

A CHECK LIST OF THE MOSQUITOES (CULICINAE) OF NORTH AMERICA (DIPTERA: CULICIDAE)

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INTRODUCTION—Many additions to and changes in the list of North American mosquitoes have been made in the ten years since Dr. Robert Matheson's "Handbook of the Mosquitoes of North America" was published in 1944. Therefore, a resolution was made at the March 1954 meetings of the American Mosquito Control Association in Atlantic City, N. J., proposing that a check list of the North American mosquitoes be prepared and published in *Mosquito News*. In the interests of economy of space, references to new species described, new synonymy proposed, or previously described species added to the North American mosquito fauna have been listed only where these additions or changes were not included in the 1944 edition of Dr. Matheson's book.

These changes may be summarized briefly as follows: *Anopheles earlei* Vargas is recognized as a valid species. The generic name *Megarhinus* is changed to *Toxorhynchites*, and the tribe, from Megarhinini to Toxorhynchitini following Stone (1948). The genus *Toxorhynchites* in the United States includes one species with two subspecies, *rutilus rutilus* (Coquillett) and *rutilus septentrionalis* (Dyar and Knab), following Jenkins (1949). *Wyeomyia haynei* is described as new by Dodge in 1947. *Uranotaenia syntheta* Dyar and Shannon is listed as a subspecies of *Uranotaenia anhydor* Dyar.

In the large genus *Aedes*, two subgenera not listed in Matheson are recognized: the subgenus *Taeniorhynchus* following Ross (1947) including *mitchellae* (Dyar), *nigromaculis* (Ludlow), *sollicitans* (Walker) and *taeniorhynchus* (Wiedemann); and the subgenus *Feltianus* Martini (1930) for two species *trichurus* (Dyar) and *bicristatus* Thurman and Winkler, which have more than one pair of hair tufts on the larval air tube and very

short claspette filaments with transverse wrinklins in the male genitalia. *Aedes zoosophus* Dyar and Knab is an earlier name than *alleni* Turner, *decticus* Howard, Dyar and Knab is an earlier name than *pseudodiantaeus* Smith, *impiger* (Walker) is an earlier name for the species known for many years as *nearcticus* Dyar, *nigripes* (Zetterstedt) is a more appropriate name than *alpinus* Linnaeus, and *thelcter* Dyar is an earlier name than *keyensis* Buren. After examining the types in the British Museum, Vockeroth (1954) decided that *impiger* Walker was identical with *nearcticus* Dyar and that a new name *implicatus* Vockeroth was needed for *impiger* of Dyar (1928), Matheson (1944) and others. He found that the type of *implacabilis* Walker was identical with *puncator* Kirby and therefore revived the name *abserratus* (Felt and Young) for the species known as *implacabilis* by many authors. Knight (1951) separated *punctodes* Dyar as a distinct species in the *puncator* group, and Vockeroth (1954) described a new species *rempeli*. *Aedes spencerii* (Theobald) is the correct name for both *spencerii* (Theobald) and *idahoensis* (Theobald). Similarly, the name *sticticus* (Meigen) appears to be the correct name for both *sticticus* and *lateralis* in North America. *Aedes tortilis* (Theobald) is added to the North American fauna on the basis of the Key West record of Staebler and Buren (1946) and additional records from the Florida Keys. Smith (1952) has described and correctly associated the stages of *diantaeus* Howard, Dyar and Knab and a closely allied new species *pseudodiantaeus* Smith, here placed as a synonym of *decticus* Howard, Dyar, and Knab.

In the large genus *Culex* subgenus *Culex*, *chidesteri* Dyar has been found in Texas by Joyce (1948), the *pipiens* com-

plex has been divided into three subspecies: *pipiens molestus* Forskal, *pipiens pipiens* Linnaeus, and *pipiens quinquefasciatus* Say following Rozeboom and Gilford (1954), *thriambus* Dyar has been separated from *stigmatosoma* by Galindo and Kelley (1943), and *virgultus* (Theobald) has been recognized as an earlier name than *declarator* Dyar and Knab by Lane (1951 and 1953). In the subgenus *Neoculex*, Bohart (1948) has used larval and male characters to divide the species previously known as *apicalis* Adams. *Culex* (*Neoculex*) *apicalis* Adams is restricted to southwestern United States, the name *territans* Walker is revived for the species previously known as *apicalis* in eastern and northwestern North America, a new species *arizonensis* Bohart is described from Arizona and California, and a second new species *reevesi* Bohart is described which Brookman and Reeves (1950) believe is different from *reevesi* Wirth. They therefore have renamed *reevesi* Bohart as *boharti* Brookman and Reeves. The mosquitoes in the subgenus *Melanoconion* have been studied intensively in recent years, Rozeboom and Komp (1950) making a detailed study of the males, and Foote (1954) of the larvae. Foote has revived the subgenus *Mochlostyrax* for some of the species formerly contained in the subgenus *Melanoconion* including the North American species *pilosus* (Dyar and Knab). The larva of *anips* Dyar was described by Brookman and Reeves (1953), *iolambdis* Dyar was reported from Florida by Pratt and Seabrook (1952), *mulrennani* was described by Basham in 1948 from the Florida Keys, and *opisthopus* Komp was reported from Florida by Pratt, Wirth, and Denning (1945).

