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Original Contribution

POSSIBILITIES FOR PROVIDING BEE PASTURE FROM NECTARIFEROUS PLANTS IN SINITE KAMANI NATURAL PARK - SLIVEN

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ABSTRACT

The study is part of a project for preserving the biodiversity of vascular plants in Sinite kamani Natural park and it comprises research on the possibilities for using bee colonies as pollinators. Observations have been carried out throughout the vegetation period of 2007-2009 concerning the blossoming period of nectariferous species in the park, the number and area of their populations. The blossoming of nectariferous plants in Sinite Kamani Natural Park starts in January at earliest and continues as late as November. The least number of blossoming plants has been registered at the beginning and end of vegetation and the greatest – in June. In the greater part of species extension of the blossoming period has been recorded. The main source of pollen and nectar for bees throughout the entire vegetation of woody nectariferous plants are: *Cornus mas*, *Corylus avellana, Tilia tomentosa*; *Robinia pseudoacacia*; *Acer campestre*; *Acer platanoides, Crataegus monogyna*. A valuable nutritional basis of herbaceous nectariferous plants are both the numerous populations of *Satureja montana*, *Galanthus elwesii, Primula veris*, *Anemone ranunculoides*, *Viola odorata, Paeonia peregrina, Fritillaria pontica*, *Pulmonaria officinalis*, *Geranium macrorrhizum*, and those of the species of the following genera *Thymus, Teucrium, Salvia, Sedum, Marrubium, Ajuga, Echium, Echinops*, *Carduus, Genista, Lathyrus, Medicago, Melilotus, Potentilla, Stachys,* etc. The amount of pollen and nectar throughout the entire vegetation are sufficient for providing a very good bee pasture. The data obtained give us good reason to think that on the territory of Sinite Kamani Natural Park there are very good conditions for providing continuous and lasting bee pasture throughout the entire vegetation.

Keywords: nectariferous plants, Sinite Kamani Natural Park, blossoming period, pollen, nectar

INTRODUCTION

Sinite Kamani Natural Park is natural and unique scenery of the town of Sliven. The highly rugged terrain, the variety of soils and subsoil rocks, the different climatic influences combined with the long geological history and dynamic historical development of the Sliven region have pre-determined an extraordinary plant diversity on its territory. Up to that moment a total of 963 species and 27 subspecies of vascular plants have been reported for the park (1, 2, 3), i.e. about 1/4 of the known for the Bulgarian flora. The preservation of that outstanding wealth is directly related to the provision of suitable conditions for normal development and conservation of their populations. Great part of the species are entomophillic ones and their vegetation is completely dependent on their pollinators. Many and different types of insects visit the plants in blossom but cross pollination is not always arrived at. Pollination is complete only with mixed pollen collected from many plants of a given species the populations of which are at varied conditions. In regard to that bees are indispensable according to a number of authors (4, 5, 6, 7). They are always attracted by plants of a given species and a conditional reflex is created in them to the fragrance, the presence of nectar, the shape and colour of the blossom of that species. In addition, they can fly within a radius of up to 3.5 km and respectively they can visit many flowers of varied populations of the species, and their heavily pappilated body retains and

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transfers a considerable amount of pollen. For bee colonies to be used as pollinators in a given territory it is necessary to have a sufficient number of flowering nectariferous plants throughout the entire vegetation.

The present study is part of a project for keeping the biological diversity of vascular plants in Sinite Kamani Natural Park that comprises study on the opportunities for using bees as pollinators. During its first stage nectariferous plants in the parks have been established. The aim of this one is to assess the opportunities for providing more extended and successive bee pasture by studying the blossoming period of nectariferous species on the park territory.

