

# OKRA

A Beloved Virgin



5.2:

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St. Croix, V.I.

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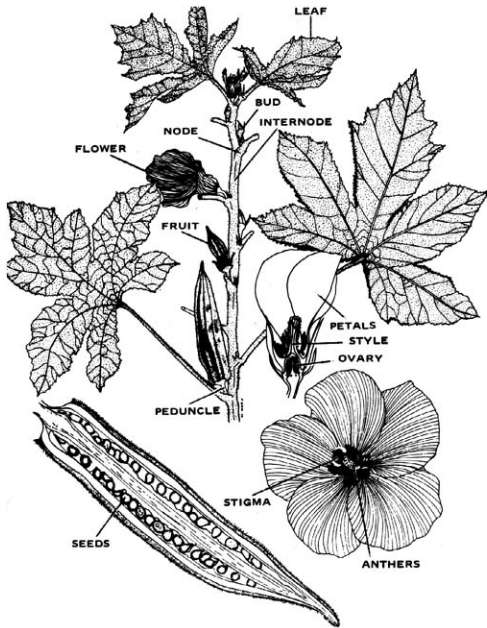
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## OKRA – A BELOVED VIRGIN

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Okra (gumbo or quingumbo) is one of the most popular vegetables in the Virgin Islands. Because of its outstanding popularity in the Virgin Islands cookery, it has assumed the status of a "national vegetable" of the territory. On the market all year, it is used principally in fungi, or baked, or fried. Okra combines well with other vegetables, especially tomatoes, and is a natural thickening agent – performing this function in gumbos. Most of the continentals do not like okra due to the pastiness which can be overcome with proper cooking. Pastiness does not occur if the whole pods are not broken or subjected to long cooking. Whether boiled, baked, or fried, rapid cooking will preserve the flavor as well as prevent the mucilaginous consistency from developing. Okra should not be cooked in iron, copper, or brass utensils for the resulting chemical reaction, while harmless, will cause the pods to become discolored. Okra pods can be preserved by drying, quick freezing, canning, or by being barrelled in brine.

The botanical name of okra is *Hibiscus esculentus* L. (Syn. *Abelmoschus esculentus* (L.) Moench) with chromosome number of  $2n=72-132$ . An okra plant is a robust, erect, annual herb, 1 - 2 meters tall. Its stems are green or slightly red in color. Palmately 3 - 7 lobed leaves are alternate. Flowers are solitary, axillary with peduncle about 2 cm. long. Calyx is completely fused as flower develops, splitting longitudinally as flower opens and falling with corolla after anthesis. Five petals are yellow with crimson spot on claw. Staminal column is united to base of petals with numerous stamens. Ovary is superior. Stigmas are small and deep red in color. Fruits are beaked capsules, longitudinally furrowed. Seeds are dark green to dark brown in color.



AERIAL PARTS OF OKRA PLANT

## FOOD VALUE

One hundred (100) grams of the edible portion of raw okra contains the following amounts of nutritional components.

NUTRITIONAL COMPONENT	AMOUNT
water	88.9 per cent
calories	36
protein	2.4 grams
fat	0.3 grams
carbohydrate (total)	7.6 grams
carbohydrate (fiber)	1.0 grams
ash	0.8 grams
calcium	92 milligrams
phosphorous	51 milligrams
iron	0.6 milligrams
sodium	3 milligrams
potassium	249 milligrams
vitamin A	520 international units
thiamine	0.17 milligrams
riboflavin	0.21 milligrams
niacin	1.0 milligrams
ascorbic acid	31 milligrams
magnesium	41 milligrams

Research has been done on the use of powdered okra as a blood plasma substitute. It was prepared by grinding the pods and then removing the waxes and fats with ether or alcohol. There appears to be a number of other applications for dehydrated okra in the food and pharmaceutical areas. For example, in aqueous mixtures it is an emulsifier for certain oily materials.

The use of okra seeds as human food has been suggested by a researcher at the University of Rhode Island. According to this researcher, the dried okra seeds are rich in protein and can be pressed for oil and ground into flour. Because of okra's higher protein content and particularly because of its high content of lycine, an essential amino acid, an acceptable bread can be made with substantially improved nutritional value.

