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**GROWING AND HANDLING
DRY BULB ONION
IN THE CARIBBEAN**



Frances Chandler



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FOREWORD

The Common or Dry Bulb Onion (*Allium cepa* L.) is one of the few bulb crops used for food. It is popular as a vegetable, but is used more often as a seasoning. Onion is second only to tomato in world vegetable production and demand is generally inelastic.

In the Caribbean, over 8,000 tonnes of onions are imported annually at a cost of approximately EC\$11 million mainly from Netherlands, USA and Spain. Foreign exchange savings through import substitution is a priority for Caribbean governments, and onion shows potential for this purpose.

Onion is currently being produced in Antigua, Barbados, Grenada, Jamaica, Montserrat, St Kitts, Nevis and St Vincent. Research is aimed at increasing self-sufficiency in onions in these countries. While intra-regional exports could also be considered at certain periods of the year particularly when the world market price for onions is high, it is doubtful whether extra-regional exports would be feasible.

The major constraints to achieving self-sufficiency have been seasonality of production, limited availability of water for irrigation in some countries, poor shelf-life of most short-day varieties and a host of pests and diseases which make onion a "high risk" crop for growers in the Caribbean.

The scale on which onion is grown varies from one country to another eg. in Montserrat, production is characterised by small plots 0.05-0.1 ha (0.1- 0.2 ac) in area, while in Barbados the crop is grown on a larger scale i.e 1-5 ha (2.5-12 ac) mainly by sugar cane farmers and specialist vegetable producers, but a few small farmers have started production during recent years. The production system varies from totally manual in St Vincent to partly mechanised in St Kitts to nearly fully mechanised (except for the harvesting operation) in Barbados.

Although the climatic conditions within the Caribbean region are relatively uniform, onions are sensitive to small environmental changes, even at a particular site from year to year, and varietal performance may vary slightly from country to country. It is therefore important to note that when new varieties are being introduced, they should be tested in small plots alongside proven varieties over at least two seasons before acreages are increased.

This bulletin seeks to bring together information gathered from a number of sources, including farmer experience over the past two decades to provide both large and small scale onion growers in the Caribbean with comprehensive production and post-harvest recommendations which are relevant to the prevailing environmental and economic conditions. The bulletin is divided into three sections:

- Section I covers detailed recommendations for the production of the onion crop.
- Section II describes the major aspects of post-harvest management of onion bulbs.
- Section III gives general information on the maintenance of equipment and on pest and disease control methods.

Frances Chandler

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The author would also like to thank Messrs Gerald Proverbs and Bruce Lauckner for their editorial comments and advice.

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SECTION I

PRODUCTION PRACTICES FOR GROWING ONIONS

Onion requires a high level of management and considerable inputs, particularly in the areas of pest, disease and weed control. Unless the crop is mechanised, it is very labour intensive and therefore not attractive to many growers. Since timeliness of cultural operations (e.g. land preparation and pest control) is important, growers who have their own equipment have a distinct advantage over those who have to rely on contractors to carry out these operations.

1. Site selection & Land preparation

Onions should be planted on flat or gently sloping land which is prone neither to erosion nor flooding. The site should be easily accessible since frequent inspections of the crop are necessary and theft is often a problem in isolated areas. Areas which are naturally sheltered from strong winds are recommended.

The crop should not be planted in the same field more than once every four years. This is a precaution against the build-up of nematodes and diseases like *Sclerotium rolfsii* and *Fusarium* sp. which may reduce yield. Sugarcane and sweet potato are among the best crops to precede onions in a rotation. Since *Xanthomonas campestris* which causes "blast" disease has been isolated from many leguminous crops, it is wise to avoid these in your rotation.

Fields should be relatively free from weeds, particularly nutgrass (*Cyperus rotundus*), devil's grass (*Cynodon dactylon*) and other perennial weeds. The slow establishment of the onion seedling makes it susceptible to weed competition particularly in the early growth stages. The land preparation methods used will depend on a number of factors, including the type of crop preceding the onion crop.

Fields coming out of sugar cane

If the field has not been burnt, it will be necessary to chop and invert the large quantity of crop debris which will remain on the field. If this is not done well, the sugar cane will grow again, and this will affect the growth of the onion crop.

Chopping and inverting debris

The field should be disc-harrowed in two directions. A disc plough is sometimes used, but this will not chop the cane stubble as effectively as the harrow.

