

SUNFLOWER GENOTYPES FROM NARDI FUNDULEA IN FIELD INFESTATION WITH BROOMRAPE IN BRAILA AREA, IN YEAR 2019

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Abstract

In south-east of Romania is present the most dangerous races of parasite *Orobanche cumana* and because of that, who want to cultivated sunflower hybrids, has low seed yield do to broomrape attack. In year 2019, in Braila area, in sunflower fields natural infested with the new races of broomrape from Romania, we tested many sunflower genotypes for resistance/tolerance to this parasite. We want to identifying sunflower genotypes who are resistant/tolerant to broomrape present in Brăila area and from 20 sunflower experimental hybrids tested in natural infested field in three epochs, no one was resistant at broomrape attack. The highest intensity of broomrape attack was in epoch I who was sowing on date May 3, 2019 and sunflower hybrid H2 has 520 broomrape\44 sunflower plants. The lowest intensity of broomrape attack was in epoch II who was sowing on date May 17, 2019 and sunflower hybrid H19 has 40 sunflower plants\13 broomrapes. Sunflower hybrid H17 has a better tolerance at broomrape then other 19 sunflower hybrids tested in field with natural infestation with parasite *Orobanche cumana*, from Brăila area, Romania where is present races G and H. Regarding plant height of sunflower hybrids tested, was between 90 cm (H10) and 135 cm (H6) in first epoch and between 145 cm (H2) and 200 cm (H9) in the second epoch.

Key words: broomrape, sunflower, genotypes, infestation

Broomrape (*Orobanche cumana*) causes a low seed yield of sunflower in fields infested with this parasite (Yang C. *et al*, 2020) and because of that must sowing resistant hybrids who has integrated gene *Or*. Broomrape is present in many countries over the world (Dedić B. *et al*, 2018; Shi B. and Zhao J., 2020) and in other countries just appear (Nabloussi A. *et al*, 2017; González-Cantón E. *et al*, 2019). Parasite *Orobanche cumana* causes low seed yield, small head diameter, small plant height, small hectolitre weight, low one thousand seed yield (TSW) and for they who cultivated sunflower in field infested with this parasite with races G and H is a big problem (Duriez P. *et al*, 2019).

MATERIAL AND METHOD

We sowing 20 experimental sunflower hybrids, from H1 to H20, created at NARDI Fundulea, on two rows, 4 m long, in field infested natural with broomrape, in Braila area, in year 2019, in three epochs, I, II and III. First epoch was sowing on date 3.05.2019, second was sowing on date 17.05.2019 and third was sowing on date 30.05.2019. In flowering time, we make notation

about broomrape attack, head diameter and plant height, of sunflower genotypes tested in natural conditions.

RESULTS AND DISCUSSIONS

In flowering time, sunflower hybrids from H1 to H20, was tested in epoch I, in a field with high infestation with broomrape (*table 1*).

Head diameter of sunflower hybrids was between 7 cm (H10 and H18) and 15 cm (H11, H13 and H16).

Plant height of sunflower hybrids was between 90 cm (H10) and 135 cm (H6).

Number of broomrape per two rows with sunflower hybrid was between 50 (H17) and 520 (H2).

In flowering time, sunflower hybrids from H1 to H20, was tested in epoch II (*table 2*) and has head diameter between 12 cm (H7) and 23 cm (H9 and H10).

Plant height of sunflower hybrids was between 145 cm (H2) and 200 cm (H9).

Number of broomrape per two rows with sunflower hybrid was between 13 (H19) and 170 (H1).

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In flowering time, sunflower hybrids tested in epoch III (*table 3*), has head diameter between 7 cm (H18) and 15 cm (H3 and H16).

Plant height of sunflower hybrids was between 80 cm (H4) and 135 cm (H6).

Number of broomrape per two rows with sunflower hybrid was between 1 (H19) and 58 (H13).

Sunflower hybrids sowing on date 30.05.2019 in epoch III, has a small number of plants in flowering time.

Sunflower hybrids tested, has a bigger intensity of broomrape attack in epoch I, then second and third epoch, especially at H1 and H2 (*figure 1*).

Sunflower hybrids tested, has a bigger head diameter in epoch II, then first and third epoch, especially H9 and H10 (*figure 2*).

Sunflower hybrids tested has a bigger plant height in epoch II, then first and third epoch, especially at H6, H7, H8, H9 and H17 (*figure 3*).

