

A mosquito *Psorophora ciliata* (Fabricius) (Insecta: Diptera: Culicidae)¹

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Introduction

Psorophora ciliata (Fabricius) is a large mosquito (Cutwa and O'Meara 2005) that has developed an outsized reputation because of its relatively intimidating heft and persistent biting behavior (Gladney and Turner 1969), including anecdotal historical accounts of its legendary aggressiveness (Wallis and Whitman 1971) and 'frightening appearance' (King et al. 1960). The 'gallinipper' or 'shaggy-legged gallinipper' was used as a common name for *Psorophora ciliata* in various published reports (Ross 1947, King et al. 1960, Breeland et al. 1961, Goddard et al. 2009). The term was mentioned much earlier by Flanery (1897) describing the mosquito as 'the little zebra-legged thing - the shyest, slyest, meanest and most venomous of them all' [sic] but did not specify what species it was. The word gallinipper originated as a vernacular term in the southeastern region of the United States referring to 'a large mosquito or other insect that has a painful bite or sting' and has appeared in folk tales, traditional minstrel songs, and a blues song referencing a large mosquito with a 'fearsome bite' (McCann 2006). However, the Entomological Society of America has not recognized 'gallinipper' or 'shaggy-legged gallinipper' as an official common name for *Psorophora ciliata* (ESA 2012). Of special interest, *Psorophora ciliata* is one of the few mosquito species whose larvae are predaceous to other mosquito larvae (Howard et al. 1917, Carpenter and LaCasse 1955).

For additional information on mosquitoes, see <http://edis.ifas.ufl.edu/IN652>.

Synonymy

Psorophora ciliata (Fabricius, 1794)

Culex ciliata Fabricius, 1794

Culex conterrens Walker, 1856

Culex molestus Weidemann, 1820

Culex rubidus Robineau-Desvoidy, 1827

Psorophora boscii Robineau-Desvoidy, 1827

Psorophora ctites Dyar, 1918

(From ITIS 2011)

Distribution

Psorophora ciliata usually is associated with other floodwater mosquitoes, including many species from the *Aedes* genera (Breeland et al. 1961), and has a wide distribution in the New World. Floodwater mosquitoes often lay their eggs in low-lying areas with damp soil and grassy overgrowth. When these areas flood following a dry period,

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the eggs hatch, often producing very large numbers of adult mosquitoes.

Psorophora ciliata occurs east of the Continental Divide (Howard et al. 1917, Darsie and Ward 2005) from the southern portions of Ontario and Quebec (Wood et al. 1979, Foss and Deyrup 2007) to as far south as Argentina (Campos et al. 2004). A new record has been reported recently from the highlands of Colombia (Barreto et al. 1996) but still east of the Continental Divide. There is no record of *Psorophora ciliata* in the Old World.



Figure 1. *Psorophora ciliata* distribution in North America, north of Mexico.

Credits: Marcos Gomez based on Darsie and Ward 2005.

Description

Adults

Psorophora ciliata is one of the largest known mosquitoes in the U.S. (Carpenter and LaCasse 1955) with female adults having a wingspan of 6.0-6.7 mm (Means 1987). The size alone is a distinguishing characteristic (Cutwa and O'Meara 2005) with only *Toxorhynchites rutilus rutilus* (Coquillett), *Toxorhynchites rutilus septentrionalis* (Dyar and Knab), and *Psorophora howardii* Coquillett being of similar or larger size (King et al. 1960). *Psorophora howardii* is similar morphologically and has the same distribution (Darsie and Ward 2005) in the southeastern United States, but is encountered less frequently (King et al. 1960, Breeland et al. 1961). Other distinguishing characteristics include a longitudinal band of yellow scales on the thorax, yellow scales forming a band on the proboscis, and the 'shaggy' or 'feathery' pronounced dark scales on the hindleg segments (Darsie and War 2005), hence the unofficial common name of 'shaggy-legged' or 'feather-legged gallinipper.'



Figure 2. An adult female *Psorophora ciliata* blood-feeding.

Credits: Sean McCann



Figure 3. An adult female *Psorophora ciliata* showing relative size.

Credits: Darrin O'Brien

Eggs

Psorophora ciliata eggs are 'elongate ovoid' in shape measuring about 0.8 mm in length and 0.4 mm in diameter at their widest girth, and are among the longest and thickest measured among the *Psorophora* species. Their outer surface is white when first deposited but later turns black, with spine-like projections directed towards the anterior (Horsfall et al. 1952). Comparable with other floodwater and container-breeding mosquitoes, *Psorophora ciliata* eggs can stand long periods of desiccation and usually are found in areas where rain collects (Carpenter and LaCasse 1955).



Figure 4. Close-up of a female *Psorophora ciliata* showing the 'shaggy' dark scales.

Credits: Michelle Cutwa-Francis, University of Florida.

Larvae

Similar to adults, *Psorophora ciliata* larvae are larger than most mosquito larvae. Another distinguishing characteristic of fourth instar larvae is a square-shaped head with the dorsal side of the head curved inwards (Cutwa and O'Meara 2005, Darsie and Ward 2005). The mouthparts of the larvae have evolved to hold and grasp prey (Shalaby 1957).



Figure 5. *Psorophora ciliata* eating a mosquito larva.
Credits: Ary Farajollahi, Mercer County Mosquito Control, NJ.

