

Harvest Maturity Indices

Plantain maturity can be judged by the include age of the bunch, fruit diameter, the shape of the fruit, and peel colour. Plantains usually require about 3 months from the beginning of flowering until harvest. Bunches should be tagged with different coloured ribbons at the time of fruit appearance. The colour of the ribbons is changed weekly to coincide with the time of fruit appearance and the age of the bunch.

Diameter

Plantain maturity is related to the diameter or thickness of the fruit (fingers) and can be determined by measuring the fruit at its midpoint with a pair of calipers. Since bunches differ in size and shape, it is helpful to know the range in diameter which is typical of mature fruit and use this as a guide.

Shape

The angular shape and fullness of the fruit is another sign of harvest maturity. Immature fruit are angled in cross-sectional shape and have distinct ridges. As the fruit matures, it becomes less angular and more rounded or full. Typically, the fullness of the fruit on the middle hand is measured.



The correct shape to harvest the fruit depends on the market. Fruit intended for the domestic market should be harvested when the fruit shape is nearly round. If the fruit is too mature at harvest, particularly following a heavy rain, peel splitting can occur. Also, mature fruit may ripen prematurely during transport or storage. Fruit intended for the Caribbean market should be harvested when the fruit shape is slightly angular. Plantains intended for longer distance export markets should be harvested when the fruit shape is more noticeably angular.

A fourth way of judging plantain bunch maturity is to measure the length of the edible pulp of the fruit from the fruit in the middle hand. The length should be at least 15 cm (6 in) for the domestic market and 18 cm (7 in) for the export market.

Peel Colour

Plantain fruit should be harvested when the peel is green in colour.

Harvest Method

Typically, two people work as team to harvest plantains. One person stands underneath the bunch to catch it on a shoulder pad or padded platform. The other person removes the leaves near the bunch and cuts a notch into the fruit stalk so the bunch falls slowly onto the shoulder pad of the other worker. The plantain bunches are taken from the field to a collection area or consolidation site. Piling bunches on top of each other causes considerable bruising and should be avoided. Preliminary grading should be done to throw out diseased, damaged, or over-ripe fruit.

Preparation for Market

Foam padding can be placed along the bottom and sidewalls of the truck or between bunches to reduce bruising and damage during transport. Racks made from strong, smooth boards should be used in the truck bed to create several layers for stacking of bunches. Fruit for export market should be de-handed and packed in strong, well-ventilated wooden or plastic field containers for transport.

Cleaning

The surface stains and dirt on the plantain fruit should be removed with cotton gloves or a moist cloth before being sold in the domestic market. Export market fruit must be subject to more strict washing standards. The hands should be cut smoothly from the main stalk using a sharp curved knife or blade. A portion of the crown is left attached to the hand. The hand should be grasped in the crown area and not by lifting one or two fingers, which will possibly result in separating individual fruit from the hand.



When the hands are cut off, sap (latex) oozes from the crown. The sap or latex causes a dark stain or blemish on the peel. In order to avoid the stain, the hands can either be left to drain for 2 minutes

on de-latexing trays or placed in water tanks to wash the latex off the fruit surface. If de-latexing trays are used, spongy cellulose crown pads with the fungicide thiabendazole should be applied to the cut crown area after the latex has stopped. Small-scale growers commonly use crown pads.

Tip: Bunch covers are used to reduce insect and leaf damage, increase weight and improve over all appearance of the fruit. Information on bunch covers, how to use them and where to purchase them is available through the New Guyana Marketing Corporation. Contact information is on the back panel.

Large-scale plantain growers float the plantain bunches in a water tank to remove any adhering dirt from the peel surface and to coagulate the exuded latex. The water tank should be filled with clean flowing water sanitized with 150 ppm free chlorine. This is equal to 2 oz of household bleach (such as Marvex) per 5 gallons of water, or 0.3 liters of bleach per 100 liters of water. Also, wash water should include 1% aluminum potassium sulphate (alum) to coagulate the latex, and an appropriate fungicide (1000 ppm thiabendazole or imazalil). Follow manufacturer's instructions for use of fungicides. The fruit should remain in the water tank at least 15 minutes or until all oozing of latex stops. After washing and de-latexing, the clusters are removed from the tank and placed on trays or a flat surface to dry.

