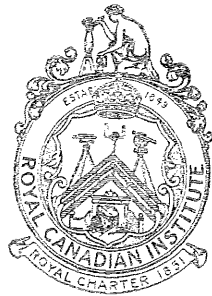


# The Mosquitoes of Canada

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This mosquito is rarely met with except by breeding from pitcher-plant leaves. It has not been recorded as biting; but as many of the tropical species attack warm-blooded animals, this may be found to do so.

Distribution: Canada to Alabama, probably coextensive with the range of the host plant *Sarracenia purpurea*.

#### CANADIAN RECORDS.

Guelph, Ontario (T. D. Jarvis, Can. Ent., xxxviii, 7, 1906).

Carlsbad Springs, Ontario (A. Gibson).

Goderich, Ontario, January, 1914 (C. V. Lawson).

#### Tribe CULICINI.

This tribe includes the bulk of the mosquitoes, and all of those of typically northern distribution. Only a few of the lowest members live in water in plant tissues, such as tree-holes; most of the species inhabit ground puddles. The species and genera are variously differentiated. *Aedes* inhabits temporary puddles, especially water left from the melted snow in spring, and these species have in general but a single annual generation. *Culex* and *Culiseta* inhabit pools of a generally permanent character, and overwinter as adults. *Anopheles* larvae are surface-feeders, and consequently the character of the water makes less difference in them. They have been found in all sorts of water, even in running streams, but the different species are variously restricted.

#### GENUS CULEX Linnaeus.

This genus is in general of southern distribution, and but few species occur in Canada. The larvae inhabit water of a permanent nature, some species taking kindly to water in artificial containers, such as water-barrels and sewer-traps. Such species are liable to be abundant and troublesome in cities.

The subgenera, defined on the male genitalia, are as follows:

1. Harpes few toothed. . . . Subgenus CLIMACURA Howard, Dyar & Knab  
Harpes with a crown of spines. . . . . 2
2. Second uncal plate present (four plates). . Subgenus CULEX Linnaeus  
Second uncal plate absent (three plates). . Subgenus NEOCULEX Dyar

#### KEY TO THE CANADIAN SPECIES OF CULEX.

1. Tarsi ringed with white at both ends of the joints. . *tarsalis* Coquillett  
Tarsi entirely dark. . . . . 2

2. Abdomen with apical segmental white bands, *testaceus* van der Wulp  
 Abdomen with basal segmental white bands. . . . . 3  
 Abdomen without white bands dorsally. . . . . *melanurus* Coquillett
3. Band at base of second abdominal segment triangular or triangularly  
 produced. . . . . *pipiens* Linnaeus  
 This band transverse, not mesially produced. . . . . *territans* Walker

CULEX (CULEX) TARSALIS Coquillett.

*Culex tarsalis* Coquillett, Can. Ent., xxviii, 43, 1896.

*Culex willistoni* Giles, Handb. Gnats or Mosq., 281, 1900.

*Culex affinis* Adams, Kans. Univ. Bull., ii, 25, 1903.

*Culex kelloggi* Theobald, Can. Ent., xxxv, 211, 1903.

*Culex peus* Speiser, Insektenbörse, xxi, 148, 1904.

A medium sized mosquito, the mesonotum bronzy-brown scaled, frequently ornamented with narrow silvery white lines each side of the posterior portion, running back to the scutellum. The abdomen is blackish or brown, with moderate basal segmental white bands, the one on the basal segment triangular; venter whitish scaled, with angular transverse black bands, which form cusps directed posteriorly. Proboscis dark, with a white ring near the middle. Legs brown, the femora white beneath, the tarsi with white rings at both ends of the joints, small on front and middle legs, distinct on the hind pair; a white line on the outer side of femora and tibiae. Wing-scales wholly dark, fine and hair-like, forming a little tuft at the base of the third vein.

The male genitalia have the second uncal plate large and furnished with denticles. The lobe of the side piece has three rods, a seta, a leaf and a seta.

The larvae are commonly found in grassy ponds or marshes, often in escaped irrigation water. They do not take to artificial receptacles.

This mosquito will enter houses and may become a considerable nuisance in the western part of the country.

Distribution: Mississippi Valley and western prairies to the Pacific Ocean, Mexico to British Columbia.

CANADIAN RECORDS.

Saskatoon, Saskatchewan, August 12, 1918 (H. G. Dyar).

Mission, British Columbia, August, 1919 (E. Hearle).

Wellington, British Columbia, August 8, 1906 (Dyar & Caudell).

Royal Oak, British Columbia, April, 1917 (R. C. Trehearne).

Chilliwack, British Columbia, July 3, 1919 (E. Hearle).

Harrison, British Columbia, June 20, 1919 (E. Hearle).

## CULEX (CULEX) TERRITANS Walker.

*Culex territans* Walker, Ins. Saund., Dipt., i, 428, 1856.

*Culex restuans* Theobald, Mon. Culic., ii, 142, 1901.

*Culex brehmei* Knab, Proc. Biol. Soc. Wash., xxix, 161, 1916.

A medium sized, reddish brown mosquito, the proboscis and legs all dark, or the tarsi with faint pale brownish rings at the ends of the joints. Mesonotum with narrow curved bronzy brown scales, often ornamented with little patches of light yellowish ones on each side of the middle; but these light spots may be wanting. Abdomen blackish brown above, with moderate basal segmental whitish bands, transverse and even; venter whitish scaled, often with dusky angular transverse bands, the cusps directed anteriorly. Wing-scales fine and hair-like, all brown.

The male genitalia have the second uncal plate short and pointed, without denticles. Lobe of the side piece with three rods, a seta, a leaf and a seta.

The larvae live in dirty ground puddles, and take rather readily to artificial receptacles, such as water-barrels. The adults readily enter houses, thus making this the common house-mosquito of eastern Canada.

Distribution: Eastern North America, Gulf of Mexico to Canada.

## CANADIAN RECORDS.

Toronto, Ontario, August 6, 1900 (A. Gibson).

Ottawa, Ontario, August 21, 1900 (J. Fletcher).

White River, Ontario, June 26, 1907 (F. Knab).

## CULEX (CULEX) PIPIENS Linnaeus.

*Culex pipiens* Linnaeus, Syst Nat., ed. x, 602, 1758.

*Culex consobrinus* R.-Desvoidy, Mem. Soc. d'hist. nat. Paris, iii, 408  
1827.

*Culex flavipes* Macquart, Dipt. Exot., i, part 1, 35, 1838.

*Culex haematophagus* Ficalbi, Bull. Soc. Ent. Ital., xxviii, 287, 1893.

*Culex pallens* Coquillett, Proc. U.S. Nat. Mus., xxi, 303, 1898.

*Culex varioannulatus* Theobald, Mon. Culic., iii, 198, 1903.

*Culex azoriensis* Theobald, Mon. Culic., iii, 210, 1903.

*Culex osakaensis* Theobald (♀), Mon. Culic., iv, 439, 1907.

*Culex comitatus* Dyar & Knab, Proc. Ent. Soc. Wash., xi, 35, 1909.

*Culex quasiquarti* Theobald (♀), Mon. Culic., v, 374, 1910.

A medium sized, reddish brown mosquito, the mesonotum with narrow curved reddish brown scales; legs and proboscis blackish scaled, the femora pale below at base. Abdomen blackish above, with moderate basal segmental whitish bands, the band at the base of the second ab-

dominal segment somewhat triangular. Wing-scales narrow and hair-like, wholly dark.

Male genitalia with the second uncal plate narrow and strap-like, the lobe of the side-piece with three rods, two setae, a filament, a leaf and a seta.

The larvae occur in artificial receptacles by preference, but are also found in ground pools when soiled by animal refuse.

This is the common house-mosquito of Europe, introduced by commerce into various temperate regions. It does not persist in the tropics.

Distribution: Europe and Asia, from England to Japan; South America, Argentine and Chile; North America, Virginia to Canada on the Atlantic, and California to British Columbia on the Pacific.

#### CANADIAN RECORDS.

Jordan, Ontario, July 18, 1919 (W. A. Røse).

Stoney Creek, Ontario, August 17, 1917 (E. Hearle).

Guelph, Ontario, November 29, 1919 (E. Hearle).

Vancouver, British Columbia, September, 1919 (E. Hearle).

#### CULEX (NEOCULEX) TESTACEUS van der Wulp.\*

*Culex testaceus* van der Wulp, Tidsch. voor Ent., (2), x, 128, 1867.

*Culex apicalis* Adams, Kans. Univ. Sci. Bull., ii, 26, 1903.

*Culex saxatilis* Grossbeck, Can. Ent., xxxvii, 360, 1905.

*Culex frickii* Ludlow, Can. Ent., xxxviii, 132, 1906.

A small blackish mosquito, readily distinguished by the white abdominal bands being apical on the segments instead of basal, though sometimes very narrow. Mesonotum with bronzy brown scales and sometimes a pair of light spots near the middle. Proboscis and legs blackish scaled, the femora whitish beneath. Wing-scales narrow and hair-like, wholly dark.

The male genitalia lack the second uncal plate, the third pair united by a bridge in a characteristic manner. Lobe of the side piece with two capitate rods, three flattened setae and three normal setae.

The larvae occur in grassy marshes, and can be found all summer.

The adults do not bite warm-blooded animals, but have been observed attacking frogs.

Distribution: North America, from Mexico to Canada.

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\* This species was for a long time called *Culex territans*; but that name has lately been shown to belong to a preceding species, formerly known as *Culex restuans*.

## CANADIAN RECORDS.

Guelph, Ontario, September 17, 1916 (E. Hearle).  
Winnipeg Beach, Manitoba, July 1918 (H. G. Dyar).  
Wellington, British Columbia, August, 1906 (Dyar & Caudell).  
Pitt Mead, British Columbia, June 7, 1919 (E. Hearle).  
Royal Oak, British Columbia, April, 1917 (R. C. Trehearne).  
Agassiz, British Columbia, June 20, 1919 (E. Hearle).  
Dewdney, British Columbia, July 4, 1919 (E. Hearle).  
Mission, British Columbia, October 9, 1919 (E. Hearle).

## CULEX (CLIMACURA) MELANURUS Coquillett.

*Culex melanurus* Coquillett, Journ. N.Y. Ent. Soc., x, 193, 1902.

A dark brown mosquito, rather over middle size, the abdomen wholly blackish above, without white bands. Proboscis and legs blackish, the femora narrowly whitish beneath. Mesonotum with dark brown scales and conspicuous dark setae. The abdomen has pale triangular basal segmental spots on the sides, the venter pale, with faint darker bands at the apices of the segments. The wing-scales are long, dense, and broader than usual, being ligulate, rather than hair-like, all dark brown.

The male genitalia have the unci membranous and paired, with an outwardly directed basal chitinization. Side piece without lobe, the basal excavation with three stout setae at its tip.

The larvae live in small collections of permanent water in swamps, and are very peculiar in passing the winter as full-grown larvae under the ice. The eggs appear to be laid singly on the surface of water in the summer time. No observations are on record of the biting habits of the adult. The mosquito is rare, and in no way troublesome.

Distribution: Gulf of Mexico and Atlantic watershed to northern New York and New Hampshire, presumably in southern Canada.

## CANADIAN RECORDS.

None.

## GENUS CULISETA Felt.

The species of *Culiseta* are large mosquitoes, inhabiting temperate latitudes in both Europe and America. The genus contains a small number of species. The larvae inhabit permanent water, the eggs of *Culiseta* proper being deposited in rafts by overwintering females. Some of the species take kindly to artificial containers, but the adults rarely attack man, preferring larger mammals such as horses and cattle.



## CANADIAN RECORDS.

White River, Ontario, June 20, 1918 (H. G. Dyar).  
 Red Deer, Alberta, July 30, 1918 (H. G. Dyar).  
 Kalso, British Columbia, May 29, 1903 (H. G. Dyar).  
 Kwinitsa, British Columbia, June 10, 1919 (H. G. Dyar).  
 Whitehorse, Yukon Territory, July 3, 1919 (H. G. Dyar).

## CULISETA (CULISETA) ALASKAËNSIS Ludlow.

*Theobaldia alaskaënsis* Ludlow, Can. Ent., xxxviii, 326, 1906.

A very large blackish mosquito. Proboscis dark brown, palpi with small white tips at the ends of the joints. Mesonotum uniformly coloured, without impressed lines, the vestiture of black and white narrow curved scales, appearing coarsely frosted. Abdomen black, with basal segmental white bands, the venter mostly whitish scaled. Legs black, mixed with some white scales, femora whitish beneath, femora and tibiae with a white line on the outer side; tarsi with white rings at the bases of the joints, mostly small, but large on the second and third joints of the hind legs. Wings broad, the cross-veins in line; scales black, mixed with some white ones along costa, forming tufts or spots at the bases of first, third and fourth veins and the forks of second, fourth and fifth.

The male genitalia have the unci simple, the penultimate segment without spines.

The larvae live in grassy marshes, generally in river-valleys. The adults pass the winter, hiding in hollow logs and similar locations, and appear very early in the spring. The eggs are deposited in rafts on the surface of the water. The adults will attack man, but are never numerous or particularly troublesome.

Distribution: Rocky Mountains and vicinity to the Yukon Valley, Alaska.

## CANADIAN RECORDS.

Calgary, Alberta, April 14, 1913 (N. Criddle).  
 Edmonton, Alberta, April 27, 1919 (H. G. Dyar).  
 Banff, Alberta (N. B. Sanson).  
 Atlin, British Columbia, July 26, 1919 (H. G. Dyar).  
 Hope, British Columbia, May 20, 1919 (E. Hearle).  
 Selkirk, Yukon Territory, July 18, 1919 (H. G. Dyar).  
 Whitehorse, Yukon Territory, June 28, 1919 (H. G. Dyar).  
 Dawson, Yukon Territory, July 8, 1919 (H. G. Dyar).

