

## RESEARCH REGARDING THE MELLIFEROUS CHARACTERISTICS OF LABIATES FROM XEROPHILE MEADOWS FROM DANUBE VALLEY

### CERCETĂRI ASUPRA VALORII MELIFERE A LAMIACEELOR DIN PAJIȘTILE XEROFITE DIN LUNCA DUNĂRII

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*The xerophile meadows in the Danube Valley are dry meadows, located at a great distance from the Danube and with underground waters at greater depth. Their floral composition is characterized by a small number of species pertaining to both mezoxerophiles and to xerophiles, yet the highest percentage is covered by xerophile species, which are characterized by their small foliage surface, the very narrow and tough limb, and acute porosity etc.*

*In the floral composition of these species, the graminaceae species are best represented, followed by leguminous and lamiaceae, known in beekeeping as good honey plants. Thus, the researches carried out have shown that Lamiaceae species have a good participation, with variation limits ranging from 15% to 50-60%. Leguminous species are represented less on xerophile meadows than in hidrophile meadows. Among these we mention: Lotus corniculatus L., Trifolium repens L. și Medicago lupulina L., all these species being known in beekeeping as good honey plants.*

*Among gramineae species the most representatives are: Lolium perene L. and Poa pratensis L., yet with no melliferous value. Likewise, the group of „various” plants varied a lot as participation in the structure of the vegetal cover of xerophile meadows, depending on the place of research, all these species having no melliferous value.*

*The current paper describes the results o biometric and melliferous researches carried out over the period 2003-2005 on 5 plant species pertaining to the Lamiaceae family, namely: Salvia nemerosa L. – sage; Salvia pratensis L. – meadow sage; Marrubium vulgare L. – horehound; Lamium purpureum L. – purple deatnettle; Lamium amplexicaule L. – henbit deadnettle.*

**Key words:** Labiates; Melliferous characteristics.

#### Introduction

The xerophile meadows in the Danube Valley are dry meadows, located at a great distance from the Danube and with underground waters at greater depth. The Danube Valley, most meadows are near localities and are set up as communal pastures. Due to irrational overgrazing, the layer of wasteland is discontinuous, hence the low degree of vegetation cover (round 80% or even below this limit).

The floral composition is represented by a relatively small number of plant species pertaining to both mezoxerophiles, and xerophiles, yet the highest percentage is represented by xerophile species, characterized by small foliage surface, very narrow and tough limb, and acute porosity etc.

On xerophile meadows, on negative forms of relief, slightly lowlands, mezophile species are dominant, and on positive forms of relief, on smooth slopes and south – south-eastern exposure the mezophile species become more dominant.

## Materials and Methods

The species in the family *Lamiaceae* were studied in two localities from Călărași County, during 2003-2005.

These researches aimed at studying the vegetation in hydrophyte meadows, where numerous species can be found.

The species were identified using the gravimetric method. This method, also known as “the method of botanical analysis” consisted in the botanical analysis of plant samples harvested from the field, classification of plant species on botanical families and the determination of participation percentage for each family in the setup of botanical structure.

The method was applied during the mass flowering stage of plants in the family *Lamiaceae*. Plant sample were harvested from areas of 10 m<sup>2</sup>, being selected as to comprise all aspects of the vegetation occurring on channels. The number of samples has been established according to the degree of floral uniformity.

The species were identified in field, then classified on groups of species, which were further expressed in percentage compared to the total number of analysed samples. Lists of flowers were drawn up, by classifying the plants on the main economic groups: labiatae, leguminous, composite, others.

Those species impossible to identify directly in the field were harvested and taken to a laboratory for further determinations.

The next stage consisted in studying the melliferous potential of *Mentha* genus, the following determinations being performed:

- 1- Density of melliferous plants /sqm and the number of flower/sqm ;
- 2- Duration of flowering per flower (in days);
- 3- Average Quantity of nectar secreted by a flower (mg/flower).

The quantity of secreted nectar was estimated using the capillaries method. This is the most frequently used method in researches.

Parallel to the analysis of nectar/flower, the number of flowers/plant was also determined, and then, having the density per surface unit, we have calculated the number of flowers per ha.

For the estimation of honey production per ha, the sugar production per ha was initially calculated, according to a mathematical formula.

Having the quantity of sugar per ha, we proceeded to the estimation honey production per ha.

