THE UNIVERSITY OF GEORGIA
COOPERATIVE EXTENSION
Colleges of Agricultural and Environmental Sciences & Family and Consumer Sciences ®

Organic Vidalia Onion Production

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Certification

The primary purpose of the USDA National Organic Program (NOP) is to help growers market their roducts by meeting a specific standard of certification for organic production. Buyers from other areas are assured the produce meets a certain standard if the grower is certified organic. In addition, consumers can be confident that such produce meets certain standards for organic production.

The USDA fully implemented rules governing organic production in the United States in October 2002. The National Organic Program, which is part of the USDA, oversees this program by certifying agencies throughout the world that engage in grower certification for the purposes of marketing organic produce in the United States. To use the word "organic" in relation to an agricultural product is governed by the Federal government under this program.

For more information about the NOP program and the statutory guidelines for production, see their Web site (Table 1). Only those with less than $5,000.00 in total annual sales are exempt from certification and still allowed to use the term "organic," but they must still follow the regulations set down in these rules.

In Georgia, organic growers are further required to register with the Georgia Department of Agriculture regardless of their sales volume. For more information on this, see the Georgia Department of Agriculture's Web site (Table 1).

Land that is to be certified for organic production must not have had any unapproved inputs used for the past three years. Land that has been in conventional production will require this three-year delay, during which time it is said to be in "transition." Produce from land in transition cannot be sold as organic, but growers are permitted to use the term "in transition" for such produce. Land that has remained fallow for the past three years can be brought into certification almost immediately by going through the certification process and inspection.

Certification begins by contacting a certifying agent. All of the certifying agents recognized by the USDA are on the NOP site. Chances are, growers in Georgia will want to contact a certifier close to home to minimize costs. There are certifying agents in North Carolina, South Carolina, Georgia, and Florida (Table 1). Costs of certification will differ among certifying agents, and there will be ongoing annual costs associated with annual inspections to maintain certification.

The certifying agency will send you a packet of information with a lengthy, detailed questionnaire about your operation. From this questionnaire you will be required to develop your organic farm plan. You will be required to be familiar with the NOP regulations, which can be downloaded from the NOP web site (Table 1). These regulations will guide you as to what is required in managing an organic operation.

The questionnaire will have to be filled out with this in mind. In addition, additional documentation such as soil tests, water tests, and affidavits will be required. You will have to document how the land was used for the previous three years to ensure prohibited materials have not been used. Your local soil conservation office and your local county extension office can help with filling out this questionnaire and compiling the necessary documentation. If you are unfamiliar with organic production, you should contact your local county extension agent for help.

Once these materials have been compiled, they are sent back to the certifying agency, which will review them. Often the certifying agency will have additional questions or require additional documentation. Finally, they will arrange a convenient time for inspection. The field inspector will want to view your property, records and record keeping system. In addition, he or she may wish to view other facilities such as packing sheds, etc., that are involved in your production. The inspector will compile a report that will be reviewed by the certifying agency.

This report may also indicate areas of concern where additional questions or documents are required. Finally, if all goes well, a certificate will be issued. Dual use facilities that handle both organic and conventionally produced crops will have the greatest burden under this program. Any equipment used in both operations will have to be carefully cleaned prior to use with organic produce, and careful documentation will have to be maintained and be available for inspection. This is to avoid mingling of products and contamination from products produced in conventional production.

Although your certifying agency and inspector can answer some questions, they cannot act as a consultant. You are expected to read and understand the NOP guidelines. For additional help with questions your certifying agency can't answer concerning organic production, you should contact your local county extension office.

Site Selection

Growers wishing to produce organic Vidalia onions should carefully consider the site to be selected. If you wish to have land certified for the current year's production, you must choose a site that has had no prohibited substances used on it for the past three years. Those willing to go through transition have more flexibility in site selection since they will have to manage the site for organic production for three years before the land can be certified.

Other important criteria for site selection include access to irrigation water, free from shade and competition from other plants, well drained soils, and free from aggressive weeds.

Vidalia onions cannot be produced without irrigation water. Water is critical for both vigorous growth and producing mild flavored onions. Very small sites may be difficult to irrigate with large irrigation equipment and there is a greater chance of competition from shade and other plant roots if located near hedgerows, etc.