## CULISETA (CULISETA) INORNATUS Williston.

*Culex inornatus* Williston, U.S. Dep. Agr., N. Am. Fauna, No. 7, 253, 1893.

*Culex magnipennis* Felt, Bull. 79, N.Y. State Mus., 278, 1904.

A very large brown mosquito. Proboscis and palpi brown. Mesonotum with two pale brown, slightly impressed lines, the vestiture crossing these; of pale yellowish and dark scales mixed. Abdomen dark brown, with diffused pale yellow basal segmental bands, and scattering scales over the rest; venter sparsely pale yellow scaled. Legs dark brown, with scattering pale scales, the femora and tibiae pale below; tarsi nearly black. Wings broad, the cross-veins somewhat approximated but not very close, long from the breadth of the wing and generally with a few scales; wing-scales linear, all dark, not forming any spots.

The male genitalia have the unci slender and creased; penultimate segment without spines.

The larvae live in permanent ground pools. They do not come in artificial receptacles. The adults hibernate, and the eggs are laid in elongate rafts on the surface of water. The adult is not troublesome, probably attacking by preference the larger mammals.

Distribution: North America, from Mexico to southern Canada, exclusive of the northern forests.

## CANADIAN RECORDS.

Aweme, Manitoba, May 17, 1904 (N. Criddle).

Winnipeg Beach, Manitoba, July 9, 1918 (H. G. Dyar).

Regina, Saskatchewan, October 2, 1900 (J. Fletcher).

Saskatoon, Saskatchewan, August 10, 1918 (H. G. Dyar).

Maple Creek, Saskatchewan, October 30, 1903 (T. N. Willing).

Carnduff, Saskatchewan, May 28, 1901 (T. N. Willing).

Olds, Saskatchewan, August 14, 1902 (T. N. Willing).

Kinistino, Saskatchewan, July 10, — (J. Fletcher).

Shepard, Saskatchewan, July 21, 1901 (T. N. Willing).

Medicine Hat, Alberta, August 23, 1906 (Dyar & Caudell).

Lochearn, Alberta, August 5, 1918 (H. G. Dyar).

Lamoral, Alberta, August 6, 1918 (H. G. Dyar).

Banff, Alberta, August 1, 1918 (H. G. Dyar).

Nicomen, British Columbia, July 27, 1919 (E. Hearle).

## CULISETA (CULISETA) INCIDENS Thomson.

*Culex incidens* Thomson, Kongl. Sven. Freg. Eug. Resa, vi, Dipt., 443 1868.

*Culex particeps* Adams, Kans. Univ. Bull., ii, 26, 1903.

A large dark mosquito with spotted wings. Mesonotum uniform, without impressed lines; vestiture dark, mixed with yellowish white scales, which form diffuse longitudinal lines, and a spot on each side. Abdomen black, with basal segmental white bands; venter whitish scaled. Legs black, the femora whitish below, the tibiae also more or less whitish within; tarsi with white specks at the bases of the joints, a rather distinct ring at the base of the second hind tarsal. Wings broad, the cross-veins in line, or nearly so; wing-scales black, hair-like, forming more or less conspicuous spots on the bases of the forks of the second and fourth veins, and along the second and fourth veins within the cross-veins.

The male genitalia have the unci simple; a short row of spines on the penultimate segment.

The larvae live in permanent pools of a dirty character, and take readily to artificial receptacles, this being the common water-barrel mosquito of the west. The adults hibernate; the eggs are laid in narrow rafts on the surface of water. The adults will attack man, but rarely, preferring larger mammals. A man on horseback is generally immune, though the horse may be bitten.

Distribution: Northern Rocky Mountains and the Pacific coast from southern California to Alaska.

#### CANADIAN RECORDS.

- Banff, Alberta, July 26, 1918 (H. G. Dyar).  
Mission, British Columbia, June 14, 1919 (E. Hearle).  
Agassiz, British Columbia, April 22, 1919 (E. Hearle).  
Caulfields, British Columbia, May 3, 1919 (E. Hearle).  
Hazelton, British Columbia, September 9, 1919 (H. G. Dyar).  
Prince Rupert, British Columbia, May 31, 1919 (H. G. Dyar).  
Metlakatla, British Columbia, August 1, 1910 (J. H. Keen).  
Atlin, British Columbia, July 26, 1919 (H. G. Dyar).  
Whitehorse, Yukon Territory, June 26, 1919 (H. G. Dyar).  
Dawson, Yukon Territory, July 16, 1919 (H. G. Dyar).

#### CULISETA (CULISETA) IMPATIENS Walker.

- Culex impatiens* Walker, List Dipt. Brit. Mus., i, 5, 1848.  
*Culex pinguis* Walker, Lord's Nat. in Vanc. Id. & B.C., ii, 337, 1866.  
*Culex absobrinus* Felt, Bull. 79, N.Y. State Mus., 391c, 1904.

A very large dark brown mosquito. Proboscis and palpi black. Mesonotum with two broad impressed lighter brown lines, the vestiture sparse, and forming frosted yellowish lines on each side posteriorly.

Abdomen black, with basal segmental white bands; venter mostly whitish. Legs black, the femora white beneath; knee-spots pale. Wings broad, the cross-veins nearly in line, the scales all blackish, coarsely linear; a small tuft at base of third vein, but no scales on the cross-veins.

The male genitalia have the unci simple; a long row of spines on the penultimate segment.

The larvae live in dark permanent pools in the forest, where they are frequently much preyed upon by *Eucorethra underwoodi* larvae. The adults hibernate; the eggs are deposited in broad roundedly triangular rafts on the surface of the water.

Distribution: Northern forests from the Atlantic to Pacific, mountains of California to Alaska.

#### CANADIAN RECORDS.

Martin's Fall, Ontario (Walker).

White River, Ontario, June, 1918 (H. G. Dyar).

Red Deer, Alberta, August 1, 1918 (H. G. Dyar).

Smith Landing, Alberta, May 30, 1911 (H. V. Radford).

Fort Simpson, Mackenzie, April 21, 1914 (E. A. Preble).

Kalso, British Columbia, July 19, 1903 (H. G. Dyar).

Terrace, British Columbia, August 14, 1919 (H. G. Dyar).

Caulfields, British Columbia, May 3, 1919 (E. Hearle).

Agassiz, British Columbia, June 1, 1917 (A. E. Cameron).

Prince Rupert, British Columbia, May 14, 1919 (H. G. Dyar).

Clayburn, British Columbia, March 25, 1919 (E. Hearle).

Hatzie, British Columbia, April 14, 1919 (E. Hearle).

Hope, British Columbia, May 20, 1919 (E. Hearle).

Whitehorse, Yukon Territory, July 3, 1919 (H. G. Dyar).

Dawson, Yukon Territory, July 15, 1919 (H. G. Dyar).

#### GENUS MANSONIA Blanchard.

A small genus of general distribution, the species more numerous in the tropics. The larvae are peculiar in having the air-tube adapted for piercing the vascular roots of certain aquatic plants, from which they get their supply of air. The eggs are deposited in rafts in swamps where suitable plants grow, and the young larvae descend to the roots, never coming to the surface again.

The genus has been divided into subgenera on genitalic characters (Dyar, *Ins. Ins. Mens.*, vi, 112, 1918). The single Canadian species belongs to the subgenus *COQUILLETIDIA* Dyar.

## MANSONIA (COQUILLETIDIA) PERTURBANS Walker.

*Culex perturbans* Walker, Ins. Saund., Dipt., 428, 1856.

*Culex ochropus* Dyar & Knab, Journ. N.Y. Ent. Soc., xv, 100, 1907.

A rather large mosquito with scaly wings and conspicuously ringed legs. Proboscis with many pale scales in the middle, the base and tip dark. Mesonotum with rather coarse pale golden scales, imperfectly covering the surface. Abdomen brown, with a few pale scales at the bases of the segments, and triangular whitish spots at the sides; venter pale scaled, with blackish ones toward the apices of the segments. Legs, dark, with pale scales intermixed, the femora and tibiae pale beneath the hind tibiae with a pale ring at outer third; tarsi with broad white rings at the bases of the joints, the first joint also with a white ring in the middle. Wings with the scales dense and rather broad, brown with white ones intermixed.

The larvae are attached to the roots of a species of *Carex* growing in marshes or the edges of ponds. The winter is passed as half-grown larva. The adults fly several miles from the breeding grounds, and are severe biters. They have been known to descend unused chimneys to get into dwellings which were otherwise screened.

Distribution: North America, Florida to Canada, westward in timbered country to British Columbia.

## CANADIAN RECORDS.

Sand Hill, Rideau, Ontario, July 1, 1906 (J. Fletcher).

Kingston, Ontario, June 21, 1917 (A. B. Klugh).

Kenora, Ontario, July 2, 1918 (H. G. Dyar).

Dryden, Ontario, June 30, 1918 (H. G. Dyar).

Jordan, Ontario, July 27, 1916 (E. Hearle).

Aweme, Manitoba, June 30, 1906 (N. Criddle).

Kalso, British Columbia, July 2, 1903 (R. P. Currie).

Vancouver, British Columbia, August 22, 1919 (E. Hearle).

Hatzie, British Columbia, July 22, 1919 (E. Hearle).

## GENUS PSOROPHORA Robineau-Desvoidy,

A genus of tropical American origin, developed as an extreme specialization of the *Aedes* type. A number of species occur in the southern United States, some of them straying into southern Ontario.

The genus contains two subgenera, which divide by genitalic characters as follows:

Clasp filament furcate or angled; harpago with setae evenly over the bulbous tip..... PSOROPHORA Robineau-Desvoidy

Clasp-filament swollen mesially; harpago with all the setae on the inner aspect, in some species soldered to the side-piece,

JANTHINOSOMA Lynch Arribalzaga

One species of PSOROPHORA will probably be found to reach Canada, as it has been reported from the Champlain Valley in northern New York, but a short distance from the Canadian boundary. One species of JANTHINOSOMA, also, is known to occur.

PSOROPHORA (PSOROPHORA) CILIATA Fabricius.

*Culex ciliata* Fabricius, Ent. Syst., iv, 401, 1794.

*Culex molestus* Wiedemann, Dipt. Exot., 7, 1821.

*Culex tibialis* Robineau-Desvoidy, Mem. Soc. Nat. Hist. Paris, iii, 404, 1827.

*Culex rubidus* Robineau-Desvoidy, Mem. Soc. Nat. Hist. Paris, iii, 404, 1827.

*Psorophora boscii* Robineau-Desvoidy, Mem. Soc. Nat. Hist. Paris, iii, 413, 1827.

*Culex conterrens* Walker, Ins. Saund., Dipt., 427, 1856.

*Culex perterrens* Walker, Ins. Saund., Dipt., 431, 1856.

A very large mosquito, with dusky wings and shaggy, white-ringed legs. Scales on palpi and base of proboscis mostly shaggy and erect, dark. Mesonotum with smooth nude areas, a line of golden scales in the middle, and large patch of silvery gray ones on the shoulders. Abdomen brown scaled, with scattering white ones, especially toward the tips of the segments. Legs with the yellow integument showing in many places; black erect scales at ends of femora, all of tibiae and apices of tarsal joints, the tarsi, especially the hind pair, broadly white-ringed at the bases. Wings with narrow brown scales, mixed with some whitish ones along the costa.

The larvae live in temporary rain-puddles, and are predaceous upon the larvae of other mosquitoes with the same habit, either *Psorophora* (subgenus *Janthinosoma*) or *Aedes*. The period of larval life is very short. The winter is passed in the egg state, the eggs being spinose and adapted to withstand dessication. The adult is a severe biter; but may be classed otherwise as a beneficial insect, since its larva destroys many other mosquito larvae.

Distribution: Brazil to the eastern United States east of the plains to northern New York.

CANADIAN RECORDS.

None.

## PSOROPHORA (JANTHINOSOMA) SAYI Dyar &amp; Knab.

*Culex musicus* Say (not Leach), Journ. Acad. Nat. Sci. Phil., vi, 149, 1827.

*Culex posticatus* Coquillett (not Wiedemann), U.S. Dept. Agr., Div. Ent., Circl. 40, 2 Ser., 6, 1900.

*Janthinosoma discrucians* Giles (not Walker), Gnats or Mosq., 2 ed. 339 1902.

*Ianthosoma mexicanum* Blanchard (not Bellardi), Les Moust., 234, 1905.

*Janthinosoma sayi* Dyar & Knab, Journ. N.Y. Ent. Soc., xiv, 181, 1906.

*Janthinosoma sayi* Theobald, Mon. Culic., iv, 155, 1907.

A large brown mosquito, the hind legs shortly shaggy and tipped with white. Palpi, legs and abdomen black with blue reflection. Head with dense erect golden scales; mesonotum with sparse golden scales; abdomen blue-black dorasally, with lateral triangular apical segmental yellow patches, confluent with the golden yellow venter; legs blue-black, the vestiture of the hind pair shortly erect, tip of third tarsal and all of the fourth and fifth white. Wings slightly smoky, the scales narrow, all dark.

The larvae live in temporary rain-puddles, and develop rapidly. The period of larval life is very short. The winter is passed in the egg state, the eggs being spinose and adapted to withstand dessication. The adult is generally rare, but conspicuous when seen. It will bite in day time in the open, but is never numerous enough to be troublesome.

Distribution: Atlantic and Gulf States to southern Ontario, Cuba and Bahamas.

## CANADIAN RECORDS.

Jordan, Ontario, August 3, 1916 (E. Hearle).

## GENUS AÆDES Meigen.

A large genus of world-wide distribution. Species of this genus are especially abundant in northern and arctic regions. The winter is passed in the egg state, and development takes place in ground pools filled by snow-water. The adults are all severe biters, and often occur in enormous numbers. They are killed by the first hard frosts.

