Bulgarian Journal of Agricultural Science, 20 (No 6) 2014, 1435-1438
Agricultural Academy

SELECTION APPROACHES FOR THE SESAME FORMS SUITABLE FOR MECHANIZED HARVESTING

S. STAMATOV and M. DESHEV
Institute of Plant Genetic Resources, BG - 4122 Sadovo, Bulgaria

Abstract

STAMATOV, S. and M. DESHEV, 2014. Selection approaches for the sesame forms suitable for mechanized harvesting. *Bulg. J. Agric. Sci.*, 20: 1435-1438

Receipt of forms suitable for mechanized harvesting is possible by changing the architecture of the fruit box. It must be resistant to cleavage and seeds to be fastened firmly enough placentas to not fall off the entry into the threshing mechanism. As a result of this research work on a collection of sesame dendrogram was created which identified genetic kinship of the studied forms. Analysis of the results helped to determine the parental pairs in the breeding program.

The resulting hybridization forms sesame, which are characterized by cleavage resistant box and attached membrane suitable for mechanized harvesting, with minimum loss of seeds. The architecture of this type of box was saved successfully fixed in the next generations. The study established modes of inheritance of phenological signs responsible for the mechanized harvesting.

Key words: sesame, mechanized harvesting, attached membrane, seed loss

Abbreviations: BP - real heterosis, Gca - inheritance in a broad sense, Sca - inheritance in a strict sense

Introduction

Selection-improvement works with sesame in the direction of forms suitable for mechanized harvesting require the creation of such a non-shattering capsules. The idea was that the capsules will hold the seed to enter the threshing mechanism. Recorded results from the field experiments have shown that the set up so far sesame lines suitable for mechanized harvesting threshing not 100%. Losses of seeds after combine them in individual samples ranged from 25-50%. The architecture of the capsules in which they remain completely closed after drying, does not allow the separation of all the seeds in the threshing mechanism. Some of the capsules pass through it without being crushed, while others, although partially crushed not allocate part of their seeds, Trifonov et al. (2013). Laboratory measurements made "Pendell apparatus" shown limited range of operation of the harvester, which produces the most complete separation of the seeds of these lines Ishpekov et al. (2008).

To obtain a threshing plant without loss of seed, it was necessary to change the architecture of the capsules. Yermanos (1984) attempts to improve the release of the seed in threshing apart by increasing the length of the fruit box. Unfortunately, even with a small hole in the top of the capsule, the percentage of damaged seed is high. Langham et al. (1956) reported that a new type of attached membrane (attached membrane) is very important to keep the seed in the fruit box. Our and foreign experience show that should be selected such forms which possess resistant to cleavage box and seeds attached membrane.

The purpose of program selection forms sesame suitable for mechanized harvesting was getting capsules resistant to cleavage, which seeds to keep entering. The task ahead of us was the selection of parental pairs, tracking their progeny to detect the required features and way of inheritance.

Materials and Methods

Preliminary study of 22 varieties and lines of work sesame collection by 21 morphological attributes allow us to design a dendrogram of genetic kinship of individual samples. Morphological parameters were measured 20 lines are non-

E-mail: stanislav44@abv.bg

shattering capsules and two varieties of sesame shattering capsules. Biometric measurements were carried out on 20 randomly chosen plants. The results of the analysis allowed us to select parental couples to use in the breeding program. Were carried out 6 top artichokes or chorogi crosses between bursting with sesame and non-shattering capsules as is their genetic distance. Parents were used varieties shattering capsules Sadovo 1 and Milena and breeding lines with numbers Sadovo 3850, Sadovo 3959, Sadovo 3959-3 and Sadovo 3962, characterized by non-shattering Capsules. Cross were forms of split capsules are those with non-shattering capsules. To be genetically distant forms we cross and Sadovo 3959 with Sadovo 3962.

Selection scheme which we worked was in the Pedigree method. Obtained in F2 forms sesame that have persistent cleavage box with membrane remained attached to the next generation. The degree of dominance signs responsible for the mechanized harvesting, Georgiev et al. (2010) Sesame in F1, was consistent with Genchev et al. (1975).

