

Seed development and maturation studies in onion

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SUMMARY

Field experiment was conducted to find out the physiological maturity and germinability in aggregatum onion cv. COOn5. The seeds attained physiological maturity on 30 days after anthesis with 19 per cent moisture content coinciding with maximum dry weight, seed germination and vigour. The visual symptom of seed maturation was turning of seed colour from white to deep black. Using image analyser, the stages of seed development and maturation was assessed. The size and shape of seed was found to stabilize between 25 and 30 days after anthesis which was confirmed with microtome sections of developing seeds at various stages.

Key words : Seed development, Maturation, Capsules, Seed, Germination

Seed development and maturation study is important because the seeds have to be harvested in time to ensure good yield associated with viability, vigour and field performance. It is understood that seed maturation is the gradual preparation for germination. The development process during seed growth and maturity interacts with the production environment to determine the planting quality of a seed. It is well established that seed quality would be the highest at physiological maturity which precedes harvestable maturity. The pre-harvest factor of degree of seed maturity influences the germinability and vigour which in turn affect the potential longevity of seeds (Delouche and Baskin, 1973).

Determining the harvest date is a critical decision in onion seed production because all the umbels do not mature at the same time. Two objectives are in conflict: to allow maximum seed maturity and to minimize the loss of seed from umbels shattered during harvest. Too early harvest will minimize loss due to shattering but some harvested seeds will be immature, light weight, poor-vigour or non viable. If harvest is delayed until all seeds reach optimal maturity much of the earlier maturing seeds could fall to the ground or shatter from the umbels during cutting and transport. Hence, the knowledge on development of seed from fertilization to maturity is valuable for better management.

MATERIALS AND METHODS

Physical and physiological changes during seed development and maturation

A field trial was laid out by adopting randomized block design with three replications during November to March, 2003-04 with recommended package of practices.

The crop was raised from seed bulb and large number of umbels were tagged at the time of anthesis and the umbels were harvested at five day intervals from the start of anthesis to 35 days after anthesis (DAA) for studying the development and maturation of seeds. The stages of collection of umbels were represented as 5, 10, 15, 20, 25, 30 and 35 DAA, respectively. The following observations like fresh weight and dry weight of umbel, umbel colour, fresh weight and dry weight of seed, moisture content of seed, seed colour, 100 seed weight and germination percentage were recorded with the umbels collected from all the stages.

Measurement of geometry of capsule and seed using Image Analysis Technique

The seeds of different stages from 1 to 7 were subjected to Image Analysis Technique, with five replications having twenty five seeds each. The details of the measurements on area, length, width, elongation and circularity were recorded.

Histological studies

Histological studies were made with seeds of onion collected during the early, middle and final stages of seed development and maturation. The materials were processed and sectioned by rotary microtome adopting the method suggested by Johanson (1960).

RESULTS AND DISCUSSION

Physical and physiological changes during seed development and maturation

Highly significant differences were observed for the evaluated umbel, seed and seedling characters viz., fresh

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