs and larvae already on plants.
Confirm 2F (tebufenozide)	6-8 fl oz	4	7	armyworms, cabbage looper, cabbage webworm, cross-striped cabbageworm, garden webworm, imported cabbageworm	18	If diamondback moth is also present another, or an additional, insecticide should be considered. Do not exceed 56 ounces of product per season.
Crymax WDG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5-2.0 lb	4	0	caterpillars	11B2	Use high rate for armyworms. Treat when larvae are young.
*Danitol³ (fenpropathrin)	10.67-16 fl oz	24	7	cabbage looper, imported cabbageworm, yellow-striped armyworm	3	Do not apply more than 0.8 lb active ingredient per acre per season.
Deliver (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.25-1.5 lb	4	0	caterpillars	11B2	Use higher rates for armyworms. OMRI-listed ² .
*Diazinon AG-500; *4 EC, *50 W (diazinon)	AG500, 4EC foliar: 0.5-1 pt 50W: 0.5-1 lb AG500, 4EC preplant: 1-4 oz 50W preplant: 2-8 lb	24	21	aphids, diamondback moth, imported cabbageworm, leafminers	1B	Limit 5 foliar applications per year.
			preplant	cutworms, mole crickets, root maggots, wireworms	1B	See label for depth to incorporate.
Dibrom 8 EC (naled)	1 pt	48	1	aphids, diamondback moth, imported cabbageworm	1B	Do not apply more than 1 pt per acre in Florida. Limit 10 pt per season.
DiPel DF (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5-2.0 lb	4	0	caterpillars	11B2	Treat when larvae are young. Good coverage is essential. OMRI-listed ² .
*Di-Syston 8 EC; *15G (disulfoton)	8EC: 1-2 pt 15G: 6.7 lb	48	42	aphids, flea beetles, leafhoppers	1B	See label for details on rates.

Table 12. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
Endosulfan 3 EC (endosulfan)	1-1.33 qt	24	7	aphids, armyworms, cabbage looper, cross-striped cabbageworm, cutworms, diamondback moth, flea beetles, harlequin bug, imported cabbageworm, leafhoppers, stink bugs, whiteflies	2	Do not make more than 4 applications per year or exceed 3.0 lb active ingredient per acre per year.
Entrust (spinosad)	0.5-3 oz	4	1	armyworms, cabbage looper, diamondback moth, imported cabbage worm, leafminers, thrips	5	Do not apply more than 9 oz per acre per crop. OMRI-listed ² .
Esteem Ant Bait (Pyriproxyfen)	1.5-2.0 lb	12	1	Red imported fire ant	7D	Apply when ants are actively foraging.
Extinguish ((S)-methoprene)	1.0-1.5 lb	4	0	fire ants	7A	Slow-acting IGR (insect growth regulator). Best applied early spring and fall where crop will be grown. Colonies will be reduced after three weeks and eliminated after 8 to 10 weeks. May be applied by ground equipment or aerially.
Fulfill (pymetrozine)	2.75 oz	12	7	cabbage aphid, green peach aphid, turnip aphid, whiteflies	9B	Apply when aphids and whiteflies first appear. Provides suppression of whiteflies. Maximum of 2 applications per crop.
Intrepid 2F (methoxyfenozide)	4-16 fl oz	4	1	beet armyworm, cabbage looper, cabageworm, cross-striped cabbage-worm, fall armyworm, garden webworm, imported cabbageworm, southern armyworm, true armyworm, yellowstriped armyworm	18	Do not apply more than 64 oz per acre per season.
Javelin (Bacillus thuringiensis subspecies kurstaki)	0.12-1.50 lb	4	0	most caterpillars, but not Spodoptera species (armyworms)	11B2	Treat when larvae are young. Thorough coverage is essential. OMRI-listed ² .
Knack IGR (pyriproxyfen)	8-10 fl oz	12	7	whiteflies	7D	Do not apply more than twice per season.
Kryocide (cryolite)	8-16 lb	12	14	cabbage looper, corn earworm, cutworms, Diabrotica beetles, diamondback moth, flea beetles, imported cabbageworm, yellowstriped armyworm	9A	Minimum of 7 days between applications. Do not exceed 96 lb per acre per season.
*Lannate LV; *SP (methomyl)	LV: 0.75-3.0 pt SP: 0.25-1.0 lb	48	1	diamondback moth, fall armyworm, imported cabbageworm, loopers, variegated cutworm	1A	Use a wetting agent to improve coverage.
*Larvin 3.2 (thiodicarb)	16-40 fl oz	48	7	alfalfa looper, beet armyworm, cabbage looper, diamondback moth, flea beetles, imported cabbageworm	1A	Do not exceed more than 4 lb active ingredient per acre per season. (160 fl oz)

Table 12. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
Lepinox WDG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	1.0-2.0 lb	12	0	for most caterpillars, including beet armyworm (see label)	11B2	Treat when larvae are small. Thorough coverage is essential.
Lorsban 50 W, 75WG (chlorpyrifos)	50W: 2 lb 75WG: 0.67-1.33 lb	24	21	aphids, armyworms, beet armyworm, cutworms, flea beetles, imported cab- bageworm	1B	Soil application at planting for root maggot. Maximum of 3 foliar applications of 75WG.
15 G	See labels		preplant	root maggots	1B	One application per season.
Malathion 8F (malathion)	1.5-2.5 pt	12	7	aphids, cabbage looper, diamondback moth, imported cabbageworm, webworms	1B	For best results, combine with other recommended insecticides.
*MSR Spray Concentrate (oxy- demeton-methyl)	1.5-3 pt	48	7	aphids, thrips	1B	Do not apply more than 3 times per season.
*Mocap 15 G, EC (ethoprop)	See labels	48	preplant	symphylans	1B	
M-Pede 49% EC (Soap, insecticidal)	1-2% V/V	12	0	aphids, leafhoppers, mites, plant bugs, thrips, whiteflies	--	OMRI-listed ² .
*Mustang Max³ (zeta-cypermethrin)	2.24-4.0 oz	12	1	aphids (some), army- worms, cabbage looper, cabbage webworm, corn earworm, crickets, cucum- ber beetles, cutworm, flea beetles, grasshoppers, imported cabbageworm, leafhoppers, saltmarsh caterpillar, southern cab- bageworm, stink bugs	3	Do not make applications less than 7 days apart. Diamondback moth populations in Florida have been found to be resistant to pyrethroids.
Neemix 4.5 (azadi- rachtin)	4-16 fl oz	12	0	aphids, armyworms, cab- bage looper, cutworms, diamondback moth, imported cabbageworm, leafminers, thrips, web- worms, whiteflies	26	IGR and feeding repellent. Greenhouse and field. OMRI- listed ² .
Oberon 2SC (spiromesifen)	7.5-8.0 fl oz	12	7	whiteflies	23	Maximum amount per crop: 25.5 fl oz/acre. No more than 3 appli- cations.
*Pounce 3.2 EC⁽¹⁾ (permethrin)	2-8 oz	12	1	armyworms, beet army- worm, cabbage aphid (sup- pression), cabbage looper, cutworms, diamondback moth, flea beetles, import- ed cabbageworm, southern white butterfly	3	
*Proaxis Insecticide¹ (gamma-cyhalothrin)	1.92-3.84 fl oz	24	1	aphids ⁽¹⁾ , armyworm, beet armyworm ⁽¹⁾ , cabbage looper, cabbage webworm, corn earworm, cutworms, diamondback moth, fall armyworm ⁽²⁾ , flea beetles, grasshoppers, imported cabbageworm, leafhoppers, southern cabbageworm, spider mites ⁽¹⁾ , stink bugs, thrips ⁽¹⁾ , vegetable weevil (adult), whiteflies ⁽¹⁾ , yel- lowstriped armyworm	3	⁽¹⁾ Suppression only. ⁽²⁾ First and second instars only. Do not apply more than 1.92 pints per acre per season.

Table 12. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
*Proclaim (emamectin benzoate)	2.4-4.8 oz	48	7	beet armyworm, cabbage webworm, corn earworm, cross-striped cabbage-worm, diamondback moth, fall armyworm, imported cabbageworm, loopers	6	Do not make more than 2 sequential applications without rotating to another product with a different mode of action. Do not apply by aircraft.
Provado 1.6 F (imidacloprid)	3.8 oz	12	7 - foliar	aphids, flea beetles, white-flies	4A	Maximum per season 18.8 oz/acre.
Pyrellin EC (pyrethrin + rotenone)	1-2 pt	12	12 hours	aphids, cabbage looper, flea beetles, harlequin bug, imported cabbageworm, leafhoppers, leafminers, Lygus bug, mites, plant bugs, stink bugs, thrips, vegetable weevils, white-flies	3, 21	
Pyronyl Crop Spray (pyrethrins + piperonyl butoxide)	1-12 oz	12	0	ants, aphids, armyworms, cabbage looper, corn earworm, cucumber beetles, flea beetle, leafhoppers, crickets, cross-striped cabbageworm, diamondback moth, harlequin bug, imported cabbageworm, thrips, webworms, white-flies	3	
Rimon 0.83 EC (novaluron)	6-12 fl oz	12	7	armyworms, cabbage looper, cabbage webworm, corn earworm, cucumber beetles, diamondback moth, imported cabbageworm, leafminers, suppression of thrips and whiteflies	15	Do not apply more than 24 oz per acre per season. See label for application timing.
Sevin 80S; XLR, 4F (carbaryl)	80S: 0.63-2.5 lb XLR, 4F: 0.5-2 qts	12	3	armyworms, corn earworm, diamondback moth, fall armyworm, flea beetle, harlequin bug, imported cabbageworm, stink bugs	1A	Up to 4 applications, at least 7 days apart.
SpinTor 2 SC (spinosad)	1.5-10 fl oz	4	1	armyworms, cabbage looper, diamondback moth, imported cabbageworm, leafminers, thrips	5	Do not apply to cole crops grown for transplant within a greenhouse or screenhouse.
SunSpray 98.8%; JMS Stylet-Oil; others (Oil, insecticidal)	3-6 qt/100 gal (JMS) See labels	4	0	aphids, leafhoppers, leafminers, mites, thrips, whiteflies	--	See label for cautions on tank mixes. Organic Stylet-Oil is OMRI-listed ² .
*Telone C-35 (dichloropropene + chloropicrin)	See label	5 days - See label	2-4 weeks preplant	symphylans, wireworms		See supplemental label for use restrictions in south and central Florida.
*Telone II (dichloropropene)						
Trigard (cyromazine)	2.66 oz	12	7	leafminers	17	Limited to 6 applications.
Trilogy (extract of neem oil)	0.5-2.0% V/V	4	0	aphids, mites, suppression of thrips and whiteflies	26	Apply morning or evening to reduce potential for leaf burn. Toxic to bees exposed to direct treatment. OMRI-listed ² .

