СЕЛСКОСТОПАНСКА АКАДЕМИЯ

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7-11 Ноември 1994
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FOURTH SYMPOSIUM ON PLANT IMMUNITY TO DISEASES AND PEST

November 7-11 , 1994
Dobrich

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ИНСТИТУТ ПО ПШЕНИЦАТА И СЛЪНЧОГЛЕДА "ДОБРУДЖА"
КРАЙ ГЕНЕРАЛ ТОШЕВО

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APPENDIX

PHYSIOLOGICAL SPECIALIZATION AND PATHOGENE GENETICS

PATHOTYPES OF THE WHEAT STEM RUST IN SERBIA

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ABSTRACT

The wheat stem rust pathotypes occurrence on wheat,grass and *Berberis* in Serbia,during the period 1991-1993 in this paper was shown.A total 833 isolates were studied(576 from wheat,159 from grasses and 98 from *Berberis*)and 62 pathotypes were found.Pathotypes RHT was the most frequent on wheat,and BBB on grasses and *Berberis*.By additional issogenic lines,144 virulence formulas in structure of population were established.

INTRODUCTION

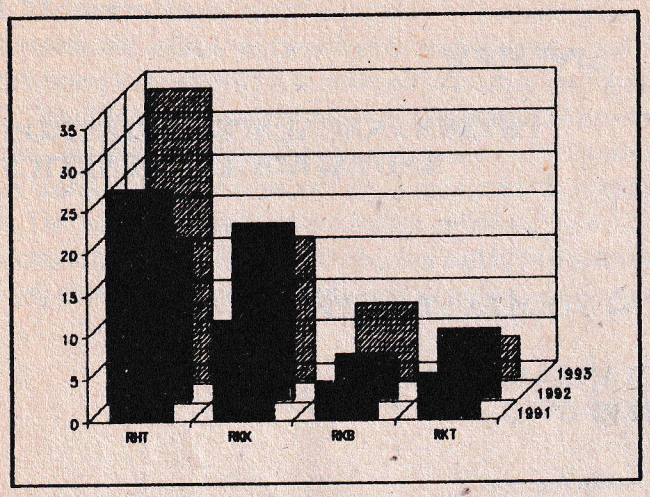
The wheat stem rust appears in many locations on territory of Serbia.However,intensity of its attack is relative low and epiphytocies almost weren't noticed.Investigation of the population of this parasitic fungus in Serbia began in 1958(2),and from that time to nowadays continue.The concept of races was leaved and by population structure analysis on the basis of Flor's gene-for-gene theory replaced.The goal of these investigations was to establish occurrence of *Puccinia graminis f.sp.tritici* on territory of Serbia and to contribute to succesful breeding for rsistance.

MATERIALS AND METHODS

Investigations were carried out in the Institute for small grains,during the period 1991-1993.The uredio samples were collected.in more locations from different wheat cultivars(*T.aestivum*), barley (*H.vulgare*), grass(*Lolium sp.,Hordeum sp.*) and *Berberis*(*B.curawunensis, B.ilicifolia, B.aquifolium, B.provincialis, B.oblonga,B.lycium,B.latiflora, B.fisheri, B.candidula, B.bidenta, B.atropurpurea, B.amurensis, B.angulosa, B.purpurea, B.vulgaris,B.virescens, B.vernae, B.mutabilis*).Analysis of samples was performed in the greenhouse ussing two sets of isogenic lines:a.Sr5,Sr6, Sr7b,Sr8a,Sr9b,Sr9e, Sr9g,Sr11,Sr17,Sr21,Sr30,Sr36 and b. Sr1, Sr9d, Sr10,Sr13,Sr14,Sr16,Sr22, Sr24, Sr25,Sr26,Sr27, Sr29, Sr31,Sr32,Sr33,Sr37.The pathotypes identification was performed according to Roelfs and Martens(1988).Virulence formulas using of additional set(b) were establised.Total of 576 isolates from wheat,159 from grasses and 98 from *Berberis*,during three years period were studied.

RESULTS AND DISCUSSION

Obtained data point out that the wheat stem rust causer population on the territory of Serbia consists from more ddifferent virulence pathotypes.Total of 62 pathotypes,from what 44 on wheat,24 on grasses and 21 on *Berberis*,with the help of differentiators(2)were established.Pathorypes RHT(27,09%),RKK(16,50%),RKB(6,25%) and RKT(6,08%)on wheat were prevalent(Graf.1)



Graf.1.Pathotypes of stem rust on wheat

Pathotypes BBB (46,54%),RRK((9,44%),RKB(7,55%)and RHT(6,29%)on grass,as well as BBB(44,90%), RKB(16,33%), RKH(8,17%) and RRK(4,09%) on *Berberis* were the most frequent.Existance of resemblance,but also differences,for wheat,grass and Berberis stem rust pathotypes particiwere found.

As could be observed, the biotypes BBB on grass and *Berberis* and RHT on wheat, make the majority of population. Resemblence between populations on grasses and *Berberis* exist since,the most of uredio samples from grass were colected at immediate closeness of *Berberis* bushes.More of patothypes in wheat (RKF,RKN, RKS,RKP, RTT, RTQ, RTG, RTD, RTJ, RHL, RHF, RHJ, RHQ, RHP, RJF, RRT, RMS, HKB, HKL, HKQ, RGG, RGT, RGS, RJK,RCS,RPG), grass (RHR,RFB,QBB, QHB, QKB,QGF, QKS, NTH, TNT) and *Berberis* (RGD, RTH,RQH,LGB,LDB, CBB,MQB, NHC,PHB) only were found. The role of *Berberis* for new pathotypes formation is known.But, because of wide migration of urediospores, different origin cultures were mixed, and pathotypes of fungus on wheat which on transitional sustainer weren't found, appear.

Only by differentiators with genes Sr5,Sr6,Sr7b,Sr8a, Sr9b,Sr9e, Sr9g, Sr11, Sr17, Sr21, Sr30 and Sr36 (2) it was not complety possibile, population structure analysis of this parasite to perform. By using of additional wheat isogenic lines (set b), 144 virulence formulas were established. Virulence to avirulence genes of parasite ratios were very different. The most frequent formulas were with next virulence allels: V1,V5,V6, V7b,V9b,V9d,V9g,V10,V14,V16,V17,V21,V22,V25,V27, V30, V37(13.04%), V1,V5,V6, V7b,V9b,V9d,V9g, V10,V13,V14, V16, V17, V21, V22, V25,V27, V30, V36,V37(8.70%) and V1,V5,V6, V7b,V9b,V9d,V9g,V10,V14,V16,V17,V21,V22,V25,V27, V30, V36, V37(7.45%)

CONCLUSIONS

Wheat stem rust population on territory of Serbia consists from a lot of different virulence pathotypes. During the period 1991-1993 62 pathotypes and 144 virulence formulas were established. The most of these were on wheat (44) , then on grasses (24), and the lest on *Berberis* (21).Pathotypes RHT, RKK, RKB and RKT on wheat, BBB, RKB and RHT on grass and BBB, RKB, RKH and RRK on *Berberis* were prevalent. The most frequent combinations of virulence genes between allels V1,V5,V6, V7b,V9b,V9d,V9g, V10,V13,V14, V16, V17, V21, V22, V25,V27, V30, V36,V37 were. Such a large number of *Puccinia graminis tritici* pathotypes, points out for existence of difficulties in resistance to this fungus wheat breeding, and need for new resistance genes donors using and identification.

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