

AN ANNOTATED CHECKLIST OF THE CERATOPOGONIDAE (DIPTERA) OF EGYPT

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ABSTRACT. A checklist of Ceratopogonidae (Diptera) in Egypt is provided. New distributional data for 19 species from 9 localities including one new record of *Leptoconops* sp.1 from Ras Muhammad (S. Sinai) are given. The total number of ceratopogonid species from Egypt now is 73 in 12 genera and 4 subfamilies. Previously, 57 species in 10 genera and 4 subfamilies were known. *Nomina dubia* need further investigation.

Key words: Checklist, Egypt, Ceratopogonidae, biting midges, distribution.

Introduction

The dipteran family Ceratopogonidae (biting midges) is an extremely diverse group that is widely distributed throughout the world, with 5349 species already named (Borkent, *pers. comm.*, Nov. 17, 2000). Many species in the family are serious pests because of their blood sucking habits, particularly along sea shores, rivers, and lakes (Wilkening et al., 1985). The painful bites of adult females can make life unbearable. In Egypt, they constitute a major threat to the tourism industry, especially at recreational beaches and in the resort areas of Southern Sinai, the North Coast, and the Red Sea shores. Furthermore, recent discoveries are increasingly incriminating species of *Culicoides* and *Leptoconops* as vectors of many protozoal, filarial and viral pathogens of both man and animals (Linley & Davies, 1971, Wilkening et al., 1985). In Egypt, the widespread and famous disease, locally called "El Negma" or African Horse Sickness is transmitted by ceratopogonid midges (Kamal, 1948, Morsy, 1961). Becker (1903) was the earliest worker to study the Egyptian fauna of biting midges. He was followed by a series of publications by Kieffer (1908-1925), and then by Macfie (1924, 1940, 1943, 1944). More recently, Nagaty & Morsy (1959a, 1959b; 1960a, 1960b) studied the taxonomy, morphology and ecology of the most important genus including biting species, *Culicoides* Latreille. Abdel Samei (1974) and Eesa (1975) followed Nagaty & Morsy in their works on the same genus. In their survey in Sinai, Braverman et al. (1981) recorded 16 *Culicoides* species for the first time, in addition to *C. langeroni* Kieffer, which was already recorded from North Sinai. Ahmed (1991) gave an account on 12 *Culicoides* species. Steyskal & El-Bialy (1968) listed 46 species in 10 genera from Egypt, and Ghonaim

(1997) listed 59 species placed in 10 genera. Ghonaim et al. (2001), in reviewing the genus *Forcipomyia* in Egypt, listed 8 species with one new record, *F. pulcherrima* Santos Abreu and one new species, *F. marsafae* Ghonaim, Ibrahim & Ali.

The current study lists the Ceratopogonidae of Egypt based on collections of adults made by the first author from different localities in Egypt, from 1997 to 1999. Previously published records were examined and names follow those in the world catalog by Borkent & Wirth (1997). The distribution of each species and pertinent references are provided.

The systematic arrangement below follows Borkent & Wirth (1997) who included the subfamily *Leptoconopinae* under Ceratopogonidae, although separate familial status for this group has been proposed by other workers (e.g., Downes, 1977).

Materials and Methods

Adults were collected from over a white sheet lit with a portable light source by using an aspirator, essentially a little modification of the method described by Ingram & Macfie (1922b). Specimens were preserved in 70% alcohol, and then slide-mounted in Canada Balsam, using the method of Wirth & Marston (1968), for further identification.

The taxa are arranged phyletically by subfamilies but genera and species are listed alphabetically, similar to that adopted by Borkent & Wirth (1997). Species names are printed in bold, followed by the author name, year, and the page number. Under each species the distribution locality is followed by the name of the governorate (= province) in parenthesis and by the related reference.

SUBFAMILY LEPTOCONOPINAE NOÉ, 1907

Genus *LEPTOCONOPS* Skuse, 1889 (4 spp.)

