

Checklist of citrus mites (Acari) of Egypt

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ABSTRACT

Mites inhabiting citrus orchards in Egypt were listed. The checklist, compiled from a survey of published literature, contains 149 mite species representing 39 families. It is expected that the number of the Egyptian mite species inhabiting different citrus cultivations will increase as comprehensive surveys continue. The most diverse order, Prostigmata, is represented by 95 species followed by, Mesostigmata, with 37 species. The families with the most citrus mite species known from Egypt are the Phytoseiidae and Tetranychidae with 18 and 12 species.

Key words: Acari; mites; diversity; Egypt; taxonomy.

INTRODUCTION

Citrus is the most popular fruit to Egyptians. Egypt is considered the second largest citrus-growing area (137,370 he) in Africa after Nigeria (732,000 he), where orange, mandarin, lime, lemon and grapefruit are cultivated (FAOSTAT, 2008). Mites play an important role in citrus production whether as pests or beneficials. In Egypt, the mite fauna of citrus orchards is still not completely known. Few comprehensive surveys concerning mites associated with citrus were conducted (Zaher *et al.*, 1970; Rasmay *et al.*, 1972; Abo-Korah, 1980-1981; Zaher, 1984a & b, 1986; Kandeel & Nassar, 1986 and Rahil & Abd-El-Halim, 2000) which are important addition to the literature.

There is no single source compiling mite taxa reported from citrus orchards in Egypt. Here the authors present a list of citrus mites collected from Egypt as a first work aiming at providing a foundation for future studies on Egyptian citrus mites.

MATERIALS AND METHODS

The list was prepared from several data sources. The authors surveyed the original literature dealing with the Egyptian mite fauna of citrus orchards (sweet orange, mandarin, lemon, grapefruit, kumquat, lime) including soil, litter and debris beneath trees. Data for the list include the mite species and its author(s) in addition to distribution records and habitats. Species from unpublished theses were not included in the present work. Families, genera and species of citrus mites are presented in alphabetical order.

RESULTS AND DISCUSSION

The mite fauna of citrus orchards was found belonging to the orders Mesostigmata (10 families, 37 species), Prostigmata (20 families, 95 species), Cryptostigmata (6 families, 12 species) and Astigmata (3 families, 5 species).

ORDER MESOSTIGMATA

Family: Ameroseiidae Evans

1. *Kleemannia kosi* El Badry, Nasr & Hafez

Habitats and distribution: Debris under orange in Qena and Aswan (Zaher, 1986).

2. *Kleemannia plumosus* Oudemans

Habitats and distribution: Leaves of lime in Fayoum (Sennores) (Rahil & Abd-El-Halim, 2000).

Family: Ascidae Voigts & Oudemans

3. *Arctoseius bilinear* Nasr

Habitats and distribution: Debris under sweet orange, *Citrus sinensis* (L.) Osbeck in Giza (Zaher, 1986); leaves of mandarin in Fayoum (Sennores) (Rahil & Abd-El-Halim, 2000).

4. *Gamasellodes zaheri* Nasr

Habitats and distribution: Debris under citrus trees in Beheira and Qalyubia (Zaher, 1986).

5. *Proctolaelaps bickleyi* (Bram.)

Habitats and distribution: Litter under citrus trees in Giza and Assiut (Sahel Saleem, Badary) (Zaher *et al.*, 1970); leaves, fruits and litter of Baladi and Navel orange in Lower Egypt (Rasmay *et al.*, 1972).

6. *Proctolaelaps hypudaei* (Oudemans)

Habitats and distribution: Leaves, fruits and litter of mandarin, Baladi and Navel orange in Lower Egypt (Rasmay *et al.*, 1972).

7. *Proctolaelaps orientalis* Nasr

Habitats and distribution: Debris under citrus trees in Giza and Beni Suef (Zaher, 1986).

Family: Blattisociidae Garman

8. *Cheiroseius nepalensis* (Evans and Hyatt)

Habitats and distribution: Debris under citrus trees in Giza (Zaher, 1986).

9. *Lasioseius africanus* Nasr

Habitats and distribution: Debris under citrus trees in Giza and Sohag (Zaher, 1986).

10. *Lasioseius peritremus* Nasr & Abou-Awad

Habitats and distribution: Debris under citrus trees in Beni Suef (Zaher, 1986).

Family: Digamasellidae Evans

11. *Dendrolaelaps aegypticus* Metwally & Mersal

Habitats and distribution: Debris under citrus trees in Giza (Zaher, 1986).

Family: Laelapidae Berlese

12. *Hypoaspis koseii* Hafez, El Badry & Nasr

Habitats and distribution: Soil under orange in Assiut (Zaher, 1986).

Family Macrochelidae Vitzthum

13. *Macrocheles punctata* Hafez, El-Badry & Nasr

Habitats and distribution: Leaves of sweet orange in Fayoum (Sennores) (Rahil & Abd-El-Halim, 2000).