Results and Discussion

The resulting dendrogram made by cluster analysis showed genetic spacing of test forms (Figure 1). It is seen that varieties whit non-shattering capsules Sadovo 1 and Milena stay far away genetically from all lines whit shattering capsules and establish an independent group. The clustering is done on indicators of seed yield per plant, plant height, number and length of branches, height betting branching and height of betting on the first box on the authorities to increase.

The resulting hybrid materials in F1 generation were characterized by habit and architecture of the capsules typical shoot parent. In tracking progeny F2 generation progeny from 9 to establish desired trait, namely sustainable cleavage capsules with attached membrane, confirming the results of Langham et al. (2004) that trait is recessive in the state. This sign is attached to keep the next generations. Capsules resistant to cleavage are characterized by less pinching and gently sweep the top of walls of the capsules. When dried it opens slightly on the top and the membrane and is not separated from the membrane, holding the seed.

Attached placenta retained satisfactorily seeds to their entry into the threshing mechanism (Figure 2).

Cleavage at the top of the capsules allows for a better drying of the internal walls of carpel and evaporation of moisture from the seeds. After drying boxes to entering the threshing device seeds are retained by the attached membrane. Easier crushing of these capsules will allow a wide range of operation of the combine and harvesting will be carried out with minimal loss of seeds.

In traceability of mode of transmission of the attributes corresponding to the requirements for the mechanized harvesting (lower plants, a small number of taps and in short), is found that they are inherited dominant in the direction of unhatched parent 3959 (Tables 1, 2 and 3). Hybrids are characterized by lower plants with less and shorter branches from their parents. Most dominant inheritance observed in the length of the branches. In two crosses in terms of this trait is over dominance of the trait.

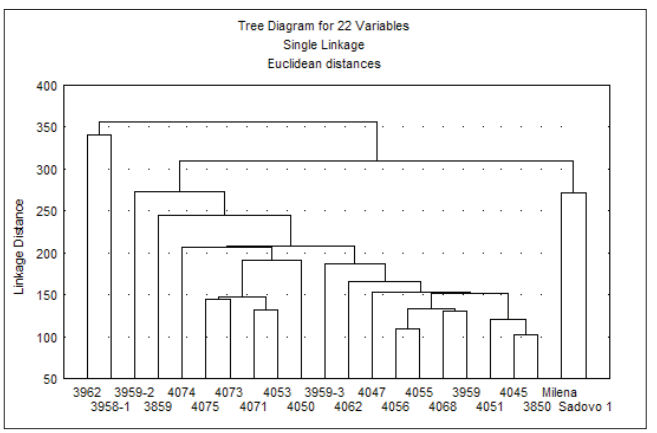

Fig. 1. Cluster analyze dendrogram

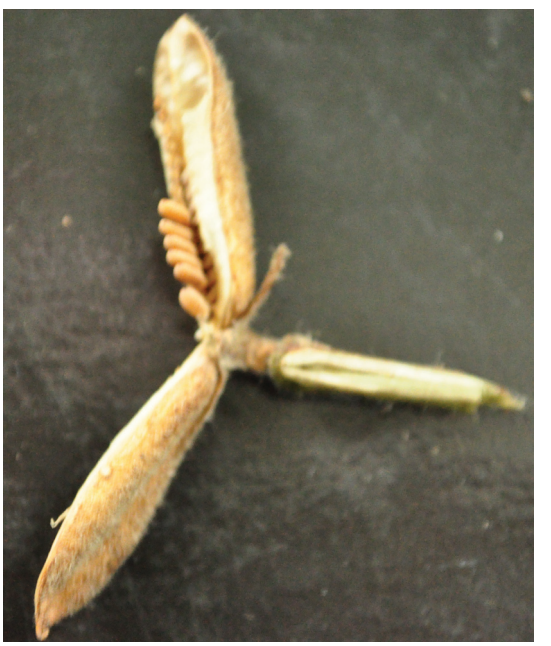

Fig. 2. Attached placenta by breeding lines 4083

Table1
Height of Plant

Hybrids	Value, cm	d/a	GD = 0-1	BP	Gca	Sca	Additive dominant model
Milena	152.6 - 168.0						
F1 (Milena x № 3959)	117.6 – 139.1	-0.30	<	83.67	63.30	60.50	0
№ 3959	155.0 – 166.4						
№ 3959	155.0 – 166.4						
F1(№ 3959 x Milena)	138.2 – 166.4	0.31	<	88.03	74.18	70.77	-
Milena	152.6 - 168.0						
Sadovo 1	143.7 – 163.7						
F1 (Sadovo 1 x № 3959)	129.7 – 158.5	4/1	>	123.36	66.61	5/1	0
№ 3959	132.4 – 146.2						
№ 3959	132.4 – 146.2						
F1(3959 x Sadovo 1)	146.5 – 165.7	0.61	<	97.58	32.69	54.27	-
Sadovo 1	143.7 – 163.7						