The genus has been divided into a number of subgenera on the characters of the male genitalia. The groups occurring in Canada may be separated as follows:

1. Harpagones present, strap-shaped organs with terminal filament. . . . . 2
- Harpagones absent. . . . . 3



- Abdomen generally without the median stripe, *idahoensis* Theobald
13. Mesonotum typically with central broad undivided dark band. . . . . 14  
 Mesonotum with central dark band, if present, distinctly divided. . . . . 15
14. Mesonotum creamy yellow at the sides. . . . . *hirsuteron* Theobald  
 Mesonotum golden or reddish brown at the sides; median stripe some-  
 times divided, or mesonotum uniformly dark brown, *punctor* Kirby  
 Mesonotum contrastingly yellow at the sides. . . . . *aurifer* Coquillett
15. Mesonotum with paired brown lines. . . . . 16  
 Mesonotum uniformly dark brown, without lines. . . . . 17
16. Mesonotum yellowish, lines narrow, well separated; a very small  
 species. . . . . *aldrichi* Dyar & Knab  
 Mesonotum yellow (or gray), sometimes more or less suffused with  
 brown centrally, the margin remaining yellow; lines narrow, some-  
 times obsolete; medium sized species. *lazarensis* Felt & Young  
 Mesonotum yellow (rarely gray), the dark lines broad, heavy, well  
 contrasted and passing back around the ante-scutellar space; a  
 larger species. . . . . *pionips* Dyar  
 Mesonotum yellow, lines slender, often conjoined into a median  
 stripe; legs very deep black. . . . . *diantaeus* Howard, Dyar & Knab  
 Mesonotum yellow, the side stripes darker and heavier than the  
 median pair; small species, confined to Pacific coast region,  
*cyclocerculus* Dyar  
 Mesonotum yellow; lines moderate, normal; medium sized species,  
 confined to Pacific coast region. . . . . *leuconotips* Dyar  
 Mesonotum yellow to brown; lines distinct, broad; a large species,  
 confined to Pacific coast region. . . . . *aboriginis* Dyar  
 Mesonotum gray, with central brown shade, lines fine, dark; a small  
 species. . . . . *impiger* Walker  
 Mesonotum mossy yellow; lines narrow and very approximate,  
*pullatus* Coquillett
17. Thorax with long hairs, especially below. . . . . *nearcticus* Dyar  
 Thorax with normal setae. . . . . 18
18. Mesonotum light gray, with traces of dark lines, or a central brown  
 shade, sometimes covering the whole mesonotum; a small species,  
*prodotes* Dyar  
 Mesonotum dark gray, often with whitish shades at each side; a  
 large species. . . . . *trichurus* Dyar,  
 Mesonotum uniformly dark brown; a medium sized species, very  
 fond of entering houses. . . . . *intrudens* Dyar
- As indicated above, the variation in colour of the mesonotum is con-  
 siderable in the same species, so that the characters overlap on all sides.  
 The male genitalia are of great assistance to determination in such cases,

especially in the subgenus HETERONYCHA, where the confusion due to this variability is likely to be greatest.

KEY TO THE CANADIAN SPECIES OF HETERONYCHA BY THE MALE  
GENITALIA.

1. Basal lobes modified, obsolete as such, but leaving a large spine on one side and two approximate setae on the other, the latter sometimes obsolete. . . . . (group *pullatus*) 2  
Basal lobes more or less developed, with or without an accompanying spine. . . . . 4
2. Basal lobe large, with two stout spines. . . . . 3  
Basal lobe small, with two stout spines. . . . . *pullatus* Coquillett  
Basal lobe absent, no basal spines. . . . . *aurifer* Coquillett
3. A slight hairy area distal of apical lobe. . . . . *intrudens* Dyar  
A strong hairy area proximal of apical lobe,  
*diantaeus* Howard, Dyar & Knab
4. Basal lobe more or less expanded and tubercular, short-haired, with or without accompanying spine. . . . . 5  
Basal lobe unmodified, uniformly long-haired. . . . . 19
5. Apical lobe very large, resembling the basal one, with many straight stout, lanceolately thickened, rather long setae (group *canadensis*)  
*canadensis* Theobald  
Apical lobe with short, recurved flattened, clinging setae. . . . . 6  
Apical lobe with normally shaped setae. . . . . 9
6. Spine of basal lobe very thick, angularly curved and of a pale appearance. . . . . (group *hirsuteron*) . . 7  
This structure a normal curved spine, not differentiated in texture from other setae, although larger. . . . . (group *puncator*) . . 8
7. The four species *spencerii* Theobald, *idahoensis* Theobald, *hirsuteron* Theobald, and *aldrichi* Dyar & Knab have no marked differences in the male genitalia.
8. The four species *puncator* Kirby, *cyclocerculus* Dyar, *leuconotips* Dyar and *aboriginis* Dyar have no marked differences in the male genitalia. The second and third species have a stronger spine on the basal lobe than the first and fourth; but the character is relative.
9. Setae on the apical lobe coarse and somewhat thickened,  
(group *curriei*) . . 10  
These setae normal, fine and slender. . . . . 11
10. Basal lobe with two stout spines on the margin. . . . . *curriei* Coquillett  
Basal lobe with coarse setae on the margin, no spines,  
*campestris* Dyar & Knab

11. Setae on apical lobe inwardly directed, on inner surface of lobe  
(group *stimulans*) . . . . . 12  
Setae on apical lobe outwardly directed, on outer surface of lobe  
(group *impiger*) . . . . . 16
12. Basal lobe of side piece with a stout spine . . . . . 13  
Basal lobe without a spine . . . . . *excrucians* Walker
13. Spine on basal lobe very strong and distinct . . . . . 14  
This spine scarcely differentiated from adjacent setae . . . . . 15
14. Basal lobe large, rugose-tubercular; filament of harpago angularly  
widened beyond middle . . . . . *stimulans* Walker  
Basal lobe very small with few setae, non-rugose; filament of harpago  
smoothly widened at middle . . . . . *cantator* Coquillett  
Basal lobe rugose-papillose, the area extending nearly to apical lobe;  
filament of harpago broadly expanded near base,  
*fletcheri* Coquillett
15. Spine fairly strong; filament of harpago short, notched at base,  
*fitchii* Felt & Young  
Spine weaker; filament of harpago long, with broad knife-blade ex-  
pansion . . . . . *riparius* Dyar & Knab
16. Setae on apical lobe moderate and numerous . . . . . 17  
Setae on apical lobe small, very few . . . . . 18
17. Setae on basal lobe many, much shorter than the spine,  
*lazarensis* Felt & Young  
These setae sparse, not much shorter than the spine . . . . . *pionips* Dyar
18. Adjacent setae of basal lobe about as long as the spine, *prodotes* Dyar  
These setae distinctly shorter than the spine . . . . . *impiger* Walker
19. Harpago rather long; filament sickle-shaped with double dorsal  
membranous ridge (group *neracticus*) . . . . . *nearcticus* Dyar  
Harpago long, the filament bud-shaped (group *trichurus*),  
*trichurus* Dyar

## SUBGENUS HETERONYCH Lynch Arribalzaga.

## Group PULLATUS.

## AËDES (HETERONYCHA) AURIFER COQUILLET.

*Culex aurifer* Coquillett, Can. Ent., xxxv, 255, 1903.

A medium sized to rather large brown-black mosquito. Head golden-scaled in the middle and sides, dark brown between. Mesonotum with a very broad median deep blackish brown stripe, leaving the sides narrowly golden yellow. Abdomen black dorsally, with elongate triangular white basal segmental lateral spots; venter mostly whitish. Legs deep black, the femora broadly white below except at tips. Wing scales narrow, black.

The larvae live in early spring pools, particularly cranberry bogs, hatching from overwintering eggs. The attack of the adult is described as blood-thirsty. The mating habits of the males are unknown. The species is local and rare.

Distribution: Southern Canada to New Jersey; Minnesota.

#### CANADIAN RECORDS.

Ottawa, Ontario, June 12, 1917 (A. B. Klugh).

#### AËDES (HETERONYCHA) PULLATUS Coquillett.

*Culex pullatus* Coquillett, Proc. Ent. Soc. Wash., vi, 168, 1904.

*Aedes acrophilus* Dyar, Ins. Ins. Mens., v, 127, 1917.

A medium sized black mosquito. Mesonotum dull olivaceous yellow when fresh, fading to mossy whitish; lines distinct, narrow, approximate, median lines normally present, the side stripes more often obsolete. Abdomen black, the basal segmental white bands narrowed centrally or obsolete dorsally, widened at the sides; venter pale, with dark apical segmental bands. Legs black, the femora pale below; knee-spots white. Wing-scales narrow, all dark.

The winter is passed in the egg stage. The larvae develop in early ground-pools, more especially muddy pools along streams and lakes. They are somewhat late in development, being the last of the forest species to be found as larvae. The species frequents high altitudes. The males swarm after sunset in openings of the forest or over willows. In the far north, in June, when it is light practically all night, the swarms may be seen as early as 4 p.m. when the sun passes behind a temporary cloud.

Distribution: Alaska and the Yukon, down the Rocky mountains to Colorado.

#### CANADIAN RECORDS.

Lake Louise, Alberta, July 11, 1918 (H. G. Dyar).

Banff, Alberta, July 14, 1918 (H. G. Dyar).

Kalso, British Columbia, July 2, 1903 (H. G. Dyar).

Kwinitsa, British Columbia, May 29, 1919 (H. G. Dyar).

Bennett, British Columbia, July 28, 1919 (H. G. Dyar).

Atlin, British Columbia, July 23, 1919 (H. G. Dyar).

Carcross, Yukon Territory, July 21, 1919 (H. G. Dyar).

Whitehorse, Yukon Territory, June 27, 1919 (H. G. Dyar).

Tahkeena River, Yukon Territory, July 19, 1919 (H. G. Dyar).

Hootalinqua, Yukon Territory, July 15, 1919 (H. G. Dyar).  
 Tantalus Mine, Yukon Territory, July 6, 1919 (H. G. Dyar).  
 Big Salmon, Yukon Territory, July 15, 1919 (H. G. Dyar).  
 Carmack's, Yukon Territory, July 14, 1919 (H. G. Dyar).  
 Dawson, Yukon Territory, July 7, 1919 (H. G. Dyar).

*AËDES (HETERONYCHA) INTRUDENS* Dyar.

*Aedes intrudens* Dyar, Ins. Ins. Mens., vii, 23, 1919.

A medium sized, black mosquito, very fond of entering houses. Head with brown scales on the vertex, a narrow line of black ones on each side, and a patch of creamy ones below. Mesonotum with dark bronzy brown scales, the posterior lateral stripes often showing faintly blackish, with a slender light line within. Abdomen black, with basal segmental white bands, generally not contracted in the middle; venter whitish scaled. Legs black, the femora pale beneath. Wing-scales dark.

Liable to be confused with the *abserratus* form of *punctator* or the heavily suffused form of *prodotes*, the male genitalia abundantly diagnostic in both cases. Also similar to the unlined form of *lazarensis*; but that has always a pale margin to the mesonotum, lacking in *intrudens*.

The winter is passed in the egg state. The larvae develop in early ground-pools in spring, this being one of the especially early species. The adults are short-lived, disappearing comparatively early in the season. This is the most troublesome of the forest mosquitoes, from its habit of entering houses. When large numbers get in, as often happens, sleep is difficult. No other forest species behaves in this manner.

The mating habits of the males have not been observed.

Distribution: Northern forests, Atlantic to Pacific.

CANADIAN RECORDS.

Chats Rapids, Quebec, May 24, 1900 (J. Fletcher).  
 White River, Ontario, June 24, 1907 (F. Knab).  
 Nipigon, Ontario, June 26, 1918 (H. G. Dyar).  
 Dryden, Ontario, June 29, 1918 (H. G. Dyar).  
 Winnipeg Beach, Manitoba, July 5, 1918 (H. G. Dyar).  
 Lake Minnewanka, Alberta, July 22, 1918 (H. G. Dyar).  
 Banff, Alberta, July 7, 1918 (H. G. Dyar).  
 Laggan, Alberta, July 11, 1918 (H. G. Dyar).  
 Terrace, British Columbia, August 12, 1919 (H. G. Dyar).  
 Salvus, British Columbia, June 3, 1919 (H. G. Dyar).  
 Kwinitsa, British Columbia, May 22, August 14, 1919 (H. G. Dyar).

AËDES (HETERONYCHA) DIANTAEUS Howard, Dyar & Knab.

*Aedes diantaeus* Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., iv. 758, 1917.

A medium sized black mosquito. Mesonotum yellow, the two median blackish lines distinct, narrow, sometimes joined into a single median stripe; side stripes generally weak. Abdomen black, the white bands obsolete dorsally, forming triangular spots at the sides at the bases of the segments; venter whitish, the segments black at their apices. Legs deep black, the femora white below, broadly so at base. Wing-scales narrow, all dark.

Liable to be confused with the normal form of *lazarensis*, from which there is no marked distinction. The form of *diantaeus* with single dark stripe closely resembles the normal form of *punctator*; but is more slender, the legs blacker. Male genitalia always diagnostic.

The winter is passed in the egg state. Larvae in early ground-pools especially cold pools in spruce bogs; but in one river valley breeding in flood-pools in summer.

The males do not swarm, but attack the females singly as these are tempting to bite some warm-blooded animal.

Distribution: Northern forests from Atlantic to Pacific.

#### CANADIAN RECORDS.

White River, Ontario, June 17, 1918 (H. G. Dyar).

Terrace, British Columbia, August 13, 1919 (H. G. Dyar).

Salvus, British Columbia, June 9, 1919 (H. G. Dyar).

#### Group HIRSUTERON.

AËDES (HETERONYCHA) SPENCERII Theobald.

*Culex spencerii* Theobald, Mon. Culic., ii, 99, 1901.

A rather small, dark gray mosquito, inhabiting the open prairie. Mesonotum dark brown in the middle, a grayish stripe on each side on the margin and over antescutellar space. Abdomen with diffuse grayish white bands at bases and apices of segments, and a line of the same colour down the middle, cutting the black ground into paired squarish spots; venter whitish. Legs black and grayish white, the latter colour predominating beneath; femora white below. Wings with the costa, first, third and fifth veins black-scaled, the alternating ones white-scaled.

