

## THE INFLUENCE OF AGRO-TECHNICAL FACTORS ON THE MELLIFEROUS VALUE OF SUN-FLOWER (*HELIANTHUS ANNUUS*) HYBRIDS, CULTIVATED IN ROMANIA\*

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Out of the main factors that lead to obtaining increased yields of honey, originated from sun-flower hybrids cultivated in Romania, a significant share hold the agro-technical factors, especially soil tilling for sowing, culture managing measures, sowing period, culture fertilization and irrigation, density of plants per unity of surface etc. To this point the precursory culture and ploughing have a significant role.

The research works carried out in our country stress on the significant role that the chemical fertilizers play, based on nitrogen, phosphorus and potassium, viewing to increase the seed and oil production. Thus, through a balanced fertilization with moderate dosage of nitrogen and phosphorus or nitrogen, phosphorus and potassium fertilizers, the process of photosynthesis intensifies itself having positive effects on the seed and oil production. The results obtained confirm the point of view, according to which, in certain cases, the growths due to phosphorus fertilizers can be higher than those obtained

when applying the nitrogen fertilization. The same researches show that it is not proper to administer nitrogen solely and in high doses, since it negatively influences quantitatively the seed production and especially the oil content.

As for the influence of chemical fertilizers containing NPK on the melliferous value in the sun-flower hybrids, the nectar secretion and the sugar concentration of nectar is significantly higher when applying fertilization with chemicals administered either simply or in association, as compared to the case when no fertilization is done (table 1).

When speaking about nitrogen, administered solely, in doses varying from 40 to 160 kg., active substance per nectar, the best results proved by the highest quantity of nectar per flower are obtained after an administration of moderate doses of 70—80 kg/ha.

If the nitrogen dose is increased, it will consequently lead to diminishing the nectar quantity, since the high nitrogen doses become uneconomic. However, if nitrogen

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\* chapter from the doctor's degree thesis

Table 1

**The influence of chemical fertilizers containing NPK on the melliferous value, in 82 Fundulea hybrid, cultivated in Romania**

Variant	Dosis of applied fertilizers	Quant. of nectar/flower	Sugar conc. %	sugar kg/ha	Melliferous value %	Dif. Mt.
V <sub>1</sub>	N <sub>0</sub> P <sub>0</sub> K <sub>0</sub>	0.397	49.000	19.435	100	—
V <sub>2</sub>	N <sub>40</sub> P <sub>0</sub> K <sub>0</sub>	0.540	56.667	30.600	157	11.15
V <sub>3</sub>	N <sub>80</sub> P <sub>0</sub> K <sub>0</sub>	0.653	61.333	40.050	206	20.60
V <sub>4</sub>	N <sub>120</sub> P <sub>0</sub> K <sub>0</sub>	0.623	57.333	35.145	181	15.70
V <sub>5</sub>	N <sub>160</sub> P <sub>0</sub> K <sub>0</sub>	0.517	53.000	27.401	141	7.95
Average N		0.580	57.000	33.300	171	13.85
V <sub>6</sub>	P <sub>40</sub> K <sub>0</sub> N <sub>0</sub>	0.570	61.333	34.960	180	15.51
V <sub>7</sub>	P <sub>80</sub> K <sub>0</sub> N <sub>0</sub>	0.737	66.667	49.134	253	29.68
V <sub>8</sub>	P <sub>120</sub> K <sub>0</sub> N <sub>0</sub>	0.673	63.000	42.399	218	22.95
V <sub>9</sub>	P <sub>160</sub> K <sub>0</sub> N <sub>0</sub>	0.453	56.667	25.670	132	6.22
Average P		0.610	62.000	38.040	195	18.58
V <sub>10</sub>	K <sub>40</sub> N <sub>0</sub> P <sub>0</sub>	0.433	53.333	23.093	119	3.64
V <sub>11</sub>	K <sub>80</sub> N <sub>0</sub> P <sub>0</sub>	0.417	51.667	21.545	111	2.10
V <sub>12</sub>	K <sub>120</sub> N <sub>0</sub> P <sub>0</sub>	0.407	49.667	20.214	104	0.76
Average K		0.420	51.000	21.620	111	2.16
V <sub>13</sub>	N <sub>80</sub> P <sub>80</sub> K <sub>0</sub>	0.947	67.333	63.764	328	44.31
V <sub>14</sub>	N <sub>80</sub> P <sub>80</sub> K <sub>80</sub>	0.913	68.000	62.084	319	42.63

is excessively administered it shows negative effects on the nectaro-genesis. When administered in doses of 140—150 kg/ha, it determines the inhibition of nectariferous glands.

