

A Ceratopogonine Midge (*Culicoides anophelis* Edwards, 1922) sucking engorged Blood from a Mosquito (*Armigeres lacuum* Edwards, 1922) at Palmalmal, New Britain.

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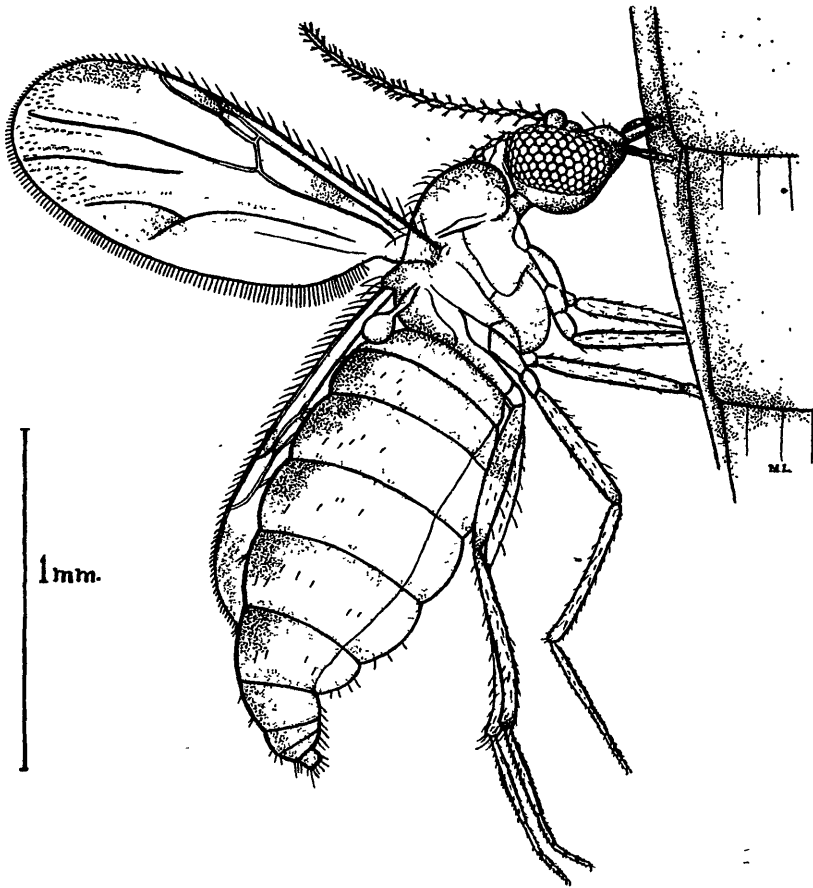
THIS record was made in the course of a collection of day-biting mosquitoes in shady jungle at Palmalmal, New Britain, on the afternoon of 23rd August, 1945.

A mosquito was observed to be flying slowly and in unusually erratic fashion about 3 ft. from the ground. It was captured, and proved to be an engorged female of *Armigeres lacuum* Edwards. A ceratopogonine midge was in the act of biting this mosquito, its mouth-parts penetrating the lateral part of the fourth abdominal segment of its host. The abdomen of the midge was distended with blood, which showed through the cuticle as a reddish mass.

Both insects were chloroformed and preserved in formalin. Even after death the ceratopogonid remained in the biting position, so firmly were its mouth-parts embedded in the tissues of the mosquito. The midge was subsequently identified as a female *Culicoides anophelis* Edwards (Edwards, 1922). The figure was drawn from the preserved specimens, and shows the appearance of the engorged midge. The distal part of the latter's proboscis is buried in the side of the mosquito's abdomen.

C. anophelis has not previously been reported from the Australian Region. Earlier records of attacks on mosquitoes by this insect are from India, Ceylon, Burma, Malaya (type), Indo-China, and Sumatra. The records to date are summarised in Table 1, in so far as attacks on identified mosquitoes are concerned. Other accounts of such attacks are those of Fearnside (1900), who reported a *Culicoides* as biting an unidentified *Culex* at Rajahmundry Gaol, India; Rutherford (Knab, 1914) and Carter (1927), who collected *Culicoides* (queried by Carter as *C. anophelis*) from several species of *Anopheles* in Ceylon; and Stanton (Edwards, 1922), who obtained *C. anophelis* from an unspecified host at Deli, Sumatra.

