

## PRELIMINARY DATA ON THE MELIFEROUS CAPACITY OF SOME FOREIGN SUNFLOWER HYBRIDS

### DATE PRELIMINARII PRIVIND CAPACITATEA MELIFERĂ A UNOR HIBRIZI STRĂINI DE FLOAREA-SOARELUI

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*The soil and climate conditions in Romania are favorable for the sunflower crops. The sunflower is one of the main large culture crops in Romania and the most important oilseed plant, being on the third place as cultivated area, after corn and wheat. This makes the sunflower the most important melliferous crop plant, ensuring the last great production harvest before winter. This importance results both from the period and the duration of flowering, and from the large number of flowers per unit of area and the great nectar secretion. Yet, the melliferous capacity in sunflower is affected by the climate conditions [3], fact ascertained by beekeepers over great variations in time and space of honey productions. Likewise, the melliferous capacity in sunflower differs from one hybrid to another [1][2], the beekeepers being interested in the melliferous capacities specific to various sunflower hybrids cultivated in our country. The current work depicts the results of researches on the melliferous capacity on a variety of 4 sunflower hybrids cultivated over 5 periods, under the conditions of the southern part of Romania, (15 km North-East from Bucharest) and under the climate conditions of 2007. The studied sunflower hybrids were: Fleoret OR, Melodi, Sunko and Arena. By the cultivation over different periods it was intended that the flowering period to overlap periods with different climate conditions, so to determine the melliferous potential in the hybrids studied in different climate conditions and to note the way in which they vary according to the climate conditions.*

**Key words:** Sunflower hybrids; Melliferous characteristics.

#### Materials and Methods

Researches on the melliferous capacity in sunflower hybrids were carried out in field trials over the year 2007. These researches were established on a reddish preluvosol located at 15 km from Bucharest on a North-East direction. The experiments were placed within the Moara Domnească trial field pertaining to the Phyto-Technical Department of the Faculty of Agriculture within the University of Agronomic Sciences and Veterinary Medicine Bucharest. They were part of researches carried out within the research project no. 106/2005, a CEEEX grant.

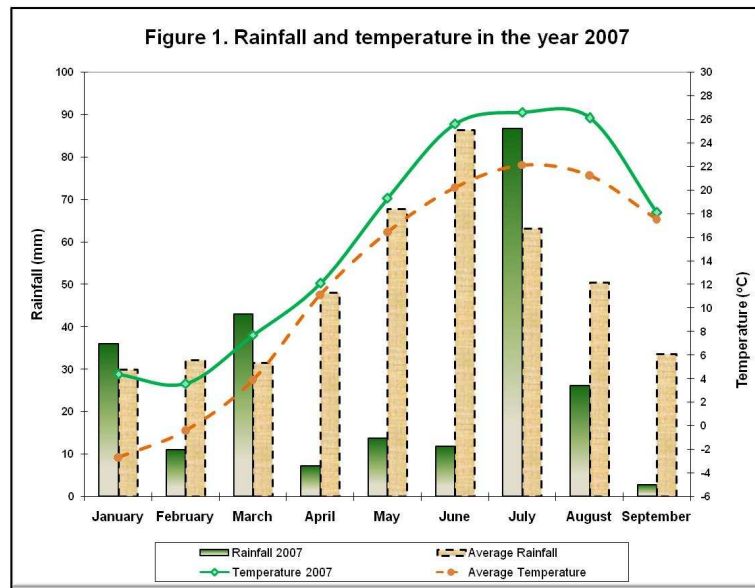
The objective of these researches was to study the melliferous potential in 4 sunflower hybrids (Fleoret OR, Melodi, Sunko and Arena), cultivated at different

calendar periods (sowing periods), namely: 1<sup>st</sup> period – March 27; 2<sup>nd</sup> period – April 6; 3<sup>rd</sup> period – April 18; 4<sup>th</sup> Period – May 12; 5<sup>th</sup> Period – June 2.

By sowing at different periods it was intended that the flowering period lap other periods with different climate conditions, so that to determine the melliferous potential in the studied hybrids over different climatic conditions and to observe the variation of this potential according to climate conditions.

Each experimental plot measured 21sqm, resulted from 6 rows of plants cultivated at a distance of 70 cm between rows and a row length of 5 m. The experimental designs have been located using the method of dividing plots by 2 factors (the sunflower hybrid and the sowing period).

