

## FIVE-YEAR EXPERIENCES IN SUNFLOWER DISEASES CONTROL BY FUNGICIDES IN PRODUCTION PLOTS IN YUGOSLAVIA

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First positive results of fungicide application in this country in 1975. During the severe attack of *Alternaria helianthi* on VNIMK variety in 1985, the yield of grain increased for 22% with several applications of benomyle. In vitro experiments showed that some fungicides have very good fungitoxic effect to the most important sunflower parasites. The best effects were obtained by preparations on the basis of bensymidasol and methyl tiophanate. The analysis of possibilities of application of chemical preparations in prevention of sunflower diseases continued even after the introduction of first generation of national hybrids in production of 1977. These genotypes have also reacted favorably in the conditions of very severe attacks of *Alternaria helianthi* and *Phoma macdonaldi* on fungicide application by the increase of yield and grain quality. The work continued intensively after the epiphytotic attack of grey spots of the stalk (*Phomopsis/Diaporthe*) it was determined in some field experiments that fungicide application will represent the only radical way of protection of sensitive hybrids from this disease. In vitro analysis proved the high sensitivity of *Phomopsis Diaporthe* to benzimidazole preparations. However, before introduction of this measure in production, it was necessary to solve numerous problems as for example the technique of fungicide application, date and number of treatments, possibility of prevention of other diseases and economic effects of the application of these preparations. In order to solve these problems, large number of micro and macro experiments was performed in Vojvodina and Slavonija in 1981 and 1982. In the meantime, the yields decreased and the areas under sunflower also decreased in the most severely attacked regions. Thus, for example, the mean yield in Vojvodina decreased from year to year (1977-2,63 : 1978 - 2,43 : 1979 - 2,15 : 1980 - 1981 - 1982 -1,41 t/ha). It was especially the case with mass occurrence of *Phomopsis/Diaporthe*. At the same time, the areas under sunflower decreased in this Province (1977 - 194.965 ha, 1983 - 34.529 ha). On the basis of three years experiments the technology of sunflower protection with fungicides was developed, which was at the beginning mostly oriented to prevention of *Phomopsis/Diaporthe*. At the same time they tried to protect crops from other sunflower parasites. Chemical measures of prevention of sunflower diseases were introduced to the large productive areas in Vojvodina and Slavonia in 1983. In that year, the average yield of sunflower grain was increased to 2,0 t/ha in Vojvodina. On the unsprayed areas, sunflower yield ranged between 1,0 and 1,5 t/ha.

In the following 1984, the prevention of grey spots on stalk (*Phomopsis/Diaporthe*) and other sunflower diseases was done on the majority of productive regions in Vojvodina, when mean yield of grain of 2,42 t/ha was obtained. The technology of

protection in both years consisted of two crop spraying (at the phenostage of 14 to 16 leaves and at the beginning of plant flowering) by the mixture of systemic (benomyl, methyl tiophanate) and protective fungicides (ineb, mancozeb). In the first spraying, tractor sprayer (250-300 l/ha) and airplane sprinkling/ 80-100 l of liquidG/ha)

After epiphytotic attack Phomopsis/Diaporthe, national selectioners intensively worked on finding of the hybrids to this parasite. The particular hybrids with high resistance to Phomopsis Diaporthe. The introduction of resistant hybrids and the use of fungicides are mean yields as well as productive areas under sunflower in Vojvodina (1985- 65.040 ha with 2,52 t/ha:1986-119.653 ha with 2,577 t/ha).

The technology of protection of second generation of national hybrids was checked and directed to the prevention of white rot of sunflower head (*Sclerotinia sclerotiniorum*) and some other sunflower diseases. The mixtures of preparations on the basis of benzimidazole and some botrycides were applied (yprodion, promycidine, vinclosoline). By the spraying of these hybrids in one replication, the increase of seed yield was obtained in the three-years experiments from 170 to 310 kg/ha in relation to the control parcel.

In further investigation, we will try to develop the varietal technology of protection of crops by fungicides, in regard to different sensitivity of new sunflower genotypes to particular parasites.