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EVALUATION OF CERTAIN MUTANT LINES OF COMMON WHEAT

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ABSTRACT

A total of 24 mutant lines originated from Aköz and Siete Cerros were tested in a micro yield trial at Bornova during 1980-1981. Three mutant lines were found promising for yielding capacity and they were promoted to the large scale yield testing trials to be run in the region.

ÖZET

Aköz ve Siete Cerros buğday çeşitlerinden türetilmiş olan 24 mutant hat Bornova'da yürütülen bir mikro verim denemesinde kontrol edilmiştir. Deneme sonucunda 3 tane mutant hat verim bakımından ümitli görülmüş ve bölgede yürütülecek daha geniş kapsamlı verim denemelerine geçilmiştir.

INTRODUCTION

Induced mutations have been utilized in wheat breeding for several years /1-6/. In the Aegean region we have first started to study the possibility of using mutations in wheat and barley /9/. The effects of mass selection on the mutant populations were studied by Yıldırım /8/. Selection was applied in the mutant populations and a total of 24 mutant lines were selected for further testing. This paper reports the results of a micro yield trial conducted during the 1980-1981 growing season.

EXPERIMENTS AND RESULTS

The mutant lines tested in this study were obtained by applying the gamma rays and fast neutrons to the Aköz and Siete Cerros varieties of common wheat T.

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aestivum L. em Thell. ssp. Vulgare (Vill., Host) Mackey. The descriptions of these varieties and the information pertinent to the irradiations were given by Yıldırım /8/. A summary of the information about the lines were shown in Table-1.

TABLE-1. Mutant lines tested in the study

Name	Type of Mutation	Dose	Number of lines
Aköz	Gamma	10 krad	1
"	"	15 krad	5
"	Fast neutron	0.4 krad	2
"	" "	0.7 krad	2
Siete Cerros	Gamma	15 krad	5
" "	Fast neutron	0.4 krad	4
" "	" "	0.7 krad	4
Aköz x Siete Cerros	Fast neutron	0.4 krad	1

The mutant lines alongwith the controls Aköz (1) and Siete Cerros (3) were planted at Bornova experimental field on 24.10.1980. The design of the experiment was a randomized complete blocks with 3 replications. Plots consisted of 4 rows, 3m long and 30 cm apart. Fertilizers were applied at planting time as follows:

N : 8 kg/da P : 6 kg/da K : 6 kg/da

At the shootig time additional N was given as 4 kg/da. The following traits were measured on each plot as described by Johnson et al /7/.

Heading date, plant height, spike length, length of flag leaf, width of flag leaf, length of flag leaf sheath, time of maturity, plot yield, and thousand kernel weight.

The data obtained were analyzed by using an IBM 370/128 type computer located in the computer center of Ege University.

The L.S.D values computed based on the statistical analyses described by Steel and Torrie (1960).

The means of the traits measured on the mutant lines are shown in Table-2. From Table-2, it can be seen that there were significant differences between the mutant lines. For plot yield the mutant lines originated from Siete Cerros such as 157, 158, 160, 153 and

155 were significantly higher than the controls. The mutants originated from Aköz had low plot yields. Only one mutant line (151) had higher plot yield than Aköz.

For thousand kernel weight the mutants of Aköz had higher values as compared to Aköz and Siete Cerros. Especially mutants 142, 150, 148, 144 had significantly higher thousand kernel weight than that of Aköz.

For plant height the mutant number 151 was considerably shorter than Aköz (140 cm vs. 104 cm). Aköz had longer spikes than the mutants. Only one mutant overpassed Aköz in terms of spike length. Mutant number 151 also had longer spikes than that of the other mutants and the control Siete Cerros.

There were some early mutant lines among the entries tested. For instance mutant no: 151 headed very early. Maturity periods of some mutants were also shorter than those of two controls: Aköz and Siete Cerros. Early mutants were among the Siete Cerros lines. Only one Aköz X Siete Cerros mutant appeared as early as Siete Cerros (no: 151).

Some mutants had long flag leaf although Aköz had the longest flag leaf. Width of flag leaf was the largest in mutant no: 151. The mutant lines expressed differences for the length of flag leaf sheath. Two mutants of Aköz overpassed it in terms of this trait. Mutant line no: 151 had the shortest flag leaf sheath.

Aköz is a Turkish variety bred by a local experiment station during the 1960's. This variety has high TKW and it is also accepted as a tall variety. Mutant lines originated from it had high thousand kernel weight. But these lines were also tall. Only one mutant line selected from the irradiated cross of Aköz X Siete Cerros population expressed short stature. This mutant had long spikes and high plot yield.

Siete Cerros is a Mexican bred variety. It is short. This variety had also high yielding capacity. Several mutant lines selected in the irradiated Siete Cerros populations have overyielded it. One mutant no: 151 had also overproduced Siete Cerros in terms of plot yield (Fig.1).

CONCLUSION

Mutants no: 157, 158 and 151 could be selected for high yielding capacity. The mutant lines selected for high plot yield showed low thousand kernel weight. This may indicate a negative association between yield and kernel weight in this population.

