

Thrips (Insecta: Thysanoptera) fauna from the Dampa Tiger Reserve, Mizoram, India

Thang Johnson* & R. Varatharajan

Centre for Advanced Study in Life Sciences, Manipur University, Canchipur –795 003, India.

(Email: thangjohnson@gmail.com)

Abstract

The data from the Dampa Tiger Reserve (DTR) (23°20' to 23°47' N latitude and 92°15' to 92°30' E longitude) situated in the district of West Phaileng, Mizoram, NE India revealed the occurrence of 55 thrips species belonging to 3 families, 5 sub-families and 40 genera. All the fifty-five species with the exception of *Nagathrips crenulatus* were collected and recorded for the first time from the state of Mizoram. Among these, 28 species placed in 21 genera belong to the suborder Terebrantia while 27 species clubbed in 19 genera are tubuliferans. In terms of feeding habit and habitat, 17 species are foliage invaders, 15 are flower inhabiting anthophilous species, 12 are fungal spore feeding mycophagous forms, 6 are gall inducing cecidogenous thrips, 4 are of grass dwellers and one is aquatic.

Keywords: *Thrips, Thysanoptera, Mizoram, survey, habit, habitat.*

Received: 27 January 2018; Revised: 22 June 2018; Online: 12 September 2018.

Introduction

Thrips are minute insects belonging to the order Thysanoptera. They are characterized by the presence of protrusible bladder-like structure at the tarsal end, fringed wings, and a pre-pupal stage between the larval & pupal stages. Yet another unique character is the asymmetrical mouthparts with vestigial right mandible. Insects of this order exhibit an incredible diversity of feeding habits in that, they may be herbivorous, fungivorous, pollinivorous or predacious (Mound & Marullo, 1996; Mound, 2005). Some of the species serve as biological carriers of tospovirus affecting at least 1090 plant species of diverse families (Parella *et al.*, 2003). However, some species act as predators on other soft-bodied insect pests like aleyrodids, coccids, mites, etc. acting as bio-control agents and the anthophilous forms involve in pollination in the agro-ecosystem (Ananthkrishnan, 1969, 1982).

Taxonomic survey pertaining to thrips of the Indian subcontinent has been carried out by a number of scientists and the results of which have been documented by Ananthkrishnan & Sen (1980) and Bhatti (1990). A list comprising 309 terebrantian and 430 tubuliferan species collected from India has been provided by Tyagi & Kumar (2016)

and recently, an updated catalogue of 333 terebrantians by Rachana & Varatharajan (2017). With respect to thrips of NE India, which is one of the world's megadiversity hotspots, a classified checklist of nearly 200 thrips has been presented by Varatharajan (2005). Subsequently, thrips of Nagaland (Tarunkumar & Varatharajan, 2010), Itanagar Wildlife Sanctuary, Arunachal Pradesh (Shyam, *et al.*, 2012), Kaziranga National Park of Assam (Chingthangkomba & Varatharajan, 2013), and Keibul Lamjao National Park of Manipur (Nishikanta & Varatharajan, 2014) were documented. The present paper provides an inventory of thrips collected from Dampa Tiger Reserve, Mizoram.

Materials and Methods

Study Area: The Dampa Tiger Reserve (approx. 500 km² area; 23°20' to 23°47' N latitude and 92°15' to 92°30' E longitude) lies in west Mizoram of north-eastern India, sharing an international border with Bangladesh. The altitude ranges from 250 to 1100 m above mean sea level (Raman *et al.*, 1998). The site falls under the category of moist deciduous forests in the lower altitudes and evergreen and semi-evergreen with natural

grassland at higher altitudes (Champion & Seth, 1968).

Field Survey & Sampling Methods:

Survey was undertaken after prior permission from the Forest department of Mizoram. During the study period (2014–16), periodical collections were made to cover most parts of the accessible areas. Different methods like random sampling, delayed counting, sweeping method, modified Tullgren method, etc. were followed to collect thrips from diverse habitats (Ananthakrishnan, 1984) and the extracted specimens were preserved in a standard collection fluid (10% Ethanol + Glacial Acetic acid in the ratio 9:1 with few drops of Triton-X) (Bhatti, 1997) for further processing in the laboratory.

