

## APIFLORA OF SOME MEADOWS AROUND KRAGUJEVAC (SERBIA)

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(Received, 18 September 1996.)

*This work presents the melliferous flora in eight meadow phytocoenoses in the area surrounding Kragujevac. By analysing the presence of melliferous species in each meadow community (number and coverage), as well as by determining the intensity of nectar production of each melliferous species in the community, the coenotic coefficient of nectar production (CCnp) of the plant community was obtained. CCnp shows the significance of the plant community for bee pasture. Simultaneously the percentage of melliferous species was estimated in each investigated community. Ranking the phytocoenoses with regard to their significance as bee pasture, was carried out on the basis of the coenotic coefficient of melliferousness.*

*Key words: honey plants, nectar, meadow phytocoenoses*

### INTRODUCTION

Melliferous flora have been continuously investigated at the Department of Botany for ten years (Blaženčić, 1987., Danon, and Blaženčić, 1987a., Danon, and Blaženčić, 1987b., Danon, and Blaženčić, 1988a., Danon, and Blaženčić, 1988b., Danon, et al., 1990a., Danon, et al., 1990., Blaženčić, et al. 1994.).

Natural phytocoenoses in the vicinity of Kragujevac include 35% of the whole area. The natural vegetation of this area is divided between forest (23%), meadow (12%) and swamp vegetation.

The analysis of melliferous flora, registered in the phytocoenoses described by Veljović (1967), included investigations on the following plant communities: Scirpeto - Phragmitetum, Agrostideto - Juncetum effusi, Caricetum vulpinae - ripariae, Trifolio - Agrostidetum, Trifolio - Cynosuretum cristati, Agropireto - Festucetum pratensis, Trifolio - Chrysopogonetum grylli and Agrostido - Andropogonetum ischaemi.

### MATERIALS AND METHODS

The coenotic coefficient of nectar production is the most reliable index of the significance of a certain plant community for bee pasture, and it includes several parameters.

The index of nectar production (Inp) or quality of a plant species was graded by numerals from 1 to 4 (1 is for a poor melliferous species, 2 for good, 3 for very good and 4 for excellent.) The data on the quality of the species are presented according to the method of Jašmak (1980) and Lovašen - Eberhardot, Šegulja and Krga (1989).

The abundance of melliferous species in a plant community was determined on the basis of a combined estimation of number and coverage according to the method of Braun-Blanquet (1928). The mean value of number and coverage of species was calculated from the phytocoenological table, and in this way a real value of the abundance of melliferous species in the analysed communities was obtained. These values, according to the above mentioned author, ranged from 1 to 5. If a species was only present in a community and designated within the phytocoenological survey, in our work it was valued as 0,5.

The coefficient of nectar production (Cnp) for each melliferous species in the community was calculated, and that coefficient represents the product of the mean value of number and coverage (nc) and the index of nectar production (Inp). The sum of all individual Cnp in a single phytocoenosis represents the coenotic coefficient of nectar production (CCnp) of the community.

## RESULTS AND DISCUSSION

Out of the total of 43 species in the community Scirpeto - Phragmitetum W. Koch (table 1), 14 were melliferous making up 32,56%.

Table 1. Melliferous species in the community Scirpeto - Phragmitetum W. Koch.

Species	Inp	nc	Cnp
<i>Alisma plantago</i>	2	0,52	1,04
<i>Lythrum salicaria</i>	4	0,58	2,32
<i>Stachys palustris</i>	3	0,24	0,72
<i>Polygonum persicaria</i>	2	0,30	0,60
<i>Mentha aquatica</i>	4	0,72	2,88
<i>Symphutum officinale</i>	3	0,14	0,42
<i>Althaea officinalis</i>	3	0,16	0,48
<i>Cirsium arvense</i>	2	0,10	0,20
<i>Plantago maior</i>	3	0,12	0,36
<i>Eupatorium cannabinum</i>	4	0,08	0,32
<i>Ranunculus repens</i>	1	0,08	0,08
<i>Lysimachia nummularis</i>	2	0,14	0,28
<i>Trifolium hybridum</i>	4	0,04	0,16
<i>Potentilla reptans</i>	2	0,32	0,64

Among these 14 melliferous species in the Scirpo-Phragmitetum association, the biggest Cnp was found for the species *Lythrum salicaria* and *Mentha aquatica*. Their distribution in this association was not uniform. The biggest number of the named species was found in the facies *Typhosum latifoliae* where they were registered in all the phytocoenological samples. This fragment of the Scirpo-Phragmitetum association gives the best bee pasture.