When phosphorus is administered in increasing doses from 40 to 160 kg/ha, the greatest nectar production is obtained at the dose of 80 kg/ha. Beyond this dose the nectar secretion gradually decreases, and higher doses turn out to be certainly unprofitable.

The growth of nectar production registered after potassium fertiliza-

tion, solely administered, in doses of 40—120 kg/ha is insignificant and, from the economical point of view, doesn't justify the expenses made to this point.

The best results concerning the increase of the melliferous value of sun-flower hybrids are obtained when two or three elements are administered together, within moderate doses, of about 80 kg/ha for each element.

If comparatively expressed with the melliferous value of the unfertilized cultures (Mt) and the average value of each element, notice is

taken first of all of the positive effect on increasing the nectar secretion of all three NKP elements, although differentiated according to the specificity feature each one holds, administered either solely or in association. Thus, phosphorus plays the prevailing role in intensifying the nectaro-genesis, since after unilateral administration, the highest values are obtained, compared to both unfertilized cultures and nitrogen and potassium fertilization. It is also observed that the decisive role that phosphorus plays in intensifying the melliferous value in the sun-flower hybrids as compared to the other elements, is given by the sugar concentration of nectar (higher in phosphorus than in other elements).

The effect of potassium when solely administered or in association with nitrogen and phosphorus is insignificant and the expenses in this respect prove to be unprofitable.

The highest value of sugar production is accomplished after the associated administration of nitrogen with phosphorus, at moderate doses of  $N_{80}P_{80}$  and so on.

Plants' density is also an important agro-technical measure to obtaining high yields of seed and oil from sun-flower hybrids, following the increase in the number of plants per unity of surface.

At the same time notice should be taken of the fact that sun flower is known as a highly exigent species towards light, which actions

to intensifying the photosynthesis process in plants. Many research works, some of them reports of synthesis as well as the framework technology of sun-flower culture, suggest densities that vary from 30,000 to 70,000 plants/hectar, depending on a great variety of factors such: soil, species, culture area, technology, etc.

As for the effect of plants' density on the melliferous value in the sun-flower hybrids cultivated in Romania, the researches have stressed on the fact that honey yield increases together with density, the highest values being registered to a density of 50,000 plants/hectar in the phenophase of blooming (diagram 1).

At higher densities the nectar production is inverse proportional to density, explained in the reduction of nectar quantity per flower and the number of flowers in the calathidies (200—400 less), although the sugar concentration of nectar maintains approximatively at constant values.

Sowing at proper period, within the conditions of Romania, positively influences the seed production and their oil content.

In our report, considering the large cultivated area with sun-flower, about 500 thousand hectares, besides the oil production we are also interested in the honey production. Therefore, sowing at proper period bears a significant importance to this point.

Most of the papers from our country and from abroad accept

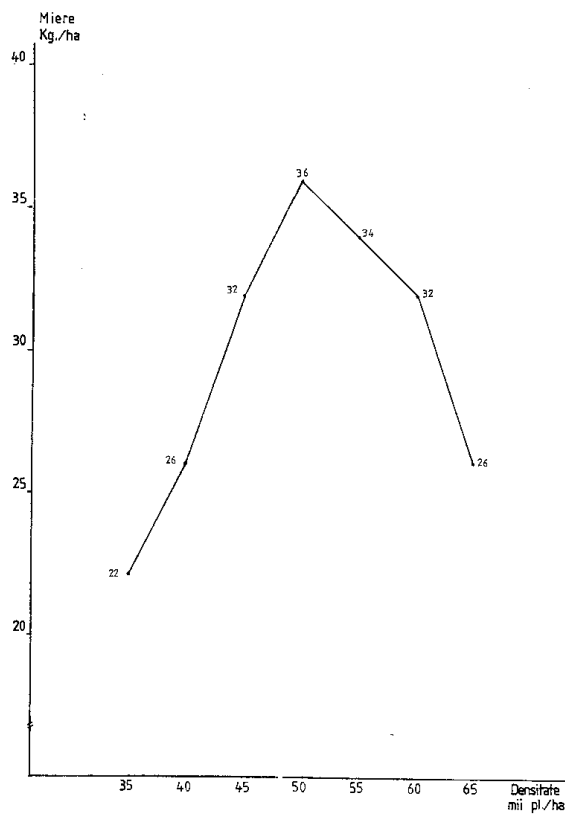


Fig. 1 — The influence of plants' density on the melliferous value in sun-flower hybrids, cultivated in Romania.  
Vertical line — honey kg/ha, Horizontal line — density, thousand plants/ha

