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Original Contribution

NECTARIFEROUS PLANTS IN SINITE KAMANI NATURAL PARK – SLIVEN

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ABSTRACT

The study is part of a project dedicated on investigation of nectariferous plants in Sinite Kamani Natural Park – Sliven and the opportunities for practicing movable apiculture. It was carried out in the vegetation periods of 2007-2009. To find out the taxonomic diversity of nectariferous plants the route method has been applied. A total of 220 species and 4 subspecies of nectariferous plants have been established belonging to 133 genera and 47 families of the Magnoliophyta. The families *Lamiaceae*; *Fabaceae*; *Rosaceae*; *Asteraceae*; *Boraginaceae*; *Ranunculaceae*; *Fagaceae*; *Liliaceae* have the greatest number of medicinal species and the most numerous genera. The genera *Trifolium*; *Sedum*; *Quercus*; *Thymus*; *Vicia*; *Salvia*; *Sorbus*; *Allium* have the greatest number of nectariferous representatives. Ten of the nectariferous species have national nature protected status. The presence of medicinal plants is significant. These data characterize the studied protected territory as comparatively rich in nectariferous species.

Keywords: nectariferous plants, Sinite Kamani Natural Park, biodiversity, conservation importance, functionality

INTRODUCTION

Nectariferous plants are an important biological resource for our country. They provide food for bees and raw materials for obtaining valuable apiary products. In its number of nectariferous species, our country excels many European countries. The development of nectiferious plants is closely connected to the life of their pollinators. Bees are an important factor for the maintenance of a great number of ecosystems and for the preservation of the biological diversity in them. According to Petkov (2006), a reserve that is still not used enough in apiculture are the nectariferous plants from protected areas, towards which the efforts of everyone who wishes to optimize yield in apiculture and contribute to the preservation of Bulgarian nature should be directed. According to data by Grozeva et al. (2004) 20% of fernlike Ferns and Spermatophytes in Sinite Kamani Natural Park – town of Sliven are nectariferous. The review of botanical researches in the Park (2, 3, 4, 5) shows the absence of scientific works on nectariferous plants.

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The objective of the present study is to establish the species variety of nectariferous plants in Sinite Kamani Natural Park and to make a short description of their taxonomic structure, biological types, conservation importance and functionality. It is part of a project that envisages research of nectariferous plants on the territory of the Park and the possibilities for practising movable apiculture.

MATERIAL AND METHOD

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. The routes specified by Grozeva et al. (2004) have been used, which cover the maximum area of habitat variety in the Park.

In the course of terrain research the taxa found were recorded in lists, and in case of difficulties with the identification of the species on the terrain herbarium materials have been collected. Under laboratory conditions systematization of the terrain lists and

determination of the herbarium materials was performed. Special attention has been paid to the endemic nectiferious species, the nectariferous species protected by Bulgarian conservation legislation or the nectariferous species under the protection of various international normative documents.

The taxonomic basis used was Flora of RB, volumes I – X (6, 7), The Flora in Bulgaria, volumes I – II (8), Field Guide to the Vascular Plants in Bulgaria (9), Key to the Plants of Bulgaria (10).

RESULTS AND DISCUSSION

Taxonomic structure of nectariferous plants. As a result of the research conducted on the territory of Sinite Kamani Natural Park by the town of Sliven, 220 species and 4 sub-species of nectariferous plants have been determined **(Appendix 1)**, which belong to 133 genera and 47 families of the Magnoliophyta. These data characterize the territory of the Park as an area comparatively rich in nectariferous species. The species determined represent 23.4% of the ferny and seed plants determined for the territory of the park by Grozeva et al. (2004), as well as 52% of the nectariferous plants in Bulgaria (1), and 54% of the plants which have practical value for apiculture (11). 92% of the registered nectariferous species are from the class of Magnoliopsida, and the remaining 8% belong to the class of Liliopsida. The families and genera which are the richest in nectariferous species in the Bulgarian flowering flora are usually widely represented here as well. The most nectariferous species and the greatest number of genera are registered from the following families: *Lamiaceae*; *Fabaceae*; *Rosaceae*; *Asteraceae*; *Boraginaceae*; *Ranunculaceae*; *Fagaceae*; *Liliaceae* **(Table 1).**

Table 1. *Families of nectariferous plants with the greatest number of genera and species in Sinite Kamani Natural Park*