The coenotic coefficient of nectar production (CCnp) of this community was found to be 10,5.

Out of the total of 41 species in the community *Agrostideto - Juncetum effusi* T. Cincović, (table 2), 15 were melliferous making up 36,59%.

Table 2. Melliferous species in the community *Agrostideto-Juncetum effusi* T. Cincović

Species	lnp	nc	Cnp
<i>Potentilla reptans</i>	2	0,27	0,53
<i>Ranunculus repens</i>	1	0,27	0,27
<i>Lysimachia Vulgaris</i>	2	0,23	0,46
<i>Mentha aquatica</i>	4	0,67	2,67
<i>Lysimachia nummularia</i>	2	0,50	1,00
<i>Alisma plantago</i>	2	1,07	2,14
<i>Lotus corniculatus</i>	4	0,37	1,47
<i>Trifolium patens</i>	4	0,37	1,47
<i>Plantago maior</i>	3	0,23	0,70
<i>Trifolium hybridum</i>	4	0,20	0,80
<i>Polugonum persicaria</i>	2	0,20	0,40
<i>Lythrum salicaria</i>	4	0,10	0,40
<i>Althaea officinalis</i>	3	0,10	0,30
<i>Stachys palustris</i>	3	0,07	0,21
<i>Melilotus officinalis</i>	3	0,07	0,21

Table 3. Melliferous species in the community *Caricetum vulpinae - ripariae* R. Jov.

Species	lnp	nc	Cnp
<i>Alisma plantago</i>	2	0,30	0,60
<i>Althaea officinalis</i>	3	0,13	0,39
<i>Lythrum salicaria</i>	4	0,10	0,40
<i>Lysimachia nummularia</i>	2	0,73	1,47
<i>Potentilla reptans</i>	2	1,00	2,00
<i>Mentha aquatica</i>	4	0,47	1,87
<i>Plantago maior</i>	3	0,47	1,41
<i>Trifolium hybridum</i>	4	0,53	2,12
<i>Lotus corniculatus</i>	4	0,50	2,00
<i>Ranunculus repens</i>	1	0,40	0,40
<i>Inula salicina</i>	2	0,17	0,33
<i>Trifolium patens</i>	4	0,23	0,93
<i>Taraxacum officinale</i>	4	0,07	0,27
<i>Trifolium resupinatum</i>	4	0,17	0,67
<i>Trifolium pratense</i>	3	0,07	0,21
<i>Vicia grandiflora</i>	3	0,07	0,21
<i>Ononis spinosa</i>	3	0,10	0,30
<i>Achillea millefolium</i>	1	0,07	0,07

In this association besides melliferous hygrophylous species (*Mentha aquatica*, *Alisma plantago*, *Lysimachia nummularia*) some excellent melliferous species belonging to the family Fabaceae (*Lotus corniculatus*, *Trifolium patens*, *Trifolium hybridum*, *Melilotus officinalis*) were also found. Unfortunately they occurred in some small populations, so their influence on the CCnp was insignificant.

The coenotic coefficient of nectar production (CCnp) for this community was found to be 13,03.

Out of the total of 44 species in the community *Caricetum vulpinae* - *ripariae* R. Jov. (table 3), 18 were melliferous making up 40,9%.

Compared to the two previous phytocenoses, the *Caricetum vulpinae* - *ripariae* R. Jov. association included over 40% of melliferous species. These species were found in the flowering period in early summer (end of June) providing continuous bee pasture after *Acacia* had already passed as a significant melliferous species.

The coenotic coefficient of nectar production (CCnp) for this community was found to be 15,65.

Out of the total of 47 species in the community *Trifolio* - *Agrostidetum* Veljović (table 4), 19 were melliferous making up 40,43%.