Slide Preparation:

Permanent slides were prepared by following the protocol available at ThripsWiki (accessed on 14 December, 2015).

Thrips Identification & Cataloguing:

The prepared permanent slides were then identified using standard keys available in the specialized monographs and publications of Ananthakrishnan & Sen, 1980; Bhatti, 1980; Dang *et al.*, 2014; Mound & Minaei, 2007; Mound & Ng, 2009; Sen *et al.*, 1988; Palmer *et al.*, 1989; Varatharajan, 2005. The specimens were also compared with reference slides and some paratypes available in the Insect Museum of Manipur University. Some of the specimens were identified by Prof. L. A. Mound, CSIRO, Australia and Prof. J. S. Bhatti of Delhi University. Finally, validation was done with the help of ThripsWiki (accessed on 11 September, 2017), to facilitate diagnosis and accurate identification of the specimens.

Results & Discussion

The present study revealed the occurrence of 55 species belonging to 3 families, namely Merothripidae, Thripidae & Phlaeothripidae, and 5 sub-families viz., Dendrothripinae, Panchaetothripinae, Thripinae, Idolothripinae & Phlaeothripinae. The following systematic list provides details about the collected specimens.

I. SUBORDER TEREBRANTIA

IA. Family Merothripidae

Genus *Merothrips* Hood, 1912

1. *Merothrips indicus* Bhatti & Ananthakrishnan, 1975

Specimen studied: 2♀, Dampa Tiger Reserve; Mycophagous; ex. Dry twigs of Grass; Dt. 11.iii.2014;

Distribution: **India**– Kerala, Manipur, Nagaland, Tamil Nadu; **World**– China.

IB. Family Thripidae

Subfamily Dendrothripinae

Genus *Dendrothrips* Uzel, 1895

2. *Dendrothrips schimae* Kudo, 1989

Specimen studied: 6♀ & 4♂, Dampa Tiger Reserve; Phyllophilous; ex. Leaves of *Schima wallichii* (DC.) Korth. (Theaceae); Dt. 3.x.2014;

Distribution: **India**– Manipur, Nagaland; **World**– Nepal.

Subfamily Panchaetothripinae

Genus *Astrothrips* Karny, 1921

3. *Astrothrips tumiceps* Karny, 1923

Specimen studied: 5♀, Dampa Tiger Reserve; Phyllophilous; ex. Leaves of *Melia azaderarch* L. (Meliaceae); Dt. 24.xi.2015.

Distribution: **India**– Assam, Arunachal Pradesh, Delhi, Karnataka, Madhya Pradesh, Manipur, Punjab, Tamil Nadu, Uttar Pradesh, West Bengal; **World**– Indonesia, Philippines, northern Australia.

Genus *Helionothrips* Bagnall, 1932

4. *Helionothrips kadaliphilus* (Ramakrishna & Margabandhu, 1931)

Specimen studied: 8♀ & 4♂, Dampa Tiger Reserve; Phyllophilous; ex. Leaves of *Colocasia esculenta* (L.) Schott (Araceae); Dt. 25.ix.2014.

Distribution: **India**– Assam, Arunachal Pradesh, Kerala, Maharashtra, Manipur, Meghalaya, Nagaland, Tamil Nadu, West Bengal; **World**– New Guinea.

Genus *Heliothrips* Haliday, 1836

5. *Heliothrips haemorrhoidalis* (Bouche, 1833)

Specimen studied: 4♀ & 1♂, Dampa Tiger Reserve; Phyllophilous; ex. Leaves of *Ficus* sp. (Moraceae); Dt. 1.x.2016.

Distribution: **India**– Andamans, Arunachal Pradesh, Karnataka, Kerala, Maharashtra, Manipur, Meghalaya, Nagaland, Tamil Nadu; **World**– Australia, Germany, England, Finland, Sri Lanka, Suriname.