The winter is passed in the egg stage, the larvae developing in early spring pools. The adults inhabit the open prairie, avoiding timber. The males swarm after sunset over prominent objects on the prairie.

Distribution: Prairies of central Canada and northern edge of the United States.

## CANADIAN RECORDS.

Aweme, Manitoba, July 28, 1916 (N. Criddle).  
Winnipeg, Manitoba, June 22, 1907 (F. Knab).  
Oxbow, Saskatchewan, May 30, 1907 (F. Knab).  
Belonge Creek, Saskatchewan, July, 1907 (V. A. Armstrong).  
Kinisteno, Saskatchewan, July 10, — (J. Fletcher).  
Regina, Saskatchewan, June 9, 1907 (T. N. Willing).  
Strassburg, Saskatchewan, June 3, 1907 (T. N. Willing).  
Carnduff, Saskatchewan, May 28, 1901 (J. Fletcher).  
Alameda, Saskatchewan, June 5, 1902 (J. Fletcher).  
Olds, Saskatchewan, July 5, 1901 (J. Fletcher).  
Rosthern, Saskatchewan, July 13, — (J. Fletcher).  
Saskatoon, Saskatchewan, August 11, 1918 (H. G. Dyar).  
Lochearn, Alberta, August 5, 1918 (H. G. Dyar).  
Lamoral, Alberta, August 6, 1918 (H. G. Dyar).  
Nordegg, Alberta, August 6, 1918 (H. G. Dyar).  
Banff, Alberta, July 8, 1918 (H. G. Dyar).  
Kalso, British Columbia, June 13, 1903 (R. P. Currie).

## AËDES (HETERONYCHA) IDAHOENSIS Theobald.

*Grabhamia spencerii idahoensis* Theobald, Mon. Culic., iii, 250, 1903.

A rather small, dark gray mosquito, inhabiting open, dry country. Mesonotum dark brown in the middle, a grayish stripe on each side on the margin and over antescutellar space. Abdomen with grayish white bands at the bases of the segments, narrowed centrally, and a few white scales at the apices of the segments also; venter whitish. Legs black and grayish white, the latter colour predominating beneath; femora white below. Wings with the costa, first, third and fifth veins black-scaled, the alternating ones white-scaled.

In some specimens there is a more or less complete band of pale scales down the middle of the abdomen, and these are indistinguishable from *spencerii*.

The winter is passed in the egg state, the larvae developing in early spring pools. The adults inhabit open country, avoiding timber. The males swarm after sunset over prominent objects. There are larval differences between *idahoensis* and *spencerii*, and they do not occupy the same territory; but the adults, under exceptional circumstances, may be confused.

Distribution: Dry valleys from Colorado and Montana to Nevada and Washington, probably in Canada, at least in the Okanagan Valley of British Columbia.

## CANADIAN RECORDS.

None.

*AËDES* (HETERONYCHA) *HIRSUTERON* Theobald.

*Culex hirsuteron* Theobald, Mon. Culic., ii, 98, 1901.

*Culex pretans* Grossbeak, Ent. News, xv, 332, 1904.

*Culex aestivalis* Dyar, Journ. N.Y. Ent. Soc., xii, 245, 1904.

*Aedes vinnipegensis* Dyar, Ins. Ins. Mens., vii, 34, 1919.

A rather small, dark gray mosquito. Mesonotum dark brown in the middle, gray on the sides and over antescutellar space. Abdomen black, with basal segmental straight white bands; venter whitish. Wing scales all dark, but the costa, first and third veins distinctly darker than the others. Legs black, whitish below, the femora largely white; knee-spots white.

The winter is passed in the egg state, the larvae developing in early spring pools. The mating habits of the males are unobserved. The form *vinnipegensis* is a diminutive race from Manitoba; *aestivalis* is the western form, large and showing slight larval differences. The adults inhabit wooded country, not being found in the open.

Distribution: Eastern United States from the Gulf of Mexico to southern Canada, thence along the southern fringe of the forest to the Pacific coast.

## CANADIAN RECORD.

Ottawa, Ontario, June 16, 1917 (A. B. Klugh).

Winnipeg Beach, Manitoba, July 4, 1918 (H. G. Dyar).

Aweme, Manitoba, July 6, 1910 (N. Criddle).

Kaslo, British Columbia, July 4, 1903 (H. G. Dyar).

Lardo, British Columbia, July 7, 1903 (H. G. Dyar).

Sicamous, British Columbia, July 28, 1916 (C. G. Hewitt).

Ainsworth, British Columbia, July 10, 1903 (H. G. Dyar).

Wigwam, British Columbia, August 14, 1903 (H. G. Dyar).

Prince George, British Columbia, September 7, 1919 (H. G. Dyar).

Nanoose Bay, British Columbia, August 1, 1903 (J. Fletcher).

*AËDES* (HETERONYCHA) *ALDRICHI* Dyar & Knab.

*Aedes aldrichi* Dyar & Knab, Proc. U.S. Nat. Mus., xxxv, 57, 1908.

A small dark gray mosquito. Mesonotum yellowish, with two median dark brown lines and short posterior lateral ones. Abdomen black, with basal segmental white bands, often narrowed in the middle; venter whitish. Legs black, largely whitish below, the femora white below. Wing scales all blackish.

The larvae occur in flood pools shaded by bushes. The adults are often extremely small, so as to pass through window-screens. They inhabit the woods in river-bottoms, not coming out into open country. The adults are voracious biters.

Distribution: River valleys of the Rocky Mountain watershed, both east and west.

## CANADIAN RECORDS.

- Mission, British Columbia, August 4, 1919 (E. Hearle).  
 Nicomen Island, British Columbia, June 15 to August 3, 1919 (E. Hearle).  
 Chilliwack, British Columbia, July 2, 1919 (E. Hearle).  
 Agassiz, British Columbia, July 16, 1919 (E. Hearle).  
 Ruskin, British Columbia, July 23, 1919 (E. Hearle).  
 Hope, British Columbia, August 3, 1919 (E. Hearle).  
 Abbotsford, British Columbia, July 12, 1920 (H. G. Dyar).

## Group PUNCTOR.

## AËDES (HETERONYCHA) PUNCTOR Kirby.

- Culex punctor* Kirby, Richardson's Fauna Bor.-Am., iv, 309, 1837.  
*Culex implacabilis* Walker, List Dipt. Brit. Mus., i, 7, 1848.  
*Culex provocans* Walker, List Dipt. Brit. Mus., i, 7, 1848.  
*Culex abserratus* Felt & Young, Science, n.s., xx, 312, 1904.  
*Culicelsa auroides* Felt, Bull. 79, N.Y. State Mus., 448, 1905.  
*Aedes centrotus* Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I.,  
 iv, 747, 1917.

A rather large blackish mosquito. Mesonotum with dark yellow or gray scales on the sides, a quadrate broad dark brown band in the middle. Abdomen black, with basal segmental white bands, usually narrow and narrowed centrally; venter white-scaled. Legs black, the femora white below. Wing-scales wholly dark.

In the east, the mesonotum is commonly suffused with brown, with the dark central band still visible (form *centrotus*), or entirely dark brown (form *abserratus*). The latter is difficult to distinguish from *intrudens*. In the west, the typical form (*punctor* = *auroides*) predominates, suffused examples being rare. Here the sides of the mesonotum are as often gray as yellow; in the east, always yellow. Another variation which occurs throughout the range, although not abundantly, has the median mesonotal stripe divided, forming two lines. This is very difficult to distinguish from *lazarensis*. Both the forms of *diantaeus*, also, closely resemble corresponding forms of *punctor*. This is, however, generally a larger and more robust mosquito than *diantaeus*, the legs less deep black.

The winter is passed in the eggs state, the larvae developing in early spring pools, particularly in spruce swamps. None were found in the flood-pools referred to as breeding places for *diantaeus* and others. The adults are severe biters, and can be found till frost in the northern woods, although there is but a single annual generation.

Distribution: Canadian forests from Atlantic to Pacific except the rainy Pacific belt; mountains of New England, New York and Minnesota.

#### CANADIAN RECORDS.

- Rigolet, Labrador, July 18, 1906 (C. W. Johnson).  
 St. Lewis Inlet, Labrador, July 12, 1906 (C. W. Johnson).  
 Cape Charles, Labrador, July 28, 1906 (C. W. Johnson).  
 Younghall, New Brunswick, July 2, 1908 (A. Gibson).  
 Martin Fall, Ontario (Kirby).  
 Fort Hope, Ontario, June 27, 1918 (H. N. Awrey).  
 Moose Factory, Ontario, July 26, 1918 (H. N. Awrey).  
 Mammamattawa, Ontario, August 27, 1903 (W. J. Wilson).  
 White River, Ontario, June 24, 1907 (F. Knab).  
 Height of Land, Ontario, June 7, 1918 (H. N. Awrey).  
 Osnaburg, Ontario, June 21, 1918 (H. N. Awrey).  
 Ghost River, Ontario, July 7, 1918 (H. N. Awrey).  
 Albany, Ontario, July 10, 1918 (H. N. Awrey).  
 Attawapiscat, Ontario, July 13, 1918 (H. N. Awrey).  
 Kenogami River, Ontario, June 30, 1903 (W. J. Wilson).  
 Nipigon, Ontario, June 26, 1918 (H. G. Dyar).  
 Dryden, Ontario, June 27, 1918 (H. G. Dyar).  
 Kenora, Ontario, July 2, 1918 (H. G. Dyar).  
 Winnipeg Beach, Manitoba, July 4, 1918 (H. G. Dyar).  
 Prince Albert, Saskatchewan, August 14, 1918 (H. G. Dyar).  
 Saskatoon, Saskatchewan, August 10, 1918 (H. G. Dyar).  
 Red Deer, Alberta, July 29, 1918 (H. G. Dyar).  
 Locheam, Alberta, August 5, 1918 (H. G. Dyar).  
 Lake Minnewanka, Alberta, July 22, 1918 (H. G. Dyar).  
 Edmonton, Alberta, May 4, 1919 (H. G. Dyar).  
 Banff, Alberta, July 9, 1918 (H. G. Dyar).  
 Field, British Columbia, August 15, 1903 (H. G. Dyar).  
 Agassiz, British Columbia, May 1, 1919 (E. Hearle).  
 Prince George, British Columbia, May 12, 1919 (H. G. Dyar).  
 Hazelton, British Columbia, September 6, 1919 (H. G. Dyar).  
 Terrace, British Columbia, August 12, 1919 (H. G. Dyar).  
 Kwinitsa, British Columbia, May 22, 1919 (H. G. Dyar).  
 Atlin, British Columbia, July 22, 1919 (H. G. Dyar).

Carcross, Yukon Territory, July 21, 1919 (H. G. Dyar).  
 Whitehorse, Yukon Territory, June 26, 1919 (H. G. Dyar).  
 Tahkeena River, Yukon Territory, July 19, 1919 (H. G. Dyar).  
 Byer's Camp, Yukon Territory, July 6, 1919 (H. G. Dyar).  
 Carmack's, Yukon Territory, July 14, 1919 (H. G. Dyar).  
 Selkirk, Yukon Territory, July 13, 1919 (H. G. Dyar).  
 Horse Falls, Yukon Territory, July 13, 1919 (H. G. Dyar).  
 Dawson, Yukon Territory, July 7, 1919 (H. G. Dyar).

AÆDES (HETERONYCHA) LEUCONOTIPS Dyar.

*Aedes leuconotips* Dyar, Ins. Ins. Mens., viii, 24, 1920.

A rather large blackish mosquito. Mesonotum brownish yellow, with two median dark brown lines, and short posterior lateral ones of the same colour. Abdomen black, with basal segmental white bands, narrow and narrowed centrally; venter white-scaled, with some black ones at the tips of the segments. Legs black, the femora white below; knee-spots narrowly white. Wing-scales all dark.

The markings are not distinguishable from *lazarensis*, although, as seen from the male genitalia and larvae, the species is extremely close to *punctor*. The winter is passed in the egg state, the larvae developing in early muskeg-pools in the rainy Pacific coast strip. The mating habits of the males have not been observed.

Distribution: Pacific coast, British Columbia to Alaska.

CANADIAN RECORDS.

Prince Rupert, British Columbia, May 22, 1919 (H. G. Dyar).

AÆDES (HETERONYCHA) CYCLOCERCULUS Dyar.

*Aedes cyclocerculus* Dyar, Ins. Ins. Mens., viii, 23, 1920.

A medium sized blackish mosquito. Mesonotum brownish yellow, with two median brown lines, and short thick posterior lateral ones, heavier and blacker than the median ones. Abdomen black, with narrow basal segmental white bands, narrowed centrally; venter whitish-scaled. Legs black, mixed with gray scales, especially below, the femora white below. Wing-scales wholly dark.

By the male genitalia and larvae, this species is closely allied to *punctor*. It is a rather small species, the winter being passed in the egg state, the larvae developing in early muskeg-pools in the rainy Pacific coast strip. The mating habits of the males have not been observed.

Distribution: Pacific coast, British Columbia to Alaska.

## CANADIAN RECORDS.

Prince Rupert, British Columbia, May 11, 1919 (H. G. Dyar).

## AËDES (HETERONYCHA) ABORIGINIS Dyar.

*Aedes aboriginis* Dyar, Ins. Ins. Mens., v, 99, 1917.

A large blackish mosquito. Mesonotum yellow-brown, with two broad central stripes, sometimes confluent, and short thick posterior lateral ones. Abdomen black, with basal segmental narrow white bands; venter white-scaled, with more or less distinct black bands at the apices of the segments. Legs black, some whitish scales intermixed; femora white below. Wing-scales wholly dark.

