

Chapter 14.

Onion, Leek, and Chive Production in Florida

S.M. Olson, W.M. Stall, K.L. Pernezny, and S.E. Webb

BOTANY

Nomenclature

Family - Alliaceae (Amaryllidaceae)

Onion - *Allium cepa*

Leek - *Allium ampeloprasum*

Chive - *Allium schoenoprasum*

Origin

It is believed that all of the edible onions and their relatives are native to Asia.

Related Species

Garlic, shallot, and various exotic onions also are members of the Alliaceae family. Many important ornamentals also are included in this family.

VARIETIES

Onion and leek varieties grown in Florida are listed below (H=hybrid):

Onion

Caramelo (H)
Don Victor (H)
Granex 33 (H)
Kalahari (H)
Prowler (H)
Savannah Sweet (H)
Sugar Belle (H)
Sweet Deal (H)
Sweet Success (H)

Bunching Onion

Perfecto Blanco
Tokyo Long White
White Portugal

Leeks (Fig. 14-1)

King Richard
Tivi
Verina

Chives

Staro

SEEDING AND PLANTING

Planting dates and seeding information are given in Table 1.

Table 1. Seeding and planting information for onion and allies.

Planting dates	Seeded	Transplanted
North Florida	Mid Sept - mid Nov	Nov - Jan
Central Florida	Oct	Dec - Jan
South Florida	Oct	Dec - Jan
Planting information		
Distance between rows (in) ¹	14 - 18	14 - 18
Distance between plants (in)	3 - 4	4 - 6
Seeding depth (in)	0.25 - 0.5	-
Seed per acre (lb)	3 - 4	1.0
Days to maturity	100 - 130	100 - 130 ²
Plant populations (acre)	149,343	112,123
¹ Traditionally 14 inches between rows, 4 inches between plants.		
² From time of field setting.		

Table 4. Chemical weed controls: onions, leek, garlic & shallot.

