

POLLEN ANALYSIS OF RIZE-ANZER (TURKISH) HONEY

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Introduction

Pollen analysis is the shortest and most certain way in determining the nectary plants that are the source in producing honey (1). The fact that there exists a large amount of literature concerning the melissopalynologic studies shows us that this subject is given a lot of importance. By making the pollen analysis, MAURIZIO (2) VORWOHL (3), HOWELS (4) and many other melissopalynologists have identified the nectary plants in their regions. We carried out researches in Anzer, a region around Rize İkizdere, 2100 metres above the sea level. Known as Ballik'oy by some people, Anzer serves as a summer resort for the local people from June to October. The people in this region bring their hives to Anzer during summer months and take them back to Rize in the winter. It has been claimed that the Palace preferred Anzer honey during the period of the Ottoman Empire. The fact that this honey has been able to keep its reputation up to our days causes its market price to be 50 times higher than those of honeys from other regions.

The samples extracted from Rize have been subjected to a series of

pollen analyses (5—6). The fact that the amount of Anzer Honey used for these researches was limited, made it impossible to locate the nectary source in this honey.

Anzer honey is a nutrient regarded as a remedy for every kind of illness. Therefore, our study is not only consumer but also producer centered.

Material and Method

The honey samples that constituted the basis of our research were obtained from various locations of Anzer. 8 extracts from Altuncular, 3 extracts from Alçual, 2 extracts from Camii, 2 extracts from Kindirakol, 3 extracts from Hapelli, 2 extracts from Hamurlu, 2 extracts from Yayıklar and 1 extract from Çikolar were collected (Table 1).

The pollen preparations from these honeys were made according to the common methods accepted by experts working in beekeeping institutes in the USA and Europe (2) and according to the method which was proposed by SORKUN, K., INCEOĞLU, Ö. (7).

Plant pollens, forming the honey we researched, were diagnosed by a close inspection and examination

of the preparations. Resource books (8—10), Herbarium Universitatis Hacettepensis (HUB), and pollen preparations obtained from Anzer honey were used at the stage of diagnosis. After pollens were diagnosed, they were counted up to 200, and their percentages were calculated.

Results

As a result of the pollen analysis of Anzer honey, 6 of the plants were diagnosed at the level of family, 26 of them, at the level of genus, and 3 of them, at the level of species. The results are presented in Table 1. The amount of pollen ranging between 0% and 5% was considered as the rare group, the one ranging between 6% and 20% was considered as the minor group, the one between 21% and 50% was considered as the secondary group and the amount of pollen exceeding 50% was called "the dominant group".

Almost in all of the 28 samples analysed, rare and minor pollens were observed. The amount of rare and minor pollens in honey is always higher than that of the other groups (11). Plants which pollens are traced at rare levels are as follows: in 8 samples, 25% *Astragalus* L. pollens; in 12 samples, 2% *Brassicaceae* pollens; in 4 samples, 3% *Campanula* L. pollens; in 6 samples, 1,5% *Carduus* L. pollens; in 3 samples, 2,5% *Caryophyllaceae* pollens; in 3 samples, 1,5%

Castanea sativa Miller pollens; in 12 samples, 2% *Centaurea* L. pollens; in 7 samples, 1% *Chenopodium* L. pollens; in 18 samples, 2% *Cirsium* Miller pollens; in 5 samples, 1% *Cynoglossum* L. pollens; in 10 samples, 1,5% *Eryngium* L. pollens; in 2 samples, 3% *Euphorbia* L. pollens; in 9 samples, 3% *Geranium* L. pollens; in 5 samples, 2,5% *Helianthemum* Miller pollens; in 5 samples, 2,5% *Lathyrus* L. pollens; in 1 sample, 0,5% *Liliaceae* pollens; in 2 samples, 3% *Lotus* L. pollens; in 5 samples, 2,5% *Melilotus* L. pollens; in 3 samples, 1,5% *Mentha* L. pollens; in 17 samples, 3% *Myosotis* L. pollens; in 7 samples, 2% *Onobrychis* Adans. pollens; in 1 sample, 0,5% *Onograceae* pollens; in 5 samples, 1% *Onosma* L. pollens; in 9 samples, 3% *Plantago* L. pollens; in 13 samples, 25% *Poaceae* pollens; in 9 samples, 2% *Ranunculus* L. pollens; in 6 samples, 2% *Rhododendron ponticum* L. pollens; in 1 sample, 1% *Rubiaceae* pollens; in 16 samples, 25% *Rubus* L. pollens; in 2 samples, 2% *Rumex* L. pollens; in 9 samples, 2% *Thymus* L. pollens; in 1 sample, 3,5% *Trifolium ambiguum* Bieb. pollens, in 1 sample, 2% *Trifolium* L. pollens (Table 2).

