Black Fly
Ectemnia invenusta

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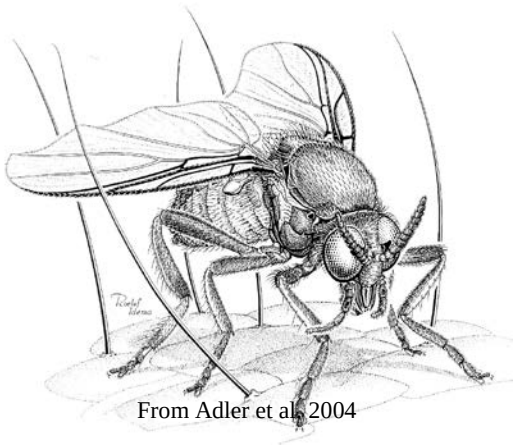

From Adler et al. 2004

DESCRIPTION

Taxonomy and Basic Description

Ectemnia invenusta was described by Francis Walker in 1848 from adults collected in Canada. The species was originally described in the genus *Simulium* and later transferred to the genus *Cnephia* before it was finally established as a member of the genus *Ectemnia*. The larvae and pupae were not discovered until the late 1940s. Black flies are members of the family Simuliidae, in the order Diptera, suborder Nematocera.

Adult black flies are stout-bodied insects, somewhat resembling a buffalo, with a wingspan of about 3 to 9 mm (0.12 to 0.35 in.). They are typically dark colored, but also can be gray, orange, yellow or iridescent. They are well-known pests of humans and their animals, their economic importance stemming from the female's requirement for a meal of bird or mammal blood to mature the eggs. However, only about 16% of the 255 species in North America are pests. The majority of species take blood inconspicuously from wildlife while about 10% of the North American species do not feed on blood.

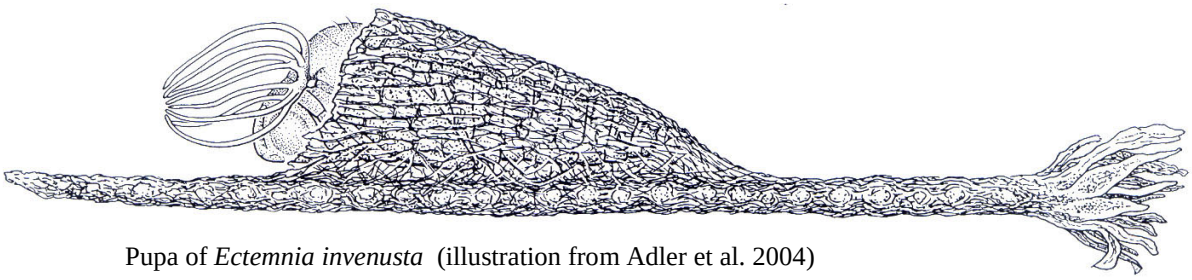

Ectemnia invenusta larva (from Adler et al. 2004)

Females lay their eggs in streams and rivers where the larvae and pupae develop exclusively in flowing water. Larvae are beneficial elements of the food web of running waters, serving as prey for many aquatic organisms.They filter their food from the water current, using a specialized pair of head fans. Larvae spin a silken cocoon onto an object in the current and pupate within this silken shroud. The pupa is recognized by a pair of gills issuing from the anterior of the thorax. The adult splits the skin of the pupa and pops to the surface of the water in a bubble of air. Most species of black flies have specific habitat requirements often related to the rate of water flow.

Adult black flies are dark colored and among the largest black flies in North America. They have a costa with spinules and fine setae and a dorsally haired radius. Females have a frons about 4x as long as its narrowest width, claws each with a large thumblike lobe, and an elongate wrinkled spermatheca. Males have a ventral plate with the body about two and one-half times broader than long and tapered posteriorly in

ventral view, gonostyli each with two or three apical spinules, and numerous short parameral spines.