Herbicide	Labeled crops	Time of application to crop	Rate (lbs. AI./Acre)	
			Mineral	Muck
Bensulide (Prefar 4E)	onions (dry bulb), garlic, shallots	Preplant Preemergence	5-6	--
Remarks: Preplant incorporate to depth of 1-2 inches in well worked soil. Apply preemergence and irrigate to incorporate. With overhead irrigation, wet soil at least 2-4 inches deep. For furrow irrigation thoroughly wet the entire bed top. Controls many grass species.				
Bromoxynil (Buctril)	Onions Garlic	Preemergence Postemergence	0.25 - 0.375	---
Remarks: Apply to onions before planting until just prior to crop emergence (onions only). Postemergence apply to onions which have 2 to 5 true leaves or to garlic after emergence but before 12 inches in height. Controls several broadleaf weeds such as lambsquarter, smartweed, morningglory, spiny pigweed, ragweed, etc. (see label). When they are small, do not exceed 4 leaf stage, or less than 2 inches in height. Use at least 50 to 70 gallons of water per acre for application. Soil and onion foliage must be dry at time of applications. Waxy coating on onion leaves reduces chances for injury. Onion varieties vary in sensitivity. Use on a trial basis.				
Carfentrazone (Aim)	(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 burn-down 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.				
Clethodim (Select)	Onions (dry bulb) Garlic Shallots (dry bulbs)	Postemergence	0.94-.125	.094-.128
Remarks: Material is a selective postemergence herbicide for control of annual and perennial grasses. Always use a crop oil concentrate at 1% v/v in the finished spray volume should range from 5 to 40 gallons per acre. Rates range from 6 to 8 oz. Product per acre for annual grasses up to 16 oz. Product for perennial grasses. Do not apply within 45 days of harvest.				
DCPA (Dacthal W-75)	Onions, Garlic	Preemergence Posttransplanting or At layby	6.0-10.5	---
Remarks: Controls germinating annuals. Incorporate 0.5 to 1.0 inch with overhead irrigation or shallow cultivation. Apply layby treatment to weed-free field up to 14 weeks after planting at rates not exceeding 10.5 lbs. ai./acre per season. In Hastings area, onions may be injured with single applications exceeding 6.0 lbs. ai./acre. Note precautions of planting non-registered crops within 8 months.				
Fluazifop-p (Fusilade)	Dry bulb onions, garlic	Postemergence	0.188	0.188
Remarks: Controls actively growing grass weeds. A total of 48 oz. product may be applied to the crop per season. Rates for the control of actively growing grass species at specific growth stages are specified on the label. Depending on the species, the growth stage for best control ranges from the 3- to 8-leaf stage. Use oil concentrates or non-ionic surfactants in the spray mixture. A pre-harvest interval of 45 days must be maintained.				
Glyphosate (Roundup, Durango Touchdown, Glyphomax)		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.				
Oxyfluorfen (Goal 2XL) (Goaltender)	Dry bulb onions	Early postemergence Posttransplant	0.12 0.5	--- ---
Remarks: Spray when seeded onions have 2 fully developed true leaves. On transplanted onions spray as soon after transplanting as practical. Necrotic lesions, twisting or stunting of onion plants can occur if applications are made during cool, wet weather or prior to the full development of the true leaves on the onion plant. Multiple applications may be made. Do not apply within 60 days of harvest.				
Paraquat (Gramoxone Inteon) (Firestorm)	Seeded onions: Green or dry bulb & Garlic	Preplant Preemergence	0.63 - 0.94	0.63 - 0.94
Remarks: Apply as a broadcast treatment prior to, during or after seeding, but before emergence of the crop for control of emerged weeds. Weeds and grasses emerging after treatment will not be controlled. Crop plants emerged at the time of application will be damaged. Use a non-ionic surfactant with application. Do not apply within 60 days of harvest.				
Pendimethalin (Prowl 3.3 EC)	Dry Bulb Onions	Preemergence (muck only) Postemergence or post-transplant	0.5 - 0.75	1.0 - 2.0
Remarks: In mineral soils, apply as broadcast treatment when onions have 2 to 9 true leaves at a rate of 1.2 to 1.8 pts. In muck soils may be applied sequentially as follows: Preemergence through loop stage (2.4 to 4.8 pts/A); Early postemergence (2 to 6 true leaf stage) 3.6 to 4.8 pts/A; Late postemergence (6 to 9 true leaf stage) 3.6 to 4.8 pts/A. Do not apply more than 14.4 pts/A per growing season on muck soils. Do not apply preemergence through loop stage if heavy rains are expected or severe crop injury may result. If irrigating after application, do not irrigate in excess of 0.5 inch. Do not apply within 45 days of harvest.				
Sethoxydim (Poast)	Bulb vegetables: all onions, dry bulb and bunching, garlic, leeks	Postemergence	.187	.187
Remarks: For control of actively growing grass weeds. Always add a crop oil concentrate at a rate of 2 pts./acre. Do not apply within 30 days of harvest. A general use rate of 1 pt. material may be used. Do not apply more than 4.5 pts. per acre in one season.				

Table 5. Disease control for onion.