Grading

Remove small or defective fingers from the hand. Plantain hands destined for export usually range from 4 to 8 joined fingers. However, some markets require each finger to be separated from the bunch.



Fruit must be clean, well trimmed, well developed without pronounced ribs or marked angles, and free from visible decay or damage. Peel scarring is the most important fruit defect. Fruit should also be similar in shape, colour (pale green), and skin typical of the cultivar, and the neck holding the stems of the fruit together must be between 1 to 2.5 cm (0.5 to 1 in) from the pulp.

There are three grade classifications based on size (Grade I, II, and III) for domestic marketing. *Grade I* fruit must be at least 18 cm in length, *Grade II* fruit 15 cm, and *Grade III* fruit must be at

least 10 cm long. The U.K. market requires a minimum finger length of 22 cm (9 in) and the fruit must arrive with a green peel colour.

Packing

Plantains sold in the domestic market are usually not packaged, but transported as bunches and de-handled at the market site. However, the external fruit appearance would benefit by de-handing from the bunch and packing the hands with the finger tips pointed down in padded cartons prior to loading in the transport vehicle.

Plantains exported to Barbados or other market destinations should be packed in strong, well-ventilated fiberboard cartons, typically containing 18 kg (40 lb) of fruit.

Hands should be packed in a neat, regular pattern to minimize movement and scratching of the peel. The cartons may be lined with a semi-permeable polyethylene film to prevent fruit damage and reduce moisture loss. The crowns should face the base of the carton and a thin divider should be used to separate the two layers of fruit. The fruit should never be over-packed so it forces the top of the carton to bulge out.

Temperature Control

The best storage and transport temperature for maximizing plantain shelf life is 12°C (54°F). This temperature will delay ripening, but avoid low temperature chilling injury (CI). The average shelf life of mature green harvested plantains and stored at 12°C (54°F) is between 4 to 5 weeks. Mature green harvested plantains stored under ambient temperatures will have a shelf life of only about 7-10 days. The pulp will soften but the peel will remain green at temperatures above 30°C (86°F). Shelf life of green mature plantains can be increased up to 4 weeks by storing the fruit in semi-permeable polyethylene bags with an ethylene absorbent (potassium permanganate).

Plantains are very sensitive to chilling injury (CI), which occurs at temperatures below 12°C (54°F). Signs include peel discolouration (dull grayish-brown colour), flesh darkening, uneven ripening, and off-flavour. Moderate CI will result from exposing plantains for several days at 10°C (50°F), but severe CI

will occur at 4°C (39°F). The best postharvest relative humidity (RH) for plantains is between 90% to 95%.

Principal Postharvest Diseases

Plantains are vulnerable to a number of postharvest diseases. They can be controlled by removing decaying plantain leaves and fruit from the field, pre-harvest spraying with fungicides, careful harvesting and handling practices to reduce injury to the fruit, dipping the hands of fruit in a fungicide-treated wash tank, and maintaining fruit temperature at 12°C (54°F).

Crown Rot

Signs begin as a softening and blackening of the cut crown surface. Decay then spreads from the cut surface into the crown area of the hand of plantains during transport. In severe cases, the decay may extend to the top part of the fruit.

How the hand is cut from the stalk also affects the amount of crown rot. Breaking the stalk near the crown rather than neatly trimming it with a knife will increase the amount of crown rot. Dipping the fruit in 50°C (122°F) water for 5 minutes can help reduce crown rot.



Anthracnose

Anthracnose spots on green fruit are generally dark brown to black with a pale margin, oval in shape, and slightly sunken. The signs on ripe fruit are small dark spots that get bigger and become sunken. Salmon-pink spore masses are eventually produced. Diseased fingers mature faster than healthy fingers.

For additional technical bulletins and bunch cover information contact:

New Guyana Marketing Corporation (NGMC)
87 Robb & Alexander Sts., Georgetown, Guyana
Tel: 226-8255, 226-2219

National Agricultural Research Institute (NARI)
Mon Repos, East Coast Demerara, Guyana Tel: 220 2950



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PLANTAIN

Postharvest Care and Market Preparation Information Sheet



This information sheet provides growers and agriculture extension personnel a summary of the recommended harvesting and postharvest handling practices for plantain. A more technical and detailed bulletin is available from the New Guyana Marketing Corporation (NGMC) and the National Agricultural Research Institute (NARI).