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INVENTORY OF THE TRUE FLIES (DIPTERA) OF THE THAR DESERT

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INTRODUCTION

Great Indian Desert or the Thar Desert with its xeric environment is known to harbour an improvised fauna. The members of the order Diptera are commonly known as flies, gnats, midges, mosquitoes, keds, bots, etc. This diversity of names documents the importance of the group to man and reflects the range of organisms in the order. However, it is admittedly true that there is a paucity of knowledge on the account that does not show the Diptera of distinction that are absolutely prone to the arid and semi-arid situations in the desert.

A perusal of literature revealed that Kumar and Kumar (1996) have provided first exhaustive list of dipterans of the Thar Desert enumerating 84 species belonging to 45 genera spread over 22 families. However, recent studies on this group from Thar Desert by Parui and Mitra (2000), Banerjee and Mitra (2002) and Mitra *et al.*, (2002) have further substantially increased our knowledge bringing the tally of the species to 155 belonging to 77 genera spread over 27 families. The systematic list is as follows :

Suborder NEMATOCERA

Family 1. PHLEBOTOMIDAE

1. *Phlebotomus (Anaphlebotomus) colabaensis* Young & Chalam
2. *Phlebotomus (Euphlebotomus) argentipes* Annandale & Brunetti
3. *Phlebotomus (Paraphlebotomus) sergenti* Parrot
4. *Phlebotomus (Phlebotomus) papatasii* Scopoli
5. *Phlebotomus (Phlebotomus) salehi* Mesghali

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6. *Sergentomyia (Parrotomyia) babu* (Annandale)
7. *Sergentomyia (Parrotomyia) baghadadis* (Adler & Theodor)
8. *Sergentomyia (Sergentomyia) punjabensis* (Sinton)
9. *Sergentomyia (Sintonius) christophersi* (Sinton)
10. *Sergentomyia (Sintonius) clydei* (Sinton)
11. *Phlebotomus bailyi* (Sinton)

Family 2. CULICIDAE

Subfamily ANOPHELINAE

12. *Anopheles (Anopheles) barbirostris* van der Wulp
13. *Anopheles (Anopheles) nigerrimus* Giles
14. *Anopheles (Cellia) annularis* van der Wulp
15. *Anopheles (Cellia) culicifacies* Giles
16. *Anopheles (Cellia) dthali* Patton
17. *Anopheles (Cellia) fluviatilis* James
18. *Anopheles (Cellia) pallidus* Theobald
19. *Anopheles (Cellia) pulcherrimus* Theobald
20. *Anopheles (Cellia) splendidus* Koidzumi
21. *Anopheles (Cellia) stephensi* Liston
22. *Anopheles (Cellia) subpictus* Grassi
23. *Anopheles (Cellia) tessellatus* Theobald
24. *Anopheles (Cellia) turkhudi* Liston
25. *Anopheles (Cellia) vagus* Donitz

Subfamily CULICINAE

26. *Aedes (Aedimorphus) culicinus* Edwards
27. *Aedes (Aedimorphus) taeniorhynchoides* (Christophers)
28. *Aedes (Finlaya) sintoni* (Barraud)
29. *Aedes (Neomacleya) yusafi* Barraud
30. *Aedes (Stegomyia) aegypti* Linnaeus
31. *Aedes (Stegomyia) vittatus* Bigot
32. *Aedes (Stegomyia) w-albus* Theobald
33. *Coquillettidia (Coquillettidia) crassipes* (van der Wulp)
34. *Culex (Culex) barraudi* Edwards

35. *Culex (Culex) perplexus quinquefasciatus* Say
36. *Culex (Culex) pseudovishnui* Colless
37. *Culex (Culex) bitaeniorhynchus* Giles
38. *Culex (Culex) sitiens* Wiedemann
39. *Culex (Culex) tritaeniorhynchus* Giles
40. *Culex (Culex) univittatus* Theobald
41. *Culex (Lutzia) halifaxii* Theobald
42. *Culex (Mochthogenes) malayi* (Leicester)

Family 3. CECIDOMYIIDAE

43. *Contarinia prosopidis* (Mani)

Suborder BRACHYCERA

Family 4. STRATIOMYIDAE

44. *Adoxomyia heminopla* (Wiedemann)

Family 5. TABANIDAE

Subfamily TABANINAE

45. *Tabanus (Tabanus) rubidus* Wiedemann
46. *Tabanus (Tabanus) striatus* Fabricius

Family 6. ASILIDAE

Tribe LAPHRIINI

47. *Laxenecera albibarbis* Macquart
48. *Laxenecera flavibarbis* Macquart
49. *Nusa elva* (Walker)

Tribe STICHOPOGONINI

50. *Stichopogon meridionalis* Oldroyd
51. *Stichopogon inaequalis* (Loew)
52. *Cophinopoda chinensis* (Fabricius)
53. *Michotamia aurata* (Fabricius)
54. *Ommatius hradskyi* Joseph & Parui
55. *Ommatius ponti* Joseph & Parui
56. *Ommatius pseudokempi* Joseph & Parui