In *Mansonia*, Pratt (1945) reported *indubitans* Dyar and Shannon from Florida. It is the common *Mansonia* (*Mansonia*) on water lettuce.

In *Orthopodomyia*, Bohart described *californica* in 1950 as a distinct species based principally on larval characters.

In *Psorophora*, Roth (1945) described *longipalpis* and separated it from *horrida* (Dyar and Knab), Joyce (1945) reported

mexicana Bellardi from Brownsville, Texas, and Thurman, Haeger and Mulrennan (1951) reported *johnstonii* (Grabham) from the Florida Keys.

TRIBE ANOPHELINI

Anopheles Meigen

A. (Anopheles) atropos D. and K.

A. (Anopheles) barberi Coq.

A. (Anopheles) bradleyi King

A. (Anopheles) crucians Wied.

A. (Anopheles) earlei Vargas

For differentiation of *earlei* from *occidentalis* see Vargas, Luis and R. Matheson, Rev. Inst. Sal. Enferm-Trop. Mex. 9 (1): 27-33, 1948; Pratt, H. D., Amer. J. Trop. Med. & Hyg. 1 (3):484-493, 1952; and Rozeboom, L. E., Amer. J. Trop. Med. & Hyg. 1 (3):477-483, 1952

A. (Anopheles) franciscanus McCrack.

A. (Anopheles) freeborni Aitk.

A. (Anopheles) georgianus King

A. (Anopheles) occidentalis D. & K.

A. (Anopheles) pseudopunctipennis Theob.

A. (Anopheles) punctipennis (Say)

A. (Anopheles) quadrimaculatus Say

A. (Anopheles) walkeri Theob.

A. (Nyssorhynchus) albimanus Wied.

TRIBE TOXORHYNCHITINI

(Tribe Megarhinini of Dyar 1928, Matheson 1944, and others)

The mosquito generic name *Megarhinus* Robineau-Desvoidy 1827 is preoccupied by *Megarhinus* Rafinesque 1820, a genus of fishes. See Stone, Alan, Proc. Ent. Soc. Wash. 50 (6):161, 1948.

Toxorhynchites Theobald

T. rutilus rutilus (Coq.)

T. rutilus septentrionalis (D. & K.)

See Jenkins, D. W., Proc. Ent. Soc. Wash. 51 (5): 225-229, 1949

TRIBE SABETHINI

Wyeomyia Theobald

W. haynei Dodge

Proc. Ent. Soc. Wash. 49 (5):117-122, 1947

W. mitchellii (Theob.)

W. smithii (Coq.)

W. vanduzeei D. & K.

TRIBE URANOETAENIINI

Uranotaenia Lynch-Arribalzaga

U. anhydor anhydor Dyar

U. anhydor syntheta D. & S.

U. anhydor and *U. syntheta* are here listed as subspecies, although they may actually be one species. See Brookman and Reeves, Ann. Ent. Soc. Amer. 46:235, 1953 or Galindo, Blanton, and Peyton, Ann. Ent. Soc. Amer. 47 (1):118-119, 1954.

U. lowii Theob.

U. sapphirina (O.S.)

TRIBE CULICINI

Aedes Meigen

A. (Aedes) cinereus Meig.

A. (Aedimorphus) vexans (Meig.)

A. (Stegomyia) aegypti (Linn.)

A. (Finlaya) atropalpus (Coq.)

A. (Finlaya) triseriatus (Say)

A. (Finlaya) varipalpus (Coq.)

A. (Finlaya) zoosophus D. & K.

A. (Finlaya) alleni Turner

Synonymy by Gjullin, Proc. Ent. Soc. Wash. 48(9):234, 1946

A. (Feltianus) trichurus (Dyar)

A. (Feltianus) bicristatus Thurman and Winkler

Proc. Ent. Soc. Wash., 52 (5):237-250, 1950

A. (Taeniorhynchus) mitchellae (Dyar)

A. (Taeniorhynchus) nigromaculis (Ludl.)

A. (Taeniorhynchus) sollicitans (Walk.)

A. (Taeniorhynchus) taeniorhynchus (Wied.)

A. (Ochlerotatus) aboriginis Dyar

A. (Ochlerotatus) abserratus (F. & Y.)

Aedes implacabilis of Dyar 1928, Matheson 1944, and many others. Not *implacabilis* Walker according to Vockeroth, Can. Ent. 86 (3):109-116, 1954

