

DEVELOPMENT OF PARASITE BROOMRAPE (*OROBANCHE CUMANA* WALLR.) IN BRAILA COUNTY IN YEARS 2016 AND 2017

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ABSTRACT

In the last two years broomrape became more and more agresive in favorable area for sunflower crop. Because of that, we must tested in every year in natural and artificial condition many genotypes of sunflower to identify new sources of resistance at races of broomrape present in this Braila area. We

tested 20 genotypes created at NARDI Fundulea, in artificial conditions, in the greenhouse in 2017 (broomrape collected from Brăila County, Chișcani locality) and under natural conditions in year 2017 on the field of ARDS Braila (Braila County, Chișcani locality), where is races of broomrape more then G and H.

INTRODUCTION

Broomrape parasite (*Orobanche cumana* Wallr.) is obligate root parasitic plant and cause losses on seed yield on sunflower from 10% up to 100%, depending on attack intensity. Soils from south east of Romania are the most favorable for broomrape on sunflower (Pacureanu Joița. M, 2014; Risnoveanu L. et al, 2016). Crop rotation don't have any success to escape from this parasite, because can resist in soil up to 20 years without host plant. 1000 seed weight (TSW) of broomrape is 0.001 g and 1 g contain 250000 seeds (Skoric D. et al,

2012). One plant of broomrape contained 50000 seed who are transported by wind big distances (Vranceanu A., 2000).

Annual wild species are diploid and are more easy do make crossing with cultivated sunflower *Helianthus annuus*, L. (Terzić S. et al., 2016; Seiller G. et al, 2017; Seiller G., 2018). Annual wild *Helianthus argophyllus* was tested for resistance to races of broomrape by many researchers (Labrousse P. et al., 2001; Christov M. et al., 2009; Anton F.G. et al., 2017).

MATERIALS AND METHODS

We tested 13 experimental sunflower hybrids, 4 interspecific hybrids, 1

sintetic population, 1 maintainer line (line B) and 1 restorer line (line C) in artificial

condition in greenhouse at NARDI Fundulea in year 2017 with broomrape collected in year 2016 from Braila area and in natural condition in field infested with broomrape in area Braila in year 2017. Interspecific hybrids was obtained

from crossing with wild annual specie *Helianthus argophyllus*. We make notation about broomrape attack at flowering time when *Orobanche cumana* get out from soil.

RESEARCH RESULTS

Four genotype tested in artificial condition for resistance to broomrape from Braila area 2016 was resistant: H11, H13, SP20

and interspecific hybrid with *Helianthus argophyllus* H 17 (table 1).

Table 1
Result of broomrape attack in artificial condition in greenhouse in Fundulea 2017 (broomrape from area Braila 2016)

No.	Hybrid/Genotype	Name of genotype	Sunflower plant / broomrape
H1	Experimental Hybrid	991A x 17*1	11/176
H2	Experimental Hybrid	1010A x 11-1C	12/216
H3	Experimental Hybrid	1010 A x 17*1	8/48
H4	Experimental Hybrid	1050 A x 17*1	6/36
H5	Experimental Hybrid	1093A x 11-1 C	12/96
H6	Experimental Hybrid	1093A x 17*1	11/22
H7	Experimental Hybrid	V1633A x 17*1	9/18
H8	Experimental Hybrid	1010 A x 11-1 C	7/28
H9	Experimental Hybrid	1010 A x CepC	12/24
H10	Experimental Hybrid	1093 A x CepC	9/18
H11	Experimental Hybrid	1093Arg. A x Cep C	11/0
H12	Experimental Hybrid	1050 A x CepC	9/18
H13	Experimental Hybrid	991 A x 17*1	13/0
H14	Interspecific Hybrid	1010B x <i>H.argophyllus</i>	9/54
H15	Interspecific Hybrid	1029B x <i>H.argophyllus</i>	11/66
H16	Interspecific Hybrid	1050B x <i>H.argophyllus</i>	12/60
H17	Interspecific Hybrid	1093B x <i>H.argophyllus</i>	9/0
LB18	Line B	Cep B	8/112
LC19	Line C	Cep C	12/192
SP20	Synthetic population	17*1	11/0

Regarding intensity of broomrape attack in artificial condition, two experimental hybrid (H11 and H13), one interspecific hybrid (H17)

and one synthetic population (SP 20) have zero plant of broomrape on sunflower plant tested. (figure 1).

