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Report

EVALUATION OF SUNFLOWER HYBRIDS FOR RESISTANCE TO BROOMRAPE (*Orobanche cumana* Wallr.) IN FAO YIELD TRIAL DURING 1996-97

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SUMMARY

Sunflower hybrids which were under FAO varietal experimentation during 1996-97 were tested for resistance to broomrape in Turkey. Results are discussed in this report.

Key words: ***Orobanche*, broomrape, sunflower**

INTRODUCTION

Broomrape (*Orobanche cumana* Wallr.) is an obligate parasitic plant that attacks sunflower in some countries. It may cause important seed and oil yield reductions under heavy infection conditions. It is also capable of generating new physiologic races. The studies showed that there were at least five physiologic races of *Orobanche* present in Turkey (Uludere *et al.*, 1988). However, recent observations in sunflower areas in Thrace give signals of a new broomrape race emerging which deserves full attention of sunflower breeders.

This study was conducted to obtain information about broomrape resistance of hybrids experimented in FAO yield trial during 1996-97.

MATERIAL AND METHODS

The study was conducted at the Thrace Agricultural Research Institute during 1996-97. Thirty sunflower varieties with one check (Vniimk-8931) were each planted in a single row (5 m long) with 2 replications in both years. *Orobanche* seeds collected from sunflower fields in the Thrace region were used for artificial inoculation with an inoculum mixture prepared from mixing one rate *Orobanche* with nine rates of fine sand.

At physiological maturity, total sunflower plants per plot, plants parasitized by *Orobanche* per plot and *Orobanche* shoots per plot were counted. Three indices of

parasitism, as defined by Vranceanu *et al.* (1986) were calculated. "Frequency" was calculated as the percent of sunflower plants attacked by broomrape. "Intensity" was the average number of broomrape shoots per parasitized sunflower plant. "Attack rate" was the average number of broomrape shoots considering all sunflower plants per plot.

Table 1: Frequency, intensity and attack rate scores of *Orobanche* infection on varieties in FAO yield trial (1996-97)

Entry No.	Entry Name	1996			1997		
		F	I	A.R.	F	I	A.R.
1	Alex	16.7	1.0	0.17	43.3	3.4	1.5
2	Performer	0	0	0	65.4	3.5	2.3
3	PSF-025	72.7	4.8	3.45	65.4	4.3	2.8
4	73115	75.0	6.2	8.3	69.0	2.8	1.9
5	93316	72.7	5.3	3.82	51.7	3.6	1.9
6	Trakya-259	0	0	0	25	1.5	0.4
7	Claudia	72.7	3.8	2.7	52	1.4	0.7
8	Eva	91.7	5.1	4.67	42.9	2.5	1.1
9	Flores	100.0	7.3	7.3	66.7	3.8	2.5
10	AS-5305	100.0	2.7	2.7	51.7	2.7	1.4
	CONTROL (V-8931)	83.3	3.1	2.6	88.9	5.2	4.6
11	Ex-399	83.3	4.1	3.4	31	4.4	1.4
12	Maya	33.3	1.7	0.6	17.9	1.6	0.3
13	NSH-410	25.0	2.3	0.6	53.6	3.3	1.8
14	NSH-605	91.7	2.9	2.7	70.4	2.1	1.4
15	ST-2110	100.0	4.1	4.1	30.8	1.9	0.6
16	ST-2132	100.0	6.4	6.4	59.2	3.7	2.2
17	NX-11064	16.7	1.0	0.17	41.7	4.2	1.7
18	NX-12244	0	0	0	3.8	1.0	0.04
19	PAC-7219	58.3	3.1	1.83	46.7	6.1	2.9
20	Bilto	25.0	1.3	0.33	56.7	4.1	2.3
21	Fox	25.0	1.0	0.25	67.9	3.0	1.0
22	XF-432	66.7	2.1	1.41	74.1	3.7	2.8
23	XF-463	8.3	1.0	0.08	51.7	2.1	1.1
24	Gala	41.7	2.4	1.00	37.9	3.3	1.2
25	Andora	45.5	3.0	1.36	40	4.1	1.6
26	HB-9611	0	0	0	42.9	3.1	1.3
27	HB-9612	0	0	0	50	2.1	1.0
28	Tenor	16.7	1	0.17	55.2	3.5	1.9
29	German	16.7	1.5	0.25	41.4	2.8	1.2
30	Kironi	0	0	0	37.9	2.8	1.1

RESULTS AND DISCUSSION

Frequency, intentsity and attack rate scores of *Orobanche* on sunflowers are given for 1996 and 1997 in Table 1. Although six varieties had no *Orobanche* infestion in 1996, all entries were infested in the second year. The reason for that must be the source of *Orobanche* seeds which were collected from different locations in both years. We think that the *Orobanche* seed source used in the 1997 inoculations included different race structure than the source used in 1996. Other observations on *Orobanche* screening tests at the Institute with the 1997 inoculum source confirm our finding that almost all of the hybrids which were known as resistant in the market were infected with *Orobanche*.

