

NEW HYBRID

New Bulgarian sunflower hybrid “LINZI”

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Abstract

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The conventional sunflower hybrid “Linzi” was developed at Dobrudzha agricultural institute, General Toshevo. It is a single interline hybrid. The mother line 217A was created in DAI. The father line 99R was developed using the method of induced parthenogenesis, combined with embryo culture from experimental hybrid 132 x 98. In 2013, the hybrid “Linzi” was included in unified competitive variety trials (UCVT) after two years testing in competitive trials. The average seed yield of hybrid “Linzi” in two UCVT was 382.7 kg/da, which exceeded with 16.6% the mean standard of hybrids San Luka, Klarisa and PR 64F50. The seed oil content was 52.5% and the protein content was 28.1%. In 2014 and 2015 it was tested by the Executive Agency for Variety Testing, Field Inspection and Seed Control. In 2017, the Patent Office issued the certificate №11125P2 for the hybrid. The plants height is 140-145cm. The vegetation period is 118 days. “Linzi” belongs to the group of middle early hybrids. The head diameter is 25-27 cm. The head position is vertical and it is slightly convex. The seeds are black with weakly expressed grey stripes on their edges. Thousand seeds weight is 60g. The percentage of hull content is 20%. The hybrid is resistant to downy mildew /race 731/ and broomrape. It possesses middle resistance to phoma and phomopsis. The hybrid needs no special requirements for cultivation and the traditional scheme for seed production could be applied. The optimum plant density is 65000 – 71000 per hectare. Both the parental lines flower on the same time and they could be planted together during seed production of the hybrid. The hybrid “Linzi” was tested for two years in Moldova, and registered in 2017.

Key words: Disease resistance, Hybrid, Oil and protein content, Sunflower

Introduction

Nowadays the breeding puts into practice a large number of hybrids and varieties with high genetic potential, combined with good qualitative characters. The market proposes huge performance of sunflower hybrids. Therefore, the producer has to possess a disposable information for biological and economic qualities of every

product with aim to establish the correct variety structure in the region, where the relevant hybrid will be planted (Encheva et al., 2014^a; Georgiev et al., 2015; 2016; Georgiev et al., 2016^a; 2016^b). This is a prerequisite factor for avoiding some of the stress factors and guarantee for success. Developing of high productive sunflower hybrids is the main priority of present intensive agriculture. The present hybrids combine high seed yield, low moisture content at harvesting, resistance to stress factors as drought, high temperatures, diseases and broomrape (Encheva et al., 2014^b) Their seeds are distinguished with high oil content and they are much in demand by crushing industry. Improving of qualities of commercial hybrids is strongly connected to their breeding. Many breeding programs were directed to market supply with various hybrid seeds. The main factor, determined the obtaining of high and qualitative seed yield is the correct alternative of suitable hybrids for each region. They have to insure the high yield in combination with high oil content, resistance or tolerance to the most important diseases, pests and parasites. It is very difficult or almost impossible all these characters to be included in one hybrid. This is a main purpose in the research programs of the breeding centers. For larger plots, 3-4 hybrids with different values for cultivation and use, is better to be planted and ensure the stable yield.

The aim of present study is to make a detailed characteristics of newly registered Bulgarian hybrid “Linzi”, developed in Dobrudzha agricultural institute – General Toshevo with certificate №11125P2 of Patent office of Republic of Bulgaria.

Materials and methods

Hybrid “Linzi” is single cross hybrid, developed on the method of interlinear hybridization /217A x 99R/. The maternal line 217A was obtained by crossing of experimental hybrid N:72 and line 246, created from Russian cultivars, self-pollination and selection. The mother line was characterized with good general and specific combining ability. It is resistant to broomrape, race F, middle resistant to phoma and alternaria, middle susceptible to phomopsis. During the last several years it was a maternal component of newly registered hybrids Veleka, Vokil, Vyara, Deveda and etc.

The paternal component of hybrid “Linzi” is the branched line-restorer of fertility 99 R. That line was obtained using the method of induced parthenogenesis from the experimental hybrid 132 x 98, self-pollination and selection. It is resistant to downy mildew, race 731 and resistant to broomrape, race G. It is middle resistant to phomopsis and alternaria, resistant to phoma.

Results and discussion

Values for cultivation and use (VCU) of hybrid “Linzi”

Hybrid “Linzi” was tested for three years in variety testing trials (VTT) in the field of DAI. It exceeded the average standards on the characters seed yield and oil yield per hectare (Table 1).

Table 1. Results from testing of hybrid “Linzi” in VTT – 2010, 2011 and 2012.