Table 4. Melliferous species in the community *Trifolio* - *Agrostidetum* Veljović

Species	Inp	nc	Cnp
<i>Trifolium hybridum</i>	4	1,88	7,5
<i>Trifolium resupinatum</i>	4	1,46	5,84
<i>Potentilla reptans</i>	2	0,83	1,67
<i>Lotus corniculatus</i>	4	0,54	2,17
<i>Circhorium intybus</i>	3	0,42	1,25
<i>Inula salicina</i>	2	0,46	0,92
<i>Ranunculus repens</i>	1	0,21	0,21
<i>Brunela vulgaris</i>	2	0,25	0,50
<i>Lathyrus pratensis</i>	4	0,21	0,83
<i>Lysimachia vulgaris</i>	2	0,08	0,16
<i>Trifolium patens</i>	4	1,17	4,67
<i>Lysimachia nummularia</i>	2	0,42	0,84
<i>Mentha aquatica</i>	4	0,29	1,17
<i>Taraxacum officinale</i>	4	0,29	1,17
<i>Symphytum officinale</i>	3	0,37	1,12
<i>Trifolium pratense</i>	3	0,13	0,38
<i>Lythrum salicaria</i>	4	0,21	0,83
<i>Ononis spinosa</i>	3	0,21	0,63
<i>Geranium pratense</i>	2	0,08	0,16

Besides the swamp vegetation mentioned above, some valley meadows and meadows located in the hills exist in the area around Kragujevac. Mesophyllous valley meadows of the *Trifolio*-*Agrostidetum* *albae* type had a relatively high value of CCnp because of the characteristic melliferous species *Trifolium hybridum* and *Trifolium resupinatum* which occurred in this association in significant numbers.

The coenotic coefficient of nectar production (CCnp) in this community was found to be 32,02.

Out of the total of 76 species in the community *Trifolio* - *Cynosuretum cristati* Veljović (table 5), 43 were melliferous, making up 56,58%.

Table 5. Melliferous species in the community *Trifolio - Cynosuretim cristati* Veljović

Species	Inp	nc	Cnp
<i>Trifolium patens</i>	4	3,73	14,92
<i>Taraxacum officinale</i>	4	0,33	1,33
<i>Daucus carota</i>	3	0,33	1,00
<i>Trifolium pratense</i>	3	0,33	1,00
<i>Lotus corniculatus</i>	4	0,47	1,87
<i>Achillea millefolium</i>	1	0,40	0,40
<i>Potentilla reptans</i>	2	0,47	0,93
<i>Tragopogon pratensis</i>	1	0,23	0,23
<i>Lathyrus pratensis</i>	4	0,20	0,80
<i>Vicia cracca</i>	2	0,23	0,47
<i>Bellis perennis</i>	2	0,17	0,33
<i>Campanula patula</i>	1	0,20	0,20
<i>Trifolium repens</i>	4	0,17	0,67
<i>Stachys officinalis</i>	4	0,20	0,80
<i>Ranunculus repens</i>	1	0,07	0,07
<i>Cichorium intybus</i>	3	0,47	1,40
<i>Ononis spinosa</i>	3	0,37	1,11
<i>Verbena officinalis</i>	2	0,43	0,86
<i>Inula salicina</i>	2	0,27	0,53
<i>Lathyrus tuberosus</i>	4	0,20	0,80
<i>Trifolium hybridum</i>	4	0,20	0,80
<i>Trifolium resupinatum</i>	4	0,20	0,80
<i>Symphitum officinale</i>	3	0,27	0,80
<i>Convolvulus arvensis</i>	1	0,20	0,20
<i>Brunella vulgaris</i>	2	0,13	0,26
<i>Plantago media</i>	3	0,37	1,10
<i>Allium angulosum</i>	3	0,13	0,40
<i>Filipendula hexapetala</i>	2	0,13	0,26
<i>Trifolium incarnatum</i>	4	0,30	1,20
<i>Lythrum salicaria</i>	4	0,13	0,53
<i>Polygala comosa</i>	2	0,17	0,33
<i>Ajuga reptans</i>	3	0,23	0,70
<i>Lysimachia vulgaris</i>	2	0,03	0,07
<i>Betonica officinalis</i>	4	0,10	0,40
<i>Medicago lupulina</i>	2	0,06	0,13
<i>Glechoma hederacea</i>	4	0,06	0,24
<i>Salvia pratensis</i>	4	0,16	0,67
<i>Althaea officinalis</i>	3	0,20	0,60
<i>Hieracium umbellatum</i>	2	0,07	0,14
<i>Viola tricolor</i>	1	0,07	0,07
<i>Hypericum perforatum</i>	2	0,07	0,14
<i>Vicia grandiflora</i>	3	0,07	0,21
<i>Vicia pannonica</i>	3	0,07	0,21

In the second mesophyllous meadow of *Trifolio-Cynosuretim cristati* type, the dense population of the most dominant species *Trifolium patens* with some other very good melliferous species (*Taraxacum officinale*, *Lotus corniculatus*, *Ononis spinosa*, *Cichorium intybus*), accounts for the high value of CCnp of this association.

