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THE DISTRIBUTION AND AVIAN HOSTS OF *CARNUS HEMAPTERUS*
(DIPTERA: MILICHIIDAE) IN NORTH AMERICA

The association of *Carnus hemapterus* Nitzsch with nestling birds was first reported in Europe in 1818 (Nitzsch, 1818, Mag. d. Ent. (Halle) 3: 261-316) and in North America in 1942 (Bequaert, 1942, Bull. Brooklyn Ent. Soc. 37: 140-49). Since then it has been collected from 7 additional localities in Canada, Mexico, and the United States. A second species, *Carnus orientalis*, was reported from the fish owl in Malaya (Maa, 1968, Pacif. Ins. 10: 33-36).

Bequaert (loc. cit.) found *C. hemapterus* in Flicker nests in New York and on the Screech Owl in Florida. Later he reported it from the Screech Owl in Arizona and from nests of unknown hosts in British Columbia and California (Bequaert, 1951, Psyche 58: 157). Lloyd & Philip (1966, J. Parasitol. 52: 414) recorded *C. hemapterus* from the Red-tailed Hawk, Prairie Falcon, and Sparrow Hawk in Utah. Sabrosky (1965, In: A. Stone, C. W. Sabrosky, W. W. Wirth, B. H. Foote, & J. R. Coulson (eds.), *A catalog of the Diptera of America north of Mexico*, p. 728-33) added New Brunswick and Baja California, but he did not record the hosts. The first record from the Midwest was reported by Wilson (1968, Amer. Midl. Natur. 79: 251-52) who collected 5 dealated male *Carnus* from Starlings in Wayne Co., Indiana. Thus in North America *Carnus hemapterus* is known from 2 separate regions of geographical distribution, in the east and west. It extends from New Brunswick to Wisconsin and New York, southward to Indiana and Florida. In the west, it extends from British Columbia south to Idaho, Utah, Arizona, California, and Mexico (Baja California). There are no published records from the region of the Great Plains.

Previous host records from North America are those given above. This paper adds 13 additional records from nestling birds in Utah and 1 each from Wisconsin and Idaho. Our host records include the previously recorded Starling, Sparrow Hawk and Red-shafted Flicker, and add as new species records Black-billed Magpie, Yellow-bellied Sapsucker, and Williamson's Sapsucker. Numbers of parasites collected per nest varied from 1 (Magpie) to 95 (Red-shafted Flicker).

Our collection dates, localities, and host records are as follows: Black-billed Magpie (5 records), 24 and 29 May, Cache Co., Utah, and 6 June, Franklin Co., Idaho; Starling (3 records), 26 May, 21 and 29 June, Cache Co., Utah; Williamson's Sapsucker (1 record), 10 July, Cache Co., Utah; Red-shafted Flicker (1 record), 9 July, Box Elder Co., Utah; Sparrow Hawk (2 records), 28 June and 20 July, Cache Co., Utah; and Yellow-bellied Sapsucker (2 records), 5 and 8 July, Cache Co., and Box Elder Co., Utah. All of the Utah and Idaho specimens were taken in 1970-1971 in conjunction with a research project on the avian blood-sucking maggots (*Protocalliphora*). One earlier collection of *Carnus hemapterus* not previously recorded is from Starlings at Poynette, Columbia Co., Wisconsin, in 1949 (FIG. 1).

Ninety-five adult *Carnus* were collected on 9 July 1970, from 6 nestling Red-shafted Flickers at Willard Basin, Box Elder Co., Utah. Both dealated and winged forms were collected, and 1 pair was taken in copula. Most of the parasites were found in clusters of 5 to 8 in the axillae of the wings, and they moved quickly over the body of the host when disturbed. One-third of the male flies had retained their wings, but all of the females were dealated and their abdomens distended with eggs. Eggs were deposited in transit to the laboratory, and several hatched 5 days later. Pupae (FIG. 2) were recovered from the nest debris, but larvae were not evident.

