

POLLEN ANALYSES OF HONEYS FROM SOME REGIONS IN TURKEY

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ABSTRACT

This study presents the pollen analyses of 13 floral honeys from the some regions of Turkey. The pollen analyses revealed 1 unifloral honey and 12 multifloral honeys. Pollen have been identified pertaining to 86 taxa, 74 of which were at genus level and 12 were at species level. The dominant group of pollen grains consisted of: *Hedera helix*, *Gossypium*, *Trifolium*, *Sophora*, *Rhododendron*, *Castanea sativa*, *Peganum harmala* and *Helianthus*.

Keywords: Pollen, Honey, Unifloral honey, Multifloral honey

INTRODUCTION

Honey is great importance for commercial and the importance source of nourishment for people. The taste, smell and color of honey is to change according to the nectar of the flowers. Pollen analyses of floral honeys reveal the plant taxa, which is a source for honey. Bess collected the nectar and pollen from flowers at the same time. Pollen which are mixing in honey is importance for quality. Melitopalynology is the study of the pollen grains and spores in honeys. The geographical and botanical properties is importance for quality of honeys. The first pollen analyses of honey were studied by Pfister 1845. Nectar containing flowering plants have been identified through pollen analyses in honey samples from various countries, for example; Various samples from different regions in Europe [1-2], 54 samples from Louisiana [3], 119 samples from New Zealand [4], 8 samples from Nigeria [5], 25 samples from Canary Islands [6], 39 samples from Spain [7]. Studies in Turkey identified flowering plants containing nectar through pollen analyses in honey samples, with: 192 samples from various regions in Turkey [8], 8 samples from Erzurum [9], 7 samples from Elazığ [10], 24 samples from Konya [11], 12 samples from Gümüşhane [12], 20 samples from various regions in Turkey [13], 25 samples from Antalya [14], 17 samples from İzmit [15], 6 samples from Marmaris [16], 74 samples from various regions in Turkey [17].

MATERIALS AND METHODS

The study was conducted during a two years period from 2002 to 2003. Fig.1 shows the regions and district where the samples originate. The preparation and pollen analyses of the honey samples were done using the method defined by the International Bee Research Association [18]. Reference pollen preparations and

source books [19-23] were used during the pollen analyses. Olympus BH 28 Trinocüler research microscope was used for identifying pollen grains.

The amount of pollen ranging: between 1 % and 5 % was considered as the rare group, between 6 % and 20 % was considered as the minor group, between 21 % and 50 % was considered as the secondary group and pollen exceeding 50 % was called the dominant group.



Figure 1. Regions from where samples were collected places names.

RESULTS

Out of the 13 samples studied, 12 were identified as multifloral honeys, because they contained pollen grains of multiple taxa and 1 samples identified as unifloral honeys. Among the multifloral honey samples, a minimum of 4 and a maximum of 22 different taxa pollen grains were observed (Table 1). *Hedera helix* pollen grains in samples 1 from Kırklareli were observed dominant and *Erica* were secondary. Samples 2 from Muğla were not observed dominant pollen grains But *Lotus* *Xanthium* and *Erica* pollen grains were secondary. *Gossypium* Pollen grains were identified as dominant and *Salix* pollen grains were secondary in samples 3 from Manisa. *Trifolium* pollen grains were identified as dominant and *Chrysanthemum* and *Melilotus* pollen grains were secondary in samples 4 from Yozgat. *Sophora* pollen grains were identified as dominant, *Centaurea* and *Xanthium* pollen grains were secondary in samples 5 from Çankırı. *Rhododendron* pollen grains were identified as dominant and *Erica* pollen grains were secondary in samples 6 from Bolu. Samples 7 from Balıkesir were not observed dominant pollen grains But *Trifolium* pollen grains were secondary. Samples 8 from Aydın were not observed dominant and secondary pollen grains. *Castanea sativa* pollen grains were identified as dominant in samples 9-10 from Bartın. *Peganum harmala* pollen grains were identified as dominant and *Astragalus* and *Eleagnus angustifolia* pollen grains were secondary in samples 11 from Elazığ. *Helianthus* pollen grains were identified as dominant and *Solidago* pollen grains were secondary in samples 12 from Tekirdağ. Samples 13 from Rize-Anzer were not observed dominant pollen grains But *Campanula* and *Trifolium* pollen grains were

secondary. Table 1 gives the rare and minor pollen rates in the samples according to taxa.

Table 1. Honey sample number, Regional name and pollen spectrum.