TABLE-2. Certain agronomical traits pertinent to mutant lines tested

No	Name	Plot yield per g	Thousand kernel weight per g	Plant height per cm	Heading period per day	Spike length per cm	Maturity period per day	Length of flag leaf per cm	Width of flag leaf per cm	Length of flag leaf sheath per cm
141	Aköz 15 krad (1)	668.3	44.7	134.5	16.7	11.3	69.0	21.4	2.2	21.5
142	" " " (2)	580.0	46.7	136.2	16.7	12.4	69.0	22.6	1.9	21.8
143	" " " (3)	613.3	44.5	126.7	17.0	11.7	69.0	22.9	2.2	22.0
144	" " " (4)	703.3	45.2	131.5	16.7	11.3	69.0	23.4	2.2	21.9
145	" " " (5)	566.7	42.3	132.7	16.7	12.4	69.0	23.7	2.3	22.0
146	Aköz N. 700 (6)	636.7	41.8	139.7	16.7	12.7	69.0	22.8	2.2	21.9
147	" " " (7)	470.0	37.3	144.0	19.3	15.3	67.0	28.5	2.3	24.0
148	Aköz N. 400 (8)	586.7	45.4	140.5	16.7	11.9	69.0	23.7	2.2	22.0
149	" " (9)	620.0	42.5	132.7	16.3	11.7	69.0	23.3	2.3	20.9
150	Aköz 10 krad (10)	650.0	45.8	138.5	18.0	11.7	69.0	25.4	2.3	23.2
151	AKXSC N. 400 (11)	843.3	34.5	104.8	7.0	13.0	62.0	24.7	2.5	27.9
152	Aköz (kontrol) (12)	675.0	39.8	140.1	17.3	14.6	69.0	29.8	2.4	22.9
153	SC 15 krad (13)	873.3	36.3	108.0	10.3	11.1	62.0	23.6	2.1	19.8
154	" " " (14)	761.7	36.8	105.3	14.3	11.9	62.7	21.6	2.2	19.5
155	" " " (15)	866.7	35.0	110.8	14.3	10.2	64.3	22.1	2.1	18.5
156	" " " (16)	863.3	33.7	111.2	14.3	10.6	62.3	24.4	2.1	18.8
157	" " " (17)	925.0	35.2	108.3	11.0	10.2	66.3	22.5	2.0	18.3
158	SC N. 400 (18)	903.3	36.2	107.8	13.0	10.9	69.0	22.2	2.2	18.8
159	" " " (19)	743.3	35.0	109.0	14.0	11.1	63.0	24.1	2.2	19.0
160	" " " (20)	880.0	35.7	109.0	12.3	11.6	64.3	22.7	2.3	20.3
161	" " " (21)	833.3	36.8	106.0	12.0	11.4	61.7	21.3	2.1	18.6
162	SC N. 700 (22)	843.3	33.7	116.3	10.3	11.6	59.0	22.4	2.1	20.1
163	" " " (23)	675.0	34.5	107.0	11.3	11.5	61.3	22.9	2.2	19.7
164	" " " (24)	836.7	37.3	112.5	12.0	10.8	59.0	22.5	2.1	18.8
165	" " " (25)	843.3	36.3	107.7	11.3	10.5	64.7	22.8	2.2	19.3
166	SC kontrol (26)	598.3	35.5	104.2	13.0	11.0	65.0	18.7	2.2	18.7
167	" " (27)	778.3	35.2	113.3	12.0	10.7	62.3	22.6	2.1	18.9
168	" " (28)	723.3	36.5	105.5	14.3	11.5	64.3	20.3	2.2	19.5
L.S.D. 005		206.9	4.1	9.4	4.6	1.2	3.2	3.4	0.3	1.6

The mutant line no: 151 had desirable values for heading period, plant height, spike length, length of flag leaf, width of flag leaf, and maturity period. The other two mutants no: 157 and 158 had also earliness in heading and maturity. They had also short plant height.

These 3 mutant lines were accepted as promising for yielding ability. Therefore they were passed to the further stages of testing. They will be tested at several locations of Aegean and Marmara regions.

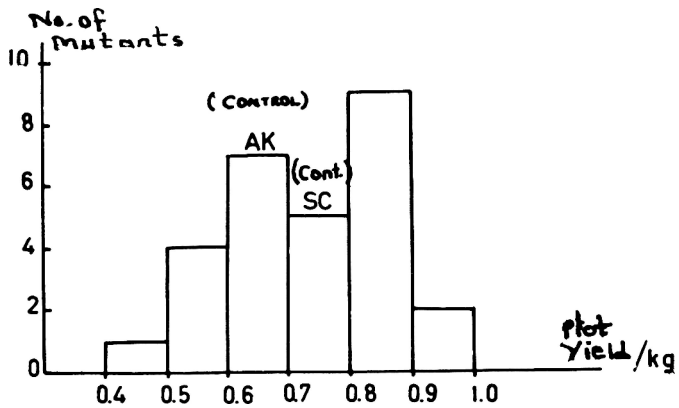


Fig. 1. Histogram for the plot yields of mutants lines.

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