MATERIAL AND METHODS

During the vegetation periods of 2007-2009 a series of expeditions have veen organized in Sinite Kamani Natural Park. The taxonomic diversity of nectariferous plants has been studied by using the route method. Observations have been made on the blossoming period, the area and numbers of their populations. The routes specified by Grozeva et al. (2004) have been used, which cover the maximum area of habitat variety in the Park. The taxonomic basis used was Flora of RB, volumes I – X (9, 10), The Flora in Bulgaria, volumes I – II (13), Field Guide to the Vascular Plants in Bulgaria (12), Key to the Plants of Bulgaria (13). To specify the products collected by bees from nectariferous plants we used the data of a number of leading researchers (5, 6, 7).

RESULTS AND DISCUSSION

For the territory of Sinite Kamani Natural Park populations of 220 species and 4 subspecies of nectariferous plants have been established belonging to 133 genera and 47 families (14). The results from the reference made show that a significant part – 167 species and 3 subspecies, i.e. 75% of the nectariferous plants in the park are visited by bees for nectar and pollen, 30 species and 1 subspecies (14%) – for pollen and 24 species (11%) – for nectar only **(Fig. 1)**. A small part of the species (a total of about 4%), e.g. *Fagus sylvatica* L., *Quercus cerris* L., *Q. dalechampii* L., *Q. frainetto* Ten., etc. are the source of nectar dew as well. When nectariferous plants are insufficient, bees visit other plants as well and they collect pollen from them, too, and thus facilitate their pollination. Having in mind that over 85% of vascular plants registered in the Park are entomophillic, the role of pollinators for their future development is great.

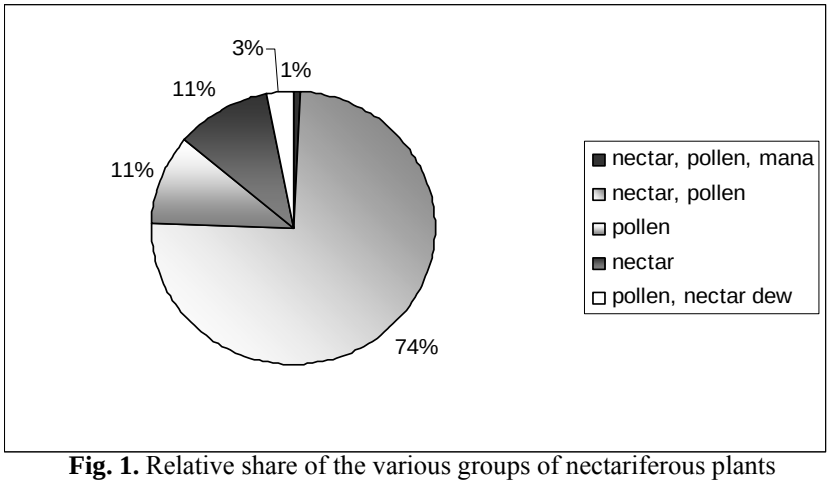

Fig. 1. Relative share of the various groups of nectariferous plants depending on the products that bees obtain from them.

According to the time of blossoming nectariferous plants are commonly subdivided into the following groups: early spring (blossoming at the end of winter and beginning of spring), spring, summer and autumn. The most favourable for bee practice according to Bizhev et al. (2003) are the areas with overlapping of flowering nectariferous plants of all or most groups. The data form the present study reveal that on the territory of Sinite Kamani Natural Park nectariferous plants of all groups are available **(Fig. 2)**. In great part of the species due to difference in relief, exposure, soil and atmospheric moisture, extension of the blossoming period is observed.

