NOTES ON THE *CULEX VIRGULITIS* COMPLEX
(DIPTERA: CULICIDAE) 1

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INTRODUCTION. On October 12, 1933 the writer collected many larvae and several egg rafts of a species of *Culex* at Palmetto State Park, about 5 miles south of Luling, Texas. Some of the egg rafts hatched and series of larvae as well as many adults were obtained. By using available keys and descriptions, the writer found it impossible to identify positively the species involved. Consequently, a series was sent to Dr. Alan Stone at the National Museum for a comparison with types. Dr. Stone kindly identified the specimens as *Culex virgulitis* Theobald.

Until recently the name, *Culex declarator* D. & K., has been used for certain members of this group. Lane (1957), however, after an examination of types in the United States National Museum and in the British Museum, synonymized *C. declarator* under *C. virgulitis*.

*Culex virgulitis* as at present recognized has a very wide distribution: from Texas south through Mexico, Central America and to Uruguay in South America. It also occurs in some of the islands of the West Indies (Dyar 1928; Kumm, Komp and Ritz 1940). This species is quite variable, which is doubtless responsible for the large number of synonyms, and it causes the identification of the species in different parts of its range to be quite difficult. Additional studies may cause the group to be broken into two or more species, but at the present state of our knowledge it appears best to consider the group as a single species or species complex.

So far as could be determined, this species has been reported only a few times from the United States, and it has consequently been considered rare in the country. In view of the large number of specimens recently collected, and the confusion existing relative to this group, the writer has thought it worthwhile to review and bring up to date available information relative to the complex. It has also been thought advisable to point out briefly how the specimens at hand differ from current descriptions. These descriptions and the accompanying illustrations should be of assistance to other workers in identifying members of the *C. virgulitis* complex found in Texas.

HISTORICAL. In the following brief discussion of the *C. virgulitis* complex, only those publications are cited which seem to be of most importance. A more complete bibliography may be found in Dyar (1928) and in Matheson (1944).

*Culex virgulitis* was described by Theobald (1901) from two male specimens collected at Rio de Janeiro, Brazil in 1899.

Dyar and Knab (1906) described *Culex declarator* from larvae collected in Trinidad, West Indies. Dyar (1918) after studying larger series, synonymized *C. jubilator* D. & K., *C. declarator* D. & K. and *C. vindicator* D. & K. under *C. declarator*.

He also made *proclamator* D. & K. a variety of declarator, and synonymized *inquisitor* D. & K. and *revelator* D. & K. under this variety. At this time, Dyar stated that features he had previously used to distinguish these various groups became less distinct as more specimens were studied. The features mentioned included the length and the number of pecten teeth on the siphon, the position of the siphonal hairs and the presence or absence of white-tipped tarsi in the adult.

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Bonne-Wepster and Bonne (1921) after collecting in Surinam (Dutch Guiana) for several years, compared their specimens with types in the United States National Museum and the British Museum. On the basis of these studies, these workers considered C. declarator and C. virgultis as identical. Dyar (1921a) accepted this interpretation, but later (1921b) restored declarator to specific rank. At this time, Dyar listed previously recognized synonyms, and in addition, reduced proclamator, a previously recognized variety, to a synonym of declarator. In his 1928 monograph Dyar recognized both C. virgultis and C. declarator as valid species, and so far as could be determined, both groups were considered distinct until the study by Lane noted above.

The Present Study. It was mentioned previously that Culex virgultis (= declarator) has been reported from the United States only a few times. The most recent report noted was by Rueger and Buce (1950) who found eight adults from a total of almost 300,000 specimens collected at 32 army installations in Texas over a period of two years. C. virgultis came from Port Sam Houston (Brazos County) and from Harlingen Army Air Field (Cameron County). Dyar (1925; 1928) states that C. virgultis (called C. declarator in these publications) has been taken from Brownsville, Texas, but gives no indication of the number of specimens or the type of habitat from which the mosquitoes were obtained. Fisk and LeVan (1940) also collected the species at Brownsville in light traps. They did not state the number of specimens obtained.

The larvae and egg rafts collected by the writer were from two sites within a few hundred yards of each other, both in Palmetto State Park (Gonzales County), Texas. Most of the larvae and all the egg rafts were found in cow tracks and other small puddles on the bank of a small woodland stream. Other species obtained at the same time included Culex restuans Theobald, C. thriambus Dyar, C. terrritis Walker and Anopheles' pseudopunctitennis Theobald. A few adults of C. virgultis also emerged from larvae collected from a seepage area on the bank of the San Marcos River. Associated species included C. toralis Coq., C. thriambus and Uranotaenia syntheta Dyar and Shannon.

From these collections, more than 50 larvae were obtained for study and a similar number of adults emerged in the laboratory. The following descriptions and the accompanying illustrations are based upon a study of this material.

The most recently complete descriptions of this species (called C. declarator in these publications) of which the writer is aware, are those of Matheson (1944) and Yamaguti and LaCassee (1951). The descriptive features emphasized are those in which the writer's specimens differ from those given in these publications and Dyar (1928). Since most Culex are easiest to identify from larvae or male genitalia, only these points are discussed.

Larva: (fig. 1). From the standpoint of key features, perhaps the most important variation in the larva is the position of the siphonal hairs in relation to the pecten. Dyar (1928) states that the first siphonal hair may be either within or outside the pecten; in his key to larvae, declarator is distinguished from similar larvae by the first hair being close to or within the pecten as opposed to the first hair being some distance from the pecten. Matheson (1944) quotes Dyar's description of the larva, but in his key includes declarator with those species in which the basal tuft arises within the pecten. Yamaguti and LaCassee describe and figure a larva from Nicaragua in which the distal pecten teeth overlap the basal tuft.

There is some slight variation in the position of the basal siphonal tuft in the writer's specimens, but in all cases the basal tuft arises well beyond the pecten.

The authors noted above state that the pecten occurs on the basal one half of the siphon; in most of the writer's larvae, the pecten occurs only on the basal one third. Yamaguti and LaCassee figure the individual pecten tooth with several short
Fig. 1. Larval structures of *Culex virgulii* Theobald. Specimens collected near Luling, Texas. Upper: head. Lower, terminal segments. Left middle, representative comb scale. Right middle, representative pecten tooth.
The individual pecten tooth of the Texas larvae has much longer denticles. The upper pair of anal gills of the larvae of Yamaguti and LaCasse are shortest in the illustration, whereas in our larvae the lower pair are shortest.

Additional variations of minor importance in the Texas specimens include the number of branches in both the head hairs and in the siphonal hairs.

Despite the variation existing in certain features of the larvae of C. virginalis, the species should usually be one of the easiest in the United States to identify correctly in the larval stage. It is the only species of Culex known from this country which routinely has only three pairs of hairs on the siphon. A few other species may occasionally exhibit this feature as a variation (e.g. C. nigripalpus Theobald) but in most cases four or more pairs of tufts or single hairs occur.

Male Genitalia: (Fig. 2). At least two differences are evident in the genitalia of the writer’s specimens as opposed to the illustrations of Dyar (1928) and Yamaguti and LaCasse (1951). In both these publications the appendages of the subbasal lobe are illustrated as consisting of a relatively symmetrical leaf, three hooked rods, a flattened rod slightly expanded distally and a seta. In the Texas specimens the leaf is asymmetrical and the flattened rod is much more expanded distally.

Obviously, additional studies are needed on this very variable complex of mosquitoes.

Literature Cited


Fig. 2. Apex of sidepiece or basistyle of male of Culex virginalis Theobald. Specimens collected near Lolaing, Texas.