The coenotic coefficient of nectar production (CCnp) for this community was found to be 38,1.

Out of the total of 77 species in the community Agropireto-Festucetum pratensis Veljović (table 6), 45 were melliferous, making up 58,44%.

Table 6. Melliferous species in the community Agropireto-Festucetum pratensis Veljović

Species	lnp	no	Cnp
Medicago lupulina	2	0,55	1,10
Allium angulosum	3	0,33	0,98
Plantago lanceolata	3	0,33	0,98
Trifolium patens	4	1,18	4,70
Trifolium pratense	3	0,55	1,65
Achillea millefolium	1	0,83	0,83
Lotus corniculatus	4	0,80	3,20
Ranunculus repens	1	1,00	1,00
Lathyrus pratensis	4	0,63	2,50
Galium verum	1	0,52	0,52
Bellis perennis	2	0,25	0,50
Daucus carota	3	0,30	0,90
Ononis spinosa	3	0,25	0,75
Potentilla reptans	2	0,40	0,80
Trifolium resupinatum	4	0,15	0,60
Taraxacum officinale	3	0,20	0,60
Cirsium canum	3	0,08	0,24
Leontodon hispidus	2	0,05	0,10
Cichorium intybus	3	0,85	2,55
Medicago maculata	3	0,68	2,03
Leucanthemum vulgare	2	0,40	0,80
Convolvulus arvensis	1	0,73	0,73
Lathyrus Tuberosus	4	0,63	2,50
Salvia pratensis	4	0,53	2,10
Coronilla varia	2	0,35	0,70
Vicia sativa	2	0,25	0,50
Vicia tetrasperma	2	0,23	0,46
Symphytum officinale	3	0,23	0,46
Inula salicina	2	0,13	0,26
Medicago falcata	4	0,23	0,90
Sanguisorba officinalis	2	0,30	0,60
Plantago maior	3	0,08	0,23
Trifolium hybridum	4	0,15	0,60
Trifolium repens	4	0,08	0,23
Geranium pratense	2	0,08	0,15
Veronica officinalis	2	0,15	0,30
Filipendula hexapetala	2	0,10	0,20
Lathyris aphaca	3	0,08	0,23
Vicia cracca	2	0,10	0,20
Cynanchum vincetoxicum	3	0,05	0,15
Plantago media	3	0,10	0,30
Papaver rhoeas	2	0,10	0,20
Lathyrus pannonicus	2	0,05	0,10
Potentilla recta	2	0,10	0,20
Betonica officinalis	4	0,03	0,12

Among all the analysed phytocoenoses, the highest frequency of melliferous species (58,44%) and the highest value of CCnp (40,04) was found in this mesophyllous Agropireto-Festucetum pratensis association. The most significant

melliferous species in this valley meadow were found to be *Trifolium patens*, *Lotus corniculatus*, *Lathyrus pratensis*, *Cychorium intibus* and *Salvia pratensis*.

The coenotic coefficient of nectar production (CCnp) for this community was 40,04.

Out of the total of 88 species in the community *Trifolio-Chrysopogonietum grylli* Veljović out of the total of 88 species (table 7), 46 were melliferous, making up 52,27%.

Table 7. Melliferous species in the community *Trifolio - Chrysopogonietum grylli* Veljović

