

SACBROOD: A VIRUS DISEASE OF THE HONEYBEE

by

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A thesis presented for the degree of
Doctor of Philosophy
in the
Faculty of Science of the University of London.
June 1972.

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ABSTRACT

Sacbrood virus causes changes in honeybees which may be summarized as follows:

A. Larvae

1. Fewer protein granules than usual form in the cytoplasm of the fat body cells of growing larvae.
2. The protein reserves that form in the fat body cells, and the cells themselves, remain intact when the larvae become mature, whereas in healthy larvae they are broken down.
3. The endocuticle of mature larvae remains undigested, when the last larval skin is being shed, and so prevents ecdysis.

B. Adults

1. The protein granules in the cytoplasm of the fat body cells and the proteinaceous secretory globules in the cytoplasm of the hypopharyngeal glands disappear sooner than usual.
2. The lives of bees are decreased to about three weeks, the same length of life as of bees deprived of protein (pollen).
3. Worker bees are more susceptible to chilling than usual, probably because of their decreased metabolism, an effect also caused when healthy bees are deprived of protein.
4. Young worker bees fail to eat pollen, to attend the queen or drones, and to rear brood.

5. Young worker bees and drones try to fly and worker bees start to forage sooner than usual.

6. Foraging worker bees do not collect pollen, or collect very little.

7. The eggs of unmated queens mature sooner than usual.

8. The mitochondria in the brain of drones appear to be damaged.

The changes caused by sacbrood virus in adults summarized in (4), (5), (6) and (7) above, are the same as those that follow when healthy individuals are anaesthetized with carbon dioxide, and are equivalent to changes that occur in senile individuals, possibly activated by accumulated acid metabolites. Most of these changes are probably important in preventing rapid spread of sacbrood in nature.