ROLE OF ENVIRONMENTAL FACTORS ON MULBERRY GROWTH

Dr. Mahesha H B
Professor of Sericulture
Yuvaraja's College
University of Mysore, Mysuru, India

Climate is defined as an area's long-term weather patterns.

The simplest way to describe climate is to look at average temperature and precipitation over time. However other useful **Environmental Factors** are

Season- Summer, Winter, Rainy,..

Sunshine- More, Medium, Less.

Water- Rain Fall/Precipitation, Ground water.,.

Soil- Sandy, loam, clay,..

Pruning Methods – Bottom, Middle, Top,..

Temperature- High, Moderate, Low..

Humidity – High, Moderate, Low...etc.,

1. Quality of Mulberry Leaves and Harvesting Season

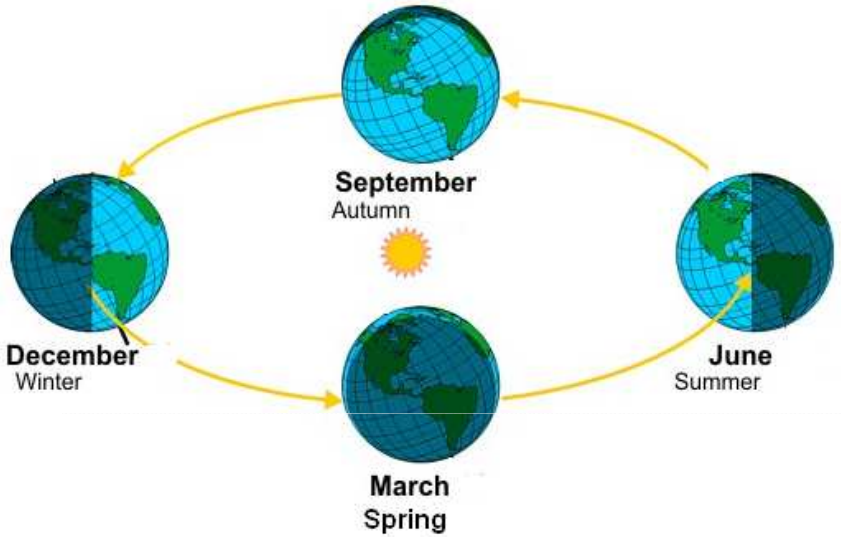
In Temperate Zone (Japan) the seasons are as follows

Spring :- Middle of March – Beginning of May warm temperature but not too high

Summer :- Middle of May to beginning of September, High temperature of up to 40°C in many places.

Autumn/Fall :- Middle of September – Beginning of November, Cool temperature of 8-10°C.

Winter :- Middle of November to beginning of March, Average temperature of 1-5°C.



1. Quality of Mulberry Leaves and Harvesting Season con..

Species or race	season	Water (%)	Crude protein (%)	Soluble carbohy-drate (%)	Crude fat (%)	Crude ash (%)	Crude fibre (%)
Kairyonezu-migaeshi (Morus alba)	Spring	78,45	6,20	5,58	1,42	2,36	2,11
	Early autumn	78,43	6,92	3,81	1,19	2,22	2,27
	Late autumn	72,33	6,96	7,30	1,08	2,66	2,76
Akame roso (Morus latifolia)	Spring	76,37	5,51	5,98	1,37	2,33	1,87
	Early autumn	77,98	5,93	5,00	1,15	2,67	2,66
	Late autumn	74,79	6,46	6,29	1,17	2,48	2,96

2. Sunshine

- **Light/Sunshine is essential in the production of chlorophyll and in photosynthesis.**
- **Other plant processes that are enhanced by this climatic factor include:**

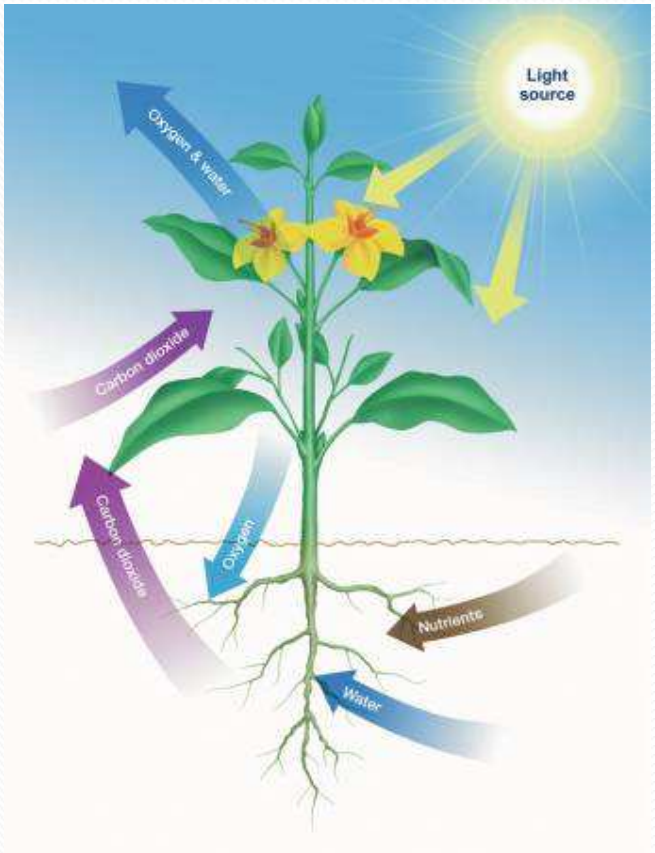
  Stomatal movement

  Phototropism

  Photomorphogenesis

  Mineral absorption

  Abscission.



