

# A TENTATIVE LIST OF CERATOPOGONIDAE (DIPTERA)

## RECORDED FROM TAIWAN

by

Wesley K. C. Sun

- Family Ceratopogonidae Molloch (1917) Tokunaga  
(Heleidae Speiser, 1910) Tokunaga, 1940, Tenthredo, 3:181-183,  
figs. 13-14, ♂ ♀.
- Genus *Alluaudomyia* Kieffer (1913) *Alluaudomyia* (*Thysanognathus*) *macu-*  
*losipennis* Okada, 1942, Trans. Nat.  
Hist. Soc. Formosa, 32:316 & 319, ♂  
(key).
1. *Alluaudomyia maculipennis*  
(Carter, Ingram & Macfie)  
*Prionognathus maculipennis* Carter, In-  
gram et Macfie, 1920, Ann. Trop.  
Med. Parasitol., 14:316-318.  
*Alluaudomyia* (*Thysanognathus*) *macu-*  
*lipennis* var. *formosana* Okada, 1942,  
Trans. Nat. Hist. Soc. Formosa, 32:  
317 & 320, figs. 5-8, ♀ (key).  
Local Distribution: Taihoku (Taipei),  
Formosa (Taiwan).  
Further Distribution: Africa.
- Local Distribution: Boryo, Takao-syu  
(Kaohsiung), Formosa (Taiwan)  
(Okada, 1942).  
Further Distribution: Ponape, Micr-  
onesia (Tokunaga & Murachi, 1959).
2. *Alluaudomyia maculosipennis*
3. *Alluaudomyia sagaensis* Tok-  
unaga  
Tokunaga, 1940, Philipp. Jour. Sci. 72:  
257.  
Tokunaga, 1940, Tenthredo, 3:153-154  
misprinted as "*saganis*" (key).

1. The arrangement and classification of the genera and subgenera follow mainly those of Prof. Dr. Masaaki Tokunaga and E. K. Murachi in their paper, "Insects of Micronesia, Diptera: Ceratopogonidae", B. P. Bishop Museum, Insects of Micronesia, vol. 12, no. 3, published in 1959.
2. The "Further Distribution" & "Biting Habits" noted in this manuscript are confined only to those species which have already been recorded.
3. The author is indebted to Prof. M. Tokunaga of Kyoto Pref. University for the identification of some specimens, to Mr. T. C. Maa of B. P. Bishop Museum in Hawaii for his critical reading & revising of this manuscript, to Dr. Herbert S. Hurlbut of NAMRU 2 for his encouragement and help in this work and for his valuable suggestions for this manuscript and to Mr. K. S. Lin of the Taiwan Agr. Res. Inst. for his help in gathering material.



- Hung. 16:89-90.  
*Atrichopogon (Atrichopogon) formosanus*  
Tokunaga, 1940, Tenthredo. 3:110, ♀,  
(key).  
Local Distribution: Pilam (Kieffer, 19  
18), Taihoku (Taipei) (Tokunaga,  
1940), Formosa (Taiwan).
- 11. *Atrichopogon haemorrhoidalis***  
Kieffer  
Kieffer, 1921, Philipp. Jour. Sci. 18:560.  
*Atrichopogon (Atrichopogon) haemor-  
rhoidalis* Tokunaga, 1940, Tenthredo,  
3:110, (key).  
Local Distribution: Hokuto (Pei-to)  
(Kieffer, 1921), Arisan, Formosa  
(Taiwan) (NTUE).
- 12. *Atrichopogon insularis*** Kieffer.  
Kieffer, 1921. Philipp. Jour. Sci. 18:  
561-562, ♂♀.  
*Atrichopogon (Kempia) insularis* Tok-  
unaga, 1940, Tenthredo, 3:113, fig. 49,  
♂♀ (key).  
Local Distribution: Hokuto (Pei-to),  
Taihoku (Taipei), Daitotei (Ta-tao-  
cheng) (Kieffer, 1921), Taihoku (Tai-  
pei), Formosa (Taiwan) (Tokunaga,  
1940).
- 13. *Atrichopogon kagiensis*** Tok-  
unaga  
*Atrichopogon (Kempia) kagiensis* Tok-  
unaga, 1940, Philipp. Jour. Sci. 72:  
270, hl. 2, fig. 39, ♂.  
*Atrichopogon (Kempia) kagiensis* Tok-  
unaga, 1940 Tenthredo, 3:112, (key).  
Local Distribution: Kagi (Chia-I), For-  
mosa (Taiwan) (Tokunaga, 1940).
- 14. *Atrichopogon minimus*** Kieffer  
Kieffer, 1916, Ann. Hist. Nat. Mus.  
Nat. Hung. 14:87.  
Kieffer, 1922, Ann. Soc. Linn. Lyon 68:  
156.  
*Atrichopogon (Atrichopogon) minimus*  
Tokunaga, 1940, Philipp. Jour. Sci.  
72: 263-264, pl. 1, fig. 1, ♀.  
*Atrichopogon (Atrichopogon) minimus*  
Tokunaga, 1940, Tenthredo, 3:110  
(key).  
Local Distribution: Takao (Kaohsiung),  
Tainan (Kieffer, 1916), Taihoku (Ta-  
ipei), (Kieffer, 1922), Kagi (Chia-I),  
Sizyukei (Sz-chung-hsi), Formosa  
(Taiwan)(Tokunaga, 1940), (NTUE).
- 15. *Atrichopogon monticolus*** Tok-  
unaga  
*Atrichopogon (Kempia) monticolus* Tok-  
unaga, 1940, Philipp. Jour. Sci. 72:  
271, ♀.  
*Atrichopogon (Kempia) monticolus* Tok-  
unaga, 1940, Tenthredo, 3:113, (key).  
Local Distribution: Arisan, Formosa  
(Taiwan) (Tokunaga, 1940).
- 16. *Atrichopogon myrmedon*** Kieffer  
Kieffer, 1922, Ann. Soc. Linn. Lyon 68:  
155, ♀.  
*Atrichopogon (Atrichopogon) myrmedon*  
Tokunaga, 1940, Tenthredo, 3:109,  
(key).  
Local Distribution: Taihoku (Taipei)  
(Kieffer, 1922), Formosa (Taiwan)  
(NTUE).
- 17. *Atrichopogon pruinosus*** Kieffer  
Kieffer, 1921, Philipp. Jour. Sci. 18:559-  
560, ♀.  
*Atrichopogon (Atrichopogon) pruinosus*  
Tokunaga, 1940, Tenthredo, 3:110  
(key).  
Local Distribution: Taihoku (Taipei),

Formosa (Taiwan) (Tokunaga, 1940).