By far the most important criteria in site selection is the potential for weed competition. Onions are very poor competitors with weeds. Their upright growth habit and slow growth make them particularly susceptible to weed competition. Avoid sites with particularly aggressive weeds such as nutsedge and bermudagrass. Sites with even small amounts of these weeds will quickly become completely infested. Each time the soil is worked, the problem will become worse because these weeds propagate by vegetative parts.

If you have no choice but to use such a site, develop a preventive weed management plan. Soil solarization, whereby soil is covered with clear plastic for one month or longer, as well as using materials such as corn gluten meal, which has limited herbicidal activity, may help reduce weed seed banks in the soil. They will probably have only limited effectiveness, if at all, with aggressive weeds such as nutsedge and bermudagrass.

Varieties

Currently there are no organically produced Vidalia onion seed sources available. There is, however, a list of Georgia Department of Agriculture officially recognized varieties that growers are required to grow (Table 2). If no organic seed source is available of the variety needed, the grower is allowed to use nonorganically produced seed, but they must be untreated. Growers should contact their seed source early to ensure they have sufficient untreated seed available.

Generally, Vidalia onions can be broadly placed into one of three maturity classes, early, mid-season, and late. Early varieties are known to have good foliar disease resistance and greater daylength sensitivity (the tops go down early and uniformly), and they can stay in the ground for up to a week with tops down. Such onions continue to imbibe water and increase in size, which increases the mildness of the onions.

Mid-season onions are less sensitive to daylength and must be carefully monitored for optimum harvest since tops down is not always the best criteria. They are generally mild onions, but should be monitored for bacterial disease problems.

Late-season onions are the most susceptible to bacterial diseases such as slippery skin and sour skin. They generally must be harvested in a somewhat immature state to prevent this problem. Because of these problems, these varieties are not recommended for organic production.

Plantbed Onion Production

Onion plantbeds are usually seeded during September. The optimum time to seed these beds is the second and third week of September.

Earlier seeding may result in transplants that are too large and prone to bolting (forming seedstems) in the spring. Usually earlier seeding is done for onions destined for salad onion production. Later seeding may result in plants too weak to survive colder late fall weather.

Growers should begin land preparation at least one month prior to seeding. The soil should be deep turned to allow all the previous crop residue to break down. Half the fertilizer should be preplant incorporated. Chicken litter is an inexpensive readily available fertilizer source. Approximately 3 tons/acre should be incorporated prior to final bed preparation. If a commercial organic fertilizer is going to be used, apply it at a rate at least 50 percent greater than the N-P-K percent would suggest.

For example, our recommendations are for 130 lbs of actual nitrogen/acre on plantbeds but, with organic fertilizer, you would want to apply such products with at least 195 lbs/acre nitrogen to get an effect comparable to inorganic fertilizers. Split application with half the fertilizer (97.5 lbs/acre N) applied preplant and incorporated and half approximately four weeks later is recommended. Organic fertilizers do not have much of their nutrients in plant available forms; they must undergo a mineralization process whereby the organic nutrient sources are converted to a plant available form. The recommended higher application rate is to compensate for this lack of availability. Fertilizer application some weeks or months prior to planting may also work and may require less fertilizer since this allows time for the mineralization process to occur. At this time we do not have enough information to make an accurate ecommendation concerning fertilizer timing. In addition, applying fertilizer much in advance of planting may not work, particularly during periods of high rainfall in which nutrients can be readily leached from the root zone.

Beds are usually formed on 6-foot centers with four rows per bed planted 12 inches apart. The final step in preparation should be rototilling to form a smooth debris free bed. Some growers have suggested applying a 1 inch or greater layer of good quality weed free compost to these beds prior to seeding. This is done as a weed control measure to smother weeds as they germinate. To use this method, it is critically important that this layer be at least 1 inch thick and that it be applied uniformly over the entire bed. Any gaps in this cover or gaps produced in the seeding process will reduce its effectiveness. This method has not been evaluated for efficacy by the University of Georgia.

The bed should have sufficient moisture to hold the bed together, but not so much that the shoe on the planter is clogged. Beds that are too dry are prone to falling apart on very light soils or forming a crust with the planter riding up on top of the bed. This may require rerotovating the soil to remoisten the surface.