The study of biology and the flowering dynamic was performed by recurring observations during the flowering period. The study of floral biology consisted in observations on the flower anatomy.

## Results and Discussions

*Salvia nemerosa* L. (meadow sage) was found in the floral composition of xerophile meadows occurring as very dense thickets. As isolated exemplars, sage was frequently found around ruderal places and brushwood in the Danube Valley.

Biometric measurements performed in the field and synthesized in table 1, shown that average height of studied plants was 60 cm. The average number of inflorescences per plant was 13, with 10

whorls per inflorescence, and the average number of flowers per whorl was 12,8. The average number of flowers per plant was calculated to 1.664 flowers.

Table 1

Average figures related of plant and the number of floral organs for *Salvia nemerosa* L. (Danube Valley, 2003 – 2005)

Location research	Height of plant (cm)	Floral stems per plant	Worls per flowery stem	Flowers per whorl	Flowers per plant
Mănăstirea	60	13	10	12,8	1.664

Table 2

Average figures regarding the glucidic index and honey production in *Salvia nemerosa* L. (Danube Valley, 2003 – 2005)

Quantity of nectar (mg/flower)	Sugar content (%)	Average flowering period (days)	Number flowers per plant	Number plant per sqm	Number flowers per sqm	Kg of honey per ha
0,6	69,5	3	1.664	17	28.288	434,8

*Salvia pratensis* L. (meadow sage) was found in the floral composition of xerophile meadows under the form of dense thickets.

Biometric measurement listed in table 3 shown that the average height of studied plants was of 85 cm, ranging from 57,8 cm to 101 cm. the average number of inflorescence per plant was of 22 inflorescence, average number of whorls per inflorescence was 12 whorls, number of flowers within a whorl was 8 flowers, and the average number of flowers per plant was calculated to 2.112 flowers/plants.

Table 3

Average figures related of plant and the number of floral organs for *Salvia pratensis* L. (Danube Valley, 2003 – 2005)

Location research	Height of plant (cm)	Floral stems per plant	Worls per flowery stem	Flowers per whorl	Flowers per plant
Dorobanțu	85	22	12	8	2.112

Meadow sage is a valuable honey plant in the natural flora of the Danube Valley, which often occurs on dry meadows but also on glades and bushes, railway sides and in crops.

Field calculations have shown that the average quantity of nectar was of 67%. Base upon these data, potential honey yield was calculated to 171 kg/ha (table 4).

Table 4

Average figures regarding the glucidic index and honey production in  
*Salvia pratensis* L. (Danube Valley, 2003 – 2005)

Quantity of nectar (mg/flower)	Sugar content (%)	Average flowering period (days)	Number flowers per plant	Number plant per sqm	Number flowers per sqm	Kg of honey per ha
0,4	67	3	2.112	8	16.896	171

*Marrubium vulgare* L. (horehound) was found in the floral composition of xerophile meadows as isolated exemplars, rarely in thickets. Biometric measurements, carried out on a xerophile meadow near Călărașii-Vechi and listed in table 5, show that the average height of studied plants was of 55 cm, ranging from 30 to 85 cm. the same table shows that horehound is a strongly branched plant, with an average number of stems /plant being of 35 branches. Each branch had an average of 7 layers of whorls, made up of 9 flowers. The average number of flowers per plant was calculated to 2.205.

Table 5

Average figures related of plant and the number of floral organs for  
*Marrubium vulgare* L. (Danube Valley, 2003 – 2005)

Location research	Height of plant (cm)	Floral stems per plant	Worls per flowery stem	Flowers per whorl Număr flori pe verticil	Flowers per plant
Călărașii-Vechi	55	35	7	9	2.205

Carried out determinations shown that the quantity of nectar secreted by a flower in 24 hours 0,09 mg/flower, and nectar sugar content was 55 %. The average life cycle of a flower was 2 days (table 6).

Table 6

Average figures regarding the glucidic index and honey production in  
*Marrubium vulgare* L. (Lunca Dunării, 2003 – 2005)

Quantity of nectar (mg/flower)	Sugar content (%)	Average flowering period (days)	Number flowers per plant	Number plant per sqm	Number flowers per sqm	Kg of honey per ha
0,09	55	2	2.205	4	8.820	11

*Lamium purpureum* L. (purple deadnettle) was found throughout the valley, on xerophile meadows, in dense thickets, and also on roadsides, channels, crops, mainly autumn cereals, as well as on wastelands. Biometric measurements listed in table 7 show that the average height of studied plants was 19,5 cm. From the same table it results an average number of stems per plant was 3,5 stems, each inflorescence being formed of 4,4 whorls, with 6,2 flowers per whorls, resulting in an average number of 95,5 flowers per plant.

