

Study of *Brachypodium distachyon* (L.) P. Beauv. and Kazakhstani soft wheat varieties resistance to *Puccinia recondita* Rob. ex Desm f. sp. tritici

Научный руководитель – Omirbekova Nargul Zhapparovna

Zhangisina S.¹, Kenzheeva A.¹, Mynbaeva D.¹, Zhussupova A.I.¹, Zhunusbaeva Z.K.¹

1 - Казахский национальный университет имени аль-Фараби, Факультет биологии и биотехнологии, Алматы, Казахстан

One of the important issues of the modern world economics is ensuring the quality of food, relevant for Kazakhstan, where the possibility of cultivating soft and hard wheat varieties and high technological quality grain production are among the strategically important tasks of its national security. Biotic and abiotic environmental stress factors may lead to decrease in cereals productivity, and annual loss in the global yield of crops from diseases. In this regard, one of the primary tasks of practical breeding is the identification and development of resilient methods and ways of forming plant resistance to pathogens, including *Puccinia recondita* Rob. ex Desm f. sp. tritici or wheat brown (leaf) rust, the loss of grain from this disease for a number of losses over a number of years is persistently rather high [2, 4]. *Brachypodium distachyon* - the only annual wild grass, phylogenetically closely related to the most important cereal crops [1, 3] quite easy to operate in laboratory and field conditions.

Our scientific group is the first in Kazakhstan, engaged in detailed studies on the use of *B. distachyon* as a model object for studying changes caused by the brown rust pathogen. Within the framework of the project “Introduction of a new model object *Brachypodium distachyon* L. into the breeding practice in order to improve the resistance of cereals to biotic environmental factors” (SR No. 0115RK00382, MES RK) the influence of *P. recondita* on the activity of stress enzymes, composition of the storage proteins in the endosperm, quantitative indices of the internal anatomical structure of leaf, stem and root, on the content of chlorophylls in leaves, the elements of the productivity of two soft wheat varieties with different degrees of resistance - Kazakhstanskaya early and Kazakhstanskaya 19 and standard line Bd21 was established prior and upon the pathogen infection. Introduction of *Brachypodium* into *in vitro* culture was carried out as well, including choice of the explant, optimization of the nutrient media composition for *in vitro* conditions, optimization of conditions for regeneration and adaptation of test tube plants during transfer to the open ground, optimization of test tube plants adaptation during their transfer to the open ground. Based on the results of the research, an application for the patent of invention “Method of reproduction of *Brachypodium distachyon in vitro*” was submitted. We now aim to study in detail the physiological and biochemical mechanisms of nonhost resistance on named plants.

Источники и литература

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