A. (Ochlerotatus) atlanticus D. & K.

A. (Ochlerotatus) aurifer (Coq.)

A. (Ochlerotatus) bimaculatus (Coq.)

A. (Ochlerotatus) campestris D. & K.

A. (Ochlerotatus) canadensis canadensis (Theob.)

A. (Ochlerotatus) canadensis mathesoni Middlek.

See Rings, R. W., and S. O. Hill, Proc. Ent. Soc. Wash. 48 (9):237-240, 1946

A. (Ochlerotatus) cantator (Coq.)

A. (Ochlerotatus) cataphylla Dyar

A. (Ochlerotatus) communis (De G.)

A. (Ochlerotatus) decticus H., D. & K.

A. (Ochlerotatus) pseudodiantaeus Smith, Bull. Brook. Ent. Soc. 47 (1):19-40, 1952. Dr. Alan Stone, in a letter dated October 28, 1954, has stated that he believes this synonymy is correct. Dr. Marion Smith has also studied the types and concurs.

A. (Ochlerotatus) diantaeus H., D. & K.

For correct association of all stages of *diantaeus* and *decticus* see Smith, Bull. Brook. Ent. Soc. 47 (1):19-40, 1952.

A. (Ochlerotatus) dorsalis (Meig.)

A. (Ochlerotatus) dupreei (Coq.)

A. (Ochlerotatus) excrucians (Walk.)

A. (Ochlerotatus) fitchii (F. & Y.)

A. (Ochlerotatus) flavescens (Müll.)

A. (Ochlerotatus) fulvus pallens (Ross)

A. (Ochlerotatus) grossbecki D. & K.

A. (Ochlerotatus) hexodontus Dyar

A. (Ochlerotatus) impiger (Walk.)

A. nearcticus Dyar. Synonymy by Vock., Can. Ent. 86 (3):109-116, 1954

A. (Ochlerotatus) implicatus Vock.

Can. Ent. 86 (3):110-112, 1954. This is a new name for *Aedes impiger* of Dyar 1928, Matheson 1944, and many others, not Walker 1848. Vockeroth has examined the types of *impiger* Walker and *nearcticus* Dyar and believes that they are the same, therefore *nearcticus* is a synonym of *impiger*.

A. (Ochlerotatus) increpitus Dyar

A. (Ochlerotatus) infirmatus D. & K.

A. (Ochlerotatus) intrudens Dyar

A. (Ochlerotatus) melanimon Dyar

A. (Ochlerotatus) klotsi Matheson. Dr. Stone and I examined the types of *melanimon* Dyar and *klotsi* Matheson in January 1954 and believe they are the same. In a letter dated Oct. 28, 1954, Dr. Stone has written, "I am not so certain that *melanimon* is a full species, distinct from *dorsalis*, but

