GREENBUG RESISTANCE IN OAT ACCESSIONS FROM ASIA

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The greenbug Schizaphis graminum Rondani (fig.1) is an economically considerable pest of oat and other cereals in southern Russia. Only 4 oat genotypes for resistance to greenbug, which are effective against certain biotypes of the insect in the United States, are known. It is obvious that the existing stock of resistance genes is not enough for supplying present-day breeding programs.

The goal of the present work was to evaluate the diversity of oats from Asian countries (371 accessions) for greenbug resistance.

Materials and methods:

Experimental accessions and susceptible control (cultivar Borrus) were sown in trays filled with a mixture of soil, sand, and peat (fig. 2).

Young plants were infested with aphids from Krasnodar or Dagestan populations and when the control died, we determined the extent of damage of plants according to the scale from 0 (no damages) to 10 (fig. 3, 4).

Clones with different virulence phenotypes (test clones) were used for investigation of the mode of greenbug resistance in some of the selected oat forms.

The experimental accessions and susceptible control were planted in vessels with soil in a circular order, covered with glass cages. The seedlings were infested with aphids of one clone. Upon death of the control, we determined the extent of damage to plants (fig. 5).

Conclusions:
- oat accessions resistant to greenbug occur with high frequency among landraces from Asia;
- oat accessions k-2490, k-2539, k-4074, k-12213, k-12214 (Mongolia), k-6688 (India) and k-13624 (North Korea) are protected by diverse alleles of resistance genes which differ from the earlier identified gene Grb3;
- the accession k-13624 is protected by the most effective gene (genes) of resistance to the insect populations from North Caucasus;
- the accessions k-6688, k-4074 and k-12214 possess high resistance to Krasnodar and Dagestan greenbug populations.

Results:
The 95 accessions heterogeneous for resistance to Krasnodar greenbug population were found. The damage scores of resistant components among 47 accessions constituted 1-4, the moderate resistance (scores 5-7) was revealed in 48 forms being studied.

For some accessions the wide plant variation in the score range 1–10 was characteristic that can be conditioned by the manifestation of the genes with low expressivity and (or) the presence of clones with varying virulence in the Krasnodar insect population.

The resistant plants of 7 accessions were brought to maturity, the seeds were multiplied, and the obtained lines were again estimated for resistance to the greenbug clones.

A comparison of resistance of the experimental material to the 7 test clones of S. graminum indicates that the 7 selected oat accessions are protected by different alleles of resistance genes which are non-identical to the earlier identified gene Grb3 in oat line CI 4888.

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