Pupae

The pupae of *Psorophora ciliata* are very difficult to distinguish from other mosquito species and rarely are used for mosquito identification, but the size alone should be an indication of species potential. The pupae of *Toxorhynchites* species and *Psorophora howardii*, also relatively large mosquitoes that could be mistaken for *Psorophora ciliata*.

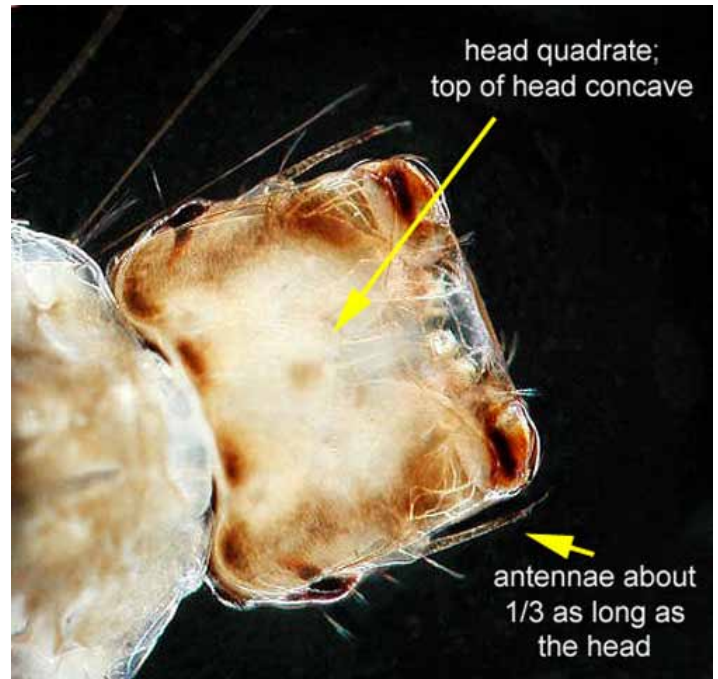


Figure 6. Close-up of the head of *Psorophora ciliata* with larval characteristics.

Credits: Michelle Cutwa-Francis from Cutwa and O'Meara 2005.



Figure 7. *Psorophora ciliata* pupa.
Credits: Michelle Cutwa-Francis, University of Florida.

Life Cycle

Psorophora ciliata overwinters in the egg stage (Breeland et al. 1961, Wallis and Whitman 1971) and may not hatch until mid-summer or after the first rainfall event of the season (Wood et al. 1979). The first instar larvae are filter-feeders, whereas the second, third, and fourth instar larvae are predaceous to aquatic invertebrates, including other mosquito larvae (Shalaby 1957). *Psorophora ciliata* larvae also have been reported to be cannibalistic (Howard et al. 1917) and have been documented feeding on tadpoles (Breeland et al. 1961). Adults lay their eggs in habitats used by *Aedes* and other *Psorophora* species in floodwater

environments (Carpenter and LaCasse 1955, Horsfall et al. 1952, King et al. 1960). Larvae have a very rapid development in laboratory settings, with adults emerging only six days after eggs hatch (Breeland and Pickard 1963).

Medical and Veterinary Importance

Psorophora ciliata are primarily mammalian blood-feeders. An extensive study of Florida mosquitoes by Edman (1971) demonstrated that more than half of the blood meals detected from this species were from ruminants, and the rest from armadillos, raccoons, and rabbits. This mosquito will feed readily on humans and can be annoying in larger numbers (Howard et al. 1917). However, Wallis and Whitman (1971) conveyed that its status as a pest species may not be that important due to its relative rarity compared to other pest mosquito species.

Psorophora ciliata have tested positive for the presence of Eastern equine encephalitis virus (Chamberlain et al. 1954), Venezuelan equine encephalitis virus (Sudia et al. 1975), Western equine encephalitis virus (Mitchell et al. 1987), Tensaw virus (Wozniak et al. 2001), and West Nile virus (Chow et al. 2002, CDC 2011). However, there are no confirmative studies indicating that *Psorophora ciliata* is a bridge vector for those viruses, nor any follow-up published research documenting that this species is a competent vector of pathogens of medical and veterinary importance.

Management

Limited published surveillance or management studies have been found specifically for this mosquito. In a study to determine attraction to different artificial lights, *Psorophora ciliata* was shown to be attracted to certain incandescent blue light compared to other colors (Ali et al. 1989). Because this species is associated with other floodwater mosquitoes, the management and control of such species should lead to the reduction of *Psorophora ciliata* populations.

The proclivity of *Psorophora ciliata* larvae to consume other mosquito larvae, including pestiferous species such as *Aedes albifasciatus* (Macquart) (Campos et al. 2004), *Aedes vexans* (Meigen), and other floodwater mosquitoes (Breeland et al. 1961), has led to suggestions of using this species as biological control agent of pest and vector mosquitoes (Howard et al. 1917, Gladney and Turner 1969). However, King et al. (1960) argued that *Psorophora ciliata* larvae do not occur in large enough numbers to be effective in controlling overall

pest mosquito populations. Additionally, the point is moot because of the pestiferous nature of adult females effectively undermining any potential benefits of using the larvae as a biological control agent (Holck 1988, Mercer et al. 2005)

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