Tribe ASILINI

57. *Apoclea rajasthanensis* Joseph & Parui
58. *Astochia psedoguptai* Joseph & Parui
59. *Clephydroneura pulla* Oldroyd
60. *Philodicus pruthii* Bromley
61. *Philodicus femoralis* Ricardo
62. *Philodicus ceylanicus* Schiner
63. *Philodicus femoralis* Ricardo
64. *Philodicus javanus* (Wiedemann)
65. *Philodicus raoi* Joseph & Parui
66. *Promachus duvaucelii* (Macquart)
67. *Promachus melampygus* van der Wulp

Family 7. BOMBYLIIDAE

Subfamily TOXOPHORINAE

68. *Toxophora javana* Wiedemann

Subfamily BOMBYLIINAE

69. *Bombylius maculatus* (Fabricius)

Subfamily ANTHRACINAE

70. *Petrorossia albofulva* (Walker)
71. *Petrorossia nigrofemorata* (Brunetti)
72. *Anthrax bipunctatus* Fabricius
73. *Argyromoeba duvaucelii* (Macquart)

Subfamily EXOPROSOPINAE

74. *Thyridanthrax (Exhyalanthrax) absalon* (Wiedemann)
75. *Exoprosopa (Exoprosopa) collaris* (Wiedemann)
76. *Ligyra aurantiaca* (Guérin-Méneville)
77. *Ligyra oenomaus* (Rondani)

Family 8. PIPUNCULIDAE

78. *Tomosvaryella limpidipennis* (Brunetti)

Family 9. SYRPHIDAE

79. *Asarkina (Asarkina) ericetorum* Fabricius
80. *Ischiodon scutellaris* (Fabricius)
81. *Scaeva latimaculata* (Brunetti)
82. *Baccha (Allobaccha) sapphirina* Wiedemann
83. *Baccha (Allobaccha) umbrosa* Brunetti
84. *Eristalinus arvorum* (Fabricius)

Suborder CYCLORRHAPHA

Family 10. DIOPSIDAE

85. *Sphyracephala hearseiana* (Westwood)

Family 11. TEPHRITIDAE

86. *Euphranta (Staurella) crux* (Fabricius)
87. *Carpomyia vesuviana* Costa

Family 12. OTITIDAE

88. *Chrysomyza* sp.
89. *Physiphora aenea* (Fabricius)
90. *Physiphora demandata* (Fabricius)

Family 13. SEPSIDAE

93. *Sepsis cynipsea* Linnaeus
94. *Sepsis nitens* Wiedemann
95. *Saltella setigera* Brunetti
96. *Australosepsis frontalis* (Walker)

Family 14. AGROMYZIDAE

91. *Melanagromyza cuscutae* Hering
92. *Liriomyza trifolii* (Burgess)

Family 15. MILICHIIDAE

97. *Desmometopa singaporensis* Kertesz

Family 16. CHLOROPIDAE

98. *Anatrichus pygmaeus* Lamb
99. *Pachylophus rufescens* (de Meijere)

Family 17. EPHYDRIDAE

100. *Paralimna hirticornis* de Meijere
101. *Paralimna* sp.
102. *Brachydeutera longipes* Hendel
103. *Ochthera brevitibialis* de Meijere

Family 18. DROSOPHILIDAE

104. *Drosophila (Sophophora) ananassae* Doleschall

Family 19. HIPPOBOSCIDAE

105. *Hippobosca variegata* Megerle

Family 20. NYCTERIBIIDAE

106. *Basilia (Basilia) blainvillii amiculata* (Speiser)
107. *Basilia (Paracyclopodia) roylii* Westwood

Family 21. STREBLIDAE

108. *Brachyotheca lobulata* (Speiser)
109. *Brachytarsina (s.str.) maii* Advani & Vazirani
110. *Brachytarsina (s.str.) joblingi* Advani & Vazirani
111. *Brachytarsina (s.str.) theodori* Advani & Vazirani
112. *Brachytarsina (s.str.) sinhai* Advani & Vazirani
113. *Ascodipteron namrui* Maa
114. *Ascodipteron rhinopomatos* Jobling
115. *Parascodipteron scotophilus* Advani & Vazirani

Family 22. MUSCIDAE

Subfamily MUSCINAE

116. *Musca (Musca) domestica* Linnaeus
117. *Musca (Byomya) sorbens* Wiedemann

Subfamily PHAONIINAE

118. *Atherigona (Acritochaeta) orientalis* Schiner
119. *Atherigona (Atherigona) approximata* Malloch
120. *Atherigona (Atherigona) falcata* (Thomson)

121. *Atherigona (Atherigona) naqvii* Steyskal
122. *Atherigona (Atherigona) oryzae* Malloch
123. *Atherigona (Atherigona) soccata* Rondani

