

CONTRIBUTIONS TO THE IMPLEMENTATION OF SOME MODERN TECHNOLOGIES IN SUNFLOWER CROP, ON A TYPICAL CHERNOZEM FROM THE AREA OF LOCALITY SLOBOZIA NOUA, IALOMITA COUNTY

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Abstract. *In recent years, Romanian farmers had the opportunity to use in the culture the most modern creations of the researches from genetics and plant breeding domains, but also from the field of plant protection. In the paper is presented the behavior of some sunflower hybrids, newly introduced into the culture in Romania, under the conditions of Muntenia Plain. The experience was conducted in the farm I.I. Visan Daniela Elena, locality Slobozia Noua, Ialomita County. There were tested under field conditions two semi-early sunflower hybrids, existing from a short time in The Official Catalogue of the culture plants from Romania, on a typical chernozem soil type. In the paper is presented the culture technology applied to both sunflower hybrids, with reference to preliminary plant, administration of fertilizers, the applied soil tillage. Also, it was tested in the field a variant of technology concerning the culture protection against diseases and pests. Together with these elements, the authors tested under field conditions a variant of technology regarding the control of weeds. In order to accentuate the behavior of the two hybrids, we effectuated the following determinations: plants height, head diameter, weight of the whole plants, weight of heads with seeds, weight of heads without seeds, weight of seeds from the head, weight of 1,000 kernels. Considering that the surface cultivated with sunflower in Romania in 2013 was over 1 million hectares, and the average yield on the country was 2,000.5 kg/ha, the modern technology applied and the hybrids that are used may constitute a starting point for the farmers who want to implement in the production the modern technologies and sunflower hybrids tested in the present paperwork.*

Key words: *sunflower hybrids, modern technologies, semi-early hybrid*

INTRODUCTION

We cannot talk about the obtaining of some increased and efficient agricultural productions, about the use of certain performant and well adapted technologies to the pedo-climatic conditions specific to each area without taking into account their influence upon the soil layer, natural conditions, fauna and flora, but also upon the quality of the products.

The use of performant sunflower hybrids is considered a qualitative leap which ensured the increase of yield and oil content until levels almost unimaginable in the past, a task realized by improvement of agrophytotechnical methods (AL. VIOREL VRANCEANU, 2000).

MATERIAL AND METHOD

In the paper is presented the behavior of some sunflower hybrids, newly introduced into the culture in Romania, under the conditions of Baragan Plain. The experience was conducted in the farm I.I. Visan Daniela Elena, locality Slobozia Noua, Ialomita County.

In Baragan Plain, the dryness phenomena are present in almost the entire period of vegetation June-September, and the drought in August, more pronounced towards east (Figure 1). The soils have a very high fertility, advantaged by the plain relief, allowing very good conditions for agriculture. The climate is temperate continental, Pontic type, arid and with strong contrasts of temperature between winter and summer. The annual average of isotherms is +10 °C and -11 °C, the coldest month of the year being January (mean temperature -3 °C) and the warmest is July (mean temperature +22.9 °C). The resultant is an average amplitude of the temperature, one of the highest from the country. Regarding the rainfalls, the area has a character of aridity. The driest month is February (19.0 mm), the wettest is June (70.2 mm), the annual average of rainfalls being 456 mm.

In the period between years 1901-2000, at the weather stations from Baragan Plain, were recorded the following quantities of multiannual average precipitations: at Slobozia 491.7 mm; Calarasi 497.2 mm; Fetesti 462.6 mm; Marculesti 488.3 mm, Fundulea 561.6 mm.

In order to achieve the proposed goals in accomplishment of this study, we chose two sunflower hybrids: hybrid Paraiso 102 (Saaten Union) grown on a surface of 8.5 ha and hybrid P64LE99 (Pioneer®) on 3.5 ha. The seeding was effectuated with the sowing machine on 8 rows SPC 8 FS.

The hybrid P64LE99 is a semi-early hybrid, simple, with a very high and stable yield potential. It is resistant to herbicide Express®, has a good plasticity and adaptability. The height is medium, abundant and dark green foliage, and the head is medium-large, well covered with seeds. It is resistant to broomrape (*Orobanche cumana*), including race E, tolerant until race G. At the same time it has great tolerance to Phomopsis and Sclerotinia, both on stalk and head, good tolerance to drought and heat. The grade of self-fertility is high, and the root system is very well developed, with a very good exploration capacity.

