

Insect Management for Onions, Leek, and Garlic¹

S. E. Webb²

Sweet varieties of bulbing onions, which make bulbs under short day conditions and do not store well, are by far the most common onions grown in Florida. They are generally grown on small acreages in the winter for local and farmers markets. In Hillsborough County and in the Suwannee Valley, strawberry growers are the major producers of onions, many of which are harvested green.

Because it is grown in the winter and early spring, the onion crop in Florida suffers from relatively few insect pests, with thrips and seedcorn maggot being the most commonly found. Armyworms and cutworms can occasionally damage seedlings. Cultural controls, such as growing thrips-tolerant varieties and preparing seedbeds early, should be used and insecticides avoided as much as possible to limit the development of insecticide resistance and favor the survival of insect predators and parasites.

Several species of thrips feed on onions. In north Florida, onion thrips (*Thrips tabaci*) and tobacco thrips (*Frankliniella fusca*) are the most commonly found. Onion thrips can transmit *Iris yellow spot virus* and tobacco thrips transmits *Tomato spotted wilt virus* to onions. Other thrips that have been reported to attack onions include western flower thrips (*F. occidentalis*) and melon thrips (*T. palmi*). Thrips can become resistant to insecticides very quickly. Because they feed deep down at the base of emerging leaves, they

can also avoid both insecticides and natural enemies, such as the insidious pirate bug. There are relatively few insecticides labeled for use on onions. The most commonly used are the pyrethroids and methomyl, a carbamate, but they may be only moderately effective. A threshold of 5-10 thrips per plant has been suggested for winter-grown sweet onions in the South.

Seedcorn maggot (*Delia platura*), which feeds on many different plants, can be a problem when there are high levels of decaying organic matter in the soil and when the weather is cool and wet. Soil applications of chlorpyrifos or diazinon at planting may be useful if there is a history of seedcorn maggot problems. Early preparation of the field to allow the breakdown of organic matter before planting is essential.

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Table 1. Selected insecticides for use on insects attacking onions and allies.

Trade Name (Common Name)	Rate (Product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
Admire Pro (imidacloprid)	14.0 fl oz	12	21	foliage-feeding thrips	4A	See supplemental label for application methods.
Agree WG (<i>Bacillus thuringiensis</i> subspecies <i>aiizawai</i>)	1.0-2.0 lb	4	0	lepidopteran larvae (caterpillar pests)	11A	Apply when larvae are small for best control. OMRI-listed ² .
*Agri-Mek SC (abamectin)	1.75-3.5 fl oz	12	30	<i>Liriomyza</i> leafminers, thrips	6	Must be used with a non-ionic activator type wetting, spreading and/or penetrating adjuvant., not a binder sticker type adjuvant. Maximum of 10.25 fl oz per acre per season.
*Ambush 25W (permethrin)	6.4-19.2 oz	12	1	armyworms, cutworms, leafminers, onion maggot (adults), onion thrips, stink bugs	3A	Dry bulb and garlic only. Maximum of 2 lb ai/acre per season.
Assail 30SG (acetamiprid)	5.0-8.0 oz	12	7	thrips	4A	No more than 4 applications or 32 oz of product per acre per season.
Aza-Direct (azadirachtin)	1-2 pts, up to 3.5, if needed	4	0	aphids, beetles, caterpillars, leafhoppers, leafminers, mites, stink bugs, thrips, weevils, whiteflies	un	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	un	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)	11A	Treat when larvae are young. Good coverage is essential. Can be used in the greenhouse. For organic production.
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
Coragen (chlorantraniliprole)	3.5-5.0 fl oz	4	1	beet armyworm	28	No more than 4 applications or 15.4 fl oz of product per acre per crop. For entire Bulb Vegetable Group.
Crymax WDG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5-2.0 lb	4	0	caterpillars	11A	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	11A	Use higher rates for armyworms. OMRI-listed ² .
*Diazinon AG500, *Diazinon 50W (diazinon)	AG500: 2-4 qt 50W: 4-8 lb	72	preplant	onion maggots, wireworms	1B	Do not make more than one soil application per year. For onions, bulb and green, leeks, garlic shallots.

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DiPel DF (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.25-2.0 lb	4	0	caterpillars	11A	Treat when larvae are young. Good coverage is essential. OMRI-listed ² .
Entrust SC (spinosad)	3-8 fl oz	4	1	armyworms, dipteran leafminers, flea beetle, loopers, suppression of thrips	5	No more than 5 applications per year (29 fl oz product). OMRI-listed ² .
Esteem Ant Bait (pyriproxyfen)	1.5-2.0 lb	12	1	red imported fire ant	7C	Dry bulb only.
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.
Grandevo (<i>Chromobacterium</i> <i>subtsugae</i> strain PRAA4-1)	1-3 lb	4	0	aphids, armyworms, cutworms, leek moth, loopers, omnivorous leafroller, saltmarsh caterpillar, thrips, webworms	–	Leek, garlic, onion (bulb and green), shallot
Intrepid 2F (methoxyfenozide)	4-12 fl oz	4	1	lepidopteran larvae, including armyworms and loopers	18	Green onion subgroup only. Do not apply more than 64 fl oz per acre per year.
Javelin WG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.12-1.5 lb	4	0	most caterpillars, but not <i>Spodoptera</i> species (armyworms)	11A	Treat when larvae are young. Thorough coverage is essential. OMRI-listed ² .
Knack IGR (pyriproxyfen)	8 fl oz	12	3	onion thrips, western flower thrips	7C	Maximum of 2 applications, at least 14 days apart. No activity against adult insects. Onion (dry bulb only).
*Lannate LV; *SP (methomyl)	LV: 1.5-3.0 pt SP: 0.5-1.0 lb	48	7	beet armyworm, black cutworm, thrips, variegated cutworm	1A	Dry bulb, green onions, only. Add a wetting agent to improve coverage.
*Lannate LV; *SP (methomyl)	LV: 1.5 pt SP: 0.5 lb	48	7	beet armyworm	1A	Garlic only.
Lorsban 15G; 75WG; *Advanced (chlorpyrifos)	15G: 3.7 oz/1000 ft of row 75WG: 1.33 lb Advanced: see label	24	at planting	onion maggot, seedcorn maggot	1B	Dry bulb only. One application per year.