**18. *Atrichopogon ruber* Kieffer**

Kieffer, 1916a, Ann. Hist. Nat. Mus. Nat. Hung. 14:86.

Kieffer, 1916b, Suppl. Ent. 5:115.

Kieffer, 1921, Philipp. Journ. Sci. 18:560 & 563, ♀.

Kieffer, 1922, Ann. Soc. Linn. Lyon, 68:155.

*Atrichopogon (Atrichopogon) ruber* Tokunaga, 1940, Tenthredo, 3:109, (key).

Local Distribution: Kosempo, Chipchip, Tainan (Kieffer, 1916a), Chipun (Kieffer, 1916b), Taihoku (Taipei), Hokuto (Pei-to), Paroe (Kieffer, 1921, 1922), Taihoku (NTUE).

**19. *Atrichopogon rufescens* Kieffer**

Kieffer, 1921, Philipp. Journ. Sci. 18:563, ♀.

*Atrichopogon (Atrichopogon) rufescens* Tokunaga, 1940, Tenthredo, 3:115, fig. 50, ♂♀ (key).

Local Distribution: Taihoku (Taipei), Taiwan (Tokunaga, 1940).

**Genus *Bezzia* Kieffer (1899)**

**20. *Bezzia (Bezzia) chrysolopha***

Kieffer

*Bezzia chrysolopha* Kieffer, 1912, Suppl. Ent. 1:31, ♂.

*Bezzia chrysolopha* Tokunaga, 1939, Tenthredo, 2:274-275, ♂.

Local Distribution: Tainan, Formosa (Taiwan) (Kieffer, 1912).

**21. *Bezzia (Bezzia) insularis* Kieffer**

*Bezzia insularis* Kieffer, 1921, Philipp. Journ. Sci. 18:571, ♀.

*Bezzia insularis* Tokunaga, 1939, Ten-

thredo, 2:276-277, ♀.

*Bezzia insularis* Tokunaga, 1940, Tenthredo, 3:160, (key).

Local Distribution: Anping, (Kieffer, 1921), Taiwan (NTUE).

**22. *Bezzia (Bezzia) micronyx* Kieffer**

*Bezzia micronyx* Kieffer, 1922, Ann. Soc. Linn. Lyon 68:162, ♂, ♀.

*Bezzia micronyx* Tokunaga, 1939, Tenthredo, 2:276.

*Bezzia micronyx* Tokunaga, 1940, Tenthredo, 3:160, (key).

Local Distribution: Daitotei (Ta-tao-cheng), Maruyama (Yuan-shan) (Kieffer, 1922), Taihoku (Taipei), Formosa (Taiwan) (NTUE).

**23. *Bezzia (Bezzia) murina* Kieffer**

*Bezzia murina* Kieffer, 1922, Ann. Soc. Linn. Lyon, 68:162. ♀.

*Bezzia murina* Tokunaga, 1939, Tenthredo, 2:275-276, ♀.

*Bezzia murina* Tokunaga, 1940, Tenthredo, 3:163-164, ♀ (key).

Local Distribution: Hokuto (Pei-to), Maruyama (Yuan-shan) (Kieffer, 1922), Taihoku (Taipei) (Collector. Takahashi, 1934).

**24. *Bezzia (Bezzia) nigriclava* Kieffer**

*Bezzia nigriclava* Kieffer, 1921, Philipp. Journ. Sci. 18:571-572, ♀.

*Bezzia nigriclava* Tokunaga, 1939, Tenthredo, 2:281, ♀.

*Bezzia nigriclava* Tokunaga, 1940, Tenthredo, 3:160, (key).

Local Distribution: Maruyama (Yuan-shan) (Kieffer, 1921), Taihoku (Taipei), Formosa (Taiwan) (NTUE).

25. *Bezzia* (*Bezzia*) *separata* Kieffer  
*Bezzia separata* Kieffer, 1916, Ann.  
Hist. Nat. Mus. Nat. Hung. 14:96. ♀.  
*Bezzia separata* Tokunaga, 1939, Ten-  
thredo, 2:275. ♀.  
*Bezzia separata* Tokunaga, 1940, Ten-  
thredo, 3:160, (key).  
Local Distribution: Takao (Kaohsiung),  
Formosa (Taiwan) (Kieffer, 1916).

26. *Bezzia* (*Nilobezzia*) *claripennis*  
Kieffer  
*Bezzia claripennis* Kieffer, 1916, Ann.  
Hist. Nat. Mus. Nat. Hung. 14:97, ♀.  
*Nilobezzia claripennis* Tokunaga, 1939,  
Tenthredo, 2:288-289. ♀.  
Local Distribution: Anping, Formosa  
(Taiwan) (Kieffer, 1916), (NTUE).

27. *Bezzia* (*Nilobezzia*) *formosana*  
(Kieffer)  
*Bezzia formosana* Kieffer, 1912, Suppl.  
Ent. 1:30 ♀.  
*Nilobezzia formosana* Tokunaga, 1939,  
Tenthredo, 2:285. ♀.  
Local Distribution: Tainan, Formosa  
(Taiwan) (Kieffer, 1912).

28. *Bezzia* (*Nilobezzia*) *kerteszi*  
Kieffer  
*Bezzia kerteszi* Kieffer, 1916, Ann.  
Hist. Nat. Mus. Nat. Hung. 14:97,  
fig. 13, ♀.  
*Nilobezzia kerteszi* Kieffer, 1922, Ann.  
Soc. Linn. Lyon, 68:161.  
*Nilobezzia kerteszi* Tokunaga, 1939,  
Tenthredo, 2:288-289, ♀.  
Local Distribution: Tainan (Kieffer, 19  
16), Maruyama (Yuan-shan) (Kieffer,  
1922), Formosa (Taiwan) (NTUE).