Seed should be sown at 30 to 70 seed per linear foot at 1/8-1/4 inch depth. Once the beds are sown, they should be carefully monitored for water requirements. Onion seed are very small and may require light irrigation several times a day for uniform emergence.

The most important activity at this point in organic onion production is weed control. Weeds can quickly take over a bed, so vigilance is important. Even when onions are at the one to two leaf stage, weeding may be required. Although sweeps or other cultivation equipment may work, onions are so small at this stage that hand weeding is probably the only viable method of control.

At approximately four weeks of age, the onions should be topdressed with the second application of fertilizer. An additional 3 tons/acre of chicken litter or the second half of the commercial organic fertilizer should be used. In addition, sodium nitrate (NaNO3, Chilean nitrate, 16-0-0) can be used for up to 20 percent of the crop's nitrogen needs, but it must be from a mined source rather than a manufactured source. Chilean nitrate will react as a conventional fertilizer, so it may be advantageous to use if problems arise with crop response to fertilization. Currently the University of Georgia's recommendations for plantbed onions is 100-130 lbs/acre nitrogen. This means that an organic grower could use up to 26 lbs/acre nitrogen from this source to fertilize plantbed onions.

Good quality onion transplants should be about the size of a pencil in diameter and should be ready for harvest in about 8 to 10 weeks after seeding. Plants are pulled, bundled (50-80/bundle), and approximately 50 percent of their tops removed before transporting to fields for final spacing. Some growers will mow transplant onions prior to pulling as a more efficient method of top removal. Onion transplants that cannot be planted right away (day of pulling) should be held in a shady or enclosed location, preferably removed from the bag and spread out on the ground to prevent the plants going through "a heat," which is a rapid breakdown process.

Onions are transplanted in November and December to their final spacing for dry bulb onion production. Onions may be transplanted up to the end of January and still produce good quality onions.

Dry Bulb Onion Production

Land preparation for dry bulb onion production is the same as for plantbed production. Growers should begin land preparation at least one month prior to transplanting by deep turning previous crop residue to ensure breakdown. A weed and debris free bed is critical for good onion production.

Beds are formed in the exact same manner as for plantbed onion production. They are formed 6-foot on center and transplanted with four rows per bed 12 inches apart. If plastic mulch is going to be used, it can be pegged with a pegger if the bed is wide enough to accommodate the pegger (Figure 1). Much of the plastic laid in south Georgia has a bed top of only 30 inches wide, which is too narrow to accommodate a pegger without modification.

Narrower beds can be used but will have lower plant populations per acre. Conventional onions are grown on bare ground with overhead irrigation. With plastic mulch, drip tape may be used to ensure adequate water for good onion development. It is recommended with wider beds that two tapes be placed under the plastic. Drip tape is available with various emitter spacings (4 to 12 inches); the closer spacing may be advantageous since onions are typically spaced 4 to 6 inches in-row. If the plastic covered bed is then going to be pegged, take care the pegger does not puncture the drip lines. Overhead irrigation should be avoided with plastic mulch since water can not get under the beds. If a grower is going to use this method, however, extra holes should be punched in the plastic to allow water infiltration.

More widely spaced plastic covered beds have one advantage and that is weed control in row middles. This configuration allows for equipment access and reduces the chance of tearing the plastic bed covering during weeding.

Fertilization

Fertilization depends on whether or not plastic mulch will be used. If plastic mulch is going to be used for weed control, then all of the fertilizer must be applied preplant. We recommend 6 tons/acre poultry litter, which should be preplant applied and incorporated prior to final bed preparation and plastic application.

Commercial organic fertilizers will also have to be preplant applied. Remember, organic fertilizer should be applied at a rate at least 50 percent greater than the N-P-K percentages would indicate. For dry bulb onion production the University of Georgia recommends 125-150 lbs/acre nitrogen. Again, up to 20 percent of the nitrogen recommendation can be applied from Chilean nitrate.

Growers who will not be using plastic mulch have more flexibility in fertilization. For such growers we recommend half the fertilizer be applied preplant and incorporated into the bed. The remaining half can be applied in one to two or more additional applications.

