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NOTES ON TWO SPECIES OF CALLIPHORIDAE (DIPTERA) PARASITIZING NESTLING BIRDS

BY JOHN L. GEORGE AND ROBERT T. MITCHELL

IN the course of studies on the effect of feeding DDT-killed insect larvae to nestling birds, some incidental information was gathered on Calliphorid parasites of the nestlings. The work was done at Lake Clear Junction, N. Y., during June and July, 1946.

The authors are indebted to Mr. Phillip Dowden, Division of Forest Insects, Bureau of Entomology and Plant Quarantine, who reared the flies, and also to Mr. Curtis Sabrosky of the United States National Museum and Mr. David Hall for their determinations of the adult specimens.

Larvae of *Apaulina metallica* (Townsend) were found feeding on nestlings in one nest, each, of Hermit Thrush, Chipping Sparrow, Song Sparrow and Redstart. The larvae were present in moderate numbers, varying from two to six per nest, except in the case of the Redstart, in which thirty maggots were found.

The single nestling in the Redstart nest was, on July 5, an active and apparently healthy bird that, as is normal, readily consumed the

equivalent of its body weight of insect larvae. On July 6, the nestling became weaker, consumed only 47 per cent of its weight in food, and died July 7. The numerous maggots found feeding on this one nestling were believed to have been the direct cause of its death.

All of the maggots of *A. metallica* (Tns.) were strictly external parasites; none were observed beneath the skin. In general they confined their feeding to the naked abdomen of the nestlings, but a few were found in the ear cavities and feather tracts. Any disturbance of the nest would send the larvae scurrying to shelter, and often the only manner of detecting their presence was by examination of the nest material.

The larva of *Apaulina metallica* (Townsend) closely resembles that of *Protocalliphora azurea* (Fallen), as illustrated by Coutant (1915)¹. A striking difference is the presence of a crowded row of long curved spines encircling the middle of the second segment. Undoubtedly these curved spines, together with the general spiny nature of the maggot, enable it to cling more tenaciously while feeding. Nine larvae were reared to the adult stage, the adults emerging August 8 to 10.

This same species has been reported by Plath (1919) as occurring in the nest of a Western Robin in the Puget Sound area and by Neff (1945) from nests of the Mockingbird, California Shrike, Western Kingbird, and English Sparrow in the San Joaquin Valley, California.

Larvae of *Apaulina hirudo* (Shannon and Dobroscky) were discovered July 26 on Chipping Sparrow nestlings, probably the second brood from parents that nested near by during June. Four nestlings fluttered from the nest on discovery, but three were caught for banding. Although the feather development of the nestlings appeared normal, the birds were lighter in weight and more sluggish than might be normally expected. The average weight of the three nestlings was 10.48 grams as compared to 11.26 grams of three Chipping Sparrow nestlings caught under similar circumstances June 23.

The nestlings were infested with twelve maggots of *Apaulina hirudo* (Shannon & Dobr.). One of the young birds had only two maggots. It was the heaviest and most active of the three. A large maggot was removed from the right side of the body and another from the bend of the right wing between the secondaries and primaries. After these maggots were removed, the nestling was banded and released.

The remaining two nestlings were taken to the laboratory for observation. One of these died seven hours later. The bird was feeding quietly and had just accepted three sawfly larvae when it lost muscular

¹According to Dobroscky, the larva illustrated by Coutant is *avium* instead of *azurea*. (See Hall, 1948, p. 189.)

control and flopped over on its back in a nervous spasm, its wings extended and fluttering, its legs twitching violently. When returned to a normal position, it lost strength rapidly and within a few minutes from the start of its spasm the bird was dead. Almost immediately after its death, five maggots, which had been completely embedded beneath the skin of the bird, began to leave its body. The maggots had embedded themselves in the following places: one beneath the skin of the right ventral side of the abdomen just posterior to the "knee"; another on the left ventral thoracic wall at the base of the neck; a third across the dorsal surface of the radius with the exit of the pouch along the posterior edge of the right wing at the mid-point of the radius and extending distad to the wrist; a fourth along the ventral mid-line of the body just anterior to the anus; and the fifth along the dorsal mid-line of the body just anterior to the oil gland. There was no evidence to indicate the maggots had directly damaged any of the muscle tissue. All of their sac-like burrows were just beneath the dermal surface. Feather development immediately above the burrows was retarded. It is possible that the maggot at the base of the neck caused a physical obstruction of the trachea when the bird was feeding. The burrow of this maggot began at the base of the neck in the left thoracic wall and crossed over to the right side as it continued cranial up the ventral side of the neck. The bulk of the larva exerted pressure on the vertebral column, trachea, and oesophagus. It is likely that when the nestling was eating the sawfly larvae, the oesophagus was distended enough to completely obstruct the trachea, with suffocation resulting.

The third nestling did not feed readily in the laboratory but lived for twenty-four hours after discovery. It was the condition of this individual that aroused our initial interest in the parasites since immediately upon its capture a curious swelling was noticed across its forehead and crown. A large maggot had entered the bird's left naris and was living completely hidden beneath the skin of the head. It could be seen externally only through the enlarged nares. In addition this nestling had four other maggots imbedded within it. Two were in a cavity in the right wing which lay just beneath the skin and ran the entire length of the radius and dorsal to it. Two openings from this cavity open posteriorly just above the secondaries. A third maggot had a burrow in the left ventral abdominal wall at the level of the posterior edge of the sternum. The fourth had a burrow in the left ventral abdominal wall just lateral to the anus. There was no evidence of any direct damage to the muscle tissue.

The larva of *Apaulina hirudo* (Shannon & Dobr.) differs decidedly from that of *Apaulina metallica* (Townsend), being more robust,

thicker-skinned, and spineless. It is interesting to note that when the larvae of *hirudo* were removed by forceps, a large drop of blood always oozed to the opening of the lesion, and these openings were typically moist, with the feathers about the opening heavily matted with a sticky substance. Six larvae were reared to the adult stage, the adults emerging August 14 and 15.

Only one reference in the literature is known to the authors on subcutaneous parasitism by Calliphorid flies. At Seattle, Washington, Plath (1919) found three larvae in the head of a nestling Willow Goldfinch. The feathers in the infested areas were erect, and the bird was observed frequently scratching its head. The larvae were extracted but were not reared. Sargent (1938), upon describing the habits of the larvae of *Protocalliphora splendida sialis* Shan. & Dob. on various hawks at Ithaca, N. Y., states that they appeared to occur under the skin, but investigation proved the apparent skin surface to be an incrustation of down, blood, and fecal waste caused by maggots and that the skin was not pierced.

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U. S. Fish and Wildlife Service
Patuxent Research Refuge
Laurel, Maryland