Loosening compaction

The field should be subsoiled to loosen compaction resulting from the passage of heavy implements over the field during the past season. Subsoiling also removes hard pans and improves drainage.

Soil refining

Onion, like most other vegetable crops, requires a fine soil tilth. This is usually achieved by rotavating the field. However, care must be taken to avoid the overuse of rotavation since this can cause the breakdown of the soil structure and crusting of the soil surface which will hinder seed germination. A power harrow may be used under conditions which are too wet for a rotavator. On light soils, rotavation is sometimes replaced by power harrowing which also assists in levelling the field.

For successful seeding, land preparation should be completed far enough in advance to allow a fine tilth free of clods to develop by weathering. In addition, cane stumps and stones should be removed since these will cause obstruction to the seed drill and may result in a poor crop stand.

Bed formation

During the dry season or in well-drained soil, very shallow beds are produced by the pressure of the tractor wheels, so that the wheelmarks separate the beds. However, during the wet season or if the soil tends to waterlog, slightly higher beds



Figure 1 Ridging to produce seedbeds

are produced by ridging with a furrowing implement and levelling the tops of the ridges with a rotavator with the back flap down. Storm-diversion drains should be constructed to protect the plot from runoff during heavy rains, particularly if the area is sloping.

Rolling

The rolling of beds with a Cam-

bridge roller both before and after planting, ensures that the seed and soil come into contact and that seeds do not fall into air spaces between soil particles. Rolling has been shown to improve germination. Tractor speed should be approximately 3 km (1.3 mls) per hr.



Figure 2 Rolling beds has been shown to improve germination

Fields coming out of vegetables

If the onion crop is following another vegetable crop, then soil preparation is much simpler since primary preparation would already have been done.

If time is available, the original beds and wheelmarks may be chisel ploughed before re-marking and rolling in preparation for the new planting.

If replanting must be done immediately, the tops of the beds may

be rotavated and the new crop planted the same day.

2. Variety selection and planting times

When selecting varieties, a number of factors must be considered eg. yield, consumer acceptability, shelf-life and the expected market situation at harvest time.

Bulbing in onions is affected by day length and temperature. A long day variety grown under short day conditions will continue to produce leaves without producing a bulb, while a short day variety grown under long day conditions will bulb at a very early stage when the leaf area is small, and therefore a very low bulb yield will be produced. High temperatures increase the rate at which bulbing occurs. Since varieties are bred for specific conditions and therefore have a limited area of adaptation, it is recommended that only varieties which have been tested under local conditions should be planted commercially.

A large proportion of the onion crop in the Caribbean is planted under rainfed conditions during August to October which means that maturity of the main crop takes place over a limited period from December to March and severe competition exists on the market at this time. CARDI is therefore recommending that emphasis should be placed on varieties with a long shelf- life for this planting season.

Although it is always more advisable to plant varieties with a long shelf-life, varieties with poorer storage characteristics but excellent yields may be planted "out-of-season" (November – March) with irrigation since the market at harvest time (May/June) tends to be less competitive, and crops are usually sold promptly after harvest. However, if wet conditions occur at harvest these varieties will be very prone to rotting, and post-harvest losses may be high.

Crops which are planted in June/July will mature in the wet season, and the risk of post-harvest losses is high. Varieties with firm bulbs and a long shelf-life are recommended for this season. The planting seasons for the various countries are described in Figure 3 and the varieties which are currently being grown in the various planting seasons are listed in Table 1.

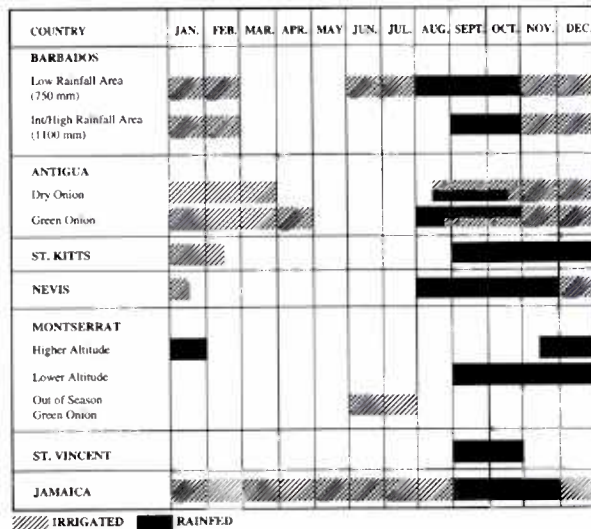
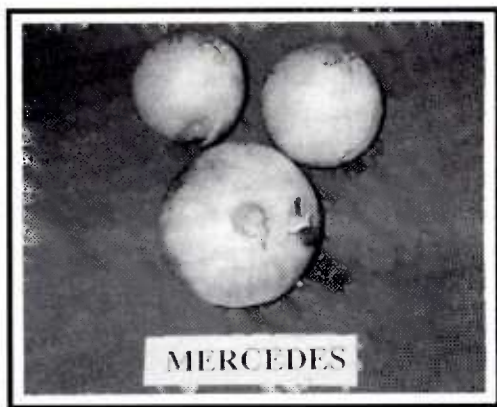