29. *Bezzia* (*Probezzia*) *myrmedon*

Kieffer  
*Probezzia myrmedon* Kieffer, 1921,  
Philipp. Jour. Sci. 18:570 & 571, ♂.  
*Probezzia myrmedon* Tokunaga, 1939,  
Tenthredo, 2:293, ♂.  
Local Distribution: Anping, Formosa  
(Taiwan) (Kieffer, 1921).

30. *Bezzia* (*Probezzia*) *semirufa*  
Kieffer  
*Probezzia semirufa* Kieffer, 1922, Ann.  
Soc. Linn. Lyon, 68:161, ♀.  
*Probezzia semirufa* Tokunaga, 1939,  
Tenthredo, 2:291, ♀.  
Local Distribution: Maruyama (Yuan-  
shan), Formosa (Taiwan) (Kieffer,  
1922).

#### Genus *Ceratopogon* Meigen (1803)

31. *Ceratopogon* (*Isochelea*) *flaviv-*  
*entris* Kieffer  
Tokunaga, 1940, Philipp. Jour. Sci. 72:  
260, pl. 1, fig. 14, ♂.  
Tokunaga, 1940, Tenthredo, 3:151, (key).  
Local Distribution: Sizyukei (Sz-chung-  
hsi), Formosa (Taiwan) (Tokunaga,  
1940).

#### Genus *Culicoides* Latreille (1809)

32. *Culicoides albifascia* Tokunaga.  
Tokunaga, 1937, Tenthredo, 1:319, fig.  
27, pl.28, fig. 17, ♀.  
Tokunaga, 1940, Tenthredo, 3:143, (key).  
Local Distribution: Mt. Ari., about 2,270  
M in altitude, Formosa (Taiwan)  
(Tokunaga, 1937).

33. *Culicoides formosae* Kieffer  
Kieffer, 1912, Suppl. Ent. 1:29, ♀.  
Tokunaga, 1937, Tenthredo, 1:275, ♀.

- (key).  
Tokunaga, 1940, *Tenthredo*, 3:142, (key).  
Local Distribution: Tainan, Formosa (Taiwan) (Kieffer, 1912).
- 34. *Culicoides indecora* Kieffer**  
Kieffer, 1912, *Suppl. Ent.* 1:29, ♂.  
Tokunaga, 1937, *Tenthredo*, 1:275, ♂ (key).  
Tokunaga, 1940, *Tenthredo*, 3:141, (key).  
Local Distribution: Tainan, Formosa (Taiwan) (Kieffer, 1912).
- 35. *Culicoides sumatra* Macfie**  
Macfie, 1934, *Tijds. Ent.* 77:215.  
Arnauld, 1956, *Microent.* 21-3:154.  
Local Distribution: Chao-chow, Pingtung, Taiwan (Lin, C., C. TAMRI\* 1954).
- 36. *Culicoides (Avaritia) hui* Wirth and Hubert**  
Wirth and Hubert, 1961, *Pac. Ins.* 3:16-17, fig. 1-3, ♀.  
Local Distribution: Utai, Pingtung, Taiwan (Ni, J. K. & S. Y. Liu, 1954).
- 37. *Culicoides (Avaritia) jacobsoni* Macfie**  
*Culicoides jacobsoni* Macfie, 1934, *Tijds. Ent.* 77:215, fig., ♂.  
*Culicoides kitaokai* Tokunaga, 1955, *Saikyo Univ. Sci. Rept. Agr.* 7:6, fig., ♀.  
*Culicoides kitaokai* Arnauld, 1956, *Microent.* 21-3:109, fig. 66, map 13, ♀ (key).  
*Culicoides (Avaritia) jacobsoni* Wirth et Hubert, 1961, *Pac. Ins.* 3:15.  
Local Distribution: Tung-shih, Taichung
- (Barnett, 1951).  
Further Distribution: Sumatra, Malaya, N. Borneo, Thailand, Ryukyu Islands and Japan.
- 38. *Culicoides (Avaritia) maculatus* Shiraki**  
*Ceratopogon maculatus* Shiraki, 1913, *Taiwan Sotokufu Noji Shikenjo Tokubetsu Hokoku*, 8:294-297, pl. 7, figs. 9-11, ♂♀.  
*Culicoides tainana* Kieffer, 1916, *Suppl. Ent.* 5:114-117, ♀.  
*Culicoides maculatus* Tokunaga, 1937, *Tenthredo*, 1:286-289, fig. 15, pl. 29, fig. 24, ♂♀ (key).  
*Culicoides maculatus* Tokunaga, 1940, *Tenthredo*, 3:142, 143, & 147, (key).  
*Culicoides (Avaritia) maculatus* Wirth et Hubert, 1961, *Pac. Ins.* 3:15-16.  
Local Distribution: Arison (Shiraki, 1913), Tainan (Kieffer, 1916), Hokuzanko (Shiraki, 1917). Tungshih, Taichung (Barnett, 1951), Shih-tsu, Fenglin, Ping-tung (Lin, & Lo, 1954), Chao-chow (Hu, S. M. K. 1958), Hsin-she, Taichung (Hu, S. M. K. 1959).  
Biting Habits: "The midge is common in the mountainous region most abundant from May to September in a year and very troublesome severely biting men....." (Shiraki, 1913).
- 39. *Culicoides (Culicoides) amamiensis* Tokunaga**  
*Culicoides amamiensis* Tokunaga, 1937, *Tenthredo*, 1:325-327, fig. 30, pl. 28, fig. 20, ♀.  
*Culicoides amamiensis* Tokunaga, 1937,

\* TAMRI Taiwan Malaria Research Institute.