Table 12. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
Venom (dinotefuran)	foliar: 1-4 oz soil: 5-6 oz	12	foliar - 1 soil - 21	cabbage aphid, green peach aphid, leafminer, whiteflies	4A	Do not apply more than 6 oz per acre per season (foliar) or 12 oz per acre per season (soil). Use only one method of application (soil or foliar).
*Warrior³ (lambda-cyhalothrin)	1.92-3.84 fl oz	24	1	aphids ⁽¹⁾ , armyworms, beet armyworm, cabbage looper, cabbage webworm, cutworms, diamondback moth, fall armyworm, flea beetles, grasshoppers, imported cabbageworm, leafhoppers, spidermites ⁽¹⁾ , stink bugs, thrips ⁽¹⁾ , whiteflies ⁽¹⁾	3	Do not apply more than 0.24 lb ai/acre per season. (¹) Suppression only.
Xentari DF (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	0.5-2.0 lb	4	0	caterpillars	11B1	Treat when larvae are young. Thorough coverage is essential. May be used in the greenhouse. Can be used in organic production.

The pesticide information presented in this table was current with federal and state regulations at the time of revision. The user is responsible for determining the intended use is consistent with the label of the product being used. Use pesticides safely. Read and follow label instructions.

¹ Mode of Action codes for vegetable pest insecticides from the Insecticide Resistance Action Committee (IRAC) Mode of Action Classification v.3.3 October 2003. 1A. Acetylcholine esterase inhibitors, Carbamates 1B. Acetylcholine esterase inhibitors, Organophosphates

2A. GABA-gated chloride channel antagonists
3. Sodium channel modulators
4A. Nicotinic Acetylcholine receptor agonists/antagonists, Neonicotinoids
5. Nicotinic Acetylcholine receptor agonists (not group 4)
6. Chloride channel activators
7A. Juvenile hormone mimics, Juvenile hormone analogues
7D. Juvenile hormone mimics, Pyriproxifen
9A. Compounds of unknown or non-specific mode of action (selective feeding blockers), Cryolite
9B. Compounds of unknown or non-specific mode of action (selective feeding blockers), Pymetrozine
11B1. Microbial disruptors of insect midgut membranes, *B.t.* var *aizawai*
11B2. Microbial disruptors of insect midgut membranes, *B.t.* var *kurstaki*
12B. Inhibitors of oxidative phosphorylation, disruptors of ATP formation, Organotin miticide
15. Inhibitors of chitin biosynthesis, type 0, Lepidopteran
16. Inhibitors of chitin biosynthesis, type 1, Homopteran
17. Inhibitors of chitin biosynthesis, type 2, Dipteran
18. Ecdysone agonist/disruptor
20. Site II electron transport inhibitors
21. Site I electron transport inhibitors
22. Voltage-dependent sodium channel blocker
23. Inhibitors of lipid biosynthesis
25. Neuroactive (unknown mode of action)
26. Unknown mode of action, Azadirachtin

² OMRI listed: Listed by the Organic Materials Review Institute for use in organic production.
³ Avoid pyrethroids if diamondback moth is a problem. Larvae have been shown to be resistant.

***Restricted Use Only.**

Table 13. Selected insecticides approved for use on insects attacking cauliflower.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
Admire 2F (imidacloprid)	10-24 fl oz	12	21	aphids, whiteflies	4A	Do not apply more than 0.38 lb ai per acre per year.
Admire Pro	4.4-10.5			aphids, leafhoppers, foliage-feeding thrips, whiteflies		See label for application methods. Limited to 0.38 lb ai per acre.
Agree WG (<i>Bacillus thuringiensis</i> subspecies aizawai)	0.5-2.0 lb	4	0	lepidopteran larvae (caterpillar pests)	11B1	Apply when larvae are small for best control. OMRI-listed ² .
*Ambush 25W³ (permethrin)	3.2-6.4 oz	12	1	cabbage aphid (suppression), cabbage looper, diamondback moth (larvae), imported cabbageworm	3	Do not apply more than 51.2 oz per acre per season.
*Ammo 2.5 EC³ (cypermethrin)	2.5-5.0 fl oz	12	1	armyworms, crickets, corn earworm, cutworms, flea beetles, imported cabbageworm, leafhoppers, loopers, lygus bug, stink bugs, aids in control of aphids and whiteflies	3	Maximum of 30 ounces of product per season.
*Asana XL (0.66EC)³ (esfenvalerate)	2.9-9.6 fl oz	12	3	beet armyworm (aids in control), cabbage looper, cutworms, flea beetles, grasshoppers, imported cabbageworm	3	Do not apply more than 0.4 lb ai/acre per season (8 applications at high rate).
Assail 70WP (acetamiprid)	0.8-1.7 oz	12	7	aphids, thrips, whiteflies	4A	Begin applications for whiteflies when first adults are noticed. Do not apply more than 5 times per season or apply more often than every 7 days.
Assail 30SG	2.0-4.0 oz					
Avaunt (indoxacarb)	2.5-3.5 oz	12	3	beet armyworm cabbage looper, cabbage webworm, cross-striped cabbageworm, diamondback moth, imported cabbageworm	22	Do not apply more than 14 oz per acre per crop. Add a wetting agent to improve coverage.
Aza-Direct (azadirachtin)	1-2 pts, up to 3.5 pts, if needed	4	0	aphids, beetles, caterpillars, leafhoppers, leafminers, mites, thrips, weevils, whiteflies	26	Antifeedant, repellent, insect growth regulator. OMRI-listed ² .
Azatin XL (azadirachtin)	5-21 fl oz	4	0	aphids, beetles, caterpillars, leafhoppers, leafminers, thrips, weevils, whiteflies	26	Antifeedant, repellent, insect growth regulator.
*Baythroid 2³ (cyfluthrin)	0.8-3.2 fl oz	12	0	beet armyworm (1st & 2 nd instar), cabbage looper, cabbage webworm, cutworms, diamondback moth larvae, fall armyworm (1st & 2 nd instar), grasshoppers, imported cabbageworm, southern armyworm (1st & 2 nd instar), thrips, yellowstriped armyworm	3	Limit 4 applications per season.
Biobit HP (<i>Bacillus thuringiensis</i> subspecies kurstaki)	0.5-2.0 lb	4	0	caterpillars (will not control large armyworms)	11B2	Treat when larvae are young. Good coverage is essential.

Table 13. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
BotaniGard 22 WP, ES (<i>Beauveria bassiana</i>)	WP: 0.5-2 lb/100 gal ES: 0.5-2 qts/100 gal	4	0	aphids, thrips, whiteflies	--	May be used in greenhouses. Contact dealer for recommendations if an adjuvant must be used. Not compatible in tank mix with fungicides.
*Capture 2 EC³ (bifenthrin)	2.1-6.4 fl oz	12	7	aphids, armyworms, corn earworm, crickets, cucumber beetles, cutworms, diamondback moth, flea beetles, ground beetles, imported cabbageworm, leafhoppers, loopers, mites, saltmarsh caterpillar, stink bugs, thrips, tobacco budworm, whiteflies	3	Do not apply more than one quart of product per acre per season.
Checkmate DBM-F (pheromone)	3.1-6.2 fl oz	0	0	diamondback moth	--	For mating disruption. Does not affect eggs and larvae already on plants.
Confirm 2F (tebufenozide)	6-8 fl oz	4	7	armyworms, cabbage looper, cabbage webworm, cross-striped cabbageworm, garden webworm, imported cabbageworm	18	If diamondback moth is also present another, or an additional, insecticide should be considered. Do not exceed 56 ounces of product per acre per season.
Crymax WDG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5-2.0 lb	4	0	caterpillars	11B2	Use high rate for armyworms. Treat when larvae are young.
*Danitol³ (fenpropathrin)	10.67-16 fl oz	24	7	cabbage aphid ⁽¹⁾ , cabbage looper, cabbage webworm ⁽¹⁾ , green peach aphid ⁽¹⁾ , imported cabbageworm, whiteflies, yellowstriped armyworm	3	Do not apply more than 42.67 fl oz active ingredient per acre per season. (¹) Suppression only.
Deliver (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.25-1.5 lb	4	0	caterpillars	11B2	Use higher rates for armyworms. OMRI-listed ² .
*Diazinon AG-500, *4E, *50W (diazinon)	AG500, 4EC foliar: 0.5-1 pt 50W foliar: 0.5-1 lb AG500, 4EC preplant: 1-4 qts 50W preplant: 2-8 lb	24	7	aphids, diamondback moth, dipterous leafminers, imported cabbageworm	1B	Do not make more than 5 foliar applications per year.
			preplant	cutworms, mole crickets, root maggots, wireworms	1B	See label for depth to incorporate.
Dibrom 8EC (naled)	1 pt	48	1	aphids, diamondback moth (larvae), imported cabbageworm	1B	Apply no more than 1 pt per acre in Florida. Limit 10 pt per acre per season.
Dimethoate 4EC, 2.67 (dimethoate)	4EC: 0.5-1 pt 2.67: 0.75-1.50 pt	48	7	aphids	1B	Highly toxic to bees.

