

Ministry of Higher Education
Salahaddin University
College of Agricultural Engineering Sciences
field Crops and Medicinal Plants Department



Principles of Field Crops
Second Grade
Fall Semester (2022-2023)
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Lecture 6

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Summer fallow



- In the drier regions, when land is left uncropped but tilled during growing season, it is referred to as summer fallow or summer tilled.
- The primary reason for summer fallowing is to conserve moisture and store in the soil for use by a later crop.
- Summer fallowed land is usually used in rotation with small-grain crops.

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The three objectives of tillage between harvest and seeding on dry farms **are:**

- 1- Control weeds and save moisture
- 2- Provide a good seedbed, well supplied with moisture at the time of planting.
- 3- Keep crop residues on the surface to help control erosion.

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There are some notes for summer fallow:

- 1- Fallow land need not to be plowed deeper than 8 inches
- 2- Plowing should be done in the fall or early summer
- 3- Subsoiling 15 and 18 inches deep did not increase wheat yield
- 4- Frequent cultivation of fallow is unnecessary
- 5- The moldboard plow gave higher yields than the one-way disk and harrow

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Benefits of good preparation

- 1- Conservation of moisture
- 2- Destruction of weeds
- 3- Better aeration of the soil
- 4- Utilization of organic material to the best advantage

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Seed and Seeding Practices



The Value of Good Varieties

For the varieties to be used, the following qualifications should be taken into consideration:

- 1- Adaptability: **a-** adaptation to soil **b-** adaptation to climate **c-** length of growing season
- 2- Yielding ability
- 3- Purity
- 4- Quality of product for market or feeding purposes
- 5- Diseases and insect resistant



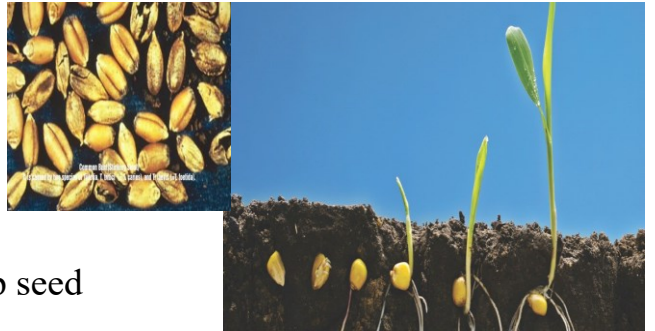
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The Value of Good Seed

The use of seeds of good quality is of great importance in crop production. It is not enough or good seeds belong to good variety but they must have:

- 1- Strong germination
- 2- Proper size and development
- 3- Free from seed borne diseases
- 4- Free from noxious weeds
- 5- Free from mixtures with other crop seed



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Seed Germination:

- The most important external conditions necessary for germination of matured seeds are moisture, oxygen, a suitable temperature, and, for some seeds, certain light conditions.
- A deficiency in any factor may prevent germination.



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- Good seeds show a germination of **90-100%** in the laboratory or under good conditions.
- In a poor seedbed, the emergence maybe much less.
- The low germination sometimes is due to harvesting when many of the panicles are immature and to inadequate drying



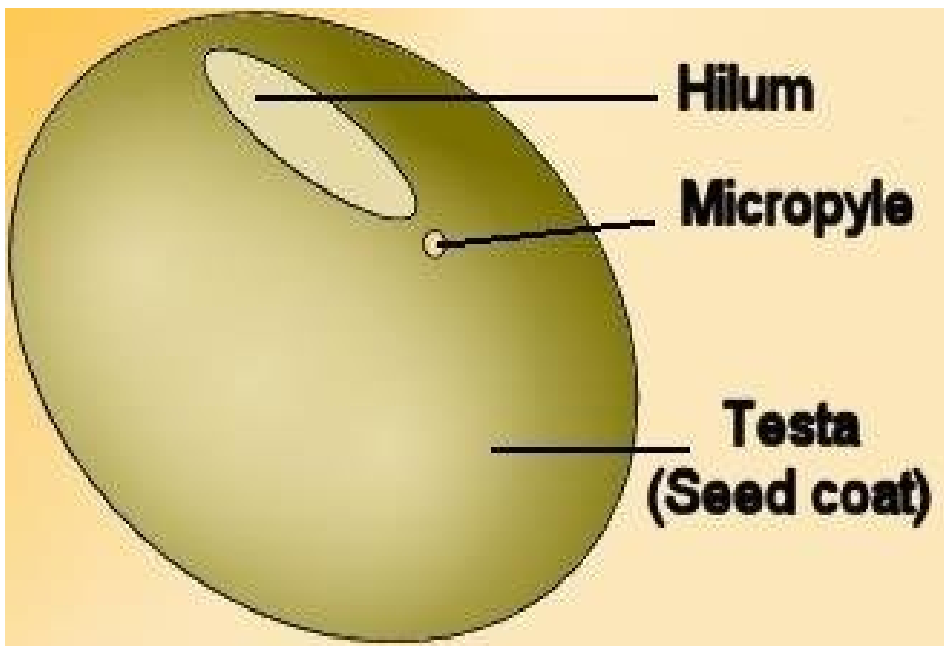
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Factors for germination



- **Moisture:** water is necessary for rapid germination which the soil contain about **50-70%** of its water holding capacity.
- Field crop seeds start to germinate when their moisture content reaches **26-75%**, e.g., **26%** in sorghum, millet, and **45 to 75 %** in small grains, and as high as **75 %** for soybeans.
- The water usually enters the seed through the micropyle or hilum, or it may penetrate the seed coat directly

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- Water inside the seed coat is imbibed by the embryo and endosperm.
- The imbibed water causes the colloidal proteins and starch of the seed to swell.
- Seeds sown in dry soil therefore may fail to germinate, or they may absorb sufficient moisture to swell and partly to germinate.

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Oxygen:

- Many dry seeds particularly peas and beans are impervious to gases, including oxygen.
- Absorption of moisture may at the same time render the seed permeable to oxygen.
- Seeds planted too deeply or in a saturated soil maybe prevented from germination through an oxygen deficiency except rice seeds.

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Temperature:

The temp. range for the germination of field crop seeds is from 0-49°C.

In general, cool season crops germinate at lower temp. than warm-season crops.

The optimum temp. for wheat is 15°C

The optimum temp. for soybean is 25°C

The optimum temp. for tobacco is 31°C

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- Warm weather crops germinate best at 30-31°C.
- Most crop seeds are germinated at alternating night and day temp. of 20°C and 30 °C in laboratory tests, which simulates field conditions, favors better germination.
- At temperature too high for germination, the seed maybe killed or be merely forced in to secondary dormancy as a result of ascribed destruction of enzymes and coagulation of cell proteins.

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- **Light:** Most field-crop seeds germinate in either light or darkness. Many of the grasses germinate in the presence of light especially when the seeds are fresh.
- Light is necessary for germination of some types of tobacco, except at low temp. of about 14°C.
- The light requirement in all cases is small which may induce germination in seeds that are wet and swollen.

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