- Tenthredo, 1:327, fig. 31, pl. 29, fig. 21, ♀.
- Culicoides kagiensis* Tokunaga, 1940, Tenthredo, 3:144, 145, fig. 76, ♂. (key).
- Culicoides amamiensis* Tenthredo Tokunaga, 3:143. (key).
- Culicoides (Culicoides) amamiensis* Wirth and Hubert, 1961, Pac. Ins. 3:17. Local Distribution: Kagi, Doba (Tokunaga, 1940), Nan-ao, I-lan (Liu, S. Y. TAMRI, 1954), Chaochow, Pingtung (Hu, S. M. K. 1959), Kappan San (Shiraki, 1920) (NTUE). Further Distribution: Manchuria, Japan, Ryukyu Islands, India, Indonesia & New Guinea. Biting Habits: "Very abundant and troublesome severely biting men in the evening." (reported from Amami-Oshima, Japan, Tokunaga, 1937); "Collected from water buffalo." (Liu, 1954).
- 40. *Culicoides (Culicoides) liui*** Wirth and Hubert  
*Culicoides (Culicoides) liui* Wirth and Hubert, 1961, Pac. Ins. 3:20-21, figs. 4-6, ♀. Local Distribution: Tao Shan, Wufeng, Hsinchu, Taiwan (Liu, S. Y. 1954). Further Distribution: Thailand.
- 41. *Culicoides (Culicoides) nipponensis***  
*Culicoides peregrinus* of authors, misident., not Kieffer, 1910; Tokunaga (in part), 1937, Tenthredo 1:305-307, fig. 21, pl. 26, fig. 11, (key); Arnauld, 1956, Microent, 21:122, figs. 84-85, map 16, ♂ ♀ (key).  
*Culicoides nipponensis* Tokunaga, 1955, Saikyo Univ. Sci. Rept Agr. 7:4, fig., ♂ ♀.
- Culicoides (Culicoides) nipponensis* Wirth and Hubert, 1961, Pac. Ins. 3:18-19. Local Distribution: Shijukei (Sz-chung-shi) (Tokunaga, 1937), Hsinshu, Tai-chung (Hu, S. M. K. 1959), Chaochow, Pingtung (Hu, S. M. K. 1959), Sankon Li, Chaochow (Lin, C. C. 1954), Taipei (Barnett, 1951), Fengshan, Kaohsiung (Barnett, 1951). Further Distribution: Tang-shan, N. China, Japan, Korea, Malaya, India, Sumatra, Thailand and Micronesia. Biting Habits: "Suspected as possible transmitter of *Onchocerca gibsoni* Cleland et Johnsen in *Bos* species in Malaya." (Arnauld, 1956).
- 42. *Culicoides (Culicoides) peregrinus*** Kieffer  
*Culicoides peregrinus* Kieffer, 1910, Mem. Ind. Mus. 2:191-192, pl. 8, fig. 1, ♀.  
*Culicoides esmoneti* Salm, 1917, Soc. Zool. France, Bull. 42:136, -figs, ♂ ♀.  
*Culicoides judicandus* Bezzi, 1917, Philipp. Jour. Sci. 12:108, ♀.  
*Culicoides philippinensis* Kieffer, 1921, Philipp. Jour. Sci. 18:564, ♀.  
*Culicoides (Culicoides) peregrinus* Wirth and Hubert, 1961, Pac. Ins. 3:19-20. Local Distribution: Taipei (Barnett, 1951), Chao-chow, Pingtung (Hu, S. M. K. 1959), Fengshan, Kaohsiung (Barnett, 1951), Szeckun (Barnett, 1951). Further Distribution: India to New Guinea, Indonesia.
- 43. *Culicoides (Meijerehelea) arakawai*** (Arakawa).  
*Ceratopogn arakanae* Matsumura, Arakawa, 1910, Kinchu-Sekai, 14 (156):

- 411-414.  
*Ceratopogon sugimotonis* Shiraki, 1913, Taiwan Sotokufu Noji Shikenjo Tokubetsu Hokoku, 8:289-290, pl. 30, fig. 4, ♂♀.
- Culicoides albogutatus* Kieffer, 1921, Philipp. Jour. Sci. 18:563, ♀.
- Ceratopogon shimai* Sasaki, 1928, Proc. Imp. Acad. Japan, 3:687-689, figs. 1-7, ♀, larva.
- Culicoides sugimotonis* Tokunaga, 1940, Tenthredo, 3:142 & 145, (key).
- Culicoides arakawae* Arnauld, 1956, Microent. 21-3:92, 134 & 138, figs. 49-50, map 3, ♂♀, (key).
- Culicoides (Meijerehelea) arakawai* Wirth and Hubert, 1961, Pac. Ins. 3: 23-24.
- Local Distribution: Taihoku (Taipei) (Shiraki, 1913), Kagi (Chia-I) (Tokunaga, 1934), Mu-tan, Pingtung (Lin, C. C. TAMRI, 1954), Hsinshu, Taichung (NAMRU 2, 1959), Chung-ho, Taipei (NAMRU 2,\* 1959), Tunghai, Taichung (the Author, 1961).
- Further Distribution: Widely distributed in Japan, Ryukyu Islands, Korea, Manchuria, North China, Siberia, Indonesia & New Guinea.
- Biting Habits "This species has frequently been recorded as a severe biting species of domestic fowl and less severe on man. Because of its association as a bird biting species its should be investigated to ascertain if it plays any part in virus transmission in native and domestic birds." (Arnauld, 1956).
- 44. *Culicoides (Meijerehelea) duodenarius* Kieffer**
- Culicoides duodenarius* Kieffer, 1922, Ann. Soc. Linn. Lyon 68:157, ♀.
- Ceratopogon sopparoensis* Matsumura (in litt.), Tokunaga, 1937, Tenthredo, 1:332-333.
- Culicoides duodenarius* Tokunaga, 1937, Tenthredo, 1:315-317, fig. 25, pl. 27, fig. 15, ♂♀ (key).
- Culicoides (Meijerehelea) duodenarius* Wirth and Hubert, 1961, Pac. Ins. 3: 24-25.
- Local Distribution: Daitotei (Ta-tao-cheng) (Kieffer, 1922), Shijukei (Szechung-shi) (Tokunaga, 1937), Chao-chow, Pingtung (Lin, C. C. TAMRI, 1954), Chao-chow, Pingtung (Hu, S. M. K. 1959).
- 45. *Culicoides (Monoculicoides) homotomus* Kieffer**
- Culicoides homotomus* Kieffer, 1922, Ann. Soc. Linn. Lyon 68:158, ♀.
- Culicoides nubeculosus* Iwata, 1935, Trans. Ent. Soc. Hiroshima, 2:7.
- Culicoides homotomus* Tokunaga, 1937, Tenthredo, 1:236, 237, 240, 273, 280-284, fig. 13, pl. 24, fig. 3, ♂♀ (key).
- Culicoides homotomus* Arnauld, 1956, Microent. 21-3:105-106, figs. 61-62, map 11, ♂♀ (key).
- Culicoides (Monoculicoides) homotomus* Wirth and Hubert, 1961, Pac. Ins. 3: 25-26.
- Local Distribution: Kagi (Chia-I) (Tokunaga, 1937), Chao-chow, Pingtung (Lin, C. C. TAMRI, 1954), Chao-chow, Pingtung (Hu, S. M. K. 1959), Chung-ho, Taipei (NAMRU 2, 1959).
- Further Distribution Japan, Inner Mongolia, Manchuria, and North China.

