

agMOOCs

Crop-Weather Interactions: Sugarbeet and Chickpea

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Dear student in the last class we have seen crop weather interaction for cotton and sugarcane.

(3) Crop weather interaction C. Sugar beet, Chickpea and weather



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In this class we like to see the crop weather interaction for sugarbeet and chickpea. Let us see the crop weather interaction for sugarbeet.

Crop weather interaction **Sugar beet**

Examples

- Sugar beet is mostly cultivated under irrigated condition normally in temperate region
- Seed germination occurs at 5°C, however, the effective minimum temperature is ranged from 7 to 10°C, while optimum is 15-20°C
- Higher temperature during vegetative growth is preferred
- The optimum temperature required during tuberization is >24°C
- However, high sugar yields are obtained when night temperatures prevails between 15 and 20°C and day temperatures between 20 and 25°C during the latter part of the growing period
- During maturity period temperature above 30°C greatly decreases sugar yield
- Total water requirement is from 550 to 750 mm

It is one of the important crop cultivated in most part of the temperate region. To some extent it can be possible to grow under a tropical region by introduction of the new varieties. Already several varieties are existed for a tropical region also. Let us see the crop weather interaction during different growth phases. The phase one is germination. I told you in the earlier class the weather requirement of a crop is determined by the habitat of the species. It is originated from the temperate region. Therefore the germination occurs at a low temperature of 5 degree Celsius while the minimum is 7 to 10 degree Celsius and the optimum is 15 to 20 degree Celsius. If the temperature goes above 30 degree Celsius that will harm the seed germination.

Let us see the crop weather requirement for vegetative stage. During this stage crop can able to produce more than 15 leaves arranged on the top of the root chrome on a circular manner to harness more sunlight energy. The duration is around the 5 to 6 month. Therefore it has to be harness more sun light energy it requires sunny hours coupled with a warm temperature during the vegetative stage.

The next stage is the tuberization stage or tuber formation stage. The maximum tuber size harvested with the optimum temperature of about 24 degree Celsius was reported. During the two-phase that is from vegetative to reproductive stage or the tuberization stage it requires the optimum soil moisture level. It is adjust to light irrigation has to be provided at a periodical interval to get the maximum tuber size because tubers are grown under the soil. Therefore, optimum moisture has to be adapted to increase the maximum tuber size.

The next phase is the ripening phase or the maturity phase. In general most of the sugarcane or sugar producing crops requires a cool temperature during the ripening stage. High sugar yields are obtained when the night temperature prevail during the 15 to 20 degree Celsius and the day temperature between 20 to 25 degree Celsius in the later part of the period. During the maturity period if the temperature above 30 degree Celsius greatly decreased the sugar yield.

Let us see the water requirement. The water requirement is around 550 to 750 mm.

Crop weather interaction

Chickpea

Examples

- Chickpea is an important cool season grain legume, which is grown during post-rainy season under stored soil moisture
- Chickpea is sensitive to light and temperature
- Chickpea seeds germinate at an optimum temperature of about 28-33°C under optimum soil moisture level (80 % ASM)
- The crop may tolerate cool (5 to 10 °C) and frosty nights (0 to -1 °C) during its vegetative stage and even warm (20 to 27°C) and hot (>30°C)
- The optimum temperature for chick pea is 21° to 26.6°C during day time and 17.8° to 21°C during night time.

(Contd..)

Let us see the crop weather interaction for chickpea crop. It is one of the important cool season crop cultivated in most part of India especially during the post rainy season under the stored soil moisture. Let us see the crop weather interaction for chickpea crop. Chickpea is highly sensitive to light as well as high temperature. Being a cool season crop it is highly sensitive to high temperature as well as drought situation. It has two different types one is the desi type, another one is the kabuli type based upon the color of the seeds. However, the desi seeds or desi type can tolerate even the cooler temperature as compared with the kabuli variety.

Let us see the crop weather interaction in different growth phases. Chickpea seeds germinate at an optimum temperature of about 28 to 33 degree Celsius coupled with the optimum soil moisture that is almost 80% of available soil moisture. As I told you earlier the nature of the seeds also determine the weather requirement of the crop. It is a bigger in size therefore it requests more moisture as well as it is covered with a thick seed coat. It requires little higher moisture to catalyze the germination process. The optimum temperature for a seed germination is 28 to 33 degree Celsius coupled with the 80% soil available moisture. This crop may tolerate under cold temperature as well as the frosty nights ranging from 0 to -1 degree Celsius and also it can able to tolerate even the warm temperature as well as the hot temperature situation. However, it is highly sensitive to drought condition.

The optimum temperature during the vegetative stage is 21 to 26.6 degree Celsius during the daytime and the 17.8 to 21 degree Celsius during the night time is required to produce maximum biomass.

Crop weather interaction
Chickpea (Contd..)

Examples

- Temperature above 30 °C, especially 32 to 35 °C during flowering distinctly affect the yield
- The water requirement of chick pea is 110 to 280 mm

Let us see the other growth stages namely reproductive. Temperature above 30 degree Celsius especially 32 to 35 degree Celsius during flowering distinctly affect the flowering. Let us see the water requirement of the crop the water requirement of a crop is determined by the stored soil moisture. Therefore the water requirement is a very minimum for a chickpeas around 110 to 280 mm.

This is about the crop weather interaction for sugarbeet as well as chickpea crop. In the next class we will see the crop weather interaction for sunflower and mustard.

Thank you.