Table 13. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
DiPel DF (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5-2.0 lb	4	0	caterpillars	11B2	Treat when larvae are young. Good coverage is essential. OMRI-listed ² .
*Di-Syston 15G, * 8 (disulfoton)	15G: 6.7 lb 8EC: 1 pt	48	40	aphids, flea beetles, leafhoppers	1B	
Endosulfan 3EC (endosulfan)	1-1.33 qts	24	14	aphids, armyworms, cabbage looper, cross-striped cabbageworm, cutworms, diamondback moth (larvae), flea beetles, harlequin bug, imported cabbageworm, leafhoppers, stink bugs, whiteflies	2	Do not make more than 4 applications per year or exceed 3.0 lb active ingredient per acre per year.
Entrust (spinosad)	0.5-3.0 oz	4	1	armyworms, cabbage looper, diamondback moth, imported cabbageworm, leafminers, thrips	5	Do not apply more than 9 oz per acre per crop. OMRI-listed ² .
Esteem Ant Bait (pyriproxyfen)	1.5-2.0 lb	12	1	Red imported fire ant	7D	Apply when ants are foraging.
Extinguish (S)-methoprene)	1-1.5 lb	4	0	fire ants	7A	Slow-acting IGR (insect growth regulator). Best applied early spring and fall where crop will be grown. Colonies will be reduced after three weeks and eliminated after 8 to 10 weeks. May be applied by ground equipment or aerially.
Fulfill (pymetrozine)	2.75 oz	12	7	cabbage aphid, green peach aphid, turnip aphid, whiteflies	9B	Apply when aphids and whiteflies first appear. Provides suppression of whiteflies. Maximum of 2 applications per crop.
Intrepid 2F (methoxyfenozide)	4-16 fl oz	4	1	beet armyworm, cabbage looper, cabbageworm, cross-striped cabbageworm, fall armyworm garden webworm, imported cabbageworm, southern armyworm, true armyworm, yellowstriped armyworm	18	Do not apply more than 64 oz per acre per season.
Javelin WG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.12-1.5 lb	4	0	most caterpillars, but not Spodoptera species (armyworms)	11B2	Treat when larvae are young. Thorough coverage is essential. OMRI-listed ² .
Knack IGR (pyriproxyfen)	8-10 fl oz	12	7	whiteflies (immatures)	7D	No more than 2 applications per season.
Kryocide (cryolite)	8-16 lb	12	7	cabbage looper, cutworms, diamondback moth (larvae), flea beetles, imported cabbageworm, yellow-striped armyworm	9A	Do not exceed 96 lb per acre per season.
*Lannate LV, *SP (methomyl)	LV: 0.75-3.0 pt SP: 0.25-1.0 lb	48	3	diamondback moth (larvae), imported cabbageworm, loopers, variegated cutworm	1A	Use a wetting agent to improve coverage.

Table 13. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
*Larvin 3.2 (thiodicarb)	16-40 fl oz	48	7	beet armyworm, cabbage looper, diamondback moth (larvae), flea beetles, imported cabbageworm	1A	Do not exceed more than 4.0 lb active ingredient per acre per season. 160 fl oz
Lepinox WDG (Bacillus thuringiensis subspecies kurstaki)	1.0-2.0 lb	12	0	most caterpillars, including beet armyworm (see label)	11B2	Treat when larvae are small. Thorough coverage is essential.
Lorsban 50W; 75WG (chlorpyrifos)	50W: 2 lb 75WG: 0.67-1.33 lb	24	21	aphids, armyworms, beet armyworm, cutworms, flea beetles, imported cabbageworm	1B	Soil application at planting for root maggot. Maximum of 3 foliar applications of 75WG.
15G	See labels	24	at planting	root maggots	1B	One application per season.
Malathion 8F (malathion)	1.5-2.5 pt	12	7	aphids, cabbage loopers, diamondback moth (larvae), flea beetles	1B	
*MSR Spray Concentrate (oxydemeton-methyl)	1.5-2.0 pt	48	7	aphids	1B	Do not apply more than 3 times per season.
M-Pede 49% EC (Soap, insecticidal)	1-2% V/V	12	0	aphids, leafhoppers, mites, thrips, whiteflies, plant bugs	--	OMRI-listed ² .
*Mustang Max³ (zeta-cypermethrin)	2.24-4.0 oz	12	1	aphids (some), armyworms, cabbage looper, cabbage webworm, corn earworm, crickets, cucumber beetles, cutworm, flea beetles, grasshoppers, imported cabbageworm, leafhoppers, saltmarsh caterpillar, southern cabbageworm, stink bugs	3	Do not make applications less than 7 days apart. Diamondback moth populations in Florida have been found to be resistant to pyrethroids.
Neemix 4.5 (azadirachtin)	4-16 fl oz	12	0	aphids, armyworms, cabbage looper, caterpillars, cutworms, diamondback moth (larvae), imported cabbageworm, leafminers, thrips, webworms, whiteflies	26	IGR and feeding repellent. Greenhouse and Field use. OMRI-listed ² .
Oberon 2SC (spiromesifen)	7.5-8.0 fl oz	12	7	whiteflies	23	Maximum amount per crop: 25.5 fl oz/acre. No more than 3 applications.
Orthene 75S, 97 (acephate)	75S: 0.67-1.33 lb 97: 0.5-1.0 lb	24	14	aphids, cabbage looper, diamondback moth (larvae), imported cabbageworm	1B	Do not apply more than 2 lb active ingredient per acre per season.
*Pounce 3.2 EC³ (permethrin)	2-4 oz	12	1	armyworms, beet armyworm, cabbage aphid (suppression), cabbage looper, diamondback moth (larvae), imported cabbageworm, thrips	3	

Table 13. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
*Proaxis Insecticide³ (gamma-cyhalothrin)	1.92-3.84 fl oz	24	1	aphids ⁽¹⁾ , armyworm, beet armyworm ⁽²⁾ , cabbage looper, cabbage webworm, corn earworm, cutworms, diamondback moth, fall armyworm ⁽²⁾ , flea beetles, grasshoppers, imported cabbageworm, leafhoppers, southern cabbageworm, spider mites ⁽¹⁾ , stink bugs, thrips ⁽¹⁾ , vegetable weevil (adult), whiteflies ⁽¹⁾ , yellowstriped armyworm	3	Do not apply more than 1.92 pints per acre per season. (1) Suppression only. (2) First and second instars only.
*Proclaim (emamectin benzoate)	2.4-4.8 oz	48	7	beet armyworm, cabbage webworm, corn earworm, cross-striped cabbageworm, diamondback moth, fall armyworm, imported cabbageworm, loopers	6	Do not make more than 2 sequential applications without rotating to another product with a different mode of action.
Prokil Cryolite 96 (cryolite)	10-16 lb	12	7	cabbage looper, cutworms, diamondback moth (larvae), flea beetles, imported cabbageworm, yellow-striped armyworm	9A	
Provado 1.6F (imidacloprid)	3.8 oz	12	7	aphids, flea beetles, whiteflies	4A	
Pyrellin EC (pyrethrin + rotenone)	1-2 pt	12	12 hours	aphids, leafhoppers, leafminers, loopers, lygus bugs, mites, plant bugs, thrips	3, 21	
Pyronyl Crop Spray (pyrethrins + piperonyl butoxide)	1-12 oz	12	0	ants, aphids, armyworms, cabbage looper, corn earworm, crickets, cross-striped cabbageworm, diamondback moth (larvae), flea beetles, harlequin bug, imported cabbageworm, leafhoppers, thrips, webworms	3	
Rimon 0.83 EC (novaluron)	6-12 fl oz	12	7	armyworms, cabbage loopers, cabbage webworm, corn earworm, cucumber beetles, diamondback moth, imported cabbageworm, leafminers, suppression of thrips, whiteflies	15	Do not apply more than 24 oz per acre per season.
Sevin 80S; XLR; 4F (carbaryl)	80S: 0.63-2.5 lb XLR, 4F: 0.5-2 qt	12	3	armyworms, diamondback moth (larvae), fall armyworm, imported cabbageworm, loopers, webworms, yellowstriped armyworm	1A	Up to 4 applications at least 7 days apart. No more than 6 /acre/crop.
SpinTor 2 SC (spinosad)	1.5-10 fl oz	4	1	armyworms, cabbage looper, diamondback moth, imported cabbageworm, leafminers, thrips	5	Do not apply to cole crops grown within a greenhouse or screenhouse for transplant.
SunSpray 98.8%; JMS Stylet-Oil; others (Oil, insecticidal)	3-6 qts/100 gal (JMS) See labels	4	up to day of harvest	aphids, leafhoppers, leafminers, mites, thrips, whiteflies	--	See label for cautions on tank mixes. Organic Stylet-Oil is OMRI-listed ² .

Table 13. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
*Telone C-35 (dichloropropene + chloropicrin)	See label	5 days - See label	preplant	symphylans, wireworms	--	See supplemental label for use restrictions in south and central Florida.
*Telone II (dichloropropene)						
Trigard (cyromazine)	2.66 oz	12	7	leafminers	17	Limited to 6 applications.
Trilogy (extract of neem oil)	0.5-2.0%	4	0	aphids, mites, suppression of thrips and whiteflies	26	Apply morning or evening to reduce potential for leaf burn. Toxic to bees exposed to direct treatment. OMRI-listed ² .
Venom (dinotefuran)	foliar: 1-4 oz soil: 5-6 oz	12	foliar - 1 soil - 21	cabbage aphid, green peach aphid, leafminers, whiteflies	4A	Do not use both application methods. Maximum per acre per season: 6 oz, foliar or 12 oz, soil.
*Warrior³ (lambda-cyhalothrin)	1.92-3.84 fl oz	24	1	aphids ⁽¹⁾ , armyworms, cabbage webworm, corn earworm, cutworms, diamondback moth, flea beetles, grasshoppers, imported cabbageworm, leafhoppers, loopers, mites ⁽¹⁾ , plant bugs, stink bugs, thrips ⁽¹⁾ , whiteflies ⁽¹⁾	3	Do not apply more than 0.24 lb ai/acre per year. (¹) Suppression only.
Xentari DF (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	0.5-2.0 lb	4	0	caterpillars	11B1	Treat when larvae are young. Thorough coverage is essential. May be used in the greenhouse. Can be used in organic production.

The pesticide information presented in this table was current with federal and state regulations at the time of revision. The user is responsible for determining the intended use is consistent with the label of the product being used. Use pesticides safely. Read and follow label instructions.

