



# Timber Talks



## Department of Fisheries and Forestry

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Insect Hormones

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Hormones influence the external morphological features of insects and the development of their reproductive organs. Some require a juvenile hormone, produced by a gland, corpus allatum, located in the head, for development of the ovaries; others, whose eggs are developed in the pupa, do not require this hormone which, if applied has an inhibitory effect. To obtain an understanding of this inhibitory effect and to acquire information pertinent to designing programs for insect population control an investigation was initiated.

In the laboratory, the brains and an endocrine organ (corpus allatum) were removed from one-day-old pupae of the western tent caterpillar and the former implanted in isolated abdomens. Results were studied from isolated abdomens subjected to the following treatments.

- a) Topical application of farnesyl methyl ether, a juvenile hormone mimic.
- b) Injection of ecdysone, a hormone that initiates adult development.
- c) Brain from one-day-old pupa implanted in the abdomen at time of abdomen isolation.
- d) Injection of ethanol or untreated.

Pupa and isolated abdomens were dissected and examined eight days after pupation.

Normally, adult development is completed in 11 days when about 200 eggs are produced. In the untreated and ethanol injected abdomens, adult development was retarded and the mean number of eggs produced was slightly in excess of 10. This is attributed to lack of ecdysone. Farnesyl methyl ether completely stopped egg development. A limited number of eggs (av. 4.2) was produced in specimens where the brain had been implanted. There was evidence that the brain did not have any direct effect but that it triggered the physiological processes responsible for the production of ecdysone. Specimens injected with ecdysone attained ovarian development and produced a mean number of 159 eggs, confirming the essential role of this substance in the reproduction of an insect in which reproduction is closely associated with adult development.

Ovarian development within an insect and the production of eggs requires that the ovaries be subjected to ecdysone and a low concentration of the juvenile hormone. The former stimulates synthetic processes for development; the latter controls the nature of these processes. Farnesyl methyl ether, the juvenile hormone mimic which was applied in greater than normal levels, blocked adult and ovarian development in the absence of ecdysone and inhibited it when it was present.