ONION PRODUCTION FOR ST. KITTS AND NEVIS

John Leach

Onions represent a large proportion of the total imports of vegetables into St. Kitts and Nevis. Considerable potential therefore exists for the production and marketing of locally grown onions.

The following is a summary of recommendations derived from onion research done by institutions in Barbados, Montserrat, St. Kitts, Nevis and St. Vincent and is intended as a guideline for growers and extension officers in St. Kitts and Nevis.

Site Selection

Onions should be planted on flat or gently sloping land which is prone neither to erosion nor flooding. A plot where weeds can be easily controlled should be selected – nutgrass infested areas should be avoided.

Land Preparation

Onions require good drainage, so flat-topped, slightly raised beds should be prepared. The beds should follow the contours to reduce erosion on sloping land. The soil should be free of trash and stones and have a fine tilth to prevent clogging of the planter and to ensure good seed-soil contact which will improve germination.

Beds of 50 - 66 in (1.27 - 1.68 m), depending on the width of the tractor in use, can be made by harrowing and rotovating the land.

On slopes, where the soil is highly erodible, the land should be banked after harrowing using a ‘cane’-banker. Banks can be flattened manually with a rake or with a rotovator. The first (basal) fertilizer application can be incorporated at this time.

Storm/diversion drains should be made to protect the plot from runoff during heavy rain.

An onion field in St. Kitts

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Variety Selection
The following varieties have performed well in the region:

<table>
<thead>
<tr>
<th>Variety</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Golden F1 hybrid</td>
<td>Intermediate yield; good storage characteristics; medium-sized bulbs with firm pungent flesh.</td>
</tr>
<tr>
<td>Granex F1 hybrid</td>
<td>Very high yield but short storage life.</td>
</tr>
<tr>
<td>Yellow Creole</td>
<td>Low yield but bulbs are very pungent and store well.</td>
</tr>
<tr>
<td>Texas Early Grano 502</td>
<td>Large bulbs with a mild taste.</td>
</tr>
<tr>
<td>Texas Yellow Grano</td>
<td>Similar to Texas Early Grano 502.</td>
</tr>
<tr>
<td>Henry’s Special</td>
<td>High yield; large bulbs; only fair storage.</td>
</tr>
<tr>
<td>El Toro</td>
<td>Good yield of white bulbs; short storage.</td>
</tr>
<tr>
<td>Robust White</td>
<td>Productive white variety; fair storage.</td>
</tr>
<tr>
<td>Red Creole</td>
<td>Small red pungent bulbs; very good storage.</td>
</tr>
<tr>
<td>Special 38</td>
<td>High yield; large mild bulbs; poor storage.</td>
</tr>
<tr>
<td>Grand Stand (H7)</td>
<td>Intermediate yield; very firm bulbs; excellent storage.</td>
</tr>
</tbody>
</table>

Seed Treatment
Ideally seed should be dusted with either Fernasan® seed dressing, benomyl (Benlate®) or Captan® to prevent seedlings from ‘damping-off’ under wet soil conditions.

Spacing and Planting
Onions can either be direct-seeded or transplanted. Transplanting is labour-intensive but may be necessary if weed control is difficult and relatively small plots are being used.

i. Direct-seeding: For direct-seeding small plots an Earthway seeder may be used. The radish seed plate with every other hole blocked gives a good distribution of seed. If the percentage germination of the seed is below 90 or irrigation is not available none of the holes on the seed plate should be blocked. Four or five rows per bed spaced 10 in (25 cm) apart should be planted. The Stanhay Precision Seed Drill is recommended for plots larger than 1 acre (0.4 ha). A plain rubber belt with #11 hole (90 holes per belt) on the A pulley should be used to space seed at 1 in (2.5 cm) in the row. The A2 spring base and T choke will be needed. The amount of seed required will be 5 - 6 lb per acre (5-5 kg per ha). Some thinning may be needed when the Earthway seeder is used. The normal depth of planting is 3/4 - 1/2 in (1.5 - 2 cm) but seeds may be planted as deep as 1 in (2.5 cm) if rainfall is limiting.

ii. Transplanting: Seeds should be planted thickly in a raised free-draining nursery bed rich in organic matter. When seedlings reach 6 weeks old, or pencil thickness they should be transplanted into beds prepared as for direct-seeded onions with four or five rows per bed and spaced 3 in (7.5 cm) apart within the row.

Fertilizing
Onions are shallow-rooting so it is essential that nutrients be applied regularly for good healthy growth. No specific recommendations are available for St. Kitts to date but the following temporary recommendations are based on research in Montserrat.

i. Direct seeding: An application of 480 lb per acre (538 kg per ha) of 15-15-15 should be incorporated during final land preparation or raked into beds before planting. At 4, 8 and 10 weeks after germination, Sulphate of Ammonia at 114 lb per acre (128 kg per ha) mixed with Muriate of Potash at 70 lb per acre (78 kg per ha) should be applied broadcast.

ii. Transplanting: An application of 160 lb per acre (179 kg per ha) 15-15-15 should be made to the seedbed. Before transplanting 15-15-15 fertilizer at 320 lb per acre (360 kg per...
ha) should be incorporated into the field. Then at 4 and 8 weeks after transplanting applications of Sulphate of Ammonia at 114lb per ac (128 kg per ac) mixed with Muriate of Potash at 70 lb per ac (78 kg per ha) should be given.

