PRINCIPLES OF SEED TECHNOLOGY (PBS 501)

BY

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LECTURE 1
- Differences between Seed and Grain
  * Seeds are planting materials to produce good crops
  * Seeds is nature’s bridge for conveying improved and superior characters between generations and to farmer’s field.
  * Seed represents fruits of Plant Breeding
  * Grain is meant for food, feed or raw materials
  * Seed can become grain but grain cannot become seed e.t.c
- Definition of Seed Industry
- Basics Components of Seed Quality are:
  * Superior, high yielding variety
  * Genetically pure
  * High germination percentage
  * Freedom from seed-borne diseases
  * Freedom from other crop seed, inert matter-noxious weed seed
  * High seedling vigour
  * Safe Moisture content
  * Good physical appearance etc
- Functions of Seed Industry
  * Plant Breeding i.e different types of seed
  * Cultivar assessment
  * Multiplication
  * Processing
  * Marketing and Procurement
  * Quality Control
  * Quarantine
  * Extension Activity

LECTURE 2
- Requirement for Seed Production
  * Climatic factors: temperature, rain (water supply), wind, light
- Pollination
  * Definition
  * Modes of pollination:
    - Self pollination
    - Cross pollination
    - Vegetative propagation
  * Pollination of F1 hybrid seeds – mostly controlled pollination operates
  * Methods of pollination in F1 hybrid seed production
  * Detasselling – Male sterility and hand pollination
  * Practical implication of cross pollinations
    - Isolation from contaminants

- Seed Multiplication chain
  * Seed is multiplied in controlled stages to achieve good quality
  * Breeder seed
  * Foundation seed
  * Certified seed

LECTURE 3
- Improvement factors to consider in seed multiplication
  * Previous cropping history of the land
  * Fertilizer application
  * Irrigation
  * Weed and its control
  * Disease and pests & their control
  * Seed for sowing
  * Sowing date and rate
  * Mechanical contamination

- Roguing is a process of removing undesirable plants from field crops.
  * Such contaminants are weeds, plants of other crop spp. Plants of another cultivar of some spp, off-types or genetic variants etc
  * Efficacy depends on the distinctness of the rogues and skill of the roguers.
  * Contribute to maintenance of purity
* Is an essential operation in seed multiplication
  * Should be done several times at different stages of crop development

  - Determinant of seed quality
    * Source of seed
    * Inheritance factor
    * Field contamination
    * Growing conditions
    * After maturation
    * Harvesting
    * Aeration
    * Handling
    * Processing
    * Storage
    * Chronological age
    * Uniformity

LECTURE 4
- Contract Seed Production
  * Contract growing what is it?
  * Why contract grower
  * Characteristics of contract growers
  * Organization of contract growing
  * Contract documents

- Seed Processing, treating & Packaging
  * What is seed processing?
  * Purpose of seed processing
  * Principles of seed processing
  * Pure live seed
  * Essential steps in seed processing
  * Types of materials removed from seed during processing
  * Seed cleaning equipment

- Seed treatment
  * Definition of seed treatment
  * Seed packaging – Benefits and types
  * Types of seed treatment materials

LECTURE 5
- Seed marketing
  * Definition of seed marketing
  * Seed marketing scheme
  * Reasons why seed marketing differs from marketing of other agricultural inputs
  * Seed marketing organization and management

- Activities in seed market operations
  * Market intelligence
  * Demand assessment
  * Inventory control
  * Seed storage
  * Pricing
  * Dealer development
  * Logistics and seed movement
  * Supply and transport
  * Sales and collection of sale proceeds
  * Promotion and publicity
  * Market research

Seed Laws
  * What is seed legislation?

- Legislative Strategy: Two types
  * Truth-labeling
  * Minimum standards

- Provisions of State and Federal Seed Laws
  * Farmer seed exchange
  * Current Germination Tests
  * Labeling vegetable seed container
  * Transport for Processing
  * Disclaimer not allowed
  * Proof of Internet not needed
  * Colouration and labeling of treated seed
  * Keeping of records
  * Collection of damages etc

- Breeders’ Rights
  * Legal protection for crop varieties

- Provides two avenues of protection of owner of a variety
* Rights to the propagation and use of a protected variety
* Rights to stipulate in his application that the variety name be protected through seed Certification
* Special exemption for farmers – right to produce seed of a protected variety for their use and for sale to neighbors’ for planting.

- Farmers’ Rights
  * Recognition of contributions of farmers to conservation and development of Plant Genetic Resources (PGB)
  * Right to protect traditional knowledge
  * Right to participate in benefit sharing and in national decision making about PGR
  * Right to save, use, exchange & sell farm-saved seeds.

LECTURE 6

- Seed Programme Development (SPD)
  * Justification and missing of SPD
- Components of seed industry programme
  * Crop improvement and plant breeding
  * Availability of seed
  * Rapid rehabilitation of agriculture
  * Objective Economic and technical justification
- Specific Benefits of Seed Programme in a Country
  * Increase in total yield due to introduction and distribution of superior seeds of variety/hybrid
  * Increase in yield due to higher physiological quality of planting materials
  * More efficient utilization of fertilizers, irrigation and pesticides
  * Reduction in planting rate
  * Higher quality of produce
  * Less re-infestation of land with weed seeds
  * Less diseases in the soil and soil insect problem in seed beds and in the field
  * More rapid and efficient periodic replacement of varieties with newer and better ones
  * Facilitate introduction of new crops into agriculture
* Contributing to agric development of a nation
* Employment opportunity
* Contributing to nation economic (GDP) growth
* Quality control
- Essential elements of seed programme
  * Skilled knowledgeable manpower
  * Needs for diffusion of efforts for solid and pragmatic seed programme
  * Quality of input into the programme
  * Time frame is realistic (No crash programme)
  * Planning & evaluation and implementation

LECTURE 7
- Sampling of Agricultural Seeds
  * Two steps are involved
    Step 1: submitted sample
    Step 2: working sample
- Sampling process
  * Bulk seed
  * Seed in Bags
  * Seed in small container
  * Sub-dividing the sample
  * Mailing the sample
  * Sub sampling

LECTURE 8
- Seed germination test
  * Seed treatment and packaging
  * Seed vigour test

LECTURE 9
- Practical
  * Seed purity determination
  * Seed Moisture content determination

LECTURE 10
- Revision class
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