

Seed Physiological Maturity in Eggplant (*Solanum melongena*)

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Abstract: Seed physiological maturity was studied to determine the optimum time of harvest and physiological changes in eggplant seeds. Eggplant seeds reached physiological maturity at 50 days after anthesis. During this stage the percentage of germination was 93.33%. The average seed moisture content was 52.09 %. The average dry weight of the seeds was 0.126 grams and then declined. This point determines the best time to harvest the seeds since it has already reached its physiological maturity.

Keywords: germination, seed development, physiological maturity, seeds, eggplant.

INTRODUCTION

In seed development, two distinct wave of growth can be distinguished. The first is the structural development which involves cell division, cell enlargement increase in concentration of many enzymes and hormones and the production of DNA. The second is the large increase in dry weight towards maturity as nutrients flow into the seed and are converted into reserve food. Deposition of reserve materials continues beyond cell enlargement. Growth of the seed does not proceed at a constant rate but shows a characteristic course, being slow initially then increases rapidly and finally slowing down till growth stops entirely.

Development of the seed involves major morphological changes affecting various tissue of the ovule. With the embryo, this involves complex changes following specific patterns which vary among different species except during the very early stages. A better understanding of optimum harvesting time for eggplant will further improve quality and quantity of seeds. Such information is also important for planning of harvesting [1]. Therefore, the objective of this paper was to determine the physiological maturity of eggplant seed.

MATERIALS AND METHODS

Eggplants were grown in the field following all the recommended cultural management practices. At the onset of flowering, the time of anthesis was noted (artificial pollination maybe done to determine the exact time of pollination). The flowers were tagged to indicate the date of anthesis. Three to five days after anthesis and at three to five days intervals thereafter the following parameters were determined; the dry weight, seed size, moisture content and the germination capacity of the developing seeds. 50 seeds were used as samples replicated three times. The data was plot to determine the point of physiological maturity.

RESULTS AND DISCUSSIONS

Average Fresh weight and dry weight over time after anthesis

The average fresh weight and dry weight of 30 seeds of eggplant from 5 to 10 days after anthesis (DAA) was negligible hence they are designated zero. Table 1 and Figure 1 clearly depicted the gradual increase of dry weight of the seeds starting from 15 DAA. The gain in dry weight is a result of the synthesis and deposition of the stored reserves; cells expand to accommodate these reserves. The highest dry matter accumulation or the highest average dry weight of 30 seeds was obtained from 50 DAA with an average of 0.126 grams. This showed that the physiological maturity was at 50 DAA since it has the highest or maximum point of dry weight. After 50 DAA there was a slight decreased of dry weight with an average of 0.116 grams respectively. According to Sasikasem Sukwibul [2], physiological maturity of eggplant seeds was reached at 47 days after anthesis (41.27 % SMC, 94 % germination).

The highest dry weight serves as the point of physiological maturity since this time all the assimilates necessary for the development and germination of the seeds are translocated at the developing seeds. Hence after the point of physiological maturity which was the highest dry weight accumulation, deterioration of the seeds could occur since the seeds were exposed to such environmental stresses which could contribute to the deterioration of the seeds quality, hence the point of physiological maturity (50 DAA) could be the best time to harvest for the seeds. Beyond 50 DAA there was a decline in dry weight which attributed in the used or utilization of assimilates within the seeds like starch proteins and other seed materials which is present within the seed. 55 DAA has an average dry weight of 0.116 grams. The whole seed fresh weight remains

relatively stable, although the seed loses water as this is displaced by the accumulating insoluble reserves within

the cells of storage tissues.

