COMPARATIVE STUDY BETWEEN THE OBSERVATIONS YEARS MADE ON THE SUNFLOWER CROP IN VIEW OF FAMILY BEE PROTECTION AGAINST CERTAIN POISONINGS

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Abstract: *The researches show to be a novelty in the field because they are a link between two areas of great interest to agriculture. They were conducted in 2006, 2007 and 2008 in the localities Bulgărus and Grabat, in Timis County. Research environment and area in which they have occurred are original to this study. Entomophilous crop pollination by bees is an important measure that enhances agro natural development (clean, without additional investment) in the production of seeds, fruits and vegetables. Analysis of the number of bees entering the hive influences the amount of brood brought up. For 2006 the range of variation in the number of bees is between 50 and 382 (variation was of 332 bees) and the amount of brood ranges between 558 and 1293 cm^2 (735 cm^2 is the variation), the increase in the number of bees entering the hive influences the amount of brood by 0.612 with a guarantee of results of 0.2% (Sig.0, 002) – the maximum allowable value is of 5%. In 2007, the range of factors examined was very different than in 2006, the amount of brood showed a variation range between 632 and 1055 cm^2 (the variation is 423 cm^2), the variation in the number of bees is between 47 and 117 (variation of 70 bees), the influence coefficient dropped to 0.625. The year 2008 recorded the following variation intervals of the factors' values included in this study, the amount of brood showed a variation range is between 640 and 1040 cm^2 (variation is 400 cm^2) end the variation in the number of bees is between 8 and 49 (variation was of 41 bees). A negative connection has been recorded in 2008 - the correlation coefficient is -0.646, the result is a guarantee of 0.1%, ie 5% above the allowable ratio Sig. F Change of 5%, ie 10% were recorded. The purpose of this study was to determine the degree of development of bee families where pesticide treatments were made to the culture of sun-flower.*

*Key words***:** *bee, pollen, brood, intoxication, observation*

INTRODUCTION

The importance of bees emerges not only from the production of honey, beeswax, propolis, royal jelly and venom, but also the role that they have in the pollination of entomophilous crops. It was found that the increase of agricultural production is achieved by using bee pollination, more than 10-15 times the value of bee products [2, 3, 9, 10].

To prevent attack by wire worms (*Agriotes sp.*) from soil after emergence of *Tanymecus dilaticollis*, the sunflower seed is treated with systemic insecticides (*fipronil* Cosmos 500 SF 50g / l; Gaucho 60 ES *imidacloprid* 600g / l FE 350 Cruiser *thiametoxan* 350g / l) [1.14, 16].

During vegetation, the sunflower is affected by a number of diseases that significantly diminishes the production and oil content in seeds. The most common diseases are: white rot (*Sclerotinia sclerotiorum*), gray rot (*Botrytis cinerea),* mana (*Plasmophara helianthi*) breaking strain and brown staining (*Phomopsis helianthi*) stem darkening (*Phoma Macdonald)* package rot (*Sclerotinia balaticola*). To combat these diseases cultural means are used, rotation, rotation and use of quality seed material. Chemical control is made by seed treatment and treatment during the vegetation with the following products (Topsin 70 PU 70% *thiophanate methyl*; Mirage 45 EC 450 g / l prochloraz; Bumper Forte 75g / l *propiconazole* 300 g / l *carbendazim*;

Tanos 50WG 250g / *famoxadone* kg 250 g / kg *cymoxanil*, Pictor 200g / l *dimoxistrobin* 200 g / l boscalid) [1, 11, 14, 16].

Bees' life is closely related to flowers. Nutrients that bees need to feed themselves and their broods are collected from flowers of meliferous plants. From some, bees collect only nectar (nectar plants), from others, pollen only (plants pollenous) and from others both pollen and nectar (nectar-pollenous plants) [4].

The importance of using bees to pollinate is entailed from the fact that in present conditions, the extensive use of treatments to combat diseases and pests of agricultural crops, resulted into in a reduction or even disappearance of wild pollinators entomofauna [2, 4, 10, 14].

Entomophilous crop pollination by bees is an important measure that enhances agro natural development (clean, without additional investment) in the production of seeds, fruits and vegetables [4].

MATERIAL AND METHODS

The researches show to be a novelty in the field because they are a link between two areas of great interest to agriculture. They were conducted in 2006, 2007 and 2008 in the localities Bulgarus and Grabat, in Timis County.

As biological material, bee colonies were used from the specie *Apis mellifera var. Carpathian* and sunflower (*Helianthus annus*) as nectar-poleniferous culture.