Plants which pollens are traced at minor levels are as follows: in 4 samples, 10% *Brassicaceae* pollens; in 4 samples, 11,5% *Castanea sativa* pollens; in 3 samples, 10% *Geranium* pollens; in 3 samples, 9% *Lathyrus* pollens; in 4 samples, 9,5% *Melilotus* pollens; in 2 samples, 19% *Mentha* pollens; in 11

samples, 9% *Myosotis* pollens; in 4 samples, 11% *Nonea* Medikus pollens; in 1 sample, 15% *Onosima* pollens; in 2 samples, 10% *Plantago* pollens; in 11 samples, 10% *Poaceae* pollens; in 1 sample, 12,5% *Ranunculus* pollens; in 8 samples 13% *Rhododendron ponticum* pollens; in 4 samples, 12% *Rubus* pollens; in 2 samples, 7% *Thymus* pollens; in 4 samples, 15% *Trifolium ambiguum* pollens; in 1 sample, 18,5% *Trifolium* pollens; in 1 sample, 6% *Vicia* pollens (Table 2).

Plants which pollens are traced at secondary levels are as follows: in 2 samples, 35% *Castanea sativa* pollens; in 1 sample, 25% *Ranunculus* pollens; in 5 samples, 32% *Rhododendron ponticum* pollens; in 1 sample, 28% *Rubus* pollens; in 1 sample, 21,5% *Rumex* pollens; in 1 sample, 36,5% *Thymus* pollens; in 2 samples, 47,5% *Trifolium ambiguum* pollens; in 7 samples, 34% *Trifolium* pollens; in 1 sample, 37,5% *Vicia* pollens (Table 2).

Plants which pollens are traced at dominant levels are as follows: in 2 samples, 53,5% *Castanea sativa* pollens; in 1 sample, 67,5% *Centaurea* pollens; in 4 samples, 58,5% *Trifolium ambiguum* pollens; in 5 samples, 72% *Trifolium* pollens (Table 2).

Discussions and Conclusion

35 different kinds of plant pollens, 6 at the level of family; 26 at the level of genus, 3 at the level of

species were traced in the 28 honey samples taken from the Anzer region. The families to which these plants belong and the taxon number contained in these plants were calculated and are presented in Diagram 1.

Fabaceae family members were traced as being the dominant group in Anzer honeys. *Asteraceae*, *Boraginaceae*, *Poaceae*, *Rosaceae*, *Geraniaceae*, *Lamiaceae*, and other families followed *Fabaceae* in sequential form (Diagram 1). The dominant plant group found in the results of pollen analysis is made of rare pollens, and it is followed by the minor, the secondary and the dominant groups (1, 7, 11).

The fact that *Trifolium* species have been traced in a dominant amount is an expected result. *Trifolium* is known to be a plant which is an important source in the honey making, and we observed that it is widely existent in the Anzer region.

Centaurea pollen is another pollen type traced to be at a dominant level in another honey sample (12).

Although the *Castanea sativa* and the *Rhododendron ponticum* species cannot be found in the flora of the Anzer region, (13—14), the fact that both CS and Rp can be found in the honey samples taken from the Anzer region stems from the fact that the hives spend the springs in Rize and the summers in the Anzer region. If obtaining pure Anzer honey is desired, the hives must be totally milked before they are moved to Anzer.