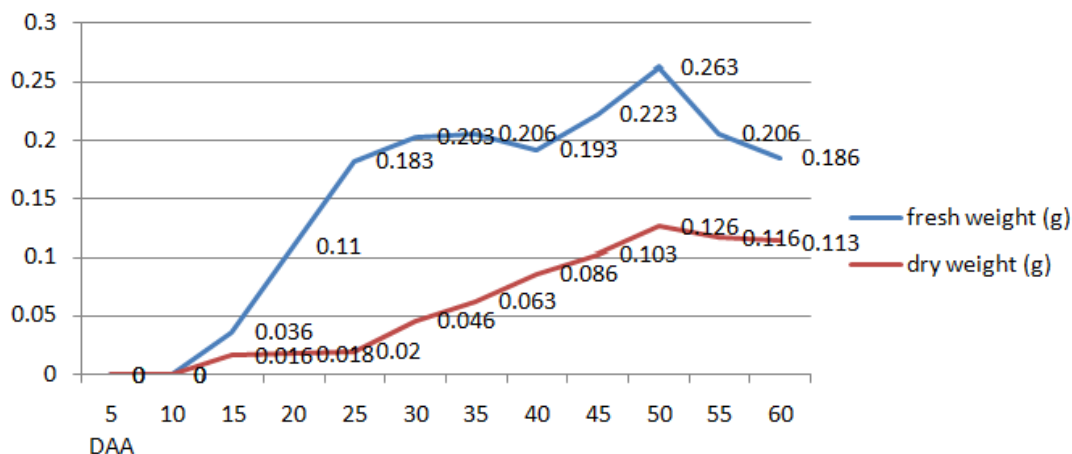


Fig-1: Average dry and fresh weight of 30 eggplant seeds over time of anthesis

Seed physiological maturity is an important point since storage starts only from the moment the seed is mature. The most generally accepted measure of maturity is the time when the seed has reach its maximum dry weight a point called the physiological maturity. The seed is still high in moisture content (higher than 50%), however so that continued drying is necessary for minimum damaged in harvest or for success in storage. At physiological maturity the seeds of most species can be dried to low moisture content without loss in viability [3].

Maximum fresh weight does not indicate physiological maturity because the maturing seeds begins losing water while nutrients are still moving into the seed and important biochemical processes are occurring such as an increase in ribonuclease activity and a decreased in RNA. Accompanying physiological maturity are changes in the fruit or the seed coat which show visual signs that can be used to determine maturity.

Average Moisture content and Percentage of Germination

The average moisture content of the seeds was still at zero from 5 to 10 days since it was negligible. However, at 15 DAA the moisture content was 55.55%. There was an abrupt increase in moisture content during the 20 days after anthesis.

The highest moisture content was at the 25 days after anthesis with an average of 89.07% and then it declined for the succeeding days. The decline in moisture content slows as the seed approaches its maximum dry weight. Leininger and Urie [4] and Hong, et al. [6] found a steady decline in the percentage moisture of ripening seeds from 80-90% to 10-20%.

In terms of the percentage germination there was no germination 5 to 25 days after anthesis. At 30 DAA the percentage of germination was 70 percent and from 35 to 40 DAA it has a 100% germination. After 40 DAA there was a decline in the average percentage of germination which had from 100% to 93.33% and then until it has reach the 60 DAA with a percentage germination of 83.33%. However, percentage of germination during the highest would not still served as basis for the seed physiological maturity and the best time to harvest the seed since the germination was conducted inside the laboratory. It was within the laboratory conditions wher all the necessary conditions and favorable environment was provided for the seeds to germinate thus it could not serve as basis. Germination perse of the seeds will have a different result when it will be conducted outside the laboratory since the seeds will be exposed to unnecessary conditions and unfavorable environment like stress which could affect the germination capacity of the seeds.