Table 2
Number of branches

Hybrids	Value number	d/a	GD.= 0-1	BP	Gca	Sca	Additive dominant model
Milena	4.40- 6.2						
F1 (Milena x № 3959)	2.7 – 5.9	0.47	<	86.00	30.00	27.00	-
№ 3959	2.6 – 4.3						
№ 3959	2.6 – 4.3						
F1(№ 3959 x Milena)	3.1 – 6.1	-0.42	<	76.28	17.77	16.31	-
Milena	4.40- 6.2						
Sadovo 1	4.5 – 5.7						
F1 (Sadovo 1 x № 3959)	2.8 – 5.4	5.00	>	133.33	21.48	1/1	0
№ 3959	1.9 – 4.1						
№ 3959	1.9 – 4.1						
F1(3959 x Sadovo 1)	1.1 – 7.0	-0.61	<	65.30	35.01	9/3	-
Sadovo 1	4.5 – 5.7						

Table 3
Length of branches

Hybrids	Value Length	d/a	GD = 0-1	BP	Gca	Sca	Additive dominant model
Milena	73.2 – 85.7						
F1 (Milena x № 3959)	64.9 – 92.9	15.64	>	118.34	18.30	0.10	0
№3959	66.3 – 88.1						
№3959	66.3 – 88.1						
F1(№ 3959 x Milena)	78.3 – 105.3	0.15	<	83.42	52.04	51.45	-
Milena	73.2 – 85.7						
Sadovo 1	75.9 – 83.9						
F1 (Sadovo 1 x № 3959)	80.0 – 106.4	13.95	>	153.95	65.38	0.66	0
№ 3959	66.3 – 88.1						
№ 3959	66.3 – 88.1						
F1(3959 x Sadovo 1)	62.2 – 82.4	-0.25	<	78.20	62.35	75.23	-
Sadovo 1	75.9 – 83.9						

Conclusion

As a result of breeding approaches used created an original Bulgarian germplasm of sesame forms suitable for mechanized harvesting. By hybridization of remote forms bursting with sesame and unhatched capsules to create those having attached placenta and structure of the plant is suitable for mechanical harvesting

References

Georgiev, S., S. Stamatov and M. Deshev, 2008. Requirements to Sesame (*Sesamum indicum*) Cultivars for Mechanized Harvesting. *Bulgarian Journal of Agricultural Science*, **14** (6): 616-620.

Genchev, G., E. Marincov, V. Iovcheva and A. Ognianova, 1975. Biometric methods in plant, genetics and breeding, *Zemizdat*, Sofia, 145 pp. (Bg).

Ishpecov, S., A. Triffonov, S. Stamatov and S. Georgiev, 2008. Indicators striker destruction of unhatched is sesame capsules. *Agricultural Engineering Units*, **3:** 38-43.

Langham, D. G., M. Rodriguez and E. Reveron, 1956. Dehiscencia, y otras caracteristicas del ajonjoli Sesamum indicum, L., en relacion con el problema de la cosecha. Genesa, *Publ. Tecnica*, 1, Maracay, Venezuela.

Langham, D., R. G. Smith, T. Wiemers and M. Wetzel, 2004. Southwest sesame grower's pamphlet. Sesaco Corporation. www.sesaco.net

Yermanos, D. M., 1984. Sesame growing: An idealized overview. Unpublished manuscript.

Triffonov, A., P. Petrov, S. Ishpecov, S. Georgiev, S. Stamatov and M. Deshev, 2013. Harvesting Combines with sesame in a Bulgaria. *Magazine Mechanization of Agriculture*, ISSN 0861-9638, **59 (**4): 16-19.

Received December, 2, 2013; accepted for printing June, 2, 2014.