Chemical	Fungicide Group	Maximum Rate/Acre/		Min. Days to Harvest	Pertinent Diseases	Remarks
		Application	Season			
Ridomil Gold 4 EC (mefenoxam)	4	1 pt/trted acre			Pythium seedling blight	Apply at seeding in a 7-12" band on soil over seed furrow
Cabrio 20 EG (pyraclostrobin)	11	12 oz	72 oz	7	Purple blotch Powdery mildew Downy mildew	Do not make more than 6 appl. of Cabrio or other group 11 fungicides/season
Various chlorothalonil products such as Bravo, Echo, Equus, Applaus	M5	SEE INDIVIDUAL LABELS		7	Botrytis leaf blight Purple blotch	See individual labels
Phosphonics (various derivatives of phosphoric and phosphorous acids including but not limited to Fosphite, Fungi-Phite, Helena Prophyt, Phostrol, Topaz)	SEE INDIVIDUAL LABELS				Phytophthora blight Downy mildew	
Manex 4 F (maneb)	M3	2.4 qt	24 qt ¹	7	Botrytis leaf blight Purple blotch	Do not apply to exposed bulbs
Maneb 80 WP (maneb)	M3	3 lb	30 lb ²	7	Botrytis leaf blight Purple blotch	Do not apply to exposed bulbs
Forum (dimethomorph)	40	6 oz	30 oz	0	Downy mildew	Rotate chemistries
Botran 75 W (dichloran)	14	5 1/3 lb	5 1/3 lb		Botrytis	Limit is 1 appl/crop
Botran 5 F (dichloran)	14	1 3/5 qt	2 qt	14	Botrytis	Do not plant spinach as a follow up crop
Penncozeb, Dithane M45, or Manzate 80 WPs (Dry bulb only) (mancozeb)	M3	3 lb	30 lb	7	Botrytis leaf blight Purple blotch	Do not apply to exposed bulbs
Reason 500 SC (fenamidone)	11	5.5 fl oz	22 fl oz	7	Downy mildew Purple blotch	Use only 1 spray before alt/w fungicide from different group
Dithane F-45 or Manex II 4 FLs (Dry bulb only) (mancozeb)	M3	2.4 qt	24 qt	7	Botrytis leaf blight Purple blotch	Do not apply to exposed bulbs
Rovral 75 WG (Dry bulb only) (iprodione)	2	1 lb	5 lb	7	Botrytis leaf blight Purple blotch	Limit 5 appl/season
Maneb 75 DF (maneb)	M3	3 lb	32 lb ³	7	Botrytis leaf blight Purple blotch	Do not apply to exposed bulbs
Penncozeb, Dithane, or Manzate 75 DFs (mancozeb)	M3	3 lb	32 lb	7	Botrytis leaf blight Purple blotch	Do not apply to exposed bulbs
Pristine 38 WG (pyraclostrobin/boscalid)	11 + 7	18.5 oz	111 oz	7	Botrytis leaf blight Purple blotch Stemphyllium leaf blight	Limit is 6 appl/crop & alternate chemistry
Quadris Opti 0.5 & 5 FL (azoxystrobin)	11	3.2 pt	11.1 pt	14	Purple blotch <i>Botrytis</i>	Limit is 3 appl/crop & alternate chemistry. For green bunching, leeks & shallots
Endura 70 WP (boscalid)	7	6.8 oz	41 oz	7	Purple blotch <i>Botrytis</i>	Limit is 6 appl/crop & alternate chemistry
Acrobat 50WP (dimethomorph)	40	6.4 oz	32 oz	0	Downy mildew	Must be applied in a tank mix with another fungicide active against downy mildew. Do not make more than 2 sequential appl.

Table 5. Continued.

Chemical	Fungicide Group	Maximum Rate/Acre/		Min. Days to Harvest	Pertinent Diseases	Remarks
		Application	Season			
Aliette WDG (fosetyl-Al)	33	3.0 lb	21lb	7	Downy mildew Purple blotch	
Various copper compounds (see ind. Labels), including Basic Copper 53, Champ, COC, Copper Count-N, Cuprofix Disperss, Kocide, Nordox, Nu Cop,	M1				Bacterial blight Downy mildew Purple blotch	See the individual labels
Iprodione 4L (iprodione)	2	1.5 pt	7.5 pt	7	<i>Botrytis</i> Purple blotch	
Scala SC (pyrimethanil)	9	18 oz	54 oz	7	<i>Botrytis</i> Purple blotch	
Switch 625WG (cyprodinil/fludioxonil)	9 + 12	14 oz	56 oz	7	<i>Botrytis</i> Purple blotch	After 2 appl. of Switch, a/w another fungicide with a different mode of action for 2 appl.
Serenade Max (biofungicide) (QST 713 strain of <i>Bacillus subtilis</i>)		3 lb		0	<i>Botrytis</i> Downy mildew Purple blotch Rust	
Sonata (biofungicide) (QST 2808 strain of <i>Bacillus pumilis</i>)		4 qt		0	Downy mildew Powdery mildew Rust	
Topsin M 70WDG (other formulations available) (thio-phanate-methyl)	1	2 lb			White rot	Spray in open furrows at seeding. Not to be used in any irrigation system
Ultra Flourish 2EC (mefenoxam)	4	2 pt/trtd acre			Pythium damping-off	Soil treatment at planting only
¹ 16.8 qts. for green onions ² 21.0 lbs. for green onions ³ 22.4 lbs. for green onions ⁴ 3 pts. for green bunching, leeks, shallots & garlic ⁵ 14 days for green bunching, leeks, shallots & garlic ⁶ 2.7 lbs. for garlic						

