

Maturity Indices of Vegetable Crops

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SUMMARY

Identifying the correct stage of maturity and harvesting at proper time are important pre harvest factors. The definition of maturity as the stage of development giving minimum acceptable quality to the ultimate consumer implies a measurable point in the commodity's development, and it also implies the need for techniques to measure maturity. Maturity indices are important for deciding when a given commodity should be harvested to provide some marketing flexibility and to ensure the attainment of acceptable eating quality to the consumer.

INTRODUCTION

Identifying the correct stage of maturity and harvesting at proper time are important pre harvest factors. Maturity indices are important for deciding when a given commodity should be harvested to provide some marketing flexibility and to ensure the attainment of acceptable eating quality to the consumer. Maturity is the stage of development leading to attainment of the consumer for a particular purpose.

What are Maturity Indices?

Maturity indices are the sign or indication the readiness of the commodity for harvest. It is the basis for determining harvest date.

Types of Maturity in Vegetables

- Harvesting Maturity
- Physiological Maturity
- Commercial or Horticultural Maturity

A) Harvesting Maturity

The harvest maturity of vegetable depends upon the purposes for which it is harvested. For local market and for processing, fully coloured tomato fruits are harvested. However, for a distant market fruit which have started developing colour are harvested. The post-harvest quality and storage life of fruit appear to be controlled by the maturity.

B) Physiological Maturity

In a physiological sense, maturity refers to the attainment of final stage of biological function by a plant part of plant as a whole.

C) Commercial or Horticultural Maturity

It is the stage of development, when plant or plant part possesses the prerequisites the utilization by consumer for particular purpose.













Maturity Indices for Important Vegetables

Tomato:

a) Immature green: It is the stage of fruit, before the development of seeds fully and before surrounding the seeds by a jelly like substance. The fruits are harvested at this stage only for frying purpose.

b) Mature green: It is the stage of fruit when it is fully grown, and show brownish ring at the stem scar on removal of calyx and light green colour at blossom end changes to yellowish green and seeds are surrounded by jelly substances filling seed cavity. The fruits at this stage are harvested for shipment to long distance and for long storage too.

c) Turning (breaker stage): It is the stage of fruit when one-fourth of the surface at

Stage Name	Images	
Green & Breaker		
		
Turning		
Pink		
Light Red		
Red		

blossom end shows pink colour. The fruits at this stage are harvested for local market.

d) Pink stage: It is the stage of fruit when three-fourth of the fruit surface shows the pink colour. The fruit at this stage is also harvested for local markets.

e) Hard ripe stage: It is the stage of fruit when nearly the whole fruit skin shows red or pink colour but flesh is still firm. The fruits at this stage are harvested for table purpose, processing and for the extraction of seed too.

f) Over ripe stage: It is the stage of fruit when the fruit is fully red coloured and soft. At this stage, the fruits can be used only for the extraction of seeds, not for table purpose and processing since the fruits onward start decaying.

Brinjal: The harvest of brinjal should be done as soon as they reach the desired size and colour. They should also be harvested before they start losing their bright and glossy appearance and become very dull. The brinjals are edible from the time at which they are quarter grown till they are almost near to ripen.



Chilli: Chillies are basically harvested in two stages. One for the sake of green vegetables. The harvest of green chillies is done when they are matured completely and prior to their colour is changed from green to red. The dried chillies are harvested when the colour changes from green to red immediately.



Capsicum:

a) Green pepper varieties: Fully mature green fruits should be harvested before ripening.

b) Red and yellow varieties: Fully mature green fruits should be harvested at the onset of colour change.

c) Pepper fruits at the time of harvest should be firm and crisp not tender and immature.



Okra: Immature green tender fruits should be picked 3rd and 5th day from the time of first pod formation or 3 to 7 days after flowering. Okra should be harvested when the fruits are bright green, the pods are fleshy and seeds are small.



Cucumber: Fruits can be harvested from 45 days after sowing. The tender fruits (for salad) can be harvested on 8th and 10th day of flowering. In cucumber the proper stage of maturity is judged by size and not by the age of the fruit. Cucumber for slicing should be picked when they are 15 to 35 cm long, whereas for pickling 6 to 15 cm long. In case of slices at marketable stage, spines on fruit becomes soft and fall down. In general cucumber may be picked at any stage of fruit growth, provided yellowish has not started.



