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N. I. Kalybekova[1], Sh. K. Shapalov[1], M. B. Yunussov[1], G. Z. Turebekova[1], G. A. Issengalieva[2], K. I. Islamova[2], G. E. Nurmukhanova[2], G. Sh. Toregeldi[1], Zh. M. Altybayev[1]

[1]South Kazakhstan pedagogical university, Shymkent, Kazakhstan,
[2]K. Zhubanov Aktobe regional state university, Aktobe, Kazakhstan.
E-mail: shermahan_1984@mail.ru

DEVELOPMENT AND DISEARSES OF WHEAT RUST IN THE CONDITIONS OF KAZAKHSTAN SOUTH-EAST

Abstract. Wheat stem rust (*Puccinia recondita f. sp. tritici Rob. ex. Desm)* damages all vegetative members of grains such as leaf, stalks, spike, spike's grass-blade, sometimes it damages its seed too, it lowers the yield and seed quality, leads to reduction, affection of wheat with yellow rust leads to lowering of yield and seed quality. When it is damaged the water balance deteriorates, transpiration greatens and leads to lowering of photosynthesis process in leaf, metabolism process violates in plant and the height of plant, thickness of stalk and length of spike shorten, the number of small spikes, seed, seed weight decrease, the period of spike generation extends. Resistance of plant to cold lowers, the root system develops poorly, and absorption of water from soil goes down. While using non-resistant varieties in production in the years of epiphytoty the disease, occurred when spring wheat strikes root, can reduce the yield up to 80 percent and during coming into emergence up to 20-30 percent. Efficient conduction of phytosanitary control and appropriate organization of protection actions for forecasts about evolution of disease give a possibility to prevent environmental loss of yield. Over the past few years the phytosanitary condition of grains worsens year by year. It is related to change of climatic conditions, ability of pathogenic mutation and sowing of non-resistant varieties. In this connection the development of wheat stem rust and dissemination in conditions of South Kazakhstan is studied in this article.

Key words: wheat stem rust, monitoring, epiphytotic, yield, plant protection.

Introduction. Wheat stem rust is a harmful disease widespread in all field areas of the world. Wheat stem rust damages the leaf surface, weakens the assimilative action, because of that physiological processes are spoiled, the length of spike shortens, number of small spikes, seeds and weight lowers, quality of wheat and yield decreases [1-4]. Further due to damage the height of plant, thickness of stalk and root development reduces, as a result the absorption of nutrients by root from soil becomes complicated [5-9]. Because of deterioration of physiological processes the endurance to winter is decreased, low molecular weight gluten components are generated in seed, synthetic process and accumulation of starch weakens, in addition the quantity of protein in the endosperm drops off.

When the epidemic is stronger the damaged leaf dies early, growth of plant and seed formation reduces. As a consequence fine seeds are formed; yield decrease reaches up to 70-80%. Sometimes the epiphytoty of this disease leads to complete loss of yield [10-15].

It is noticed in the fields of North Kazakhstan every year. Over the past few years the phytosanitary condition of grain fields worsens year by year. 740 million hectare of wheat field was damaged by stem rust in Kostanai oblast in 2014. This situation is due to change of climatic condition, mutation of pathogenic population, and loss of endurance by varieties consequently [16-20].

Regular efficient conduction of phytosanitary control in the field and correct organization of protection actions for forecasts about development of disease enables prevention of environmental loss, preservation of resistance of varieties to disease, prevention of epiphytoty.

Study methods. For conduction of study the general methods of agricultural phytophathology science were used. Development of diseases and their dissemination was observed in the experimental and production fields of south and south-east of the Republic of Kazakhstan. The phytophathology, herbiology methods, monitoring method and methods determining dissmenination of phytopathogenes were used in the research [21-24]. In order to maintain the basic report several fields were distinguished to identify damage of cereals with rusty fungus. During monitoring two indicators will be identified: dissemination (number of plants damaged in the field) and pace (level of damage). In order to get precise outcomes the special scales describing the pace of progress of disease was used. Damage type of plants by the score and percentage of development and dissemination of phytopathogen according to number of sick plants in the sample were determined. Collection of cereals' vegetative members (leaf, stalk) damaged by rust fungus was conducted by the method of N. E. Konavalova and others [7, 25]. The form of monitoring of rust diseases of cereals is shown below.

Study outcomes. Monitoring of stem rustprogress and dissemination was conducted during ear formation and milk-wax stage of ripenessin conditions of plots of Kazakh scientific-research institute of agriculture and crop farming. Received materials were used for the purpose of investigation. Among reservators of disease excitants the damages of goat grass, brome and wheat grass *Agropyron pectiniforme, Aegilops sylindrica, (Aegilops squarrosa), Winter rye* were registered.

During investigation of the wheat field 20–40% of winter wheat's middle part and surface and common wheat varieties' lower and middle parts were affected by rust disease. The development rate of leaf rust of the wheat varieties was 60-80% in the period of milk-wax stage of ripeness (figure, table).

Agropyronpectiniforme

Winter rye

Triticumaestivum

Triticumaestivum

Development of stem rust on field crops