Family: Ologamasidae Ryke

14. *Gamasiphis denticus* Hafez & Nasr

Habitats and distribution: Leaves of mandarin in Fayoum (Sennores) (Rahil & Abd-El-Halim, 2000).

15. *Gamasiphis parpulchellus* Nasr & Mersal

Habitats and distribution: Debris under citrus trees in Giza and Qalyubia (Zaher, 1986).

16. *Sessiluncus aegypticus* Nasr & Afifi

Habitats and distribution: Debris under citrus trees in Minya and Qalyubia (Zaher, 1986).

Family: Pachylaelapidae Berlese

17. *Zygoseius badrii* Hafez & Nasr

Habitats and distribution: Soil under *C. sinensis* in Qalyubia (Zaher, 1986).

Family: Phytoseiidae Berlese

18. *Amblyseiella setosa* Muma (= *Amblyseius denmarki* El-Borolossy– Chant & McMurtry, 2007)

Habitats and distribution: Debris under citrus trees in Qalyubia (Zaher, 1986).

19. *Amblyseius swirskii* Athias-Henriot (= *Amblyseius enab* El-Badry–Ramadan *et al.*, 2009)

Habitats and distribution: Leaves and fruits of orange, mandarin, lemon, kumquat and grapefruit in Lower Egypt (Rasmy *et al.*, 1972); citrus in Ismailia and Dakahlia (Zaher, 1986); cosmopolitan in citrus orchards (Kandeel & Nassar, 1986); leaves of mandarin in Fayoum (Sennores) (Rahil & Abd-El-Halim, 2000).

20. *Amblyseius* sp.

Habitats and distribution: Citrus trees in Giza (Zaher *et al.*, 1970); orange orchards in Giza and Tahreer (Rasmy, 1970); leaves of Baladi orange in Lower Egypt (Rasmy *et al.*, 1972).

21. *Cydnoseius negevi* (Swirski & Amitai) (= *Typhlodromus medanicus* El-Badry–Chant & Yoshida-Shaul, 1986; = *Typhlodromus schusteri* Yousef & El Brollosy–Kanouh *et al.*, 2012).

Habitats and distribution: Citrus in Qalyubia and Beheira (Zaher 1986).

22. *Euseius scutalis* (Athias-Henriot) (= *Amblyseius gossipi* El-Badry–Wyoski & Bolland, 1983)

Habitats and distribution: Citrus orchards in Qalyubia (Kandeel & Nassar, 1986; Kandeel *et al.*, 1986); leaves and branches of sweet orange and mandarin in Fayoum (Sennores) (Rahil & Abd-El-Halim, 2000).

23. *Iphiseius degenerans* (Berlese)

Habitats and distribution: Leaves of citrus in Giza (Zaher, 1986).

24. *Neoseiulus aegyptocitri* (Kandeel & El-Halawany)

Habitats and distribution: Citrus orchards in Qalyubia (Kandeel & El-Halawany, 1986).

25. *Neoseiulus longispinosus* (Evans)

Habitats and distribution: Branches of sweet orange in Fayoum (Sennores) (Rahil & Abd-El-Halim, 2000).

26. *Paraseiulus talbii* (Athias-Henriot) (= *Typhlodromus tetramedius* Zaher & Shehata–Chant & Yoshia-Shaul, 1982).

Habitats and distribution: Citrus trees in Giza (El-Badry, 1967); citrus leaves in Gharbia (Samannoud) and Fayoum (Zaher & Shehata, 1970); cosmopolitan in citrus orchards (Kandeel & Nassar, 1986).

27. *Proprioseiopsis messor* (Wainstein) (= *Amblyseius lindquisti* Schuster & Pritchard–Abbasova, 1972).

Habitats and distribution: Debris under citrus trees in Ismailia, Monufia and Dakahlia (Zaher, 1986).

28. *Seiulus* sp.

Habitats and distribution: Citrus trees in Beheira (Wadi El Natrun), Tahreer and Port Said (Zaher *et al.*, 1970).

29. *Typhlodromus (Anthoseius) citri* Hassan & Romeih

Habitats and distribution: Leaves and debris of citrus in Fayoum (Romeih *et al.*, 2005).

30. *Typhlodromus (Anthoseius) egypticus* El-Badry (= *Typhlodromus mangiferus* Zaher & El-Borolossy–Abo-Shnaf & Moraes, 2014).

Habitats and distribution: Citrus in South Sinai (Wadi Firan, Wady El-Tarfa, St. Cathrin) (Zaher, 1984b).

31. *Typhlodromus (Anthoseius) lataniae* El-Badry

Habitats and distribution: Leaves of citrus in

Alexandria (El-Badry, 1968).

32. *Typhlodromus (Typhlodromus) athiasae* Porath & Swirski (= *Typhlodromus pelargonicus* El-Badry–Abbasova, 1972; Chant & Yoshida-Shaul, 1987).