In 2007, the average air temperature was higher than the multi annual average temperature, and the monthly rainfall exceeded the multi annual values of January, March and July, yet with a total rainfall water deficit of 204, 7 mm over the first 9 months compared to the multi annual mean (figure1).



The quantity of secreted nectar per flower was calculated using the capillaries method, the most employed method in researches. The nectar sugar content was measured using the refractometer.

Parallel to nectar analysis the number of flowers/inflorescence was determined, respectively the number of plants/ha in order to calculate the number of flowers/ha.

The potential honey yield /ha was calculated using the following formula:

$$M = \frac{Sn \times Cn \times D \times Nf \times Np}{100.000.000} \times 1,25$$

Where: M = potential honey yield (kg/ha);

Sn = nectar secretion (mg nectar/flower);  
Cn = nectar content in sugar (%);  
D = flowering duration of a flower (days);  
Nf = number of flowers /inflorescence;  
Np = number of plants/ha;  
1,25 = quotient of sugar transformation in honey

## Results and Discussions

*Over the first period*, the first flower heads occurred between 14 and 18 of June. The observations and melliferous determinations were made during peak flowering, which corresponded with the period June 14 and July 2. The average nectar quantity secreted by a flower in 24 hours (table 1) ranged from 0,32 mg/flower (in Fleuret OR hybrid) to 0,49 mg/flower (in Sunko hybrid). A nectar secretion greater than 0,4 mg/flower was observed also in Arena hybrid (0,46 mg/flower). The nectar sugar content ranged between 56,5% (in Arena hybrid ) and 61,5% (in Fleuret OR hybrid), and the potential honey yield varied from 26 kg/ha (in Melody hybrid) to 38 kg/ha (in Sunko hybrid).

*Over the 2<sup>nd</sup> period*, the first flower heads occurred between 15 and 20 of June. The observations and melliferous determinations were made during peak flowering, which corresponded with the period June 19 and July 4. The average quantity of nectar secreted by a single flower in 24 hours varied from 0,27 mg/flower (in Arena hybrid) to 0,49 mg/flower (in Sunko hybrid). Within the second sowing period, the nectar sugar content was high, respectively over 60%, except in Sunko hybrid, with a nectar sugar content of only 55%. The higher nectar sugar content was registered in Melody hybrid (65,5%). Potential honey yield varied from 23,3 kg/ha (Melody hybrid ) to 34,3 kg/ha (Sunko hybrid).

To note that the Sunko hybrid had the highest sugar content and the highest values over the two studied periods, with the greatest honey yields. Likewise, the Sunko hybrid is the only hybrid secreting a quantity of nectar over 0,4 mg/flower during the second sowing period.

*Over the third period*, the first flower heads occurred between 18 and 23 of June, and researches on the melliferous capacity in sunflower hybrids were carried out during peak flowering that corresponded with the period comprised between June 24 and July 9. During this sowing period, the nectar sugar content per flower was lower compared to the first and second period, namely, the quantity of nectar produced by a flower in 24 hours varied from 0,09 mg/flower (Fleuret OR hybrid) to 0,31 mg/flower (Arena hybrid). To note that the Sunko hybrid, which during the first and second period reached the highest values in nectar secretion, during the third period this hybrid had a much weaker nectar secretion, from 0,49 mg/flower (1<sup>st</sup> and 2<sup>nd</sup> period) to 0,15 mg/flower (3<sup>rd</sup> period). Over the third period, the nectar sugar content reached higher average values compared to the first two periods, ranging from 58% (in Arena hybrid ) to 66,7% (in Fleuret OR hybrid). Though nectar sugar content was higher, the weak nectar secretion per flower has affected the potential honey yield per ha, being smaller compared to the other studied periods. This proves that the factor greatly influencing honey yield is the nectar secretion of flowers. It is

interesting to note that during the third period, most hybrids shown a potential honey yield below 20 kg/ha, except in Arena hybrid (23 kg honey/ha). The smallest potential honey yield was measured in Melody and Fleuret OR hybrids (13,6 kg/ha).