Figure 3 Planting times

Table 1 Onion varieties grown commercially in the various planting seasons in the Caribbean

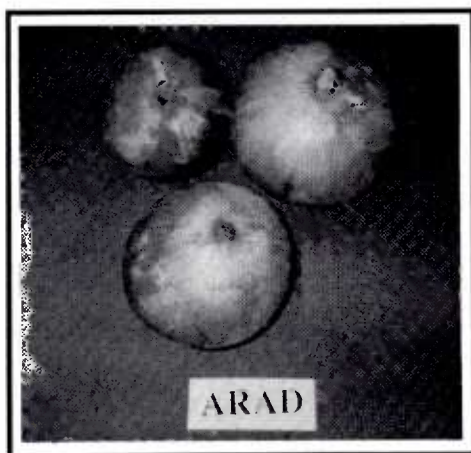
Variety	Description*	Country	Planting Season
Arad (H60) (Hazera Seed Co.)	High yield, flat yellow globe bulbs with thick dark brown scale leaves, mild flavour, good storage	Barbados	January, February, July, August - December
		Antigua	January, February
		Montserrat	September - January June/July (green onion)
Grandstand (H7) (Hazera Seed Co.)	Good yield, firm yellow globe/high globe bulbs, mild taste, excellent storage	Barbados	January, February, August - December
		St Kitts/Nevis	September - February
		Antigua	August - October August - December (green onion)
		Montserrat	September - January
Texas Early Grano 502 (various seed companies)	Moderate yield, relatively large, yellow bulbs, mild taste, short storage life	St Kitts/Nevis	September - December
		Jamaica	Year round
Yellow Grano (various seed companies)	Similar to Texas Early Grano 502	Montserrat	September - December
		St Kitts/Nevis	
		Antigua	January, February August - January (green onion)
Granoble (Sunseed)	Moderate yield medium sized yellow globe bulbs, mild taste, short storage life	St Kitts/Nevis	September - December
Barak (H8) (Hazera Seed Co.)	Moderate yield, medium sized yellow globe bulbs, intermediate shelf-life	Antigua	December, January
Ben Shemen (Hazera Seed Co.)	Intermediate day, yellow variety, long shelf life	Antigua	February, March January - April (green onion)
Red Creole (Sunseed)	Red variety with short shelf-life	Antigua	August - October
El Toro (for green onion only) (Sunseed)	Medium sized white bulbs - poor storage	Antigua	August - January
Nissan (H9) (Hazera Seed Co.)	Good yield, medium to large, yellow bulbs with dark brown scale leaves - good storage	Montserrat	September - January
Mercedes (Petoseed)	Good yield, medium to large, yellow bulbs, light brown scale leaves, good storage	Barbados	September - February, July

*Moderate yield = 40 tonnes/ha; Good yield = 50 tonnes/ha; High yield = 60 tonnes/ha.



Mercedes is the earliest maturing of the varieties. It produces medium to large yellow globe bulbs with light brown scale leaves and long storage life.

Grandstand matures slightly later than Mercedes and produces medium sized yellow bulbs with dark brown scales and long storage life.



Arad is a late maturing high yielding variety producing yellow flattened globe bulbs with dark brown scale leaves and long storage life.

Windbreaks

If fields which are exposed to strong winds must be used, temporary windbreaks of sugarcane, corn or sorghum should be planted at intervals to protect the crop. Observations over several years have shown that windbreaks have favourable effects on plant vigour, tip burn, 'blast' and bulb size. The windbreaks should be planted in advance of sowing the onion crop and should not be allowed to become too tall and to damage the crop by lodging.