Subgenus *HOLOCONOPS* Kieffer

1. *L. kerteszi* Kieffer, 1908: 576.
Cairo (Cairo); Wadi el Natrun (Beheira); Saqqara (Giza) **Kieffer, 1908**. Bir el Abd (N. Sinai); Moascar, Gebel Maryium (Ismailia) **Macfie, 1943**.
2. *L. macfiei* Clastrier, 1975: 28.
Bir el Abd (N. Sinai); Gebel Maryium (S. Sinai); Moascar (Ismailia) **Clastrier, 1975**.
3. *L. transversalis* (Kieffer), 1921a: 112 (*Holoconops*).
Steyskal & El-Bialy, 1968 listed *L. transversalis* (Kieffer); however, no data on its distribution are available.
4. *L. sp. 1* (*New Record*).
Ras Muhammad (S. Sinai) IV, 1999 coll. **Ghonaim**.

SUBFAMILY FORCIPOMYIINAE LENZ, 1934

Genus *ATRICHOPOGON* Kieffer, 1906 (7 spp.)

5. *A. atriscapulus* Kieffer, 1918: 45.
Beni Hassan, Girga (Sohag); Dendera, Luxor (Qena); Edfu (Aswan);
Cairo (Cairo) Macfie, 1924.
6. *A. callipotami* Macfie, 1924: 65.
Cairo (Cairo) Macfie, 1924.
7. *A. flavitarsatus* (Becker), 1903: 74 (*Ceratopogon*).
Luxor (Luxor) Becker, 1903.
8. *A. homoius* Ingram & Macfie, 1921: 338.
Maadi (Cairo) Kieffer, 1925. Ayyat (Giza); Beni Hassan, Girga
(Sohag); Asyut (Asyut); Dendera (Qena); Aswan (Aswan) Macfie,
1924. El Qanatir (Qalyubiya) XI, 1997; El Badrasheen (Giza) IX,
1999 coll. Ghonaim.
9. *A. isis* Kieffer, 1925: 252. (*Nomen dubium*).
Maadi (Cairo) Kieffer, 1925.
10. *A. luteicollis* (Becker), 1903: 74 (*Ceratopogon*).
Aswan (Aswan) Becker, 1903. Maadi (Cairo) Kieffer, 1925. El
Bustan (Beheira) Ghonaim, 1997. Shakshook (Faiyum); Aswan
(Aswan); El Sammaneen (Luxor) IX, 1999 coll. Ghonaim.
11. *A. osiris* Kieffer, 1925: 250.
Maadi (Cairo) Kieffer, 1925.

Genus *FORCIPOMYIA* Lenz, 1934 (8 spp.)Subgenus *EUPROJOANISIA* Brethes

12. *F. psilonota* (Kieffer), 1911a: 337 (*Ceratopogon*).
Maadi (Cairo) Kieffer, 1925. Moascar (Ismailia) Macfie, 1943. El
Bustan (Beheira) Ghonaim, 1997. El Qanatir (Qalyubiya) XI, 1997
coll. Ghonaim.

Subgenus *FORCIPOMYIA* Meigen

13. *F. biannulata* Ingram & Macfie, 1924: 557.
Moascar (Ismailia) Macfie, 1943. El Bustan (Beheira) Ghonaim,
1997. El Qanatir (Qalyubiya) XI, 1997; Shakshook (Faiyum); El
Badrasheen (Giza); El Shewash (Sohag); Aswan (Aswan) IX, 1999
coll. Ghonaim
14. *F. nilicola* (Kieffer), 1925: 253 (*Apelma*).
Maadi (Cairo) Kieffer, 1925. El Shewash (Sohag) IX, 1999 coll.
Ghonaim.
15. *F. urnigera* Kieffer, 1925: 247.
Maadi (Cairo) Kieffer, 1925.