#### ME BORN IN AFRICA

Okra is believed to have originated in Africa in an area that includes Ethiopia, the mountainous or plateau portion of Eritrea, and the eastern higher part of the Anglo-Egyptian Sudan. From Ethiopia it spread to north Africa, the eastern Mediterranean, Arabia, and India. It reached Brazil by 1658 and Dutch Guiana by 1686. Okra came to the West Indies with the African population.

## GROWING OKRA

### Soil and Land Preparation

Most of the soils in the Virgin Islands will produce a satisfactory crop of okra if other conditions are favorable. Like the majority of other vegetables, okra does best on well-drained sandy loam soils. The best soil reaction is between pH 5.5 and 6.5. The bed should be prepared by working the soil to a good tilth. Well-rotted animal manure or compost should be applied at a rate of 10 - 15 tons per acre for producing a good crop.

### Choice of Cultivars is Available

Good quality okra may be green or white in color with pods that are either long and thin or short and chunky. In the Virgin Islands, consumers show preference for green poded cultivars (varieties). Okra cultivars vary in plant height. Pods of some cultivars have distinct lengthwise ridges, while those of other cultivars are smooth. The two cultivars that have given best performance under local conditions are:

#### Dwarf Green Long Pod

A dwarf, height about 3 feet, mature pods 7 - 8 inches long, ridged, and green. Recommended for fall planting.

#### Emerald

Height is 5 feet; pods are 8 inches long. The pods are smooth, round, very slender, and deep green. They remain tender longer than the pods of many other cultivars. While suitable for both fall and spring planting, during summer this cultivar has consistently out yielded others.



EMERALD CULTIVAR



### Seed – An Important Factor

Okra seeds are hard coated and slow to germinate. This characteristic enables the okra seed to stay in the soil for considerable time and wait for optimum moisture to germinate. However, the rate and percentage of germination can be hastened by soaking the seed for 24 hours in water or for 30 minutes in acetone and alcohol. One ounce contains about 425 okra seeds which will plant a 100 foot row. 6 - 8 pounds of seed will plant an acre. Under ordinary conditions the longevity of okra seed is for 2 years, therefore, it is recommended to use fresh seed or seed stored in a cool dry place. In case old seed is used, it would be advisable to test the germination before planting.

### Planting the Right Way

Okra seeds can be planted on flat beds, on ridges, or in furrows. The furrow method is preferred in the Virgin Islands because the bottom of furrows is cool and moist. Whichever method you choose, plant 2 - 3 seeds per foot in a row with rows 3 feet apart. When plants are well established, they should be thinned to one plant every 12 to 18 inches depending upon the cultivar grown.

### Fertilizer Application Needs Judgment

The proper amount and type of fertilizer to be applied varies with the specific location on the islands and also the soil type. Soil test results will help make the decision. Heavier soils high in nitrogen may not need any fertilizer application. However, average soils will need 500 pounds of 5 - 10 - 5 (nitrogen-phosphorous-potash) fertilizer to be applied at the time of planting. An additional side dressing of nitrogen will be necessary to keep plants growing rapidly. The harvest may be delayed if excessive amounts of nitrogen are used before the plants begin to fruit.

### Irrigation Makes the Difference

In the heavy rainfall areas of the islands, okra can be grown without supplemental irrigation if planted during the rainy season. However, irrigation is required for spring and summer plantings. Irrigation is necessary for best yields and good quality of okra irrespective of the season. The frequency and amount of water to be applied depends upon weather, soil type, and stage of crop.

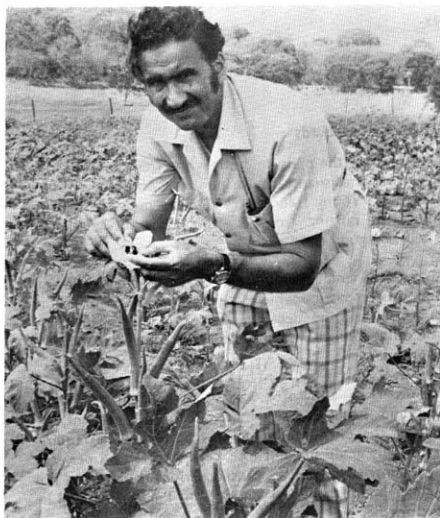
### Harvesting Stage is Critical

Under favorable conditions of growth, the recommended okra cultivars will begin to produce edible pods after 50 - 60 days of planting. Pods should be harvested when they are from 3 - 4 inches long. The stage will be reached in five days after flowering. If allowed to remain on the plants for a longer time, the pods become too tough and fibrous for food. In order to get maximum yields, okra pods should be harvested every other day. Mature pods left on the plants suppresses fruiting and maximum yield. A good crop of okra would produce 4 - 6 tons per acre.