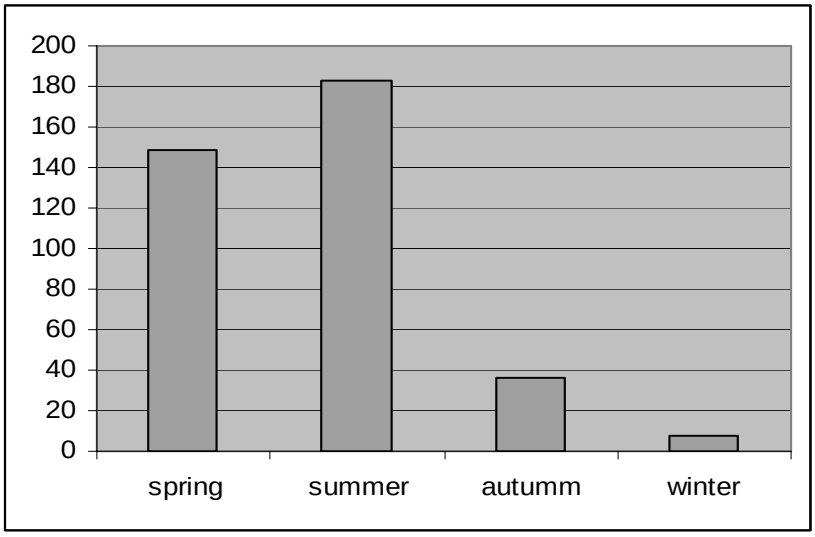

Fig. 2. Distribution of nectariferous plant species in Sinite Kamani Natural Park by seasons according to the period of their blossoming.

The greatest numbers the of nectariferous plants have been registered in the summer – 177 species and 3 subspecies **(Fig. 2, Table 1)**. Significant is the number of spring flowering ones as well – 147 species and 2 subspecies **(Table 1)**. Autumn species are more limited in number – 35 species and 1 subspecies, and early spring ones are only 8 species **(Table 1)**.

Table 1. *A list of nectariferous plants found in Sinite Kamani Natural Park by seasons according to the period of their blossoming.*

Period of flowering	**Species**
Spring (III-V)	*Acer campestre* L., *A. platanoides* L., *A. tataricum* L., *Adonis vernalis* L., *Aegopodium podagraria* L., *Amelancher ovalis* Medicus, *Amorpha fruticosa* L., *Amygdalus communis* L., *Anemone nemorosa* L., *A. ranunculoides* L., *A. sylvestris* L., *Anthylis vulneraria* L. subsp. *pulchella* (Vis), *Ajuga genevensis* L., *A. reptans* L., *Asparagus officinalis* L., *Berberis vulgaris* L., *Betula pendula* Roth., *Capsella bursa-pastoris* (L.) Medicus, *Cerinthe minor* L., *Chamaespartium sagittale* (L.) Gibbs., *Cirsium arvense* (L.) Scop., *Colutea arborescens* L., *Convallaria majalis* L., *Cornus mas* L., *C. sanguinea* L., *Corylus avellana* L., *C. colurna* L., *Cotoneaster integerrimus* Medicus, *Crataegus monogyna* Jacq., *Crocus biflorus* Miller, *C. flavus* Weston, *C. olivieri* J. Gay., *Cynoglossum officinale* L., *Dictamnus albus* L., *Dorycnium herbaceum* Vill., *Echium vulgare* L., *Elaeagnus angustifolia* L., *Fagus sylvatica* L. ssp. *moesiaca* (K. Maly) Hjelmquist, *Fragaria vesca* L., *Fraxinus exelsior* L., *F. ornus* L., *Fritillaria pontica* Wahl., *Gagea lutea* L., *Galanthus elwesii* Hooker, *Genista carinalis* Griseb., *G. tinctoria* L., *Geranium macrorrhizum* L., *G. phaeum* L., *Glechoma hederacea* L., *Helleborus odorus* Walds.et Kit., *Hepatica nobilis* Miller, *Hypericum perforatum* L., *Jasminum fruticans* L., *Juglans regia* L., *Lamium amplexicaule* L., *L. purpureum* L., *Lathyrus aphaca* L., *L. vernus* (L.) Bernh., *Lembotropis nigricans* (L.) Griseb. subsp. *australis*, *Ligustrum vulgare* L., *Lonicera nigra* L., *Lotus corniculatus* L., *Malus sylvestris* Mill., *Malva sylvestris* L., *Marrubium vulgare* L., *Medicago sativa* L., *Melampyrum arvense* L., *Muscari botryoides* Mill., *M. comosum* Mill., *Myosotis arvensis* (L.) Hill., *M. stricta* Link., *M. sylvatica* Ehrh. ex Hoffm., *Nepeta cataria* L., *Origanum vulgare* L., *Ornithogalum montanum* Cyr., *Paeonia peregrina* Miller, *Paliurus spina-christi* Mill., *Polygonum aviculare* L., *Populus tremula* L., *Potentila argentea* L., *P. neglecta* Baumg., *Primula veris* L., *Prunella vulgaris* L., *Prunus avium* L. (Cerasus avium), *P. cerasifera* Ehrh., *P. machaleb* L. (Cerasus m.), *P. spinosa* L.,

