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M. Aćimović, Yugoslavia

SUNFLOWER TRIALS FOR SUSCEPTIBILITY AND INTENSITY OF DISEASE INFECTION

Sunflower diseases are a serious problem in Yugoslavia. In seasons with normal climatic conditions during vegetation period, seed yields were reduced by 20-30% due to disease damage and in humid seasons by 30-50%.

The main sunflower diseases are: downy mildew (Plasmopara halstedii /Farl./Berl et Tomi); white rot (Sclerotinia libertiana Fuckel); leaf spot, sometimes caused by fungi Alternaria sp. (A. leucanthemi = A. helianthi), and sometimes by the fungi Septoria helianthi and Phoma sp.; blight of plants, the main pathogen being Sclerotium bataticola Taub. and additional pathogens Verticillium and Fusarium sp.; head rot, caused by Sclerotinia libertiana Fuckel, Botrytis cinerea Pers. and Alternaria sp. (A. leucanthemi - A. helinathi).

Leaf spot and blight are observed every year and are different in intensity, reducing the yield by 15-30%; downy mildew and white rot are observed in severe forms in humid seasons.

In 1975 new varieties and hybrids were tested for susceptibility to economically important diseases.

Trials were effected on five plots in Voevodina region (North-Eastern part of Yugoslavia): Subotica, Novi Sad, Erdevik, Morovic (Sid) and Pancevo.

In the first four plots ten varieties and hybrids were tested, including six hybrids and one variety developed at the Plant-Growing Institute in Novi Sad (NS) and one Romanian hybrid (Ro).

In Pancevo six foreign hybrids were tested. In all trials the known Soviet varieties VNIIMK 8931 and Peredovik were used as checks.

The intensity of disease damage was evaluated two times during vegetation, in the first half of June and in the second half of August,

involving downy mildew, blight and head rot.

Damaged plants were determined by observing 200 plants and heads of each variety and hybrid. This was used to get percentages of blighted plants and rotten heads. The severity of the leaf spot was evaluated using the count scale 0-4, and leaf damage was expressed in indices according to the Mc Kinney formula.

The vegetation period in 1975 was rather specific. All six months of vegetation (April-September) were cool and humid compared with the average data for 20 years. Mean monthly relative air humidity ranged from 73 to 90%. These conditions favoured the development of downy mildew, leaf spot, blight and head rot.

A weak form of downy mildew was observed on all varieties and hybrids only in Novi Sad, whereas in Subotica this disease was not observed at all. Downy mildew was not observed in Erdevik and Morovice (Sid) on NS-G-62-RM, NS-G-67-RM. NS-G-25-RM and NS-G-22, and in Morovice (Sid) also on hybrid NS-F-65-RM.

Results of the trials show that the soil was infected with cospores of Plasmopara halstedii differently. As a result of the weak infection a low number of infected plants was observed in new varieties and hybrids tested, as well as on the check varieties VNIIMK, Peredovik and Ro-G-52 which are well known as susceptible to this disease.

All tested varieties and hybrids were highly susceptible to leaf spot. In Subotica, Erdevik and Morovice (Sid) this disease killed 100% of leaves on all varieties and hybrids. Leaf spots was observed in a slightly lesser degree only in Novi Sad, but this could be explained by somewhat premature evaluation. According to the previous testing all varieties had a high rate of susceptibility to this disease.

The percentage of blighted plants caused by S. bataticola and S. libertiana was different depending on varieties and hybrids. The proportion of blighted plants damaged by S. bataticola

ranged from 12.0% to 73.6%, i.e., it was less than the average for many years (30-90%). Most damaged plants were observed on hybrids NS-G-25-RM and NS-G-22, the least number of damaged plants were observed on VNIIMK 8931 and NS-P-61.

The highest number of blighted plants damaged by S. libertiana was observed in Morovic (Sid) in hybrid NS-G-63-RM (75%). Mostly damaged in all four plots were hybrids NS-G-62-RM, NS-G-63-RN, NS-G-25-RM and VNIIMK 8931.

The fungus Botrytis cinerea slightly damaged the plants in Erdevik and Morovic (Sid) in the Western part of Vojvodina. At the same time the head rot caused by S. libertiana was observed in all four plots (sites) on all varieties and hybrids at the infection rate ranging from 0.8 to 34%. The average number of damaged heads was from 9.35 to 15.5%.

At Pancevo trials were conducted with a different set of varieties, including six foreign hybrids (designated as G-10, G-20, G-30, G-40, G-50 and G-60) with VNIIMK 8931 and Peredovik as checks.

Downy mildew was registered on five hybrids and two varieties, the number of damaged plants ranging from 0.17 to 7.14%. Hybrid G-40 showed no symptoms of this disease.

Leaf spot caused 100% infection rate on six hybrids and VNIMMK 8931 and 98.75% in Peredovik.

Plant fading cause by S. bataticola was observed in all varieties and hybrids, the number of affected plants ranging from 44 to 75.5%. The number of faded plants due to S. libertiana was considerably smaller (2 to 5.5%).

Head rot was mainly caused by S. libertiana. The number of rotten heads was significantly large, ranging from 24 to 31%.

Drawing on the results of the trials we may conclude that the disease caused by Plasmopara halstedii was weakly expressed although humid

weather conditions favoured its development. The number of diseased plants was relatively low in susceptible varieties VNIIMK 8931 and Peredovik and in hybrids. This may be explained by the fact that the soil in the trials was poorly infected by cospores.

Other diseases for which the degree of soil infection was of no consequence (leaf spot, plant blight and head rot), were observed at high infection rates. At all trial sites leaf spot and plant blight were caused by Sclerotium bataticola and were expressed in severe form. The number of faded plants due to S. libertiana was less in most varieties and hybrids. This disease was significant only in Subotica in hybrids NS-G-62-RM (45%), on VNIIMK 8931 (52%) and in hybrids NS-G-63-RM (75%), RS-G-52 and NS-G-22 (20%).

Head rot caused by S. libertiana was observed in a higher or lesser degree in all five sites on all varieties and hybrids. The highest number of rotten heads was registered in Subotica on the hybrid NS-G-63-RM (34%), while the highest mean number of rotten heads was registered on the variety NS-P-61 (15.50%).

The results of these trials within one economic region of sunflower production show that varieties and hybrids differently react to the intensity of the main diseases. Testing of new varieties and hybrids should therefore be obligatory in all regions of sunflower production for the introduction of new varieties and hybrids may give rise to new problems which are to be rapidly detected and solved.