Habitats and distribution: Leaves and debris of citrus in Giza and Monufia (Zaher, 1986); leaves and branches of sweet orange, mandarin and lime in Fayoum (Sennores) (Rahil & Abd-El-Halim, 2000).

33. *Typhlodromus (Typhlodromus) kadii* Kandeel & El-Halawany

Habitats and distribution: Citrus orchards in Fayoum and Giza (Kandeel & El-Halawany, 1985; Kandeel & Nassar, 1986).

34. *Typhlodromus (Typhlodromus) pyri* Scheuten

Habitats and distribution: Cosmopolitan in citrus orchards (Zaher *et al.*, 1970); orange orchards in Giza and Cairo (Rasmy, 1970); leaves of Valencia orange in Lower Egypt (Rasmy *et al.*, 1972).

35. *Typhlodromus* sp.

Habitats and distribution: Citrus orchards in Giza, Alexandria and Tahreer (Zaher *et al.*, 1970).

Family: Uropodidae Kramer

36. *Nenteria hypotichus* El-Borolossy & El-Banhawy

Habitats and distribution: Lemon orchards (El-Banhawy *et al.*, 1997).

37. Unidentified genus and species

Habitats and distribution: Citrus orchards in Qalyubia (Zaher *et al.*, 1970); litter under mandarin in Lower Egypt (Rasmy *et al.*, 1972).

ORDER PROSTIGMATA

Family: Bdellidae Dugès

38. *Cyta latirostris* (Hermann)

Habitats and distribution: Litter under citrus trees in Giza and Sharkeia (Kandeel & Nassar, 1986).

39. *Spinibdella bifurcata* Ateyo

Habitats and distribution: Litter under citrus trees in Upper Egypt (Kandeel & Nassar, 1986); leaves and branches of mandarin and lime in Fayoum (Sennores) (Rahil & Abd-El-Halim, 2000).

40. Unidentified genus and species

Habitats and distribution: Leaves of Navel and Baladi orange in Lower Egypt (Rasmy *et al.*, 1972).

Family: Caligonellidae Grandjean

41. *Molothrognathus minutus* Soliman

Habitats and distribution: Debris under citrus trees in Giza and Beni Suef (Zaher, 1986).

Family: Camerobiidae Southcott

42. *Neophyllobius aegyptium* Soliman & Zaher

Habitats and distribution: Leaves of Navel orange in Lower Egypt (Rasmy *et al.*, 1972); citrus trees in Giza (Zaher, 1986).

43. *Neophyllobius citri* Soliman & Zaher

Habitats and distribution: Citrus orchards in Giza and Assiut (Sahel Saleem, Badary) (Zaher *et al.*, 1970); leaves of Baladi orange in Lower Egypt (Rasmy *et al.*, 1972); citrus trees in Aswan (Zaher, 1986); citrus trees in Alexandria and Aswan (Kandeel & Nassar, 1986).

44. *Neophyllobius mangiferus* Zaher & Gomaa

Habitats and distribution: Citrus trees in Sharqia, Tahreer and Beheira (Kandeel & Nassar, 1986); leaves of lime in Fayoum (Sennores) (Rahil & Abd-El-Halim, 2000).

Family: Cheyletidae Leach

45. *Acaropsella volgini* Gerson (= *Acaropsis*

aegyptiaca Wafa & Soliman–Negm & Mesbah, 2014)
Habitats and distribution: Fallen citrus fruits and debris in Tahreer and Giza (Wafa & Soliman, 1968).

46. *Acaropsellina docta* (Berlese)

Habitats and distribution: Citrus trees in Giza (Zaher *et al.*, 1970).

47. *Acaropsellina sollers* (Rohdendorf)

Habitats and distribution: Citrus trees in Sharqia (Kandeel & Nassar, 1986); *Citrus aurantium* L. in Giza and Fayoum (Romeih *et al.*, 2010).

48. *Cheletogenes ornatus* (Canestrini & Fanzago)

Habitats and distribution: Citrus trees (El-Badry & Zaher, 1960); citrus trees in Alexandria, Beheira (Wadi El Natrun) and Assiut (Sahel Saleem, Badary) (Zaher *et al.*, 1970); leaves and fruits of orange, mandarin, lemon, kumquat and grapefruit in Lower Egypt (Rasmy *et al.*, 1972); leaves of lime, orange and mandarin in Assiut (Salman *et al.*, 1975); citrus trees (Rizk *et al.*, 1978-1979); cosmopolitan in citrus orchards (Kandeel & Nassar, 1986); leaves and branches of sweet orange and mandarin in Fayoum (Sennores) (Rahil & Abd-El-Halim, 2000); *Citrus* buds in Giza (Embaba) (Negm & Mesbah, 2014).

49. *Cheyletus malaccensis* Oudemans

Habitats and distribution: Branches of sweet orange and mandarin in Fayoum (Sennores) (Rahil & Abd-El-Halim, 2000).