¹ Mode of Action codes for vegetable pest insecticides from the Insecticide Resistance Action Committee (IRAC) Mode of Action Classification v.3.3 October 2003. 1A. Acetylcholine esterase inhibitors, Carbamates 1B. Acetylcholine esterase inhibitors, Organophosphates

- 2A. GABA-gated chloride channel antagonists
- 3. Sodium channel modulators
- 4A. Nicotinic Acetylcholine receptor agonists/antagonists, Neonicotinoids
- 5. Nicotinic Acetylcholine receptor agonists (not group 4)
- 6. Chloride channel activators
- 7A. Juvenile hormone mimics, Juvenile hormone analogues
- 7D. Juvenile hormone mimics, Pyriproxifen
- 9A. Compounds of unknown or non-specific mode of action (selective feeding blockers), Cryolite
- 9B. Compounds of unknown or non-specific mode of action (selective feeding blockers), Pymetrozine
- 11B1. Microbial disruptors of insect midgut membranes, *B.t.* var *aizawai*
- 11B2. Microbial disruptors of insect midgut membranes, *B.t.* var *kurstaki*
- 12B. Inhibitors of oxidative phosphorylation, disruptors of ATP formation, Organotin miticide
- 15. Inhibitors of chitin biosynthesis, type 0, Lepidopteran
- 16. Inhibitors of chitin biosynthesis, type 1, Homopteran
- 17. Inhibitors of chitin biosynthesis, type 2, Dipteran
- 18. Ecdysone agonist/disruptor
- 20. Site II electron transport inhibitors
- 21. Site I electron transport inhibitors
- 22. Voltage-dependent sodium channel blocker
- 23. Inhibitors of lipid biosynthesis
- 25. Neuroactive (unknown mode of action)
- 26. Unknown mode of action, Azadirachtin

² OMRI-listed: Listed by the Organic Materials Review Institute for use in organic production.

³ Avoid pyrethroids if diamondback moth is a problem. Larvae have been shown to be resistant.

*** Restricted Use Only**

Table 14. Selected insecticides approved for use on insects attacking collards.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
Admire 2F (imidacloprid)	10-24 fl oz	12	21	aphids, leafhoppers, thrips, whiteflies	4A	Do not apply more than 0.38 lb ai per acre per year.
Admire Pro	4.4-10.5 fl oz					
Agree WG (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	0.5-2.0 lb	4	0	lepidopteran larvae (caterpillar pests)	11B1	Apply when larvae are small for best control. Can be used in greenhouse. OMRI-listed ² .
*Ammo 2.5 EC³ (cypermethrin)	2.5-5.0 fl oz	12	1	armyworms, corn earworm, crickets, cutworms, flea beetles, imported cabbageworm, leafhoppers, loopers, Lygus bug, saltmarsh caterpillar, stink bugs, aids in control of aphids and whiteflies	3	Maximum of 20 ounces of product per acre per season.
*Asana XL (0.66EC)³ (esfenvalerate)	5.8-9.6 fl oz	12	7	beet armyworm (aids in control), cabbage looper, cutworms, flea beetles, grasshoppers, imported cabbageworm	3	Do not feed treated plants to livestock. Do not apply more than 0.2 lb ai/acre per season.
Assail 70WP (acetamiprid)	0.8-1.7 oz	12		aphids, thrips, whiteflies	4A	Begin applications for whiteflies when first adults are noticed. Do not apply more than 5 times per season or apply more often than every 7 days.
Assail 30 SG	2.0-4.0 oz					
Aza-Direct (azadirachtin)	1-2 pts, up to 3.5 pts if needed	4	0	aphids, beetles, caterpillars, leafhoppers, leafminers, mites, stink bugs, thrips, weevils, whiteflies	26	Antifeedant, repellent, insect growth regulator. OMRI-listed ² .
Azatin XL (azadirachtin)	5-21 fl oz	4	0	aphids, beetles, caterpillars, leafhoppers, leafminers, thrips, weevils, whiteflies	26	Antifeedant, repellent, insect growth regulator.
Biobit HP (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5-2.0 lb	4	0	caterpillars (will not control large armyworms)	11B2	Treat when larvae are young. Good coverage is essential. Can be used in the greenhouse. OMRI-listed ² .
BotaniGard 22 WP, ES (<i>Beauveria bassiana</i>)	WP: 0.5-2 lb/100 gal ES: 0.5-2 qt/100 gal	4	0	aphids, thrips, whiteflies	--	May be used in greenhouses. Contact dealer for recommendations if an adjuvant must be used. Not compatible in tank mix with fungicides.
Checkmate DBM-F (pheromone)	3.1-6.2 fl oz	0	0	diamondback moth	--	For mating disruption. Does not affect larvae and eggs already on plants.
Confirm 2F (tebufenozide)	6-8 fl oz	4	7	armyworms, cabbage looper, cabbage webworm, cross-striped cabbageworm, garden webworm, imported cabbageworm	18	If diamondback moth is also present another, or an additional, insecticide should be considered. Do not exceed 56 ounces of product per season.
Crymax WDG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5-2.0 lb	4	0	caterpillars	11B2	Use high rate for armyworms. Treat when larvae are young.

Table 14. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
Deliver (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.25-1.5 lb	4	0	caterpillars	11B2	Use higher rates for armyworms. OMRI-listed ² .
*Diazinon AG-500; *4EC; *50W (diazinon)	AG500, 4EC foliar: 0.5-1 pt 50W foliar: 0.5-1 lb AG500, 4EC pre- plant: 1-4 qts 50W preplant: 2-8 lb	24	10	aphids, corn earworm, cutworms, diamondback moth, harlequin bugs, imported cabbageworm, mole crickets, wireworms	1B	Do not make more than 5 foliar applications per year.
			preplant	cutworms, mole crickets, wireworms	1B	See label for depth to incorporate soil applications.
Dibrom 8EC (naled)	1 pt	48	1	aphids, diamondback moth (larvae), imported cabbageworm	1B	Apply no more than 1 pt per acre in Florida. Do not apply when temperature is over 90°F.
DiPel DF (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5-2.0 lb	4	0	caterpillars	11B2	Treat when larvae are young. Good coverage is essential. OMRI-listed ² .
Endosulfan 3EC (endosulfan)	1-1.33 qt	24	21	aphids, cabbage looper, diamondback moth (lar- vae), fall armyworm, flea beetles, harlequin bug, imported cabbageworm, leafhoppers, whiteflies	2	One application per year.
Entrust (spinosad)	0.5-3.0 oz	4	1	armyworms, cabbage looper, diamondback moth, imported cabbage worm, leafminers, thrips	5	Do not apply more than 9 oz per acre per crop. OMRI-listed ² .
Esteem Ant Bait (pyriproxyfen)	1.5-2.0 lb	12	1	red imported fire ant	7D	Apply when ants are actively foraging.
Extinguish ((S)-methoprene)	1.0-1.5 lb	4	0	fire ants	7A	Slow-acting IGR (insect growth regulator). Best applied early spring and fall where crop will be grown. Colonies will be reduced after three weeks and eliminated after 8 to 10 weeks. May be applied by ground equipment or aerially.
Fulfill (pymetrozine)	2.75 oz	12	7	cabbage aphid, green peach aphid, turnip aphid, whiteflies	9B	Apply when aphids and whiteflies first appear. Provides suppres- sion of whiteflies. Maximum of 2 applications per crop.
Intrepid 2F (methoxyfenozide)	4-16 fl oz	4	1	beet armyworm, cabbage looper, cabbageworm, cross-striped cabbage- worm, fall armyworm garden webworm, imported cabbageworm, southern armyworm, true armyworm, yellowstriped armyworm	18	Do not apply more than 64 oz per acre per season.
Javelin WG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.12-1.50 lb	4	0	most caterpillars, but not <i>Spodoptera</i> species (army- worms)	11B2	Treat when larvae are young. Thorough coverage is essential. OMRI-listed ² .

Table 14. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
Knack IGR (pyriproxyfen)	8-10 fl oz	12	7	whiteflies (immatures)	7D	No more than 2 applications per season.
Kryocide (cryolite)	8-16 lb	12	14	cabbage looper, corn earworm, cucumber beetles, cutworms, diamondback moth (larvae), flea beetles, imported cabbageworm, yellowstriped armyworm	9A	Do not exceed 96 lb per acre per season. Minimum of 10 days between applications.
*Lannate LV; *SP (methomyl)	LV: 1.5-3.0 pt SP: 0.5-1.0 lb	48	10	beet armyworms, cabbage looper, diamondback moth (larvae), imported cabbageworm, variegated cutworm	1A	Fresh market only. See label for other restrictions.
Lepinox WDG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	1.0-2.0 lb	12	0	most caterpillars, including beet armyworm (see label)	11B2	Treat when larvae are small. Thorough coverage is essential.
Lorsban 50W; 75WG (chlorpyrifos)	50W: 1 lb 75WG: 0.67-1.33 lb	24	21	armyworms, cabbage aphids, cutworms, diamondback moth (larvae), flea beetles, imported cabbageworm	1B	See label for restrictions.
15G	See labels	24	at planting	root maggots	1B	Soil application at planting for root maggot.
Malathion 8F (malathion)	1.5-2.5 pt	12	7	aphids, cabbage looper, flea beetles, harlequin bugs, imported cabbageworm	1B	
M-Pede 49% EC (Soap, insecticidal)	1-2% V/V	12	0	aphids, leafhoppers, whiteflies	--	OMRI-listed ² .
*Mustang Max³ (zeta-cypermethrin)	2.24-4.0 oz	12	1	aphids (some), armyworms, cabbage looper, cabbage webworm, corn earworm, crickets, cucumber beetles, cutworm, flea beetles, grasshoppers, imported cabbageworm, leafhoppers, saltmarsh caterpillar, southern cabbageworm, stink bugs	3	Do not make applications less than 7 days apart. Diamondback moth populations in Florida have been found to be resistant to pyrethroids.
Neemix 4.5EC (azadirachtin)	4-16 fl oz	12	0	aphids, armyworms, cabbage looper, caterpillars, cutworms, diamondback moth (larvae), imported cabbageworm, leafminers, thrips, vegetable weevil, whiteflies	26	IGR and feeding repellent. Greenhouse and field use. OMRI-listed ² .
Oberon 2SC (spiromesifen)	7.0-8.5 fl oz	12	7	whiteflies	23	Maximum amount per crop: 25.5 fl oz/acre. No more than 3 applications.
*Proclaim (emamectin benzoate)	2.4-4.8 oz	48	14	beet armyworm, cabbage webworm, cross-striped cabbageworm, diamondback moth, fall armyworm, imported cabbageworm, loopers	6	Do not apply more than 28.8 oz per acre per crop.

