Print : ISSN 0970-7662

Journal of Tree Sciences
online available at www.ists.in

Volume 31 No.1&2 June & December, 2012

Study of Maturity Indices of Sour Cherry (*Prunus cerasus* L.) in Kashmir Valley

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ABSTRACT

Sour cherry (*Prunus cerasus* L.), a broadleaved tree species is growing under temperate conditions in Kashmir valley having multiple utility with the perspective of farming communities of the region is under severe threat. In the recent past, the species was over exploited as root stock especially for raising the sweet cherry orchards. So, there is need to conserve and propagate the species on large scale for biodiversity and other stated multiple usages. In this direction attempt has been made to standardize the maturity indices in order to know the exact time of seed collection without any loss of time, money and effort for large scale plantation programmes. During the investigation, in totality seven collection intervals were studied with different maturity indices parameters and found that 16th-30th June is the best seed collection time for getting the better seed seedling ratio. The period may be extended up to 15th of July.

Keywords:

Kashmir valley, maturity indices, plantation, *Prunus cerasus*, Sour cherry, temperate..

INTRODUCTION

There are three distinct agro-climatic zones viz. sub-tropical, temperate and cold arid zone falling in the state of Jammu and Kashmir with temperate zone in the valley of Kashmir. The forests of Kashmir valley mostly consist of evergreen conifers and broad leaved tree species. *Prunus cerasus* L. is one of the broad leaved tree species grown in the Kashmir valley which is commonly known as Sour cherry and is best known representative of the family *Rosaceae* (the rose family) and genus *Prunus.* This genus also includes the plums, apricots, peaches and almonds. The Sour cherry tree is locally known as Aulichi-kul in Kashmir valley.

The origin of Sour cherry is between Caspian Sea and Black sea i.e around the Mediterranean region. The Sour cherry is mainly distributed and produced by Italy, United States, Germany and France. It is mainly grown in three pacific coast states and Michigan and is also known by tart or pie cherry. In India, Sour cherry is mainly grown in Shimla hills, Kullu valley in Himachal Pradesh and Kashmir in J&K at an altitude of 1500 m above mean sea level (Yadav et. al. 1996). Its bark is astringent, bitter and febrifuge. The seed is nervine (Chopra et. al. 1986). The root bark has been used as a wash for old sores and ulcers (Moerman 1998). The fruit of Sour cherry is edible, used in pies, preserves, etc. or dried for later use. Its leaves are used as a tea substitute (Facciola 1990). Oil obtained from the seed is used in cosmetics. The gum obtained from the stem is used as an adhesive. Plants can be grown as a hedge. A

green dye can be obtained from its leaves. A dark grey to green dye can be obtained from the fruit. In Kashmir, this plant is largely used as stock for propagating the sweet cherry and now there are very few plants existing in different landscape of the valley. This is an attempt to revive the existence of the sour cherry by adopting different propagation and conservation techniques. The knowledge of approximate stage and time of seed maturity is essential for collection of abundant quantity of healthy and vigorous seeds. Seeds collected when fully ripened retain the viability longer than the seeds collected when immature. Immature seeds are low in viability and often produce low vigour and deformed seedlings. Immature seeds die when allowed to dry out (Harrington 1972). Thus, fruit collection should be started only when the seeds are sufficiently mature. Therefore, indicators of maturity for individual species is must, so that the collection is made at right time. Otherwise, immature collection of seeds will result in loss of time, money and failure of germination. As per available literature, very scanty information was available with regard to maturity indices of Sour cherry in the Kashmir valley. Therefore, an attempt was made to standardize its maturity indices in Sour cherry.

MATERIALS AND METHODS

The optimal time to seed harvest is when a large amount of viable germinable seeds can be collected. In order to determine the best time for collection of seeds, the seeds were collected from 20 identified phenotypically superior trees growing at two sites namely Harwan and Shuhama areas of district Srinagar falls in central zone of the Kashmir valley. The seeds were picked starting from 1st of April till their maturation at an interval of 15 days and were subjected to germination test, specific gravity, seed weight, change in fruit and seed colour, seed weight, moisture content (%) and seed dimensions. The germination test was done in petri-plates lined with double fold germination paper at bottom. The seeds were placed sparsely in petri-plates and moistened as and when required. The plates were monitored regularly. The seeds were considered to be germinated as soon as radical emerged out. The germination percent was calculated as per the following standard formulae:Germination (%) =Number of germinated seedsx 100 Total number of seeds kept The specific gravity of seeds was determined by water displacement method (Oliver, 1974). The specific gravity of seed was determined by dividing the fresh weight by the volume of water displaced.

