

COMMUNICATION

## Water contact during courtship of males of *Archiseopsis diversiformis* (Sepsidae)

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**Abstract:** On uncut plants of *Dieffenbachia* (Araceae) male aggregations of *Archiseopsis diversiformis* (Sepsidae) were observed fighting with each other and courting females. The males were observed repeatedly orienting toward water droplets, moving next to the droplet and leaning against it, alternatively, to the two sides of the body and using the legs from the opposite side to push against it. This movement was repeated up to seven times in one "bathing" event. The occasional "bath" probably helps to dissipate heat from the body surface, thus preventing a rise in body temperature.

**Key words:** *Archiseopsis diversiformis*, Sepsidae, aggregations, bathing.

Sepsidae is well represented in all zoogeographic regions of the world, with 26 described genera and about 250 species (Steyskal 1981). In the neotropical region there are 36 species in seven genera. The genera *Archiseopsis*, *Meroplioseopsis*, *Microseopsis*, *Palaeoseopsis* and *Pseudopalaeoseopsis* have been collected in Costa Rica (W. Eberhard pers. comm.).

This family includes thin, small to medium sized flies, 2 to 6 mm in length (Steyskal 1981), whose biology is poorly known, especially in the neotropics (W. Eberhard pers. comm.). Many species are closely associated with mammalian excrement: larvae are coprophagous (Steyskal 1981), or, less commonly, saprophagous (Pont 1979); the eggs are laid directly in the larval food source, and pupation occurs in the same food or in the soil beneath (Pont 1979). Sepsids are among the first insects to appear in fresh cow excrement (Hafez 1948). In certain parts of Egypt adults

are known to feed on nectar, but others visit excrement in order to satisfy their requirements for protein, water and minerals, and mating and reproduction.

Aggregations of *Archiseopsis* sp. were observed throughout the day near a stream (La Cañaza) in Golfito (Puntarenas Province), Costa Rica, in a shaded area of a very humid tropical forest life zone (Holdridge 1967). Detailed close-ups of the interactions were obtained with a video camera (Sony CCD Video Hi 8) and a +6X zoom lens. Males were found fighting with each other and courting females on leaves of *Dieffenbachia* (Araceae), even though this plant is not an oviposition site and the flies apparently do not obtain any resource from this plant. However, recently cut stems and leaves of this plant attracted large numbers of individuals of at least three species of sepsids, and some of these were observed to take liquid from cut parts of the plant.

On uncut plants one or two males moved actively over the leaves, apparently waiting for the arrival of females. As is typical for the family, the flies constantly moved their wings while standing still, although in the presence of other individuals they apparently move about more frequently. On four occasions two different male flies were observed repeatedly orienting toward water droplets that had accumulated near the edge of the leaf. The flies moved next to the droplet and leaned against it, alternately with the two sides of the body, using the legs from the opposite side to push against it. This movement was repeated up to seven times in one "bathing" event. The males also lowered themselves and submerged the ventral part of the body in the water droplet. The total duration of the "bathing" event was 45 s ( $n = 4$ ), each leaning movement lasting  $11.1 \pm 3.66$  s ( $n = 11$ ) and each submergence lasting  $17 \pm 16.6$  s ( $n = 3$ ). Later the males walked away from the droplet and groomed their body with their legs.

Insects commonly reduce the problems associated with hot environments by avoiding exposure to high temperatures, thus minimizing water loss and the risk of death due to overheating (Prange 1995). Even though the flies in this study were found in a shaded locality, midday temperatures still tend to be around 30°C. It is probable that males of this sepsid species are utilizing evaporative cooling to avoid heat stress and consequent loss of water, which may be especially important since they are quite active (aggressive interactions and courting behavior) and inhabit a hot humid environment. The occasional "baths" probably

help dissipate heat from the body surface evaporation of water, thus preventing a rise in body temperature. Drinking water directly from the droplets was not observed during this study. Another possible mechanism that may help minimize the loss of water in this species was their reduced activity during midday.

## REFERENCES

- Duda, O. 1925. Monographie der Sepsiden (Dipt.) I. Ann. Naturhist. Mus. Wien 39: 1-153.
- Duda, O. 1926. Monographie der Sepsiden (Dipt.) II. Ann. Naturhist. Mus. Wien 40: 1-110.
- Hafez, M. 1948. Ecological and biological observations on some coprophagous Sepsidae (Diptera). Proc. Roy. Entomol. Soc. Lond. 23: 10-12.
- Hammer, O. 1941. Biological and ecological investigations on flies associated with pasturing cattle and their excrement. *In* Videnskabelige Meddelelser Fra Dansk Naturhistorisk Forening. 105: 1-135.
- Holdridge, L.R. 1967. Life zone ecology. Tropical Science Center, San José, Costa Rica.
- Pont, A.C. 1979. Sepsidae. Diptera, Cyclorhapha, Acalyprata, p. 1-35. *In* M.G. Fitton (ed.). Handbooks for the identification of British insects. Volume X, Part 5(c). Royal Entomological Society of London, London.
- Prange, H.A. 1995. Evaporative cooling in insects. J. Ins. Physiol. 42: 493-499.
- Steyskal, G.C. 1981. Sepsidae, p. 945-950. *In* J.F. McAlpine (ed.). Manual of Nearctic Diptera. Volume 1. Canadian Government Publishing Agents and other bookstores. Hull, Quebec, Canada.