Table 14. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
Provado 1.6F (imidacloprid)	3.8 oz	12	7	aphids, flea beetles, whiteflies	4A	
Pyrellin EC (pyrethrin+ rotenone)	1-2 pt	12	12 hours	aphids, cabbage looper, leafhoppers, leafminers, loopers, lygus bugs, mites, thrips, whiteflies	3, 21	
Pyronyl Crop Spray (pyrethrins + piperonyl butoxide)	1-12 fl oz	12	0	ants, aphids, armyworms, cabbage looper, caterpillars, corn earworm, crickets, diamondback moth (larvae), flea beetles, harlequin bug, imported cabbageworm, leafhoppers, stink bugs, thrips, whiteflies	3	
Sevin 80S, 4F, XLR (carbaryl)	80S: 0.63-2.5 lb 4F, XLR: 0.5-2.0 qt	12	14	armyworms, aster leafhopper, corn earworm, fall armyworm, flea beetles, harlequin bugs, imported cabbageworm, leafhoppers, stink bugs, tarnished plant bug	1A	Up to 4 applications, at least 7 days apart.
SpinTor 2 SC (spinosad)	1.5-10 fl oz	4	1	armyworms, cabbage looper, diamondback moth, imported cabbageworm, leafminers, thrips	5	Do not apply to cole crops grown within a greenhouse or screenhouse for transplant.
*Telone C-35 (dichloropropene + chloropicrin)	See label	5 days - See label	preplant	wireworms	--	See supplemental label for use restrictions in central and south Florida counties.
*Telone II (dichloropropene)						
Trigard (cyromazine)	2.66 oz	12	7	leafminers	17	Limited to 6 applications.
Trilogy (extract of neem oil)	0.5-2.0%	4	0	aphids, mites, suppression of thrips and whiteflies	26	Apply morning or evening to reduce potential for leaf burn. Toxic to bees exposed to direct treatment. OMRI-listed ² .
Xentari DF (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	0.5-2.0 lb	4	0	caterpillars	11B1	Treat when larvae are young. Thorough coverage is essential. May be used in the greenhouse. Can be used in organic production.

The pesticide information presented in this table was current with federal and state regulations at the time of revision. The user is responsible for determining the intended use is consistent with the label of the product being used. Use pesticides safely. Read and follow label instructions.

Table 14. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
¹ Mode of Action codes for vegetable pest insecticides from the Insecticide Resistance Action Committee (IRAC) Mode of Action Classification v.3.3 October 2003. 1A. Acetylcholine esterase inhibitors, Carbamates 1B. Acetylcholine esterase inhibitors, Organophosphates 2A. GABA-gated chloride channel antagonists 3. Sodium channel modulators 4A. Nicotinic Acetylcholine receptor agonists/antagonists, Neonicotinoids 5. Nicotinic Acetylcholine receptor agonists (not group 4) 6. Chloride channel activators 7A. Juvenile hormone mimics, Juvenile hormone analogues 7D. Juvenile hormone mimics, Pyriproxifen 9A. Compounds of unknown or non-specific mode of action (selective feeding blockers), Cryolite 9B. Compounds of unknown or non-specific mode of action (selective feeding blockers), Pymetrozine 11B1. Microbial disruptors of insect midgut membranes, B.t. var aizawai 11B2. Microbial disruptors of insect midgut membranes, B.t. var kurstaki 12B. Inhibitors of oxidative phosphorylation, disruptors of ATP formation, Organotin miticide 15. Inhibitors of chitin biosynthesis, type 0, Lepidopteran 16. Inhibitors of chitin biosynthesis, type 1, Homopteran 17. Inhibitors of chitin biosynthesis, type 2, Dipteran 18. Ecdysone agonist/disruptor 20. Site II electron transport inhibitors 21. Site I electron transport inhibitors 22. Voltage-dependent sodium channel blocker 23. Inhibitors of lipid biosynthesis 25. Neuroactive (unknown mode of action) 26. Unknown mode of action, Azadirachtin ² OMRI-listed: Listed by the Organic Materials Review Institute for use in organic production. ³ Avoid pyrethroids if diamondback moth is a problem. Larvae have been shown to be resistant. * Restricted Use Only.						

Table 15. Selected insecticides approved for use on insects attacking kale.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
Admire 2F (imidacloprid)	10-24 fl oz	12	21	aphids, leafhoppers, thrips, whiteflies	4A	Do not apply more than 0.38 lb ai per acre per year.
Admire Pro	4.4-10.5 fl oz					
Agree WG (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	0.5-2.0 lb	4	0	lepidopteran larvae (caterpillar pests)	11B1	Apply when larvae are small for best control. Can be used in greenhouse. OMRI-listed ² .
*Ammo 2.5 EC³ (cypermethrin)	2.5-5.0 fl oz	12	1	armyworms, corn earworm, crickets, cutworms, flea beetles, imported cabbageworm, leafhoppers, loopers, lygus bug, saltmarsh caterpillar, stink bugs, aids in control of aphids and whiteflies	3	Maximum of 20 ounces product per acre per season.
Assail 70WP Assail 30 SG (acetamiprid)	0.8-1.7 oz 2.0-4.0 oz	12	7	aphids, thrips, whiteflies	4A	Begin applications for whiteflies when first adults are noticed. Do not apply more than 5 times per season or apply more often than every 7 days.
Aza-Direct (azadirachtin)	1-2 pts, up to 3.5 pts, if needed	4	0	aphids, beetles, caterpillars, leafhoppers, leafminers, mites, stink bugs, thrips, weevils, whiteflies	26	Antifeedant, repellent, insect growth regulator. OMRI-listed ² .
Azatin XL (azadirachtin)	5-21 fl oz	4	0	aphids, beetles, caterpillars, leafhoppers, leafminers, thrips, weevils, whiteflies	26	Antifeedant, repellent, insect growth regulator.
Biobit HP (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5-2.0 lb	4	0	caterpillars (will not control large armyworms)	11B2	Treat when larvae are young. Good coverage is essential. Can be used in the greenhouse. OMRI-listed ² .
BotaniGard 22 WP, ES (<i>Beauveria bassiana</i>)	WP: 0.5-2 lb/100 gal ES: 0.5-2 qt/100 gal	4	0	aphids, thrips, whiteflies	--	May be used in greenhouses. Contact dealer for recommendations if an adjuvant must be used. Not compatible in tank mix with fungicides.
Checkmate DBM-F (pheromone)	3.1-6.2 fl oz	0	0	diamondback moth	--	For mating disruption. Does not affect eggs and larvae already on plant.
Confirm 2F (tebufenozide)	6-8 fl oz	4	7	armyworms, cabbage looper, cabbage webworm, cross-striped cabbage-worm, garden webworm, imported cabbageworm	18	If diamondback moth is also present another, or an additional, insecticide should be considered. Do not exceed 56 ounces of product per acre per season.
Crymax WDG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5-2.0 lb	4	0	caterpillars	11B2	Use high rate for armyworms. Treat when larvae are young.
Deliver (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.25-1.5 lb	4	0	caterpillars	11B2	Use higher rates for armyworms. OMRI-listed ² .

Table 15. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
*Diazinon AG-500, *4 E, *50 W (diazinon)	foliar-- AG500, 4E: 0.5- 1 pt 50W: 0.5-1 lb preplant-- AG500, 4E: 1-4 qts 50W: 2-8 lb	24	10	aphids, corn earworm, dia- mondback moth, harlequin bugs, imported cabbage- worm	1B	Do not make more than 5 foliar applications per year.
			preplant	cutworms, mole crickets, wireworms		Depth to incorporate varies by pest.
Dibrom 8EC (naled)	1 pt	48	1	aphids, diamondback moth (caterpillar), imported cab- bageworm	1B	Apply no more than 1 pt per acre in Florida. Do not apply when temperature is over 90°F.
Dimethoate 4EC, 2.67 (dimethoate)	4EC: 0.5 pt 2.67: 0.75 pt	48	14	aphids, leafhoppers, leafminers	1B	Highly toxic to bees.
DiPel DF (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5-3.0 oz	4	0	caterpillars	11B2	Treat when larvae are young. Good coverage is essential. Can be used in greenhouse. OMRI- listed ² .
Endosulfan 3EC (endosulfan)	1 qt	24	21	cabbage flea beetle, har- lequin bug, imported cab- bageworm	2	One application per year.
Entrust (spinosad)	0.5-3.0 oz	4	1	armyworms, cabbage looper, diamondback moth, imported cabbage worm, leafminers, thrips	5	Do not apply more than 9 oz per acre per crop. OMRI-listed ² .
Esteem Ant Bait (pyriproxyfen)	1.5-2.0 lb	12	1	red imported fire ant	7D	Apply when ants are actively foraging.
Extinguish ((S)-methoprene)	1.0-1.5 lb	4	0	fire ants	7A	Slow-acting IGR (insect growth regulator). Best applied early spring and fall where crop will be grown. Colonies will be reduced after three weeks and eliminated after 8 to 10 weeks. May be applied by ground equipment or aerially.
Fulfill (pymetrozine)	2.75 oz	12	7	cabbage aphid, green peach aphid, turnip aphid, whiteflies	9B	Apply when aphids and whiteflies first appear. Provides suppression of whiteflies. Maximum of 2 appli- cations per crop.
Intrepid 2F (methoxyfenozide)	4-16 fl oz	4	1	beet armyworm, cabbage looper, cabbageworm, cross-striped cabbage- worm, fall armyworm garden webworm, imported cabbageworm, southern armyworm, true armyworm, yellowstriped armyworm	18	Do not apply more than 64 oz per acre per season.
Javelin WG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.12-1.50 lb	4	0	caterpillars, but not <i>Spodoptera</i> species (army- worms)	11B2	Treat when larvae are young. Thorough coverage is essential. OMRI-listed ² .
Knack IGR (pyriproxyfen)	8-10 fl oz	12	7	whiteflies (immatures)	7D	No more than 2 applications per season.

