CULEX SUBGENUS *THAIOMYIA* BRAM, A SYNONYM OF *CULEX* SUBGENUS *CULICIOMYIA* THEOBALD (DIPTERA: CULICIDAE)

by

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ABSTRACT. A review of the morphological characters found in members of the subgenus *Culiciomyia* is presented to demonstrate that *Culex dispectus* and *Culex hainanensis*, currently assigned to the subgenus *Thaiomyia*, should be in the subgenus *Culiciomyia*. Accordingly, subgenus *Thaiomyia* is synonymized under *Culiciomyia*.

INTRODUCTION. During the past several years I have developed an interest in the *Culex* subgenus *Culiciomyia* Theobald 1907, and the exceptional morphological variability exhibited in the included species. One reason for this interest is, *Culiciomyia* is the only large subgenus of *Culex* in the Oriental region that was not revised during the 19 year period of the two Smithsonian projects, "the Southeast Asia Mosquito Project (SEAMP) and the Medical Entomology Project (MEP)". This subgenus currently contains 49 species and is restricted to the Eastern Hemisphere (South Pacific islands to Africa).

While pursuing this interest, I also examined three other subgenera that are closely related to *Culiciomyia*: *Acalleomyia* Leicester 1908, *Acallyntrum* Stone and Penn 1948, and *Thaiomyia* Bram 1966. Belkin (1962) and Bram (1966, 1967, 1968, 1969) indicated that these three subgenera possess characters suggesting a close relationship with *Culiciomyia*. Based on morphological evidence this is clearly true. Furthermore, based on a review of the diagnostic characters for *Culiciomyia*, I believe that the two currently described species of *Thaiomyia* do not deserve separate subgeneric recognition, and that *Thaiomyia* should be considered a synonym of *Culiciomyia*. The following historical review and other data are presented to support this decision.

HISTORICAL REVIEW. In 1966, while working on a monograph of the *Culex* of Thailand, Bram (1966) described *Thaiomyia* as a new subgenus of *Culex* based on *Culex dispectus* Bram, a new species from Thailand. He differentiated this new subgenus from *Culiciomyia*, on which he was also working, by the following three characters:

1. Palpomere 3 of the male without ventral lanceolate scales.
2. Siphon of the fourth instar larva without a pecten.
3. Seta 4-X of the fourth instar larva with ten individual tufts (five pairs).

1. The views of the author do not purport to reflect the position of the Department of the Army or the Department of Defense.

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The following year Bram (1967) defined the 11 species of *Culiciomyia* found in Thailand as possessing along with other characters:

1. Palpomere 3 of the male with ventral lanceolate scales.
2. Siphon of the fourth instar larva with a pecten.
3. Seta 4-X of the fourth instar larva with eight individual tufts (four pairs).

Bram (1966, 1967), however, also mentioned that females of *Cx. (Thaiomyia) dispectus* could not be separated from females of the Thailand species of *Culiciomyia*, and that the male genitalia of *Cx. (Thaiomyia) dispectus* could be included with the *Culiciomyia*. In fact, Bram (1969) suggested that *Cx. dispectus* should perhaps be included within the Fragilis Group of *Culiciomyia*, however, he felt the three characters (given above) indicated a separate distinction. He also noted that a study of the other species in *Culiciomyia* would undoubtedly throw additional light on species relations within the subgenus.

At the time Bram published his monograph of the *Culex* of Thailand (1967), there were 30 additional recognized species of *Culiciomyia* other than the 11 that he studied from Thailand. Of these 30 species, 12 were described with the number of pairs of seta 4-X tufts on the fourth instar larva exceeding the number given in Bram's (1967) definition of *Culiciomyia* (Table 1). Furthermore, these 12 either approach, meet or exceed the number of 4-X pairs given in Bram's (1966) description of *Thaiomyia*. An additional eight species of *Culiciomyia* have been described since 1967 and three of these species (Table 1) also possess more pairs of seta 4-X on the fourth instar larva than was described for *Culiciomyia* by Bram (1967).