50. *Eutogenes punctata* Zaher & Soliman

Habitats and distribution: Citrus trees (Zaher & Soliman, 1965); citrus in Giza, Beni Suef and Qalyubia (Zaher, 1986).

51. *Hemicheyletia bakeri* Ehara

Habitats and distribution: Citrus trees in Alexandria, Assiut (Sahel Saleem, Badary) and Beheira (Wadi El Natrun) (Zaher *et al.*, 1970); leaves and fruits of orange, mandarin, lemon, kumquat and grapefruit in Lower Egypt (Rasmy *et al.*, 1972); citrus in North Sinai (Areish, Rafah, El-Sheikh Zewaid), South Sinai (Dahab, Newaibei, Taba, Sharm El-Sheikh) (Zaher, 1984b); leaves of sweet orange in Fayoum (Sennores) (Rahil & Abd-El-Halim, 2000).

Family: Cunaxidae Sig Thor

52. *Cunaxa capreolus* (Berlese)

Habitats and distribution: Branches of sweet orange in Fayoum (Sennores) (Rahil & Abd-El-Halim, 2000).

53. *Cunaxa setirostris* (Hermann)

Habitats and distribution: Citrus orchards in Giza (Zaher *et al.*, 1970); leaves and fruits of Navel and Baladi orange in Lower Egypt (Rasmy *et al.*, 1972); citrus orchards in Dakahlia, Sharkeia and Damietta (Zaher, 1986); leaves of citrus and litter under citrus trees in the Nile Delta (Kandeel & Nassar, 1986).

54. *Neocunaxoides fayoumi* Romeih & Abo-Shnaf

Habitats and distribution: Debris of *Citrus* spp. in Fayoum (Romeih & Abo-Shnaf, 2006).

Family: Eriophyidae Nalepa

55. *Aceria sheldoni* (Ewing)

Habitats and distribution: *Citrus* sp., sweet orange and lemon in Alexandria (Zaher, 1984a); citrus buds in North Sinai (Areish) (Zaher, 1984b).

56. *Phyllocoptruta citri* Soliman & Abou-Awad

Habitats and distribution: *Citrus* spp., leaves and fruits of Navel and Valencia orange and mandarin (Soliman & Abou-Awad, 1978); citrus trees in Beheira and Nile Delta (Zaher, 1984a).

57. *Phyllocoptruta oleivora* (Ashmead)

Habitats and distribution: Citrus trees in Alexandria and North Sinai (Areish, Rafah) (Zaher *et al.*, 1970); leaves of Navel, Valencia, mandarin and Baladi lemon (Rasmy *et al.*, 1972); orange trees in Kafr El-Sheikh, Dakahlia, Beheira and Alexandria (Zaher, 1984a).

Family: Eupalopsellidae Willmann

58. *Eupalopsellus olearius* Zaher & Gomaa

Habitats and distribution: Citrus trees in Sharqia, Qalyubia, Gharbia, Monufia, Beheira, Alexandria, Giza and Beni suef (Kandeel & Nassar, 1986).

59. *Exothorhis aegyptium* Kandeel & Nassar

Habitats and distribution: Citrus trees in Sharqia (Kandeel & Nassar, 1986).

60. *Saniosulus nudus* Summers

Habitats and distribution: Citrus trees in Giza (Zaher *et al.*, 1970); leaves and fruits of orange, mandarin, lemon, kumquat and grapefruit in Lower Egypt (Rasmy *et al.*, 1972); citrus trees in Dakahlia, Damietta and Alexandria (Kandeel & Nassar, 1986).

Family: Eupodidae Koch

61. *Egypteupodes strandtmanni* (Abou-Awad)

Habitats and distribution: Soil under citrus trees in Monufia and Giza (Zaher, 1986).

62. *Eupodes niloticus* Abou-Awad & El-Bagoury

Habitats and distribution: Leaves and branches of sweet orange, mandarin and lime in Fayoum (Sennores) (Rahil & Abd-El-Halim, 2000).

63. *Eupodes* sp.

Habitats and distribution: Citrus trees in Port Said (Zaher *et al.*, 1970); litter under Baladi lemon in Lower Egypt (Rasmy *et al.*, 1972).

Family: Microdispidae Cross

64. *Brennandania silvestris* Jacob

Habitats and distribution: Soil of citrus orchards in Monufia (Abo-Korah, 1980-1981).

Family: Pyemotidae Oudemans

65. Unidentified genus and species

Habitats and distribution: Litter under Baladi lemon in Lower Egypt (Rasmy *et al.*, 1972).

Family: Pygmephoridae Cross

66. *Bakerdania centriger* (Cooreman)

Habitats and distribution: Soil of citrus orchards in Monufia (Abo-Korah, 1980-1981).

67. *Bakerdania citri* Zaher & Kandeel

Habitats and distribution: Soil under citrus in Sharkeia (Zaher, 1986).

68. *Bakerdania gracilis* (Krczal)

Habitats and distribution: Soil of citrus orchards in Monufia (Abo-Korah, 1980-1981).