Irrigation

In the absence of regular rainfall plots should be irrigated every 2 - 3 days until germination is complete and every 6 - 8 days thereafter. Irrigation should be discontinued 3 - 4 weeks before harvesting.

Weed Control

Weeds are one of the main constraints to production since onions are poor competitors with weeds. Good weed control is essential and starts before planting the crop.

It is important to select land which is relatively clean of weeds, especially nutgrass, devil's grass and other difficult weeds. In cases where this is not possible, the land should be prepared 2 - 3 weeks before planting. Any germinated weeds should then be treated with glyphosate (Roundup®) at the rate of 3 tablespoons per gallon (12 ml per litre) about 1 week before sowing (in cases of intense weed regrowth) or 4 - 5 days after sowing but before germination of the onions. In areas heavily infested with nutgrass two applications of glyphosate (Roundup®) may be required before the onions germinate.

Other methods of weed control include:

Pre-Emergent Herbicides:

DCPA (Daetal W75®) can be applied at 10 - 12 lb per acre (11 - 13 kg per ha) immediately after sowing.

Note: if applications of Herbadox 330E are to be given later, the dosage of Daetal W75 can be reduced to 7 lb per acre (7.8 kg per ha).

Application can be delayed up to 5 days after sowing (but must be applied before the weed seeds have germinated).

Post-Emergent Herbicides:

Application of Daetal W75® can also be made just after emergence of onion seedlings. This is advised if heavy rainfall is expected since application of Daetal W75® followed by heavy rainfall has been associated with reduced germination.

 pendimethalin (Herbadox 330E) can be applied at 3 1/2 pints per acre (3.91 per ha) once the onions have a minimum of three leaves (about 6 - 7 weeks after sowing).

 Fluazifop-butyrl (Fusilade) can be applied at a rate of 1.5 pints per acre (1.75 l per ha) to control grass weeds after germination of the onions.

 Oxfluoren (Goal 1-6EC) can be applied at 0.5 - 1.25 pints per acre (0.6 - 1.5 litre per ha) to control broad-leaf weeds but this herbicide can only be applied after the onions have passed this three leaf stage. It is important to read the label carefully before using this herbicide. The Table below gives approximate pesticide usage rates per gallon or per litre of water. Hand weeding can be done but it is very tedious and costly.

Pest and Disease Control

For the first 2 - 3 weeks after germination fields must be monitored regularly for leaf-eating caterpillars and a precautionary weekly spray programme should be implemented using the following pesticides:

Leaf-eating Caterpillars (e.g. Armyworm)

Diazoxin 60E (Basudin®) at 3/4 - 1 pt per acre (0.9 - 1.2 l per ha)

 OR
 Permethrin 50E (Ambush®), decamethrin 2.5E (Decis®) at 4 - 5 fl oz per ac (0.3 - 0.4 l per ha).

 OR
 Fenvalerate 10E (Beltmark®) at 10 - 12 fl oz per acre (0.7 - 0.9l per ha).

 OR
 Bacillus thuringiensis (Dipel®) at 1/2 - 4 lb per acre (0.6 - 4.5 kg per ha).

Leaf Miners

Dimethoate (Perfekthion 40EC®) at 6 - 8 fl oz per acre (0.4 - 0.6 l per ha).

 OR
 Diazoxin 60E (Basudin®) at 1/4 - 1 pint per acre (0.9 - 1.2 l per ha).

Thrips

Diazoxin 60EC (Basudin®) 3/4 - 1 pint per acre (0.9 - 1.2 l per ha)

 OR
 Lambda-cyhalothrin (Karate® 2.5EC) 0.4 pint per acre (0.5 l per ha)

 OR
 Malathion 57EC at 1 - 2 pints per acre (1 - 2.3 l per ha)

 OR
 Methomyl (Lannate® 1.8 litre) 2 pints per acre (2.3 l per ha)

 OR
 Acephate (Orthene® 75S) at 10 - 21 oz per acre (0.7 - 1.4 kg per ha).

Damping off

Adequate drainage should be provided and where necessary metalaxyl (Ridomil 2E) applied at 4 - 8 pints per acre (5-6 - 11 l per ha) immediately after seeding.

Blast

Application of pesticides should begin at approximately 10 days after emergence of seedlings. Lower rates are needed on young plants. Copper hydroxide (Kocide 101) at 3/4 lb per acre (0.9 kg per ha) should be alternated with mancozeb (Manzate 200) at 3 lb per acre (2.2 - 3.4 kg per ha).
Safety clothes should always be worn when spraying. The recommendations on the label should always be followed. The safety interval between spraying and harvest should be observed for all chemicals. If in doubt farmers should call the CARDI/SSMC Integrated Pest Control Unit (465-2337/2846) or the extension agent.