Remember that with raw manure (chicken litter) the final application must be made at least 120 days prior to harvest according to the NOP rules governing food crops in contact with the soil. For onions that would be harvested on April 1, for example, the last day of application would be December 1. Commercial organic fertilizers can be applied closer to the time of harvest, therefore offering greater flexibility.

We do not have any experience with organic fertilizers used with drip tape. This has been done with organic greenhouse tomato production, but the concentrated organic fertilizer must be continuously agitated to ensure the material stays in solution. The emitter holes on drip tape are very small and, even with agitation, they may be prone to clogging under these circumstances. Chilean nitrate, which is water soluble, would be a better choice, but remember that it can only be used to supply 20 percent of the crop's nitrogen need.

Weed Control

Weed control is the greatest challenge to organic onion production. Plastic mulch will go a long way in controlling weeds on the bed, but weeding will still be required between beds and for weeds that come up in the holes where the onions are growing. Equipment can do a good job controlling weeds between the beds, but take care so that the plastic is not snagged by sweeps or tines. Hand weeding will still be required for those weeds that emerge from the planting holes in the plastic.

Growers not wishing to use plastic can control weeds with equipment set up to cultivate between the onion rows. With a conventional planting arrangement (beds on 6-foot centers, 4 rows/bed, 12 inches between-row), there is very little wiggle room for sweeps or tines. Growers may wish to try a slightly wider spacing to prevent damaging the onions.

Sweeps or tines chosen for this purpose will need a narrow footprint to work well. As onions grow larger, their leaves tend to fold over and cover the row middles, so late season use of cultivation equipment may be precluded due to unacceptable damage to the onion plants. Some hand weeding will probably still have to be done in order to keep the crop clean.

Figure 1. Pegging plastic covered beds. Note the plantbed onions on the right, which were regularly hand weeded and the weed pressure directly to their right along the irrigation row. This highlights the importance of weed control. Additionally these beds are approximately 4 foot across the top to facilitate the use of the pegger resulting in a plant population comparable to conventional onions.

We do not have any experience with organic herbicides such as corn gluten meal, acetic acid, citric acid, oil based materials (clove or thyme oil), combinations of these materials, or other products. With the exception of corn gluten meal, all are burn down materials, so repeated applications would be required without contacting the onion plants. The limited amount of research on all these materials indicates they have only limited effectiveness.

Soap based herbicides are allowed in organic production only for fence row and roadside weed control. They are not allowed in food crop production.

Disease and Insect Control

All of the general disease and insect control methods recommended in organic production such as crop rotation (three years or greater), farmscaping to enhance natural control, avoiding overhead irrigation when extended leaf wetness may occur, etc., should be practiced with organic onion production.

As with weed control, materials available for disease and insect control are highly restricted in organic production. For diseases, very few products would fit into the typical fungicide or bactericide category. One such product is Bordeaux mixture, which is a combination of copper sulfate and lime. It is a very old fungicide and, because it is copper based, has bactericidal properties as well. Not all copper based products can be used in organic production.

Products listed with the Organic Materials

Review Institute (OMRI) will meet NOP regulations for organic production (Table 1). Another product that has been tested for disease control in onions is Serenade (Bacillus subtilis) (AgraQuest, Davis, CA). This bacteria has fungicidal properties against several onion diseases. In tests at the University of Georgia, it was shown to be slightly toxic to onions at very high doses.

There may be other disease control products available, particularly as the organic industry grows. Since onions are a winter crop, insects tend to be much less problematic. Several soilborne insects can attack onions including several maggots, cutworms, wireworms, and mole crickets. The University of Georgia does not have any experience with organic insect control measures at this time, but, there are products such as beneficial nematodes that are supposed to

help control some of these insects. In addition, a green manure of rapeseed or other brassicas has been suggested to suppress some of these soil insects.

Thrips are the only other major insect pest of onions. They usually are most prevalent in late winter or early spring. In most years they are not a major problem, but they are known to transmit some diseases including purple blotch. Neem oil has been tested in Georgia to control this insect but has proven to be ineffective. This is probably due to the fact that thrips congregate on the underside of onion leaves where they fold over, making contact from an insecticide extremely difficult.

