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Қазақстан Республикасы Ұлттық ғылым академиясы "ҚР ҰҒА Хабаршысы" ғылыми журналының Web of Science-тің жаңаланған нұсқасы Emerging Sources Citation Index-те индекстелуге қабылданғанын хабарлайды. Бұл индекстелу барысында Clarivate Analytics компаниясы журналды одан әрі the Science Citation Index Expanded, the Social Sciences Citation Index және the Arts & Humanities Citation Index-ке қабылдау мәселесін қарастыруда. Web of Science зерттеушілер, авторлар, баспашылар мен мекемелерге контент тереңдігі мен сапасын ұсынады. ҚР ҰҒА Хабаршысының Emerging Sources Citation Index-ке енуі біздің қоғамдастық үшін ең өзекті және беделді мультидисциплинарлы контентке адалдығымызды білдіреді.

НАН РК сообщает, что научный журнал «Вестник НАН РК» был принят для индексирования в Emerging Sources Citation Index, обновленной версии Web of Science. Содержание в этом индексировании находится в стадии рассмотрения компанией Clarivate Analytics для дальнейшего принятия журнала в the Science Citation Index Expanded, the Social Sciences Citation Index и the Arts & Humanities Citation Index. Web of Science предлагает качество и глубину контента для исследователей, авторов, издателей и учреждений. Включение Вестника НАН РК в Emerging Sources Citation Index демонстрирует нашу приверженность к наиболее актуальному и влиятельному мультидисциплинарному контенту для нашего сообщества.

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THE DISEASE OF WHEAT LEAF RUST

Abstract. Among the main factors of increasing the yield of grain crops due to increased immunity can be creation of resistant varieties based on the study of the world variety assortment, creation of a bank of resistant varieties, study of plant characteristics that contribute to reduce the damage and reduce the negative consequences of affect and increasing resistance to stressful situations. According to modern ideas, the resistance genes of soft wheat to brown leaf rust are subdivided into genes of juvenile and adult resistance.

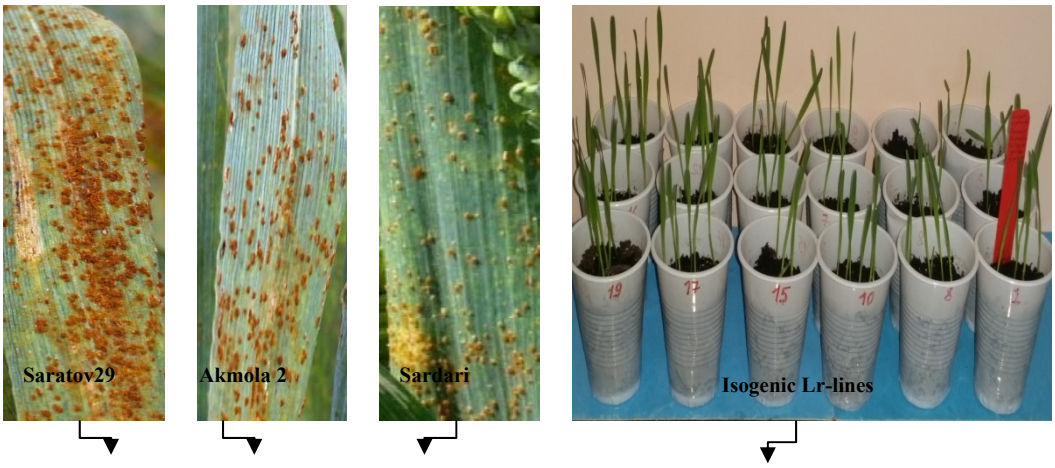
Keywords: Lr-isogenic lines, wheat leaf rust, epiphytotic, crop yield.

Introduction. *Puccinia recondita f. sp. tritici* Rob. ex.Desm–a virulent fungal disease causing epiphythroidism in a favorable condition that is rapidly spreading through several hundreds of distances to the wheat brown taste, aggressive parasite, which generates 6 uredogeneration at vegetative stages [1-4]. The issue to produce the sources of resistance to wheat brown rust, introduction into production is due to the high mutation and adaptability of pathogens.The microevolutionary process of new virulent form (pathotype) in the pathogen population continues uninterruptedly.Long-term use of varieties in the production, which leads to the occurrence of new virulent forms, reduces the effectiveness of resistant genes, promotes the spread of disease. Speed of the spread of disease is due to existence of nonresistant varieties of wheat [4-8].

The reliable way to combat the disease of wheat leaf brown rust is effective use of varieties and tolerance types. An effective way of dealing with the most dangerous pathogens of wheat is the production of germoplasm of new varieties providing resistant genes, stopping low level of yield and improving the quality of varieties [9-12]. Resistanceof the plant, reduces the spread of disease and reduces the level of pathogenic populations.