	Pulmonaria officinalis L., *Pyrus pyraster* Burgsd., *Quercus cerris* L., *Q. dalechampii* L., *Q. frainetto* Ten., *Q. petraea* Matusctka, *Q. pubescens* Willd., *Q. robur* L., *Q. rubra* L., *Ranunculus repens* L., *Rhamnus catharticus* L., *Rhodax canus* (L.) Fuss., *Robinia pseudoacacia* L., *Rubus canescens* DC., *Salix caprea* L., *Salvia nemorosa* L., *S. pratensis* L., *Sambucus ebulus* L., *Scilla bifolia* L., *Scrophularia canina* L., *Scutellaria altissima* L., *Sedum album* L., *S. pallidum* Bieb., *S. rubens* L., *Sideritis montana* L., *Sorbus aria* (L.) Crantz., *S. aucuparia* L., *S. domestica* L., *S. graeca* (Spach.) Kotschy, *S. torminalis* (L.) Crantz., *Stellaria graminea* L., *S. holostea* St., H., L., *S. media* (L.)Vill., *Syringa vulgaris* L., *Taraxacum officinale* W. et K., *Teucrium chamaedrys* L., *T. montanum* L., *Thymus leucotrichus* Hall., *T. moesiacus* Velen., *T. jancae* Celac., *T. pulegioides* L., *T. sibthorpii* x *pannonicus*, *T. striatus* Vahl., *Trifolium alpestre* L., *T. arvense* L., *T. incarnatum* L., *T. patens* Schreber, *T. pratense* L., *T. repens* L., *Tussilago farfara* L., *Ulmus glabra* Hudson, *U. laevis* Pall., *U. minor* Miller, *Verbena officinalis* L., *Veronica austriaca* L., *V. chamaedrys* L., *Viburnum lantata* L., *V. opulus* L., *Vicia grandiflora* Scop., *V. sativa* L., *V. varia* Host., *V. villosa* Roth., Bornm., *Viola odorata* L., *V. tricolor* L.
Summer (VI-VIII)	*Acer pseudoplatanus* L., *A. tataricum* L., *Adonis vernalis* L., *Aegopodium podagraria* L., *Agrimonia eupatoria* L., *Ajuga genevensis* L., *A. reptans* L., *Alcea heldreichii* (Boiss) Boiss., *Allium carinatum* L., *A. flavum* L., *A. paniculatum* L., *A. sphaerocephalum* L., *A. victorialis* L., *Amorpha fruticosa* L., *Anchusa procera* Bess., *Anthylis vulneraria* L. subsp. *pulchella* (Vis) Bornm., *Artemisia vulgaris* L., *Asparagus officinalis* L., *Berberis vulgaris* L., *Capsella bursa-pastoris* (L.) Medicus, *Carduus acanthoides* L., *C. nutans* L., *C. thracicus* (Velen.) Hoyek, *Carlina acanthifolia* All., *Cerinthe minor* L., *Chamaecytisus hirsutus* (L.) Link., *Chamaenerion angustifolium* (L.) Scop. (Epilobium a. L.), *Chamaespartium sagittale* (L.) Gibbs., *Cichorium intybis* L., *Cirsium arvense* (L.) Scop., *Clematis vitalba* L., *Clinopodium vulgare* L., *Colchicum autumnale* L., *Colutea arborescens* L., *Consolida hispanica* (Costa) Greuter et Burdet, *Convallaria majalis* L., *Cornus sanguinea* L., *Cotoneaster integerrimus* Medicus, *Crataegus monogyna* Jacq., *Cynoglossum officinale* L., *Daucus carota* L., *Dictamnus albus* L., *Dipsacus laciniatus* L., *Dorychium herbaceum* Vill., *Echinops ritro* L., *E. schaerocephalus* L., *Echium vulgare* L., *Elaeagnus angustifolia* L., *Epilobium hirsutum* L., *Eryngium campestre* L., *Fritillaria pontica* Wahl., *Fragaria vesca* L., *Galeopsis speciosa* Miller, *G. tetrahit* L., *Genista carinalis* Griseb., *G. depressa* Bieb., *G. tinctoria* L., *Geranium macrorrhizum* L., *G. phaeum* L., *Glechoma hederacea* L., *G. hirsuta* W. K., *Hypericum perforatum* L., *Lamium amplexicaule* L., *L. purpureum* L., *Lathyrus aphaca* L., *L. pratensis* L., *L. vernus* (L.) Bernh., *Lavatera thuringiaca* L., *Lembotropis nigricans* (L.) Griseb. subsp. *australis*, *Ligustrum vulgare* L., *Lonicera nigra* L., *Lotus corniculatus* L., *Lythrum salicaria* L., *Malva sylvestris* L., *Marrubium peregrinum* L., *M. vulgare* L., *Medicago sativa* L., *Melampyrum arvense* L., *Melilotus alba* Medicus, *M. officinalis* (L.) Pallas, *Melissa officinalis* L., *Mentha spicata* L. subsp. *spicata*, *Muscari comosum* Mill., *Myosotis nemorosa* Bess., *M. stricta* Link., *M. sylvatica* Ehrh. ex Hoffm., *Nepeta cataria* L., *N. nuda* L., *Jasminum fruticans* L., *Ononis spinosa* L., *Origanum vulgare* L., *Ornithogalum montanum* Cyr., *Paeonia peregrina* Miller, *Paliurus spina-christi* Mill., *Phlomis tuberosa* L., *Polygonum aviculare* L., *Populus tremula* L., *Potentila argentea* L., *P. erecta* L., *P. neglecta* Baumg., *P. pindicola* (Nyman) Haussk., *Prunella grandiflora* (L.) Scholler., *P. laciniata* (L.) L., *P. vulgaris* L., *Quercus cerris* L., *Ranunculus repens* L., *Reseda lutea* L., *Rhamnus catharticus* L., *Rhodax canus* (L.) Fuss., *Robinia pseudoacacia* L., *Rubus canescens* DC., *R. hirtus* Walds. et Kit., *Salix caprea* L., *Salvia glutinosa* L., *S. nemorosa* L., *S. pratensis* L., *S. sclarea* L., *S. verticillata* L., *Sambucus ebulus* L., *Satureja coerulea* Janca., *S. montana* L., *Scabiosa ochroleuca* L., *Scrophularia canina* L., *Scutellaria altissima* L., *Sedum album* L., *S. hispanicum* L., *S. maximum* (L.) Suter., *S. ochroleucum* Chaix., *S. pallidum* Bieb., *S. rubens* L., *S. urvillei* DC. (S. sartorianum Boiss.), *Sideritis montana* L., *Solanum nigrum* L., *Sorbus aria* (L.) Crantz., *S. aucuparia* L., *S. graeca* (Spach.) Kotschy, *S. torminalis* (L.) Crantz., *Stachys recta* L. subsp. *subcrenata* (Vis.) Birg., *Stellaria graminea* L., *S. holostea* St.,