Table 1
First epoch with sunflower genotypes tested for resistance/tolerance to broomrape in Braila area, in year 2019

Sunflower genotype	Head diameter	Plant height	Sunflower plants\broomrape plants
H1	11 cm	115 cm	50 sunflower plants\250 broomrape
H2	10 cm	105 cm	44 sunflower plants\520 broomrape
H3	10 cm	100 cm	50 sunflower plants\70 broomrape
H4	10 cm	100 cm	48 sunflower plants\80 broomrape
H5	12 cm	105 cm	49 sunflower plants\90 broomrape
H6	11 cm	135 cm	49 sunflower plants\120 broomrape
H7	14 cm	130 cm	55 sunflower plants\100 broomrape
H8	11 cm	125 cm	50 sunflower plants\80 broomrape
H9	9 cm	105 cm	46 sunflower plants\70 broomrape
H10	7 cm	90 cm	46 sunflower plants\110 broomrape
H11	15 cm	120 cm	44 sunflower plants\70 broomrape
H12	12 cm	130 cm	41 sunflower plants\60 broomrape
H13	15 cm	130 cm	44 sunflower plants\100 broomrape
H14	13 cm	125 cm	47 sunflower plants\120 broomrape
H15	13 cm	110 cm	36 sunflower plants\70 broomrape
H16	15 cm	115 cm	44 sunflower plants\70 broomrape
H17	12 cm	115 cm	52 sunflower plants\50 broomrape
H18	7 cm	95 cm	44 sunflower plants\85 broomrape
H19	12 cm	125 cm	42 sunflower plants\90 broomrape
H20	13 cm	115 cm	44 sunflower plants\70 broomrape

Table 2
Second epoch with sunflower genotypes tested for resistance/tolerance to broomrape in Braila area, in year 2019

Sunflower genotype	Head diameter	Plant height	Sunflower plants\broomrape plants
H1	16 cm	165 cm	49 sunflower plants\170 broomrape
H2	15 cm	145 cm	31 sunflower plants\40 broomrape
H3	16 cm	170 cm	40 sunflower plants\48 broomrape
H4	15 cm	175 cm	47 sunflower plants\40 broomrape
H5	15 cm	180 cm	53 sunflower plants\65 broomrape
H6	17 cm	195 cm	45 sunflower plants\70 broomrape
H7	12 cm	195 cm	42 sunflower plants\43 broomrape
H8	21 cm	195 cm	36 sunflower plants\55 broomrape
H9	23 cm	200 cm	42 sunflower plants\45 broomrape
H10	23 cm	170 cm	40 sunflower plants\45 broomrape
H11	19 cm	185 cm	45 sunflower plants\38 broomrape
H12	18 cm	175 cm	44 sunflower plants\25 broomrape
H13	21 cm	190 cm	42 sunflower plants\60 broomrape
H14	20 cm	175 cm	38 sunflower plants\20 broomrape
H15	15 cm	180 cm	40 sunflower plants\48 broomrape
H16	16 cm	175 cm	41 sunflower plants\35 broomrape
H17	15 cm	195 cm	41 sunflower plants\30 broomrape
H18	17 cm	170 cm	42 sunflower plants\43 broomrape
H19	16 cm	175 cm	40 sunflower plants\13 broomrape
H20	18 cm	180 cm	40 sunflower plants\28 broomrape

Table 3

Third epoch with sunflower genotypes tested for resistance/tolerance to broomrape in Braila area, in year 2019

Sunflower genotype	Head diameter	Plant height	Sunflower plants\broomrape plants
H1	10 cm	130 cm	17 sunflower plants\3 broomrape
H2	10 cm	125 cm	22 sunflower plants\2 broomrape
H3	15 cm	125 cm	10 sunflower plants\8 broomrape
H4	9 cm	80 cm	12 sunflower plants\2 broomrape
H5	12 cm	120 cm	10 sunflower plants\3 broomrape
H6	11 cm	135 cm	7 sunflower plants\2 broomrape
H7	14 cm	130 cm	15 sunflower plants\25 broomrape
H8	11 cm	125 cm	10 sunflower plants\15 broomrape
H9	11 cm	125 cm	4 sunflower plants\2 broomrape
H10	12 cm	125 cm	14 sunflower plants\19 broomrape
H11	11 cm	100 cm	18 sunflower plants\13 broomrape
H12	13 cm	120 cm	25 sunflower plants\28 broomrape
H13	13 cm	120 cm	23 sunflower plants\58 broomrape
H14	12 cm	120 cm	18 sunflower plants\25 broomrape
H15	13 cm	115 cm	18 sunflower plants\29 broomrape
H16	15 cm	110 cm	8 sunflower plants\13 broomrape
H17	12 cm	115 cm	10sunflower plants\12 broomrape
H18	7 cm	95 cm	10 sunflower plants\17 broomrape
H19	12 cm	125 cm	2 sunflower plants\1 broomrape
H20	13 cm	115 cm	3 sunflower plants\8 broomrape