Since the phytopathogenic adaptability is endless, the selection of resistant is a complex and continuous process [13-15]. In breeding, phytopathology two types of juvenile and adult plant resistance mechanisms are used to combat pathogen.Long-term survival of the varieties is solved by a large number of resistant genes that can withstand newborn pathogens [16-19]. The use of varieties nonresistant to diseases in the production enables the spread of pathogens, formation of epiphythia. It is also important to test the sources of resistance, analyze the virulence of leaf brown rust population continuously.

Study methods. In order to detect the virulence of wheat leaf brown rust, the isogenic Lr-lines, grown in the laboratory conditions, were infected by sprinkling of monophosphate isolates of leaf rust uredospore from the wheat damaged in an experimental site of the Kazakh Research Institute of Agriculture and Plant Cultivation. To ensure high humidity after infection, the experimental plants were covered with polyethylene film, a wet camera was prepared for 24 hours (figure). Pathogen development was determined by point of reaction, damage level by percentage (%). According to Mains E.E., Jackson H.S. [20] tolerant to reactions were 0-2 points, and intolerance was 3-4. According to Peterson R.F., Campbell A.B., Hannah A.E. [21] the leaf palm injury was determined in percent.



Puccinia recondita Rob. ex Desm. f. sp. tritici –damaging of Lr-lines with leaf rust

Study outcomes. Virulence of leaf rust of Thatcer variety to isogenic Lr-lines was analyzed in the laboratory conditions. Immune reaction of isogenic Lr-lines in the inoculum of excitant were different in the leaf samples of varieties Saratov 29, Sardari and Akmola 2 under the field conditions. Single-pustule isolates of Lr1, Lr2A, Lr3, Lr10, Lr15, Lr25, Lr28, Lr30 taken from the varieties Saratov 29, Sardari and Akmola 2, isolates изоляттар Lr1, Lr10, Lr3, Lr10, Lr15, Lr 25 taken from Sardari variety showed virulence to isogenic lines.

Low level of virulence of wheat leaf rust isolates was noticed in lines Lr9, Lr12, Lr13, Lr17, Lr18, Lr20, Lr 21, Lr23, Lr26. These lines, with necrotic spots, were covered by 5 to 30% of the leaf strip. No virulent isolates to Lr 18 and Lr 24 isogenic lines were detected from the pathogenic population, the effectiveness of lines of tolerant genes against diseases lines were high, and no sickness symptoms were observed in the vegetative organs (table).

Virulence of wheat brown rust toLr lines

Isogenic l ines	Type and level of damage, point /%								
	Variety name								
	Saratov 29			Sardari			Akmola 2		
	Isolates								
	№1	№2	№3	№1	№2	№3	№1	№2	№3
Lr1	4/40	4/50	4/50	4/20	4/5	4/20	4/40	4/40	4/30
Lr2a	4/30	4/40	4/30	1/5	2/20	2+3/5	4/30	4/40	4/30
Lr2b	3/10	4/30	4/10	3/10	3/5	2/20	4/40	3/30	3/30
Lr3	4/30	4/30	4/50	3/30	3/20	4/5	4/30	4/40	4/20
Lr9	2/5	2/20	2/30	2/5	2/10	1+2/5	2/20	2/5	2/20
Lr10	3/30	4/30	4/40	4/30	3/10	3/20	3/20	4/30	4/20
Lr11	4/5	3/10	3/5	3/5	2+3/5	3/10	3/10	3/5	3/5
Lr12	2/20	2/30	2/30	2/10	2/5	2/20	2/30	2/5	2/30
Lr13	1+2/5	2/30	2/20	2/5	2/10	2/5	2/20	2/5	2/5
Lr15	4/40	4/50	4/40	4/5	2/20	3/40	4/10	4/40	4/20
Lr17	2/20	1+2/5	2/10	2/5	2/5	2/10	1+2/5	2/10	2/10
Lr18	0	0	0	0	0	0	0	0	0
Lr20	2/20	2/20	2/5	2/10	2/5	2/10	2/5	2/20	2/20
Lr21	2/30	2/10	2/5	2/10	2/5	3/10	2/5	2/40	2/20
Lr23	2/20	2/20	2/10	2/10	2/5	2/10	2/5	2/20	2/20
Lr24	0	0	0	0	0	0	0	0	0
Lr25	4/20	4/20	4/10	3/20	4/5	3/30	4/30	4/20	4/10
Lr26	2/10	2/20	2/3	2/10	2/5	2/10	2/5	2/20	2/30
Lr28	4/30	4/30	4/20	3/5	2+3/5	3/20	4/20	4/5	4/10
Lr30	3/30	4/20	4/5	3/5	3/10	2+3/10	4/5	3/40	3/20