Subgenus *LEPIDOHELEA* Kieffer

16. *F. marsafae* Ghonaim, Ibrahim & Ali, 2001: 42.
Marsafa (Qalyubiya) Ghonaim et al., 2001. Aswan (Aswan) IX, 1999 coll. Ghonaim.
17. *F. pulcherrima* Santos Abreu, 1918: 272.
Marsafa (Qalyubiya) Ghonaim et al., 2001. El Qanatir (Qalyubiya) XI, 1997; El Badrasheen (Giza) IV, 1999; El Shewash (Sohag); Aswan (Aswan); El Sammaneen (Luxor) IX, 1999 coll. Ghonaim.

Subgenus *MICROHELEA* Kieffer

18. *F. fuliginosa* (Meigen), 1818: 86 (*Ceratopogon*).
Asyut (Asyut) Macfie, 1924. El Bustan (Beheira) Ghonaim, 1997. El Badrasheen (Giza) IV, 1999 coll. Ghonaim.

Subgenus *SYNTHYRIDOMYIA* Saunders

19. *F. murina* (Winnertz), 1852: 26 (*Ceratopogon*).
Guyot Gardens (Suez); Sidi Gaber (Alexandria) Kieffer, 1925; Moascar (Ismailia) Macfie, 1943. El Qanatir (Qalyubiya) XI, 1997; Aswan (Aswan) IX, 1999 coll. Ghonaim.

SUBFAMILY DASYHELEINAE LENZ, 1934

Genus *DASYHELEA* Kieffer, 1911b (11 spp.)

20. *D. arenivaga* Macfie, 1943: 151.
Moascar (Ismailia) Macfie, 1943. Aswan (Aswan) IX, 1999 coll. Ghonaim.
21. *D. arenosa* Kieffer, 1925: 255.
Pyramids (Giza) Kieffer, 1925.
22. *D. begueti* Kieffer, 1922: 508.
Guyot Gardens (Suez); Helwan, Maadi (Cairo); Sea shore (Alexandria) Kieffer, 1925.
23. *D. egypti* Macfie, 1943: 149 (as a variety of *inconspicua*) (*Nomen dubium*).
Moascar (Ismailia) Macfie, 1943.
24. *D. fusca* Carter, Ingram & Macfie, 1921: 204.
Moascar (Ismailia) Macfie, 1943.
25. *D. heliophila* Macfie, 1943: 150 (as a variety of *inconspicua*) (*Nomen dubium*).
Nifisha (Ismailia) Macfie, 1943.
26. *D. inconspicua* Carter, Ingram & Macfie, 1921: 191 (*Nomen dubium*).
Moascar (Ismailia) Macfie, 1943.

27. *D. ismailiae* Macfie, 1943: 152.
Moascar (Ismailia) **Macfie, 1943.**
28. *D. luteocincta* Kieffer, 1925: 254.
Maadi(Cairo) **Kieffer, 1925.** Etsa (Faiyum); Aswan (Aswan) IX,
1999 coll. **Ghonaim.**
29. *D. modesta* (Winnertz) 1852: 43 (*Ceratopogon*).
Moascar (Ismailia) **Macfie, 1943.** El Bustan (Beheira); Marsafa
(Qalyubia) **Ghonaim, 1997.** El Qanatir (Qalyubia) XI, 1997; El
Mansoura (Daqahliya) VIII, 1999 coll. **Ghonaim.**
30. *D. nyasae* Ingram & Macfie, 1925: 286.
Moascar (Ismailia) **Macfie, 1943.** El Bustan (Beheira) **Ghonaim,**
1997.

SUBFAMILY CERATOPOGONINAE NEWMAN, 1834

TRIBE CULICOIDINI KIEFFER, 1911b

Genus *CULICOIDES* Latreille, 1809 (36 spp.)