Muskmelon: Fruits are generally harvested 60-70 days after sowing, 30-40 days after anthesis and 25-30 days after setting, observing other changes of outer colour of the skin. It is generally picked at 'half-slip' stages for commercial marketing (Part of the pedicle remains attached to the fruit, *i.e.*, abscission layer is not fully developed). Sugar and flavour are not found optimum, at this stage. Full slip is stage at which the pedicle separates easily from the fruit with little or no pulling. Fruits for distance market should be harvested when mature but before full ripeness to minimize to breakdown in texture and damage during transport.



Watermelon: The fruits are ready for consumption in about 30-40 days after anthesis. The portion of fruit resting on ground starts turning colour from creamy white to yellow. On ripening, the rind become hard enough that resists penetration of thumbnail. The sugar content of fruit measured as soluble solids using hand refractometer is reached 10 % or more in flesh near centre of fruit. On thumbing, the immature fruits give out metallic ringing sound and the ripened dull hollow sound.



Onion: Bulbs are considered mature when the neck tissues begin to soften and tops are about to abscise and decolorizes. Maturity can be judge by the neck of the plants drying up, tops falling over while the leaves are still green. The harvest will be based on the purpose for which the plantation of the crop is done and the maturity will be based on the type which is being used. The green onion is the best one when there is a formation of a small bulb-like structure. Ripe bulb crop will be prepared for harvest within 4 months after the transplantation. The perfect time for the harvest of onion is when 70% of the top is broken. There would be a red pigment developed.



Potato: Potatoes are harvested when the leaves shows yellowing and drying of haulms and attain sufficient size. Skin slipping from the tuber, starch content and leaf senescence or top drying are the harvest indices.



Sweet Potato: When the leaves turn yellow and begin to shed, tubers can be harvested. Immature tuber, the cut surface shows dark greenish colour while the colour will be milky white in fully mature tubers.



Cabbage: Solidity, firmness, squeaking of heads indicates maturity. At lower heights, the varieties of cabbage get matured in about 120 days from the set of field and in higher heights, they take approximately 130 days to reach the stage of maturity. The firmness and solidity of the head are the general characteristics of maturity. The colour of the head will turn in a light shade of green when the fruit is completely developed. These fruits will have a tendency to burst out or their leaves get loosened when it has crossed the marketing stage.



Cauliflower: Curd size and colour are deciding factors. Snow white or creamy white, compact curds surrounded by turgid green leaves. The determination of the perfect stage of maturity is done by the size and condition of the curd. The local farmers will generally harvest the head on the required size and prior to the discolouring of curds or prior to the curds becoming loose and blemished. The head should be very compact and it should be broken into parts or segments. The head which is over matured, long and elongation of flower stalks will result in the leafy, loose conditions and give very poor value to them in markets.



Broccoli: Broccoli is predominantly grown from transplants set in April and May for a spring crop and in late June through August for a fall crop. Broccoli that is harvested in July and early August tends to have very high cull rates due to abnormalities caused by heat stress. Broccoli is cut during the cooler part of the day and sold as soon after harvest as possible, as it does not store well.



Carrot: Based on the type, carrots will get ready for harvest within 120 days after sowing is done. Based on the variety, the required sized is the first consideration in root harvesting. The roots which are oversized are not accepted. Usually, small and medium sized carrots are preferred. At the stage of marketing, the carrots should at least be 4 cm in diameter at the higher end.



Beet Root: Fresh market growers have a wide range of varieties to select from. Root colours include red, golden, or alternating red and white rings. Roots may be cylindrical or elongated. Beets can be harvested for fresh market at any stage and the greens are considered a delicacy by some. Roots harvested in the fall can be stored and sold at winter markets.



Garden Pea: Early cultivars require as few as 1000 heat units to achieve maturity, whereas, late sowing cultivars may require more than 1600 heat units. The pods are harvested when they are filled, tender, having high sugar content and changing colour from dark green to light green. Any delay in harvesting turns the pods to poor quality due to conservation of sugar into starch, and this conversion takes place more rapid at high temperature.



CONCLUSION:

Harvesting should be done at proper stage of maturity because it not only determines the quality of product but also prolong its shelf life. Tomato harvested at breaker stage ensures good quality, better shelf life and proper development. Avoid harvesting during hot part of the day as immense field heat causes wilting and shrivelling of the produce. Harvest produces on the evening hours to ensure minimum losses and better quality. Avoid harvesting during or immediately after rains. Don't pull the fruits from vines but should be picked with a twisting motion of hand or cut with knife in case of cucurbits.

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