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Malathion 8F (malathion)	1-1.56 pt	onions: 12, leeks, shallots, garlic: 24	3	onion maggot, thrips on onions, aphids and thrips on garlic, leeks, shallots	1B	Onions, bulb and green, leeks, shallots, garlic
M-Pede 49% EC Soap, insecticidal	1-2% V/V	12	0	aphids, leafhoppers, mites, plant bugs, thrips, whiteflies	--	OMRI-listed ² .
*Mustang (zeta-cypermethrin)	2.4-4.3 oz	12	7	aphids, armyworms, cutworms, leafminer adults, onion maggot adults, onion thrips, stink bugs	3A	Do not apply more than 21.5 oz per acre per season.
Neemix 4.5 EC (azadirachtin)	4-16 fl oz	12	0	aphids, armyworms, cabbage looper, cutworms, leafminers, onion maggot, whiteflies	un	OMRI-listed ² .
*PennCap-M (methyl parathion)	2 pt	13 days	15	thrips	1B	Do not apply when onions are blooming and bees are foraging. Onions only.
*Pounce 25 WP (permethrin)	6.4-19.2 oz—onions 6.4-12.8 oz—garlic	12	1	armyworms, cutworms, leafminer adults, onion maggot adults, onion thrips, , stink bugs	3A	Bulb onions and garlic
*Proaxis Insecticide (gamma-cyhalothrin)	1.92-3.84 oz	24	14	armyworms (1 st and 2 nd instar), cutworms, leafminer adults, onion and seedcorn	3A	Bulb onions and garlic
Radiant SC (spinetoram)	5-10 fl oz	4	1	armyworms, dipterous leafminers, loopers, thrips	5	Use with an adjuvant.
Requiem 25EC (extract of <i>Chenopodium ambrosioides</i>)	1.5-3.0 qt	4	0	onion thrips, western flower thrips	un	Begin as soon as thrips are seen.
Trigard (cyromazine)	2.66 oz	12	7	leafminers	17	Maximum of 6 applications per crop.
Trilogy (extract of neem oil)	0.5-2.0% V/V	4	0	aphids, mites, suppression of thrips and whiteflies	un	Apply morning or evening to reduce potential for leaf burn. Toxic to bees
*Warrior II (lambda-cyhalothrin)	0.96-1.92 fl oz	24	14	aphids, armyworms, cutworms, onion maggot adults, onion thrips, plant bugs,	3A	For bulb crops only (onions and garlic), not green onions. Do not

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Xentari DF (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	0.5-2.0 lb	4	0	caterpillars	11A	Treat when larvae are young. Thorough coverage is essential. May be used
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.7.2 February 2012. http://www.irac-online.org/wp-content/uploads/MoA-classification.pdf						
1A. Acetylcholinesterase inhibitors, Carbamates (nerve action) 1B. Acetylcholinesterase inhibitors, Organophosphates (nerve action) 2A. GABA-gated chloride channel antagonists (nerve action) 3A. Sodium channel modulators—pyrethroids 4A. Nicotinic acetylcholine receptor agonists (nerve action) 5. Nicotinic acetylcholine receptor allosteric activators—spinosins (nerve action) 6. Chloride channel activators (nerve and muscle action) 7A. Juvenile hormone mimics (growth regulation) 7C. Juvenile hormone mimics (growth regulation) 9B & 9C. Selective homopteran feeding blockers 10B. Mite growth inhibitors (growth regulation) 11A. Microbial disruptors of insect midgut membranes 12B. Inhibitors of mitochondrial ATP synthase (energy metabolism) 15. Inhibitors of chitin biosynthesis; type 0, lepidopteran (growth regulation) 16. Inhibitors of chitin biosynthesis; type 1, homopteran (growth regulation) 17. Molting disruptor, dipteran (growth regulation) 18. Ecdysone receptor agonists (growth regulation) 20B. Mitochondrial complex III electron transport inhibitors (energy metabolism) 21A. Mitochondrial complex I electron transport inhibitors (energy metabolism) 22. Voltage-dependent sodium channel blockers (nerve action) 23. Inhibitors of acetyl Co-A carboxylase (lipid synthesis, growth regulation) 28. Ryanodine receptor modulators (nerve and muscle action) un. Compounds of unknown or uncertain mode of action						
² OMRI listed: Listed by the Organic Materials Review Institute for use in organic production.						
*Restricted Use Only.						