Dominant pollen, **Secondary pollen, ***Minor pollen, *Rare pollen**

Honey Sample Number	Regional Name	Pollen spectrum
1	Kırklareli	* <i>Hedera helix</i> ** <i>Erica</i> *** <i>Helianthus, Trifolium, Melilotus, Cirsium, Brassica</i> **** <i>Centaurea, Lotus, Zea mays</i>
2	Marmaris	* - ** <i>Lotus, Xanthium, Erica</i> *** <i>Centaurea, Carduus, Gossypium, Achillea, Salix, Helianthus</i> **** <i>Chenopodium, Populus, Echium</i>
3	Manisa	* <i>Gossypium</i> ** <i>Salix</i> *** <i>Knautia, Brassica, Cucumis melo, Trifolium, Thymus Sambucus,</i> **** <i>Centaurea, Ferula, Papaver, Euphorbia, Melilotus</i>
4	Yozgat	* <i>Trifolium</i> ** <i>Chrysanthemum, Melilotus</i> *** <i>Brassica, Sophora, Astragalus, Cytisus</i> **** <i>Colchicum, Echium, Lotus, Ornithogalum</i>
5	Çankırı	* <i>Sophora</i> ** <i>Centaurea, Xanthium</i> *** <i>Tragopogon, Carthamnus, Chrysanthemum</i> **** <i>Trifolium, Vicia, Ranunculus, Raphanus, Scabiosa, Zea mays</i>
6	Bolu	* <i>Rhododendron</i> ** <i>Erica</i> *** <i>Taraxacum, Chrysanthemum, Centaurea, Thymus</i> **** <i>Carthamus, Trifolium, Zea mays</i>
7	Balıkesir	* - ** <i>Trifolium</i> *** <i>Allium, Cistus, Pyrus, Centaurea Astantia,</i> **** <i>Zea mays, Echium, Tilia</i>
8	Aydın	* - ** - *** <i>Trifolium, Vicia, Cistus, Astragalus</i> **** <i>Ornithogalum, Zea mays, Cephalaria, Helianthemum, Cucumis melo</i>
9	Bartın	* <i>Castanea sativa</i> ** - *** - **** <i>Cornus mas, Rosa</i>

10	<i>Bartın</i>	*	<i>Castanae sativa</i>
	<i>Iskalan</i>	**	<i>Rubus, Rhododendron</i>
		***	<i>Galega, Trifolium, Sophora</i>
		****	<i>Viola, Daphne, Solanum, Veronica, Phyracantha, Crataegus, Abies Vicia, Lotus, Lathyrus, Salvia, Lamium, Avena, Echium</i>
11	<i>Elazığ</i>	*	<i>Peganum harmala</i>
	<i>Keban</i>	**	<i>Astragalus, Eleagnus angustifolia</i>
		***	<i>Trifolium, Rubus, Centaurea, Achillea</i>
	<i>Kozluk Köyü</i>	****	<i>Thymus</i>
12	<i>Tekirdağ</i>	*	<i>Helianthus</i>
		**	<i>Solidago</i>
		***	<i>Vicia, Trifolium, Centaurea</i>
		****	<i>Brassica, Daucus, Olea, Cistus, Scabiosa, Teucrium, Taraxacum, Rosa Triticum vulgare, Zea mays</i>
13	<i>Rize</i>	*	-
	<i>Anzer</i>	**	<i>Campanula, Trifolium</i>
		***	<i>Geranium, Lotus, Salvia, Heracleum, Myosotis, Lamium, Thymu</i>
		****	<i>Cardamine, Silene, Centaurea, Veronica, Helianthemum, Rumex Scabiosa, Tragopogon, Teucrium, Anemone, Draba, Chaerophyllum Onobrychis</i>

DISCUSSION AND CONCLUSION

Microscopic analyses have revealed that taxon variability is greatest in the rare group, followed by minor, secondary and dominant groups (Table 1). This seems to confirm the view that variability is always little among pollen taxa in dominant groups, while greater among rare, minor and secondary groups. Pollen grains in dominant and secondary groups supply the nectar source, which plays a role in the formation of honey.

According to the results of the study: Of the Ericaceae family, *Erica* pollen grains were secondary in 1, 2 and 6 samples, *Rhododendron* pollen grains were dominant in 6 samples. Of the Malvaceae family, *Gossypium* pollen grains were dominant in 3 samples and of the Araliaceae family, *Hedera helix* pollen grains were dominant in 1 samples. Of the Leguminosae family, *Trifolium* pollen grains were dominant in 4 samples and it were seen secondary in samples 7 and 13. *Melilotus* pollen grains were secondary in 4 samples. *Sophora* pollen grains were dominant in 5 samples. Of the Fagaceae family, *Castanae sativa* pollen grains were dominant in 9 and 10 samples. Of the Asteraceae family, *Chrysanthemum* pollen grains were secondary in 4 samples. *Xanthimum* and *Centaurea* pollen grains were secondary in 5 samples. While *Helianthus* pollen grains were dominant in 12 samples, *Solidago* pollen grains were secondary. Of Salicaceae family, *Salix* pollen grains were secondary in 3 samples. *Campanula* of Campanulaceae family, and *Trifolium* of Fabaceae family are taxa with secondary pollen grains in 13 samples. Many of the pollen grains in this group have been mixed in honey in random fashion [24].

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