Table 15. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
*Lannate LV, *SP (methomyl)	LV: 1.5-3.0 pt SP: 0.5-1.0 lb	48	10	beet armyworm, cabbage looper, diamondback moth (caterpillar), imported cabbageworm	1A	
Lepinox WDG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaski</i>)	1.0-2.0 lb	12	0	most caterpillars, including beet armyworm (see label)	11B2	Treat when larvae are small. Thorough coverage is essential.
Lorsban 50W, 75WG (chlorpyrifos)	50W: 2 lb 75WG: 0.67-1.33 lb	24	21	aphids, armyworms, cutworms, diamondback moth (caterpillar), flea beetles, imported cabbageworm	1B	See label for restrictions.
15G	See labels	24	at planting	root maggots	1B	Soil application at planting for root maggot. One application per season.
Malathion 8F (malathion)	1.5-2.5 pt	12	7	aphids, cabbage looper, diamondback moth (caterpillars), imported cabbageworm, webworms	1B	
M-Pede 49% EC (Soap, insecticidal)	1-2% V/V	12	0	aphids, leafhoppers, mites, plant bugs, thrips, whiteflies	--	OMRI-listed ² .
*Mustang Max³ (zeta-cypermethrin)	2.24-4.0 oz	12	1	aphids (some), armyworms, cabbage looper, cabbage webworm, corn earworm, crickets, cucumber beetles, cutworm, flea beetles, grasshoppers, imported cabbageworm, leafhoppers, saltmarsh caterpillar, southern cabbageworm, stink bugs	3	Do not make applications less than 7 days apart. Diamondback moth populations in Florida have been found to be resistant to pyrethroids.
Neemix 4.5 (azadirachtin)	4-16 fl oz	12	0	aphids, armyworms, cabbage looper, diamondback moth, imported cabbageworm, whiteflies	26	IGR and feeding repellent. Greenhouse and field use. OMRI-listed ² .
Oberon 2SC (spiromesifen)	7.0-8.5 fl oz	12	7	whiteflies	23	Maximum amount per crop: 25.5 fl oz/acre. No more than 3 applications.
*Proclaim (emamectin benzoate)	2.4-4.8 oz	48	14	beet armyworm, cabbage webworm, cross-striped cabbageworm, diamondback moth, fall armyworm, imported cabbageworm, loopers	6	Do not apply more than 28.8 oz per acre per crop.
Provado 1.6F (imidacloprid)	3.8 oz	12	7 - foliar	aphids, flea beetles, whiteflies	4A	
Pyrellin EC (pyrethrin + rotenone)	1-2 pt	12	12 hours	aphids, leafhoppers, leafminers, loopers, lygus bug, mites, plant bugs, thrips, whiteflies	3, 21	

Table 15. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
Sevin 80S, XLR, 4F (carbaryl)	80S: 0.63-2.5 lb XLR, 4F: 0.5- 2.0 qt	12	14	armyworms, corn earworm, flea beetles, harlequin bug, imported cabbageworm, leafhoppers, stink bugs, tarnished plant bug	1A	Up to 4 applications, at least 7 days apart.
SpinTor 2 SC (spinosad)	1.5-10 fl oz	4	1	armyworms, cabbage looper, diamondback moth, imported cabbageworm, leafminers, thrips	5	Do not apply to cole crops grown within a greenhouse or screen- house for transplant.
Sulfur 80%W, others	See label	24	see label	mites	--	
*Telone C-35 (dichloro- propene + chloropicrin)	See label	5 days - See label	preplant	symphylans, wireworms	--	See supplemental label for use restrictions in south and central Florida.
*Telone II (dichloropropene)						
Trigard (cyromazine)	2.66 oz	12	7	leafminers	17	Limited to 6 applications.
Trilogy (extract of neem oil)	0.5-2.0% V/V	4	0	aphids, mites, suppression of thrips and whiteflies	26	Apply morning or evening to reduce potential for leaf burn. Toxic to bees exposed to direct treatment. OMRI-listed.
Xentari DF (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	0.5-2.0 lb	4	0	caterpillars	11B1	Treat when larvae are young. Thorough coverage is essential. May be used in the greenhouse. Can be used in organic production.

The pesticide information presented in this table was current with federal and state regulations at the time of revision. The user is responsible for determining the intended use is consistent with the label of the product being used. Use pesticides safely. Read and follow label instructions.

¹ Mode of Action codes for vegetable pest insecticides from the Insecticide Resistance Action Committee (IRAC) Mode of Action Classification v.3.3 October 2003. 1A. Acetylcholine esterase inhibitors, Carbamates 1B. Acetylcholine esterase inhibitors, Organophosphates

- 2A. GABA-gated chloride channel antagonists
- 3. Sodium channel modulators
- 4A. Nicotinic Acetylcholine receptor agonists/antagonists, Neonicotinoids
- 5. Nicotinic Acetylcholine receptor agonists (not group 4)
- 6. Chloride channel activators
- 7A. Juvenile hormone mimics, Juvenile hormone analogues
- 7D. Juvenile hormone mimics, Pyriproxifen
- 9A. Compounds of unknown or non-specific mode of action (selective feeding blockers), Cryolite
- 9B. Compounds of unknown or non-specific mode of action (selective feeding blockers), Pymetrozine
- 11B1. Microbial disruptors of insect midgut membranes, *B.t. var aizawai*
- 11B2. Microbial disruptors of insect midgut membranes, *B.t. var kurstaki*
- 12B. Inhibitors of oxidative phosphorylation, disruptors of ATP formation, Organotin miticide
- 15. Inhibitors of chitin biosynthesis, type 0, Lepidopteran
- 16. Inhibitors of chitin biosynthesis, type 1, Homopteran
- 17. Inhibitors of chitin biosynthesis, type 2, Dipteran
- 18. Ecdysone agonist/disruptor
- 20. Site II electron transport inhibitors
- 21. Site I electron transport inhibitors
- 22. Voltage-dependent sodium channel blocker
- 23. Inhibitors of lipid biosynthesis
- 25. Neuroactive (unknown mode of action)
- 26. Unknown mode of action, Azadirachtin

² OMRI-listed: Listed by the Organic Materials Review Institute for use in organic production.

³ Avoid pyrethroids if diamondback moth is a problem. Larvae have been shown to be resistant.

* **Restricted Use Only.**

Table 16. Selected insecticides approved for use on insects attacking mustard.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
Admire 2F (imidacloprid)	10-24 fl oz	12	21	aphids, leafhoppers, thrips, whiteflies	4A	Do not apply more than 24 fl oz (10.5 for Admire Pro) per acre per year.
Admire Pro	4.4-10.5 fl oz					
Agree WG (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	0.5-2.0 lb	4	0	lepidopteran larvae (caterpillar pests)	11B1	Apply when larvae are small for best control. Can be used in greenhouse. OMRI-listed ² .
*Ammo 2.5EC³ (cypermethrin)	2.5-5.0 fl oz	12	1	armyworms, corn earworm, crickets, cutworms, flea beetles, imported cabbageworm, leafhoppers, loopers, Lygus bug, saltmarsh caterpillar, stink bugs, aids in control of aphids and whiteflies	3	Maximum of 20 ounces of product per acre per season.
*Asana XL(0.66EC)³ (esfenvalerate)	9.6 fl oz	12	7	cabbage looper, imported cabbageworm	3	Do not apply more than 0.2 lb ai/acre per season.
Assail 70WP Assail 30 SG (acetamiprid)	0.8-1.7 oz 2.0-4.0 oz	12	7	aphids, thrips, whiteflies	4A	Begin applications for whiteflies when first adults are noticed. Do not apply more than 5 times per season or apply more often than every 7 days.
Aza-Direct (azadirachtin)	1-2 pts, up to 3.5 pts, if needed	4	0	aphids, beetles, caterpillars, leafhoppers, leafminers, mites, stink bugs, thrips, weevils, whiteflies	26	Antifeedant, repellent, insect growth regulator. OMRI-listed ² .
Azatin XL (azadirachtin)	5-21 fl oz	4	0	aphids, beetles, caterpillars, leafhoppers, leafminers, thrips, weevils, whiteflies	26	Antifeedant, repellent, insect growth regulator.
*Baythroid 2³ (cyfluthrin)	0.8-3.2 fl oz	12	0	beet armyworm (1 st & 2 nd instar), cabbage looper, cabbage webworm, cutworms, diamondback moth larvae, fall armyworm (1 st & 2 nd instar), grasshoppers, imported cabbageworm, southern armyworm (1 st & 2 nd instar), thrips, vegetable weevil, whitefly (suppression), yellowstriped armyworm	3	Maximum number of applications per crop = 4.
Biobit HP (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5-2.0 lb	4	0	caterpillars (will not control large armyworms)	11B2	Treat when larvae are young. Good coverage is essential. Can be used in the greenhouse. OMRI-listed ² .
BotaniGard 22 WP, ES (<i>Beauveria bassiana</i>)	WP: 0.5-2 lb/100 gal ES: 0.5-2 qt/100 gal	4	0	aphids, thrips, whiteflies	--	May be used in greenhouses. Contact dealer for recommendations if an adjuvant must be used. Not compatible in tank mix with fungicides.
Checkmate DBM-F (pheromone)	3.1-6.2 fl oz	0	0	diamondback moth	--	For mating disruption. Does not affect eggs and larvae already on plants.