Hybrid Paraiso 102 was chosen because is recommended in all culture zones of sunflower, and by application of Clearfield® technology is obtained a culture free of the main weeds and *Orobanche*. The description of hybrid consists in the fact that is resistant to breakage and has a good tolerance to drought and to the main diseases.

In order to accentuate the behavior of the two hybrids, we effectuated the following determinations:

- Plants height
- Head diameter
- Weight of the whole plants
- Weight of heads with seeds
- Weight of heads without seeds
- Weight of seeds from the head

- Weight of 1,000 kernels

RESULTS AND DISCUSSIONS

In order to achieve the objectives of this paper, were grown two sunflower hybrids, present in the Official Catalogue of plant varieties and hybrids cultivated in Romania, respective the hybrid Paraiso 102 and hybrid P64LE99, both semi-early hybrids.

The cultivation technology applied in the field

Preliminary cultures – melons and wheat. Fertilization: there were applied 200 kg/ha (commercial product) complex fertilizer NPK 20:20:20, incorporated at the same time with sowing. In vegetation was applied the foliar fertilizer Plonvit 2l/ha, which contains 6% N; 5.3% MgO; 8% B; 11% S + ME (Mn, Mo, Zn). Soil tillage: after the field releasing of preliminary culture, was effectuated the autumn ploughing at 25 cm depth. Seed and sowing: both hybrids were sown on April 5, 2014. Hybrid Paraiso 102 was sown on 8.5 ha, and hybrid P64LE99 on 3.5 ha. Plant population: 65,000 germinating seeds/ha for both studied hybrids. Distance between rows: 70 cm. Sowing depth: 7 cm.

Crop maintenance works. In choosing the hybrids it was taken into account the fact that the technology of weed control in post-emergence with herbicide Express® 50SG can be applied only to some sunflower hybrids with genetic resistance to this treatment, P64LE99 being a hybrid from this category. In the case of hybrid Paraiso 102, was applied the technology Clearfield®, treating in post-emergence with herbicide Pulsar®. Three days after sowing, we applied the herbicide Goal 4 F, with active substance 480 g/l oxifluorfen, in a dose of 0.5 l/ha, for annual dycotile weeds control (exception *Xanthium strumarium*).

In the phase of 8 leaves, was applied the herbicide Pulsar®, which is based on imazamox, from imidazolinone group. The active substance is taken by plants especially through leaves but also through the roots. Due to the residual activity at the soil level, it prevents the emergence of a new wave of weeds. The benefits of this herbicide are: guaranteed tolerance for the culture, without rotation problems (with the condition of keeping the interval of sowing mentioned in the recommendations of use).

In the phase of 12 leaves was applied the foliar fungicide Folicur 1 l/ha, after that was applied Plonvit 2 l/ ha and in addition the herbicide Prosper 1 l/ha. Folicur Solo 250EW, active substance: tebuconazole 250 g. Folicur Solo is used in a dose of 1.0 l/ha for the control of sunflower stalk and head rot.



Figure 1 – The manifestation of pedological drought in the stage of 5 - 7 leaves

Determination of plants height

After the determinations effectuated in the field, the height of plants at hybrid Paraiso 102 was on average of 1.88 m and at hybrid P64LE99 the average was 1.86 m, in the farm I.I. Visan Daniela Elena, locality Slobozia, Ialomita County, in 2014 (Table 1). It can be observed that the studied hybrids had a similar behavior in the field, regarding the height of plants.

Table 1

Results obtained regarding the height of sunflower plants

Hybrid	Paraiso 102 CL	P64LE99
Plant height (m)	1.88	1.86
Average	1.87	

Determination of the head diameter

Following the determinations effectuated in the field at farm I.I. Visan Daniela Elena, locality Slobozia, Ialomita County, in 2014, the head diameter at hybrid Paraiso 102 CL was on average of 14.82 cm and at hybrid P64LE99 was on average of 13.9 cm (Table 2).

Table 2

Results obtained concerning the head diameter of the experienced hybrids

Hybrid	Paraiso 102 CL	P64LE99
Head diameter (cm)	14.82	13.9
Average	14.36	

Determination of the weight of whole sunflower plants

The weight of whole plants for hybrid Paraiso 102 grown in locality Slobozia Noua, Ialomita County, was on average of 573.3 g and for hybrid P64LE99 was on average of 553.3 g (Table 3).