### Plant Protection Pays

Okra is relatively disease free. In the Virgin Islands, yellow vein mosaic and fusarium wilt diseases of okra are not serious. Leaf spot fungus can cause trouble during rainy season but rarely severe enough to necessitate treatment. The powdery mildew fungus producing a mealy white coating on the leaves and stems cause the leaves to die prematurely. A heavy infestation has been observed on St. Croix, and the condition can be controlled by spraying with Karathane at the rate of 8 ounces per acre.

The cotton aphid is perhaps the worst single pest of okra in the tropics. Leaf minors have also been observed to attack severely the okra crop in the Virgin Islands. A spray with Malathion or Diazinon at the rate of 1 quart per 100 gallons of water or 2 teaspoons per 1 gallon of water is recommended as a control measure. Okra is highly susceptible to root knot nematodes. Nematodes can be avoided by either crop rotation or fumigation of soil. Okra should not follow vine crops, such as cucumbers, and sweet potatoes. Treatment of soil with Nemagon at the rate of 1 gallon per acre is advisable before planting.



D.S. PADDA IN OKRA FIELD

## MARKETING OKRA

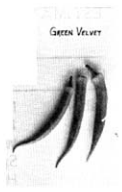
For fresh marketing, do not remove the caps of okra pods. Okra deteriorates rapidly, and normally it is stored only briefly to hold for marketing. Okra pods have a very high respiration rate at warm temperatures. If in good condition, it can be satisfactorily stored for 7 - 10 days at a temperature of 45 to 50 degrees Fahrenheit and a relative humidity of 90 to 95 per cent. Temperature below 45 degrees Fahrenheit cause surface discoloration, pitting, and decay.

### Fruit Quality Standards

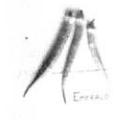
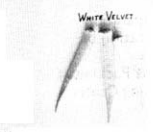
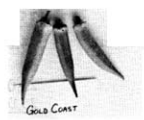
Tenderness of the pods determines the freshness and fruit quality. Pods that snap easily or puncture on slight pressure are the best. Young, tender, fresh, clean pods of small to medium size ranging from 3 - 4 inches in length are accepted as a good quality.

"U.S. No. 1 grade of okra shall consist of pods of similar varietal characteristics which are fresh, tender, not badly misshapen, free from decay, and from damage caused by dirt or other foreign matter, diseases, insects, mechanical or other means."

"In order to allow for variations incident to proper grading and handling, not more than 10 per cent, by weight, of the okra in any lot may be below the requirements of this grade but not to exceed a total of 5 per cent shall be allowed for defects causing serious damage and not more than one-fifth of the amount, or 1 per cent, shall be allowed for decay."



# OKRA VARIETIES



FRUITS OF DIFFERENT CULTIVARS OF OKRA

ESTIMATED COST PER ACRE FOR PRODUCING OKRA  
St. Croix, U.S.V.I.

ITEM	QUANTITY AND/OR HOURS	COST
Labor	Plant-Hand	20 hrs. \$ 50.00
	Fertilizer Application	12 hrs. 30.00
	Weeding-2 times	32 hrs. 80.00
	Spraying-5 times	10 hrs. 25.00
	Harvesting	100 hrs. 250.00
	Handling	14 hrs. 35.00
		Sub Total
Materials	Seed	40.00
	Manure	50.00
	Fertilizer	60.00
	Spray	20.00
	Containers	8.00
	Sub Total	178.00
Other	Land Preparation	34.00
	Transportation of Produce	35.00
	Grading & Packing at Marketing Center	175.00
		Sub Total
Fixed Costs	Land Charge	25.00
	Bookkeeping & Misc.	25.00
		Sub Total
	Total Costs	<u>\$932.00</u>

<sup>1</sup>Estimated Production 5.0 tons:

Cost per ton	\$186.40
Cost per pound	9.3 cents

<sup>1</sup> Estimated yield under normal rainfall is 6.0 tons and for a drought year it is 4.0 tons.