\* NAMRU 2 U.S. Naval Medical Research Unit No. 2



Biting Habits: "First reported in Japan as a very troublesome biting species on man and cattle by Iwata (1935) about the city of Osaka, under the name of *osakensis* Iwata. Recently reported by Takeda (1954) as very troublesome in coastal areas of Saga Prefecture in Kyushu Island. A closely allied species, *Culicoides nubeculosus* Meigen is known to transmit *Onchocerca cervicalis* Railliet et Henry (Which cause fistulous withers in horses)." (Ainauld, 1956).

46. *Culicoides (Oecacta) okinawensis* Arnauld

*Culicoides okinawensis* Arnauld, 1956, Microent. 21-3:118-119, figs. 78-79, map 6, ♂♀ (key).

*Culicoides (Oecacta) okinawensis* Wirth and Hubert, 1961, Pac. Ins. 3:21.

Local Distribution Utai Pingtung (Ni, J. K. & S. Y. Liu, 1954).

Further Distribution: Okinawa.

47. *Culicoides (Oecacta) schultzei* (Enderlein)

*Ceratopogon schultzei* Enderlein, 1908, Denkschr. med-naturw. Ver. Jena 13:459, figs., ♂♀.

*Culicoides oxystoma* Kieffer, 1910, Mem. Ind. Mus. 2:193-194, pl. 9, fig. 1, ♀.

*Culicoides oxystoma* Tokunaga, 1937, Tenthredo, 1:295-298, fig. 17, pl. 25, fig. 6. ♂♀ (key).

*Culicoides schultzei* (Enderlein), 1949, Vargas (partim), Rev. Soc. Mex. Hist. Nat. 10 (1-4): 206.

*Culicoides oxystoma* Ainauld, 1956, Microent. 21-3:120, figs. 82-83, map 15, ♂♀ (key).

*Culicoides (Oecacta) schultzei* Wirth and

Hubert, 1961, Pac. Ins. 3:22-23.

Local Distribution: Kagi (Chia-I) and Shijukei (Sz-chung-shi) (Tokunaga, 1937), Tungsheh, Taichung (Barnett, 1951), Feng-shan, Kaohsiung (Barnett, 1951), Chao chow, Pingtung (Lin, C. C. TAMRI, 1954), Hsin-she, Taichung and Chung-ho, Taipei (NAMRU 2, 1959).

Further Distribution: Japan, Korea, Ryukyu Islands, India, Malaya, Burma, Philippines, North China, Manchuria, and Micronesia.

Biting Habits: "This species is reported to bite man, domestic cattle and fowl. This species bites just before and after sunset. *Oxystoma* is known to transmit *Onchocerca gibsoni* Cleland et Johnson to *Bos taurus*, *Bos indicus* and *Bos bubalus* in Malaya." (Ainauld, 1956)

48. *Culicoides (Oecacta) verbosus*

Tokunaga

*Culicoides verbosus* Tokunaga, 1937, Tenthredo, 1:303-305, fig. 20, pl. 26, fig. 9, ♀.

*Culicoides verbosus* Tokunaga, 1940, Tenthredo, 3:142 (key).

*Culicoides (Oecacta) verbosus* Wirth and Hubert, 1961, Pac. Ins. 3:21-22.

Local Distribution: Shijukei (Sz-chung-shi) (Tokunaga, 1937), Utai, Pingtung (Liu, S. Y. TAMRI, 1954).

49. *Culicoides (Trithecoides) anophelis* Edwards

*Culicoides anophelis* Edwards, 1922, Bull. Ent. Res. 13:161-163, pl. 3, figs. 4-8, ♀.

*Culicoides anophelis* Okada, 1942, Trans. Nat. Hist. Soc. Formosa, 32:138 &

- 140, figs, 1-6, ♀.
- Culicoides anophelis* Arnauld, 1956, Microant. 21-3:91 & 135, fig. 48, map 2, ♀ (key).
- Culicoide (Tritheccoides) anophelis* Wirth and Hubert, 1959, Pac. Ins. 1:8.
- Culicoides (Tritheccoides) anophelis* Wirth and Hubert, 1961, Pac. Ins. 3:14.
- Local Distribution; Taipei (Barnett, 1951), Chao-chow, Pingtung (Hu, S. M. K. 1959), Tokuzanko (Shiraki, 1917) (NTUE).
- Further Distribution: Burma, Ceylon, Hong Kong, Indonesia, Malaya, India, Sumatra, and Thailand.
- Biting Habits: "This species has the remarkable habit of obtaining its blood meal by feeding on the abdomen of engorged *Anopheles* collected at Kuala Lumpur, Malaya which were found to be attached by *Culicoides anopheles*." (Arnauld, 1956)".
- Because of its association as an *anopheles* mosquito biting species it should be investigated to ascertain if it plays any part in malarian plasmodium transmission between the *anophelis* mosquitoes.
- Host-*Anopheles hyrcanus sinensis* Wied.
- 50. *Culicoides (Tritheccoides) humeralis* Okada**
- Culicoides raripalpis* Smith var. no. 1 Tokunaga, 1940, Tentredo, 3:147, figs. 77-78, pl. 5, fig. 2. ♀.
- Culicoides humeralis* Okada, 1941, Jour. Coll. Agr. Tokyo Imp. Univ. 15(1):14, 20-22, fig. 3, ♀.
- Culicoides raripalpis* var. no. 1 (sine nom.) Okada, 1942, Trans. Nat. Hist. Soc. Formosa, 32:140 & 143, figs. 7-10, ♀ (key).
- Culicoides (Tritheccoides) humeralis* Wirth and Hubert, 1959, Pac. Ins. 1:24.
- Culicoides (Tritheccoides) humeralis* Wirth and Hubert, 1961, Pac. Ins. 3:14.
- Local Distribution: Chialo, Chienshih, Hsinchu (Chen, H. H. TAMRI, 1954), Tung shih, Taichung (Barnett, 1951).
- Further Distribution: Japan, Malaya, Thailand and East Siberia.
- Biting Habits: Reported as biting cow (Chen, 1954).
- 51. *Culicoides (Tritheccoides) palpifer* Das Gupta and Ghosh**
- Culicoides palpifer* Das Gupta and Ghosh, 1956, Calcutta Sch. Trop. Med. Bull. 4:122, ♀.
- Culicoides (Tritheccoides) palpifer* Wirth and Hubert, 1959, Pac. Ins. 1:25, fig. 14, ♂♀.
- Culicoides (Tritheccoides) palpifer* Wirth and Hubert, 1961, Pac. Ins. 3:14.
- Local Distribution: Arison (Shiraki, 1917), Kalenko, Hu-lien (Shiraki, 1919), Kappan-shan (Shiraki, 1920), Shishito (Shiraki, 1917), Taito, Taitung (Inamura, Sonan and Yoshimo, 1919).
- Further Distribution: India, Malaya, North Borneo, Sarawak, Sumatra, Philippines and Thailand.
- 52. *Culicoides (Tritheccoides) tenuipalpis* Wirth and Hubert**
- Culicoides (Tritheccoides) tenuipalpis* Wirth and Hubert, 1959, Pac. Ins. 1:16, figs. 5, 26, ♀.
- Culicoides (Tritheccoides) tenuipalpis* Wirth and Hubert, 1961, Pac. Ins. 3:14-15.
- Local Distribution: Tungshih, Teichung (Barnett, 1951), Formosa (Liu, S. Y.