Note: Approximate amounts of pesticide required for application on small areas are given in the table below.

Approximate amounts of pesticide required* per US Gallon (or per litre) of water.

<table>
<thead>
<tr>
<th>Pesticide</th>
<th>Imperial</th>
<th>Metric</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(per U.S. Gallon)</td>
<td>(per Litre)</td>
</tr>
<tr>
<td>Ambush</td>
<td>1/2 tsp</td>
<td>0.7 ml</td>
</tr>
<tr>
<td>Belmark</td>
<td>3/4 tsp</td>
<td>1.0 ml</td>
</tr>
<tr>
<td>Bravo</td>
<td>5 tsp</td>
<td>7 ml</td>
</tr>
<tr>
<td>Dacthal 75WP</td>
<td>4 oz</td>
<td>30 g</td>
</tr>
<tr>
<td>Decis</td>
<td>3/4 tsp</td>
<td>1.0 ml</td>
</tr>
<tr>
<td>Diazinon 60EC</td>
<td>2 tsp</td>
<td>2.6 ml</td>
</tr>
<tr>
<td>Dipel</td>
<td>2 tbs</td>
<td>7 g</td>
</tr>
<tr>
<td>Fusilade</td>
<td>1/2 fl oz</td>
<td>3.9 ml</td>
</tr>
<tr>
<td>Goal 1-6EC</td>
<td>1/3 fl oz</td>
<td>2.6 ml</td>
</tr>
<tr>
<td>Herbadox 330EC</td>
<td>8 tsp</td>
<td>10.6 ml</td>
</tr>
<tr>
<td>Karate 2.5EC</td>
<td>1 - 2 tsp</td>
<td>1.3 - 2.6 ml</td>
</tr>
<tr>
<td>Kocide 101</td>
<td>1/4 oz</td>
<td>2 g</td>
</tr>
<tr>
<td>Lannate 1:8L</td>
<td>5 tsp</td>
<td>7 ml</td>
</tr>
<tr>
<td>Malathion 57EC</td>
<td>1 tbs</td>
<td>4.0 ml</td>
</tr>
<tr>
<td>Manzate 200</td>
<td>1 oz</td>
<td>7.5 g</td>
</tr>
<tr>
<td>Orthene 75S</td>
<td>1/3 oz</td>
<td>2.5 g</td>
</tr>
<tr>
<td>Perkethion 40EC</td>
<td>1 tsp</td>
<td>1.3 ml</td>
</tr>
<tr>
<td>Ridomil 2E</td>
<td>5 tbs</td>
<td>19.8 ml</td>
</tr>
<tr>
<td>Roundup</td>
<td>5 tbs</td>
<td>19.8 ml</td>
</tr>
</tbody>
</table>

* Based on the approximate rate of water applied on commercial farms. Adapted from CARDI and Ministry of Agriculture recommendations for St. Kitts and Nevis.

Harvesting

Onions will mature in 16-18 weeks depending on variety and time of planting. To ensure onions of a very high quality and long storage life the crop must be allowed to mature in the field. Green, immature or uncured onions will sprout and spoil rapidly in storage.

Onions are mature when the green tops fall over at the neck and start drying up. Harvesting should start when at least half the tops have fallen over. Harvested bulbs should be left in the field until the tops dry down to the neck (approximately 10 days), a process known as windrowing. This seals off the neck of the bulb from entry of spoilage organisms after harvest. Often bulbs are arranged so that the tops of one row are placed to cover the bulbs of the neighbouring row. This reduces the chance of bulbs being sun-burnt (which can reduce quality). Harvesting onions under wet conditions should be avoided.

Drying of bulbs in the field is recommended for large plots but if theft is a problem bulbs can be taken to a secure place and allowed to sun-dry in racks for at least 1 week. A plastic cover should be kept nearby in case of rain, particularly at night. If stacked too thick, bulbs will be crushed, their drying affected and spoilage increased.

Before bagging bulbs must be topped about 1/2 in (1-2 cm) above the neck and sun dried for a few hours. Bagged onions should be marketed without delay.

Yields

Yields of 40,000 lb per acre (45,000 kg per ha) have been recorded in Barbados although the island average is estimated to be 14,000 lb per acre (16,000 kg per ha). In Montserrat, yields of 15,000 lb per acre (17,000 kg per ha) have been recorded. In St. Kitts, under rainfed conditions, yields of 20,900 lb per acre (23,500 kg per ha) were achieved in 1989-90 (November planting) whereas in Nevis, under irrigation, 18,500 lb per acre (20,727 kg per ha) was harvested from a commercial plot in the same season.

These recommendations will change as new information is generated through research undertaken by CARDI and other agencies in Barbados, Montserrat, St. Vincent, St. Kitts and Nevis. When new information becomes available, farmers will receive updates through CARDI and the Department of Agriculture.

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