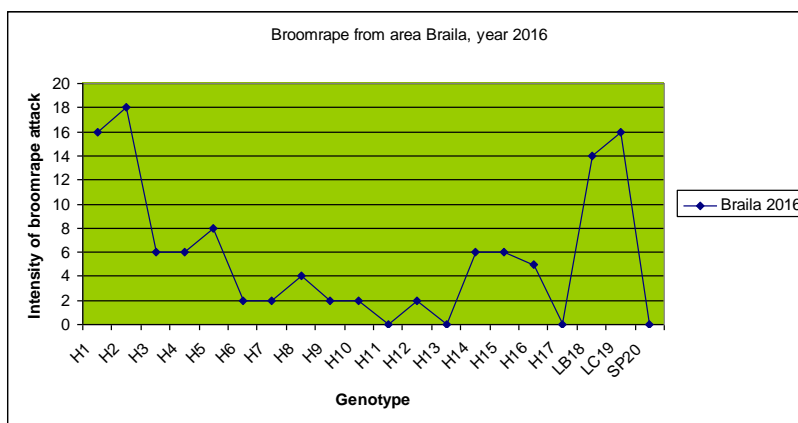


Figure 1. Intensity of broomrape attack in artificial condition (broomrape from Braila area 2016)

In picture 1, we present some aspect of infestation with broomrape collected from Braila area 2016, in artificial

condition, in greenhouse at NARDI Fundulea.



Picture 1. Artificial infestation in greenhouse in year 2017, with broomrape collected from Braila area 2016

In year 2017, in natural condition, genotype of sunflower tested wasn't resistant at broomrape from

Braila where is the most virulent races of *Orobanche cumana* Wallr (table 2).

Table 2
Result of broomrape attack in natural condition in field in Braila area 2017

No.	Hybrid/ Genotype	Name of genotype	Early sowing (6.04. 2017) Sunflower plant / broomrape	Late sowing (1.06. 2017) Sunflower plant / broomrape
H1	Experimental Hybrid	991A x 17*1	30/210	19/580
H2	Experimental Hybrid	1010A x 11-1C	31/95	16/256
H3	Experimental Hybrid	1010 A x 17*1	30/78	18/167
H4	Experimental Hybrid	1050 A x 17*1	30/150	17/220
H5	Experimental Hybrid	1093A x 11-1 C	32/142	20/274
H6	Experimental Hybrid	1093A x 17*1	36/111	15/227
H7	Experimental Hybrid	V1633A x 17*1	33/105	19/480
H8	Experimental Hybrid	1010A x 11-1 C	29/247	16/454
H9	Experimental	1010A x CepC	29/361	17/354

	Hybrid			
H 10	Experimental Hybrid	1093A x CepC	31/334	22/506
H 11	Experimental Hybrid	LC1093AxH Arg. X Cep C	26/230	18/370
H 12	Experimental Hybrid	1050A x CepC	27/224	16/228
H 13	Experimental Hybrid	991A x pop.sin. C. 17*1	9/90	7/13
H 14	Interspecific Hybrid	1010B x H.argophyllus	28/340	17/183
H 15	Interspecific Hybrid	1029B x H.argophyllus	20/200	15/260
H 16	Interspecific Hybrid	1050B x H. Argophyllus	13/393	17/330
H 17	Interspecific Hybrid	1093B x H. argophyllus	17/236	15/284
LB 18	Line B	Cep B	13/44	22/124
LC19	Line C	Cep C	19/38	18/85
SP20	Synthetic population	17*1	27/117	11/80

In *picture 2*, we present some aspect of high infestation with broomrape in natural condition in Braila area 2017.

There are differences between intensity of broomrape attack in natural condition of infestation in Braila area 2017 between stage of sowing (*figure 2*). In case



Picture 2. Braila area 2017, natural infestation on field

of early sowing, genotypes H2, H3, H6, H7, LB18 and LC19 have a good tolerance at broomrape attack but in case of late sowing, situation is changed and only genotypes H13 and LC19 present tolerance at broomrape attack in year 2017.

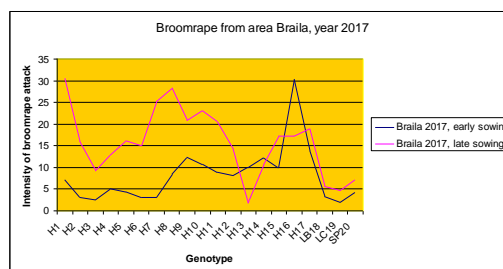


Figure 2. Intensity of broomrape attack in natural condition in area Braila 2017

CONCLUSIONS

In year 2017, in area Braila has development new races of broomrape because genotype of sunflower who was resistant in year 2016 (H 11, H13, H17 and SP 20) lose genetic resistance next

year. None genotype of sunflower tested in natural condition, in Braila area 2017 was resistant at more then races G and H of broomrape.

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