Table 16. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
Confirm 2F (tebufenozide)	6-8 fl oz	4	7	armyworms, cabbage looper, cabbage webworm, cross-striped cabbage-worm, garden webworm, imported cabbageworm	18	If diamondback moth is also present another, or an additional, insecticide should be considered. Do not exceed 56 ounces of product per acre per season.
Crymax WDG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5-2.0 lb	4	0	caterpillars	11B2	Use high rate for armyworms. Treat when larvae are young.
Deliver (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.25-1.5 lb	4	0	caterpillars	11B2	Use higher rates for armyworms. OMRI-listed ² .
*Diazinon AG-500, *4 E, *50 W (diazinon)	foliar-AG500, 4E: 0.5-1 pt 50W: 0.5-1 lb	24	10	aphids, diamondback moth, dipterous leafminers, imported cabbage-worm	1B	Do not exceed 5 foliar applications.
	preplant -AG500, 4E: 1-4 qts 50W: 2-8 lb		preplant	cutworms, mole crickets, wireworms	1B	See label for depth to incorporate.
Dimethoate 4 EC, 2.67 (dimethoate)	4EC: 0.5 pt 2.67: 0.75 pt	48	14	aphids, leafhoppers, leafminers	1B	
DiPel DF (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5-2.0 lb	4	0	caterpillars	11B2	Treat when larvae are young. Good coverage is essential. OMRI-listed ² .
Endosulfan 3EC (endosulfan)	1-1.33 qts	24	21	aphids, cabbage looper, diamondback moth (larvae), fall armyworm, flea beetles, harlequin bugs, imported cabbageworm, leafhoppers, whiteflies	2	Do not make more than one application per year.
Entrust (spinosad)	0.5-3.0 oz	4	1	armyworms, cabbage looper, diamondback moth, imported cabbageworm, leafminers, thrips	5	Do not apply more than 9 oz per acre per crop. OMRI-listed ² .
Esteem Ant Bait (pyriproxyfen)	1.5-2.0 lb	12	1	red imported fire ant	7D	Apply when ants are actively foraging.
Extinguish (S)-methoprene	1.0-1.5 lb	4	0	fire ants	7A	Slow-acting IGR (insect growth regulator). Best applied early spring and fall where crop will be grown. Colonies will be reduced after three weeks and eliminated after 8 to 10 weeks. May be applied by ground equipment or aerially.
Fulfill (pymetrozine)	2.75 oz	12	7	cabbage aphid, green peach aphid, turnip aphid, whiteflies	9B	Apply when aphids and whiteflies first appear. Provides suppression of whiteflies. Maximum of 2 applications per crop.
Intrepid 2F (methoxyfenozide)	4-16 fl oz	4	1	beet armyworm, cabbage looper, cabbageworm, cross-striped cabbage-worm, fall armyworm garden webworm, imported cabbageworm, southern armyworm, true armyworm, yellowstriped armyworm	18	Do not apply more than 64 oz per acre per season.

Table 16. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
Javelin WG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.12-1.50 lb	4	0	most caterpillars, but not Spodoptera species (army- worms)	11B2	Treat when larvae are young. Thorough coverage is essential OMRI-listed ² .
Knack IGR (pyriproxyfen)	8-10 fl oz	12	7	whiteflies (immatures)	7D	No more than 2 applications per season.
*Lannate LV, *SP (methomyl)	LV: 1.5-3.0 pt SP: 0.5-1.0 lb	48	10	armyworms, beet army- worm, cabbage looper, dia- mondback moth (larvae), imported cabbageworm, loopers	1A	
Lepinox WDG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	1.0-2.0 lb	12	0	for most caterpillars, including beet armyworm (see label)	11B2	Treat when larvae are small. Thorough coverage is essential.
Malathion 8F (malathion)	1.5-2.5 pt	12	7	aphids, cabbage looper, flea beetles, imported cab- bageworm	1B	
M-Pede 49% EC (Soap, insecticidal)	1-2% V/V	12	0	aphids, leafhoppers, mites, thrips, whiteflies	--	OMRI-listed ² .
*Mustang Max³ (zeta-cypermethrin)	2.24-4.0 oz	12	1	aphids (some), army- worms, cabbage looper, cabbage webworm, corn earworm, crickets, cucum- ber beetles, cutworm, flea beetles, grasshoppers, imported cabbageworm, leafhoppers, saltmarsh caterpillar, southern cab- bageworm, stink bugs	3	Do not make applications less than 7 days apart. Diamondback moth populations in Florida have been found to be resistant to pyrethroids.
Neemix 4.5 EC (azadi- rachtin)	4-16 fl oz	12	0	aphids, armyworms, cab- bage looper, cutworms, diamondback moth (larvae), imported cab- bageworm, leafminers, thrips, vegetable weevil, webworms, whiteflies	26	IGR and feeding repellent. Greenhouse and field use. OMRI- listed ² .
Oberon 2SC (spiromesifen)	7.0-8.5 fl oz	12	7	whiteflies	23	Maximum amount per crop: 25.5 fl oz per acre. No more than 3 applications.
*Proclaim (emamectin benzoate)	2.4-4.8 oz	48	14	beet armyworm, cabbage webworm, cross-striped cabbageworm, diamond- back moth, fall armyworm, imported cabbageworm, loopers	6	Do not apply more than 28.8 oz per acre per crop.
Provado 1.6F (imida- cloprid)	3.8 oz	12	7 - foliar	aphids, flea beetles, white- flies	4A	
Pyrellin EC (pyrethrin + rotenone)	1-2 pt	12	12 hours	aphids, cabbage looper, leafhoppers, leafminers, loopers, mites, plant bugs, thrips, whiteflies	3, 21	
Sevin 80 S, XLR, 4F (carbaryl)	80S: 0.63-2.5 lb XLR, 4F: 0.5- 2.0 qt	12	14	armyworms, corn ear- worm, fall armyworm, flea beetles, harlequin bugs, imported cabbageworm, stink bugs, tarnished plant bug	1A	

Table 16. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
SpinTor 2 SC (spinosad)	1.5-10 fl oz	4	1	armyworms, cabbage looper, diamondback moth, imported cabbageworm, leafminers, thrips	5	Do not apply to cole crops grown within a greenhouse or screen- house for transplant.
Sulfur 80%W, others	See label	24	see label	mites	--	
*Telone C-35 (dichloro- propene + chloropicrin)	See label	5 days - See label	preplant	wireworms, symphylans	--	See supplemental label for use restrictions in central in south Florida.
*Telone II (dichloropropene)	See label	5 days - See label	preplant	wireworms, symphylans		See supplemental label for use restrictions in central in south Florida.
Trigard (cyromazine)	2.66 oz	12	7	leafminers	17	Limited to 6 applications.
Trilogy (extract of neem oil)	0.5-2.0% V/V	4	0	aphids, mites, suppression of thrips and whiteflies	26	Apply morning or evening to reduce potential for leaf burn. Toxic to bees exposed to direct treatment. OMRI-listed ² .
Xentari DF (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	0.5-2.0 lb	4	0	caterpillars	11B1	Treat when larvae are young. Thorough coverage is essential. May be used in the greenhouse. Can be used in organic produc- tion.

The pesticide information presented in this table was current with federal and state regulations at the time of revision. The user is responsible for determining the intended use is consistent with the label of the product being used. Use pesticides safely. Read and follow label instructions.

¹ Mode of Action codes for vegetable pest insecticides from the Insecticide Resistance Action Committee (IRAC) Mode of Action Classification v.3.3 October 2003. 1A. Acetylcholine esterase inhibitors, Carbamates 1B. Acetylcholine esterase inhibitors, Organophosphates

- 2A. GABA-gated chloride channel antagonists
- 3. Sodium channel modulators
- 4A. Nicotinic Acetylcholine receptor agonists/antagonists, Neonicotinoids
- 5. Nicotinic Acetylcholine receptor agonists (not group 4)
- 6. Chloride channel activators
- 7A. Juvenile hormone mimics, Juvenile hormone analogues
- 7D. Juvenile hormone mimics, Pyriproxifen
- 9A. Compounds of unknown or non-specific mode of action (selective feeding blockers), Cryolite
- 9B. Compounds of unknown or non-specific mode of action (selective feeding blockers), Pymetrozine
- 11B1. Microbial disruptors of insect midgut membranes, *B.t.* var *aizawai*
- 11B2. Microbial disruptors of insect midgut membranes, *B.t.* var *kurstaki*
- 12B. Inhibitors of oxidative phosphorylation, disruptors of ATP formation, Organotin miticide
- 15. Inhibitors of chitin biosynthesis, type 0, Lepidopteran
- 16. Inhibitors of chitin biosynthesis, type 1, Homopteran
- 17. Inhibitors of chitin biosynthesis, type 2, Dipteran
- 18. Ecdysone agonist/disruptor
- 20. Site II electron transport inhibitors
- 21. Site I electron transport inhibitors
- 22. Voltage-dependent sodium channel blocker
- 23. Inhibitors of lipid biosynthesis
- 25. Neuroactive (unknown mode of action)
- 26. Unknown mode of action, Azadirachtin

² OMRI listed: Listed by the Organic Materials Review Institute for use in organic production.

³ Avoid pyrethroids if diamondback moth is a problem. Larvae have been shown to be resistant.