Table 3

Determination results regarding the weight of the whole plants

Hybrid	Paraiso 102 CL	P64LE99
Weight of whole plants (g)	573.3	553.3
Average	563.3	

Determination of the weight of heads with seeds

The weight of heads with seeds recorded for hybrid Paraiso, under the conditions of year 2014, was on average of 296.6 g seeds/head, and for hybrid P64LE99 was on average 273.33 g seeds/head (Table 4).

Table 4

Weight of heads with seeds

Hybrid	Paraiso 102 CL	P64LE99
Weight of heads with seeds (g)	296.6	273.33
Average	284.97	

Table 5

Weight of sunflower heads without seeds		
Hybrid	Paraiso 102 CL	P64LE99
Weight of heads without seeds (g)	121.6	133.66
Average	127.63	

Determination of the weight of heads without seeds

The weight of heads without seeds, under conditions of year 2014, in the farm I.I. Visan Daniela Elena from locality Slobozia Noua, Ialomita County, was on average of 121.6 g, and at hybrid P64LE99 was on average of 133.6 g (Table 5).

Determination of the weight of seeds from the head

The weight of seeds from the head at hybrid Paraiso102 was on average of 175.0 g and at hybrid P64LE99 was on average of 139.73 g, results obtained in locality Slobozia Noua, Ialomita County, farm I.I. Visan Daniela Elena, in the conditions of year 2014 (Table 6).

Table 6

Weight of seeds from the head		
Hybrid	Paraiso 102 CL	P64LE99
Weight of seeds from the head (g)	175.0	139.73
Average	157.37	

Determination of seeds number in sunflower head

The number of seeds in the head at hybrid Paraiso was on average of 1332.67 seeds. The number of seeds in the head at hybrid P64LE99 was on average of 1164.67 seeds (Table 7)

Table 7

Number of seeds in sunflower head		
Hybrid	Paraiso 102 CL	P64LE99
Number of seeds in sunflower head	1332.67	1164.67
Average	1248.67	

Determination of 1,000 seeds weight

The weight of 1,000 seeds for hybrid Paraiso 102 was 4.14 g and for hybrid P64LE99 was 6.27 g, in 2014, farm I.I. Vişan Daniela Elena, locality Slobozia Noua, Ialomita County (Table 8).

Table 8

Weight of 1,000 seeds at the studied hybrids		
Hybrid	Paraiso 102 CL	P64LE99
Weight of 1,000 seeds (g)	4.14	6.27
Average	5.21	

CONCLUSIONS

Sunflower hybrids Paraiso 102 and P64LE99, in the conditions of year 2014 in the farm I.I. Visan Daniela Elena, locality Slobozia Noua, Ialomita County, were seeded at a plant density of 65,000 germinating seeds/ha, at the distance between rows of 70 cm and sowing depth of 7 cm.

The height of plants at hybrid Paraiso 102 was on average of 1.88 m, and at hybrid P64LE99 the height average was about 1.86m; the head diameter for hybrid Paraiso102 CL was on average of 14.82 cm and for hybrid P64LE99 was on average of 13.9 cm. The weight of whole plants for Paraiso 102 was on average 573.3 g, and at hybrid P64LE99 was on average of 553.3 g.

The weight of heads with seeds recorded for hybrid Paraiso 102, under the conditions of year 2014, farm I.I Visan Daniela Elena, locality Slobozia Noua, was on average of 296.6 g seeds/head, and for hybrid P64LE99 was on average of 273.33 g seeds/head.

The weight of heads without seeds registered by hybrid Paraiso 102 was 121.6 g on average, and at hybrid P64LE99 was 133.6 g on average. The weight of seeds in the head for hybrid Paraiso 102 was 175.0 g and at hybrid P64LE99 was 139.73 g, on average.

Number of seeds in the sunflower head at hybrid Paraiso 102 was on average of 1332.67, and at hybrid P64LE99 was 1164.67 on average.

The weight of 1,000 seeds for hybrid Paraiso 102 had the average value of 4.14 g, and hybrid P64LE99 recorded a weight of 1,000 seeds of 6.27 g on average.

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