*Over the fourth period*, the first flower heads occurred between 7 and 8 of July, and researches on the melliferous capacity in sunflower hybrids were carried out during the peak flowering, between 12 and 28 of July. Nectar secretion of flowers in 24 hours ranged from 0,31 mg/flower (in Arena hybrid) to 1 mg/flower (more precise to 0,93 mg/flower, in Melody hybrid). To note that the Sunko hybrid, which over the first and second period reached the highest values in nectar secretion, except for the third period, had a very good nectar secretion during the fourth period (0,75 mg/flower). During the fourth period, the nectar sugar content was the lowest, below 55%, ranging from 43,2% (in Melody hybrid) to 54,5% (in Arena hybrid). The very good nectar secretion of flowers had a positive influence on the potential honey yield, ranging between 24,3 kg/ha (in Arena hybrid) and 52,6 kg/ha (in Melody hybrid).

*Over the fifth period*, the first flower heads occurred between 27 and 29 of July, and researches on the melliferous capacity in sunflower hybrids were carried out during the peak flowering, between 1 and 10 of August 2007. The nectar secretion per flower in 24 hours ranged from 0,35 mg/flower (in Arena hybrid) to 0,57 mg/flower (in Melody hybrid), and nectar sugar content varied between 63,1% (in Fleuret OR hybrid) and 64,6% (in Sunko hybrid). Potential honey yield varied between 32 kg/ha (in Arena hybrid) and 45,5 kg/ha (in Melody hybrid).

During the fourth and fifth sowing periods again the Sunko hybrid is remarked for the high potential honey yield. Also, the Melody hybrid is remarked for the highest potential honey yields, though during the first three periods it had the lowest potential honey yield, which proves it has a good melliferous potential, yet it is strongly influenced by less favorable weather conditions.

Table 1

Potential honey yield at sunflower hybrids function of sowing moment  
Moara Domneasca – 2007

Sowing moment	Sunflower hybrids	Quantity of nectar (mg/flower)	Sugar content (%)	Kg of honey per ha
I	Melody	0.35	59.8	26.0
	Sunko	0.49	58.2	38.0
	Arena	0.46	56.5	35.0
	Fleuret Or	0.32	61.5	29.0
II	Melody	0.29	65.5	23.3
	Sunko	0.49	55.0	34.3
	Arena	0.27	62.8	31.7
	Fleuret Or	0.36	60.2	28.7

Sowing moment	Sunflower hybrids	Quantity of nectar (mg/flower)	Sugar content (%)	Kg of honey per ha
III	Melody	0.16	63.7	13.6
	Sunko	0.15	65.5	14.5
	Arena	0.31	58.0	23.0
	Fleuret Or	0.09	66.7	13.6
IV	Melody	0.93	43.2	52.6
	Sunko	0.75	50.3	52.4
	Arena	0.31	54.5	24.3
	Fleuret Or	0.62	44.9	43.1
V	Melody	0.57	63.4	45.5
	Sunko	0.50	64.6	43.4
	Arena	0.35	64.0	32.0
	Fleuret Or	0.38	63.1	35.8

The relatively good potential honey yield over the first two sowing periods is partly determined by the soil water reserve accumulated during fall winter rainfalls (fig.1). Yet, the extremely drought period from April, May and June led to reduced potential honey yield during the third sowing period. July rainfall led to high potential honey yields. Sunflower hybrids respond differently to the action of climate factors in terms of melliferous characteristics. Among the studied hybrids, the Sunko hybrid was noticed for its high melliferous potential in most conditions, except for the most severe in terms of water stress. In exchange, under conditions of water stress, Arena hybrid responded well from the point of view of potential honey yield.

Water deficit diminished nectar secretion and increased its sugar content, while water supply improved nectar secretion, and decreased the sugar content. Potential honey yield is firstly determined by the quantity of secreted nectar and then by the nectar sugar content.

### Conclusions

1. Under the climate conditions of 2007, potential honey yield in sunflower hybrids, studied over different sowing periods, ranged between 13,6 kg/ha (in Fleuret OR hybrid) and 52,6 kg/ha (in Melody hybrid).
2. Sunko hybrid proved to have a high honey potential, with the highest values of potential honey yield during the first and second period, high values of potential honey yield during the forth and fifth sowing periods, yet it was affected by the severe drought from the third sowing period.
3. Water deficit diminished nectar secretion and increased its sugar content, while water supply improved nectar secretion, and decreased its sugar content.

4. Potential honey yield is firstly determined by the quantity of secreted nectar and then by the nectar sugar content, the severe water leading to the smallest potential honey yields.

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