Genus *Monilothrips* Moulton, 1929

6. *Monilothrips kempii* Moulton, 1929

Thrips (Insecta: Thysanoptera) fauna from the Dampa Tiger Reserve, Mizoram, India

Specimen studied: 2♀, Dampa Tiger Reserve; Phyllophilous; ex. Fronds of *Dryopteris* sp. (Dryopteridaceae); Dt. 1.x.2016.

Distribution: **India**– Madhya Pradesh, Manipur, Nagaland, Tamil Nadu, Uttar Pradesh, West Bengal; **World**– China, North America, South Africa.

Genus *Panchaetothrips* Bagnall, 1912

7. *Panchaetothrips indicus* Bagnall, 1912

Specimen studied: 10♀ & 4♂, Dampa Tiger Reserve; Phyllophilous; ex. Leaves of *Curcuma longa* L. (Zingiberaceae); Dt. 18.iii.2015.

Distribution: **India**– Assam, Arunachal Pradesh, Bihar, Goa, Haryana, Kerala, Manipur, Nagaland, Tamil Nadu, Uttar Pradesh, West Bengal; **World**– Bangladesh, China, Thailand.

Genus *Phibalothrips* Hood, 1918

8. *Phibalothrips peringueyi* (Faure, 1925)

Specimen studied: 4♀, Dampa Tiger Reserve; Grass; ex. Inflorescence of *Paspalum orbiculare* G. Forst. (Poaceae); Dt. 24.ix.2016.

Distribution: **India**– Assam, Arunachal Pradesh, Delhi, Karnataka, Madhya Pradesh, Manipur, Meghalaya, Nagaland, Tamil Nadu, Uttar Pradesh, West Bengal; **World**– South Africa, Taiwan.

Genus *Rhipiphorothrips* Morgan, 1913

9. *Rhipiphorothrips cruentatus* Hood, 1919

Specimen studied: 6♀, Dampa Tiger Reserve; Phyllophilous; ex. Leaves of *Jatropha* sp. (Euphorbiaceae); Dt. 2.x.2016.

Distribution: **India**– Andaman Island, Assam, Delhi, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Punjab, Tamil Nadu, Uttar Pradesh, West Bengal; **World**– Afghanistan, Pakistan, Sri Lanka.

Genus *Selenothrips* Karny, 1911

10. *Selenothrips rubrocinctus* (Giard, 1901)

Specimen studied: 5♀, Dampa Tiger Reserve; Phyllophilous; ex. Leaves of *Quercus* sp. (Fagaceae); Dt. 25.ix.2014.

Distribution: **India**– Andaman Island, Assam, Arunachal Pradesh, Karnataka, Kerala, Manipur, Meghalaya, Nagaland, West Bengal; **World**– Bangladesh, Honduras, Mexico, Myanmar, Philippines, Sri Lanka, Taiwan, Thailand.

Subfamily Thripinae

Genus *Anaphothrips* Uzel, 1895

11. *Anaphothrips sudanensis* Trybom, 1911

Specimen studied: 10♀, Dampa Tiger Reserve; Grass; ex. Inflorescence of *Echinochloa* sp. (Poaceae); Dt. 28.ix.2014.

Distribution: **India**– Assam, Arunachal Pradesh, Delhi, Karnataka, Manipur, Meghalaya, Nagaland, Punjab, Sikkim, West Bengal; **World**– Philippines, Trinidad, Puerto Rico, Taiwan, New South Wales, Australia, South Africa, Egypt, Malabar, Indonesia, Sri Lanka.

Genus *Ayyaria* Karny, 1927

12. *Ayyaria chaetophora* Karny, 1926

Specimen studied: 5♀ & 1♂, Dampa Tiger Reserve; Anthophilous; ex. Flowers of *Sida* sp. (Malvaceae); Dt. 3.x.2014.

Distribution: **India** – Andhra Pradesh, Arunachal Pradesh, Assam, Delhi, Haryana, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Nagaland, Odisha, Tamil Nadu, Uttar Pradesh, West Bengal; **World**– Christmas Island (Indian Ocean), Taiwan, Japan, Philippines, Tahiti, Australia.

