

An Outbreak of Cockroaches, *Nauphoeta cinerea* (Olivier), in Honolulu

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Nauphoeta cinerea (Olivier)

1789 *Blatta cinerea* Olivier, Encycl. Method., Ins., IV, p. 314.

Adults and juv., L'île de France (Mauritius).

1899 *Nauphoeta bivittata* Burm.

Fauna Hawaiiensis, Vol. II, p. 7.

"Hab. Two examples taken under bark of trees in Honolulu."

1922 *Nauphoeta cinerea* (Olivier)

Dermaptera and Orthoptera of Hawaii, Morgan Hebard, Occasional Papers, Bishop Museum, Vol. VII, No. 14, p. 335.

1920 *Nauphoeta cinerea* (Ol.)

Cockroaches as Greenhouse Pests. Garten-flora (Berlin) No. 13-14, pp. 165-168, 2 figs. "Observed in London . . . has reached Hamburg from East Africa."

1924 *Nauphoeta cinerea* (Ol.)

Nova Caledonia, Zool., Vol. III, L. II, p. 335, 1 ♂ (A. Fauvel, 1910). (Museum Paris.)

These roaches, which have heretofore been considered rather rare in Hawaii, recently developed in alarming numbers in and about the feed room of the poultry plant at the University of Hawaii. I have made observations on this species for many years, dating as far back as January 1914, and as there appears to be little on record as to their habits, this paper has been prepared.

Distribution: This is distinctively a circumtropical roach. Following its discovery in Mauritius (1789), I find evidence that it extends right around the world. I collected it in Townsville, North Queensland, in 1921, where it was an abundant pest about the buildings used for breeding experimental animals for the medical investigation. Published records include New Caledonia, Hawaii, Galapagos Islands, Brazil, East Africa, and in heated buildings, even to England and Germany.

In January, 1914, I found this species rather abundant in Camp rubbish out along Waialae beach, east of Honolulu. A favorite hiding place was in old weather worn shoes. I then collected numerous specimens and kept them for many months under observation at the College of Hawaii, making notes.

Life history and habits: I found that this species normally retains the eggs within the body until they are hatched, thus giving

birth to living young. By dissecting gravid females, I found that the eggs are packed side by side in a double row, forming an ootheca-like mass. These masses contain from 28 to 40 eggs or young, and they are covered with a delicate, transparent membrane. June 1, 1914, I observed a female with the egg mass about one half extended from the end of the body. It was white and was without any covering. The young roaches forming it could be seen distinctly, packed very closely together along each side. As they separated from this ootheca-like mass they were seen to be compressed laterally, but after a period of 2 to 3 hours they developed the normal dark coloring and assumed a roach-like appearance, with dorso-ventral flattening.

Roaches confined, after several months produced only aborted egg-masses, which they extruded, but these soon dried up because they were unprotected from the air.

I found that this species is very predacious, killing and eating cypress roaches, *Diploptera dytiscoides* (Serville), and even devouring their own dead. They are also omnivorous feeders, eating bits of soaked bread, raw potatoes, and various fruits. Recently, I learned that they are very fond of, and gorge themselves upon the balanced poultry feeds, containing fish oil, etc. With this feed abundant at the University farm, they multiplied in alarming numbers—literally by the bushel—as we found when we swept up after the war that was waged on them.

Control Measures: September 20, 1914, I discovered that ants, *Pheidole megacephala* (Fabr.) found their way into the breeding cage, where about 30 of these roaches were confined, and destroyed them completely within 24 hours. The ants first attack the legs in great numbers, eating through the soft membranes at the sutures. After they removed the legs the ants continued on the bodies until all parts were finally broken up, so that they could be carried down through a tiny hole in the floor, through which the ants had gained an entrance.

Experiments with sodium fluoride demonstrated that this chemical is very effective in destroying this species, as is the case with other large roaches. The insects do not relish the poison, but get it while preening themselves. Fearing that the hens would get the poisoned roaches prohibited this method of control. As an alternative, all portions of the infested buildings were sprayed with a combination of carbolic acid and a light poultry oil. While there was some risk from fire, and the sprayed rooms were messy for a while, the treatment killed all roaches hit. Dead specimens were so abundant on the floor after spraying that they were swept up by buckets full. Though roaches continue to appear from out-of-the-way places, not reached by the spray, this treatment gave them a real set-back.