TABLE 1. Species of *Culiciomyia* that have more seta 4-X pairs than given in Bram's (1967) definition for *Culiciomyia*.

Species	Distribution	Year Larva Described	Number of 4-X Pairs
Described by 1967			
(1) *cinerellus* Edwards	Afrotropical	1929	5-6
(2) *furlongi* van Someren	"	1954	5
(3) *gilliesi* Hamon & van Someren	"	1962	10
(4) *liberiensis* Peters	"	1955	5
(5) *macfiei* Edwards	"	1952	5
(6) *milloti* Doucet	"	1949	4-5
(7) *nailoni* King & Hoogstraal	"	1946	5
(8) *nebulosus* Theobald	Afrotropical	1952	4-5
(9) *pallidothorax* Theobald	Oriental	1946	4-5
(10) *ryukyensis* Bohart	"	1946	3.5-4.5
(11) *sasai* Kano, Nitahara & Awaya	"	1954	4-4.5
(12) *semibrunneus* Edwards	Afrotropical	1956	5
Described after 1967			
(13) *ceramensis* Sirivanakarn & Kurihara	Oriental	1973	5
(14) *lampangensis* Sirivanakarn	"	1973	5-6
(15) *pandani* Brunhes	Afrotropical	1969	5

Since 1967, *Cx. (Thaiomyia) dispectus* has been found outside of Thailand in Malaysia (Mattingly 1975) and in the Peoples' Republic of China (Dong et al. 1983). Furthermore, a second species of *Cx. (Thaiomyia)* was described from the Peoples' Republic of China. This distinct species, *Cx. hainanensis* Chen 1977, also possesses the three characters used by Bram (1966) to establish *Thaiomyia.*

Sirivanakarn (1971) presented a reclassification of the *Culex* subgenus *Neoculex* Dyar, and transferred *Culex tricuspis* Edwards to the subgenus *Culiciomyia.* In 1973, Sirivanakarn redescribed *Cx. tricuspis* and described a new species, *Cx. delfinadoae*, that is closely related to *Cx. tricuspis.* He pointed out that these two species belong in the subgenus *Culiciomyia* because of morphological characteristics of the lateral plates of the male genitalia. However, he noted that they also possess one characteristic that diverges from the classic interpretation of *Culiciomyia* (Edwards 1932) which Bram followed. This character is the complete absence of ventral lanceolate or specialized scales on palpomere 3 of the male, one of the three characters that Bram (1966) used to differentiate and establish subgenus *Thaiomyia.* More recently, Toma et al. (1984) described *Cx. azurini*, a third species belonging to the *tricuspis* group of *Culiciomyia.* Like *tricuspis* and *delfinadoae*, *azurini* lacks ventral lanceolate scales on palpomere 3 of the male .

Based on the above information, two of the three characters that Bram (1966) used to justify the subgenus *Thaiomyia* are now known to occur in certain species of *Culiciomyia* and are no longer of value for recognizing *Thaiomyia.* Only the single trait, the absence of a pecten on the siphon of the fourth instar larva, remains unique for *Cx. dispectus* and *Cx. hainanensis.*

DISCUSSION. The species currently assigned to *Culiciomyia* have an exceptionally wide range of character variations that often overlap with other subgenera. Although this subgenus was originally established on the basis of the ventral lanceolate scales on palpomere 3 of the male, specialized ventral scales on this palpomere are found in species in at least two other subgenera of *Culex*: *Acallyntrum*, and certain species of the *sitiens* group, the *vishnui* complex and the *mimeticus* subgroup of subgenus *Culex.* Thus, this character is not restricted to the subgenus *Culiciomyia.* Conversely, there is no rule that all members of *Culiciomyia* must possess this character. Actually, Sirivanakarn (1971, 1973) suggested that the shape of the male phallosome may be the best character for recognizing species of *Culiciomyia.* In this regard, the phallosomes of *Cx. dispectus* and *Cx. hainanensis* are indistinguishable from those of a number of Oriental species of *Culiciomyia.*