- I suspect it is."
- A. (Ochlerotatus) muelleri* Dyar
- A. (Ochlerotatus) nigripes* (Zett.)
- A. (Ochlerotatus) alpinus* of authors not Linnaeus Synonymy by Natvig, Norsk. Ent. Tidsskr. 7:99-106, 1945 or Norsk. Ent. Tidsskr. Suppl. 1, 302-310, 1948.
- A. (Ochlerotatus) niphadopsis* D. & K.
- A. (Ochlerotatus) pionips* Dyar
- A. (Ochlerotatus) pullatus* (Coq.)
- A. (Ochlerotatus) punctodes* Dyar
See Knight, K. L., Ann. Ent. Soc. Amer. 44 (1):87-99, 1951
- A. (Ochlerotatus) punctor* (Kby.)
- A. implacabilis* Walker. Synonymy by Vockeroth, Can. Ent. 86 (3):109-116, 1954. *A. implacabilis* of authors becomes *abserratus* Felt and Young.
- A. (Ochlerotatus) rempeli* Vock.
Can. Ent. 86 (3):112-114, 1954
- A. (Ochlerotatus) riparius* D. & K.
- A. (Ochlerotatus) scapularis* (Rond.)
- A. (Ochlerotatus) schizopinax* Dyar
- A. (Ochlerotatus) spencerii* (Theob.)
- Aedes (Ochlerotatus) idahoensis* Theob. is a synonym of *spencerii*.
- A. (Ochlerotatus) squamiger* (Coq.)
- A. (Ochlerotatus) sticticus* (Meig.)
(includes also *lateralis* of Matheson, p. 173, 1944, not Meigen 1818)
- A. (Ochlerotatus) stimulans* (Walk.)
- A. (Ochlerotatus) thelcter* Dyar
- A. (Ochlerotatus) keyensis* Buren, Proc. Ent. Soc. Wash. 49 (8):228-229, 1947. Synonymy by Thurman, Haeger, and Mulrennan, Mosq. News, 9 (4):171-172, 1949
- A. (Ochlerotatus) thibaulti* D. & K.
- A. (Ochlerotatus) tormentor* D. & K.
- A. (Ochlerotatus) tortilis* (Theob.)
See Staebler, A. E. and W. F. Buren, Public Health Reports 61:685, 1946, and Thurman, E. B., J. S. Haeger, and J. A. Mulrennan, Ann. Ent. Soc. Amer. 44 (1):144, 1951
- A. (Ochlerotatus) trivittatus* (Coq.)
- A. (Ochlerotatus) ventrovittis* Dyar
- A. (Kompia) purpureipes* Ait.
- Culex* Linnaeus
- C. (Culex) bahamensis* D. & K.
- C. (Culex) chidesteri* Dyar
See Joyce, Mosquito News, 8 (3):102-105, 1948
- C. (Culex) coronator* D. & K.
- C. (Culex) erythrothorax* Dyar
- C. (Culex) interrogator* D. & K.
- C. (Culex) nigripalpus* Theob.
- C. (Culex) pipiens molestus* Forsk.
- C. (Culex) pipiens pipiens* Linn.
- C. (Culex) pipiens quinquefasciatus* Say
Fundamental studies on the *Culex pipiens* complex are summarized in Mattingly, et al., Trans. Roy. Ent. Soc. London, 102 (7):331-382, 1951, and Rozeboom, L. E. and B. N. Gifford, J. Parasit., 40 (3):237-244, 1954
- C. (Culex) restuans* Theob.
- C. (Culex) salinarius* Coq.
- C. (Culex) stigmatosoma* Dyar
- C. (Culex) tarsalis* Coq.
- C. (Culex) thriambus* Dyar
See Galindo, P. and T. Kelley, Pan. Pac. Ent. 19 (3):87-90, 1943
- C. (Culex) virgultus* Theob.
- C. (Culex) declarator* D. & K.
Synonymy by Lane, J., Proc. Ent. Soc. Wash., 53 (6):334, 1951 Synonymy by Lane, J., Neotropical Culicidae, 1:351, 1953
- C. (Neoculex) apicalis* Adams
See, Bohart, R. M., Ann. Ent. Soc. Amer. 41:330-345, 1948
- C. (Neoculex) arizonensis* Boh.
Ann. Ent. Soc. Amer. 41:341-342, 1948
- C. (Neoculex) boharti* Brookman and Reeves (Synonym *Culex reevesi* Bohart not Wirth) Pan. Pac. Ent. 26 (4):159-160, 1950
- C. (Neoculex) reevesi* Wirth
Biology of Aquatic and Littoral Insects, U. Cal. Syllabus Series.
Syllabus SS. 230-231, 1948
See also Brookman, B. and W. C. Reeves, Ann. Ent. Soc. Amer. 46 (2):226-231, 1953
- C. (Neoculex) territans* Walk.
Culex apicalis of Matheson (in part)
See Bohart, R. M., Ann. Ent. Soc. Amer. 41:330-345, 1948
- C. (Melanoconion) abominator* D. & K.
- C. (Melanoconion) anips* Dyar

See Brookman and Reeves, Ann. Ent. Soc. Amer., 46:231-234, 1953

C. (Melanoconion) atratus Theob.

C. (Melanoconion) erraticus (D. & K.)

C. (Melanoconion) iolambdis Dyar (Synonym *elevator* Wirth, not Dyar)

See Pratt, H. D. and E. L. Seabrook, Proc. Ent. Soc. Wash. 54 (1):27-32, 1952

C. (Melanoconion) mulrennani Bash.

Ann. Ent. Soc. Amer. 41 (1):1-7, 1948

C. (Melanoconion) opisthopus Komp

See Pratt, H. D., W. W. Wirth, and D. G. Denning, Proc. Ent. Soc. Wash. 47 (8):245-251, 1945