Genus *Bolacothrips* Uzel, 1895

13. *Bolacothrips indicus** (Ananthakrishnan, 1966)

Specimen studied: 4♀, Dampa Tiger Reserve; Grass; ex. Leaf sheaths of *Saccharum* sp. (Poaceae); Dt. 26.ix.2016. (* indicates endemic to India).

Distribution: **India** – Arunachal Pradesh, Gujarat, Kerala, Madhya Pradesh, Manipur, Nagaland, Tamil Nadu, West Bengal.

Genus *Dichromothrips* Priesner, 1932

14. *Dichromothrips nakahari** Mound, 1976

Specimen studied: 9♀, Dampa Tiger Reserve; Anthophilous; ex. Flowers of *Dendrobium* sp. (Orchidaceae); Dt. 18.iii.2015.

Distribution: **India**– Assam, Arunachal Pradesh, Meghalaya, Nagaland, West Bengal.

Genus *Megalurothrips* Bagnall, 1915

15. *Megalurothrips distalis* (Karny, 1913)

Specimen studied: 4♀, Dampa Tiger Reserve; Anthophilous; ex. Flowers of *Phaseolus vulgaris* L. (Fabaceae); Dt. 24.ix.2016.

Distribution: **India**– Andaman Island, Arunachal Pradesh, Assam, Meghalaya, Nagaland, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal; **World**– China,

Fiji, Indonesia, Korea, Philippines, Sri Lanka.

16. *M. mucunae* (Priesner, 1938)
Specimen studied: 7♀, Dampa Tiger Reserve; Anthophilous; ex. Flowers of *Phaseolus vulgaris* L. (Fabaceae); Dt. 3.x.2014.
Distribution: **India**– Assam, Manipur; **World**– Fiji, Indonesia.
17. *M. peculiaris* (Bagnall, 1918)
Specimen studied: 4♀, Dampa Tiger Reserve; Anthophilous; ex. Flowers of *Phaseolus vulgaris* L. (Fabaceae); Dt. 24.ix.2016.
Distribution: **India**– Arunachal Pradesh, Assam, Bihar, Delhi, Karnataka, Manipur, Meghalaya, Nagaland, Punjab, Tamil Nadu, Uttar Pradesh; **World**– China.

Genus *Microcephalothrips* Bagnall, 1926

18. *Microcephalothrips abdominalis* (Crawford DL, 1910)
Specimen studied: 10♀, Dampa Tiger Reserve; Anthophilous; ex. Flowers of *Ageratum conyzoides* L. (Asteraceae); Dt. 12.iii.2014.
Distribution: **India**– Arunachal Pradesh, Assam, Delhi, Himachal Pradesh, Karnataka, Manipur, Meghalaya, Nagaland, Punjab, West Bengal; **World**– Korea, Iran, Sri Lanka, Philippines, Indonesia, Egypt, Guam, Australia, New Zealand, USA, Canada, Cuba, Argentina, Mexico.

Genus *Organothrips* Hood, 1940

19. *Organothrips indicus* Bhatti, 1974
Specimen studied: 9♀, Dampa Tiger Reserve; Aquatic; ex. Petiole of *Eichhornia crassipes* (Mart.) Solms (Pontederiaceae); Dt. 29.xii.2015.
Distribution: **India**– Arunachal Pradesh, Delhi, Maharashtra, Manipur, West Bengal; **World**– Australia, Bangladesh, Florida, Germany, Hong Kong, Thailand.

Genus *Rhamphothrips* Karny, 1913

20. *Rhamphothrips aureus* (Ananthakrishnan, 1954)
Specimen studied: 5♀, Dampa Tiger Reserve; Phyllophilous; ex. Leaves of *Sesbania* sp. (Leguminosae); Dt. 24.xii.2015.
Distribution: **India**– Arunachal Pradesh, Delhi, Maharashtra, Manipur, West Bengal; **World**– Australia, Bangladesh, Florida, Germany, Hong Kong, Thailand.