69. *Bakerdania haarloevi* Krczal

Habitats and distribution: Soil of citrus orchards in Monufia (Abo-Korah, 1980-1981).

70. *Bakerdania latipilosus* Rack.

Habitats and distribution: Soil of citrus orchards in Monufia (Abo-Korah, 1980-1981).

71. *Bakerdania tarsalis* (Hirst)

Habitats and distribution: Soil of citrus orchards in Monufia (Abo-Korah, 1980-1981).

72. *Bakerdania* sp.

Habitats and distribution: Soil of citrus orchards in Monufia (Abo-Korah, 1980-1981).

73. *Pediculaster mesembrinae* Can.

Habitats and distribution: Soil of citrus orchards in Monufia (Abo-Korah, 1980-1981).

74. *Pygmephorus ursulae* Mah.

Habitats and distribution: Soil of citrus orchards in Monufia (Abo-Korah, 1980-1981).

Family: Raphignathidae Kramer**75. *Raphignathus bakeri* Zaher & Gomaa**

Habitats and distribution: Lime trees in Beheira, Gharbia and Fayoum (Zaher & Gomaa, 1979).

76. *Raphignathus niloticus* Rakha & Mohamed

Habitats and distribution: Leaves of lime in Fayoum (Sennores) (Rahil & Abd-El-Halim, 2000).

Family: Scutacaridae Oudemans**77. *Imparipes tataricus* Sev.**

Habitats and distribution: Soil of citrus orchards in Monufia (Abo-Korah, 1980-1981).

78. *Imparipes* sp.

Habitats and distribution: Soil of citrus orchards in Monufia (Abo-Korah, 1980-1981).

79. *Scutacarus longitarsus* Berlese

Habitats and distribution: Soil of citrus orchards in Monufia (Abo-Korah, 1980-1981).

80. *Scutacarus quadrangularis* Paol

Habitats and distribution: Soil of citrus orchards in Monufia (Abo-Korah, 1980-1981).

81. *Scutacarus spinosus* Storkán

Habitats and distribution: Soil of citrus orchards in Monufia (Abo-Korah, 1980-1981).

82. *Scutacarus suborbiculatus* Rack

Habitats and distribution: Soil of citrus orchards in Monufia (Abo-Korah, 1980-1981).

83. *Scutacarus* sp.

Habitats and distribution: Soil of citrus orchards in Monufia (Abo-Korah, 1980-1981).

Family: Siteroptidae Mahunka**84. *Siteroptes priscus* Krczal**

Habitats and distribution: Soil of citrus orchards in Monufia (Abo-Korah, 1980-1981).

85. *Siteroptes* sp.

Habitats and distribution: Soil of citrus orchards in Monufia (Abo-Korah, 1980-1981).

Family: Stigmaeidae Oudemans**86. *Agistemus exsertus* Gonzalez**

Habitats and distribution: Cosmopolitan on citrus trees (Zaher *et al.*, 1970; Kandeel & Nassar, 1986); leaves and fruits of orange, mandarin, lemon, kumquat and grapefruit in Lower Egypt (Rasmy *et al.* 1972); leaves of lime, orange and mandarin in Assiut (Salman *et al.*, 1975); citrus trees (Rizk *et al.*, 1978-1979); leaves and branches of sweet orange, mandarin and lime in Fayoum (Sennores) (Rahil & Abd-El-Halim, 2000).

87. *Agistemus fleschneri* Summers

Habitats and distribution: *Citrus sinensis* in Giza (Zaher & El-Badry, 1962).

88. *Apostigmaeus navicella* Grandjean

Habitats and distribution: Citrus in North Sinai (Areish) (Zaher, 1984b).

89. *Mediolata aegyptiaca* (Soliman & Zaher)

Habitats and distribution: Leaves and fruits of orange, mandarin, lemon, kumquat and grapefruit in Lower Egypt (Rasmy *et al.*, 1972).

90. *Mediolata pini* (Canestrini)

Habitats and distribution: Leaves and fruits of orange, mandarin, lemon, kumquat and grapefruit in Lower Egypt (Rasmy *et al.*, 1972).

91. *Stigmaeus elongatus* Berlese (= *Stigmaeus luteus* Summers–Khanjani & Ueckermann, 2002).

Habitats and distribution: Litter under Baladi lemon in Lower Egypt (Rasmy *et al.*, 1972).

Family: Tarsonemidae Canestrini & Fanzago**92. *Diadalotarsonemus krantzi* Zaher & Kandeel**

Habitats and distribution: Citrus buds in Sharqia (Zaher, 1986).

93. *Diadalotarsonemus rodriguezii* Zaher & Kandeel

Habitats and distribution: Leaves of citrus in Qalyubia (Zaher 1986); leaves and branches of sweet orange, mandarin and lime in Fayoum (Sennores) (Rahil & Abd-El-Halim, 2000).

94. *Diadalotarsonemus* sp.

