

SEED PRODUCTION (PBS 502)

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WEEK 1 (LECTURE 1 & 2)

Environmental & other factors affecting seed multiplication

Introduction:- Seed Industry has played a vital role in the availability of high quality seed of improved crop varieties with attendant modern power equipment, improved fertilizers, and better methods of insect and weed control. These altogether have revolutionized farming. Note the vital roles played by seed industry in modern revolution.

- Expansion of production capability
- Efficiency in rapid increase of new cultivars
- Maintenance of genetic purity.
- Quantity of seeds needed by farmers each year is enormous.

WEEK 2 (LECTURES 3&4)

Environment factors affecting seed production include:

- Availability of water through rainfall/irrigation
- Suitable soil temperature
- Appropriate light intensity/quality.

Where these are not available, other regions should be explored for interstate/international co-operation.

Other factors:-

- Soil (should be fertile, not alkaline nor acid; deep and well-drained and of adequate mineral status).
- Wind: Strong winds especially during the reproductive phase may result in severe crop losses through lodging, shattering and shedding of seed.
- Biological factors: Population of insects (both wild and/or domestic) may be necessary for pollination.

Note: Plant protection operations involving the use of insecticides should bear in mind effects on pollinating insects.

- Disease - ridden areas and seed-borne diseases should be avoided as far as possible.
- **Season:** Climate in an area may be fixed, but choice of season may be possible to make the best use of it.

Note: Choice of sowing date must be made to provide the best possible conditions for the reproductive phase.

Farms/Regions with large farms are best for seed multiplication where holdings are small and fragmented, isolation is difficult to arrange system of land ownership and tenure should permit continuity for crop rotations to be well planned in advance.

Farms should be accessible to permit visits from extension officers/field inspectors.

WEEK 3 (LECTURES 5)

Farmers Qualities:- Farmers must not only be energetic and meticulous but also be intelligent and reliable.

Pollination:- This is the deposition of pollen on the stigma. Self and cross-pollination to be explained later.

Wind pollination:- to be explained.

Insect pollination - also to be explained.

Pollination of F_1 Hybrids:- For F_1 hybrid seed production, at least two inbred lines A and B, having been properly selfed are needed for the production of F_1 Hybrids after crossing.

Details of hybrid seed production to be given later. Also, protection from foreign pollens would be stressed using isolation distance especially.

Week 4 (LECTURE 6)

Controlled seed multiplication: in which seed multiplication is properly monitored to prevent contamination of plants with undesirable pollens etc.

Cultural practices: - Ranging from weeding (manual/chemical) to fertilizer application, plant protection, chemical application, etc.

Crop maturity and time of harvest: Two phases characterize plant development – vegetative and reproductive phases. Influence of moisture on these two phases must be properly grasped by students.

Time of Harvests: Crop must have reached physiological maturity and beyond. Ripening – removal of water only, before harvesting commences.

Isolation distance in crops:- for self – pollinating and cross - pollinating species.

Deterioration of seed stocks may arise from:-

- (a) Cross pollination
- (b) Substituting one cultivar for another due to wrong labelling
- (c) Poor viability status
- (d) Genetic shift, etc.

WEEK 5 (LECTURE 7)

Contract Growing of Seeds

Contract – growing, philosophy, principles and application. Contract growing of seed is encouraged where the seed needed is in enormous quantity and shortage of land, equipment, personnel and other resources make it impracticable for seed companies/government agencies e.g National Seed Service (NSS). Farmers enter into contractual agreements with the seed company, sometimes with legal transactions. The quantity and quality must be guaranteed. Processing of harvested seed could be made in the premises of the farmer or in the seed processing depot of the seed company. In principle, difficult or new varieties are given as contract only to experienced farmers who have the experience and the facility to cope with them. There is usually freedom of entry/exit from the contract. The contract document is signed by both parties.

WEEK 6 (LECTURE 8)

Practical

Seed dormancy breaking techniques:

Depending on the type of dormancy, methods for breaking dormancy in the laboratory/field would include:-

- (i) **Hard seed coat dormancy** – Scarification, rubbing on abrasive surface or in the laboratory, rubbing seed on sand paper.
- (ii) **Embryo immaturity:** Time factor is important here. Importance and definition of after- ripening stressed here.

Note: During after – ripening, it is discovered that chemical/physical changes do occur within the seed or seed coat; composition of storage material may alter, germination promoters may appear while inhibitory ones disappear, embryo may also complete its growth.

Week 7 & 8 (LECTURE 9 & 10)

- (iii) **Temperature requirements:** Stratification defined, during which a number of changes occur e.g. embryo growth may be completed, Application of GA3 replaces chilling requirement; also some seeds require alternating temperature to break their dormancy.
 - For light – requiring seeds and use of coumarine in inducing/replacing light requirements etc.
 - Germination inhibitors e.g Cyanide, Flouride Azide, etc should be demonstrated. ABA, Coumarin are also popular.
Growth regulators promoting germinators include:-
 - KNO_3 , H_2O_2 , Thiourea, Gibberellins, Auxins (IAA), Cytokinnins, Ethylene etc.
 - Application of Pesticides to seeds – their implications on undried seed stressed.

Visits to commercial seed processing companies: National Seed Service (now National Seed Council in Abuja), MANR, Asero, Abeokuta.