	H., L., *S. media* (L.)Vill., *Staphyllea pinnata* L., *Syringa vulgaris* L., *Tamarix tetranda* Pallas ex Bieb., *Taraxacum officinale* W. et K., *Teucrium montanum* L., *Thymus jancae* Celac., *T. leucotrichus* Hall., *T. moesiacus* Velen., *T. pulegioides* L., *T. sibthorpii* x *pannonicus*, *T. striatus* Vahl., *Tilia cordata* Miller, *T. tomentosa* Moench., *Trifolium alpestre* L., *T. arvense* L., *T. aureum* Poll., *T. campestre* Schreber, *T. incarnatum* L., *T. montanum* L., *T. patens* Schreber, *T. pannonicum* L., *T. pratense* L., *T. repens* L., *Verbena officinalis* L., *Veronica austriaca* L., *V. chamaedrys* L., *Viburnum lantata* L., *V. opulus* L., *Vicia cracca* L., *V. grandiflora* Scop., *V. sativa* L., *V. tenuifolia* Roth., *V. varia* Host., *V. villosa* Roth., *Vincetoxicum hirundinaria* Medicus, *Viola tricolor* L., *Xeranthemum annuum* L.
Autumn (IX-XI)	*Carduus nutans* L., *Carlina acanthifolia* All., *Cerinthe minor* L., *Cirsium arvense* (L.) Scop., *Chamaenerion angustifolium* (L.) Scop., *Cichorium intybis* L., *Colchicum autumnale* L., *Echinops sphaerocephalus* L., *Echium vulgare* L., *Daucus carota* L., *Hedera helix* L., *Lamium amplexicaule* L., *Lavatera thuringiaca* L., *Lotus corniculatus* L., *Malva sylvestris* L., *Melilotus alba* Medicus, *Mentha spicata* L. subsp. *spicata*, *Ononis spinosa* L., *Prunella vulgaris* L., *Paliurus spina-christi* Mill., *Polygonum aviculare* L., *Potentila argentea* L., *P. neglecta* Baumg., *Salvia glutinosa* L., *S. nemorosa* L., *Scabiosa ochroleuca* L., *Scutellaria altissima* L., *Sedum maximum* (L.) Suter., *Sideritis montana* L., *Solanum nigrum* L., *Taraxacum officinale* W. et K., *Thymus pulegioides* L., *Trifolium repens* L., *Viola tricolor* L., *Xeranthemum annuum* L.
Winter (XII-II)	*Cornus mas* L., *Corylus avellana* L., *Crocus biflorus* Miller, *C. flavus* Weston, *C. olivieri* J. Gay., *Galanthus elwesii* Hooker, *Helleborus odorus* Walds.et Kit., *Stellaria media* (L.)Vill.,