Habitats and distribution: Citrus orchards in Monufia (Zaher *et al.*, 1970); mandarin in Lower Egypt (Rasmy *et al.*, 1972).

95. *Tarsonemus bilobatus* Suski

Habitats and distribution: Soil of citrus orchards in Monufia (Abo-Korah, 1980-1981).

96. *Tarsonemus idaeus* Suski

Habitats and distribution: Soil of citrus orchards in Monufia (Abo-Korah, 1980-1981).

97. *Tarsonemus smithi* Ewing

Habitats and distribution: Leaves and fruits of Navel orange and Baladi lemon in Lower Egypt (Rasmy *et al.*, 1972).

98. *Tarsonemus* sp.

Habitats and distribution: Cosmopolitan in citrus orchards (Zaher *et al.*, 1970); soil of citrus orchards in Monufia (Abo-Korah, 1980-1981).

Family: Tenuipalpidae Berlese**99. *Brevipalpus californicus* (Banks)**

Habitats and distribution: Cosmopolitan in citrus orchards (Zaher *et al.*, 1970); leaves, fruits and buds of orange, mandarin, lemon, kumquat and grapefruit in Lower Egypt (Rasmy *et al.*, 1972); *C. aurantium* in Tahreer, Beheira (Wadi El Natrun), Giza, Qalyubia and Fayoum (Zaher, 1984a); citrus in Qalyubia (El-Halawany, 1991); *C. aurantium* in Giza and *Citrus* spp. in Qalyubia (Tukh), Beheira and Dakahlia (Halawa & Fawzy, 2014).

100. *Brevipalpus jordani* Dosse

Habitats and distribution: Citrus orchards (Dosse, 1972 in Vacante, 2010).

101. *Brevipalpus lewisi* McGregor

Habitats and distribution: Leaves of mandarin and Baladi lemon in Lower Egypt (Rasmy *et al.*, 1972); *Citrus* spp. in Monufia (El Bagour) (Halawa & Fawzy, 2014).

102. *Brevipalpus noranae* Halawa & Fawzy

Habitats and distribution: Mixed plantations of *C. aurantium* and *Malus domestica* Borkh. in Qalyubia (Tukh) (Halawa & Fawzy, 2014).

103. *Brevipalpus obovatus* Donnadieu

Habitats and distribution: Citrus trees in Giza (Zaher & El-Badry, 1964); cosmopolitan in citrus orchards (Zaher *et al.*, 1970); leaves of Baladi orange in Lower Egypt (Rasmy *et al.*, 1972); *C. aurantium* in Cairo, Giza, Fayoum, Port Said, Assiut and Gharbia (Zaher, 1984a); citrus in North Sinai (Areish) and Red Sea (Safagah) (Zaher, 1984b); leaves and branches of sweet orange, mandarin and lime in Fayoum (Sennores) (Rahil & Abd-El-Halim, 2000).

104. *Brevipalpus olearius* Sayed

Habitats and distribution: Leaves of sweet orange in Fayoum (Sennores) (Rahil & Abd-El-Halim, 2000).

105. *Brevipalpus phoenicis* (Geijskes)

Habitats and distribution: Cosmopolitan in citrus orchards (Zaher *et al.*, 1970); leaves of mandarin and Baladi lemon in Lower Egypt (Rasmy *et al.*, 1972); leaves of lime, orange and mandarin in Assiut (Salman *et al.*, 1975); *Citrus* spp. in Cairo, Sharkeia, Qalyubia, Giza, Fayoum, Gharbia, Port Said and Minya (Zaher, 1984a); leaves and branches of sweet

orange, mandarin and lime (Rahil & Abd-El-Halim, 2000); *Citrus* spp. in Giza (Halawa & Fawzy, 2014).

106. *Cenopalpus lanceolatisetae* (Attiah)

Habitats and distribution: Leaves of sweet orange and mandarin in Fayoum (Sennores) (Rahil & Abd-El-Halim, 2000).

107. *Cenopalpus pulcher* (Canestrini & Fanzago)

Habitats and distribution: Leaves and fruits of Navel, Sukkari and Baladi lemon in Lower Egypt (Rasmy *et al.*, 1972).

108. *Tenuipalpus granati* Sayed

Habitats and distribution: Leaves of mandarin and lime in Fayoum (Sennores) (Rahil & Abd-El-Halim, 2000).

Family: Tetranychidae Donnadieu**109. *Bryobia cristata* (Dugès)**

Habitats and distribution: *Citrus aurantium* in Giza and Fayoum (Romeih *et al.*, 2010).

110. *Eutetranychus africanus* (Tucker)

Habitats and distribution: Orange in Giza and Fayoum (Attiah, 1967).

111. *Eutetranychus banksi* (McGregor)

Habitats and distribution: Orange trees (Mohamed, 1965).

112. *Eutetranychus citri* Attiah

Habitats and distribution: Lime trees in Qalyubia (Abu-Zaabal) (Attiah, 1967).