The markings of the mesonotum are not separable from *lazarensis*. The form with the mesonotal stripes united is practically as in *punctator*, to which this species is closely allied in the male genitalia; the larvae however, are distinctive. The winter is passed in the egg state, the larvae developing in early spring pools of foul character, not in typical muskeg-pools. The males have been observed swarming as late as 9 a.m. in bright sunlight, although in deep forest and shaded by the trunks of large trees. This habit is different to that of any other known *Aedes*. The females bite by day or night, as with any other forest mosquito.

Distribution: Pacific coast, from Washington to Alaska.

## CANADIAN RECORDS.

Royal Oak, British Columbia, May 4, 1917 (R. C. Trehearne).

West Holme, British Columbia, May 3, 1917 (A. E. Cameron).

Prince Rupert, British Columbia, May 11, 1919 (H. G. Dyar).

## Group IMPIGER.

## AËDES (HETERONYCHA) LAZARENSIS Felt &amp; Young.

*Culex lazarensis* Felt & Young, Science, n.s., xx, 312, 1904.

*Culex borealis* Ludlow, Can. Ent., xliii, 178, 1911.

A rather large blackish mosquito. Mesonotum dull yellow, often a little mixed with blackish; two median black-brown lines and short posterior lateral ones, usually both broad and distinct. Abdomen black, with basal segmental white bands, often narrowed in the middle; venter whitish-scaled, with more or less black at the apices of the segments. Legs black, femora white below; knee-spots white narrowly. Wing scales all black.

The colouration of the mesonotum varies from the normal yellow to gray in the Yukon valley (form *borealis*), and in another variety is more or less overspread with brown. The lines may be narrow, or obsolete, or

much extended, in the extreme form rendering the whole mesonotum black.

No colouration characters can be given to separate all forms of *lazarensis* from *punctor*, *diantaeus*, *aboriginis*, *intrudens*, etc.

The winter is passed in the egg state, the larvae developing in early ground pools in forest, and at least in one case in flood pools. The males swarm after sunset at projecting branches of spruce trees and similar locations. The females are good biters, flying in most profusion shortly after dark.

Distribution: Northern forests, from Atlantic to Pacific, except the moist Pacific coast belt.

#### CANADIAN RECORDS.

- Ottawa, Ontario, —, — (J. Fletcher).  
 Height of Land, Ontario, June 17, 1918 (H. N. Awrey).  
 Osnaburg, Ontario, June 21, 1918 (H. N. Awrey).  
 Fort Hope, Ontario, June 27, 1918 (H. N. Awrey).  
 White River, Ontario, June 25, 1907 (F. Knab).  
 Nipigon, Ontario, June 26, 1918 (H. G. Dyar).  
 Dryden, Ontario, July 1, 1918 (H. G. Dyar).  
 Kenora, Ontario, July 2, 1918 (H. G. Dyar).  
 Red Deer, Alberta, July 30, 1918 (H. G. Dyar).  
 Locheam, Alberta, August 5, 1918 (H. G. Dyar).  
 Lamoral, Alberta, August 6, 1918 (H. G. Dyar).  
 Banff, Alberta, July 8, 1918 (H. G. Dyar).  
 Laggan, Alberta, July 11, 1918 (H. G. Dyar).  
 Glacier, British Columbia, July 28, 1916 (C. G. Hewitt).  
 Kalso, British Columbia, June 11, 1903 (H. G. Dyar).  
 Prince George, British Columbia, May 9, 1919 (H. G. Dyar).  
 Terrace, British Columbia, August 12, 1919 (H. G. Dyar).  
 Salvus, British Columbia, May 27, 1919 (H. G. Dyar).  
 Kwinitza, British Columbia, May 24, 1919 (H. G. Dyar).  
 Atlin, British Columbia, July 22, 1919 (H. G. Dyar).  
 Yukon Valley from Carcross to Dawson, July, 1919 (H. G. Dyar).

#### AEDES (HETERONYCHA) PIONIPS Dyar.

*Aedes pionips* Dyar, Ins., Ins. Mens., vii, 19, 1919.

A large blackish mosquito. Mesonotum yellow, clear and even, rarely gray; two median black lines, broad and distinct and running far back; two short posterior lateral ones. Abdomen black, with basal segmental white bands, narrowed in the middle; venter whitish scaled, with more

or less black at the apices of the segments. Legs black, femora white below; knee-spots white. Wing-scales all black.

The colouration is not variable as far as observed; but the species is liable to be confused with large specimens of *lazarensis*. The winter is passed in the egg state, the larvae developing in early pools in spruce forest. The species is found only in the deepest forest or in northern regions. The males swarm after sunset in openings in the forest.

Distribution: Northern forests, presumably from Atlantic to Pacific, although no far eastern records are available, but not in the moist Pacific coast strip.

#### CANADIAN RECORDS.

White River, Ontario, June 17, 1918 (H. G. Dyar).  
 Kenogami River, Ontario, June 30, 1903 (W. J. Wilson).  
 Prince Albert, Saskatchewan, August 14, 1918 (H. G. Dyar).  
 Red Deer, Alberta, July 30, 1918 (H. G. Dyar).  
 Lochearn, Alberta, August 5, 1918 (H. G. Dyar).  
 Lamoral, Alberta, August 6, 1918 (H. G. Dyar).  
 Lake Louise, Alberta, July 11, 1918 (H. G. Dyar).  
 Prince George, British Columbia, May 9, 1919 (H. G. Dyar).  
 Terrace, British Columbia, August 12, 1919 (H. G. Dyar).  
 Kwinitsa, British Columbia, May 25, 1919 (H. G. Dyar).  
 Atlin, British Columbia, July 22, 1919 (H. G. Dyar).  
 Carcross, Yukon Territory, July 27, 1919 (H. G. Dyar).  
 Whitehorse, Yukon Territory, July 3, 1919 (H. G. Dyar).  
 Horse Falls, Yukon Territory, July 13, 1919 (H. G. Dyar).  
 Dawson, Yukon Territory, July 7, 1919 (H. G. Dyar).

#### AEDES (HETERONYCHA) IMPIGER Walker.

*Culex impiger* Walker, List Dipt. Brit. Mus., i, 6, 1848.

*Aedes decticus* Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I., iv, 737, 1917.

A small blackish mosquito. Head gray, with or without black spots. Mesonotum gray on the margins, more or less overspread with brown centrally, and with two median blackish stripes and short posterior lateral ones. Abdomen black, with rather broad basal segmental white bands, usually not narrowed centrally; venter whitish, with apical black segmental bands. Legs black, somewhat mixed with white scales especially below; femora white below. Wing-scales wholly dark. Palpi of the male with few or no white scales.

A description of the markings shows no difference from *lazarensis*; but

the habitus is characteristic, and when once learned, the species can generally be recognized. The markings vary in the extent of median brown shading, which may be absent; also the lines may be narrow or broad, even completely filling the mesonotum. The winter is passed in the egg state, the larvae developing in the earliest spring pools. The males swarm low, near the ground, in front of small bushes under trees.

Distribution: Northern forests from Atlantic to Pacific, coming further south into the transitional zone than the two preceding species.

## CANADIAN RECORDS.

- White River, Ontario, June 25, 1907 (F. Knab).  
Nipigon, Ontario, June 26, 1918 (H. G. Dyar).  
Dryden, Ontario, June 27, 1918 (H. G. Dyar).  
Kenora, Ontario, July 2, 1918 (H. G. Dyar).  
Winnipeg, Manitoba, June 22, 1907 (F. Knab).  
Winnipeg Beach, Manitoba, July 4, 1918 (H. G. Dyar).  
Saskatoon, Saskatchewan, June 7, 1918 (A. E. Cameron).  
Beaver Creek, Saskatchewan, June 3, 1918 (A. E. Cameron).  
Red Deer, Alberta, July 30, 1918 (H. G. Dyar).  
Lochearn, Alberta, August 5, 1918 (H. G. Dyar).  
Lamoral, Alberta, August 6, 1918 (H. G. Dyar).  
Banff, Alberta, August 16, 1903 (R. P. Currie).  
Edmonton, Alberta, May 1, 1919 (H. G. Dyar).  
Prince George, British Columbia, May 11, 1919 (H. G. Dyar).  
Atlin, British Columbia, July 22, 1919 (H. G. Dyar).  
Whitehorse, Yukon Territory, June 26, 1919 (H. G. Dyar).  
Tahkeena River, Yukon Territory, July 19, 1919 (H. G. Dyar).  
Hootalinqua, Yukon Territory, July 6, 1919 (H. G. Dyar).  
Horse Falls, Yukon Territory, July 13, 1919 (H. G. Dyar).  
Dawson, Yukon Territory, July 7, 1919 (H. G. Dyar).

## AËDES (HETERONYCHA) PRODOTES Dyar.

*Aedes prodotes* Dyar, Ins. Ins. Mens., v, 118, 1917.

A small blackish mosquito. Mesonotum gray, more or less or not at all overspread with dark brown centrally, sometimes almost completely dark brown, rarely with traces of median paired blackish lines. Abdomen black, with basal segmental white bands, rather broad and usually not narrowed centrally; venter whitish-scaled. Legs black with many white scales intermixed, especially below; femora white below. Wing scales black, often with white ones intermixed, especially along subcostal region. Palpi of the male with many white scales toward the tip of the long joint.

The mesonotal markings run into *impiger* on the one hand and into *intrudens* on the other. It is a small species, like *impiger*. The winter is passed in the egg state, the larvae developing in early spring pools. The females bite both by day and night. The males swarm high over spaces between bushes or small trees in open country.

Distribution: Northern Rocky Mountains to Alaska, rare, if at all in the east.

#### CANADIAN RECORDS.

- Banff, Alberta, July 7, 1918 (H. G. Dyar).  
 Laggan, Alberta, July 11, 1918 (H. G. Dyar).  
 Lake Minnewanka, Alberta, July 22, 1918 (H. G. Dyar).  
 Lake Louise, Alberta, July 11, 1918 (H. G. Dyar).  
 Field, British Columbia, August 15, 1906 (H. G. Dyar).  
 Mt. Cheam, British Columbia, August 7, — (J. Fletcher).  
 White Pass, British Columbia, July 28, 1919 (H. G. Dyar).  
 Atlin, British Columbia, July 22, 1919 (H. G. Dyar).  
 Carcross, Yukon Territory, June 26, 1919 (H. G. Dyar).  
 Whitehorse, Yukon Territory, June 26, 1919 (H. G. Dyar).  
 Tahkeena River, Yukon Territory, July 19, 1919 (H. G. Dyar).  
 Byer's Camp, Yukon Territory, July 6, 1919 (H. G. Dyar).  
 Big Salmon, Yukon Territory, July 15, 1919 (H. G. Dyar).  
 Carmack's, Yukon Territory, July 14, 1919 (H. G. Dyar).  
 Horse Falls, Yukon Territory, July 13, 1919 (H. G. Dyar).  
 Knudson's Camp, Yukon Territory, July 6, 1919 (H. G. Dyar).  
 Tantalus Mine, Yukon Territory, July 6, 1919 (H. G. Dyar).  
 Selkirk, Yukon Territory, July 13, 1919 (H. G. Dyar).  
 Dawson, Yukon Territory, July 7, 1919 (H. G. Dyar).

#### Group CANADENSIS.

#### ÆDES (HETERONYCHA) CANADENSIS Theobald.

*Culex canadensis* Theobald, Mon. Culic., ii, 3, 1901.

*Culex nivitarsis* Coquillett, Proc. Ent. Soc. Wash., vi, 168, 1904.

A medium sized, dark brown mosquito, with conspicuously ringed tarsi. Mesonotum dark brown, with more or less distinct paired narrow light golden lines. Abdomen commonly unbanded dorsally, black, with triangular white lateral spots at the bases of the segments; venter whitish scaled. Legs black, the femora whitish beneath; tarsi with white rings involving both ends of the joints, broader on the hind tarsi, the last hind tarsal all white. Wing scales wholly dark.

The winter is passed in the egg state, the larvae developing in tran-

sient ground puddles, open woods pools and roadside ditches. The larvae will appear several times in a season, following successive filling of the pools by rain, but this probably does not indicate more than one annual generation, only that some of the eggs did not hatch at the first filling of the pool. The adults are persistent biters, being fond of attacking low, near the ground. The males swarm after sunset.

Distribution: Gulf States to southern Canada, westward in the warmer timbered country to British Columbia.

## CANADIAN RECORDS.

- St. John, New Brunswick, August 10, 1900 (W. McIntosh).  
 Younghall, New Brunswick, July 2, 1908 (A. Gibson).  
 Ottawa, Ontario, May 8, — (J. Fletcher).  
 White River, Ontario, June 25, 1907 (F. Knab).  
 Nipigon, Ontario, June 26, 1918 (H. G. Dyar).  
 Dryden, Ontario, June 30, 1918 (H. G. Dyar).  
 Kenora, Ontario, July 2, 1918 (H. G. Dyar).  
 Jordan, Ontario, July 19, 1916 (E. Hearle).  
 Winnipeg Beach, Manitoba, July 4, 1918 (H. G. Dyar).  
 Oxbow, Saskatchewan, June 13, 1907 (F. Knab).  
 Saskatoon, Saskatchewan, August 10, 1918 (H. G. Dyar).  
 Prince Albert, Saskatchewan, August 14, 1918 (H. G. Dyar).  
 Red Deer, Alberta, July 30, 1918 (H. G. Dyar).  
 Lochearn, Alberta, August 5, 1918 (H. G. Dyar).  
 Lamoral, Alberta, August 6, 1918 (H. G. Dyar).  
 Banff, Alberta, July 19, 1918 (H. G. Dyar).  
 Lake Louise, Alberta, July 11, 1918 (H. G. Dyar).  
 Kalso, British Columbia, June 3, 1903 (H. G. Dyar).  
 Prince George, British Columbia, May 22, 1919 (H. G. Dyar).  
 Mission, British Columbia, Sept. 10, 1919 (E. Hearle).

