



BUG BIZ

Pest Management and Insect Identification Series



Necrophila americana, American Carrion Beetle (Coleoptera: Silphidae)

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Left: Male fall armyworm moth (Lyle Buss, University of Florida, Bugwood.org). Right: Adult American carrion beetle, ventral view (Able Chow).

Description

Adult American carrion beetles are medium-sized beetles $\frac{1}{2}$ of an inch to $\frac{3}{4}$ of an inch (13.8 to 20.0 mm) in length with an oval, flattened body. The top surface of the thorax (pronotum) is yellow, with a central black spot and fine punctures. The thorax is expanded laterally but does not cover the head. The hardened forewings (elytra) are black, distinctly sculptured and cover the mid and hind legs as well as most of the abdomen. The head is small, with medium-sized eyes and well-developed, moderately clubbed antennae. Its legs are short and armed with small spines, and most of the time are tucked beneath the expanded elytra and pronotum.

Larval American carrion beetles are small-to-medium-sized insects $\frac{1}{4}$ of an inch to 1 inch in length (7 mm to 25 mm), depending on age. They possess six well-developed legs, and the segmented body is heavily armored dorsally with black plates. The head is exposed, and a pair of small antennae are present. The legs are short and often hidden

beneath the body plates. A pair of short appendages (urogomphi) are visible near the end of the abdomen. Eggs are oval, $\frac{1}{7}$ to $\frac{1}{10}$ of an inch (3.12 to 2.27 mm) in length and are cream colored with a slight greenish tinge. Pupae resemble a pale version of the adult, with the legs retracted and wings folded onto the sides of their bodies. The pupae possess pairs of long, erect lateral setae on each abdominal segment.

At least 10 species of carrion beetles occur in Louisiana. Three within the genus *Oiceoptoma* are similar in overall appearance to the American carrion beetle. Adults are smaller, around two-thirds the body length of adult American carrion beetles, and differ in coloration. *Oiceoptoma novaboracense* is black with pinkish borders on the pronotum. *O. inaequale* is solid black, and *O. rugulosum* is black with a more sculptured elytral surface. In Louisiana, these three species are active only during winter and early spring. Additional members of the family Silphidae in Louisiana are quite different in appearance.

Life Cycle and Ecology

American carrion beetles are widely distributed across eastern North America in various forest habitats. The species may be found throughout the year in southern United States, but adults are most abundant during spring and summer, the reproductive season. The beetles overwinter in the adult stage in northern parts of the range, but larvae can be seen during warm days in the South, where seasonality appears more flexible.

As their common name suggests, American carrion beetles require medium to large vertebrate carcasses, such as racoons, deer and domestic animals, to complete their life cycle. The adults arrive at the carcass several days after death before the onset of the active decay stage when large maggot masses rapidly consume the carcass. As decomposition progresses, the adults continue to gather, mating and feeding opportunistically on the flesh of the carcass or on maggots. For several days, adult females

will mate with numerous males and lay clutches of five to 10 eggs in the soil around the carcass. A female may lay up to 100 eggs in its lifetime. Adults disperse when the maggots have completely overwhelmed the carcass, approximately seven days postmortem, depending on weather and temperature. Adults are active fliers, often flying during the day, and strongly resemble bumblebees in flight.



Larva of American carrion beetle (Jon Yuschock, Bugwood.org).

Larvae emerge from eggs after about six days of incubation, approximately two weeks postmortem. By then the carcass is in the dry decay stage and maggots have consumed most of the carcass and migrated away for pupation, leaving behind bits of dried flesh, sinew, bones, skin and hair, which American carrion beetle larvae feed on. The duration of larval and pupal stages of American carrion beetles is not well documented, but it is estimated that larvae take 10 to 12 weeks to develop into adulthood, the longest of carrion beetles in North America. Larvae feed exclusively on carrion in the wild, but the adults feed opportunistically on all carcasses, vertebrate and invertebrate, and have been observed feeding on decaying fruits, fungi and visiting flowers.

Forensic Entomology

The presence and abundance of carrion beetles can aid in the estimation of postmortem interval (PMI), a metric

that helps forensic investigators estimate time of death, especially in the case of concealed bodies. Carcass PMI is commonly estimated from the development of maggots, which is tightly correlated to temperature and time. American carrion beetles and the red-lined carrion beetle (*Necrodes surinamensis*) have been shown to aggregate and reproduce in large numbers around concealed bodies, particularly those in suitcases and trashcans.

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