Table 6. Selected insecticides approved for use on insects attaching onions and allies.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
Agree WG (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	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 only and garlic. 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	All <i>Allium</i> spp., green and dry. Maximum of 25 oz product/acre per season.
Assail 30SG 70WP	5.0-8.0 oz 2.1-3.4 oz	12	7	thrips	4A	No more than 32 oz 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)	11	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 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.
Crymax WDG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5-2.0 lb	4	0	caterpillars	11	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	11	Use higher rates for armyworms. OMRI-listed ² .
*Diazinon AG500, 4EC, *50W (diazinon)	preplant - AG500, 4EC: 2-4 qts 50W: 4-8 lb	72	preplant	onion maggots, wireworms	1B	See label.
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 .
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.

Table 6. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
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 (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.12-1.5 lb	4	0	most caterpillars, but not <i>Spodoptera</i> 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, western flower 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 = (dry and green)	beet armyworm, black cutworm, thrips, variegated cutworm	1A	Add a wetting agent to improve coverage.
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)	11	Treat when larvae are small. Thorough coverage is essential.
Lorsban 15 G; 75WG (chlorpyrifos)	See labels for rates	24	at planting	onion maggot	1B	Dry bulb only.
Malathion 8F (malathion)	1-2 pt	12	3	onion maggot, thrips	1B	
M-Pede 49% EC Soap, insecticidal	1-2% V/V	12	0	aphids, leafhoppers, mites, plant bugs, thrips, whiteflies	--	OMRI-listed ² .
*Mustang Max EC (zeta-cypermethrin)	2.24-4.0 oz	12	7	aphids, armyworms, cutworms, leafminers, onion maggot adults, onion thrip, stink bugs	3	
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 .
*Pennacp-M (methyl parathion)	2 pt	4 days - See label	15	thrips	1B	Do not apply when onions are blooming and bees are foraging.
*Pounce 25 WP (permethrin)	6.4-19.2 oz	12	1	armyworms, cutworms, leafminers, onion maggot adults, onion thrips, stink bugs	3	Bulb onions
*Proaxis Insecticide (gamma-cyhalothrin)	1.92-3.84 oz	24	14	armyworms, 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	

Table 6. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
Pyrellin EC (pyrethrin + rotenone)	1-2 pt	12	12 hours	aphids, leafhoppers, loopers, mites, plant bugs, stink bugs, thrips, whiteflies	3, 21	
Radiant (spinetoram)	5-10 fl oz	4	1	armyworms, dipterous leafminers, loopers, thrips	5	Use with an adjuvant.
Requiem (extract of <i>Chenopodium ambrosioides</i>)	1.5-3 qts	4	0	western flower thrips	un	Begin as soon as thrips are seen.
Spintor 2 SC (spinosad)	3-8 fl oz	4	1	armyworms, dipteran leafminers, flea beetle, loopers, suppression of thrips	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, not green onions. Do not apply more than 0.24 lb ai/acre per season.
Xentari DF (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	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.

Table 6. Continued.

Trade Name (Common Name)	Rate (product/acre)	REI (hours)	Days to Harvest	Insects	MOA Code ¹	Notes
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. 6.1 August 2008. 1A. Acetylcholinesterase inhibitors, Carbamates (nerve action) 1B. Acetylcholinesterase 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.						