## Group CURRIE.

## AÈDES (HETERONYCHA) CURRIE Coquillett.

- Culex curriei* Coquillett, Can. Ent., xxxiii, 259, 1901.  
*Culex onondagensis* Felt, Bull. 79, N.Y. State Mus., 278, 1904.  
*Aedes quaylei* Dyar & Knab, Journ. N.Y. Ent. Soc., xiv, 191, 1906.  
*Culex lativittatus* Coquillett, Ent. News, xvii, 109, 1906.  
*Grahamia mediolineata* Ludlow, Can. Ent., xxxix, 129, 1907.

A rather small, yellowish gray mosquito, the tarsi banded with white, but sometimes very inconspicuously. Mesonotum creamy yellowish, a diffused brown stripe in the middle of variable width, and a little brown

on the lateral margins. Abdomen with grayish white basal segmental bands and a longitudinal mid-dorsal line, cutting the black ground into paired quadrate spots; venter pale, with median row of black spots. The pale scales on the abdomen vary, sometimes covering the whole surface. Legs black, with white scales intermixed, femora white below; tarsi with dull white rings at both ends of the joints. Wing-scales dark and whitish, rather evenly intermixed, though the third vein is predominatingly dark.

The winter is passed in the egg state, the larvae developing in early ground puddles. The males swarm after sunset over prominent objects on the prairie. The females are persistent biters, especially abundant after sunset.

Distribution: Dry, open country and prairie, central United States to Canada, also as a salt-marsh breeder on the coasts of the Atlantic, Pacific and Hudson's Bay.

#### CANADIAN RECORDS.

Moose Factory, Ontario, July 26, 1918 (H. N. Awrey).  
 Winnipeg Beach, Manitoba, July 4, 1918 (H. G. Dyar).  
 Wynyard, Saskatchewan, August 13, 1918 (H. G. Dyar).  
 Saskatoon, Saskatchewan, August 13, 1918 (H. G. Dyar).  
 Qu'Appelle, Saskatchewan, June 22, 1907 (T. N. Willing).  
 Oxbow, Saskatchewan, May 21, 1907 (F. Knab).  
 Carnduff, Saskatchewan, May 27, 1907 (F. Knab).  
 Banff, Alberta, July 8, 1918 (H. G. Dyar).  
 Vancouver, British Columbia, August 6, 1906 (Dyar & Caudell).  
 Qualicum, British Columbia, July 20, 1903 (J. Fletcher).  
 Duncans, British Columbia, August 8, 1906 (Dyar & Caudell).  
 Nanoose Bay, British Columbia, August 1, 1903 (J. Fletcher).  
 Caulfields, British Columbia, May 3, 1919 (E. Hearle).  
 Buccaneer Bay, British Columbia, August 24, 1919 (E. Hearle).  
 Victoria, British Columbia, August 29, 1919 (E. Hearle).

#### *AÆDES* (*HETERONYCHA*) *CAMPESTRIS* Dyar & Knab.

*Aedes campestris* Dyar & Knab, Journ. N.Y. Ent. Soc., xv, 213, 1907.  
*Aedes callithotrys* Dyar, Ins. Ins., Mens., viii, 16, 1920.

A rather large, yellowish gray mosquito, the tarsi banded with white, but sometimes very inconspicuously. Mesonotum creamy yellowish, a diffused brown stripe in the middle of variable width, and a little brown on the lateral margins. Abdomen with grayish white basal segmental bands, and a longitudinal mid-dorsal line, cutting the black ground into

paired quadrate spots; venter pale, with median row of black spots. The pale scales on the abdomen vary, sometimes covering the whole surface. Legs black, with white scales intermixed, femora white below; tarsi with dull white rings at both ends of the joints. Wing scales dark and whitish, rather evenly intermixed.

The winter is passed in the egg state; the larvae occur in alkaline pools with *curriei*. The males swarm after sunset close in the tops of small pine trees. The females bite by day or night, whenever one comes into their haunts.

Distribution: Utah and northward, very local, but usually abundant where it occurs.

#### CANADIAN RECORDS.

Charlton Island, James Bay, July 19, 1918 (H. N. Awrey).  
 Oxbow, Saskatchewan, June 18, 1907 (F. Knab).  
 Qu'Appelle, Saskatchewan, June 9, 1901 (T. N. Willing).  
 Carnduff, Saskatchewan, May 28, 1901 (T. N. Willing).  
 Regina, Saskatchewan, June 14, 1904 (T. N. Willing).  
 Kaslo, British Columbia, June 21, 1903 (H. G. Dyar).  
 Whitehorse, Yukon Territory, June 26, 1919 (H. G. Dyar).

#### Group STIMULANS.

#### AËDES (HETERONYCHA) STIMULANS Walker.

*Culex stimulans* Walker, List Dipt. Brit. Mus., i, 4, 1848.  
*Culicada subcantans* Felt, Bull. 97, N.Y. State Mus., 448, 1905.  
*Aëdes mercurator* Dyar, Ins. Ins. Mens., viii, 13, 1920.  
*Aëdes stimulans albertae* Dyar, Ins. Ins. Mens., viii, 115, 1920.

A rather large brown mosquito with ringed legs. Mesonotum yellowish gray on the sides, a broad reddish brown or dark brown band in the middle, joining the short posterior stripes. Abdomen blackish, with basal segmental white bands, widening on the sides, and some white scales on the apices of the segments also; venter whitish, with a row of black dashes on middle line. Legs black, with many white scales intermixed on femora and tibiae, the tarsi with white rings at the bases of the joints, broad on the hind pair. Wings with black scales, many white ones intermixed, especially along costal region, but also on the other veins. In the Yukon Valley, the wing scales are wholly black (form *mercurator*). The form *albertae* shows larval differences. There are no reliable colour difference between this and *excrucians* and *fitchii*.

The winter is passed in the egg state, the larvae developing in spring pools, especially those which have been overflowed by high water. The males swarm after sunset over bushes, flying high and rapidly. This

species, with the other two mentioned, is common through the northern forests; but it is not possible to determine one from the other by the females alone, which makes exact records scarce.

Distribution: Northern forests, from Mississippi to the Rocky Mountains; Yukon Valley.

#### CANADIAN RECORDS.

Arnprior, Ontario, May —, 1917 (C. Macnamara).  
 Oxbow, Saskatchewan, June 7, 1907 (F. Knab).  
 Edmonton, Alberta, May 14, 1919 (H. G. Dyar).  
 Dawson, Yukon Territory, July 16, 1919 (H. G. Dyar).

#### ÆDES (HETERONYCHA) CANTATOR Coquillett.

*Culex cantator* Coquillett, Can. Ent., xxxv, 255, 1903.

A medium sized brown mosquito, with very small tarsal rings. Mesonotum reddish brown, a little gray over the antescutellar space median and posterior-lateral bands faintly darker. Abdomen black, with dull white basal segmental bands, excavated centrally, the scales also somewhat diffused and occupying most of the last segment dorsally; venter whitish, with median black spots. Legs blackish brown, the femora white below; tarsi with very narrow white rings at the bases of the joints. Wing-scales wholly blackish.

Very much like *vexans* in colouration, but wholly unrelated thereto. The colouration of the abdomen furnishes the best differentiation.

The winter is passed in the egg state, the larvae developing in salt-marsh pools along the Atlantic littoral, several generations succeeding each other, according as the pools are filled by exceptionally high tides or rains. The females travel some miles inland, and become annoying far from their breeding-places. The mating habits of the males have not been described.

Distribution: Atlantic coast from New Jersey to Maine, probably in New Brunswick and Nova Scotia.

#### CANADIAN RECORDS.

None.

#### ÆDES (HETERONYCHA) FLETCHERI COQUILLET.

*Culex fletcheri* Coquillett, Proc. U.S. Nat. Mus., xxv, 84, 1902.

A large yellowish mosquito. Mesonotum dark yellow on the sides, a broad brown median band, contiguous to faint short posterior lateral stripes. Abdomen largely or wholly overspread with yellow scales, some-

times restricted to basal bands, but diffused and with scattered scales; venter yellowish, with black scales intermixed. Legs mostly yellow scaled, the tarsi black, with basal white rings on the joints, those on the hind legs large. Wings with the scales yellowish and black, the light ones predominating. In Ontario and British Columbia the form with banded abdomen occurs, but on the prairies, the abdomen is generally all yellow scaled.

The winter is passed in the egg state, the larvae developing in the larger ground pools on the prairie in early spring. The mating habits of the male have not been observed. The adults are not abundant, but occasionally met with on prairies and open woodlands.

Distribution: Canadian prairies, Minnesota<sup>1</sup> and Wisconsin.<sup>1</sup>

#### CANADIAN RECORDS.

- Albany, Ontario, July 10, 1918 (H. N. Awrey).<sup>1</sup>  
 White River, Ontario, June 24, 1918 (H. G. Dyar).<sup>1</sup>  
 Nipigon, Ontario, June 26, 1918 (H. G. Dyar).<sup>1</sup>  
 Dryden, Ontario, June 30, 1918 (H. G. Dyar).<sup>1</sup>  
 Kenora, Ontario, July 2, 1918 (H. G. Dyar).<sup>1</sup>  
 Winnipeg Beach, Manitoba, July 4, 1918 (H. G. Dyar).<sup>1</sup>  
 Winnipeg, Manitoba, June 22, 1907 (F. Knab).  
 Aweme, Manitoba, June 1, 1904 (N. Criddle).<sup>1</sup>  
 Saskatoon, Saskatchewan, June 18, 1918 (A. E. Cameron).  
 Belonge Creek, Saskatchewan, July —, 1907 (V. A. Armstrong).<sup>1</sup>  
 Durs, Saskatchewan, June 19, 1918 (A. E. Cameron).  
 Dundum, Saskatchewan, July 15, 1917 (A. E. Cameron).<sup>1</sup>  
 Beaver Creek, Saskatchewan, July 17, 1917 (A. E. Cameron).<sup>1</sup>  
 Regina, Saskatchewan, June 23, 1902 (J. Fletcher).<sup>1</sup>  
 Pine Creek, Saskatchewan, July 12, 1903 (J. Fletcher).  
 Qu'Appelle, Saskatchewan, June 9, 1901 (J. Fletcher).  
 Carnduff, Saskatchewan, May 28, 1901 (J. Fletcher).  
 Oxbrow, Saskatchewan, June —, 1907 (F. Knab).  
 Prince Albert, Saskatchewan, August 14, 1918 (H. G. Dyar).<sup>1</sup>  
 Red Deer, Alberta, August 3, 1918 (H. G. Dyar).  
 Olds, Alberta, July 15, 1901 (J. Fletcher).<sup>1</sup>  
 Lochearn, Alberta, August 5, 1918 (H. G. Dyar).<sup>1</sup>  
 Lamoral, Alberta, August 6, 1918 (H. G. Dyar).<sup>1</sup>  
 Harrison, British Columbia, June 20, 1919 (E. Hearle).<sup>1</sup>  
 Agassiz, British Columbia, May 23, 1919 (E. Hearle).<sup>1</sup>  
 Mission, British Columbia, July 14, 1919 (E. Hearle).<sup>1</sup>  
 Mt. Cheam, British Columbia, August 3, 1899 (J. Fletcher).<sup>1</sup>

<sup>1</sup>No male; the record may refer to *riparius*.

## AËDES (HETERONYCHA) RIPARIUS Dyar &amp; Knab.

*Aedes riparius* Dyar & Knab, Journ. N.Y. Ent. Soc., xv, 213, 1907.

A large yellowish mosquito. Mesonotum dark yellow on the sides, a broad brown band in the middle, contiguous to faint short posterior lateral stripes, the mesonotum more or less overspread with brown. Abdomen blackish, with yellowish diffuse basal segmental bands and scattering pale scales; venter yellowish, with black scales intermixed. Legs mostly yellow scaled, the tarsi black, with basal white rings on the joints, those on the hind legs large. Wings with the scales dark, many yellowish ones intermixed.

The larva is unknown, and the habits of the males have not been observed. The adults occur in wooded prairie, but are so much like *fletcheri* as to be indistinguishable without males. The species requires further study, although evidently distinct.

Distribution: Canadian prairies, probably coextensive with *fletcheri* but has not been differentiated.

## CANADIAN RECORDS.

Winnipeg, Manitoba, June 21, 1907 (F. Knab).

## AËDES (HETERONYCHA) EXCRUCIANS Walker.

*Culex excrucians* Walker, Ins. Saund., 429, 1856.

*Culex abfitchii* Felt, Bull. 79, N.Y. State Mus., 381, 1904.

*Culex siphonalis* Grossbeck, Can. Ent., xxxvi, 332, 1904.

*Aedes sansoni* Dyar & Knab, Can. Ent., xli, 102, 1909.

*Aedes euedes* Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W.I., iv, 714, 1917.

A rather large brown mosquito with ringed legs. Mesonotum yellowish gray on the sides, a broad reddish brown or dark brown band in the middle, joining the short posterior stripes. Abdomen blackish, with basal segmental white bands, widening on the sides, and some white scales on the apices of the segments also; venter whitish, with a row of black dashes on middle line. Legs black, with many white scales intermixed on femora and tibiae, the tarsi with white rings at the bases of the joints, broad on the hind pair. Wings with black scales, with more or less white ones intermixed, especially along costal region.

The adult females are not certainly distinguishable from *fitchii* or *stimulans*. This is commonly a larger species than *fitchii*, the sides of the mesonotum more shaded with brown, often completely so. The wing scales commonly have few or no white scales; but all the characters are intergradient, and not of diagnostic value. The larvae and male genitalia differ conspicuously in the three species.

The winter is passed in the egg stage, the larvae developing in early spring water, woods pools and marshes. There is but one annual generation, though the adults last most of the summer, flying in the woods. The species does not enter houses.

Distribution: Northern forests from New Jersey to Canada, westward to British Columbia, Yukon Valley and Alaska.