Our observations support Bequaert's comments on the marginal host specificity of *Carnus* in Europe and the ovoviviparous nature of the parasite. We believe that *Carnus* is widely distributed in North America, and its incidence is related to the nesting ecology of avian hosts

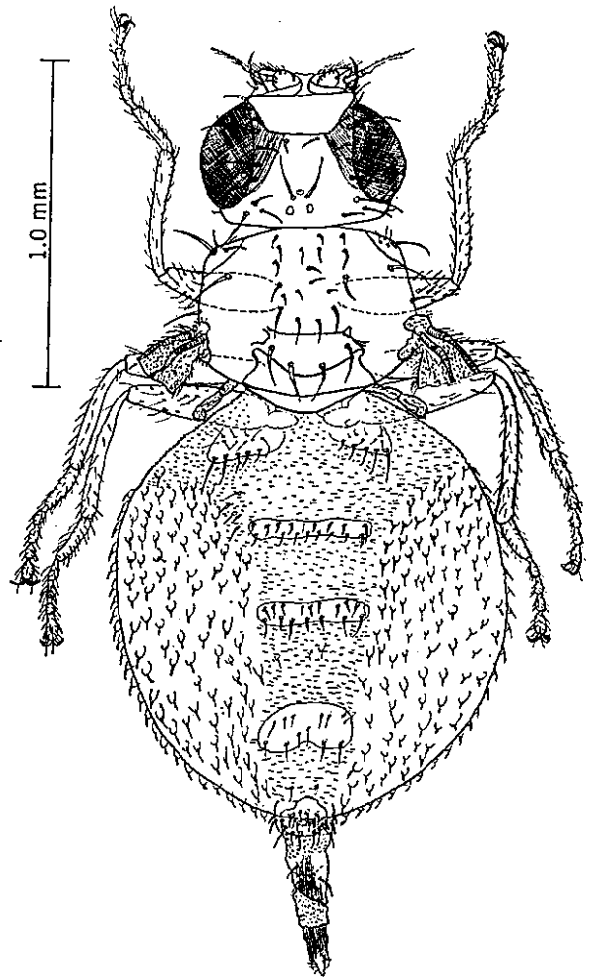


FIG. 1. ♀ *Carnus hemapterus* from Starling nest at Poynette, Columbia Co., Wisconsin.

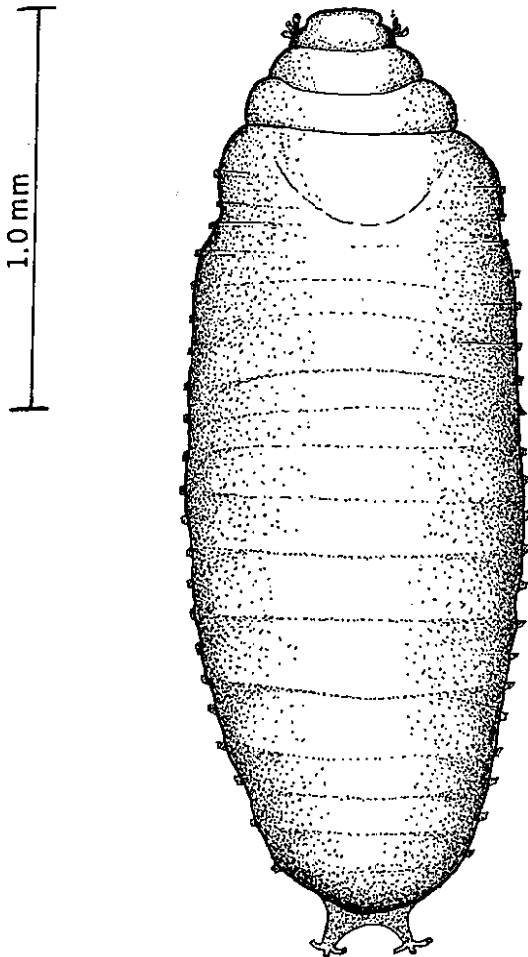


FIG. 2. Pupa of *C. hemepterus* from nest of Red-shafted Flicker at Willard Basin, Box Elder Co., Utah.

in a manner similar to the occurrence of some species of *Protocalliphora* (Sabrosky & Bennett, 1958, Proc. 10th Int. Congr. Ent. 1: 163-64). *Carnus* may be found in the same nests with *Protocalliphora*, and it demonstrates a preference for hole nests or nests with protective canopies.

The occurrence of winged males in the same nest with gravid females indicates increased mobility during mating and suggests the possibility of localized movement between nests.

Specimens obtained in this study are deposited in collections at Utah State University, Logan, and the University of Delaware, Newark.—**Kenneth J. Capelle**, Brigham City, Utah 84302, U.S.A., and **Terry L. Whitworth**, Department of Zoology, Utah State University, Logan, Utah 84321, U.S.A.