The blossoming of nectariferous plants in the Park starts as early as January and it continues to November at the very latest. The smallest numbers of flowering species have been registered at the beginning (January-February) and end (October-November) of vegetation and the greatest in June **(Fig. 3)**. During blossoming each plant has to be visited multiple times by its pollinators.

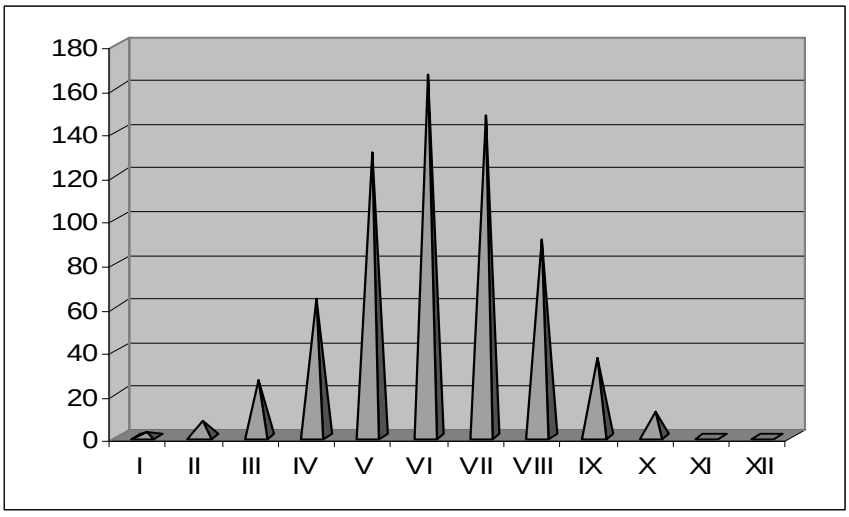

Fig. 3. Distribution of nectariferous plants in Sinite Kamani Natural Park by months according to the time of their flowering