## CANADIAN RECORDS.

Ottawa, Ontario, June 1, 1900 (J. Fletcher).  
 Trenton, Ontario, May 24, 1900 (J. Fletcher).  
 White River, Ontario, June 25, 1907 (F. Knab).  
 Dryden, Ontario, June 27, 1918 (H. G. Dyar).  
 Winnipeg, Manitoba, June 22, 1907 (F. Knab).  
 Red Deer, Alberta, July 29, 1918 (H. G. Dyar).  
 Banff, Alberta, July 7, 1918 (H. G. Dyar).  
 Whitehorse, Yukon Territory, July 2, 1919 (H. G. Dyar).

## AÆDES (HETERONYCHA) FITCHII Felt &amp; Young.

*Culex fitchii* Felt & Young, Science, n.s., xx, 312, 1904.

*Aedes palustris* Dyar, Ins. Ins. Mens., iv, 89, 1916.

*Aedes mimesis* Dyar, Ins. Ins. Mens., v, 116, 1917.

A rather large brown mosquito with ringed legs. Mesonotum yellowish gray on the sides, a broad reddish brown or dark brown band in the middle, joining the short posterior stripes. Abdomen blackish, with basal segmental white bands, widening on the sides, and some white scales on the apices of the segments also; venter whitish, with a row of black dashes on middle line. Legs black, with many white scales intermixed on femora and tibiae, the tarsi with white rings at the bases of the joints, broad on the hind pair. Wings with black scales, with more or less white ones intermixed, especially along costal region.

The adult females are not certainly distinguishable from *excrucians* and *stimulans*. This species is commonly smaller than these and often has many white scales on the wings; the mesonotum is often clear gray on the sides, but none of the characters hold. The species is less closely addicted to forests than *excrucians*, being common on the prairies where some cover exists, and in the half-open country of the Yukon region. The males swarm as with *excrucians* and *stimulans*, there being no differences in these habits between the three.

The winter is passed in the egg state, the larvae developing in early spring water, often with *excrucians*. The adults fly until late in the season, not entering houses.

Distribution: Northern forests from the Atlantic to the Rocky Mountains, the moist Pacific strip (from *palustris*); Yukon Valley, Alaska, (from *mimesis*).

## CANADIAN RECORDS.

White River, Ontario, June 25, 1907 (F. Knab).  
 Dryden, Ontario, June 27, 1918 (H. G. Dyar).  
 Winnipeg, Manitoba, June 22, 1907 (F. Knab).  
 Aweme, Manitoba, June 5, 1904 (N. Criddle).  
 Elkhorn, Manitoba, June 10, 1907 (T. N. Willing).  
 Saskatoon, Saskatchewan, June 7, 1918 (A. E. Cameron).  
 Prince Albert, Saskatchewan, June 10, 1918 (A. E. Cameron).  
 Oxbow, Saskatchewan, June —, 1907 (F. Knab).  
 Regina, Saskatchewan, June 10, 1904 (T. N. Willing).  
 Banff, Alberta, July 7, 1918 (H. G. Dyar).  
 Edmonton, Alberta, June 1, 1919 (H. G. Dyar).  
 Royal Oak, British Columbia, April, 1917 (R. C. Trehearne).  
 Dawson, Yukon Territory, July 20, 1919 (H. G. Dyar).

## Group TRICHURUS.

## AÆDES (HETERONYCHA) TRICHURUS Dyar.

*Culex trichurus* Dyar, Journ. N.Y. Ent. Soc., xii, 170, 1904.  
*Culex cinereoborealis* Felt & Young, Science, n.s., xx, 312, 1904.  
*Aedes poliochros* Dyar, Ins. Ins. Mens., vii, 35, 1919.

A large dark gray mosquito. Mesonotum gray on the sides, brown centrally and with brown posterior lateral stripes, but these markings not contrasted. Generally a small whitish space in front of the lateral stripes. Abdomen black, with broad basal segmental white bands, even; venter whitish-scaled. Legs black, the femora white towards base and nearly to tip below. Wing-scales black.

The winter is passed in the egg state, the larvae developing in early ground pools, leafy woods-pools and old road-side ditches. The mating habits of the males have not been observed. The adults fly in woods, but disappear early in the season. The name *trichurus* applies to the western form, *cinereoborealis* to the eastern, and *poliochros* to that in the wooded prairies. The eastern and western forms have larval differences the larvae of the prairie form are unknown.

Distribution: Southern fringe of the northern forests, Massachusetts to British Columbia.

## CANADIAN RECORDS.

Ottawa, Ontario, May 6, 1900 (J. Fletcher).  
 Chelsea, Quebec, May 17, 1902 (A. Gibson).  
 Aweme, Manitoba, June 3, 1904 (N. Criddle).  
 Kalso, British Columbia, June 25, 1903 (H. G. Dyar).

## Group NEARCTICUS.

## AËDES (HETERONYCHA) NEARCTICUS Dyar.

*Aedes nearcticus* Dyar, Rep. Can. Arctic Exp., iii, pt. C, 32, 1919.

A rather large black mosquito, with long hairy vestiture, especially conspicuous on under side of thorax. Mesonotum uniformly dark brown scaled, a little lighter on the margins; setae long. Abdomen black, with broad basal segmental white bands; venter whitish scaled. Legs black, the femora pale beneath. Wing-scales black.

The larvae develop in ground pools in the arctic regions. The habits of the males are unknown.

The species is closely allied to *innuitus* Dyar & Knab of Greenland and *alpinus* Linnaeus (= *nigripes* Zetterstedt) of Scandinavia. The three may prove to be one species; but the genitalia of the European form are undescribed.

Distribution: Arctic coast of Northwest Territory and Alaska.

## CANADIAN RECORDS.

Bernard Harbour, Northwest Territories, July 9, 1915 (F. Johansen).  
 Dolphin and Union Strait, Northwest Territories, July 14, 1916 (F. Johansen).  
 Young Point, Northwest Territories, July 18, 1916 (F. Johansen).  
 Cape Bathurst, Northwest Territories, July 26, 1916 (F. Johansen).  
 Herschel Island, Yukon Territory, July 26, 1916 (F. Johansen).

## Subgenus TAENIORHYNCHUS Lynch Arribalzaga.

## AËDES (TAENIORHYNCHUS) ATROPALPUS Coquillett.

*Culex atropalpus* Coquillett, Can. Ent., xxxiv, 292, 1902.

A small blackish mosquito. Mesonotum silvery gray on the sides; a dark brown median band, joining the short posterior lateral bands. Abdomen black, with even basal segmental white bands; venter white-scaled with black bands at the apices of the segments. Legs black, the femora whitish beneath; tips of femora and tibiae and tarsal joints at bases and apices narrowly white, the last hind tarsal all white. Wing scales all blackish.

The larvae live in holes in rocks along streams and the edges of lakes. The winter is passed in the egg state, the eggs fastened on the side of the rock. In summer generations, the eggs are scattered loosely. The adults are good biters in the vicinity of their breeding places which are necessarily very restricted, so that the species is never more than locally common. The mating habits of the males are unknown.

Distribution: Atlantic coast region from Virginia to New England; possibly in Mexico (*epactius* Dyar & Knab), and to be expected in southern Canada.

## CANADIAN RECORDS.

None.

## AÆDES (TAENIORHYNCHUS) VARIPALPUS Coquillett.

*Culex varipalpus* Coquillett, Can. Ent., xxxiv, 292, 1902.

*Taeniorhynchus sierrensis* Ludlow, Can. Ent., xxxvii, 231, 1905.

A small blackish mosquito with white-ringed legs. Mesonotum dark brown, ornamented with a patch of light golden scales in front and a narrow line of the same from the lateral groove backward. Abdomen black, with basal segmental even white bands; venter whitish-scaled. Legs black, the femora white below; tips of femora and tibiae and the apices of the tarsal joints silvery white, involving the bases of the joints to a less extent; rings narrow, except on the hind legs, where they are broad, involving the whole of the last joint. Wing-scales wholly dark, thick and dense.

The larvae live in the water in holes in tree-trunks, occasionally in artificial receptacles. The winter is passed in the egg state; it is not known whether there is more than one annual generation. The females occasionally occur in annoying numbers in old forests, but are usually rare. The males form little swarms in the day time about some stationary warm-blooded animal, and mate with the females as these come to bite.

Distribution: Pacific coast region from southern California to British Columbia.

## CANADIAN RECORDS.

Kalso, British Columbia, June 17, 1903 (H. G. Dyar).

Terrace, British Columbia, August 12, 1919 (H. G. Dyar).

Harrison, British Columbia, June 20, 1919 (E. Hearle).

Caulfields, British Columbia, July 19, 1919 (E. Hearle).

Vancouver, British Columbia, August 6, 1906 (H. G. Dyar).

Nanaimo, British Columbia, August 6, 1906 (Dyar & Caudell).

Wellington, British Columbia, August 8, 1906 (Dyar & Caudell).  
 Victoria, British Columbia, August 12, 1906 (H. G. Dyar).  
 Hope, British Columbia, May 20, 1919 (E. Hearle).  
 Deroche, British Columbia, June 13, 1919 (E. Hearle).  
 Mission, British Columbia, July 14, 1920 (H. G. Dyar).

AËDES (TAENIORHYNCHUS) SOLLICITANS Walker.

*Culex sollicitans* Walker, Ins. Saund., Dipt., 427, 1856.

A medium sized blackish mosquito with ringed legs. Mesonotum bronzy yellow, dark brown at the sides, the pleura white-scaled. Abdomen black with basal and median longitudinal bands of pale yellow, the lateral spots, medianly on the segments, white; venter yellowish, with some black scales toward the tips of the segments. Proboscis with a white ring. Legs black, the femora yellowish below; knee-spots white; tibiae with yellowish scales; tarsi black, the first tarsal with a yellowish central ring, the other joints white at base, broadly so on the hind pair. Wing-scales black and white, evenly mixed.

The larvae live in salt tidal pools on the coast. The winter is passed in the egg state, and there are as many generations in the year as conditions permit. The adults are locally abundant, and in such cases travel many miles inland.

Distribution: Coasts of Mexico, Gulf States, Antilles, Atlantic States to New England, probably in New Brunswick and Nova Scotia.

CANADIAN RECORDS.

None.

AËDES (TAENIORHYNCHUS) NIGROMACULIS Ludlow.

*Grabhamia nigromaculis* Ludlow, Geo. Wash. Univ. Bull., v, 85, 1907.

*Grabhamia grisea* Ludlow, Can. Ent., xxxix, 130, 1907.

A rather large blackish mosquito with ringed legs. Mesonotum bronzy yellow, a median dark brown band and dark brown at the sides, the pleura white-scaled. Abdomen black with basal and median longitudinal bands of dull yellowish, the lateral spots prolonged and of about the same shade as the dorsal markings; venter sparsely dull yellowish scaled. Legs black, femora, tibiae and first tarsal with many yellowish scales; femora sparsely black sprinkled below; tarsi black, with white rings at the bases of the joints, rather broad in the hind legs; knee-spots white. Proboscis with a white ring. Wing-scales black, a few whitish ones intermixed along the costa.

The winter is passed in the eggs state, the larvae developing in early

ground-pools in dry country. In the presence of irrigation, several generations may occur in the season, and the species become abundant. The females are severe biters. The males swarm after sunset over prominent objects on the prairie.

Distribution: Dry valleys and plains from Mexico and Arizona to Canada.

CANADIAN RECORDS.

Smoky, Alberta, August 24, 1915 (E. H. Strickland).

SUBGENUS FINLAYA Theobald.

AÆDES (FINLAYA) TRISERIATUS Say.

*Culex triseriatus* Say, Journ. Acad. Nat. Sci. Phil., iii, 12, 1823.

*Finlaya* (?) *nigra* Ludlow, Can. Ent., xxxvii, 387, 1905.

*Aedes triseriatus hendersoni* Cockerell, Journ. Econ. Ent., xi, 199, 1918.

A medium sized, black mosquito, with spotted abdomen. Mesonotum dark brown in the middle, the sides silvery white. Abdomen black dorsally, with silvery white lateral basal segmental spots; venter white-scaled, the posterior segments black-banded at apices. Legs deep black, the femora silvery white below. Wing-scales black.

The larvae live in the water in the holes in tree trunks, the winter being passed in the egg state. The females are severe biters, and, though never abundant, are often troublesome in dry woods. The habits of the males have not been observed.

Distribution: United States from the Gulf of Mexico to Montana, New England, and southern Canada.

CANADIAN RECORDS.

De Grassi Point, Ontario, June 23, July 4, 1917 (E. M. Walker).

Jordan, Ontario, August 3, 1916 (E. Hearle).

Subgenus ECCULEX Felt.

AÆDES (ECCULEX) VEXANS Meigen.

*Culex vexans* Meigen, Syst. Besch. Eur. zweifl. Ins., vi, 241, 1830.

*Culex articulatus* Rondani, Bull. Soc. Ent. Ital., iv, 30, 1872.

*Culex malariae* Grassi, Rend. della R. Accad. dei Lincei, 1899.

*Culex sylvestris* Theobald, Mon. Culic., i, 406, 1901.

*Culex vagans* Theobald, Mon. Culic., i, 411, 1901.

*Culex nocturnus* Theobald, Mon. Culic., iii, 159, 1903.

*Culex montcalmi* Blanchard, Les Moust., 407, 1905.

*Culicada nipponii* Theobald, Mon. Culic., iv, 337, 1907.

- Culicada minuta* Theobald, Mon. Culic., iv, 338, 1907.  
*Culex stenoetrus* Theobald, Mon. Culic., iv, 395, 1907.  
*Culicada eruthrosops* Theobald, Mon. Culic., v, 229, 1910.  
*Culex pseudostenoetrus* Theobald, Mon. Culic., v, 343, 1910.  
*Culex hirsutum* Ludlow (not Theobald), Psyche, xviii, 126, 1911.  
*Aedes euochrus* Howard, Dyar & Knab, Mosq. No. & Cent. Am. & W. I.,  
 iv, 716, 1917.

