

## 18. Physiological and harvestable maturity for seeds

Seeds are ready for harvest after the attainment of physiological maturation.

### 1. Physiological maturation

It is the stage of accumulation of maximum dry matter within the seeds. The moisture content of the seed at this stage will be in decreasing order (25-30%) and is expressed with maximum dry weight of seed, germination and vigour potential. The physiological maturation is represented for individual seed and this maturation will not be the same for the population, due to differential flowering habit

### 2. Harvestable maturation

The stage of attainment of physiological maturity by 80 per cent of the population is considered as the harvestable maturity. The moisture content of the seed at this stage will be lesser than the physiological maturation stage (18-20%). Generally the seed crop is harvested at harvestable maturity stage for getting high quality seed.

### Harvesting

In general, the crop harvested at harvestable maturity will have the greater seed yield. In crops the maturation will not be always be uniform but there will be mingling of matured, immatured and over matured based on the time of anthesis and fertilization. Hence optimum time of harvest for a given seed crop is necessary as beyond the point losses will be greater than the potential seed yield. Hot dry weather conditions greatly accelerate the rate of natural seed drying on the plant. Seed moisture can form the most important indication of a crop's fitness for harvesting.

Vegetable seed crops are divided in to three groups depending on the state of seed at harvest time.

#### a. Dry seed

The seed is usually dried on the plant before harvesting e.g. okra, brassicas, lettuce, peas, beans, beet and onion.

**b. Fleshy fruits**

The ripened fruits are picked from the plants and dried first. The dried fruits are then opened later to remove the dried seeds, e.g. chillies, ribbed gourds and bottle gourd.

**c. Wet fleshy fruits**

In fruits containing a high level of moisture, the seed has a gelatinous or mucilaginous coating adhering to it. This has to be removed after seed extraction by a fermentation process or treatment with dilute acids. Such fruits are harvested when they mature and ripen. (e.g. tomato, brinjal, cucumbers and pumpkins).

<b>Crop</b>	<b>Maturity indices</b>	<b>Remarks</b>
<b>Dried Seeds</b>		
Amaranthus	yellowish browning of inflorescence	Prone to shattering
Onion	Seeds become black on ripening in silver colored capsules. 10% heads exposed black seeds.	Prone to shattering
Carrot	Second and 3 <sup>rd</sup> order head turn brown	Shattering on delayed harvest
Radish	Pods become brown and parchment like	Do not shatter easily
Turnip	Plants turn to brown parchment colour	Prone to shattering
Coriander	Plants turn to light yellow or brown in colour	Prone to shattering
Peas	Pods become parchment like	Do not shatter easily
Beans	Earliest pods dry & parchment like and remaining have turned yellow	Over maturity leads to shattering and cotyledon cracking
<b>Wet fleshy fruits</b>		
Brinjal	Fruit turn to straw yellow colour	Wet seed extraction (fermentation, acid, alkali)

Tomato	Skin colour turn to red and the fruits are softened	
Cucumber	Fruit become yellowish brown in colour, and stalk adjacent to the fruit withers for confirming actual seed maturity.	Seed extraction - scooping, (acid, alkali, fermentation))
Watermelon	Tendrils wither on fruit bearing shoot. Skin colour of the fruit resting on the soil is pale yellow and gives dull sound on thumping.	
Squash, Pumpkin	Rind becomes hard & its colour changes from green to yellow/ orange or golden yellow to straw colour	
True potato seed (TPS)	Berries of potato becomes green to straw coloured and soft	
Bitter gourd	Fruit pulp and seed becomes red and light brown respectively	Seeds are separated manually and washed
<b>Fruits dried before extraction</b>		
Chillies	Green colour changes to red or yellow	Dry method of seed extraction
Bottle and Sponge gourd	Rind becomes hard and colour changes to light brown or yellow	
<b>Vegetatively propagated materials</b>		
Colacasia	Drying and dieing of petiole and leaves	Skin becomes tough, uproot
Zinger	Drying and falling down of pseudo-stem turning brown	Select healthy, disease free rhizomes
Turmeric	Drying and falling down of stem turning brown	Select healthy, disease free rhizomes
Garlic	The stem get dry and change in colour from green to brown	
Seed potato	Haulms get dry, droop down turn dark brown in colour	Delay leads to spoilage of seed tubes.

## **Method of Harvesting**

The harvesting of seed or fruits is done manually or mechanically, depending upon the scale of production, cost and availability of skilled labour and or of suitable harvesting machines.

### **1. Hand picking**

Seeds of some crops such as solanaceous fruits (brinjal, pepper, tomato), cucurbits and sweet corn are conveniently harvested by picking fruits by hand. The small seeded fruits or seed heads of vegetable crops like onion, carrot, okra or chilli can be cut with a knife or secateurs. Often it is preferable to cut off the whole plant with a machet or sickle, as in the case of lettuce, chicory, brassicas, radish and peas. The legumes are, however, usually harvested by pulling up the whole plant and then threshed to recover the seed (e.g. peas and beans). Although hand harvesting methods are labour intensive, they allow plants to be harvested individually or even at several stages of crop growth. Manual harvesting provides more protection and the maximum potential seed yield per unit area, when compared with the mechanical harvesting. In plants requiring after ripening, the larger the plant part are cut and removed with the ripening seed results in higher seed yield ( e.g. the small seeded vegetable crops like lettuce and brassicas.)

### **2. Mechanical harvesting**

Vegetable seed crop may be harvested by employing a suitable mechanical harvester, especially in the large scale commercial seed producing farms where the manual labour is costly. In the mechanical harvesting, cutting and threshing operations may be carried out by two separate machines or both the operations may be performed by a single combined machine. The cutting operations can be mechanized, using mowing-windrowing machines, which are most conveniently used for crops like peas, beans, spinach, carrot and brassicas.