Family	Number of genera	%	Number of species	%
Lamiaceae	19	14.29	38	28.57
Fabaceae	16	12.03	35	15.63
Rosaceae	12	9.02	23	10.27
Asteraceae	9	6.77	12	5.36
Ranunculaceae;	7	5.26	9	4.02
Boraginaceae	6	4.51	9	4.02
Liliaceae	7	5.26	8	3.57
Fagaceae	2	1.50	8	3.57

The following genera have the greatest number of nectariferous-bearing representatives: *Trifolium* (10); *Sedum* (7); *Quercus* (7); *Thymus* (6); *Vicia* (6); *Salvia* (5); *Sorbus* (5); *Allium* (5).

Biological types of nectariferous plants. Domination by 70% (152 species and 3 subspecies) is in herbaceous plants **(Fig. 1)**. Among them, the most numerous are the perennial species (51%), followed by the annual (14%) and the biennial (5%). The ligneous species occupy only 30% (68 species and 1 subspecies), among which the least in number are the transitional biological types of bushes-trees (4%), and the bushes and the trees are represented by almost equal number of taxa (13%). Despite their limited number on the territory of the Park, the ligneous nectariferous plants are extremely valuable as they create a favourable ecological environment for the existence of nectariferous bee families.

Species having a protected conservation status. In Red list of Bulgarian vascular plants (12) in category near threatened (NT) *Anemone sylvestris* L. is included. Protected by Biological Diversity Act (13, 14) are 10 species of nectariferous plants: *Anemone sylvestris*; *Crocus olivieri* J. Gay.; *C. biflorus* Miller; *C. flavus* Weston; *Galanthus elwesii* Hooker; *Echinops ritro* L.; *E. schaerocephalus* L.; *Paeonia peregrina* Miller. *Crocus olivieri* is included in Appendix 2 of the Act; *Galanthus elwesii* and *Anemone sylvestris* – in Appendix 3, and the remaining 7 species – in Appendix 4. The most numerous populations during the research period is registered for *Galanthus elwesii* and *Paeonia peregrina.* In very good condition, but in smaller population *Echinops ritro* and *E. schaerocephalus* were

observed, as well as *Crocus biflorus* and *C. flavus*. There is confirmation of the two populations of *Anemone sylvestris* in the region of „Gagovets" and one of *Crocus olivieri* in the region of „Dimka" which have been stated by Grozeva et al. (2004). The plants are in good general condition, but in the tree population there is a certain decrease in their number compared to the one stated for the vegetation periods of the years 2001-2003 (2). We reckon that the registered decrease is temporary since a major number of juvenile species have been registered. Despite this, the condition of the populations of *Anemone sylvestris* and *Crocus olivieri* in the territory of the park remains alarming.

