
Honey Bees and Vetch Pollination

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Pollination studies in Oklahoma have been underway for several years, but most of the effort has been directed toward the production of alfalfa seed. During the 1951 season, we also made some preliminary tests to determine the effect of honey bees on the production of vetch seed. These observations were made at the Red Plains Experiment Station near Guthrie, Oklahoma. The field of vetch at this station consisted of about sixty acres. Mr. Harley Daniels, the superintendent of the station, made arrangements with Mr. Lyman Coe, Entomologist of the Samuel Roberts Noble Foundation, Ardmore, Oklahoma, to supply the bees for pollination of this field. The bees were moved into the field early in June at about the time the vetch was coming into full bloom. There was an average of two colonies per acre. The hives were distributed over the fields in groups of 15 to 20 colonies per location, so that if the bees from the various groups ranged in a radius of one-fourth mile from their home location, their activities would easily overlap. The heaviest concentration of bees was perhaps toward the south end of the field. Since the prevailing wind was from the southwest, it gave this group of bees the advantage of drifting with the wind over the main portion of the field.

In order to determine what effect the bees might have in the way of increasing seed production in this field, it was necessary to exclude them from certain areas or plots, and to compare the yields in these plots with similar size plots to which the bees had access. It was, therefore necessary to place cages over the vetch plants in enough places so that we could get a satisfactory sample of plants for seed harvest. Inasmuch as soil conditions such as fertility and moisture vary from one part of a field to another, the cages were placed at a number of locations and varying distances. In this manner, we could get a representative sample of seeds from this field which would take in as many variations as possible. Moreover these cages were located in the field so as to be near the plots which were visited by the bees. The cages used in these tests were similar to those used elsewhere in pollination tests of legumes where such cages were shown to have had a negligible effect on the blossoming and fruiting of the enclosed plots. It is therefore believed that the caging effect on these plants was comparable.

The cages were set up in the vetch four or five days after the bees were brought to the field. The bees, therefore, had time to orient themselves to the new locations and had worked some of the blossoms over which the cages were placed. In placing the cages in the field, a survey was first made in the general vicinity in which the plots were located. The treated plot or the one to which the bees had access was as nearly representative of the vetch within the cages as it was visually possible to determine.

The plots were harvested, July 3, the samples dried, stored, and finally threshed and weighed December 31. The weights were then computed on a per acre basis.

The data are shown in Table I. The first thing to notice is the extreme variability of yield in different parts of this field which underscores the desirability of having numerous cages located at various parts of fields to get reliable data. Plots 5, 6, and 7 were close together, and the yields are all likewise very close. There is no correlation between yields of plots in close proximity and the plots at the greater distances (up to 200 yards) from these colonies. However, in all cases, there was a very good increase in yield of the vetch and in the open field as compared with that in the caged plots. This increase amounted to an average of 303.7 pounds of vetch seed per acre. This is strong evidence that honey bees do greatly increase vetch production in central Oklahoma.

TABLE I

Vetch Seed Yields for Caged and Uncaged Plants. Guthrie, Oklahoma.

PLOT No.	DISTANCE FROM COLONIES	POUNDS OF VETCH SEED PER ACRE		AREA CAGED SQUARE FEET
		IN CAGE	IN OPEN FIELD	
1	200 yards, west side	106	561.9	20
2	15-20 yards, south end	187	230	20
3	10-15 yards, southeast	52.8	356.6	20
4	75 yards, east side	192	610	20
5	10-15 yards, north end	153.6	430	12½
6	10-15 yards, north end	99.8	461	12½
7	10-15 yards, north end	138	5	9
AVERAGE		132.7		