This hybrid seed has been treated against pests (*Tanymecus dilaticollis*, *Agriotes sp.* - wire worms) and disease (*Botrytis cinerea* - gray rot, *Sclerotinia sclerotiorum* – white rot, *Phomopsis helianthi* - breaking strain, *Phoma macdonaldi* – stem darkening) from soil with systemic insecticide based on *imidacloprid* (Gaucho), and to combat soil pathogens agents the substance was used *prochloraz* (Mirage). To combat growing pathogens in vegetation, the culture was treated with Topsin 70 PU 70% *thiophanate methyl*.

The experiments are original and were conducted during June - July 2006 – 2008 at the sunflower culture for four weeks.

RESULTS AND DISCUSSIONS

In determining the amount of brood increased by bee families under study measurements were made for each individual bee family basis. All juvenile frames were analyzed for three weeks and the arithmetic average was made of the quantity of brood brought up in each family weekly.

It was followed the evolution of bee families since the beginning of the sunflower crops flowering until the end of flowering, because we wanted to determine the toxicity of the pesticide *imidacloprid* (Gaucho) on bees, the substance being used in the treatment of sunflower seeds.

Analysis of the number of bees entering the hive influences the amount of brood brought up. To determine the intensity of this correlation, if strong, weak or moderate experimental data were statistically analyzed by SPSS software (Satistical Package for the Social Science). I made an analysis for each year in part because there is greater uniformity in terms of how data is recorded.

For 2006 the range of variation in the number of bees is between 50 and 382 (variation is of 332 bees) and the amount of brood ranges between 558 and 1293 cm^2 (735 cm^2 is the variation) (Figure 1).

In 2007, the range of factors examined was very different than in 2006 (Figure 2).

Table 1

Average values and standard deviations for the analyzed years 2006, 2007 and 2008

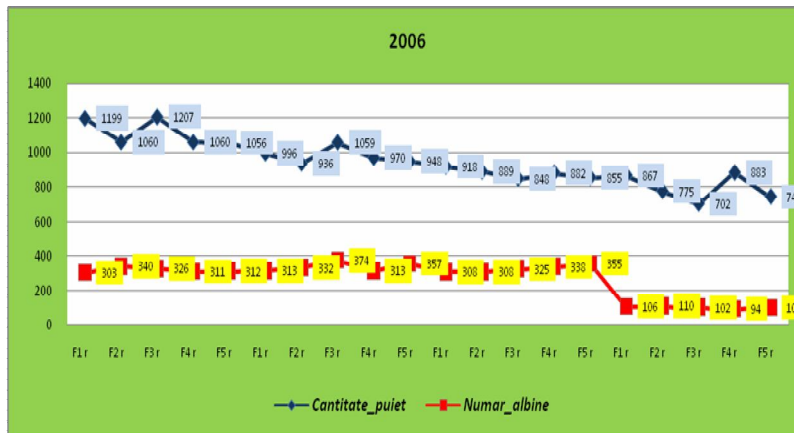| Specification	Year 2006		Year 2007		Year 2008	
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
Amount of bee brood	942,65	136,142	890,00	176,224	864,75	130,014
Number of bees	271,35	101,779	141,45	95,719	101,25	36,284

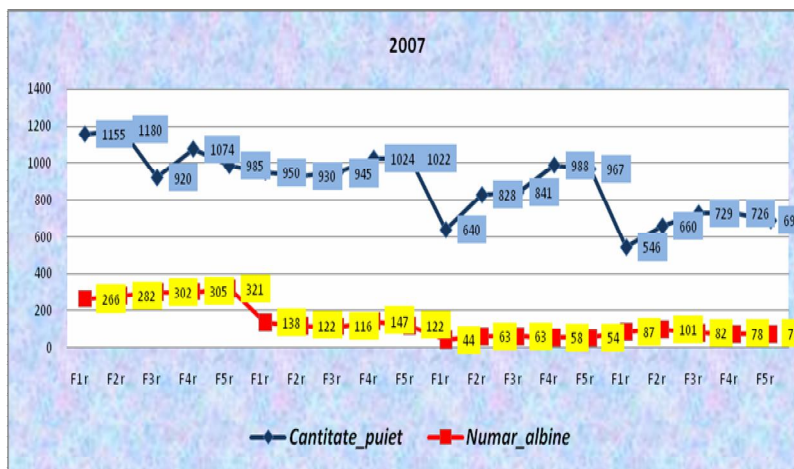Figura 1. Variations in juvenile quantities and number of bees in 2006

Figure 2. Variations in juvenile quantities and number of bees in 2007

Thus:

- the amount of brood showed a variation range between 632 and 1055 cm^2 (the variation is 423 cm^2);

