Canyon Flies  
(*Fannia benjamini* complex)

**General Information**

Canyon flies are significant pests of humans and animals in coastal mountain and foothill habitats of the southwestern United States. The canyon fly group is comprised of seven related fly species within the *Fannia benjamini* complex: *F. benjamini*, *F. conspicua*, *F. thelaziae*, *F. tescorum*, *F. operta*, *F. neotomaria*, and *F. arizonensis*. The geographic range of each of these fly species is unknown, though some overlap in range among species is recognized at a few locations where they have been studied. All flies in this group are attracted to animals to feed on body secretions such as tears, mucus, sweat, saliva, or blood from open wounds (Fig. 1). Their persistent attempts to land upon the face and body of the host can result in considerable nuisance.

Canyon flies are diurnally active, with host-seeking generally greatest soon after sunrise and in the hours before sunset. Where daytime temperatures are high, a pronounced lull in fly activity will be noted during midday. Little is known about the variation in activity among the canyon fly species, but those species that have been examined in California show a distinct seasonal activity with adult fly abundance peaking during late spring and early summer or in early-mid fall.

**Identification and Life History**

Canyon flies are small bodied, ranging in size from 3.5-4.5 mm. Only adult female canyon flies are attracted to and feed on animal hosts, from which they acquire proteins needed for egg development. Adult female canyon flies are distinguished by the yellowing of their antenna and palpi, and by their trimaculate (three spotted) abdomen (Fig. 2).

Canyon flies have sponging mouthparts, like house flies, but also have prestomal teeth (Fig. 3) which they can use to scrape a feeding surface (e.g., mucous membranes around the eyes) to encourage production of tears or other secretion. Near a human host, adult canyon flies have a characteristic flight behavior resulting in their

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**Figure 1:** Canyon fly feeding on human foot. Photo by Alec Gerry, UC Riverside.

**Figure 2:** Canyon fly abdominal coloration (female). Photo by Stephanie Leon, UC Riverside.
hovering near the head, waist, feet, or other areas where sweat builds up, with landing typically occurring only when the host remains relatively still.

The development site for immature canyon flies is not well characterized. At least one species (*F. conspicua*) is known to utilize decaying vegetation as a developmental site, and large populations of this fly species are known to occur in southern California hillside communities where an exotic succulent groundcover plant called “red apple” (*Aptenia cordifolia*) has been extensively planted.

All flies undergo complete metamorphosis with egg, larva, pupa, and adult stages. Canyon fly larvae do not look like a typical fly maggot; instead they appear flattened and have numerous filaments extending from the body often with some feathering at the base of these filaments (Fig.4). The pupa develops within a puparium, which is the hardened outer skeleton (“skin”) of the last larval instar. The canyon fly puparium retains the shape of the larva, but darkens to a deep brown as the pupa develops inside.

**Damage**

Only one member of the canyon fly complex (*F. thelaziae*) is known to pose a threat to human and animal health because it acts as an intermediate host of the nematode eye worm *Thelazia californiensis*. More typically, canyon flies cause nuisance to humans and our domestic animals through persistent attempts to land on the body and face of the host. This host-seeking behavior can severely limit human and animal use of outdoor areas that have large numbers of canyon flies.

**Integrated Pest Management**

**Trapping:** Although not typically blood feeders, canyon flies do respond to carbon dioxide (CO₂) which is a component of animal breath, and at least one species (*F. conspicua*) in the group is readily captured in CO₂-baited traps. The addition of ammonia, another host odor, to the CO₂ traps was shown to increase the capture rate of *F. conspicua*. Suction traps arrayed in a barrier and baited with CO₂ reduced the number of *F. conspicua* reaching the protected area and this management technique might provide relief from nuisance in some instances. However, not all canyon fly species are readily captured in suction traps baited with CO₂; the type species of the canyon fly group, *F. benjamini*, is not captured in CO₂-baited suction traps, even when traps are supplemented with additional host odors like ammonia and octenol.
Cultural Control: For at least one canyon fly species (*F. conspicua*) removal of larval development habitat could reduce the population considerably. The succulent groundcover “red apple” was introduced to California in the 1980s for hillside planting to prevent soil erosion and as a barrier against wildfire. Prior to the introduction of this exotic plant, *F. conspicua* numbers were low in the hillside communities of southern California and this fly species was not reported as a considerable nuisance. By the mid-1990s, “red apple” was planted widely in these hillside communities and *F. conspicua* began to utilize it as a development site (Fig. 5). Reports of nuisance by *F. conspicua* rose quickly in subsequent years. It is likely that widespread removal and replacement of “red apple” with a suitable alternate plant would reduce canyon fly populations to their previous numbers.

References for more information


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