31. *C. arenarius* Edwards, 1922: 164 (*Nomen dubium*).
Bir el Abd (N. Sinai) **Macfie, 1943.**
32. *C. azerbaijzhanicus* Dzhafarov, 1962: 211.
E-Tur, Marsa Abu Zabad, Wadi Ba'aba'a (S. Sinai) **Braverman et**
al., 1981.
33. *C. bedfordi* Ingram & Macfie, 1923: 57.
Nile delta **Morsy et al., 1989.** El Hamra (Giza), El Hara (Bahar-
riya Oasis) **Ahmed, 1991.** El Qanatir (Qalyubia) XI, 1997; El
Sammaneen (Luxor) IX, 1999 coll. **Ghonaim.**
34. *C. calloti* Kremer, Delecolle, Bailly-Choumara & Chaker, 1979: 195.
E-Tur, Hammam Saidna Mussa, Wadi Dissa (S. Sinai) **Braverman**
et al., 1981.
35. *C. cataneii* Clastrier, 1957: 438.
El Arish (N. Sinai) **Braverman et al., 1981.**
36. *C. catharinae* Kremer, Delecolle & Braverman, 1991: 151.
St. Catharina (S. Sinai) **Braverman et al., 1981.**
37. *C. circumscriptus* Kieffer, 1918: 49.
Moascar (Ismailia) **Macfie, 1943.** Mit Yaish, Nawasa el Gheit
(Daqahliya); Abis (Beheira); Abbassiya (Cairo); Abu Rauwash
(Giza); El Siliyin (Faiyum); Minya (Minya); Biblaw (Asyut) **Eesa,**
1975. El Bustan (Beheira) **Ghonaim, 1997.** El Qanatir (Qalyubia)
XI, 1997, III, 1998; El Mansoura (Daqahliya) VIII, 1999; El She-
wash (Sohag) IX, 1999 coll. **Ghonaim.**
38. *C. distinctipennis* Austen, 1912: 101.
Mit Yaish (Daqahliya); Shatanuf (Minufiya) **Nagaty & Morsy,**
1960a. Kafr Hamza, El Qanatir (Qalyubia); Itay el Barud (Be-
heira); Abbassiya, Bulaq el Dakrur (Giza); Abu Rauwash, Kafr
Tarkhan (Giza); El Siliyin (Faiyum); Ismailia (Ismailia); Asyut

- (Asyut) Eesa, 1975. El Bustan (Beheira) Ghonaim, 1997. El Mansoura (Daqahliya) VIII, 1999 coll. Ghonaim.
39. *C. firuzae* Dzhafarov, 1958: 245.
Wadi Ba'aba'a (S. Sinai) Braverman et al., 1981.
 40. *C. hanae* Braverman, Delecolle & Kremer, 1983: 678.
Rafah, El Arish, Bir el Hafen (N. Sinai) Braverman et al., 1983.
 41. *C. imicola* Kieffer, 1913: 11.
Ismailia (Ismailia) Macfie, 1943. Bulaq el Dakrur (Giza) Morsy, 1961. Suez (Suez) Ahmed, 1991.
 42. *C. inornatipennis* Carter, Ingram & Macfie 1920: 227.
Bir el Abd (N. Sinai); Moascar (Ismailia) Macfie, 1943.
 43. *C. nr. jumineri* Callot & Kremer 1969: 1112.
Ga'al, Khirba (S. Sinai) Braverman et al. 1981.
 44. *C. kingi* Austen, 1912: 104.
Moascar (Ismailia) Macfie, 1943. Bir el Abd (N. Sinai) Braverman et al., 1981.
 45. *C. langeroni* Kieffer, 1921b: 262.
Bir el Abd (N. Sinai) Macfie, 1943.
 46. *C. leucostictus* Kieffer, 1911a: 340.
Asyut (Asyut) Macfie, 1924. Maadi (Cairo) Kieffer, 1925. Moascar (Ismailia) Macfie, 1943. Wadi el Natrun (Beheira) Eesa, 1975.
 47. *C. nr. marcreti* Callot, Kremer & Basset, 1968: 271.
Khirba, Hammam Saidna Mussa, Marsa Abu Zabad, Wadi Dissa (S. Sinai) Braverman et al., 1981.
 48. *C. maritimus* Kieffer, 1924: 16.
Bir el Abd (N. Sinai); Ga'al, Khirba, Salmana (S. Sinai) Braverman et al., 1981.
 49. *C. mesghalii* Navai, 1973: 196.
Marsa Abu Zabad (S. Sinai) Braverman et al., 1981.
 50. *C. navaiae* Lane, 1983: 534.
Khirba (S. Sinai) Kremer et al., 1991. El Bustan (Beheira) Ghonaim, 1997.
 51. *C. neavei* Austen, 1912: 102.
Ismailia (Ismailia) Morsy et al., 1989.
 52. *C. newsteadi* Austen, 1921: 113.
Sheikh Zoweid (N. Sinai) Austen, 1921. El Bustan (Beheira) Ghonaim, 1997.
 53. *C. pilosipennis* Kieffer, 1925: 275.
Guyot Gardens (Suez) Kieffer, 1925.
 54. *C. pulicaris* (Linnaeus), 1758: 603 (*Culex*).
Ismailia (Ismailia); Bir el Abd (N. Sinai) Macfie, 1943.
 55. *C. puncticollis* (Becker), 1903: 75 (*Ceratopogon*).
North Coast (Alexandria); Burg Rashid (Beheira) Becker, 1903. Moascar, Nifisha (Ismailia) Macfie, 1943. Bulaq el Dakrur, Abu Rauwash (Giza); Abbassiya (Cairo) Morsy, 1961. El Mansoura, Aga (Daqahliya); Desouk (Kafr el Sheikh) Ahmed, 1991.