Species	lnp	nc	Cnp
<i>Trifolium montanum</i>	3	0,76	2,28
<i>Galium verum</i>	2	0,73	1,45
<i>Medicago falcata</i>	4	0,76	3,04
<i>Plantago media</i>	3	0,62	1,86
<i>Polygala vulgaris</i>	2	0,32	0,64
<i>Eryngium campestre</i>	2	0,26	0,52
<i>Potentilla recta</i>	2	0,20	0,40
<i>Polygala comosa</i>	2	0,18	0,36
<i>Stachys recta</i>	4	0,20	0,80
<i>Trifolium campestre</i>	3	0,04	0,12
<i>Filipendula hexapetala</i>	2	0,54	1,08
<i>Leucanthemum vulgare</i>	2	0,44	0,88
<i>Lotus corniculatus</i>	4	0,78	3,12
<i>Achillea millefolium</i>	1	0,48	0,48
<i>Salvia pratensis</i>	4	0,62	2,48
<i>Trifolium patens</i>	4	0,60	2,40
<i>Campanula rapunculus</i>	4	0,36	1,44
<i>Betonica officinalis</i>	4	0,32	1,28
<i>Convolvulus arvensis</i>	1	0,26	0,26
<i>Ononis spinosa</i>	3	0,50	1,50
<i>Vicia cracca</i>	2	0,34	0,68
<i>Teucrium chamaedrys</i>	2	0,32	0,64
<i>Trifolium pratense</i>	3	0,26	0,78
<i>Lathyrus pratensis</i>	4	0,24	0,96
<i>Knautia arvensis</i>	3	0,20	0,60
<i>Cychorium intybus</i>	3	0,12	0,36
<i>Coronilla varia</i>	2	0,18	0,36
<i>Tragopogon pratensis</i>	1	0,18	0,18
<i>Thymus serpyllum</i>	3	0,22	0,66
<i>Lathyrus tuberosus</i>	4	0,12	0,48
<i>Taraxacum officinale</i>	4	0,14	0,56
<i>Allium angulosum</i>	3	0,16	0,48
<i>Medicago lupulina</i>	2	0,16	0,32
<i>Trifolium incarnatum</i>	4	0,18	0,72
<i>Veronica officinalis</i>	2	0,22	0,44
<i>Trifolium medium</i>	3	0,12	0,36
<i>Ajuga genevensis</i>	3	0,14	0,42
<i>Leontodon hispidus</i>	2	0,06	0,12
<i>Daucus carota</i>	3	0,08	0,24
<i>Verbascum phoeniceum</i>	3	0,06	0,18
<i>Vicia tetrasperma</i>	2	0,08	0,16
<i>Trifolium alapestre</i>	4	0,06	0,24
<i>Viola tricolor</i>	1	0,06	0,06
<i>Vicia pananonica</i>	2	0,10	0,20
<i>Thymus montanum</i>	3	0,06	0,18

Due to some mesophyllous and many xerophyllous melliferous species (*Medicago falcata*, *Trifolium montanum*, *Galium verum*, *Lotus corniculatus* etc.) in the *Trifolio- Chrysopogonetum gryl* meadow association, the value of the coenotic coefficient of nectar production (CCnp) was high (36,77).

Out of the total of 72 species in the community *Agrostido - Andropogonetum ischaemi* Veljović (table 8), 31 were melliferous, making up 43,06%.

Table 8. *Agrostido-Andropogonetum ischaemi* Veljović

Species	Inp	nc	Cnp
<i>Thymus serpyllum</i>	3	1,23	3,69
<i>Galium verum</i>	1	0,37	0,37
<i>Trifolium campestre</i>	3	0,33	0,99
<i>Stachys recta</i>	4	0,23	0,93
<i>Plantago media</i>	3	0,23	0,70
<i>Trifolium montanum</i>	3	0,47	1,40
<i>Eryngium campestre</i>	2	0,23	0,46
<i>Salvia pratensis</i>	4	0,20	0,80
<i>Medicago falcata</i>	4	0,20	0,80
<i>Dorycnium herbaceum</i>	3	0,20	0,60
<i>Oryganum vulgare</i>	3	0,37	1,10
<i>Veronica chamaedrys</i>	2	0,33	0,67
<i>Stachis germanica</i>	3	0,33	1,00
<i>Hypericum perforatum</i>	2	0,33	0,67
<i>Achillea millefolium</i>	1	0,40	0,40
<i>Lotus corniculatus</i>	4	0,40	1,60
<i>Helleborus odoratus</i>	3	0,40	1,20
<i>Centaurea cyanus</i>	3	0,27	0,80
<i>Ononis spinosa</i>	3	0,23	0,70
<i>Brunella vulgaris</i>	2	0,27	0,53
<i>Campanula persicifolia</i>	4	0,23	0,93
<i>Lathyrus pratensis</i>	4	0,13	0,53
<i>Lathyrus silvestris</i>	4	0,20	0,80
<i>Campanula trachelium</i>	4	0,13	0,53
<i>Verbascum nigrum</i>	1	0,23	0,23
<i>Viola tricolor</i>	1	0,13	0,13
<i>Cichorium intybus</i>	3	0,13	0,40
<i>Vicia cracca</i>	2	0,10	0,20
<i>Rubus fruticosus</i>	3	0,47	1,40
<i>Fragaria chollina</i>	1	0,63	0,63
<i>Medicago prostrata</i>	3	0,23	0,70