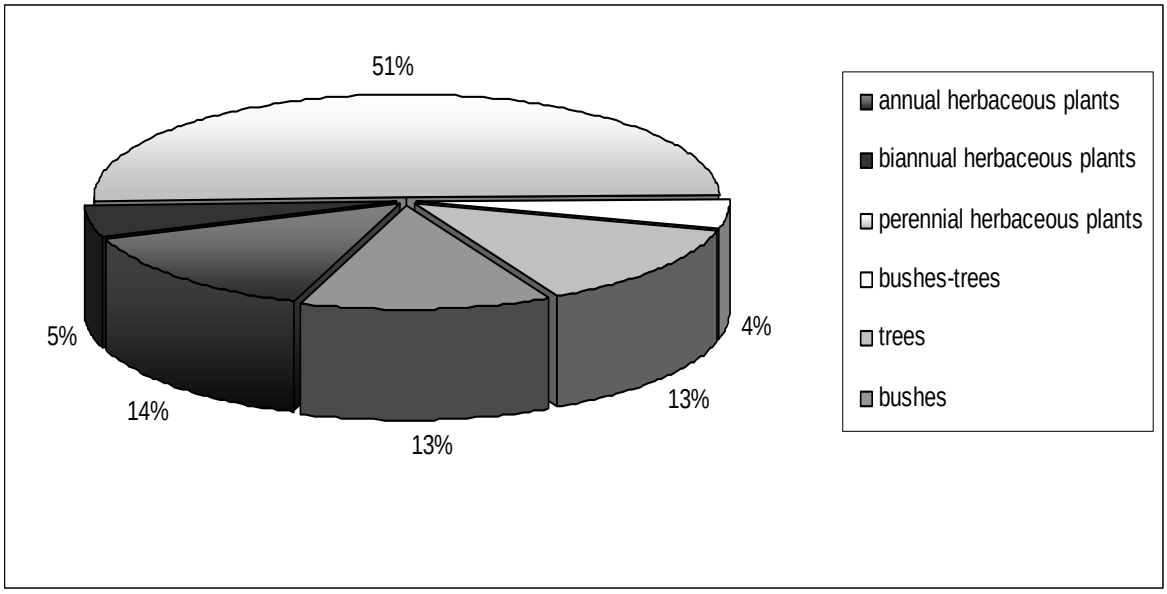

Fig 1. Average number of various biological types of nectariferous plants in Sinite Kamani Natural Park.

Functional aim of nectariferous plants. The nectariferous plants that have been registered on the territory of the park have multiple economic application **(Fig. 2)**.

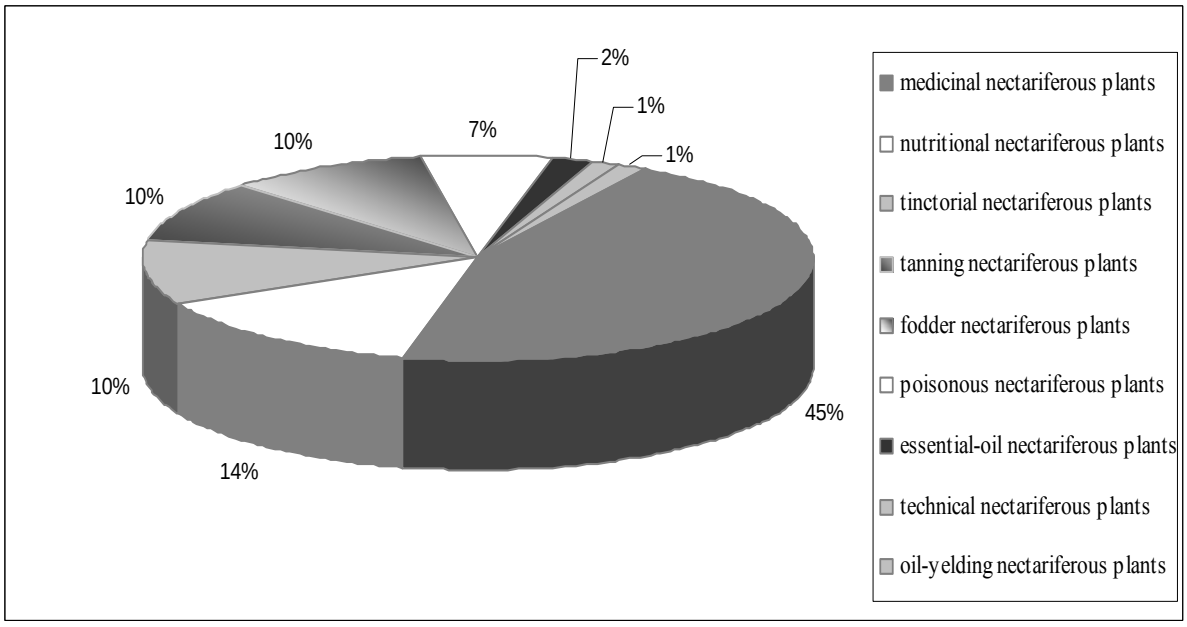

Fig 2. Functional purpose of the nectariferous plants that have been registered in Sinite Kamani Natural Park.

The greatest is the relative share of medicinal nectariferous plants (45%). They represent 18.5% of the species included in the list applied to the Medicinal Plants Act (15) and 39.4% of the medicinal ferny and seed plants registered in the Park (2). The nutritional nectariferous plants are 14%. Almost equal in number are the tinctorial nectariferous plants, the nectariferous plants containing tan and the fodder nectariferous plants. The least in number are the technical and oleaginous species.