The Black Fly pupa has a gill of 8 apically convergent filaments; the third pair of filaments from the dorsum arises from a very short stalk. The cocoon is slipper shaped with an irregular anterior margin, and is situated near the end of a silken stalk that is spun by the larva. The larva has flanges on the 5th through 8th abdominal segments. The polytene chromosomes of South Carolina populations were described by Moulton and Adler (1997). The sex chromosomes of South Carolina populations are undifferentiated and are, therefore, similar to those of Pennsylvania populations, but different from those in Canada (Adler et al. 2004).



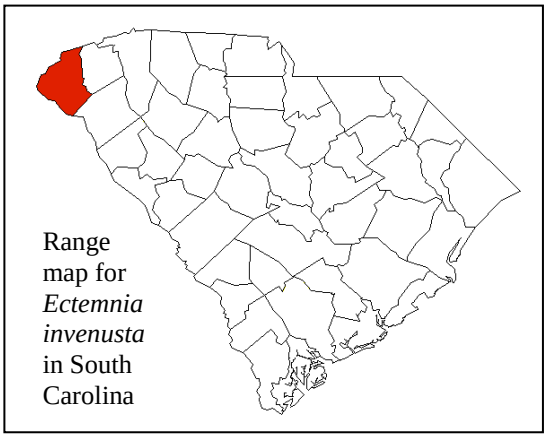
Pupa of *Ectemnia invenusta* (illustration from Adler et al. 2004)

Status

This species has no official status but is range restricted.

POPULATION SIZE AND DISTRIBUTION

The genus *Ectemnia,* with its 4 constituent species, is restricted to North America. Three of these species occur in South Carolina. *Ectemnia invenusta,* although having the widest distributional range of the three species, is known from only one river in South Carolina, the Chattooga River separating Georgia and South Carolina, where it reaches its southernmost distribution limit (Adler et al. 2004). In the northern portion of its range (Canada and New England), the Black Fly produces large populations in the early spring. However, the only known population in South Carolina (Chattooga River, Oconee County), although not quantified, is thin and difficult to sample in the swift, bitterly cold water of winter.



Range map for *Ectemnia invenusta* in South Carolina

HABITAT AND NATURAL COMMUNITY REQUIREMENTS

Black Fly larvae and pupae inhabit the rapids of the Chattooga River, where they attach their silken stalks to rocks. Only one generation is produced each year. Larvae hatch in the fall,

beginning about October, and begin to reach maturity in January (Adler et al. 2004). The adults emerge in January and February. No natural enemies of this species have been recorded, although they surely exist. The adult females feed on the blood of birds such as Canada geese, mallards and ruffed grouse.

CHALLENGES

The stability of the South Carolina population of black flies depends on the maintenance of water quality in the Chattooga River. Clear, cold, well-oxygenated, unpolluted river water is essential. Maintenance of South Carolina's Black Fly population of is dependent on a protected riparian zone along the Chattooga River to maintain water quality of the breeding site. Maintenance of superior water quality in the Chattooga River will not only ensure ideal breeding grounds for this species but also for numerous other aquatic organisms, some of which (blepharicerid midges) also are known only from the Chattooga River. Other specific terrestrial factors are presently unknown.

CONSERVATION ACCOMPLISHMENTS

There are no specific conservation accomplishments for the Black Fly.

CONSERVATION RECOMMENDATIONS

- Protect critical habitats for the Black Fly from future development and further habitat degradation by following best management practices and protecting and purchasing riparian areas.
- Promote land stewardship practices through educational programs, both within critical habitats with healthy populations and other areas that contain available habitat for the Black Fly.
- Encourage responsible land use planning.
- Consider species needs when participating in the environmental permit review process.

MEASURES OF SUCCESS

As research and management needs are identified, projects will be initiated to address those needs.

LITERATURE CITED

Adler, P.H., D.C. Currie and D.M. Wood. 2004. The Black Flies (Simuliidae) of North America. Cornell University Press. Ithaca, New York. 941 pp. + 24 color plates.

Moulton, J.K. and P.H. Adler. 1997. The genus *Ectemnia* (Diptera: Simuliidae): taxonomy, polytene chromosomes, new species, and phylogeny. Canadian Journal of Zoology. 75:1896-1915.