56. *C. riethi* Kieffer, 1914: 237.
Abu Rauwash (Giza); Wadi el Natrun (Beheira); El Siliyin (Faiyum); Botanical Gardens, High Dam (Aswan) **Abdel Samei, 1974**.
Minya (Minya) **Eesa, 1975**. Roseta (Beheira) **Ahmed, 1991**.
57. *C. sahariensis* Kieffer, 1923: 678.
Bir el Abd (N. Sinai) **Braverman et al., 1981**.
58. *C. schultzei* (Enderlein), 1908: 459 (*Ceratopogon*).
This species is very common and widely distributed all over lower and upper Egypt, in addition to Bahariya oasis and Sinai (**Ghonaim, 1997**).
59. *C. seifadinei* Dzhafarov, 1958: 247.
Wadi Sa'al (S. Sinai) **Braverman et al., 1981**.
60. *C. similis* Carter, Ingram & Macfie, 1920: 255.
Moascar (Ismailia) **Macfie, 1943**. Shatanuf (Minufiya) **Nagaty & Morsy, 1960a**. Ibyar, Kafr el Zayat (Gharbiya) **Eesa, 1975**.
61. *C. stigma* (Meigen), 1818: 73 (*Ceratopogon*).
Steyskal & El-Bialy, 1968 listed *C. stigma* (Meigen) in their list. However, no data on its distribution are available.
62. *C. vitreipennis* Austen, 1921: 103.
Bir el Abd (N. Sinai); Moascar (Ismailia) **Macfie, 1943**.
63. *C. sp. 1* Ghonaim, 1997: 132.
[This species is only known from female (Ghonaim, 1997)].
El Bustan (Beheira) **Ghonaim, 1997**.

TRIBE CERATOPOGONINI NEWMAN, 1834

Genus *ALLUAUDOMYIA* Kieffer, 1913 (3 spp.)

64. *A. melanosticta* (Ingram & Macfie), 1922a: 248 (*Thysanognathus*).
Ayyat (Giza); Beni Hassan (Sohag) **Macfie, 1924**. Moascar (Ismailia) **Macfie, 1943**.
65. *A. nilogenes* (Kieffer), 1925: 262 (*Thysanognathus*).
Maadi (Cairo) **Kieffer, 1925**.
66. *A. vudu* de Meillon & Hardy, 1954: 65.
Moascar (Ismailia) **Macfie, 1943**.
This species interferes with *A. melanosticta* [(**Macfie, 1943** collected and described it as *melanosticta* from Moascar (Ismailia)].

