HUMIDITY –ABSOLUTE HUMIDITY – SPECIFIC HUMIDITY –RELATIVE HUMIDITY – MIXING RATIO, DEW POINT TEMPERATURE – VAPOUR PRESSURE DEFICIT –DIURNAL VARIATION IN RELATIVE HUMIDITY AND ITS EFFECT ON CROP PRODUCTION.

Humidity

The amount of water vapour that is present in atmosphere is known as atmospheric moisture or humidity. Or, the concentration of water vapour present in the air is known as humidity.

Types of Humidity

1. Absolute Humidity

Absolute humidity describes the water content present in the air and is expressed in either grams per cubic meter or grams per kilogram. The absolute humidity in the atmosphere ranges from near zero to roughly 30 grams per cubic metre.

Mathematically absolute humidity is defined as mass of the water vapour divided by the volume of the air and water mixture, which is expressed as

$$\text{Absolute humidity} = \frac{Mass\ of\ water\ vapour}{Volume\ of\ air}$$

The absolute humidity varies with respect to air temperature and pressure changes, if the volume is not fixed.

2. Relative Humidity

The relative humidity of an air water mixture is defined as the ratio of the partial pressure of water vapour in the mixture to the equilibrium vapour pressure of water over a flat surface of pure water at a given temperature. It is normally expressed as a percentage. Higher percentage indicates that the air-water mixture is more humid.

$$\text{Relative humidity} = \frac{Absolute\ humidity}{vapour\ holding\ capacity} \times 100$$

3. Specific Humidity

The ratio of the mass of water vapour to the total mass of the air parcel is known as specific humidity.

What's the difference between relative humidity and absolute humidity?

Relative humidity	Absolute humidity
Relative humidity is a percentage of the amount of moisture the air could possibly hold.	The actual amount of water vapour present in the air is commonly referred to as absolute humidity.
It is expressed in percentage as the ratio of vapour pressure to saturated vapour pressure.	It is expressed in of moisture per cubic meter of air (g/m^3)
If the temperature goes up. Relative humidity goes down and vice-versa.	Absolute humidity is totally independent of the temperature.
It is affected by geographic location and temperature of a particular region.	It is influenced by the land and water distribution on earth as well as seasonal changes.
Relative humidity = $\frac{Absolute\ humidity}{vapour\ holding\ capacity} \times 100$	Absolute humidity = $\frac{Mass\ of\ water\ vapour}{Volume\ of\ air}$

- ***What causes high levels of humidity?***

High humidity (which is anything over 50 percent or so) is caused by high temperatures.

- ***Mixing ratio***

The ratio of the mass of water vapour contained in a sample of moist air to the mass of dry air. It is expressed as gram of water vapour per kilogram dry air.

- ***Dew Point temperature***

The temperature to which a given parcel of air must be cooled in order to become saturation at constant pressure and water vapour content. In this case, the invisible water vapour begins to condense into visible form like water droplets.

- ***Vapour Pressure deficit***

The difference between the saturated vapour pressure (SVP) and actual vapour pressure (AVP) at a given temperature. This is an another measure of moisture in the atmosphere which is useful in crop growth studies. When air contains all the moisture that it can hold to its maximum limit, it is called as saturated air, otherwise it is unsaturated air, at that temperature.

Importance of humidity on crop plants

The humidity is not an independent factor. It is closely related to rainfall, wind and temperature. It plays a significant role in crop production.

1. The humidity determines the crops grown in a given region.

2. It affects the internal water potential of plants.

3. It influences certain physiological phenomena in crop plants including transpiration.

- Transpiration is the evaporation of water from plants occurring at the leaves while their stomata are open for the passage of CO_2 and O_2 during photosynthesis.

4. The humidity is a major determinant of potential evapotranspiration. So, it determines the water requirement of crops.

- Evapotranspiration is a term used to refer to the combined processes by which water moves from the earth's surface into the atmosphere. It covers both water evaporation and transpiration.

5. High humidity reduces irrigation water requirement of crops as the evapotranspiration losses from crops depends on atmospheric humidity.

6. High humidity can prolong the survival of crops under moisture stress. However, very high or very low relative humidity is not conducive to higher yields of crops.

7. There are harmful effects of high humidity. It enhances the growth of some saprophytic and parasitic fungi, bacteria and pests, the growth of which causes extensive damage to crop plants.

8. High humidity at grain filling reduces the crop yields.

9. A very high relative humidity is beneficial to maize, sorghum, sugarcane etc, while it is harmful to crops like sunflower and tobacco.

10. For almost all the crops, it is always safe to have a moderate relative humidity of above 40%.

Variation in Humidity

1. Absolute humidity is highest at the equator and minimum at the poles.

2. Absolute humidity is minimum at sunrise and maximum in afternoon from 2 to 3 p.m.

3. The relative humidity is maximum at about the sunrise and minimum between 2 to 3 p.m.

4. The behaviour of relative humidity differs a lot from absolute humidity. At the equator it is at a maximum of 80 per cent and around 85 per cent at the poles.