2. Sunshine Continued....

- **In Temperate – grows 5 – 10.2 h / day**
- **In Tropics -grows well 9 – 13 h / day**

In case insufficient sun shine,

carbohydrate & protein decreases

remarkably but, the content of the total

nitrogen in leaves is about the same & increases nitrates.

3. Water – Rainfall & Underground water

Rain Fall

- **Precipitation 600 to 2500 mm/year**
- **However, 50 mm once in 10 days is essntial**

In case the underground is high, the content of
carbohydrate becomes richer
and the contents of
water and ash become smaller.

4. Soil

	Sandy soils	Loam soils	Clay soils
Drainage	Well drained, free draining	Good drainage	Poor drainage
Aeration	Well aerated	Good aeration	Poor aeration
Fertility	Low fertility	Good fertility	Fertile, retain nutrients
Tillage capabilities	Easily tilled	Easily tilled	Not suited to tillage
Temperature	Warm up quickly in spring	Will warm up in spring	Cold soils due to lack of aeration
Drought/ Waterlogging	Prone to drought, do not get waterlogged	Retain water but not prone to drought or waterlogging	Retain water, prone to poaching and waterlogging

4. Soil continued....

Quality of Mulberry Leaves and Soils:

Soils supplies - **(a) major and minor plant nutrients**
(b) oxygen for root respiration
(c) mechanical support or anchorage
(d) as a storehouse for water.

In case **loamy soil**, **water, protein and crude fat become larger** and the contents of **soluble carbohydrate and crude ash become smaller.**

On the contrary, in the **gravelly soil**, the contents of the said constituents in leave become **converse.**

Therefore, the soil should be

deep, fertile, well drained, clayey loam to loam in texture, friable, porous with good moisture holding capacity. Slightly acidic (6.2 to 6.8 pH) with free from injurious salts ideal for good growth of mulberry.

5. Quality of Mulberry Leaves and Pruning Type of Mulberry Trees:

Methodical removal of certain branches of a mulberry plant with the object of giving the trees a convenient shape and size, to increase the leaf yield (Quantity & Quality) and to improve its feeding value.

Middle or tall stemmed pruning type are richer in contents of **carbohydrate and crude fibre** and **poorer in water content** in comparison with those of the trees of low bush pruning type.

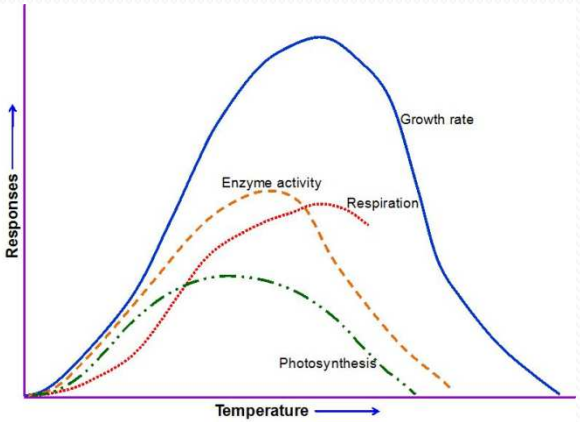
6. Temperature

The degree of hotness or coldness of a substance is called temperature.

It is commonly expressed in degree Celsius or centigrade (C) and degree Fahrenheit (F)

This climatic factor influences Photosynthesis, respiration, transpiration, breaking of seed dormancy, seed germination, protein synthesis, and translocation.

In general, plants survive within a temperature range of 0 to 50°C. Enzyme activity and the rate of most chemical reactions generally increase with rise in temperature. Up to a certain point, there is doubling of enzymatic reaction with every 10°C temperature increase But at excessively high temperatures, denaturation of enzymes and other proteins occur.



6. Temperature continued

- **Excessively low temperatures can also cause limiting effects. Eg., water absorption is inhibited when the soil temperature is low because water is more viscuous at low temperatures and less mobile, and the protoplasm is less permeable. At temperatures below the freezing point of water, there is change in the form of water from liquid to solid. The expansion of water as it solidifies in living cells causes the rupture of the cell walls.**

The favorable or optimal temperature in mulberry

Atmospheric temperature 24-28°C is optimum

Below 13°C and above 38°C no good growth

7. Humidity

- **Relative humidity (RH)** is the amount of water vapor in the air, expressed as the proportion (in %) of the maximum amount of water vapor it can hold at certain temperature.
- For example, an air having a relative humidity of 60% at 27°C temperature means that every kilogram of the air contains 60% of the maximum amount of water that it can hold at that temperature.

7. Humidity continued

- The relative humidity affects the opening and closing of the stomata which regulates loss of water from the plant through transpiration as well as photosynthesis
- **In mulberry 65-80 % R H is optimum**
- **Quality of leaf during rainy is better as the atmospheric RH is comparatively more**

Acknowledgements
to

INTERNET

FOR
PICTURES AND PHOTOGRAPHS