Ceratopogonidae have been seen to attack many other kinds of insects in addition to mosquitoes. The literature on the subject was reviewed by Knab (1914, 1914a) and Edwards (1920, 1922, 1923). Edwards draws the distinction between cases of predacity and those of simple blood-sucking in these attacks. He places cases in which small insects are killed by being sucked dry, in the former category. Such attacks as those of *Culicoides* on mosquitoes and other insects much larger than itself seldom result in the death of the victim, and Edwards refers to these as cases of blood-sucking.



Culicoides anophelis Edwards attacking *Armigeres lacuum* Edwards.

Lamborn's observations in Malaya (Edwards, 1922) draw attention to the fact that Ceratopogonidae have not been collected from male mosquitoes. There are in addition very few records of attacks on unengorged female mosquitoes. Several authors observe that midges collected from mosquitoes show a brown or pink trace of blood in their stomachs. Edwards (1922) concludes that the object of *C. anophelis* is to obtain not the body-fluids of the mosquito, but ingested blood.

As many as three specimens of *C. anophelis* have been found on one mosquito (Galliard and Gaschen, 1937). Lamborn (Edwards, 1922) and Galliard and Gaschen (1937) observe that midges may remain attached to the mosquito host for several hours without causing any apparent ill effects. However, Leon (1924) cites the case of an engorged female *Anopheles maculipennis* Meigen suffering from an external abdominal hernia at the site of a puncture made by a midge when the mosquito's stomach was empty.

The present instance is the second on record of an attack by *Culicoides* on a non-anopheline mosquito. The earlier observation is that made by Fearnside (1900) concerning a midge found biting an unidentified *Culex*. Thus it is established that *C. anophelis* does not restrict itself to *Anopheles* as a host.

Sinton (1925) mentions that there is no evidence that *C. anophelis* bites man. He suggests that if it should prove to do so this midge might become at least a potential mechanical carrier of *Plasmodium*. In view of the life-cycle of *Plasmodium*, it seems highly improbable that this could occur. It is more likely that *C. anophelis* might become a potential carrier of the virus that causes dengue fever, by feeding from a mosquito harbouring this organism. Further information concerning the habits of *C. anophelis*, particularly as to whether or not it is capable of biting man, is much to be desired.

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Mosquitos known to have been attacked by Ceratopogonine Midges.

Mosquito attacked.	Midge.	Locality	Date.	Author.
<i>Anopheles aconitus</i> Dönitz, 1902	<i>C. anophelis</i>	Kuala Lumpur, Fed. Malay States	1920	Lamborn
	<i>C. anophelis</i>	Central Provinces India	1925	Sinton and Little
	<i>C. anophelis</i>	Assam, India	1932	Smith and Swaminath
<i>Anopheles annularis</i> van der Wulp, 1884 (= <i>A. fuliginosus</i> Giles)	"Ceratopogonine midge"	Lower Burma	1912	Lalor
	<i>C. anophelis</i>	Kuala Lumpur, Fed. Malay States	1912	Stanton
	<i>C. anophelis</i>	Kuala Lumpur, Fed. Malay States	1920	Lamborn
<i>Anopheles hyrcanus nigerrimus</i> Giles, 1900	<i>C. anophelis</i>	Tonkin, Indo-China	1937	Galliard and Gaschen
<i>Anopheles hyrcanus sinensis</i> Wiedemann, 1828	<i>C. anophelis</i>	Kuala Lumpur, Fed. Malay States	1912	Stanton
	<i>C. anophelis</i>	Kuala Lumpur, Fed. Malay States	1920	Lamborn
<i>Anopheles karwari</i> (James, 1903)	<i>C. anophelis</i>	Kuala Lumpur, Fed. Malay States	1912	Stanton
	<i>C. anophelis</i>	Kuala Lumpur, Fed. Malay States	1920	Lamborn
<i>Anopheles maculatus</i> (<i>Anopheles m. maculatus</i> Theobald, 1901?)	<i>C. anophelis</i>	Jalpaiguri, Lower India	1922	Edwards (Iyengar, 1921)
<i>Anopheles maculipennis maculipennis</i> Meigen, 1818	"Culicoides"	Europe	1924	Leon
<i>Anopheles vagus vagus</i> Dönitz, 1902	<i>C. anophelis</i>	Kuala Lumpur, Fed. Malay States	1920	Lamborn
<i>Armigeres lacuum</i> Edwards, 1922	<i>C. anophelis</i>	Palmal. New Britain	1945	

TABLE I.