Genus *Scirtothrips* Shull, 1909

21. *Scirtothrips dorsalis* Hood, 1919
Specimen studied: 7♀, Dampa Tiger Reserve; Phyllophilous; ex. Leaves of *Mangifera indica* L. (Anacardiaceae); Dt. 20.iii.2015.
Distribution: **India**– Andhra Pradesh, Arunachal Pradesh, Assam, Delhi, Gujarat, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Nagaland, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal; **World**– Bangladesh, Indonesia, Japan, Malaysia, Pakistan, South Africa.

Genus *Stenchaetothrips* Bagnall, 1926

22. *Stenchaetothrips biformis* (Bagnall, 1913)
Specimen studied: 8♀, Dampa Tiger Reserve; Grass; ex. Inflorescence of *Phragmites karka* (Retz.) Trin.ex. Steud. (Poaceae); Dt. 14.iii.2014.
Distribution: **India**– Arunachal Pradesh, Delhi, Chandigarh, Himachal Pradesh, Karnataka, Odisha, Madhya Pradesh, Manipur, Meghalaya, Sikkim, Tamil Nadu, Uttar Pradesh, West Bengal; **World**– Australia, Bangladesh, England, Indonesia, Romania; widespread in Asia.

Genus *Thrips* Linnaeus, 1758

23. *Thrips florum* Schmutz, 1913
Specimen studied: 8♀, Dampa Tiger Reserve; Anthophilous; ex. Flowers of *Amaranthus* sp. (Amaranthaceae); Dt. 25.ix.2014.
Distribution: **India**– Andaman Island, Arunachal Pradesh, Delhi, Karnataka, Manipur, Punjab; **World**– Australia, Brunei, Fiji, Hawaii, Java, Myanmar, Malaysia, New Guinea, Singapore, Sri Lanka, Tahiti, Thailand, Philippines.
24. *T. hawaiiensis* (Morgan, 1913)
Specimen studied: 10♀ & 2♂, Dampa Tiger Reserve; Anthophilous; ex. Flowers of *Mangifera indica* L. (Anacardiaceae); Dt. 18.iii.2015.
Distribution: Cosmopolitan.
25. *T. orientalis* (Bagnall, 1915)
Specimen studied: 8♀, Dampa Tiger Reserve; Anthophilous; ex. Flowers of *Lantana camara* L. (Verbenaceae); Dt. 15.iii.2014.
Distribution: **India**– Arunachal Pradesh, Assam, Delhi, Karnataka, Maharashtra, Manipur, Punjab, Tripura, Tamil Nadu,

Thrips (Insecta: Thysanoptera) fauna from the Dampa Tiger Reserve, Mizoram, India

Uttar Pradesh, West Bengal; Cosmopolitan; **World**– Australia, Florida, Hawaii, New Caledonia, Tanzania, Trinidad; widespread in Asian tropics.

26. *T. palmi* Karny, 1925

Specimen studied: 9♀, Dampa Tiger Reserve; Anthophilous; ex. Flowers of *Citrus* sp. (Rutaceae); Dt. 28.ix.2014.

Distribution: Cosmopolitan.

27. *T. tabaci* Lindeman, 1889

Specimen studied: 7♀, Dampa Tiger Reserve; Anthophilous; ex. Flowers of *Allium cepa* L. (Amaryllidaceae); Dt. 25.iii.2015.

Distribution: Cosmopolitan.

Genus *Tusothrips* Bhatti, 1967

28. *Tusothrips setiprivus* (Karny, 1926)

Specimen studied: 4♀, Dampa Tiger Reserve; Phyllophilous; ex. Leaves of *Amaranthus* sp. (Amaranthaceae); Dt. 25.ix.2014.

Distribution: **India**– Manipur, Tamil Nadu, West Bengal; **World**– Australia, Thailand.

II. SUBORDER TUBULIFERA

IIA. Family Phlaeothripidae Uzel, 1895

Subfamily Idolothripinae Bagnall, 1908

Genus *Elaphrothrips* Buffa, 1909

29. *Elaphrothrips curvipes* Priesner, 1929

Specimen studied: 5♀, Dampa Tiger Reserve; Mycophagous; ex. Dry twigs of *Mangifera indica* L. (Anacardiaceae); Dt. 2.x.2014.

