duration in these areas to have a marked effect in this respect. Pollen on the stigma probably does not germinate below about 60°F. However, mango bloom is usually in its prime for two or three weeks when pollen appears to be most viable. It is not likely that temperatures would remain sufficiently low during this entire period of high viability to greatly inhibit the growth of more than a fraction of the pollen that reached receptive stigmas. Even though pollen shed one day might fail to function because of low temperature, some of that shed the following days in all likelihood would encounter favorable temperatures. These tests were concerned fundamentally with exposure of mature pollen to low temperatures. If temperatures somewhat above freezing do reduce mango yields through adverse effects on pollen, it seems plausible that the damage may occur in the earlier formative stages, such as pollen mother cells, before the pollen is mature. In any consideration of the effects of cold on mango yields, the influence of temperature on the development and functioning of the egg apparatus, embryo or ovule must not be overlooked. The trouble may be in the pistil rather than in the pollen.

HONEY BEES AS POLLINATORS OF MINNEOLA TANGELOS

F. GRAY BUTCHER
Division of Research and Industry
University of Miami
Coral Gables

An attempt to evaluate the possible benefits from honey bees in pollination of four year old Minneola tangelos was made in the fruit block referred to in the previous paper by Lynch and Mustard. Seven hives of bees were placed at the northern edge of the planting, at the head of the center row of the thirteen rows of trees. These colonies, of moderate to good strength, were established in this location prior to bloom, and remained there thru-out the season. Counts of fruits on the trees after set was complete revealed an interesting trend in average number of fruits set per tree, but with very great variation from tree to tree.

To indicate this trend, average numbers of fruit per tree were calculated in 100 foot circular zones from the bee colonies. Five such zones, centering from the location of the bees, were available, with the data summarized in Table 1.

TABLE I. Effect of Bee Pollination on Minneola Tangelo Fruit Set.

Zone No.	No. Trees in Zone	No. Fruit / Tree		Trees With 10 or More Fruit	
		Average	Range	No.	%
I (0-100 ft.)	25	4.1	0-24	3	12
II (100-200 ft.)	59	7.8	0-45	20	34
III (200-300 ft.)	46	12.3	0-46	21	46
IV (300-400 ft.)	50	9.5	0-56	17	34
V (400-500 ft.)	47	5.9	0-52	9	19

These results suggest that these pollinating insects do have a beneficial effect on fruit set. This effect appears to be most marked in an area about 200 to 300 feet away from their hives. This apparent concentration of pollinating activities of the bees at some distance from the hives rather than in the immediate area of the hives has been observed by various investigators. A recent student of Dr. R. L. Parker, Apiculturist at Kansas State College, advises that a very similar type of zonal activity in bee pollination has been recorded by Dr. Parker. Hutson, (1), working in apple orchards in New Jersey, recorded a greater number of bees visiting blooms 100 feet away from the hives rather than at closer distances. Dr. O. W. Park, (2), from Iowa State College states "The tendency for (bee) foragers to overcrowd flowers located near their hives is all but non-existent".

The fruit set reported herewith is not adequate from a commercial standpoint. However, these results suggest that honey bees may be rather important pollinating factors, and perhaps can be utilized successfully along with other pollen sources introduced into the planting if proper attention is given to location of the hives. The present data would indicate that trials of this nature in this locality might well be justified.

LITERATURE CITED

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