*** Restricted Use Only.**

Table 17. Selected insecticides approved for use on insects attacking turnips.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
Actara (thiamethoxam)	1.5-4.0 oz	12	7	aphids, flea beetles, leafhoppers, whiteflies	4A	Use higher rate for whiteflies. For turnips grown for roots. Do not exceed 8 oz/acre per season.
Admire 2F (imidacloprid)	10-24 fl oz	12	21	aphids, flea beetles, leafhoppers, whiteflies		Turnips grown for tops and roots.
Admire Pro	4.4-10.5 fl oz			aphids, flea beetles, leafhoppers, thrips, whiteflies		One application, no more than 10.5 oz/acre.
Agree WG (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	0.5-2.0 lb	4	0	lepidopteran larvae (caterpillar pests)	11B1	Apply when larvae are small for best control.
*Ambush 25W² (permethrin)	3.2-6.4 oz	12	1	cabbage aphid (suppression), cabbage looper, diamondback moth (larvae), imported cabbageworm	3	Do not exceed 4 applications. For turnips grown for roots.
*Asana XL (0.66 EC) (esfenvalerate)	5.8-9.6 fl oz	12	7	armyworm, flea beetles, imported cabbageworm	3	Do not apply more than 0.4 lb ai per acre per season.
Aza-Direct (azadirachtin)	1-2 pts, up to 3.5 pts, if needed	4	0	aphids, beetles, caterpillars, leafhoppers, leafminers, mites, stink bugs, thrips, weevils, whiteflies	26	Antifeedant, repellent, insect growth regulator. OMRI-listed ³ .
Azatin XL (azadirachtin)	5-21 fl oz	4	0	aphids, beetles, caterpillars, leafhoppers, leafminers, thrips, weevils, whiteflies	26	Antifeedant, repellent, insect growth regulator.
Biobit HP (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5-2.0 lb	4	0	caterpillars (will not control large armyworms)	11B2	Treat when larvae are young. Good coverage is essential. Can be used in the greenhouse. OMRI-listed ³ .
BotaniGard 22 WP, ES (<i>Beauveria bassiana</i>)	WP: 0.5-2 lb/100 gal ES: 0.5-2 qt/100 gal	4	0	aphids, thrips, whiteflies	--	May be used in greenhouses. Contact dealer for recommendations if an adjuvant must be used. Not compatible in tank mix with fungicides.
Checkmate DBM-F (pheromone)	3.1-6.2 fl oz	0	0	diamondback moth	--	For mating disruption. Does not affect eggs and larvae already on plants.
Confirm 2F (tebufenozide)	6-8 fl oz	4	7	armyworms, cabbage looper, cabbage webworm, cross-striped cabbageworm, garden webworm, imported cabbageworm	18	If diamondback moth is also present another, or an additional, insecticide should be considered. Do not exceed 56 ounces of product per acre per season.
Crymax WDG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5-2.0 lb	4	0	caterpillars	11B2	Use high rate for armyworms. Treat when larvae are young.
Deliver (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.25-1.5 lb	4	0	caterpillars	11B2	Use higher rates for armyworms. OMRI-listed ³ .
Dimethoate 4EC, 2.67 (dimethoate)	4EC: 0.5 pt 2.67: 0.75 pt	48	14 - greens & roots	aphids, leafhoppers, leafminers	1B	Highly toxic to bees.
DiPel DF (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5-2.0 lb	4	1	caterpillars	11	Treat when larvae are young. Good coverage is essential. OMRI-listed ³ .

Table 17. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
Entrust (spinosad)	0.5-3.0 oz (greens)	4	1 - greens	armyworms, cabbage looper, diamondback moth, imported cabbageworm, leafminers, thrips	5	Do not apply to cole crops grown within a greenhouse or screen- house for transplant. OMRI- listed ³ .
	1.0-2.0 oz (roots)		3 - roots			
Extinguish ((S)-methoprene)	1.0-1.5 lb	4	0	fire ants	7A	Slow-acting IGR (insect growth regulator). Best applied early spring and fall where crop will be grown. Colonies will be reduced after three weeks and elimi- nated after 8 to 10 weeks. May be applied by ground equipment or aerially.
Fulfill (pymetrozine)	2.75 oz	12	7	cabbage aphid, green peach aphid, turnip aphid, whiteflies	9B	Apply when aphids and whiteflies first appear. Provides suppression of whiteflies. Maximum of 2 appli- cations per crop. Greens only.
Intrepid 2F (methoxyfenozide)	4-8 fl oz if grown for greens 6-16 fl oz if grown for roots	4	1 - greens 14 - roots	beet armyworm, cabbage looper, cabbageworm, cross-striped cabbage- worm, fall armyworm gar- den webworm, imported cabbageworm, southern armyworm, true army- worm, yellowstriped army- worm	18	Do not apply more than 64 oz per acre per season.
Javelin WG (Bacillus thuringiensis subspecies kurstaki)	0.12-1.50 lb	4	0	most caterpillars, but not Spodoptera species (army- worms)	11B2	Roots only. Treat when larvae are young. Thorough coverage is essential. OMRI-listed ³ .
*Lannate LV, *SP (methomyl)	LV: 1.5-3.0 pt SP: 0.5-1.0 lb	48	10 - tops	beet armyworm, cabbage looper, cabbageworm, dia- mondback moth (larvae), imported cabbageworm	1A	
Lepinox WDG (Bacillus thuringiensis subspecies kurstaki)	1.0-2.0 lb	12	0	for most caterpillars, including beet armyworm (see label)	11B2	Treat when larvae are small. Thorough coverage is essential.
Lorsban 15 G, 75G (chlorpyrifos)	See labels for rates	24	at plant- ing	root maggots	1B	One application per season.
M-Pede 49% EC (Soap, insecticidal)	1-2% V/V	12	0	aphids, leafhoppers, mites, plant bugs, thrips, white- flies	--	OMRI-listed ² .
Neemix 4.5 EC (azadi- rachtin)	4-16 fl oz	12	0	aphids, armyworms, cab- bage looper, cutworms, diamondback moth (lar- vae), imported cabbage- worm, leafminers, thrips, whiteflies	26	IGR and feeding repellent. Greenhouse and field use. OMRI-listed ³ .

Table 17. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
Platinum (thiamethoxam)	5-8 fl oz	12	at plant- ing	aphids, flea beetles, leaf- hoppers, whiteflies	4A	Do not exceed a total of 8 fl oz per acre per season.
*Pounce 3.2 EC² (per- methrin)	2-4 oz	12	1	armyworms, beet army- worm, cabbage looper, corn earworm, cutworms, diamondback moth (lar- vae), fall armyworm, imported cabbageworm, leafhoppers, leafminers, southern armyworm, southern white butterfly	3	
*Proclaim (emamectin benzoate)	2.4-4.8 oz	48	14	beet armyworm, cabbage webworm, corn earworm, cross-striped cabbage- worm, diamondback moth, fall armyworm, imported cabbageworm, cabbage looper, suppression of Liriomyza leafminers	6	Greens only.
Provado 1.6F (imidacloprid)	3.8 oz (3.5 oz if grown for roots)	12	7	aphids, flea beetles, white- flies	4A	Do not use in conjunction with Admire. Maximum of 18.8 fl oz per acre per season (tops) 10.5 fl oz. per acre per season (roots).
Pyrellin EC (pyrethrin + rotenone)	1-2 pt	12	12 hours	aphids, leafhoppers, leafminers, loopers, mites, plant bugs, thrips	3	
SpinTor 2 SC (spinosad)	3-6 fl oz	4	1 - tops 3 - roots	armyworms, cabbage looper, diamondback moth, imported cabbageworm, leafminers, thrips	5	Do not apply to cole crops grown within a greenhouse or screen- house for transplant.
Sulfur 80% W, others	See label	24		mites	--	
*Telone C-35 (dichlo- ropropene + chloro- picrin)	See label	5 days - See label	preplant	symphylans, wireworms	--	See supplemental label for use restrictions in south and central Florida.
*Telone II (dichloropropene)						
Trigard (cyromazine)	2.66 oz	12	7	leafminers	17	Limited to 6 applications. Turnip greens only.
Trilogy (extract of neem oil)	0.5-2.0% V/V	4	0	aphids, mites, suppression of thrips and whiteflies	26	Apply morning or evening to reduce potential for leaf burn. Toxic to bees exposed to direct treatment. OMRI-listed ³ .
Xentari DF (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	0.5-2.0 lb	4	0	caterpillars	11B1	Treat when larvae are young. Thorough coverage is essential. May be used in the greenhouse. Can be used in organic produc- tion.

Table 17. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
<p>The pesticide information presented in this table was current with federal and state regulations at the time of revision. The user is responsible for determining the intended use is consistent with the label of the product being used. Use pesticides safely. Read and follow label instructions.</p> <p>¹ Mode of Action codes for vegetable pest insecticides from the Insecticide Resistance Action Committee (IRAC) Mode of Action Classification v.3.3 October 2003. 1A. Acetylcholine esterase inhibitors, Carbamates 1B. Acetylcholine esterase inhibitors, Organophosphates</p> <p>2A. GABA-gated chloride channel antagonists</p> <p>3. Sodium channel modulators</p> <p>4A. Nicotinic Acetylcholine receptor agonists/antagonists, Neonicotinoids</p> <p>5. Nicotinic Acetylcholine receptor agonists (not group 4)</p> <p>6. Chloride channel activators</p> <p>7A. Juvenile hormone mimics, Juvenile hormone analogues</p> <p>7D. Juvenile hormone mimics, Pyriproxifen</p> <p>9A. Compounds of unknown or non-specific mode of action (selective feeding blockers), Cryolite</p> <p>9B. Compounds of unknown or non-specific mode of action (selective feeding blockers), Pymetrozine</p> <p>11B1. Microbial disruptors of insect midgut membranes, B.t. var aizawai</p> <p>11B2. Microbial disruptors of insect midgut membranes, B.t. var kurstaki</p> <p>12B. Inhibitors of oxidative phosphorylation, disruptors of ATP formation, Organotin miticide</p> <p>15. Inhibitors of chitin biosynthesis, type 0, Lepidopteran</p> <p>16. Inhibitors of chitin biosynthesis, type 1, Homopteran</p> <p>17. Inhibitors of chitin biosynthesis, type 2, Dipteran</p> <p>18. Ecdysone agonist/disruptor</p> <p>20. Site II electron transport inhibitors</p> <p>21. Site I electron transport inhibitors</p> <p>22. Voltage-dependent sodium channel blocker</p> <p>23. Inhibitors of lipid biosynthesis</p> <p>25. Neuroactive (unknown mode of action)</p> <p>26. Unknown mode of action, Azadirachtin</p> <p>² Avoid pyrethroids if diamondback moth is a problem. Larvae have been shown to be resistant.</p> <p>³ OMRI listed: Listed by the Organic Materials Review Institute for use in organic production.</p> <p>* Restricted Use Only.</p>						

Table 18. Breakeven production costs for cabbage at various yield levels in the Hastings, Fla. area, 2004-2005.

	Cost per acre	Yield (crates/acre)				
		375	400	425	450	475
Variable Costs	\$1,317.27	\$3.51	\$3.29	\$3.10	\$2.93	\$2.77
Fixed Costs	\$515.10	\$1.37	\$1.29	\$1.21	\$1.14	\$1.08
Harvest Cost/unit		\$2.55	\$2.55	\$2.55	\$2.55	\$2.55
Total Cost/unit		\$7.44	\$7.13	\$6.86	\$6.62	\$6.41