CONCLUSION

The established 220 species and 4 subspecies of nectariferous plants belonging to 133 genera and 47 families of Magnoliophyta characterize the territory of Sinite Kamani Natural Park as comparatively rich in nectariferous plants. The following families are the most numerous in species and genera: *Lamiaceae*; *Fabaceae*; *Rosaceae*; *Asteraceae*; *Boraginaceae*; *Ranunculaceae*; *Fagaceae*; *Liliaceae*. The most nectariferous plant representatives belong to the following genera: *Trifolium* (10); *Sedum* (7); *Quercus* (7); *Thymus* (6); *Vicia* (6); *Salvia* (5); *Sorbus* (5); *Allium* (5). Herbaceous species prevail. Medicinal nectariferous plants have significant presence among the nectariferous plants. 10 species are protected by the Biological Diversity Act. In the Red List of Bulgarian vascular plants in category near threatened (NT), one species is included – *Anemone sylvestris* L. The most vulnerable populations are the populations of *Anemone sylvestris* and *Crocus olivieri*J. Gay.

REFERENCES

1. Petkov, V. 2006. Honey Plants and Honey-Bee Feeding in Bulgaria. Zahariy Stoyanov Publishing House, Sofia, 2006 (Bg).
2. Grozeva, N., Georgieva, M., Vulkova, M. Flowering plants and ferns. In: Stoeva, M. (ed.), *Biological diversity of Sinite Kamani Nature Park*. Kontrast – Bogomilovo, Stara Zagora, pp 9-112, 2004 (Bg).
3. Andreev, N. 1981. Development Plan of Sinite Kamani National Park. Botanical Characterization, Agrolesproekt, Sofia, 1981. (Bg).
4. Sopotlieva, D., Petrova, A., New Data for the Flora of Eastern Stara Planina mountain (Sliven Balkan). In: *Collection of Elaborations from the Sixth National Conference in Botanics*, Sofia University Publishing House, Sofia, pp 195-201, 2001 (Bg).
5. Sopotlieva, D., Petrova, A. Wild ornamental plants in Sinite Kamani Natural Park. In: *Proceedings of Third Balkan Scientific Conference „Srudy, Conservation and Utilization of Forest Resources"*, 2-6.X, Sofia, vol. II, pp 440-449, 2001.
6. Jordanov, D. (ed.), Flora Reipublicae Bulgaricae, vols 1-9, Editio Acad. „Prof. Marin Drinov", Serdicae, 1963-1989 (Bg).
7. Kožuharov, S. (ed.), Flora Reipublicae Bulgaricae, vol. 10, Editio Acad. „Prof. Marin Drinov", Serdicae, 1995 (Bg).
8. Stoyanov, N., Stefanov, B., Kitanov, B., Flora in the Republic of Bulgaria, Nauka i Izkustvo, Sofia, 1966-1967 (Bg).
9. Kožuharov, S. (ed.). Field Guide to the Vascular Plants in Bulgaria, Nauka and Izkustvo, Sofia, 1992 (Bg).
10. Delipavlov, D. & Cheshmedzhiev, I. (eds). Key to the Plants of Bulgaria. Acad. Press Agrarian University, Plovdiv, 2003 (Bg).
11. Bizhev, B., Ganchev, At., Tsonev, D., Honey Plants 2. Enyovche Publishing House, Sofia, 2003 (Bg).
12. Petrova, A., Vladimirov, V. (eds.), Red List of Bulgarian vascular plants. *Phytol. Balcan.* 15(1):63-94, 2009.
13. Biological Diversity Act. Decree № 283 accepted by the 39th National Assembly on 02 August 2002. *Darzhaven vestnik*, 77/09.08.2002: 9-42, 2002 (Bg).
14. Biological Diversity Act (Act on Amending and Supplementing the Biological Diversity Act). Decree № 354 accepted by the 40th National Assembly on 01 November 2007. *Darzhaven vestnik*, 94/16.11.2007: 2-44, 2007 (Bg).
15. Medicinal Plants Act. *Darzhaven vestnik*, 29/07.04.2000: 9-21, 2000 (Bg).