Subfamily STOMOXIINAE

124. *Stomoxys calcitrans* (Linnaeus)

Family 23. CALLIPHORIDAE

125. *Bengalia torosa* (Wiedemann)
126. *Chrysomya albiceps* (Wiedemann)
127. *Chrysomya megacephala* (Fabricius)
128. *Chrysomya rufifacies* (Macquart)
129. *Rhyncomya catalypsa* Séguy
130. *Stomorhina discolor* (Fabricius)

Family 24. SARCOPHAGIDAE

Subfamily SARCOPHAGINAE

131. *Parasarcophaga (Liopygia) ruficornis* (Fabricius)
132. *Parasarcophaga (Liosarcophaga) brevicornis* (Ho)
133. *Parasarcophaga (Liosarcophaga) dux* (Thomson)
134. *Parasarcophaga (Parasarcophaga) albiceps* (Meigen)
135. *Parasarcophaga (Parasarcophaga) hirtipes* (Wiedemann)
136. *Parasarcophaga (Parasarcophaga) misera* (Walker)
137. *Parasarcophaga (Parasarcophaga) knabi* (Parker)
138. *Parasarcophaga (Parasarcophaga) orchidea* (Böettcher)
139. *Parasarcophaga (Parasarcophaga) sericea* (Walker)
140. *Iranihindia futilis* (Senior-White)

Family 25. TACHINIDAE

Subfamily PHASIINAE

141. *Cylindromyia fuscipennis* (Wiedemann)
142. *Cylindromyia wiedemanni* Crosskey

Subfamily TACHININAE

143. *Hystricovoria bakeri* Townsend
144. *Voria ruralis* (Fallén)

Subfamily GONIINAE

145. *Peribaea orbata* (Wiedemann)
146. *Peribaea suspecta* Malloch
147. *Carcelia (Senometopia) illota* (Curran)

Family 26. GASTEROPHILIDAE

148. *Gasterophillus intestinalis* (De Geer)
149. *Gasterophillus nasalis* (Linnaeus)
150. *Gasterophillus pecorum* (Fabricius)

Family 27. OESTRIDAE

151. *Hypoderma bovis* (Linnaeus)
152. *Hypoderma lineatum* (Villers)
153. *Przhevalskiana silenus* (Brauer)
154. *Cephalopina titillator* (Clark)
155. *Oestrus ovis* Linnaeus

DISCUSSION

The Thar Desert is decidedly arid, being characterized by low rainfall and high temperature. The subterranean water is certainly insufficient to support any but very scanty plant life. However, there is abundant growth of annual vegetation shortly after the commencement of the rainy season but the greenery withers with the withdrawal of the monsoon. All these adverse conditions impose restrictions also on the animal lives that not only interact among themselves but also with various plants, plant predators and plant parasites. Therefore, the desert does not exhibit a flourished fauna that normally occurs in other ecosystems.

The Great Indian Desert or Thar Desert covers part of the four Indian states (Punjab, Haryana, Rajasthan and Gujarat) and two provinces of Pakistan (Sind and Punjab). There are 28 districts of the 4 states coming under the Thar Desert of which major area lying in the states of Rajasthan (13 districts) and Gujarat (8 districts). Besides this, 4 districts of Haryana and 3 districts of Punjab are also fall under the Thar desert of Indian part.

However, among the 27 families so far reported from the Thar Desert major share has taken by the family Culicidae (31 spp.) and Asilidae (21 spp.) followed by Phlebotomidae (11 spp.), Bombyliidae & Sarcophagidae (10 spp.), Muscidae (9 spp.), Streblidae (8 spp.), Syrphidae & Calliphoridae (6 spp.), Oestridae (5 spp.), Sepsidae (4 spp.), Otitidae & Gasterophilidae (3 spp.), Tabanidae, Tephritidae, Agromyzidae, Chloropidae, Nycteribiidae & Tachinidae (2 spp.).

The families like Cecidomyiidae, Stratiomyidae, Pipunculidae, Diopsidae, Milichiidae, Drosophilidae, Hippoboscidae, are represented by single species.

The dipterans in their adult stage are generally terrestrial but some need to go to water for oviposition or so. Indeed, they are in their larval stages more moisture loving and the great majority live in water, in rotting vegetable or animal matter, inside living plant tissues or bodies of other animals or in substrata where necessary moisture for vital process exists. It is true that the scarcity of water in the desert prevents most aquatic Diptera from colonization and the semi-aquatic Diptera that live in soil or in plants and animals have to live either in or decaying matters thus cannot undergo complete development. In fact, the other cause of limitation to many such Diptera in the desert is the physiological draught mostly due to the salinity of soil and water they inhabit.

The arid and semi-arid situations of the desert are likely to support high size population of the Asilidae, the Bombyliidae, the Conopidae and the Nemestrinidae in their diversity but the recorded fauna does not depict the true picture except the Asilidae (21 species) and the Bombyliidae (10 species).

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