Table 7

Average figures related of plant and the number of floral organs for  
*Lamium purpureum* L. (Danube Valley, 2003 – 2005)

Location research	Height of plant (cm)	Floral stems per plant	Worls per flowery stem	Flowers per whorl	Flowers per plant
Mânăstirea	19,5	3,5	4,4	6,2	95,5

From carried out analyses aimed to determine the melliferous potential in purple deadnettle it arose that the average nectar secretion was 0,3 mg/flower, with a nectar sugar content of 63,8%. Potential honey yield was estimated at 48 kg/ha (table 8).

Table 8

Average figures regarding the glucidic index and honey production in  
*Lamium purpureum* L. (Danube Valley, 2003 – 2005)

Quantity of nectar (mg/flower)	Sugar content (%)	Average flowering period (days)	Number flowers per plant	Number plant per sqm	Number flowers per sqm	Kg of honey per ha
0,3	63,8	2	95,5	106	10.123	48

*Lamium amplexicaule* L. (henbit deadnettle) was lesser spread, compared to the previous species *Lamium purpureum* L. (purple deadnettle). Pursuant to biometric measurements listed in table 9, the resulted average height of studied plants occurred on the communal pasture Dorobanțu was 22 cm. From the same table it results an average number of stems per plant of 9,1 stems, 2,5 average number of whorls per stem, and the average number of flowers per whorls was 13,7 flowers, resulting in an average number of 311,6 flowers per plant.

Table 9

Average figures related of plant and the number of floral organs for  
*Lamium amplexicaule* L. ((Danube Valley, 2003 – 2005)

Location research	Height of plant (cm)	Floral stems per plant	Worls per flowery stem	Flowers per whorl	Flowers per plant
Dorobanțu	22	9,1	2,5	13,7	311,6

From analyses carried out to determine the nectar capacity in henbit deadnettle, it resulted an average nectar secretion of 0,1 mg/flower, with a nectar sugar content of 60,5, and a potential honey yield calculated to 66,2 kg/ha (table 10).

Table 10

Average figures regarding the glucidic index and honey production in  
*Lamium amplexicaule* L. (Danube Valley, 2003 – 2005)

Quantity of nectar (mg/flower)	Sugar content (%)	Average flowering period (days)	Number flowers per plant	Number plant per sqm	Number flowers per sqm	Kg of honey per ha
0,1	60,5	2	311,6	142	44.247	66,2

### Conclusions

Pursuant to researches carried out on the floral composition of xerophyte meadows from the Danube Valley the following conclusions may be drawn:

The floral composition of xerophyte meadows is featured by a relatively small number of plant species, compared to the floral composition of hydrophyte meadows.

Yet plant species in Lamiaceae have a good participation.

Five species in the *Lamiaceae* family were identified and studied, namely:

1. *Salvia nemerosa* L. (meadow sage), characterized by:  
An average height of plants of 60 cm;  
An average number of 1.664 flowers per plant and 28.288 flowers sqm;  
A melliferous potential estimated to 434,8 kg honey/ha.
2. *Salvia pratensis* L. (meadow sage), characterized by:  
An average height of plants of 85 cm;  
An average number of 2.112 flowers per plant and 16.896 flowers sqm;  
A melliferous potential estimated to 171kg honey/ha.
3. *Marrubium vulgare* L. (horehound), characterized by:  
An average height of plants of 55 cm;  
An average number of 2.205 flowers per plant and 8.820 flowers sqm;  
A melliferous potential estimated to 11 kg honey/ha.
4. *Lamium purpureum* L. (purple deadnettle), characterized by:  
An average height of plants of 19,5 cm;  
An average number of 95,5 flowers per plant and 10.123 flowers sqm;  
A melliferous potential estimated to 48 kg honey/ha.
5. *Lamium amplexicaule* L. (henbit deadnettle), characterized by:  
An average height of plants of 22 cm;  
An average number of 311,6 flowers per plant and 44.247 flowers sqm;  
A melliferous potential estimated to 66,2 kg honey/ha.

### Bibliography

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