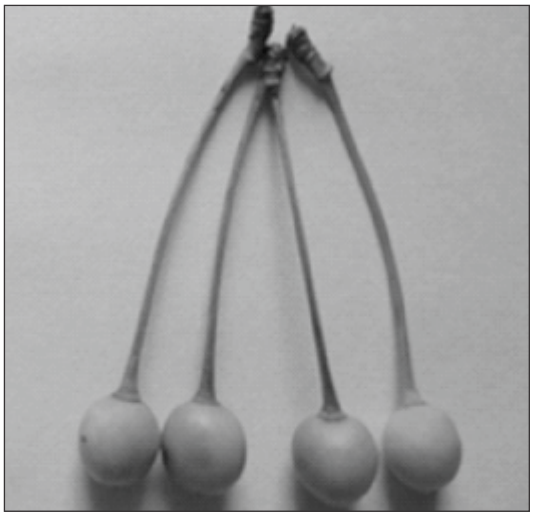
The length and diameter of seeds were recorded with the help of digital caliper. The dimensions of 100 seeds were observed by using 4 replications. The changes in fruit and seed colour provide simple and reliable criteria for judging seed maturity. The seeds were picked with effect from 1st of April and observations with regard to change in colour of fruit and seed to different shades was observed and recorded.

RESULTS AND DISCUSSION

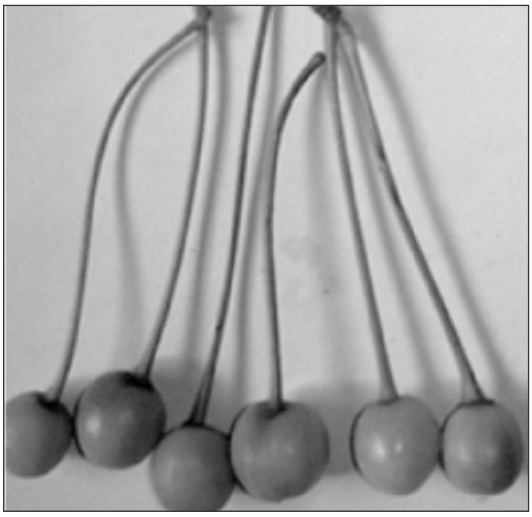
Collection dates have remarkable effect on the parameters taken for viz. colour, weight, size, moisture content, specific gravity and germination percentage of seeds (Table 1). It is observed that the fruits were green in appearance and seed was not developed under the first two collections viz. 1st to 15th April and 16th to 30th April out of seven collection intervals. Therefore, the above mentioned collections were not considered for analysis. The observations pertaining to the rest of the collection intervals are explained here as under:

The change in fruit colour was observed at each collection interval (Table 1). The colour of fruit changed from green (C_1) to red (C_4) and finally to crimson red (C_7) while the seed colour changed from light brown (C_3) to brown (C_4) which showed the maturity (Photo 1 and Fig. 1). It is further observed that no further change in colour of seed was seen under the subsequent collection intervals up to the last collection. This indicated that the change in fruit colour of Sour cherry from green to red and finally crimson red is a reliable indicator of maturity. However, the colour of the seed coat did not show much variation in its colour from immature to mature stages. Hence, the seed coat colour cannot be considered as an index of maturity in Sour cherry. Colour change in fruit/seed has been a common method for detecting the maturity of seeds in many forest tree species. Studies conducted for different species viz. *Liquidampar styraciflua* and *Platanus occidentalis* (Bonner