The hives which are moved to the Anzer region must be milked at the

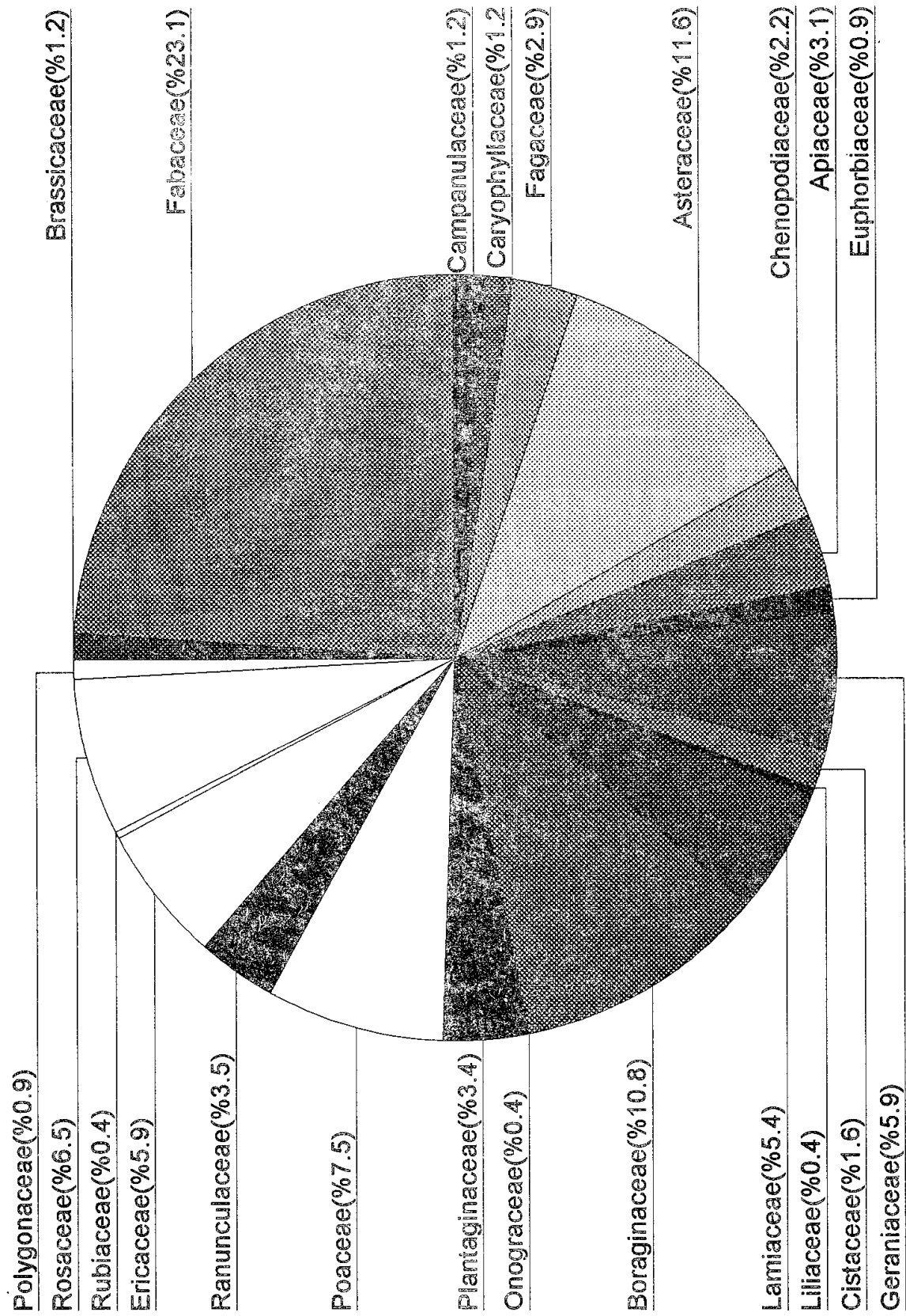


Fig. 1 — The percentage of families which pollens were observed in Anzer honeys

end of September. The variety of plants in dominant, in secondary and even in minor groups found in the 28 honey samples which were obtained through milking, showed a partial regional difference. On the other hand, *Myosotis* pollen has been traced at either minor or rare levels. And this pollen is thought to characterize the Anzer honey.

Since *Myosotis* pollens are very rare, they can be neglected during the observation. Therefore, it is very important that the experiment is carried out with utmost care.

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REFERENCES

- 1 LIEUX, M.H. (1972) — A Melissopalynological Study of 5 Louisiana (USA) honeys, *Rev. Palaeobot*, 13: 95—124
- 2 MOURIZIO, A. (1951) — Pollen Analysis of Honey, *Bee World*, 32: 1—5
- 3 VORWOHL, L. (1976) — Honey from Tropical Africa, *Microscopical Analysis and Quality Problems*, *Apiculture in Tropical Climates*, 93—101
- 4 HOWELLS, V.W. (1969) — Some Reflections on the Pollen Analysis of Honey. *J.A.P.A.* 7: 88—93
- 5 SORKUN, K., N.V. YULUĞ (1985) — The Analysis and Antimicrobial Properties of Honey from the İkizdere Region of Rize, *Scientific Journal of DOĞA*, A2, 9, 1, 118—123
- 6 SORKUN, K., A. GÜNER, M. VURAL (1989) — Pollen Analysis of Honey from Rize, *Turkish Journal of Botany*, 13(3); 547—554
- 7 SORKUN, K., Ö. INCEOĞLU (1984) — Pollen Analysis of Honey from Central Anatolia, *Scientific Journal of DOĞA*, A2, 8, 2, 222—228
- 8 MORSE, R., T. HOOPER (1985) — *Encyclopedia of Beekeeping*, Press Linkhour West Street. Poole, Dorset BH 15 1LL
- 9 MANKGRAF, V., H. D'ANTONI (1978) — *Pollen Flora of Argentina*. The University of Arizona Press, Tuscon Arizona
- 10 ERDTMAN, G. (1969) — *Handbook of Palynology*, Hafner Publishing Co., New York
- 11 LIEUX, M.H. (1979) — Minor Honeybee Plants of Louisiana Indicated by Pollen Analysis, *Economic Botany*, 32, 418—432
- 12 SORKUN, K., Ö. INCEOĞLU (1984) — Dominant Pollens in Honey of the Central Anatolian Region, *Scientific Journal of DOĞA*, A2, 8, 3, 377—381
- 13 DAVIS, P.H. (1978) — *Flora of Turkey and of the East Aegean Islands*, University Press, Edinburgh, Volume 6, 90—94
- 14 DAVIS, P.H. (1982) — *Flora of Turkey and of the East Aegean Islands*, University Press, Edinburgh, Volume 7, 659

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