ENY-467

UF UNIVERSITY of FLORIDA
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Insect Management for Onions, Leek, and Garlic[1]

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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
Agree WG (*Bacillus thuringiensis* subspecies *aizawai*)	1.0-2.0 lb	4	0	lepidopteran larvae (caterpillar pests)	11	Apply when larvae are small for best control. OMRI-listed[2].
***Ambush 25W** (permethrin)	6.4-19.2 oz	12	1	armyworms, cutworms, leafminers, onion maggot (adults), onion thrips, stink bugs	3	**Dry bulb and garlic only**. Maximum of 2 lb ai/acre per season.
***Ammo 2.5 EC** (cypermethrin)	2.0-5.0 fl oz	12	7	aphids, armyworms, cutworms, leafminers, onion maggot adults, stink bugs	3	Maximum of 25 oz product/acre per season.
Assail 30SG **Assail 70WP**	5.0-8.0 oz 2.1-3.4 oz	12	7	thrips	4A	No more than 32 oz 30SG or 13.7 oz 70WP 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, repellant, 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, repellant, insect growth regulator.
Biobit HP (*Bacillus thuringiensis* subspecies *kurstaki*)	0.5-2.0 lb	4	0	caterpillars (will not control large armyworms)	11	Treat when larvae are young. Good coverage is essential. Can be used in the greenhouse. OMRI-listed[2].
BotaniGard 22 WP, ES (*Beauveria bassiana*)	**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.
Crymax WDG (*Bacillus thuringiensis* subspecies *kurstaki*)	0.5-2.0 lb	4	0	caterpillars	11	Use high rate for armyworms. Treat when larvae are young.

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Deliver (*Bacillus thuringiensis* subspecies *kurstaki*)	0.25-1.5 lb	4	0	caterpillars	11	Use higher rates for armyworms. OMRI-listed[2].
***Diazinon AG500, *Diazinon 50W** (diazinon)	**preplant - AG500:** 2-4 qt **50W:** 4-8 lb	72	preplant	onion maggots, wireworms	1B	Do not make more than one soil application per year.
DiPel DF (*Bacillus thuringiensis* subspecies *kurstaki*)	0.5-2.0 lb	4	0	caterpillars	11B2	Treat when larvae are young. Good coverage is essential. OMRI-listed[2].
Entrust (spinosad)	1-2.5 oz	4	1	armyworms, dipteran leafminers, flea beetle, loopers, suppression of thrips	5	No more than 5 applications per year (9 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.
Javelin WG (*Bacillus thuringiensis* subspecies *kurstaki*)	0.12-1.5 lb	4	0	most caterpillars, but not *Spodoptera* species (armyworms)	11	Treat when larvae are young. Thorough coverage is essential. OMRI-listed[2].
Knack IGR (pyriproxyfen)	8 fl oz	12	3	onion thrips	7C	Maximum of 2 applications, at least 14 days apart. **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 and green onions only**. Add a wetting agent to improve coverage.

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Lorsban 15G; 75WG (chlorpyrifos)	15G: 3.7 oz/1000 ft of row 75WG: 1.33 lb	24	at planting	onion maggot	1B	**Dry bulb only**.
Malathion 8F (malathion)	1-2 pt	12	3, 7 for shallots	onion maggot, thrips on onions, aphids and thrips on garlic, leeks, shallots	1B	
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	3	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, thrips, 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	3	**Bulb onions and garlic**
***Proaxis Insecticide** (gamma-cyhalothrin)	1.92-3.84 oz	24	14	Armyworms (1st and 2nd instar), cutworms, leafminer adults, onion and seedcorn maggot adults, onion thrips, plant bugs, stink bugs, tobacco thrips, suppression of aphids, flower thrips, western flower thrips	3	**Bulb onions and garlic**
Pyrellin EC (pyrethrin + rotenone)	1-2 pt	12	12 hours	aphids, leafhoppers, loopers, mites, plant bugs, stink bugs, thrips, whiteflies	3, 21	
Radiant SC (spinetoram)	5-10 fl oz	4	1	armyworms, dipterous leafminers, loopers, thrips	5	Use with an adjuvant.
Requiem 25EC (extract of *Chenopodium ambrosioides*)	1.5-3.0 qt	4	0	western flower thrips	un	Begin as soon as thrips are seen.

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SpinTor 2SC (spinosad)	3.0-8.0 fl oz	4	1	armyworms, dipteran leafminers, flea beetle, loopers, suppression of thrips at high rate	5	Do not apply more than 29 oz per acre per crop or make more than 5 applications per year.
***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	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 exposed to direct treatment. OMRI-listed[2].
***Warrior II** (lambda-cyhalothrin)	0.96-1.92 fl oz	24	14	aphids, armyworms, cutworms, onion maggot adults, onion thrips, plant bugs, stink bugs, tobacco thrips, suppression of flower thrips, western flower thrips	3	**For bulb crops only (onions and garlic), not green onions**. Do not apply more than 0.24 lb ai/acre per season.
Xentari DF (*Bacillus thuringiensis* subspecies *aizawai*)	0.5-2.0 lb	4	0	caterpillars	11	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.						

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[1]Mode of Action codes for vegetable pest insecticides from the Insecticide Resistance Action Committee (IRAC) Mode of Action Classification v. 6.1 August 2008.
1A. Acetyl cholinesterase inhibitors, Carbamates (nerve action)
1B. Acetyl cholinesterase inhibitors, Organophosphates (nerve action)
2A. GABA-gated chloride channel antagonists (nerve action)
3. Sodium channel modulators (nerve action)
4A. Nicotinic acetylcholine receptor agonists (nerve action)
5. Nicotinic acetylcholine receptor allosteric activators (nerve action)
6. Chloride channel activators (nerve and muscle action)
7A. Juvenile hormone mimics (growth regulation)
7C. Juvenile hormone mimics (growth regulation)
9B and 9C. Selective homopteran feeding blockers
10. Mite growth inhibitors (growth regulation)
11. 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)
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.**