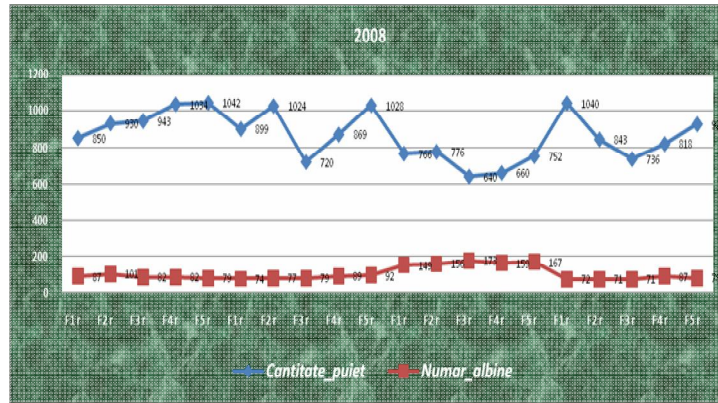- the variation in the number of bees is between 47 and 117 (variation of 70 bees).

Figure 3. Variations in juvenile quantities and number of bees in 2008

The year 2008 recorded the following variation intervals of the factors' values included in this study (Figure 3.)
- the amount of brood showed a variation range is between 640 and 1040 cm^2 (variation is 400 cm^2);
- the variation in the number of bees is between 8 and 49 (variation is 41 bees).

From the data obtained it is noted that in all the years of research the number of bees entering the hive with pollen and brood increased by the them, have registered a gradual decrease throughout the flowering period of the sunflower crop. To explain this phenomenon it is necessary that the survey is conducted over several years and it is necessary to make detailed observations in several apiaries.

The relationship between the amount of brood and the number of bees, in intensity, according to the results of the calculations, was recorded in all years for which observations were made, and is poor – of R = 0.612 and respectively R= 0.625 (Table 2 and Table 3).

Table 2

Regression coefficients and determinants for year 2006

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
Year 2006	,612ª	,374	,339	110,662	,374	10,757	1	18	,004

a. Predictors: (Constant), Bee number
b. Dependent Variable: Amount of bee brood

Even if the link is weak enough, models obtained are relevant according to the coefficients test results and *F Change Sig. F Change* (0.4% and those as 0.3%).

Table 3

Regression coefficients and determinants for year 2007

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
Year 2007	,625ª	,391	,357	141,300	,391	11,553	1	18	,003

a. Predictors: (Constant), Bee number
b. Dependent Variable: Amount of bee brood

In 2008 the link between the amount of brood and the number of bees, according to calculations, is slightly higher than in the previous period - from 0.646 with a guarantee of results of 0.2% (Table 4).

Table 4

Regression coefficients and determinants for year 2008

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
Year 2008	,646[a]	,417	,385	101,970	,417	12,888	1	18	,002

a. Predictors: (Constant), Bee number
b. Dependent Variable: Amount of bee brood

Table 5

Pearson coefficients and Sig. F Change of the tandem ,, juvenile amount-numbers of bees''

Specification		Year 2006		Year 2007		Year 2008	
		Amount of bee brood	Bee number	Amount of bee brood	Bee number	Amount of bee brood	Bee number
Pearson Correlation	Amount of bee brood	1,000	,612	1,000	,625	1,000	-,646
	Bee number	,612	1,000	,625	1,000	-,646	1,000
Sig. (1-tailed)	Amount of bee brood	.	,002	.	,002	.	,001
	Bee number	,002	.	,002	.	,001	.

In 2006, the increase in the number of bees entering the hive influences the amount of brood by 0.612 with a guarantee of results of 0.2% (Sig.0, 002) – the maximum allowable value is of 5%.

In 2007, the influence coefficient dropped to 0.625 (an increase of the influence of 0.013 points).

A negative connection has been recorded in 2008 - the correlation coefficient is -0.646, the result is a guarantee of 0.1%, ie 5% above the allowable ratio Sig. F Change of 5%, ie 10% were recorded.

CONCLUSIONS

The increase of agricultural production is achieved by using bee pollination, more than 10-15 times the value of bee products. The sunflower is affected by a number of diseases and pests those significantly diminishes the production and oil content in seeds.

Pyrethroids modified the transmission of nervous influx by prolonging the depolarization phase that follows after the action potential. It shows lateness, slowness in closing the channels for sodium and sodium flux extending and inhibition in the opening of membrane potassium ion current. It is possible to interact with a sodium channel protein constituent.

The connection between the two variables recorded in 2006-2008 is "weak" proved by the low value of Pearson correlation coefficients (0.598 to 0.646) and R-Square determination (0.358 to 0.391), with the guarantee of the experimental results within acceptable limit to 5% coefficient of Sig. F i.e. 2.0% in the sun-flower culture.

From the data obtained it is noted that in all the years of research the number of bees entering the hive with pollen and brood increased by the them, have registered a gradual decrease throughout the flowering period of the sunflower crop.

To explain this phenomenon it is necessary that the survey is conducted over several years and it is necessary to make detailed observations in several apiaries.

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