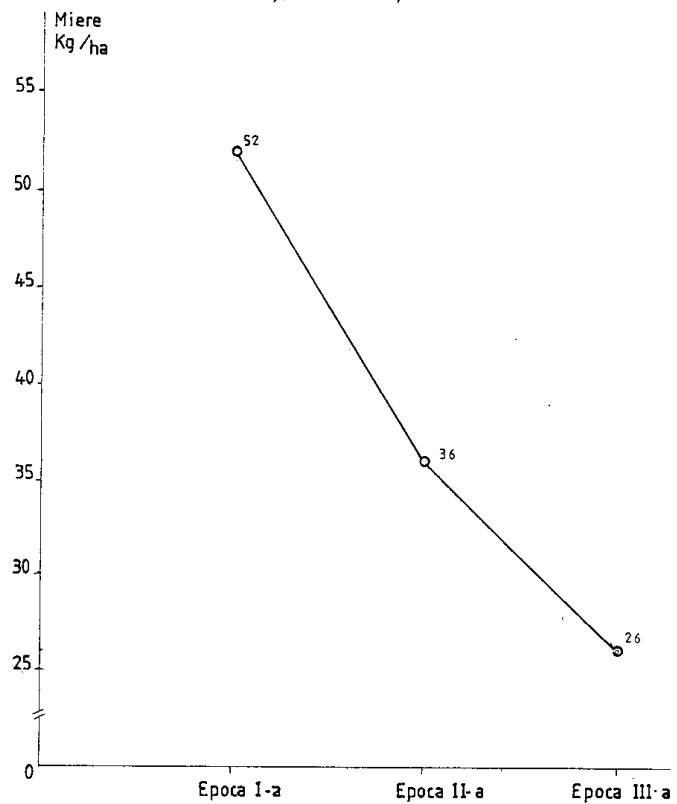


Fig. 2 — The influence of sowing period on the melliferous value in sun-flower hybrids, cultivated in Romania.  
Vertical line — honey kg/ha, Horizontal line — period 1, period 2 and period 3.

the idea that sowing should not be done too early since there are many risks concerning seed germination and evolution of culture's vegetation. At no cost should the sowing be done rushly in the case of sun-flower hybrids and species, seeds of which have a higher oil content.

The results of researches carried out by us viewing the influence of sowing period on the melliferous value in sun-flower hybrids have shown that the highest honey yield was obtained when sowing was done in the optimum period, which corresponds to a minimum germination temperature at the optimum period, which corresponds to a minimum germination temperature at the sowing deepness of 8—10°C.

If sowing is carried out 15 days later, it diminishes the honey yield with 30%, whereas the one done 30 days later diminishes to half the nectar production (diagram 2).

The reduction of the melliferous value of sun-flower hybrids in the case of sowing applied later than the optimum period is explained through the reduction in the nectar secretion due to a transpose of the nectaro-genesis period in the II<sup>nd</sup> and III<sup>rd</sup> decade of July, when the climatic conditions in our country frequently show extremely high temperatures of 35—36°C, followed by intense heat and very low air humidity, such a phenomenon causing for many a time even the inhibition of nectariferous glands.

A thorough knowledge should be approached on the following as-

pects concerning the culture:

- sowing should be done with those species and hybrids of high melliferous value only. Their high attraction degree towards honeybees will increase in its turn the pollination degree;

- establishing a suitable rotation, thus the best ones to be previously used for sun-flower would be: stalky cereals, the pea, the maize; the monoculture is out of question;

- carrying out deep tilling in summer-autumn and administration of phosphatuous fertilizers in doses of 80 kg/ha;

- administration of nitrogen fertilizers together with sowing during vegetation, in moderate doses, and simultaneously trying to keep an optimum ratio between the N and P of 1:1;

- carrying out due time and good quality managing measures of cultures;

- cultures' irrigation within optimum irrigating norms;

- pollination with honeybees using the norm of 1—2 honeybee families/hectar.

If optimum climatic conditions are also ensured, we then have the guarantee that a high production of seed, oil and honey is obtained, to the satisfaction of cultivators and beekeepers alike.

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