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SARATOV, RUSSIA
Saratov State University

Maize tetraploid pollen studies

Lobanova LP; Kolesova AY

Maize tetraploids show a wide range of valuable selective features such as growth of vegetative mass, increase of crop capacity, etc. At the same time polyploidy can lead to decrease of male and female fertility, seed production and germination. In that way generative features of tetraploids is of great interest.

We have analyzed maize tetraploid pollen of Krasnodar population 1(KrP-1). The results of this research show that frequency of morphologically normal pollen formation of different plants varies from 67,8 to 84,0%. Normal pollen grain contains one vegetative cell and two sperm cells; it is spherical and has one aperture.

Defective pollen is represented by anomalous structure pollen, plasmolyzed and hollow pollen grains. Frequency of defective pollen varies from 4,3 to 9,9%. In this group underdeveloped pollen (unicellular and bicellular) is found, as well as normal size pollen grains with an additional vegetative nucleus and four or five additional sperm cells. Considerable part of defective pollen is represented by big pollen grains of irregular shape. Among them are grains of oval, egg and dumbbell shape. These pollen grains might have been formed as a result of cell wall formation failure in microsporogenesis. Big pollen grains usually contain one vegetative nucleus and two sperm cells. They also have constriction of cytoplasm and they contain two apertures. Two pollen grains contain four sperm cells and two apertures. Pollen grains with one, three and four apertures have also been found. One of dumbbell-shaped pollen grains has seven apertures, one of the latter is typical and is on one part of dumbbell, while other six are underdeveloped and are on the other part. Frequency of plasmolyzed pollen grains of different plants varies from 2,3 to 12,9%, but frequency of dead pollen was from 5,7 to 9,4%.

Thus, the obtained results show that the amount of anomalous pollen grains of maize tetraploid pollen KrP-1 is increasing if compared to earlier studied diploids. It can be connected with disturbances in microsporogenesis and microgametogenesis of polyploids.