The variations that occur in certain morphological characters on larvae of the *Culiciomyia* are possibly as varied and exceptional as those found in any subgenus of Culicidae. As demonstrated above (Table 1), a number of species in *Culiciomyia* have the number of pairs of seta 4-X tufts overlapping the number originally established to identify *Thaiomyia.* Additional exceptional variations in *Culiciomyia* larval characters are listed in Table 2 that make the loss of a pecten on *Cx. dispectus* and *Cx. hainanensis* less unusual, and suggest that this loss is nothing more than another example of variation in *Culiciomyia* larval characters. A similar loss of a pecten is known in the genus *Uranotaenia* Lynch Arribalzaga, on *Ur. browni* Mattingly. I do not believe that this single character, the loss of pecten, is an adequate justification for the separation of *Cx. dispectus* and *Cx. hainanensis* into the subgenus *Thaiomyia.* Accordingly, I am placing *Thaiomyia* into synonymy under *Culiciomyia.* The synonymy listed in Knight and Stone (1977: 229) for *Culiciomyia* is corrected as follows.

Subgenus *Culiciomyia* Theobald

Trichorhynchus Theobald 1905: 241. (non Balbiani 1887) Type by indication (monotypy): *fuscus* Theobald [Homonymy].

Culiciomyia Theobald 1907: 227. Type by subsequent designation: *inornata* Theobald (Edwards 1912).

Neomelanoconion Theobald 1907: 514. Type by original designation: *Culex rima* Theobald [This is based upon a misidentification of *Culex nebulosus* Theobald which is a true *Culiciomyia*. The true *Culex rima* has been assigned to the subgenus *Eumelanomyia*.] Stone 1961: 45.

Pectinopalpus Theobald 1909: 11. Type by indication (monotypy): *fuscus* Theobald.

Trichorhynchomyia Brunetti 1912: 447. Type by indication: *Trichorhynchus fuscus* Theobald.

Thaiomyia Bram 1966: 73. Type by original designation: *dispectus* Bram. [NEW SYNONYMY]

With the inclusion of *Cx. dispectus* and *Cx. hainanensis*, *Culiciomyia* now contains 51 species, making it the fifth largest subgenus of *Culex*. Although I believe that *Cx. dispectus* and *Cx. hainanensis* belong in *Culiciomyia*, I am not convinced that all of the species currently included have a common origin and deserve to remain in this subgenus. Any subgenus exhibiting the character variations described for the species in *Culiciomyia* deserves additional study.

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TABLE 2. Exceptional ranges for larval variations in subgenus *Culiciomyia*.

CHARACTER	LOWER RANGE		UPPER RANGE	
	Species	Character Condition	Species	Character Condition
Larval Setae	*harleyi* Peters	short, weak	*thurmanorum* Bram	long, stellate
1-A branching	*harleyi* Peters	short, single or bifid	*liberiensis* Peters	long, 25 branches
5,6-C branching	*harleyi* Peters	short, single or bifid	*fragilis* Ludlow	long, 8 branches
1-P branching	*pandani* Brunhes	short, single	*lampangensis* Sirivanakarn	long, 3 branches
2-P branching	*fragilis* Ludlow	single	*harleyi* Peters	3 branches
3-P branching	*fragilis* Ludlow	shorter than 1,2-P	*nigropunctatus* Edwards	equal to 1,2-P
Siphon:Length/ width at base Ratio	*furlongi* van Someren	1.2 to 1	*termi* Thurman	30 to 1
Pairs of Pecten Spines	*harleyi* Peters	2-3	*nailoni* King & Hoogstraal	18-25
Saddle on X	*cinereus* Theobald	incomplete	*fragilis* Ludlow	complete
Pairs of 4-X tufts	*harleyi* Peters	0	*gilliesi* Hamon & van Someren	10