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The effect of frost stress on the growth of autumn plants and ways to deal with them

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ABSTRACT

Climatic and climatic factors play a very important role in the growth and development of plants. And are considered as controllable, effective and agricultural variables. Plant tolerance thresholds are limited in relation to each of the meteorological parameters and have the ability to grow and develop biological activity in a certain heat range, and any anomaly on these parameters can have direct and indirect effects on agricultural production. Stressors alter and disrupt the physiological processes of plants. And from this change, they affect the production of crops. Cold stress is one of the most important environmental factors that reduces the yield of crops in autumn crops in subtropical regions. The damage caused by frost to crops varies depending on the species and cultivar. And this action is often caused by autumn frosts. For any part of Qom, not only there is a favorable temperature, but also the growth stages and various activities of plants, with ideal temperatures as well as lethal temperature range and minimum and maximum, reducing the temperature of The minimum plant tolerance threshold can be harmful.

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1.Introduction

Stress in the general definition is any force that is applied to a body that causes changes in the dimensions of the body due to this force. These changes are called strains. With stimuli that lead to imbalance of the plant's biological balance. Stress occurs when this environmental factor affects the plant more than normal.
Symptoms of frostbite: During frost stress, no abnormal or obvious changes occur in a plant that should be considered for immediate and accurate diagnosis of damage. Visible symptoms vary according to temperature, duration of cold, product type, growth stage, texture type, hours of day and other environmental conditions such as light, wind, water and nutrients and etc.

2. Previous work

1.2. The symptoms that develop in a plant in the field can be very different from the symptoms that the fruits of the same plant show due to cold in the cold house.
However, frost damage is mainly observed in plants in the tropics and subtropics. However, plants in temperate regions may also suffer from frost damage. Many researchers have studied the effects of frost.[1-7]. By Betul Shahriar at al have presented methods for the growth of autumn plants [11]. Researches on heat transfer and particle processes and equations governing bubbles have been reviewed [12-21]. Research on solutions to deal with freezing and energy inside pipes in different conditions and particle transfer and particle size processes have been investigated by researchers[22-33].

Chilling Stress

Damage at room temperature and without ice formation is called frostbite. Frostbite is one of the most important environmental stresses affecting plant growth and crop production. Frost and frost cause geographical distribution, seasonal growth and significant reduction in production in many crops.
Frost stress in theory: when the ambient temperature is below the optimum temperature for plant activity at any stage of growth. But in practice this definition is not practical but depends on other conditions.
Most plants do not reach temperatures below ten degrees Celsius, cold stress does not occur. This temperature is zero conventional. Many crops and orchards and tropical and subtropical regions become vulnerable when temperatures reach a critical threshold [8,9].
Frostbite damage occurs in three forms: direct, indirect and secondary.
Direct damage: due to physical qualitative changes include four cases.
1- Leakage of soluble materials from the membrane
2- Lack of photosynthetic materials
3- Respiratory disorders
4- Accumulation of toxins

The rate of anaerobic respiration initially increases due to the pasteurizing effect but then continues due to the accumulation of toxins. Continued anaerobic respiration can cause excellent plants to die at normal temperatures within 4-24 hours. Toxic compounds at the frostbite temperature of aerobic respiration cause the accumulation of high concentrations of oxygen in the tissues compared to normal conditions. This oxygen will be provided to oxidases due to the cytochrome system, which under normal conditions is responsible for oxygen metabolism in aerobic respiration of unseen plants. Peroxidants are among the compounds made by some of these oxidases [10].
Inhibition of photosynthesis may also lead to the formation of peroxidases.
a)Decomposition of proteins
b)Biochemical damage

3. Research method

Research in the form of theory and study of books and theoretical methods, discussion and scrutiny of other researchers and scholars in the field of agricultural sciences, which has been done academically and experimentally.

4. Research findings

Factors affecting the spread of ultra-structural damage at frost temperatures
Environmental stresses occur separately in plants and therefore frost stress is no exception to this rule. There are many factors such as light intensity, relative humidity and the plant's inherent sensitivity to frost and may increase the effect of frost or act as a protective factor against damage.
Common methods of protection of gardens and farms and etc.

Active methods

Heaters are recommended for many parts of the country to protect gardens and farms from the cold.
Flood irrigation that is implemented in Mexico and Argentina and parts of our country.

Inactive methods

The most important passive protection methods that can be used for all farmers and gardeners to protect against cold and frost.

- Select places without frost (for example, the slope of the hills)
- Late cultivation in order to prevent the sensitive stages of plant growth from colliding with glacial periods
- Selection of resistant cultivars
- Physical barriers, such as walls and piles of woody foliage, to control cold air drainage

- Initial planting in protected environments (such as greenhouses) and then transfer to main environments after eliminating the risk of cold
- Cover row plants using plastic wrap
- Spraying antifreeze bacteria (NINA) on plants to compete with bacteria (Snyder 2000) INA.

5. Result and discussion:

Conclusion:

The executive instructions and related information provided to deal with plant frosts are based on studies and practical measures taken in different countries of the world, which can benefit from the results of studies conducted in countries with similar conditions. Selected the cheapest and best methods to introduce to the country's agricultural field and use in cold and frost stress management programs.

Inactive and long-term methods are widely used today in many countries that suffer from frostbite. In fact, passive methods are often more effective and less expensive than active methods.

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