Proceedings of the Iowa Academy of Science

Volume 52 | Annual Issue Article 20

1945

Pollen Content of Iowa Honey

S. M. Pattee
Roosevelt High School, Cedar Rapids, Iowa

POLLEN CONTENT OF IOWA HONEY

S. M. PATTEE

Beekeeping literature contains numerous references to the fact that honey is eaten by some people for its pollen content. Consequently, the writer was interested in learning what kinds of pollen are contained in honey. Thirteen samples were studied to determine their pollen content. These samples were secured directly from beekeepers or were purchased in local stores. The source of honey samples and the number of pollen grains counted in each is shown in Table I.

The method of separating the pollen from the honey and preparing it for study was adapted from Erdtman (1943, p. 226). 50 cc. of honey was dissolved in 150 cc. of water. This mixture was centrifuged until all of the residue was collected into one tube. The liquid was decanted and the residue treated as follows:

1. 4 cc. of glacial acetic acid was added to the pollen sediment.
2. 4 cc. of acetic anhydride and 10 drops of concentrated sulphuric acid were added. The tube and contents were placed in a water bath which was brought to boiling point.
3. Water and 4 drops of 95% alcohol were added for a rinse.
4. The material was stained with safranin.
5. The stain was washed off with water.

Between each of the above steps, the material was centrifuged and the liquid decanted. This process removed the protoplasmic contents from the pollen grains. The remaining pollen walls were mounted in glycerine jelly.

Some pollen grains such as *Tilia americana* or *Fagopyrum esculentum* can be recognized with certainty. However, there are genuine difficulties in attempting to determine the identity of certain tricolpate grains. For example, Wodehouse (1935, p. 495) states that *Aster* grains "are in no way distinguished from those of *Solidago*", and (p. 410) "The grains of Chenopodiaceae are rather uniform throughout the family and are indistinguishable from those of the related family Amaranthaceae". For this reason many of the grains in this study are classed only by family.

Table I gives ample evidence by the abundance of clover pollen that all samples were produced in the clover belt and that they did not come from cotton, sage, orange, fireweed, or other honey producing areas. This table also shows by the large percent of Polygonaceae and Compositae pollen, why samples numbered 3, 4, 6, 7, and 13 were referred to by apiarists as "fall honey" and "smartweed honey". Sample 5 was sold as buckwheat honey although it contains more *Polygonum* than *Fagopyrum* pollen. Sample 2 was basswood honey, judged by flavor, although only 3% of the pollen in the honey was that of *Tilia*. Sample 7 was the darkest of all. It contained a great abundance of buckwheat, Spanish needle, and smartweed pollen.

TABLE I POLLEN CONTENT OF IOWA HONEY SAMPLES

No. of Sample	County	Total Counted	Percents of Pollen							
			Leguminosae	*Fagopyrum*	Other Polygonaceae	*Tilia*	Chenopodiaceae or Amarantaceae	Compositae	Graminae	Others and Unknowns
1	Cedar County	4,210	93.99	.05	2.37	.00	.10	2.40	.40	.64
2	Clayton County	3,000	94.67	.00	.40	3.00	.00	.07	.50	1.36
3	Delaware County	670	78.35	.00	10.45	2.24	.00	3.73	2.98	2.24
4	Floyd County	2,310	85.71	7.57	3.62	.13	.13	1.60	.66	.56
5	Iowa County	2,700	93.19	3.89	1.94	.00	.00	.20	.48	.26
6	Jones County	2,230	83.63	.18	9.86	.18	.13	3.16	2.55	.31
7	Lee County	2,200	83.86	4.91	2.05	.00	.68	3.82	.41	4.27
8	Linn County	1,880	94.89	3.11	1.12	.05	.00	.21	.26	.32
9	Linn County	3,200	97.50	.00	1.94	.00	.00	.15	.25	.15
10	Linn County	1,400	97.57	.14	.29	.07	.00	1.14	1.57	.14
11	Linn & Benton Counties	1,880	99.67	.43	.03	.59	.00	.03	.53	1.23
12	Linn & Benton Counties	640	95.63	.78	.63	.63	.00	.62	.63	.63
13	Story County	1,300	87.69	4.46	6.07	.08	.00	.92	.08	.61

A study of the Compositae, and Graminae pollen of five samples yielded the following data:

TABLE II. PERCENTS OF COMPOSITAE AND GRAMINAE POLLEN

Sample Number	Cichoreae	Astereae	*Bidens* & *Helianthus*	*Ambrosia*	*Zea*	Other Graminae
4	.04	.25	.82	.52	.17	.43
6	.27	1.08	.58	1.21	2.16	.40
7	.14	.27	2.64	.77	.27	.14
10	.00	.00	.07	.14	.93	.64
12	.00	.31	.31	.47	.16	.47

A count of pollen grains does not necessarily give an accurate picture of the sources of nectar, since it is possible for bees to get nectar from some flowers without coming in contact with the anthers. Bees also visit plants such as willow, poplar, corn, and ragweed only for pollen. Much of the pollen gathered is mixed with honey and fed to the larvae. The surplus is stored in wax cells over the brood nest and is referred to as "bee bread".

There are a number of factors which tend to increase the amount of pollen in honey:

1. When pollen filled honey comb cells are cut away with the wax cappings some pollen will flow with the honey from the damaged cells to the storage tank.
2. When the queen bee is not prolific then more pollen will be stored rather than fed to young bees.
3. When the beekeeper extracts combs from just above the brood nest as is customary with some at the close of the season.
4. When the bees are killed in the fall and all the honey is extracted.
5. When pollen cells are uncapped, the honey from the cappings also shows an increased pollen content.
6. Different seasons and localities also cause a great variation in honey pollen content.

Anemophilous pollens not collected by honey bees may be blown into the flower to be caught in the nectar or on the anthers or may be blown into the bee equipment or extracting plant. This might account for the presence of Chenopodiaceae and Amaranthaceae pollens which are not listed as sources of nectar or pollen in Honey Plants of Iowa (1930).

Considerable doubt exists as to the value of *Trifolium pratense* as a honey plant. However, the large amount (12%) of red clover pollen found in sample 13 shows that the bees must be of considerable value as pollinators to these plants.

ROOSEVELT HIGH SCHOOL,
CEDAR RAPIDS, IOWA

LITERATURE CITED

Erdtman, G. 1943. An Introduction to Pollen Analysis. Chronica Botanica Company, Waltham, Mass.
Pammel L. H., et al. 1930. Honey Plants of Iowa. Bull. No. 7, Iowa Geol. Surv.
Wodehouse, R. P. 1935. Pollen Grains. McGraw Hill Book Co., New York.