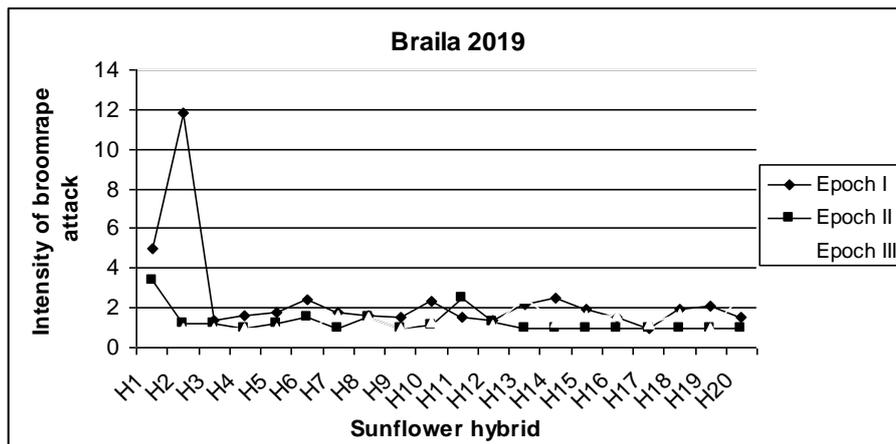


Figure 1 Intensity of broomrape attack in Braila area, in year 2019

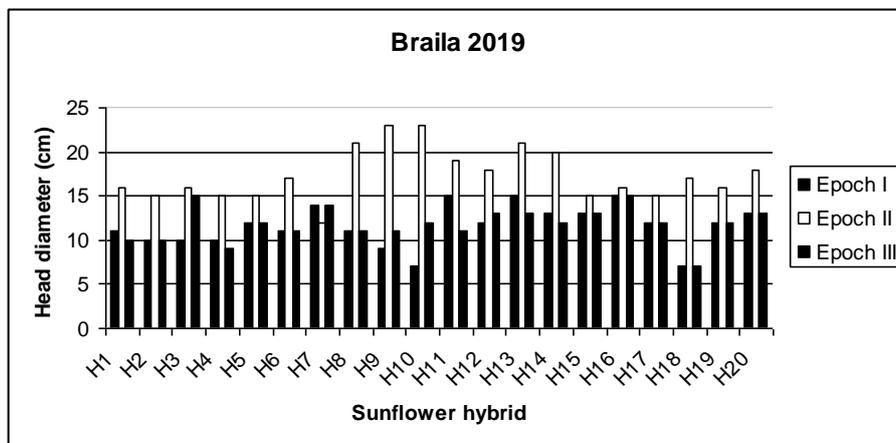


Figure 2 Head diameter of sunflower hybrids in field infested with broomrape, in Braila area, in year 2019

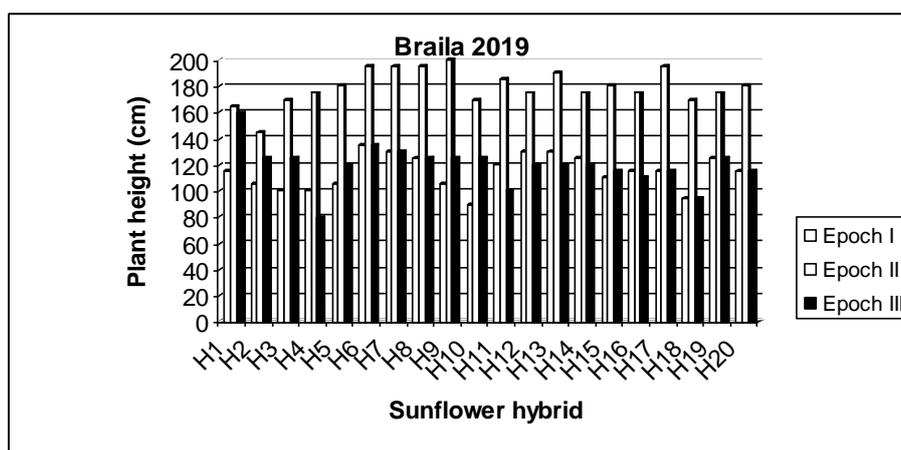


Figure 3 Plant height of sunflower hybrids in field infested with broomrape, in Braila area, in year 2019

CONCLUSIONS

Infestation with broomrape seeds is not uniform distributed in all three epochs, and because of that in epoch I, sunflower hybrids tested, was very small due to a biggest infestation.

It is a big difference between epoch I and epoch II, regarding plant height, head diameter and intensity attack with broomrape, who influence seed yield of sunflower hybrids.

All sunflower hybrids tested, was sensible to races of broomrape present in Braila area, in year 2019.

From all sunflower hybrids tested, H17 has a better tolerance than other, in epochs I, II and III with a lowest intensity of broomrape attack.

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