Seed yield kg/da	% of average standard	Oil content %	Oil yield kg/da	% of average standard
		2010		
386.9	115.5	48.2	194.7	121.4
		2011		
392	103.3	51.6	202.3	115.2
		2012		
351.7	103.9	52.7	195.9	111.6

After three years testing, hybrid “Linzi” was included in uniform variety testing trial in 2013. The results showed that the yield was 386.9 kg/da or 10.7% above the average standard. The oil content in the seeds was 52.2%. The oil yield was 201.9 kg/da or 13.6% above the average standard.

Hybrid “Linzi” was tested for values of cultivation and use in the experimental fields of the Executive agency for variety testing, field inspection & seed control for two years - 2014 2015. The average yield for the period of testing from all plots (10 plots) was 363 kg/da.

Biochemical and phytopathological characteristics of hybrid “Linzi”

The seed oil content of the hybrid is 53.7%, average for the period of testing and exceeded considerably the both standards NK Brio and LG5662. Thousands seed weight is 59.5g. The percentage of kernel content is 76.5%. The protein content in the seed is 28%.

Hybrid “Linzi” belongs to the group of middle early hybrids, as its vegetation period is average about 118 days. The maternal and paternal lines bloom simultaneously, which facilitate considerably the seed production of the hybrid. Both parental lines could be sown at the same time.

On artificial infection plot, the hybrid shows resistance to phomopsis and phoma. It is resistant to downy mildew, races 731 and 700. Hybrid “Linzi” is also 100 % resistant to broomrape, race G.

Table 2. Morphological characteristics of sunflower hybrid “Linzi”

Traits	Expression	Degree
1. Hypocotyl:antocianic pigmentation	Absent	1
2. Hypocotyl:intensity of antocianic pigmentation	Absent	1
3. Leaf: size	Large	7
4. Leaf: color	Medium green	5
5. Leaf: blistering	Medium	5
6. Leaf: serration	Medium	3
7. Leaf: shape	Rounded	5
8. Leaf: shape of distal part	Convex	3
9. Leaf: auricles	Absent	1
10. Leaf: wings	Present	3
11. Leaf: angle of lateral veins	Obtuse	3
12. Leaf: height of the tip of the blade compared to insertion of petiole (at 2/3 height of plant)	Present	3
13. Stem: intensity of hairiness at the top	Medium	5
14. Time of flowering	Medium	5
15. Ray flower number	Medium	5
16. Ray flower shape	Ovoid	2
17. Ray floret:disposition	Medium	5
18. Ray flower length	Medium	5
19. Ray flower color	Yellow	4
20. Disk flower color	Orange	2
21. Disk flower anthocyanin coloration of stigma	Absent	1
22. Disk flower: intensity of anthocyanin coloration of stigma	Absent	1
23. Disk flower presence of pollen	Present	9
24. Bract shape	Rounded	3
25. Bract length of the tip	Medium	5
26. Bract color of the external part	Medium green	5
27. Bract: attitude in relation to head	Slightly embracing	2
28. Plant: natural height	Medium	5
29. Plant: branching	Absent	1
30. Plant: type of branching	-	-
31. Plant: natural position of closest lateral head to the central head	-	-
32. Head: posture at ripeness	Vertical	5
33. Head: size	Large	7
34. Head: shape of grain side	Convex	3
35. Seed: size	Medium	5
36. Seed: shape	Ovoid wide	3
37. Seed: thickness	Medium	5
38. Seed: main color	Weakly present	2
39. Seed: stripes on margin	Absent	1
40. Seed: color of stripes	Grey	2

Morphological description

Morphological description of hybrid “Linzi” on UPOV (2002) was done. The described characters was presented on table 2.

Conclusion

Linzi is conventional sunflower hybrid and middle early hybrid (Fig.1). The vegetation period is 118 days. The hybrid is high yielding and the seed oil content is 51.3%. The hybrid is resistant to downy mildew /race 731/ and broomrape /race G/. It possesses middle resistance to phoma and phomopsis. The hybrid needs no special requirements for cultivation and the traditional scheme for seed production could be applied. The optimum plant density is 65000 – 71000 per hectare. Both the parental lines flower on the same time and they could be planted together during seed production of the hybrid. The new bulgarian hybrid “Linzi”, developed in Dobrudzha agricultural institute – General Toshevo is registered with certificate №11125P2 of Patent office of Republic of Bulgaria. The hybrid “Linzi” was tested for two years in Moldova, and registered in 2017.



Figure 1. Hybrid Linzi

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