1954).

**Genus *Dasyhelea* Kieffer (1911)**

**53. *Dasyhelea curtiradialis* Tokunaga**

Tokunaga, 1940, Tenthredo, 3:130, fig. 64, ♀.

Local Distribution: Sizyukei (Sz-chung-hsi), Formosa (Taiwan) (Tokunaga, 1940).

Further Distribution: Kitasirakawa, Kyoto, Honsyu, Japan.

**54. *Dasyhelea formosana* Kieffer**

Kieffer, 1922, Ann. Soc. Linn. Lyon 68: 157.

Tokunaga, 1940, Tenthredo, 3:136-137, ♀ (key).

Local Distribution: Daitotei (Ta-tao-cheng) (Kieffer, 1922), Taihoku (Taipei), Formosa (Taiwan) (Tokunaga, 1940).

**55. *Dasyhelea fulvicauda* Macfie**

Tokunaga, 1940, Tenthredo, 3:131, ♀ (key).

Local Distribution: Taihoku (Taipei), Formosa (Taiwan) (Tokunaga, 1940).

**56. *Dasyhelea parvifulva* Tokunaga**

Tokunaga, 1940, Tenthredo, 3:139, fig. 72, ♀.

Local Distribution: Taihoku (Taipei), Formosa (Taiwan) (Tokunaga, 1940).

**57. *Dasyhelea parvinigra* Tokunaga**

Tokunaga, 1940, Tenthredo, 3:133, ♀.

Local Distribution: Taihoku (Taipei), Formosa (Taiwan) (Tokunaga, 1940).

**58. *Dasyhelea sauteri* Tokunaga**

*Dasyhelea formosana* Kieffer, 1921, Philipp Jour. Sci. 18:565-566, ♀.

*Dasyhelea sauteri* Tokunaga, 1940, Tenthredo, 3:127.

Local Distribution: Hokuto (Pei-to), Formosa (Taiwan) (Kieffer, 1921).

**59. *Dasyhelea taiwana* Tokunaga**

Tokunaga, 1940, Tenthredo, 3:119, figs. 51-53, ♂ ♀.

Local Distribution: Taihoku (Taipei), Formosa (Taiwan) (Tokunaga, 1940).

**Genus *Dicrohelea* Kieffer (1913)**

**60. *Dicrohelea albiclava* Kieffer**

*Dicrohelea albiclava* Kieffer, 1921, Philipp. Jour. Sci. 18:566-568, ♀.

*Dicrohelea albiclava* Tokunaga, 1940, Tenthredo, 3:165.

Local Distribution: Jushifun in Taihoku-Distr. (Taipei) (Kieffer, 1921)

**Genus *Forcipomyia* Meigen (1818)**

**61. *Forcipomyia arcigera* Kieffer**

Kieffer, 1922, Ann. Soc. Linn. Lyon 68:150.

Tokunaga, 1940, Tenthredo, 3:76-77, fig. 13, ♂ ♀ (key)

Local Distribution: Hokuto (Pei-to) (Kieffer, 1922), Taihoku (Taipei), Kagi (Chia-I), Sizyukei (Sz-chung-hsi) (collectors, Takahashi & Tokunaga, 1937), Formosa (Taiwan).

**62. *Forcipomyia brachytomus* Kieffer**

*Ceratopogon (Prohelea) brachytomus* Kieffer, 1922, Ann. Soc. Linn. Lyon 68:149.

*Forcipomyia brachytomus* Tokunaga, 1940, Tenthredo, 3:61, (key).

Local Distribution: Daitotei (Tatao-

cheng), Taihoku (Taipei) Paroe Formosa (Taiwan) (Kieffer, 1922) (NTUE).

63. *Forcipomyia chrysothrix* Kieffer  
*Ceratopogon (Prohelea) chrysothrix*  
Kieffer, 1921, Philipp. Jour. Sci. 18:  
558, ♂♀.

*Forcipomyia chrysothrix* Tokunaga, 1940,  
Tenthredo, 3:61, (key).

Local Distribution: Taihoku (Taipei),  
Formosa (Taiwan) (NTUE).

Further Distribution: Luzon, Philippines.

64. *Forcipomyia despecta* Kieffer  
Kieffer, 1922, Ann. Soc. Linn. Lyon 68:  
152, ♀.

Tokunaga, 1940, Tenthredo, 3:64, (key).

Local Distribution: Taihoku (Taipei)  
(Kieffer, 1922), Arison, Formosa (Taiwan)  
(NTUE).

65. *Forcipomyia formosae* Kieffer  
*Lapidohelea formosae* Kieffer, 1922, Ann.  
Soc. Linn. Lyon 68:153-154.

*Forcipomyia formosae* Tokunaga, 1940,  
Tenthredo, 3:73, fig. 11, ♂♀ (key).