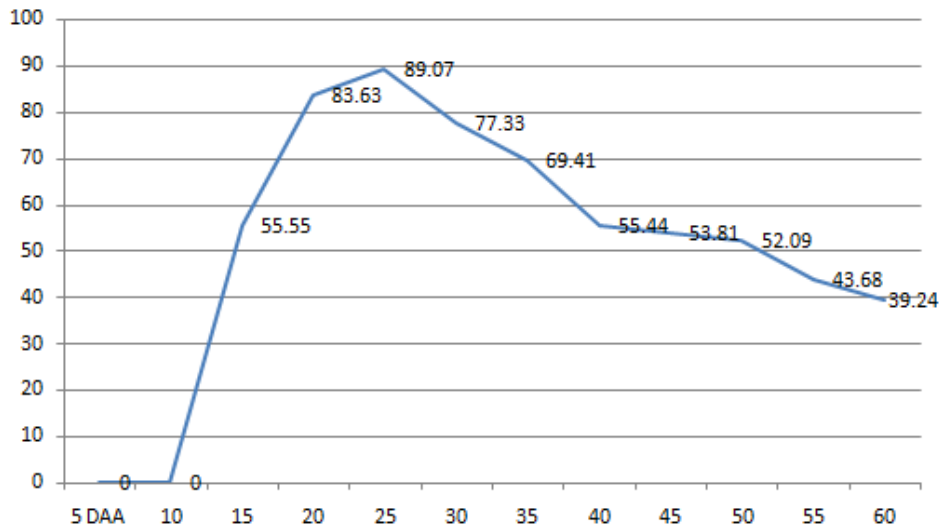


Fig-2: Average moisture content over time of anthesis

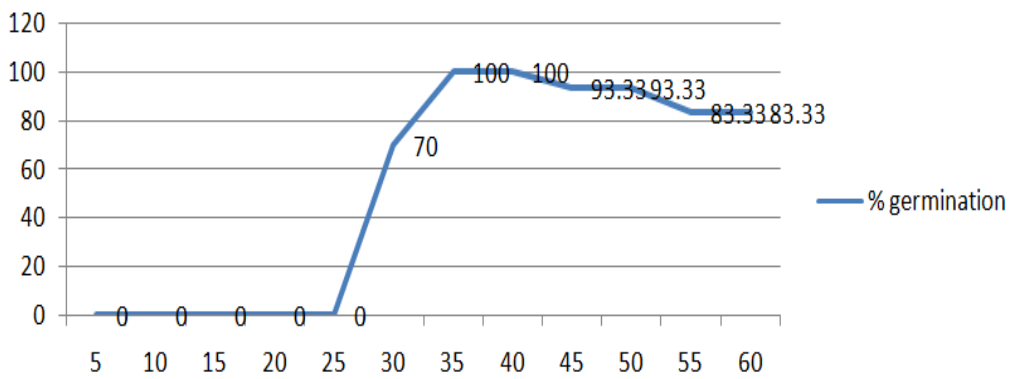


Fig-3: Percentage Germination over time of anthesis

SEED SIZE

Figure 4 presents the data on the average seed size over time of anthesis. It was observed that there was an increasing trend in the average seed size over time from 1.61 mm in 15 DAA to 3.63 mm in 30 DAA. The highest seed size was obtained from 30 DAA (3.63mm). On the 35 DAA there was a decline in seed

size with only 3.49 mm and followed during the 40 DAA. However, there was a slight increase on the average size of seeds on the succeeding days 45 and 50 DAA with 3.25 mm and then declined for the succeeding days.

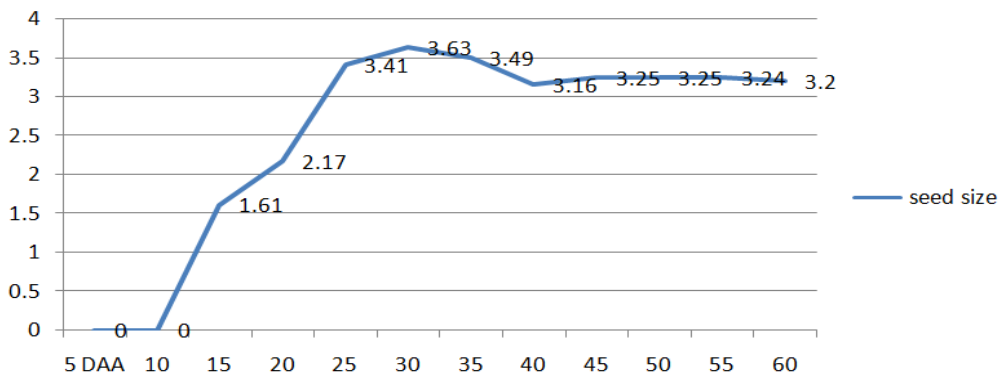


Fig-4: Average seed size over time of anthesis

CONCLUSION:

Seeds of eggplant achieved its seed physiological maturity on the 50th day after anthesis

wherein the maximum point of dry weight was obtained. This was the best time to harvest the seeds since all the assimilates were already translocated

within the seeds which is necessary for its germination. The moisture content of the seed was 52.09% and the seed size obtained was 3.25 mm. The percentage germination achieved during this time under laboratory condition was 93.33% which is quite high since the germination test was done inside the laboratory and there could be difference if germination would be done outside the laboratory.

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