Varieties which were not infested with *Orobanche* in 1996 were Performer, Trakya-259, NX-12244, HB-9611, HB-9612 and Kironi. XF-463 also had a lower frequency index (8.3) in 1996. Sunflowers with a frequency index less than 10% and attacking rate less than 1% were accepted as resistant sunflowers in our study. Therefore, these 7 varieties were found to be resistant to *Orobanche* in 1996. The susceptible check variety Vniimk-8931 had over 80% frequency index in both years. Alex, NSH-410, NX-11064, Bilto, Fox, Tenor and German were the other hybrid which had the frequency index below 25%.

The picture was different in 1997. Hybrid NX-12244, with a frequency index of 3.8 and attacking rate score of 0.04, was found to be resistant to *Orobanche*. Other hybrids were all susceptible with different parasitism scores in this year. It was mainly due to the different source of the *Orobanche* seed used as inoculum.

In conclusion, although some varieties in the FAO yield trial during 1996-97 looked resistant to *Orobanche* in one year, only NX-12244 was found to be stable for this character in the 2-year study.

REFERENCES

Uludere, Ö.A., Salýhodlu, M., Sari ve Çukadar, Ç., 1989. Trakya'da yeniden görülen orobanþýn (*Orobanche cumana* Wallr.) ýrk tespiti ile dünya'da ve Türkiye'de üretilen baþlýca ayçiçeði çeþitlerinin ve bazý hatlarýn dayanýklýlýk durumlarýnýn belirlenmesi. Sonuç Raporu, Trakya Tarýmsal Araþ. Ens., S. 45.

Vranceanu, A.V., Pirvu, N., Stoenescu, F.M. and Pacureanu, M., 1986. Some aspects of the interaction *H.annuus* / *O.cumana* and its implications in sunflower breeding. In: Proc. of Workshop on Biology and Control of *Orobanche*. Wageningen, The Netherlands, S.J. Borg (ed.), pp. 206.

EVALUACION DE LA RESISTENCIA DE LOS HIBRIDOS DE GIRASOL A LA OROBANCA (*Orobanche cumana* Wallr.) EN LOS EXPERIMENTOS DE FAO REFERENTES AL RENDIMIENTO, PUBLICADOS EN 1996-97

RESUMEN

La orobanca (*Orobanche cumana* Wallr.) es una planta parasitaria obligatoria que ataca el girasol en ciertos paises. Atacando el girasol intensivamente, la orobanca puede causar las reducciones considerables en el rendimiento de semilla y aceite. La orobanca es tambien susceptible de generar nuevas razas fisiológicas. Los estudios han mostrado que en Turquia son presentes por 10 menos cinco razas fisiológicas de orobanca (Uludere *et al.*, 1988). Las observaciones en las áreas de girasol en Tracia, recién publicadas, han señalado la aparición de una nueva raza de orobanca. Los seleccionadores tienen que prestar atención a eso.

Los hibridos de girasol incluidos en los experimentos de FAO referentes al rendimiento fueron valuados según la resistencia a la orobanca en Turquia durante los años 1996-97. En el trabajo se tratan los resultados obtenidos.

ÉVALUATION DE LA RÉSISTANCE DES HYBRIDES DE TOURNESOL À L'OROBANCHE (*Orobanche cumana* Wallr.) DANS LES EXPÉRIENCES DU FAO SUR LE RENDEMENT EN 1996-97

RÉSUMÉ

L'orobanche (*Orobanche cumana* Wallr.) est une plante parasite qui attaque le tournesol dans certains pays. Elle peut causer d'importantes réductions du rendement en graines et en huile quand les conditions d'infection sont intenses. Elle peut aussi être génératrice de nouvelles races physiologiques. Les études ont démontré qu'au moins cinq races physiologiques d'*Orobanche* étaient présentes en Turquie (Uludere *et al.*, 1988). Cependant, de récentes observations font croire qu'une nouvelle race d'orobanche est en train d'apparaître en Thrace et provoquent l'attention des sélectionneurs.

En Turquie, au cours de l'année 1996-97, des hybrides de tournesol inclus dans les expériences du FAO sur le rendement ont été évalués selon leur résistance à l'orobanche. Cette étude analyse les résultats obtenus.