Local Distribution: Taihoku (Taipei)  
(Kieffer, 1922), Taihoku, Hokuto (Pei-  
to) and Kagi (Chia-I), Formosa  
(Taiwan) (Tokunaga, 1940).

66. *Forcipomyia formosana* Kieffer  
Kieffer, 1916, Ann. Hist. Nat. Mus. Nat.  
Hung. 14:83-85.

Tokunaga, 1940, Tenthredo, 3:83, ♂.

Local Distribution: Takao (Kaohsiung)  
(Kieffer, 1916), Taihoku (Taipei)  
(collectors, Takahashi, and Tokunaga,  
1940), Takao, Formosa (Taiwan)  
(NTUE).

67. *Forcipomyia hirtipes* de Mijere  
Tokunaga, 1940, Tenthredo, 3:65-66, ♀  
(key).

Local Distribution: Taihoku (Taipei),  
Formosa (Taiwan) (collectors, Takahashi  
and Tokunaga, 1940).

Biting Habits: Host-Lepidopteron's larva,  
*Papilio polytes* Linnaeus.

68. *Forcipomyia kitasirakawae* Tokunaga

Tokunaga, 1940, Tenthredo, 3:94,95, fig.  
29, ♂♀ (key).

Local Distribution: Taihoku (Taipei),  
Formosa (Taiwan) (Tokunaga, 1940).

Further Distribution: Azabu, Tokyo,  
Honsyu, Japan.

69. *Forcipomyia lagonigera* Kieffer  
Kieffer, 1922, Ann. Soc. Linn. Lyon  
68:151.

Tokunaga, 1940, Tenthredo, 3:63 (key).

Local Distribution: Arison, Formosa  
(Taiwan) (NTUE).

70. *Forcipomyia longitarsis* Tokunaga

Tokunaga, 1940, Tenthredo, 3:92, fig.  
27, ♂.

Local Distribution: Taihoku (Taipei),  
Formosa (Taiwan) (collector, Takahashi,  
1937).

71. *Forcipomyia miricornis* Kieffer  
Kieffer, 1916, Ann. Hist. Nat. Mus. Nat.  
Hung. 14:81-83.

Tokunaga, 1940, Tenthredo, 3:77, fig. 79,  
♂ (key).

Local Distribution: Tainan, Chipchip  
(Kieffer, 1916). Taihoku (Taipei)  
(collector, Takahashi, 1933), Formosa  
(Taiwan) (NTUE).

72. **Forcipomyia takahashii** Tokunaga  
Tokunaga, 1940, Tenthredo, 3:88-90, figs. 22-23, ♂♀.  
Local Distribution: Doba, Formosa (Taiwan) (collector, Takahashi, 1938).  
man in the daytime.
73. **Forcipomyia (Lasiohelea) japonica** Tokunaga  
*Lasiohelea japonica* Tokunaga, 1937, Tenthredo, 1:267-269, fig. 8, ♀.  
*Lasiohelea japonica* Tokunaga, 1940, Tenthredo, 3:104, ♀.  
Local Distribution: Taihoku (Taipei), Formosa (Taiwan) (Tokunaga, 1937).  
Further Distribution: Kyoto, Japan (Collectors, Yoshimura & Tokunaga, 1934, 1936).  
Biting Habits: "This species is commonly found on the flowers of the plants Umbelliferae and probably the females are not blood-suckers" (Tokunaga, 1937).
74. **Forcipomyia (Lasiohelea) taiwana** (Shiraki).  
*Ceratopogon taiwanus* Shiraki, 1913, Taiwan Sotokufu Noji Shibenjo Tokubetsu Hokoku 8:290-294, pl. 29, fig. 12, ♀.  
*Lasiohelea taiwana* Shiraki, 1932, Icon. Ins. Jap.: 163, fig. 318, ♀.  
*Lasiohelea taiwana* Tokunaga, 1937, Tenthredo, 1:265-267, fig. 7, ♀.  
Local Distribution: North central region of Formosa (Shiraki, 1913), Ping-tung city (Liu, S. Y. TAMRI, 1953), Tanghai, Taichung (the Author, 1960), Chu-shan (Yang, C. H., 1961), Formosa (Taiwan).  
Biting Habits: A pestiferous species, severely biting and sucking blood from
75. **Forcipomyia (Proforcipomyia) sauteri** Kieffer  
*Forcipomyia sauteri* Kieffer, 1912, Suppl. Ent. 1:27-28, ♀.  
*Forcipomyia sautei* Tokunaga, 1940, 3:83, ♀.  
*Forcipomyia (Proforcipomyias) sauteri* Tokunaga, 1959, Ins. Micron. 12-3:190, fig. 28, ♀♀.  
Local Distribution: Doba & Taihoku, Formosa (Taiwan) (collectors, Takahashi & Tokunaga, 1937).  
Further Distribution: Micronesia and New Guinea.
76. **Forcipomyia (Subgenus B) fuscimanus** (Kieffer)  
*Ceratopogon (Prohelea) fuscimanus* Kieffer, 1921, Philipp. Jour. Sci. 18:557.  
*Forcipomyia fuscimanus* Tokunaga, 1940, Tenthredo, 3:82, fig. 19, ♂ (key).  
*Forcipomyia (Subgenus B) fuscimanus* Tokunaga, 1959, Ins. Micron. 12-3:216, fig. 39, ♂♀.  
Local Distribution: Taihoku (Taipei) & Kagi (Chia-I), Formosa (Taiwan) (Tokunaga, 1940).  
Further Distribution: Micronesia.
- Genus *Mixohelca* Kieffer (1913)
77. **Mixohelca ciliaticrus** Kieffer  
*Mixohelca ciliaticrus* Kieffer, 1921, Philipp. Jour. Sci. 18:568-569, ♀.  
*Mixohelca ciliaticrus* Tokunaga, 1940, Tenthredo, 3:165.  
Local Distribution: Jushifun in Taihoku-Distr. (Taipei) (Kieffer, 1921).

### Genus *Palpomyia* Meigen (1818)

#### 78. *Palpomyia aterrima* Kieffer

Kieffer, 1922, Ann. Soc. Linn. Lyon 68: 159.

Tokunaga, 1939, Tenthredo, 2:298-299.

Tokunaga, 1940, Tenthredo, 3:157, (key).