Distribution: **India**– Arunachal Pradesh, Assam, Karnataka, Kerala, Maharashtra, Manipur, Meghalaya, Nagaland, Sikkim, Tamil Nadu, West Bengal; **World**– Bhutan, Germany, Indonesia, Laos, Malaysia, Thailand.

30. *E. denticollis* (Bagnall, 1909)

Specimen studied: 4♀, Dampa Tiger Reserve; Mycophagous; ex. Dry twigs of *Mangifera indica* L. (Anacardiaceae); Dt. 24.xii.2015.

Distribution: **India**– Arunachal Pradesh, Assam, Karnataka, Kerala, Meghalaya, Sikkim, Tamil Nadu, Tripura, West Bengal; **World**– China, Indonesia, Myanmar, Malaysia.

31. *E. insignis** Ananthkrishnan, 1973

Specimen studied: 5♀, Dampa Tiger Reserve; Mycophagous; ex. Dry twigs of

Mangifera indica L. (Anacardiaceae); Dt. 24.ix.2016.

Distribution: **India**– Arunachal Pradesh, Uttar Pradesh, Manipur, Nagaland, West Bengal.

Genus *Nesothrips* Kirkaldy, 1907

32. *Nesothrips brevicollis* (Bagnall, 1914)

Specimen studied: 3♀, Dampa Tiger Reserve; Mycophagous; ex. Dry twigs of *Mangifera indica* L. (Anacardiaceae); Dt. 2.x.2014.

Distribution: **India**– Assam, Kerala, Madhya Pradesh, Manipur; **World**– Fiji, Hawaii, Indonesia, Japan, Mauritius, Philippines.

Subfamily Phlaeothripinae Uzel, 1895

Genus *Apelaunothrips* Karny, 1925

33. *Apelaunothrips* *madrasensis* (Ananthkrishnan, 1964)

Specimen studied: 3♀, Dampa Tiger Reserve; Mycophagous; ex. Litter of *Bambusa* sp. (Poaceae); Dt. 2.x.2016.

Distribution: **India**– Kerala, Manipur, Nagaland, Tamil Nadu; **World**– Japan, Java, Malaysia.

Genus *Baenothrips* Crawford, 1948

34. *Baenothrips asper* (Bournier, 1963)

Specimen studied: 2♀, Dampa Tiger Reserve; Mycophagous; ex. Litter of Grass; Dt. 12.iii.2014.

Distribution: **India**– Andaman, Andhra Pradesh, Arunachal Pradesh, Kerala, Manipur, Nagaland, Tamil Nadu; **World**– Angola, China.

Genus *Bamboosiella* Ananthkrishnan, 1957

35. *Bamboosiella nayari* (Ananthkrishnan, 1958)

Specimen studied: 4♀, Dampa Tiger Reserve; Mycophagous; ex. Litter of *Bambusa* sp. (Poaceae); Dt. 24.ix.2016.

Distribution: **India**– Arunachal Pradesh, Kerala, Manipur, West Bengal. **World**– China.

Genus *Dolichothrips* Karny, 1912

36. *Dolichothrips assimilis** Priesner & Seshadri, 1952

Specimen studied: 7♀, Dampa Tiger Reserve; Phyllophilous; ex. Leaves of *Quercus* sp. (Fagaceae); Dt. 25.xii.2015.

Distribution: **India**– Arunachal Pradesh, Nagaland, Tamil Nadu.