113. *Eutetranychus orientalis* (Klein)

Habitats and distribution: Leaves and fruits of citrus in Upper and Lower Egypt (Sayed, 1942 & 1946); cosmopolitan in citrus trees (Attiah, 1967); cosmopolitan in citrus orchards (Zaher *et al.*, 1970); orange orchards in Giza and Tahreer (Rasmy, 1970); leaves and fruits of orange, mandarin, lemon, kumquat and grapefruit in Lower Egypt (Rasmy *et al.*, 1972); leaves of lime, orange and mandarin in Assiut (Salman *et al.*, 1975); *C. aurantium* in Giza and Beheira (Zaher *et al.*, 1982); *C. aurantium* in Giza, Beni Suef, Qalyubia and Beheira and *C. aurantium* var. *amara* L. in Beni Suef (Zaher, 1984a); citrus in North Sinai (Areish), South Sinai (Wadi Firan, Wadi El-Tarfa, El-Tor) and Red Sea (Ras-Ghareb) (Zaher, 1984b); leaves and branches of sweet orange, mandarin and lime in Fayoum (Sennores) (Rahil & Abd-El-Halim, 2000).

114. *Eutetranychus pantopus* (Berlese)

Habitats and distribution: *Citrus* sp. (Sayed, 1942).

115. *Eutetranychus pyri* Attiah

Habitats and distribution: *Citrus aurantium* in Beni Suef (Zaher *et al.*, 1982; Zaher, 1984a).

116. *Oligonychus mangiferus* (Rahman & Sapra)
Habitats and distribution: Citrus orchards in Giza (Zaher *et al.*, 1970).

117. *Tetranychus cinnabarinus* (Boisduval)
Habitats and distribution: Leaves of orange, mandarin, lemon, kumquat and grapefruit in Lower Egypt (Rasmy *et al.*, 1972).

118. *Tetranychus cucurbitacearum* (Sayed)
Habitats and distribution: *Citrus aurantium* in Beheira (Zaher *et al.*, 1982); lemon in North Sinai (Areish, Rafah), South Sinai (El-Tor) and Red Sea (Ras-Ghareb) (Zaher, 1984b).

119. *Tetranychus neocaledonicus* André
Habitats and distribution: Citrus trees in Beheira (Attiah, 1969).

120. *Tetranychus urticae* Koch
Habitats and distribution: Cosmopolitan in citrus orchards (Zaher *et al.*, 1970); *Citrus aurantium* in Beni Suef, Minya, Assiut and Sohag (Zaher, 1984a); leaves and branches of sweet orange, mandarin and lime in Fayoum (Sennores) (Rahil & Abd-El-Halim, 2000).

Family: Tuckerellidae Baker & Pritchard

121. *Tuckerella nilotica* Zaher & Rasmy
Habitats and distribution: Citrus in Assiut (Sahel Saleem, Badary) (Zaher *et al.*, 1970); citrus trees, *C. aurantium* in Assiut and Aswan (Kom-Ombo) (Zaher, 1984a).

Family: Tydeidae Kramer

122. *Loryia mali* (Oudemans)
Habitats and distribution: Citrus in Assiut (Sahel Saleem) and New Valley (Zaher *et al.*, 1970); leaves of Baladi orange (Rasmy *et al.*, 1972).

123. *Paralorryia gizal* El-Bagoury
Habitats and distribution: Branches of mandarin and lime in Fayoum (Sennores) (Rahil & Abd-El-Halim, 2000).

124. *Paralorryia mali* (Oudemans)
Habitats and distribution: Branches of mandarin in Fayoum (Sennores) (Rahil & Abd-El-Halim, 2000).

125. *Paralorryia* sp.
Habitats and distribution: Leaves of Baladi orange and Baladi lemon in Lower Egypt (Rasmy *et al.*, 1972).

126. *Paratriphytydeus* sp.
Habitats and distribution: Leaves of Baladi orange in Lower Egypt (Rasmy *et al.*, 1972).

127. *Pronemtus rykei* Meyer & Rodriguez
Habitats and distribution: Leaves and branches of sweet orange and mandarin in Fayoum (Sennores) (Rahil & Abd-El-Halim, 2000).

128. *Pronematus ubiquitus* (McGregor)
Habitats and distribution: Citrus in Assiut (Sahel Saleem, Badary) and Giza (Zaher *et al.*, 1970); orange orchards in Giza and Tahreer (Rasmy, 1970); leaves and fruits of orange, mandarin, lemon, kumquat and grapefruit in Lower Egypt (Rasmy *et al.*, 1972); citrus in North Sinai (Areish, Rafah), South Sinai (St. Cathrin, Wadi El-Tarfa) and Red Sea (Ras-Ghareb) (Zaher, 1984b); leaves of lime in Fayoum (Sennores) (Rahil & Abd-El-Halim, 2000).