Local Distribution: Maruyama (Yuan-shan) (Kieffer, 1922), Taiboku (Taiping) (collector, Takahashi, 1937), Formosa (Taiwan).

#### 79. *Palpomyia atriclava* Kieffer

Kieffer, 1921, Philipp. Jour. Sci. 18:569, ♀.

Tokunaga, 1939, Tenthredo, 2:296-297.

Tokunaga, 1940, Tenthredo, 3:157, (key).

Local Distribution: Maruyama (Yuan-shan), Formosa (Taiwan) (Kieffer, 1921).

#### 80. *Palpomyia divisa* Kieffer

Kieffer, 1916, Ann. Hist. Nat. Mus. Nat. Hung. 14:94, ♀.

Tokunaga, 1939, Tenthredo, 2:302-303.

Tokunaga, 1940, Tenthredo, 3:158, (key).

Local Distribution: Tainan, Formosa (Taiwan) (Kieffer, 1916) (NTUE).

#### 81. *Palpomyia indivisa* Kieffer.

Kieffer, 1916, Ann. Hist. Nat. Mus. Nat. Hung. 14:95.

Tokunaga, 1939, Tenthredo, 2:311-312.

Tokunaga, 1940, Tenthredo, 3:158, (key).

Local Distribution: Sokotsu, Formosa (Taiwan) (Kieffer, 1916).

#### 82. *Palpomyia murina* Kieffer

Kieffer, 1922, Ann. Soc. Linn. Lyon 68:160.

Tokunaga, 1939, Tenthredo, 2:299-300.

Tokunaga, 1940, Tenthredo, 3:158, (key).

Local Distribution: Maruyama (Yuan-shan), Formosa (Taiwan) (Kieffer, 1922).

#### 83. *Palpomyia spinifera* Kieffer

Kieffer, 1916, Ann. Hist. Nat. Mus.

Nat. Hung. 14:94, fig. 12, ♀.

Tokunaga, 1939, Tenthredo, 2:295-296, ♂♀.

Tokunaga, 1940, Tenthredo, 3:157, (key).

Local Distribution: Tainan, Formosa (Taiwan) (Kieffer, 1916).

#### 84. *Palpomyia sterima* Kieffer

Tokunaga, 1939, Tenthredo, 2.

Local Distribution: Toihoku (Taipei), Formosa (Taiwan) (NTUE).

#### 85. *Palpomyia tainana* Kieffer

*Palpomyia tainana* Kieffer, 1912, Suppl. Ent. 1:29, ♀.

*Palpomyia tainana* var. *abdominalis* Kieffer, 1922, Ann. Soc. Linn. Lyon 68:161.

*Palpomyia tainana* var. *abdominalis* Tokunaga, 1940, Tenthredo, 3:158, (key).

Local Distribution: Tainan (Kieffer, 1912), Chosokei (Kieffer, 1922), Formosa (NTUE).

### Genus *Pterobosca* Macfie (1932)

86. *Pterobosca aescnosuga* de Meijere

de Meijere, 1923, Tijds. Ent. 66.

Oka et Asahina, 1948, Mushi 18:111.

Local Distribution: Taihoku (Taipei) (Oka et Asahina, 1948), Formosa

(Taiwan).  
Further Distribution: Java, Sumatra.  
Biting Habits: Host-Odonata: *Orthetrum triangulare*.

### Genus *Sphaeromias* Curtis (1892)

87. *Sphaeromias conjuncta* Kieffer  
Kieffer, 1916, Ann. Hist. Nat. Mus. Nat.  
Hung. 14:90-93, ♀.  
Tokunaga, 1940, Tenthredo, 3:165,  
(key).  
Local Distribution: Tainan, Formosa  
(Taiwan) (Kieffer, 1916).

88. *Sphaeromias connexa* Kieffer  
Kieffer, 1916, Ann. Hist. Nat. Mus.  
Nat. Hung. 14:92-93, ♂.  
Tokunaga, 1940, Tenthredo, 3:165,  
(key).  
Local Distribution: Tainan, Formosa  
(Taiwan) (Kieffer, 1916).

89. *Sphaeromias inermips* Kieffer  
Kieffer, 1916, Suppl. Ent. 5:115, ♀.  
Tokunaga, 1940, Tenthredo, 3:165,  
(key).  
Local Distribution: Kosempo, Formosa  
(Taiwan) (Kieffer, 1916).

90. *Sphaeromias sejuncta* Kieffer  
Kieffer, 1961, Ann. Hist. Nat. Mus.  
Nat. Hung. 14:90, ♀.  
Tokunaga, 1940, Tenthredo, 3:165,  
(key).

Local Distribution: Taihoku (Taipei),  
Formosa (Taiwan) (Kieffer, 1921).

91. *Sphaeromias uncinata* Kieffer  
Kieffer, 1916, Ann. Hist. Nat. Mus.  
Nat. Hung. 14:90-93, ♀.  
Tokunaga, 1940, Tenthredo, 3:165,  
(key).

Local Distribution: Taihoku (Taipei),  
Formosa (Taiwan) (Kieffer, 1916).

### Genus *Stilobezzia* Kieffer (1911)

92. *Stilobezzia notata* de Meijere  
*Stilobezzia decora* Kieffer, 1916a, Ann.  
Hist. Nat. Mus. Nat. Hung. 14:89-90.  
*Stilobezzia decora* Kieffer, 1916b, Suppl.  
Ent. 5:115.  
*Stilobezzia decora* Kieffer, 1921, Philipp.  
Jour. Sci. 18:566, ♀.  
*Stilobezzia decora* Kieffer, 1922, Ann.  
Soc. Linn. Lyon 68:159.  
*Stilobezzia decora* Tokunaga, 1940,  
Philipp. Jour. Sci. 72:280. pl. 4,  
figs. 90 & 92, ♂♀.  
*Stilobezzia notata* Tokunaga, 1940, Ten-  
thredo, 3:155, (key).

Local Distribution: Takao (Kaohsiung)  
(Kieffer, 1916a), Tainan (Kieffer, 1916b),  
Anping (Kieffer, 1921), Maruyama  
(Yuan-shan) (Kieffer, 1922), Kagi  
(Chia-I) (Tokunaga, 1934), Taihoku  
(Taipei), Formosa (Taiwan) (NTUE).

Further Distribution: Japan, Indonesia.