Spinosad (Saccharopolyspora spinosa) is a product derived from bacteria that is effective in controlling thrips as well as several other insects. In addition, pyrethrums from natural sources may be effective in controlling thrips.

Harvesting and Handling

Organic onion harvesting and handling can be done similarly to conventional onions. Remember, however, that in dual use operations (conventional and organic), all equipment has to be cleaned before certified organic onions can be processed. This can be a major undertaking and growers may wish to consider having equipment solely for use in their organic operations. Of course, this may not be possible with relatively expensive equipment such as grading lines. Dual use operations may wish to process organic onions first since packing shed equipment would have been cleaned from the previous season. Trying to move back and forth between organic and conventional onions may not be very feasible during the height of the
season.

Organic Vidalia onion production is a relatively new endeavor for Georgia and there is still a considerable amount of research that needs to be done to maximize success. This document represents our best recommendations at this time and we expect it to change as more information is developed.

Table 1. Web Sites of Interest.

USDA National Organic Program www.ams.usda.gov/nop/indexIE.htm This is the site for the certified organic program. The regulations for certified organic production are available from this site.
Georgia Organics www.georgiaorganics.org Georgia Organics is the organic grower group in Georgia. They are an excellent source of information and have an annual conference with educational sessions and vendor participation.
Georgia Department of Agriculture www.agr.state.ga.us This site has information on required registration for organic farms as well as marketing information.
Organic Materials Review Institute www.omri.org OMRI evaluates products for compliance with the NOP standards. A searchable list of evaluated products is available.
UGA College of Agricultural & Environmental Sciences www.caes.uga.edu This is a University of Georgia site with information on agricultural production, including organic production.
UGA Cooperative Extension - Horticulture Publications www.caes.uga.edu/publications/subjectList.html#Horticulture This site has UGA publications on horticultural production, including organic production.

Table 2. Official list of Vidalia onion varieties, 2007

Georgia Boy (DPS 1032)	D. Palmer Seed
Mr. Buck (DPS 1033)	D. Palmer Seed
Ohoopee Sweet (DPS 1024)	D. Palmer Seed
Sapelo Sweet (DPS 1039)	D. Palmer Seed
Miss Megan (DPSX 1290)	D. Palmer Seed
Caramelo SRO 1000 (RCX 6043)	Nunhems USA Inc.
Nirvana (RCS 1027)	Nunhems USA Inc.
Sweet Caroline SRO 1001 (RCX 5195-1)	Nunhems USA Inc.
Sweet Melody (RCS 1938)	Nunhems USA Inc.
Sweet Vidalia	Nunhems USA Inc.
Sweet Jasper XON-202Y (99C 5092)	Sakata
Sweet Harvest XON-203Y (01ZG 5034)	Sakata
Century (EX 07592000)	Seminis
Cyclops (XP 6995)	Seminis
EX 19013	Seminis
Granex 33	Seminis
Granex Yellow, PRR	Seminis
Pegasus	Seminis
Savannah Sweet	Seminis
Honeycomb (SSC 6372 F1)	Shamrock
Sugar Belle F1 (SSC 6371 F1)	Shamrock

Table 3. List of certifiers local to Georgia.

Fertilizer and Seed Certification Services* Clemson University 511 Westinghouse Rd. Pendleton, SC 29670 864-646-2140 www.clemson.edu/public/regulatory/plant_industry Scope: crop, livestock, wild crop, handling Accredited: 4/29/02
Georgia Crop Improvement Association, Inc. 2425 South Milledge Ave. Athens, GA 30605 706-542-2351 www.certifiedseed.org Scope: crop, livestock, handling Accredited: 4/29/02
North Carolina Crop Improvement Association 3709 Hillsborough St. Raleigh, NC 27607-5464 919-515-2851 www.nccia.nesu.edu Scope: crop, livestock, handling Accredited: 7/9/02
Quality Certification Services - Formerly FOG P.O. Box 12311 Gainesville, FL 32604 352-377-6345 www.QCSinfo.org Scope: crop, livestock, wild crop, handling Accredited: 4/29/02
*Any certifier listed on the NOP Web site can be used: (www.ams.usda.gov/nop/CertifyingAgents/Accredited.html)

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