NOTES ON THE *CULEX VIRGULTIS* COMPLEX (DIPTERA: CULICIDAE) [1]

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INTRODUCTION. On October 12, 1953 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 virgultis* Theobald.

Until recently the name, *Culex declarator* D. & K., has been used for certain members of this group. Lane (1951), however, after an examination of types in the United States National Museum and in the British Museum, synonymized *C. declarator* under *C. virgultis*.

Culex virgultis 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 Ruiz 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, thi species has been reported only a few time from the United States, and it has conse quently been considered rare in thi country. In view of the large number o specimens recently collected, and the con fusion existing relative to this group, th writer has thought it worthwhile to re view and bring up to date available in formation relative to the complex. It ha also been thought advisable to point ou briefly how the specimens at hand diffe from current descriptions. These de scriptions and the accompanying illustra tions should be of assistance to othe workers in identifying members of th *C. virgultis* complex found in Texas.

HISTORICAL. In the following brief dis cussion of the *C. virgultis* complex, onl those publications are cited which seem t be of most importance. A more com plete bibliography may be found in Dya (1928) and in Matheson (1944).

Culex virgultis was described by Theo bald (1901) from two male specimens col lected at Rio de Janeiro, Brazil in 1899 Dyar and Knab (1906) described *Cule declarator* from larvae collected in Trini dad, West Indies. Dyar (1918) afte studying larger series, synonymized *C jubilator* D. & K., *C. dictator* D. & K. an *C. vindicator* D. & K. under *C. declarato* He also made *proclamator* D. & K. variety of *declarator,* and synonymize *inquisitor* D. & K. and *revelator* D. & K under this variety. At this time, Dya stated that features he had previously use to distinguish these various groups becam less distinct as more specimens were studied. The features mentioned in cluded the length and the number o pecten teeth on the siphon, the position o the siphonal hairs and the presence o absence of white-tipped tarsi in the adult

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Bonne-Wepster and Bonne (1921) after collecting in Surinam (Dutch Guiana) or 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 Bruce (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 Fort Sam Houston (Baxar 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. territans* Walker and *Anopheles pseudopunctipennis* 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. tarsalis* 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 recent relatively 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 LaCasse (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 LaCasse 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 LaCasse figure the individual pecten tooth with several short

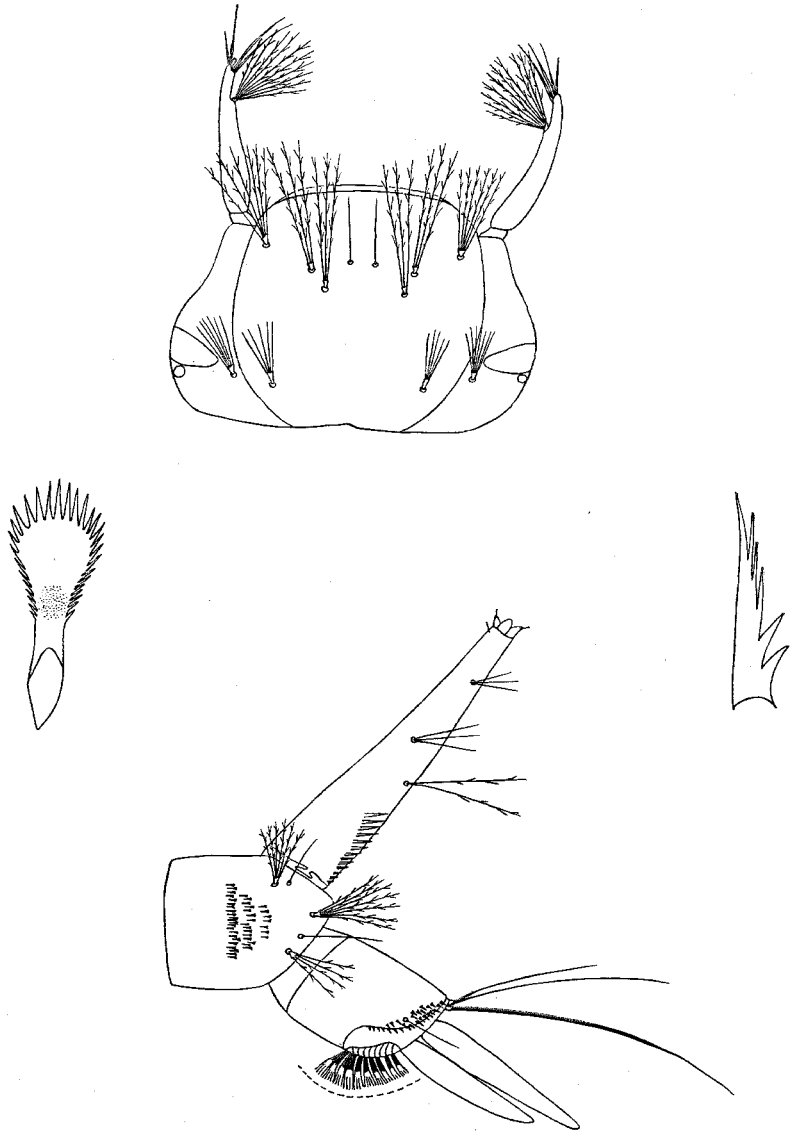


FIG. 1. Larval structures of *Culex virgultis* Theobald. Specimens collected near Luling, Texas. Upp head. Lower, terminal segments. Left middle, representative comb scale. Right middle, represent tive pecten tooth.

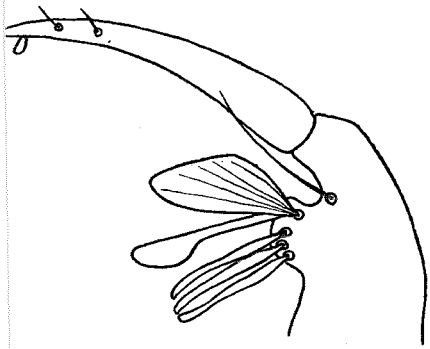
enticles. The individual pecten tooth of he Texas larvae has much longer denti- les. The upper pair of anal gills of the arvae of Yamaguti and LaCasse are hortest in the illustration, whereas in our arvae the lower pair are shortest.

Additional variations of minor im- ortance in the Texas specimens include he number of branches in both the head airs and in the siphonal hairs.

Despite the variation existing in certain eatures of the larvae of *C. virgultis,* the pecies should usually be one of the easiest n the United States to identify correctly n the larval stage. It is the only species f *Culex* known from this country which outinely has only three pairs of hairs on he siphon. A few other species may ccasionally exhibit this feature as a varia- ion (e.g. *C. nigripalpus* Theobald) but in nost cases four or more pairs of tufts or ingle hairs occur.

Male Genitalia: (fig. 2). At least wo differences are evident in the genitalia f the writer's specimens as opposed to he illustrations of Dyar (1928) and Yamaguti and LaCasse (1951). In both these publications the appendages of the subapical 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.



IG. 2. Apex of sidepiece or basistyle of male of *Culex virgultis* Theobald. Specimens collected near Luling, Texas.

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