A medium sized to small brown mosquito. Mesonotum brown, a little paler about antescutellar space. Abdomen black, with narrow white basal segmental bands, tending to be notched on dorsal line; lateral spots separated therefrom, quadrate and elongate; venter whitish-scaled, with more or less distinct median blackish spots. Legs black, femora pale below; tarsi with very narrow white rings at the bases of the joints. Wing-scales wholly dark.

The winter is passed in the egg state, the larvae hatching in early ground pools, but also later in the season whenever the pools are filled by rain or otherwise. However, there may not be more than one annual generation. The females are severe biters in woods and thickets, not frequenting the open. The males swarm after sunset, sometimes in very large groups.

Distribution: North America, from the Mexican plateau to Canada, except on the Pacific coast and far north; Europe, northern Asia.

#### CANADIAN RECORDS.

- Younghall, New Brunswick, July 4, 1908 (A. Gibson).  
 Ottawa, Ontario, June 18, 1906 (J. Fletcher).  
 White River, Ontario, June 24, 1907 (F. Knab).  
 Dryden, Ontario, June 27, 1918 (H. G. Dyar).  
 Kenora, Ontario, July 2, 1918 (H. G. Dyar).  
 Aweme, Manitoba, June 25, 1907 (N. Criddle).  
 Winnipeg, Manitoba, June 22, 1907 (F. Knab).  
 Winnipeg Beach, Manitoba, July 4, 1918 (H. G. Dyar).  
 Moose Jaw, Saskatchewan, August 24, 1906 (Dyar & Caudell).  
 Saskatoon, Saskatchewan, August 10, 1918 (H. G. Dyar).  
 Prince Albert, Saskatchewan, August 14, 1918 (H. G. Dyar).  
 Red Deer, Alberta, August 1, 1918 (H. G. Dyar).  
 Lochearn, Alberta, August 7, 1918 (H. G. Dyar).  
 Lamoral, Alberta, August 6, 1918 (H. G. Dyar).  
 Calgary, Alberta, July 28, 1918 (H. G. Dyar).  
 Lake Minnewanka, Alberta, July 22, 1918 (H. G. Dyar).  
 Banff, Alberta, July 7, 1918 (H. G. Dyar).  
 Kalso, British Columbia, June —, 1903 (H. G. Dyar).

Ainsworth, British Columbia, June 10, 1903 (R. P. Currie).  
 Prince George, British Columbia, September 7, 1919 (H. G. Dyar).  
 Mission, British Columbia, June 12 to October 9, 1919 (E. Hearle).  
 Chilliwack, British Columbia, July 3, 1919 (E. Hearle).  
 Whonnock, British Columbia, July 23, 1919 (E. Hearle).

Subgenus *AÈDES* Meigen.

*AÈDES* (*AÈDES*) *CINEREUS* Meigen.

*Aedes cinereus* Meigen, Syst. Besch. Eur. zweifl. Ins., i, 13, 1818.  
*Culex nigrutilus* Zetterstedt, Dipt. Scand., ix, 3459, 1850.  
*Aedes fuscus* Osten Sacken, Bull. U.S. Geog. Surv., iii, 191, 1877.  
*Culex pallidohirta* Grossbeck, Can. Ent., xxxvii, 359, 1905.  
*Culex pallidocephala* Theobald, Mon. Culic., v, 612, 1910.

A rather small blackish mosquito. Mesonotum dark brown. Ad-  
 domen black, with a continuous lateral white line, but also with this line  
 broken into spots and with more or less distinct basal segmental white  
 bands; venter whitish scaled. Legs black, the femora whitish beneath.  
 Wing-scales all dark. The male has short palpi as in the female and is  
 easily recognized thereby.

The winter is passed in the egg state, the larvae developing in early  
 spring pools, but also, following rains, during the summer. The later  
 emergencies are less numerous. The females are good biters in woods  
 and thickets, not coming into the open. The males swarm after sunset  
 in openings between willows and similar locations.

Distribution: Northern North America and northern Europe.

CANADIAN RECORDS.

White River, Ontario, June 18, 1918 (H. G. Dyar).  
 Dryden, Ontario, June 29, 1918 (H. G. Dyar).  
 Kenora, Ontario, July 2, 1918 (H. G. Dyar).  
 Winnipeg Beach, Manitoba, July 4, 1918 (H. G. Dyar).  
 Winnipeg, Manitoba, June 22, 1907 (F. Knab).  
 Saskatoon, Saskatchewan, August 12, 1918 (H. G. Dyar).  
 Prince Albert, Saskatchewan, August 14, 1918 (H. G. Dyar).  
 Oxbow, Saskatchewan, June 17, 1907 (F. Knab).  
 Red Deer, Alberta, July 29, 1918 (H. G. Dyar).  
 Lochearn, Alberta, August 5, 1918 (H. G. Dyar).  
 Lamoral, Alberta, August 6, 1918 (H. G. Dyar).  
 Calgary, Alberta, July 28, 1918 (H. G. Dyar).  
 Lake Minnewanka, Alberta, July 22, 1918 (H. G. Dyar).

Banff, Alberta, July 7, 1918 (H. G. Dyar).  
Kalso, British Columbia, June 11, 1903 (H. G. Dyar).  
Agassiz, British Columbia, June 20, 1919 (E. Hearle).  
Dewdney, British Columbia, June 6, 1919 (E. Hearle).  
Mission, British Columbia, June 23, 1919 (E. Hearle).  
Chilliwack, British Columbia, July 3, 1919 (E. Hearle).  
Nicomen Island, British Columbia, August 4, 1919 (E. Hearle).  
Prince George, British Columbia, September 9, 1919 (H. G. Dyar).  
Terrace, British Columbia, August 11, 1919 (H. G. Dyar).  
Salvus, British Columbia, June 7, 1919 (H. G. Dyar).  
Kwinitsa, British Columbia, June 1, 1919 (H. G. Dyar).  
Atlin, British Columbia, July 23, 1919 (H. G. Dyar).  
Whitehorse, Yukon Territory, June 29, 1919 (H. G. Dyar).  
Horse Falls, Yukon Territory, July 13, 1919 (H. G. Dyar).  
Dawson, Yukon Territory, July 10, 1919 (H. G. Dyar).

Genus URANOTAENIA Lynch Arribalzaga.

A small genus, mainly of tropical distribution. The larvae live in ground pools, and have a superficial resemblance to *Anopheles*, from the elongated black head, and the habit of lying flat in the water, although the larvae are not surface-feeders. The adults are ornamented with lines of metallic blue scales.

URANOTAENIA SAPPHIRINUS Osten Sacken.

*Aedes sapphirinus* Osten Sacken, Trans. Am. Ent. Soc., ii, 47, 1868.

A small blackish mosquito. Mesonotum brown, thinly scaled, a narrow line of metallic blue scales to the scutellum; a lateral line on each side, running to the wing. Abdomen black above; venter grayish. Legs black, femora pale beneath; tips of femora and tibiae with a pearly white spot. Wing-scales all dark.

The winter is probably passed in the adult state. Eggs are laid in boat-shaped masses floating on the water. The females are not troublesome. I have no certain records of the biting. The habits of the males are unknown. A rare species, seldom seen unless bred.

Distribution: Eastern United States from the Gulf of Mexico to northern New England, possibly in southern Canada.

CANADIAN RECORDS.

None.

## Genus ANOPHELES Meigen.

A genus of world-wide distribution, although not very numerous in species, most abundant in the tropics. The females have long palpi like the males, an elongate mesonotum and very long legs. Many of the species are the intermediate host of the malarial parasite of man. The winter is passed as adult, the eggs being laid singly on the surface of water. They are provided with little floats, which differ in shape in the different species.

*Anopheles* was divided into many genera on characters of vestiture by F. W. Theobald. Subsequent study has led to the rejection of most of these; but it has been suggested that they may be retained as sub-genera. The Canadian species all belong to *Anopheles* proper.

## KEY TO THE CANADIAN SPECIES OF ANOPHELES.

1. Wings with a white spot at outer third of costa. . . . . *punctipennis* Say  
Wings without such a white spot. . . . . 2
2. Palpi blackish throughout. . . . . 3  
Palpi with dull silvery white rings at the bases of the joints,  
*walkeri* Theobald
3. Wing at apex with a coppery spot on the fringe,  
*occidentalis* Dyar & Knab  
Wing-fringe uniformly dark. . . . . *quadrinaculatus* Say

## ANOPHELES (ANOPHELES) PUNCTIPENNIS Say.

*Culex punctipennis* Say, Jour. Acad. Nat. Sci. Phil., iii, 9, 1823.

*Culex hyemalis* Fitch, Am. Journ. Agr. & Sci., v, 281, 1847.

*Anopheles perplexens* Ludlow, Can. Ent., xxxix, 267, 1907.

Mesonotum elongate, hairy, broadly whitish in the integument in the middle, dark brown on the sides. Abdomen hairy, brown, the apices of the segments darker, in the integument. Legs long and slender, blackish; tips of femora and tibiae with small white spots. Wings with the scales black except in certain spots as follows: a large one at outer third of costa and a smaller one at apex, both involving second vein; one on third vein in the cell, on the stem and middle of both forks; at base and middle of fifth vein.

The larvae are surface-feeders in all sorts of water-puddles, often in small or temporary rain-puddles, but also in permanent water. The males swarm after sunset.

Distribution: United States from Mexico northward, except the dry central region, reaching Canada at both coasts.

## CANADIAN RECORDS.

- Ottawa, Ontario, August 16, 1900 (A. Gibson).  
 Winona, Ontario, August 16, 1916 (E. Hearle).  
 Jordan, Ontario, July 17, 1916 (E. Hearle).  
 Guelph, Ontario, November 29, 1919 (E. Hearle).  
 Nanaimo, British Columbia, August 6, 1906 (Dyar & Caudell).  
 Duncans, British Columbia, August 9, 1906 (Dyar & Caudell).  
 Wellington, British Columbia, August 7, 1906 (Dyar & Caudell).  
 Mission, British Columbia, July —, 1919 (E. Hearle).  
 Yarrow, British Columbia, March 25, 1919 (E. Hearle).  
 Ladner, British Columbia, April 5, 1919 (E. Hearle).  
 Hope, British Columbia, May 21, 1919 (E. Hearle).

## ANOPHELES (ANOPHELES) OCCIDENTALIS Dyar &amp; Knab.

*Anopheles occidentalis* Dyar & Knab, Proc. Biol. Soc. Wash., xix, 159, 1906.

Mesonotum elongate, hairy, broadly whitish in the integument in the middle, dark brown on the sides. Abdomen with light hairs, brown, the apices of the segments darker, in the integument. Legs long and slender, blackish; tips of femora and tibiae whitish. Wings with the scales black, forming four dark spots by being thickly placed as follows: base of second vein in the cell; on the cross-veins and forks of second and fourth veins. Tip of the wing with a brassy reflection in the fringe.

The larvae are surface-feeders in all sorts of water-puddles, preferring permanent water. The habits of the males have not been observed. The difference between this and *quadrimaculatus* is slight.

Distribution: Western United States except the moist northern Pacific strip, eastward through Canada to northern Maine.

## CANADIAN RECORDS.

- Ottawa, Ontario, September 30, — (J. Fletcher).  
 Guelph, Ontario, November 29, 1919 (E. Hearle).  
 Little Current River, Ontario, July 18, 1903 (W. J. Wilson).  
 Nagagami River, Seventh Portage, Ontario, June 7, 1903 (W. J. Wilson).  
 Kenora, Ontario, July 2, 1918 (H. G. Dyar).  
 Aweme, Manitoba, April 23, 1905 (N. Criddle).  
 Revelstoke, British Columbia, August 22, 1903 (H. G. Dyar).  
 Mission, British Columbia, July 22, 1919 (E. Hearle).  
 Chilliwack, British Columbia, July 3, 1919 (E. Hearle).  
 Nicomen Island, British Columbia, June 23, 1919 (E. Hearle).  
 Hootalinqua, Yukon Territory, July 6, 1919 (H. G. Dyar).  
 Valley of Mayo River, Yukon Territory, ———, 1904 (J. Keele).

## ANOPHELES (ANOPHELES) QUADRIMACULATUS Say.

*Anopheles quadrimaculatus* Say, Keat. Narr. Exp. St. Peter's Riv., ii, 356, 1824.

*Anopheles guttulatus* Harris, Hitch. Rep. Geol. Min. Bot. Zool. Mass., 595, 1835.

*Anopheles annulimanus* van der Wulp, Tij. voor Ent., x, 129, 1867.

Mesonotum elongate, hairy, broadly whitish in the integument in the middle, dark brown on the sides. Abdomen with light hairs, brown, the apices of the segments darker, in the integument. Legs long and slender; blackish; tips of femora and tibiae whitish. Wings with the scales black, forming dark spots by being thickly placed as follows: Base of second vein in the cell; on the cross-veins and forks of second and fourth veins.

The larvae are surface-feeders in water-puddles, especially permanent water connected with rivers. The habits of the males have not been observed.

Distribution: Mexico to New England and Canada, east of the Rocky Mountains.

## CANADIAN RECORDS.

St. Catherines, Ontario, August 24, 1916 (E. Hearle).

Jordan, Ontario, August 4, 1916 (E. Hearle).

## ANOPHELES (ANOPHELES) WALKERI Theobald.

*Anopheles walkeri* Theobald, Mon. Culic., i, 199, 1901.

Palpi with small white rings at the bases of the joints. Mesonotum dark brown, uniformly coloured. Abdomen blackish, with brown hairs. Legs long and slender, black, the femora pale below; small white spots at tips of femora and tibiae. Wing-scales black, not forming distinct spots, though sometimes slight ones at the bases and forks of second and fourth veins.

The larvae inhabit water formed by overflows from rivers, which occasionally goes dry. The habits of the males are unknown. It has not been demonstrated whether this species carries malaria.

Distribution: Eastern North America.

## CANADIAN RECORDS.

Lake Simcoe, Ontario, September —, — (E. M. Walker).

Ottawa, Ontario, August 23, 1900 (A. Gibson).