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The impacts of climate change on wheat domestication and epigenetic changes

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Statement of the Problem: Climate is the most important element for agricultural products. Climate change can produce physiological tensions and stresses, genetic and epigenetic changes in plants. Our researches showed that wheat has been adapted to colder and severe winds climatic conditions approximately around 12,500 years ago (Younger Dryas event). As cold conditions caused the desired genetic variation in wheat, warmer climatic conditions is effective in reduction of fertility, changes in size, crop seed shape and quality and achievement of consistency with current climatic conditions for cereals in low and middle latitudes. Moreover, the probability of the pests and fungus outbreak will be increased for cereals.

Methodology & Theoretical Orientation: The effects of climate changes on different species of wheat were investigated in various periods as well. We used to sediment core analyses for detection of cereal pollens also data on archaeological excavations were used for analysis changes in grains and seeds.

Findings: The climatic conditions in the Younger Dryas period caused the most epigenetic changes in wheat that cultivated by inhabitants of the Fertile Crescent. Climate change makes genetic and epigenetic changes in plants.

Conclusion & Significance: Wheat can reduce the transpiration surface area by forming small cells against dry conditions. Climate change during the Younger Dryas period has been effective on domestication and increasing the power adaptation of wheat in different geographical areas. However before that, wheat was cultivated for a long time but, it did not have the properties of domesticated wheat. Cold and dry climatic conditions in Younger Dryas (12,500 years ago) and dry climate in 5000-6000 years ago causes increase in the resistance of wheat and created more morphological and epigenetic changes. Wheat is sensitive to high temperature, but the sensitivity depends on several factors such as variety, ambient temperature in which corn growth and its growth stages. The warmer climatic conditions are effective in reduction of fertility, changes in size, crop seed shape and quality. With the transferring of agricultural belts to high latitudes, although, there will be a desirable temperature conditions to grow wheat, factors including high humidity, poor soil organic matter and low thickness of the soil are the most important issues that restrict the wheat cultivation. Moreover, the probability of the pests and fungus outbreak will be increased for cereals.

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