Study analysis. Study of leaf brown rust in cereals abroad is conducted by All-Russian Research Institute of Phytopathology (ARRIP), All-Russian Research Institute of Plant Protection (ARRIPP), St. Petersburg c., International Maize and Wheat Improvement Center (CIMMYT) Mexico, International Center for Agricultural Research in the Dry Areas (ICARDA), Syria; cereal disease lab in the USA (CDL USDA/ARS), St.Paul. Private research is conducted by scientists from Australia, Kenya, India and other countries [22-24]. L.G.Tyryshkin, V.G.Zaharov, L.A.Mikhailova (Russia), A.I.Morgunov, Singh R.P., Kolmer J.A., Liu J.Q. (CIMMYT, Mexico, Icarda) and other scientists have studied wheat leaf rust virulence, variability of population composition, immunological reactions of varieties of cereal crops and conducts research on a continuous basis.Depending on the ability of wheat brown rust to mutation, resistant varieties introduced into the productionare losing tolerance over time, virulent isolates are formed in the effective sources of resistance.

In this connection, it is necessary to test resistance genes in breeding and resistance of varieties to disease with with tolerance genes on a going basis. This enables to control the variability of pathogenic population, prevention of epiphythmia, and use of endurance sources effectively.

In the International Selection Center, SMITT has developed a model of varieties with long resistance. I.V.Iordanskaya, D.A.Solomatin determinted the effectiveness of genes Lr9, Lr19, Lr23, Lr24, Lr27 + 31 in the Moscow oblast. Yu.V.Lobachev, S.N.Sibkeev, E.M.Pankova recommended to use isogenic lines in breeding by classifying 3 groups rationally. L.G.Tyryshkin., V.G.Zaharov, V.V.Syukov determined resistance of linear pathogene Lr12, Lr13,Lr34, Lr35, Lr46, Lr48 and Lr49 and resistance during adult plant to some isolates in juvenile period [25-31]. Under conditions of South Kazakhstan the resistance of lines of Lr9, Lr12, Lr13, Lr17, Lr18, Lr20, Lr 21, Lr23, Lr26 was medium. Among the studied isogenic lines, high juvenile resistance to brown rust isolates was noticed in Lr 18 and Lr 24.

Conclusion. The presence of 91,7-100% virulence of leaf brown rust in isogenic Lr1, Lr 2a, Lr3, Lr11, Lr15, Lr28, Lr30 lines indicates the genetic homogeneity of varieties, lossof effectiveness of resistant genes. This will enhance the natural selection in the agro-economic system and create new patho-types. Although a new race of leaf rust generated, a variety of monogenic resistance is totally intolerant to the excitant.Determination of the endurance sources' effectiveness and their efficient use against disease will prevent the occurrence of leafbrown rust epiphythmia, preserving resistance of varieties long time. Highly effective isogenic Lr 18 and Lr 24 lines can be used for producing the varieties resistant to leaf rust disease in breeding.

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БИДАЙ ҚОҢЫР ТАТЫНЫҢ АУРУЛАРЫ

Аннотация. Астық дақылдарының егін түсімін жоғарлатудың негізгі факторы залалдануын төмендететін, залалданудан болатын зиянды әсерлерді кемітетін және стресстік жағдайларға төзімділігін жоғарлататын өсімдік белгілерін зерттеу, әлемдегі сорттардың құрамын зерттеу арқылы төзімді сорттар қорын жасау.Жұмсақ бидайда (*Triticum aestivum* L.) өскіндік және ересек өсімдік төзімділік гендері бар.

Түін сөздер: изогенді Lr-линиялар, бидай жапырық таты, эпифитотия, егін түсімі.

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БОЛЕЗНИ ЛИСТОВОЙ РЖАВЧИНЫ ПШЕНИЦЫ

Аннотация. Среди основных факторов повышения урожайности зерновых культур за счет повышения иммунитета может стать создание устойчивых сортов на базе изучения мирового сортимента сортов, создания банка устойчивых сортов, изучения признаков растений, способствующих снижению поражаемости и уменьшению отрицательных последствий поражения и повышающих устойчивость к стрессовым ситуациям. Согласно современным представлениям, гены устойчивости мягкой пшеницы к листовой бурой ржавчине подразделяют на гены ювенильной и возрастной резистентности.

Ключевые слова: Lr-изогенные линии, листовая ржавчина пшеницы, эпифитотия, ювенильная устойчивость.

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