Our observations show that at the end of winter and beginning of spring (II-III) insect flight on the park territory is rather limited. At that time bees can be very valuable as pollinators. Several tens of thousands of bee specimens spend the winter in their colonies. Their development at the end of winter and beginning of spring is very intensive. The numerous worker bees can provide pollination of a huge number of blossoms.

In January and February nectariferous plants in the park are limited in number, but the populations of some them such as *Galanthus elwesii* Hooker, *Crocus biflorus* Miller and *C. flavus* Weston are numerous and multitudinous. In February and March the basic source of pollen for the bees are generally the flowers of *Cornus mas* L. and *Corylus avellana* L. According to preliminary calculations the populations of these two species in the Park occupy a total area of over 400 dka. A good sources of nectar and pollen throughout that period are the numerous populations of some herbaceous nectariferous species observed on the park territory, such as *Primula veris* L., *Anemone ranunculoides* L., *Gagea lutea* L., *Muscari botryoides* Mill., *Viola odorata* L. Thus, already small in number, early spring plants can provide sufficient quantity of nectar and pollen for bee colonies at the end of winter and beginning of spring.

In April the number of flowering species increases drastically **(Fig. 3)**. The observations conducted reveal that this increase is due both to the occurrence of new flowering plants and the extended flowering of some early spring nectariferous species. An important sources of pollen and/or nectar in April from the woody species are: *Acer campestre* L.; *Amygdalus communis* L.; *Jasminum fruticans* L.; *Syringa vulgaris* L.; *Berberis vulgaris* L.; *Betula pendula* Roth. According to our data only the populations of *Acer campestre* in the park territory have a total area of over 900 dka. Numerous populations have been registered for many herbaceous nectariferous species, such as *Fritillaria pontica* Wahl., *Pulmonaria officinalis* L., *Geranium macrorrhizum* L., *Ajuga genevensis* L.

The number of flowering nectariferous plants observed in May is twice bigger that in April **(Fig. 3)**. According to our observations, that is due both to the appearance of many new flowering species and the continuous flowering of a number of species, such as *Jasminum fruticans* L., *Syringa vulgaris* L., *Geranium macrorrhizum* L. Especially valuable source of nectar and pollen at that time from the woody species are *Robinia pseudoacacia* L., *Crataegus monogyna* Jacq. and *Acer platanoides* L. Only the populations of *Robinia pseudoacacia* have an area of over 700 dka. A good source of pollen and/or nectar are the numerous populations of a number of herbaceous species such as *Paeonia peregrina* Mill., *Sedum album* L., *S. pallidum* Bieb., *S. rubens* L., etc.

The greatest number of flowering nectariferous plants have been registered in June and July **(Fig. 3)**. The varied habitats on the park territory provide in that period, as well as throughout the entire vegetation very good conditions for extending the blossoming of a number of nectariferous species. The abundance of pollen and nectar is very big. Only the areas occupied by *Tilia tomentosa* are over 1400 dka. Numerous are the populations of *Satureja montana* L., as well as of many herbaceous species of the genera *Genista, Lathyrus, Medicago, Potentilla, Salvia, Sedum, Stachys, Thymus, Teucrium, Trifolium, Veronica, Vicia,* etc. A continuous flowering period has been registered for the populations of *Origanum vulgare* L., *Lamium purpureum* L., *Marrubium peregrinum* L., *Mentha spicata* L. subsp. *spicata*, *Taraxacum officinale* W. et K. This huge nutritive base is absolutely sufficient both for meeting the needs of pollinator insects dwelling on the park territory and for providing basic pasture of a number of bee colonies.