The other association belonging to the hill-meadow type was *Agrostidetum Andropogonetum ischaemi*, where the most important melliferous species were found to be *Thymus serpyllum*, *Trifolium montanum*, *Origanum vulgare*, *Stachis germanica*, *Lotus corniculatus* and *Rubus fruticosus*.

The coenotic coefficient of nectar production (CCnp) for this community was found to be 25,89.

Analysis of the coenotic coefficient of nectar production (CCnp) and the proportional participation of melliferous flora in each meadow community (%mf) provided an estimation of their significance for bee pasture (table 9).



Table 9. Investigated communities in the vicinity of Kragujevac

communities	CCnp	%mf
Scirpeto-Phragmitetum W. Koch.	10,50	32,56
Agrostideto-Juncetum effusi T. Cincović	13,03	36,59
Caricetum vulpinae-ripariae R. Jov.	15,65	40,90
Trifolio-Agrostidetum Veljović	32,02	40,43
Trifolio-Cynosuretum cristati Veljović	38,10	56,58
Agropireto-Festucetum pratensis Veljović	40,04	58,44
Trifolio-Chrysopogonetum grylli Veljović	36,77	52,27
Agrostido-Andropogonetum ischaemi Veljović	25,89	43,06

Ricciardelli D'Albore and Persano Oddo (1981) and Maurizio and Grafl, (1969) investigated melliferous plants in relation to their nectar production while morphoanatomy of the secretory tissues (Fahn, 1988., investigated Metcalfe, 1988). On the other hand botanists have investigated phytocoenoses by describing them. The authors Danon et al. (1990) and Blaženčić et al. (1987) were the only ones, according to our sources, who established the melliferous potential of some plant communities.

In comparison with our previous investigations (Goč, Suva Planina, and Velika Morava), it may be noted that the highest percent of melliferous flora was found in the phytocoenoses around Kragujevac (58,44). The lowest amount of melliferous plants (10,26) was found in Suva Planina.

However, the proportion of melliferous plants in the community is not always a reliable coefficient which describes the quality of bee pasture.

As a true index of the quality of a plant community for bee pasture CCnp shows that the communities of the mountain Suva Planina had a higher value (69) than those found in the Kragujevac surroundings (40,04) and Velika Morava valley (35,62).

Comparison of the CCnp of all analysed phytocoenoses (table 9) showed that some hygrophylous associations have very small values of CCnp (10,5 - 15,65) while the frequency of melliferous species in these communities was found to be relatively high (32,56 - 40,90%).

The highest value of CCnp (36,77-40,04) as well as a high percentage of apiflora (52,27-58,44%) were detected in mesophylous and xeromesophylous meadows of the Trifolio-Cynosuretum cristati, Agropireto-Festucetum pratensis, and Trifolio - Chrysopogonetum grylly type.

These three meadow communities in the vicinity of Kragujevac represent vegetation with numerous melliferous species which are very significant for bee pasture until the grass is cut.

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#### APIFLORA NEKIH LIVADA U OKOLINI KRAGUJEVCA (SRBIJA)

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#### SADRŽAJ

U ovom radu prikazana je medonosna flora osam livadskih fitocenoza u okolini Kragujevca. Analizom prisutnosti medonosnih vrsta u svakoj livadskoj zajednici (brojnost i pokrovnost), kao i određivanjem intenziteta nektarske produkcije svake medonosne vrste u zajednici, određen je cenotički koeficijent nektarske produkcije biljne zajednice (CCnp). CCnp je pokazatelj značaja biljne zajednice za pčelinju pašu. Takođe je izračunat procenat medonosnih vrsta u svakoj ispitivanoj zajednici.

Rangiranje fitocenoza prema njihovom značaju za pčelinju pašu, je sprovedeno na osnovu koeficijenta medonosnosti.