

## Honey Bees as Pollinators

The honey bee is undoubtedly the most dependable and efficient pollinator in agriculture. It is unique in that, though it is not domesticated, it is amenable to control and is regularly husbanded in almost every climate and condition that will support plant growth. The number of bees thus remains fairly stable and colonies can be concentrated quickly in areas where abundant flora requires to be worked.

As continuous colonies, which at times comprise about 60,000 individuals, are maintained by honey bees throughout the year, large numbers of field bees are always available to work flowers whatever time flowers are in bloom.

The honey bee is dependent on flowers for all its food, honey and pollen supplying its full diet. To maintain a continuous supply of these two foods large quantities are stored, which means that the field activities of honey bees are not governed by immediate needs. Indeed, the highly developed acquisitive instinct of bees drives them out to visit flowers continually to seek pollen and nectar to add to their stores.

### Specially Adapted for Carrying Pollen

This interdependence of bees and flowers has resulted in bees having bodies specially adapted for carrying pollen and nectar, and the well-planned arrangement of hairs on honey bees' legs and bodies is ideal for pollination work.

Hive honey bees never mutilate flowers, fruit, or plant foliage; their mandibles are toothless appendages incapable of being used for such purposes. Hive bees will use a short cut to nectar in a flower through holes already made by other insects or will collect juices from fruit already cracked or punctured, but they are only exploiting prior damage done by some other agent.

Honey bees work almost exclusively on one variety of flower at each trip and the few bees that return with a variegated load usually have a minor portion only of a second pollen mixed with the main variety. The steady working of one type of flower at a time is a valuable trait, because it keeps the various plant species pure. Furthermore, the bees' habit of flying out some distance in flight lanes before dispersing to visit flowers ensures the greatest possible coverage with a maximum amount of cross-pollination among the members of particular species of plant.

### Control from Hive

What flowers will be worked by the bees from a hive is determined by the searchers, who are experienced field bees that locate sources of nectar and pollen. On returning to the hive the control bees indicate the source of supply, and sufficient field bees are

induced to go out and gather the food offering. If the supply from that source increases, more bees visit it and the reverse applies if the supply dwindles. This control from the hive accounts for honey bees working only one species of flower at each trip. The occasional mixed pollen load is probably brought in by a searcher who has tried two sorts of flower to see which offers more food.

### Pollination Service is Free

In most districts honey bees are worth keeping for the honey and beeswax they produce. This means that their most important work, pollination, is available to mankind free. That pollination is their greatest service is shown by the following, which is based on statistics compiled by the

always be given to the welfare of beneficial insects before sprays or dusts are applied indiscriminately.

### Specialised Work

Some farmers may think that they should obtain a few hives of bees to keep up the bee population in their locality, but it should be remembered that beekeeping, always specialised work, is today an even more exacting occupation under the conditions imposed by modern agriculture, which usually provides such a short honey flow that only expert apiarists can exploit it.

Unless a farmer is prepared to make a full study of beekeeping and so be able to rear young queens, control swarming, deal with bee diseases, and perform many other manipulations, he will probably do only harm to the bee population of his district and will himself suffer financial loss and personal disappointment.

## Honey Bees and Red Clover

The ability of honey bees to pollinate red clover is a subject that has aroused much interest in recent years. Red clover is almost completely self-sterile and, being entomophilous, it depends on insects for pollination. The average red clover floret is about 10 mm. deep, and as the tongue of the honey bee is about 7 mm. long it may appear at first that the difference of 3 mm. would preclude the honey bee working red clover, but it does gather nectar from this source. The honey from this source has a characteristic delicate flavour and is produced in fair to large quantities in parts of

Otago and Southland. A sample of honey representing several tons was tested recently by the Botany Division of the Department of Scientific and Industrial Research and was found to contain 83 per cent. of red clover pollen.

The 3 mm. discrepancy is overcome by the nectar rising high enough in the floret for the bee to reach down to it with its tongue.

Honey bees also gather much pollen from red clover, and as pollen gatherers obtain only as much as will stick to the hairs of their bodies at each visit, they do not linger in the blossom and consequently enter many flowers to obtain a full load of pollen. Red clover as a source of pollen is at times very satisfactory to honey bees and the amount of pollination achieved by bees employed on pollen-gathering duty is very considerable.

### Bright Colour No Attraction

However, when competing flora of a type more desirable to them is available, honey bees will forsake red clover. They will pass over fields ablaze with red to work more insignificant flowers that can provide a more readily accessible supply of nectar and pollen. This is dictated by the ruthless efficiency of the system that bees have had to develop to survive, and by their instincts.



[Robertson photo.]  
Honey bee with loaded pollen baskets. It has visited many flowers to gather such a load of pollen.

United States of America Department of Agriculture.

It has been estimated that 75 per cent. of all returns from various crops requiring insect pollination are due to the work of honey bees. Although honey bees are instrumental in pollinating more than 50 agricultural crops, only the value of 25 which are shown in the statistics are taken into consideration. The total value of these crops was 1,300,000,000 dollars, of which nearly 1,000,000,000 dollars can be attributed safely to the work of honey bees. As the honey and beeswax for the same period was worth 35,000,000 dollars, the pollination service performed was worth at least 28 times more to the country than beekeepers' returns from honey and beeswax.

In most parts of New Zealand there are ample honey bees to give a satisfactory pollination service and commercial beekeepers are capable of maintaining the bee population under reasonable conditions. However, honey bees, with their keen foraging habits, are at times most vulnerable to poisonous sprays and dusts, and with the discovery of new methods of application which give greater coverage this danger has increased. It is essential, therefore, that thought should