37. *D. indicus* (Hood, 1919)

- Specimen studied: 7♀, Dampa Tiger Reserve; Anthophilous; ex. Flowers of *Ailanthus* sp. (Simaroubaceae); Dt. 16.iii.2015.
Distribution: **India**– Assam, Delhi, Karnataka, Kerala, Manipur, Meghalaya, Nagaland, Tamil Nadu, West Bengal; **World**– Guam, Sri Lanka, Taiwan.
38. *D. montanus** Ananthkrishnan, 1964
 Specimen studied: 7♀, Dampa Tiger Reserve; Anthophilous; ex. Flowers of *Lantana camara* L. (Verbenaceae); Dt. 25.ix.2014.
Distribution: **India**– Arunachal Pradesh, Assam, Manipur, Nagaland, Tamil Nadu, West Bengal.
- Genus *Ecacanthothrips* Bagnall, 1909**
39. *Ecacanthothrips tibialis* (Ashmead, 1905)
 Specimen studied: 3♀, Dampa Tiger Reserve; Mycophagous; ex. Litter of *Bambusa* sp. (Poaceae); Dt. 22.ix.2016.
Distribution: **India**– Arunachal Pradesh, Assam, Karnataka, Kerala, Manipur, Meghalaya, Nagaland, Tripura, Tamil Nadu, Tripura, West Bengal. **World**– Australia, China, Indonesia, Japan, Malaysia, Philippines, Tanzania, Vietnam, New Zealand.
- Genus *Gigantothrips* Zimmermann, 1900**
40. *Gigantothrips elegans* Zimmermann, 1900
 Specimen studied: 5♀, Dampa Tiger Reserve; Phyllophilous; ex. Leaves of *Ficus* sp. (Moraceae); Dt. 19.iii.2015.
Distribution: **India**– Arunachal Pradesh, Assam, Bihar, Delhi, Karnataka, Manipur, Nagaland, Odisha, Punjab, Tamil Nadu; **World**– China, Indonesia, Japan, Philippines, Thailand.
41. *G. tibialis* Bagnall, 1921
 Specimen studied: 7♀, Dampa Tiger Reserve; Phyllophilous; ex. Leaves of *Ficus* sp. (Moraceae); Dt. 10.x.2016.
Distribution: **India**– Andaman, Arunachal Pradesh, Assam, Karnataka, Kerala, Manipur, Nagaland, Uttarakhand; **World**– China, Sri Lanka.
- Genus *Gynaikothrips* Zimmermann, 1900**
42. *Gynaikothrips bengalensis** Ananthkrishnan, 1973
 Specimen studied: 10♀, Dampa Tiger Reserve; Cecidogenous; ex. Leaf galls of *Pongamia* sp. (Fabaceae); Dt. 24.iii.2015.
Distribution: **India**– Arunachal Pradesh, Assam, Karnataka, Manipur, Nagaland, Tripura, West Bengal.
43. *G. uzeli* (Zimmermann, 1900)
 Specimen studied: 8♀, Dampa Tiger Reserve; Phyllophilous; ex. Leaves of *Ficus curtipes* (Corner, 1960) (Moraceae); Dt. 20.iii.2015.
Distribution: Cosmopolitan.
- Genus *Haplothrips* Amyot & Serville, 1843**
44. *Haplothrips (Haplothrips) gowdeyi* (Franklin, 1908)
 Specimen studied: 10♀ & 2♂, Dampa Tiger Reserve; Anthophilous; ex. Flowers of *Leucaena leucocephala* (Lam.) de Wit (Fabaceae); Dt. 23.x.2015.
Distribution: Cosmopolitan.
45. *Haplothrips (Haplothrips) tenuipennis* Bagnall, 1918
 Specimen studied: 6♀ & 1♂, Dampa Tiger Reserve; Anthophilous; ex. Flowers of *Gomphrena globosa* L. (Amaranthaceae); Dt. 28.xii.2015.
Distribution: Cosmopolitan.
- Genus *Karnyothrips* Watson, 1923**
46. *Karnyothrips melaleucus* (Bagnall, 1911)
 Specimen studied: 3♀, Dampa Tiger Reserve; Mycophagous; ex. Mixed leaf litter; Dt. 25.ix.2016.
Distribution: **India**– Andaman Island, Arunachal Pradesh, Assam, Karnataka, Kerala, Manipur, Meghalaya, Nagaland, Tamil Nadu, West Bengal; **World**– China, Denmark, Indonesia, Vietnam.
- Genus *Leeuwenia* Karny, 1912**
47. *Leeuwenia ananthkrishnani** Varatharajan & Sen, 2000
 Specimen studied: 7♀, Dampa Tiger Reserve; Phyllophilous; ex. Leaves of *Quercus* sp. (Fagaceae); Dt. 22.ix.2016.
Distribution: **India**– Assam, Manipur, Nagaland.
- Genus *Liothrips* Uzel, 1895**
48. *Liothrips (Liothrips) aberrans** Muraleedharan & Sen, 1978
 Specimen studied: 4♀, Dampa Tiger Reserve; Cecidogenous; ex. Leaf galls of *Bixa orellana* Linn. (Bixaceae); Dt. 10.x.2016.
Distribution: **India**– Arunachal Pradesh, Sikkim, Manipur, Nagaland, West Bengal.
49. *Liothrips (Liothrips) himalayanus** Ananthkrishnan & Jagadish, 1970