C. (Melanoconion) peccator D. & K.

C. (Mochlostyrax) pilosus (D. & K.)

See Foote, R. H., U.S.D.A. Tech. Bull. 1091: 114-116, 1954

Culiseta Felt

C. (Culiseta) alaskaensis (Ludl.)

C. (Culiseta) impatiens (Walk.)

C. (Culiseta) incidens (Thom.)

C. (Culiseta) inornata (Will.)

C. (Culiseta) maccrackenae D. & K.

C. (Culicella) morsitans (Theob.)

C. (Climacura) melanura (Coq.)

Deinocerites Theobald

D. cancer Theob.

D. spanius (D. & K.)

Mansonia Blanchard

M. (Coquillettidia) perturbans (Walk.)

M. (Mansonia) indubitans D. & S.

See Pratt, H. D., J. Kans. Ent. Soc. 18 (4):121-129, 1945

Chamberlain, R. W. and T. E. Duffy, Mosq. News, 5 (3):96-97, 1945

Carpenter, S. J., Middelkauff, W. W. and R. W. Chamberlain, Mosquitoes of S. E. U. S. A., 121-123, 1946

M. (Mansonia) titillans (Walk.)

Orthopodomyia Theobald

O. alba Baker

O. californica Boh.

Ann. Ent. Soc. Amer. 43 (3):399-404, 1950

O. signifera (Coq.)

Psorophora Robineau-Desvoidy

P. (Psorophora) ciliata (Fab.)

P. (Psorophora) howardii Coq.

P. (Janthinosoma) cyanescens (Coq.)

P. (Janthinosoma) ferox (Humb.)

P. (Janthinosoma) horrida (D. & K.)

P. (Janthinosoma) johnstonii (Grab.)

See Thurman, Haeger, and Mulrennan, Ann. Ent. Soc. Amer. 44:144-157, 1951

P. (Janthinosoma) longipalpis Roth

Psorophora (J.) horrida of Matheson, 1944. See Roth, Proc. Ent. Soc. Wash. 47 (1):1-23, 1945

P. (Janthinosoma) mexicana (Bellardi)

See Joyce, C. R., Mosq. News, 5 (3):86, 1945

P. (Janthinosoma) varipes (Coq.)

P. (Grabhamia) confinnis (L.-A.)

P. (Grabhamia) discolor (Coq.)

P. (Grabhamia) pygmaea (Theob.)

P. (Grabhamia) signipennis (Theob.)

SUMMARY

The present check list of the mosquitoes of North America contains 138 species, three with subspecies, in eleven genera as follows: 14 species of *Anopheles*; 1 species of *Toxorhynchites* with 2 subspecies; 4 species of *Wyeomyia*; 3 species of *Uranotaenia*, *anhydor* with 2 subspecies; 61 species of *Aedes*, *canadensis* containing 2 subspecies; 27 species of *Culex*, *pipiens* containing 3 subspecies; 7 species of *Culiseta*; 2 species of *Deinocerites*; 3 species of *Mansonia*; 3 species of *Orthopodomyia*; and 13 species of *Psorophora*. Adult males, females, and fourth stage larvae are known of 136 of the 138 species listed above. In many species the eggs, first, second, and third larval stages, and pupae, have also been described. The immature stages of *Aedes muelleri* Dyar and *Psorophora mexicana* (Bellardi) and the male of *P. mexicana* are still unknown.

Although much of the basic information with regard to the classification of the mosquitoes of North America has now been acquired, there are still many problems needing much additional investigations such as: the ranges of *Anopheles earlei* and *occidentalis* particularly in western North America, the status of the northern forms of *Anopheles walkeri* with

dark halteres and the more southern form with light halteres, the ranges of *Anopheles franciscanus* and *pseudopunctipennis* particularly in the area of overlap, the ranges of *Wyeomyia haynei* versus *Wyeomyia smithii* and the importance of two versus four anal gills in separating these two species or subspecies, the ranges of *Uranotaenia anhydor anhydor* and *Uranotaenia anhydor syntheta*, the composition of the *Aedes dorsalis-melanimon* complex in North America and the determination of the presence or absence of *caspicus* in this continent, the relationship of *Aedes punctor* and *punctodes*, additional information on the *Culex pipiens-quinquefasciatus-molestus* complex in North America, and further studies on *Culex stigmatosoma* and *thriambus*.

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