Appendix 1. List of the determined nectariferous plants on the territory of Sinite Kamani Natural Park – town of Sliven

Acer campestre L.; *A. platanoides* L.; *A. pseudoplatanus* L.; *A. tataricum* L.; *Adonis vernalis* L.; *Aegopodium podagraria* L.; *Agrimonia eupatoria* L.; *Ajuga genevensis* L.; *A. reptans* L.; *Alcea heldreichii* Boiss.; *Allium carinatum* L.; A. *flavum* L.; *A. paniculatum* L.; *A. sphaerocephalum* L.; *A. victorialis* L.; *Amelancher ovalis* Medicus; *Amorpha fruticosa* L.; *Amygdalus communis* L.; *Anchusa procera* Bess.; *Anemone nemorosa* L.; *A. ranunculoides* L.; *A. sylvestris* L.; *Anthylis vulneraria* L. *subsp. pulchella* (Vis) Bornm.; *Artemisia vulgaris* L.; *Asparagus officinalis* L.; *Berberis vulgaris* L.; *Betula pendula* Roth.; *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 angustifolium* 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 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.; *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.; *Fagus sylvatica* L. subsp. *moesiaca* (K. Maly.) Hjelmquist; *Fragaria vesca* L.; *Fraxinus exelsior* L.; *F. ornus* L.; *Fritillaria pontica* Wahl.; *Gagea lutea* L.; *Galanthus elwesii* Hooker; *Galeopsis tetrahit* L.; *G. speciosa* Miller; *Genista carinalis* Griseb.; *G. depressa* Bieb.; *G. tinctoria* L.; *Geranium macrorrhizum* L.; *G. phaeum* L.; *Glechoma hederacea* L.; *G. hirsuta* W. K.; *Hedera helix* 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. 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.; *Malus silvestris* Mill.; *Malva sylvestris* L.; *Marrubium peregrinum* L.; *M. vulgare* L.; *Medicago sativa* L.; *Melampirum arvense* L.; *Melilotus alba Medicus; M. officinalis* (L.) Pallas; *Melissa officinalis* L.; *Mentha spicata* L. *subsp. spicata; Muscari botrioides* Mill.; *M. comosum* Mill.; *Myosotis arvensis* (L.) Hill.; *M. nemorosa* Bess.; *M. stricta* Link.; *M. sylvatica* Ehrh. ex Hoffm.; *Nepeta cataria* L.; *N. nuda* L.; *Ononis spinosa* L.; *Origanum vulgare* L.; *Ornithogalum montanum* Cyr.; *Paeonia peregrina* Miller; *Paliurus spina-christi* Mill.; *Phlomis tuberosa* L.; *Polygonum aviculare* L.; *Potentila argentea* L.; *P. erecta* L.; *P. neglecta* Baumg.; *P. pindicola* (Nyman) Haussk.; *Prunella grandiflora* (L.) Scholler; *P. cerasifera* Ehrh.; *P. laciniata* (L.) L.; *P. machaleb* L. (*Cerasus m.*); *P. spinosa* L.; *P. vulgaris* L.; *Prunus avium* L. (*Cerasus avium*); *Pulmonaria officinalis* L.; *Pyrus pyraster* Burgsd.; *Populus tremula* L.; *Quercus cerris* L.; *Q. dalechampii* L.; *Q. frainetto* Ten.; *Q. petraea* Matusctka; *Q. pubescens* Willd.; *Q. robur* L.; *Q. rubra* 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. altissima* L.; *S. montana* L.; *Scabiosa ochroleuca* L.; *Scilla bifolia* L.; *Scrophularia canina* L.; *Sedum album* L.; *S. hispanicum* L.; *S. maximum* (L.) Suter.; *S. ochroleucum* Chaix.; *S. pallidum* Bieb.; *S. rubens* L.; *S. urvillei* DC. (*Sedum sartorianum* Boiss.); *Sideritis montana* L.; *Solanum nigrum* L.; *Sorbus aria* (L.) Crantz.; *S. aucuparia* L.; *S. domestica* L.; *S. graeca* (Spach.) Kotschy; *S. torminalis* (L.) Crantz.; *Stachys recta* L. subsp. *subcrenata* (Vis.) Birg.; *Staphyllea pinnata* L.; *Stellaria graminea* L.; *S. holostea* St., H., L.; *S. media* (L.)Vill.; *Syringa vulgaris* L.; *Tamarix tetranda Pallas* ex Bieb.; *Taraxacum officinale* W. et K.; *Teucrium chamaedrys* L.; *T. montanum* L.; *Thymus leucotrichus* Hall.; *T. jancae* Celac.; *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. pannonicum* L.; *T. patens* Schreber; *T. pratense* L.; *T. repens* L.; *Tussilago farfara* L.; *Ulmus glabra* Hudson; *Ulmus laevis* Pall.; *Ulmus minor* Miller; *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 odorata* L.; *V. tricolor* L.; *Xeranthemum annuum* L.