The abundance of flowering nectariferous plants throughout the period May-June is of particular significance since it coincides with the most important period in the development of each bee colony – breeding. Then the needs of nectar and pollen are enhanced and the use of bees as pollinators could only facilitate the timely pollination of many plants in the park. Throughout that period bee families can collect considerable quantities of nectar to be processed in bee honey of very high quality.

In August the number of flowering species decreases considerably but the quantity of nectar and pollen is significant **(Fig. 3)**. Basic flowering nectariferous species of the following families are observed: *Asteraceae*; *Lamiaceae*; *Rosaceae* and *Fabaceae*. Extension of the flowering period has been registered for *Artemisia vulgaris* L., *Cichorium intybis* L., *Echinops ritro* L., *Salvia pratensis* L., *S. verticillata* L., *Satureja montana, Melilotus alba* Medicus, *M. officinalis* (L.) Pallas, *Vicia cracca* L., *Potentila erecta* L.

Rather limited is the species composition of nectariferous plants that flower in autumn (IX-X) **(Fig. 3, Table 1)**. Although small in number, they also provide a relatively good

nutritive base for their pollinators. Throughput that period abundant flowering of some of the most nectariferous plants of the family *Asteraceae – Echinops sphaerocephalus* L.*;* family *Boraginaceae – Echium vulgare* L. and family *Fabaceae – Lotus corniculatus* L. The flowering of a number of good herbaceous species continues, such as *Carduus nutans* L., *Cichorium intybis*, *Melilotus alba*, *Sedum maximum* (L.) Suter., *Sideritis montana* L., *Trifolium repens* L. Secondary flowering is observed with some populations of *Malva sylvestris* L., *Taraxacum officinale, Thymus* sp., etc.

The results of the study reveal that the number of nectariferous species in Sinite Kamani Natural Park is different both in various seasons of the year and for each month, but the quantity of pollen and nectar throughout the entire vegetation are sufficient for providing very good bee pasture. The registered extension of the flowering period in most species can be utilized to the maximum through applying transhumant bee-keeping.

CONCLUSION

In Sinite Kamani Natural Park there are very good conditions for providing continuous and lasting bee pasture throughout the entire vegetation. On its territory there are flowering nectariferous plants from early spring to late autumn. The greatest abundance of nectar and pollen has been registered for the period from May to July. The most numerous among the flowering nectariferous plants is the group of the summer ones – 177 species and 3 subspecies, followed by that of spring – 147 species and 2 subspecies. More limited are the autumn ones – 35 species and 1 subspecies and the early spring ones – 8 species. The variety of habitats in the park is great and a significant part of the species have an extended flowering period. Main source of pollen and nectar for bees throughout the entire vegetation from the woody nectariferous species are: *Cornus mas*, *Corylus avellana, Tilia tomentosa*; *Robinia pseudoacacia*; *Acer campestre*; *Acer platanoides, Crataegus monogyna*. A valuable nutritive base from the herbaceous nectariferous plants are both the numerous populations of *Satureja montana*, *Galanthus elwesii, Primula veris*, *Anemone ranunculoides*, *Viola odorata, Paeonia peregrina, Fritillaria pontica*, *Pulmonaria officinalis*, *Geranium macrorrhizum*, and the species of the genera *Thymus, Teucrium, Salvia, Sedum, Marrubium, Ajuga, Echium, Echinops*, *Carduus, Genista, Lathyrus, Medicago, Melilotus, Potentilla, Stachys,* etc. The most complete utilization of that enormous resource could be achieved through applying transhumant bee-keeping. The use of bee colonies as pollinators will provide adequate pollination of many plants and will contribute to the preservation of the biological diversity in the Natural Park.

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