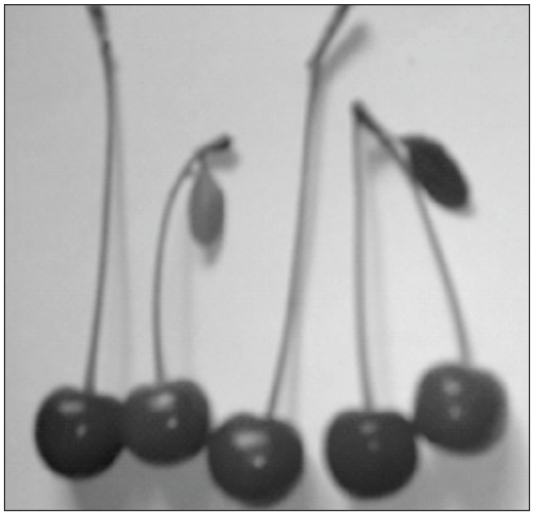
Fruits



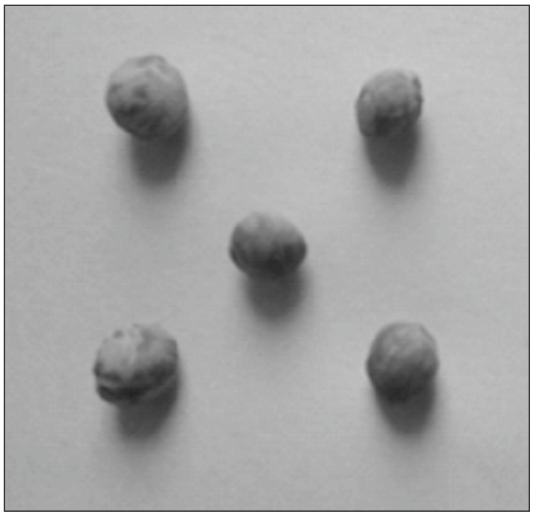
Green



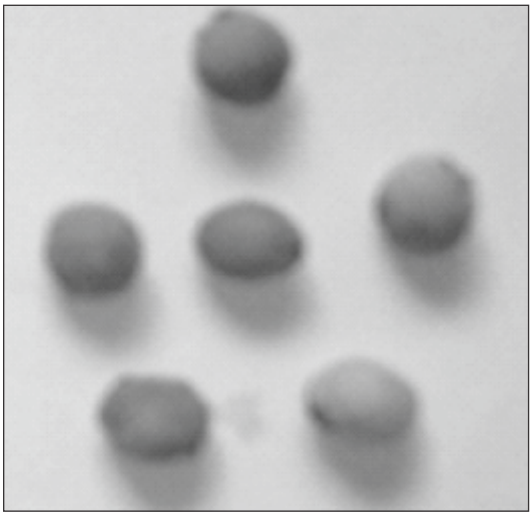
Yellowish green



Seeds



Light brown



Brown

Photo 1. Stages of fruit and seed maturity of Sour cherry

Table 1: Maturity indices of *Sour* cherry *(Prunus cerasus* L.) collected on different intervals in Kashmir

Collection Intervals (C) (15days)	Colour		Seed weight (g/1000 seeds)	Specific gravity	Moisture content (%)	Seed dimensions (mm)		Germination (%)
	Fruit	Seed				Length	Diameter	
C_1 (1^{st} to 15^{th} April)	Green	Milky	-	-	-	-	-	-
C_2 (16^{th} to 30^{th} April)	Green	Milky	-	-	-	-	-	-
C_3 (1^{st} to 15^{th} May)	Yellowish green	Light brown	149.6	1.08	59.91 (50.70)	6.13	5.18	0 (1.00)
C_4 (16^{th} to 30^{th} May)	Red	Brown	173.8	1.02	47.97 (43.82)	6.69	5.70	8.62 (3.09)
C_5 (1^{st} to 15^{th} June)	Red	Brown	190.4	0.98	39.87 (39.14)	7.44	6.24	15.42 (4.05)
C_6 (16^{th} to 30^{th} June)	Red	Brown	206.3	0.97	27.40 (31.53)	7.91	6.75	28.99 (5.47)
C_7 (I^{st} to 15^{th} July)	Crimson red	Brown	203.2	0.96	16.32 (23.80)	7.84	6.61	30.17 (5.58)
SE (m) ±	-	-	1.5	0.005	0.67	0.08	0.07	0.12
CD 0.05	-	-	4.6	0.02	2.09	0.25	0.22	0.38

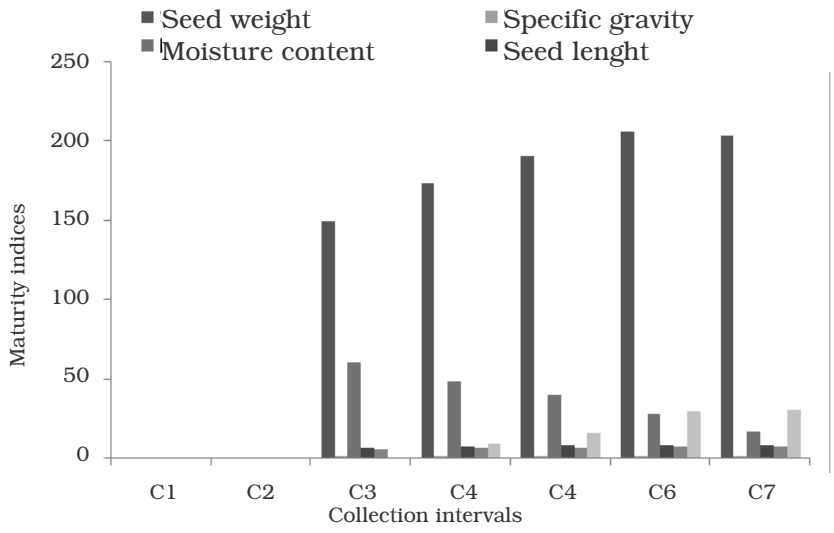


Fig. 1. Effect of collection intervals on seed weight, specific gravity, moisture content, seed dimensions and germination percentage of Sour cherry

1972), *Quercus* spp. (Bonner 1974, 1978) have reported colour changes are usually from green of the immature fruit to various shades of yellow, brown or grey and this may be accompanied by hardening of pericarp of dehiscent woody fruits. Bonner (1972) also established a relationship between colour change in fruits/seed and maturation. The seed weight showed an increasing trend from third (149.6g/1000 seeds) collection (1^{st} -15^{th} May) to sixth (206.3g/1000 seeds) collection (16^{th}-30^{th} June) and then decreased in seventh (203.2g/1000 seeds) collection (1^{st} -15^{th} July).

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