129. *Tydeus californicus* (Banks)
Habitats and distribution: Citrus orchards in Giza (Zaher *et al.*, 1970); leaves and fruits of orange, mandarin, lemon, kumquat and grapefruit in Lower Egypt (Rasmy *et al.*, 1972); citrus trees (Rizk *et al.*, 1978-1979); citrus in North Sinai (Areish, Rafah) (Zaher 1984b); leaves and branches of sweet orange, mandarin and lime in Fayoum (Sennores) (Rahil & Abd-El-Halim, 2000).

130. *Tydeus kochi* Oudemans
Habitats and distribution: Cosmopolitan in citrus orchards (Zaher *et al.*, 1970); orange orchards in Giza and Tahreer (Rasmy, 1970); leaves of Baladi orange in Lower Egypt (Rasmy *et al.*, 1972); citrus in North Sinai (Areish, Rafah) and Red sea (Ras-Ghareb) (Zaher, 1984b); leaves and branches of mandarin and lime in Fayoum (Sennores) (Rahil & Abd-El-Halim, 2000).

131. *Tydeus lambi* Baker
Habitats and distribution: Citrus in South Sinai (St. Cathrin) (Zaher 1984b).

132. *Tydeus* spp.
Habitats and distribution: *Citrus sinensis* in Giza (Zaher & El-Badry, 1962); leaves of lime, orange and mandarin in Assiut (Salman *et al.*, 1975).

ORDER CRYPTOSTIGMATA

Family: Galumnidae Jacot

133. *Galumna* sp.
Habitats and distribution: Citrus orchards in Tahreer (Zaher *et al.*, 1970).

134. *Pilogalumna* sp.
Habitats and distribution: Soil under citrus in Dakahlia and Giza (Zaher, 1986).

Family Haplozetidae Grandjean

135. *Perxylobates obesus* Bayoumi
Habitats and distribution: Soil under citrus in Alexandria and Beheira (Zaher, 1986).

136. *Rostrozetes citri* Nasr & Hassan
Habitats and distribution: Debris under citrus in Monufia and Qalyubia (Zaher, 1986).

137. *Xylobates souchnaiensis* Abdel Hamid
Habitats and distribution: Soil under orange in Qena,

Assiut, Beheira and Gharbia (Zaher, 1986).

Family: Oribatulidae Thor

138. *Oribtula* sp.

Habitats and distribution: Citrus trees (Hashem *et al.*, 1987).

139. *Siculobata sicula* (Berlese)

Habitats and distribution: Leaves and fruits of orange, mandarin, lemon, kumquat and grapefruit in Lower Egypt (Rasmy *et al.*, 1972); cosmopolitan on citrus trees (Zaher, 1986).

140. *Zygoribatula sayedi* El-Badry & Nasr

Habitats and distribution: Soil under citrus in Giza, Beni Suef and Monufia (Zaher, 1986).

Family: Phthiracaridae Perty

141. *Euphthiracarus* sp.

Habitats and distribution: Citrus orchards in Giza (Zaher *et al.*, 1970).

Family: Scheloribatidae Grandjean

142. *Liebstadia* sp.

Habitats and distribution: Cosmopolitan in citrus orchards (Zaher *et al.*, 1970); leaves and fruits of orange, mandarin, lemon, kumquat and grapefruit in Lower Egypt (Rasmy *et al.*, 1972).

143. *Scheloribates* sp.

Habitats and distribution: Citrus orchards in Assiut (Sahel Saleem) (Zaher *et al.*, 1970); leaves and fruits of orange, mandarin, lemon, kumquat and grapefruit in Lower Egypt (Rasmy *et al.*, 1972).

Family: Sphaerochthoniidae Grandjean

144. *Sphaerochthonius transversus* Wallwork

Habitats and distribution: Branches of lime in Fayoum (Sennores) (Rahil & Abd-El-Halim, 2000).

ORDER ASTIGMATA

Family: Acaridae Ewing & Nesbitt

145. *Rhizoglyphus* sp.

Habitats and distribution: Citrus orchards in Qalyubia (Banha) (Zaher *et al.*, 1970); leaves and fruits of Baladi orange in Lower Egypt (Rasmy *et al.*, 1972).

146. *Tyrophagus putrescentiae* (Schrank)

Habitats and distribution: Leaves and fruits of lemon (Rasmy *et al.*, 1972); leaves and branches of sweet orange, mandarin and lime in Fayoum (Sennores) (Rahil & Abd-El-Halim, 2000).

147. *Tyrophagus* sp.

Habitats and distribution: Cosmopolitan in citrus orchards (Zaher *et al.*, 1970).

Family: Hemisarcoptidae Oudemans

148. *Hemisarcoptes malus* (Shimer)

Habitats and distribution: Citrus trees in Giza, Qalyubia and Monufia (Zaher, 1986); citrus orchards in Cairo, Giza and Beni Suef (Kandeel & Nassar, 1986).

Family: Histiotomatidae Berlese

149. *Histiotoma* sp.

Habitats and distribution: Citrus orchards in Giza (Zaher *et al.*, 1970).

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