FLIGHT MUSCLE AUTOLYSIS IN *AEDES COMMUNIS* (DEGEER)

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Since a preliminary report of the autolysis of the flight muscles in *Aedes communis* was made (Hocking, 1952), Johnson (1953) has reported a similar phenomenon in seven species of aphids. The same phenomenon may explain in part the observations of Jackson (1952) on water beetles. In view of its bearing on blood sucking habits, a full investigation of this phenomenon in mosquitoes and other groups of blood-sucking insects would be worthwhile.

Ever since the inception of serious studies of the *Aedes* mosquito problem in northern Canada in 1946, the source of blood meals for these vast numbers of insects has been a perplexing problem. This problem prompted studies using the precipitin test which have been described by West (1951). To the question: "Where does *A. communis* get its blood meals?" we can now answer, as an indirect result of these precipitin test studies, it doesn't.

In 1951 one of Dr. West's assistants collected large numbers of mosquitoes at Churchill, Manitoba in the search for blood engorged females. He described finding amongst his collections specimens which appeared as though the abdomen were covered with scales like those of a fish. These proved to be gravid females, the scale-like appearance resulting from eggs showing through the wall of the abdomen. When they were preserved in alcohol a glance was sufficient to show that there was something strange about the thorax, which had a translucent appearance. This was particularly noticeable in the region of the postpronotum (fig. 1). Dissection showed at once that in specimens in which the eggs were fully developed, the flight muscles had completely disappeared, leaving a virtually empty thorax, although the ovaries themselves sometimes obtruded into this at the posterior end (fig. 3).

Observations on this interesting phenomenon were continued in 1952, and in 1953 L. A. Burgess of the Division of Entomology, Canada Dept. of Agriculture kindly collected some further material of gravid females for me. The information now available is summarized in Table I; because of the different temperature conditions in different seasons, dates of the break-up of river ice are given to permit comparison. This shows that the process requires about 18 days at the temperature prevailing at Churchill at this time of year; that is, about 450 degree-days above 32° F. As a result of the examination of further material, the average number of eggs developed can be revised to 65 and the maximum number to 93. There is still no evidence of blood feeding in this form of *A. communis,* nor have morphological characters been found to separate it, in any stage, from the more widespread blood feeding form. The average value of the proboscis length/wing length ratio for

TABLE I—The dates of emergence and of egg development in *Aedes communis* at Churchill, Manitoba. 1951–53.

	1948	1951	1952	1953
Churchill River ice broke up	14 June	11 June	3 June	19 June
Days after ice break up to:—				
Peak emergence	9–28	..	..	21–24
First gravid ♀ found	..	28	31	..
Gravid ♀ ♀ most abundant	..	33	35	31–35
Last gravid ♀ found	..	49	41	..

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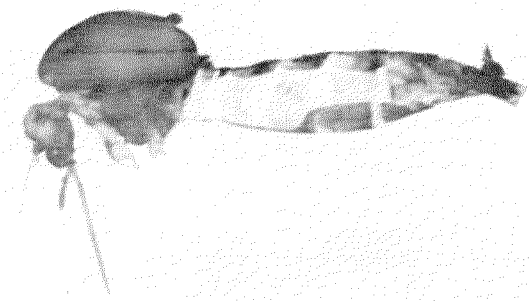

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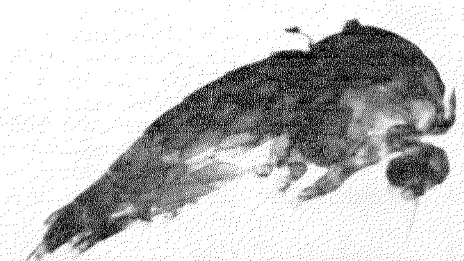

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FIG. 1. On the left a newly emerged specimen of *A. communis* showing the transparent abdomen and the opaque thorax. On the right a gravid specimen, the eggs visible in the abdomen and the thorax translucent. Note the clear spot by the postpronotum.

FIG. 2. Sagittal section of newly emerged specimen of *A. communis.* Flight muscles well developed.

FIG. 3. Sagittal section of gravid specimen showing eggs obtruding into the thorax. No flight muscles.

ese specimens was 0.738 ± 0.029. This ggests that only the small form (Hocking *et al.,* 1950) has this habit.

Nitrogen estimations were done on the ght muscles of newly emerged females id on mature eggs, to determine how any eggs these muscles are equivalent , in terms of nitrogen. The structures ere dissected out, dried at 100° C., and e nitrogen estimated by the Kirkjeldahl method (Kirk, 1936); about mg. dry weight of muscle or 100 eggs ere used in each sample. The average ry weight of 100 eggs was 0.87 mg. The erage percentage of nitrogen on dry uscle weight was 11.6 and on dry egg eight 8.2, or 0.000713 mg. per egg. The erage weight of the fresh indirect flight uscles in *A. communis* is 0.430 mg. Hocking, 1953); if the water content is sumed to be 75 per cent, this means that e flight muscles can provide the nitroen required in the development of 18 gs, nearly a third of the average number eveloped. This is a significant contribuon, although not so great as was at first pposed.

Gravid specimens of several other ecies were collected during the search r this species. These were all examined r signs of flight muscle autolysis. No gn of this was found in *A. nigripes* ett., *A. nearcticus* Dyar, *A. campestris*). & K., *A. cinereus* Meig., or *A. hexoontus* Dyar, all of which are established lood feeders. Specimens of the non-biting haoborine species *Mochlonyx culiciformis* eG., collected on July 10 and 13, 1952, owever, showed some breakdown. This as less complete than that found in *A. ommunis,* but in neither specimen were e eggs fully mature.

SUMMARY: The previously reported autolysis of the flight muscles concurrently with egg production in *Aedes communis* (DeG.) is described in more detail. The process occupies about 18 days. Up to 93 eggs are developed, the average number being 65. The nitrogen content of the flight muscles and of the eggs was estimated. The indirect flight muscles contain enough nitrogen to provide this for the development of 18 eggs. A similar autolysis of the flight muscles concurrently with egg development is reported in the non-biting mosquito *Mochlonyx culiciformis* DeG. Gravid females of five biting species of *Aedes* were collected and examined; none of these showed signs of autolysis.

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