Genus *SERROMYIA* Meigen, 1818 (1 sp.)

67. *S. mangrovi* Delécolle and Braverman, 1987: 57.
E-Shira el Gharkana, Marsa Abu Zabad, Ras Muhammad (S. Sinai) **Delécolle & Braverman, 1987**

TRIBE SPHAEROMINI NEWMAN, 1834

Genus *JOHANNSENYMYIA* Malloch, 1915 (1 sp.)

68. *J. imparunguis* (Becker), 1903: 72 (*Ceratopogon*).
Cairo (Cairo); Luxor(Qena) Becker, 1903.

Genus *MACROPEZA* Meigen, 1818 (1 sp.)

69. *M. nuda* (Becker), 1903: 77 (*Macroptilum*).
Cairo (Cairo) Becker, 1903. El Shewash (Sohag) IX, 1999 coll.
Ghonaim.

Genus *NILOBEZZIA* Kieffer, 1921a (1 sp.)

70. *N. nilotica* (Kieffer), 1925: 263 (*Parrotia*).
Maadi (Cairo) Kieffer, 1925.

Genus *PROBEZZIA* Kieffer, 1906 (1 sp.)

71. *P. (Dicrobezzia)* sp. 1
Steyskal & El-Bialy, 1968 mentioned that there is one *Probezzia* (*Dicrobezzia*) sp. in the collection of Faculty of Science, Cairo University; however, they provided no distributional data. In addition, this specimen could not be found in the referred collection.

TRIBE PALPOMYIINI ENDERLEIN, 1936

Genus *BEZZIA* Kieffer, 1899 (2 spp.)

72. *B. aegyptia* Kieffer, 1925: 264.
Guyot Gardens (Suez) Kieffer, 1925.
73. *B. albicornis* (Meigen), 1818: 74 (*Ceratopogon*).
Cairo (Cairo), Faiyum (Faiyum) Becker, 1903. Maadi (Cairo) Macfie, 1944. El Bustan (Beheira); Marsafa, Benha (Qalyubiya) Ghonaim, 1997. El Qanatir (Qalyubiya) XI, 1997; El Mansoura (Daqahliya) VIII, 1999; Etsa (Faiyum) IX, 1999 coll. Ghonaim.

Discussion

This study presents an annotated checklist of ceratopogonid midges of Egypt. The checklist primarily depends on records of existing literature, as well as recent catches made by the first author from 9 different localities throughout Egypt collecting 19 species which constitute less than 1/3 of the total 73 species recorded. Perhaps, more species could have been collected by using malaise traps, sweeping nets, and larval sampling than the presently used, apparently insufficient, trapping method. Additionally, favorable weather conditions and extended time durations for catches may enhance the

number of collected species. Nevertheless, extensive application of pesticides and environmental pollution in general during the last few decades could have adversely affected the qualitative composition of ceratopogonid midges in Egypt.

Steyskal & El-Bialy (1968) mentioned that only two ceratopogonid species, *L. kerteszi* Kieffer and *P. (Dicrobezzia)* sp. 1, are in the collection of the Institute of Plant Protection, Ministry of Agriculture, Dokki, Egypt, and in the Department of Entomology, Faculty of Science, Cairo University, Egypt. However, these deposits have been lost except for one specimen of *L. kerteszi* Kieffer in the Institute; even this pinned specimen is almost destroyed. Survey of deposits in the European and American museums as well as private collections would be helpful in improving this checklist.

Leptoconops sp. 1 seems to be a new record; it is closer to *L. macfieii* Clastrier. However, more investigation in the future is needed to confirm whether it is *L. macfieii* Clastrier or a new species.

Nomen dubium in the present study is applied mostly for those species that were cited as synonyms under other species names, but now have the rank of a species. However, without examining the deposited materials in different collections, it is still not clear whether they are just synonyms or separate species, and therefore require further investigation.

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