

SUNFLOWER BREEDING PROBLEMS IN YUGOSLAVIA

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The work on sunflower breeding in the Institute of Agricultural Research in Novi Sad has been carried out in two directions. The first one includes the creation of local high-oil-yielding varieties tolerant to the most important sunflower diseases in Yugoslavia. The results of this work are the new created varieties NSP-20, NSP-61 and NSP-317 which are now being examined at the State Commission for Variety Approval. The value of these varieties is presented in table 1 by an average of four year investigations on the Experimental field of the Institute. On the basis of the present control of the values of these varieties, NSP-20 stands out as the most productive one concerning seed yield and oil content in seed in comparison to the standard varieties VNIIMK 8931 and Peredovik which have been largely grown in our country. NSP-61 has similar producing values as the standard varieties and the advantage of this variety is lower stalk which is more suitable for combining. NSP-317 is a variety which has the shortest growing season of all varieties investigated. The aim of this breeding work is to create varieties producing higher oil yield than the present ones, which will be grown in the transitional stage until the new hybrids are not used largely into production.

Table 1

Breeding characters of some local high-oil-yielding sunflower o.p. varieties
(mean values of four-year investigations)

No	Variety	Growing period in days	Height of plants cm	Seed yield mtc/ha	% of oil in absol dry seed	Oil yield mtc/ha
1	VNIIMK 8931	131.2	202.0	37.46	47.55	15.50
2	Peredovik	128.5	186.4	36.60	48.50	15.48
	Average:	129.8	194.2	37.03	48.02	15.49
3	NSP-20	127.7	188.3	38.11	51.25	17.03
4	NSP-61	128.0	179.5	36.56	48.87	15.62
5	NSP-317	124.2	175.3	35.20	48.42	14.88

The second direction is the creation of hybrids based on male sterility. Up to now a great number of hybrids has been created on the basis of the genetic type of male sterility which are significantly better than the standard varieties. In the group of these hybrids the outstanding one is the experimental hybrid H-22 (NS-GMS-A9345 x M-6/4) which is considerably better than the standard varieties VNIIMK 8931 and Peredovik for about 25%. Within the same group of hybrids it is worth mentioning two hybrids GMS x S₉₀₁ and GMS x S₉₀₅ which are characterized by short growing season and are better than the medium early standard varieties concerning the seed yield and oil yield. These hybrids have the same length of growing season as Zarja and Chernjanka-66, namely 7—8 days shorter than VNIIMK 8931 and Peredovik. The hybrid combination GMS x S₁₄₃ is also very interesting which is considerably better as regards the seed yield and oil yield than the standard varieties and at the same time it is genetically resistant to *Plasmopara helianthi*. The above mentioned hybrids based on genetic type of male sterility as well as some others are in the process of reproduction.

Breeding based upon cytoplasmic male sterility gave satisfactory results and research conducted in 1973 pointed out a great number of these hybrids being significantly better than the standard varieties, especially concerning the seed yield. In this group of hybrids the outstanding hybrids are those based on restorers RHA-NS-1 and RHA-M-6/1-3 which regarding the seed yield and oil yield are better for 20% than the varieties VNIIMK 8931 and Peredovik. The oil content of these hybrids is at the level of the mentioned varieties. It is important that both of these hybrids are resistant to *Sclerotium bataticola* under field conditions. These hybrids are also in the process of reproduction.

Considering that in sunflower commercial production of Yugoslavia diseases are the limiting factor, both directions of sunflower breeding have the primary task to investigate the resistance to diseases. At present the greatest problem in sunflower breeding in our country are the following diseases: *Plasmopara helianthi*, *Sclerotinia libertiana*, *Alternaria sp.*, *Sclerotium bataticola* and a group of diseases causing head rot. In the present work the best results have been achieved concerning the resistance to *Plasmopara helianthi* which is being present in some of our experimental hybrids. In our breeding material we have several sources of resistance to *Plasmopara helianthi*. They are mainly lines originating from the Canadian material and their genes were by backcrossing included in our oil lines. The latest results show that the American restorers RHA 265 and RHA 266 under our conditions possess also the resistance to this disease. As regards *Sclerotinia libertiana* at present we have not a genetical source of resistance but only a source of tolerant resistance. In our breeding material we have found a great number of inbred lines resistant to *Sclerotium bataticola* under field conditions. In 1973 a great number of inbred lines of different generations were investigated for the resistance to *Sclerotium bataticola* under field conditions. The results of these investigations presented in figure 1 (A) show that 741 inbred lines possess 100% resistance to this disease under field

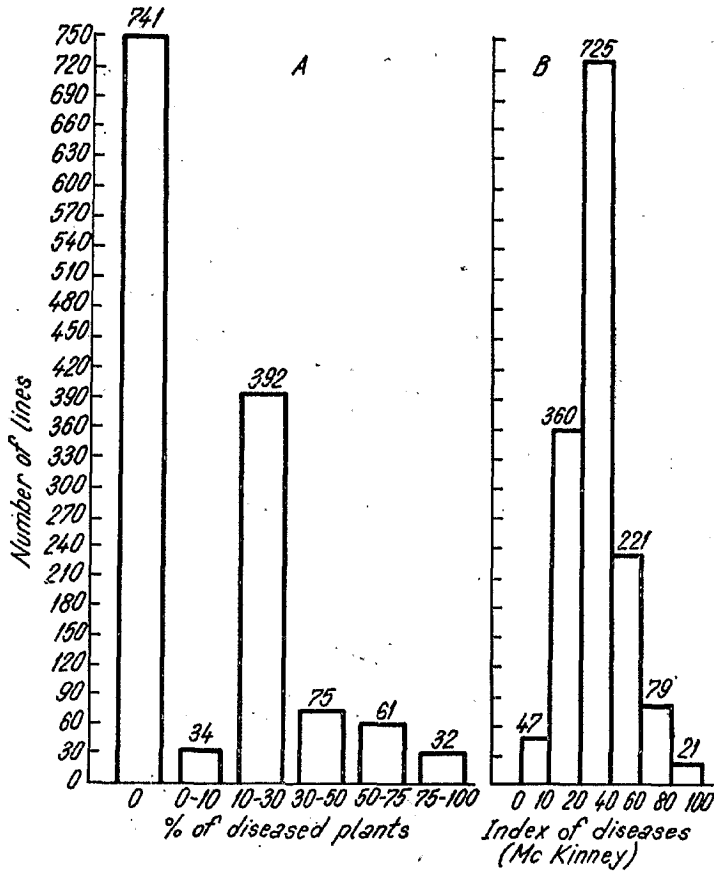


Fig. 1 — Field resistance of sunflower S-lines to *Sclerotium bataticola* (A) and *Alternaria* sp. (B), 1973.

conditions. Thus a great number of resistant lines are the results of breeding in earlier generations to *Sclerotium bataticola*. We have also a number of inbred lines with different degrees of resistance to *Alternaria* sp. under field conditions. The results illustrated in figure 1 (B) show the response of the same group of inbred lines investigated in 1973 concerning the resistance to *Alternaria* sp. under field conditions. We consider that for the further breeding work under our climatic conditions the most valuable are those inbred lines whose index of diseases ranges from 0 to 10%. Within these lines the work on finding sources of resistance to this disease which endangers to great extent the sunflower growing in our country, will be continued.