

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)
Instructor: Saber Wasman (PhD)
Lecture 3

1



Factors which Influence the Water Requirement of Plants

1- Adaptive plant characters:

- Some plants can use the moisture available to them and then mature so quickly to avoid the “no water” period.
- Other plants (sorghums) can stop growth and then complete their growth; other plant may take a growth of several centimeters with less moisture available.

2



Some of morphological plant characters which make it possible to lower the water requirement are:

- 1-** Pubescent or hairy leaves
- 2-** Rolling of the leaf
- 3-** Bloom on leaf and stem (white powder as in sorghum)
- 4-** Number and distribution of stomata
- 5-** Smaller leaf area



3



2- Water Requirement for different plants:

The water requirements of a particular plant may be relatively low, and yet the crop may suffer more drought than one in which the water requirement is more, because of a larger total production of dry matter and therefore of water required per acre.

Humidity

- Humidity is a water vapor in the air.
- Relative humidity is the vapor pressure in the air.
- A saturated atmosphere that causing fog, dew or rain.



4



Light

- Light is necessary for the formation of **chlorophyll** in green plants and for **photosynthesis**.
- Plant growth may increase with greater light intensities of up to 1800 foot-candles (19.4 lux).
- The long summer days at high latitudes enable certain plants to develop and mature in a relatively **short time**.

5



- The life processes of many plants are influenced by the relative high length of day and night which is called (**photoperiodism**).
- This led to distinction between **long-day** and **short days** plants.
- Long day plants require increase in vegetative growth, but in some crops such as red clover and the small grains (except rice) flower in the long-days of early summer.

6



- Short-day plants are stimulated to vegetative growth with delayed flowering and maturity, when the days are long, and produce flowers and fruits.
- Corn, sorghum, rice and soybean are short day plants.

7



- Short day plants require daily prolonged darkness to induce **flowering**
- Long-day plants may flower under continuous light.
- Flowering in long-day plants is hastened by even short light exposures during the night.

8



- The distribution and time of maturity of different crops and crop varieties are influenced by **photoperiodic** responses.
- Corn or sorghum varieties mature when planted in the field where the days **are short**.
- The time a crop is planted affects the periods required to reach maturity, this is due to temperature and photoperiodic influences.

9

Air



- Air not only supplies carbon dioxide for plant growth, but also nitrogen indirectly.
- It supplies O₂ for respiration of the plant as well as for chemical and biological processes in the soil.
- Air sometimes contains gaseous in concentration harmful to plant growth.
- These gases usually come from **fuel combustion or industrial fumes**.

10