Thrips (Insecta: Thysanoptera) fauna from the Dampa Tiger Reserve, Mizoram, India

Specimen studied: 3♀, Dampa Tiger Reserve; Cecidicolous; ex. Leaf galls of *Quercus* sp. (Fagaceae); Dt. 24.ix.2016.

Distribution: **India**– Arunachal Pradesh, Assam, Manipur, Meghalaya, Nagaland, West Bengal.

Genus *Mesothrips* Zimmermann, 1900

50. *Mesothrips jordani* Zimmermann, 1900
Specimen studied: 4♀, Dampa Tiger Reserve; Cecidicolous; ex. Leaf galls of *Quercus* sp. (Fagaceae); Dt. 3.x.2016.

Distribution: **India**– Andaman Island, Arunachal Pradesh, Karnataka, Manipur, Tamil Nadu, Tripura, West Bengal;
World– Australia, China, Indonesia, Japan.

Genus *Nagathrips* (Varatharajan & Singh, 2000)

51. *Nagathrips crenulatus** (Varatharajan & Singh, 2000)

Specimen studied: 7♀, Dampa Tiger Reserve; Phyllophilous; ex. Leaves of *Mallotus* sp. (Euphorbiaceae); Dt. 12.iii.2014.

Distribution: **India**– Nagaland.

Genus *Ocnothrips* Ananthakrishnan, 1969

52. *Ocnothrips indicus** Ananthakrishnan, 1969

Specimen studied: 3♀, Dampa Tiger Reserve; Cecidicolous; ex. Leaf galls of *Piper* sp. (Piperaceae); Dt. 25.ix.2016.

Distribution: **India**– Arunachal Pradesh, Kerala, Manipur, Nagaland.

Genus *Thlibothrips* Priesner, 1952

53. *Thlibothrips manipurensis**
Muraleedharan, 1982

Specimen studied: 4♀, Dampa Tiger Reserve; Cecidicolous; ex. Leaf galls of *Litsea monopetala* (Roxb.) Pers. (Lauraceae); Dt. 2.x.2016.

Distribution: **India** – Manipur, Nagaland.

Genus *Urothrips* Bagnall, 1909

54. *Urothrips tarai** (Stannard, 1970)

Specimen studied: 2♀, Dampa Tiger Reserve; Mycophagous; ex. Leaf litter of *Quercus* sp. (Fagaceae); Dt. 24.iii.2015.

Distribution: **India**– Arunachal Pradesh, Manipur, Nagaland, Uttar Pradesh.

Genus *Xylaplothrips* Priesner, 1928

55. *Xylaplothrips ligs* Ananthakrishnan & Jagadish, 1971

Specimen studied: 3♀, Dampa Tiger Reserve; Mycophagous; ex. Mixed leaf litter; Dt. 3.x.2014.

Distribution: **India**– Andhra Pradesh, Delhi, Karnataka, Manipur, Tamil Nadu.

* indicates species endemic to India.

Conclusions

The survey carried out at the Dampa Tiger Reserve (DTR) revealed the occurrence of 55 species of thrips belonging to 40 genera in five subfamilies and three families under two sub-orders. The families Merothripidae and Thripidae under the suborder Terebrantia were represented by a single species in the former and 27 species in the latter, while 27 species in the family Phlaeothripidae were collected under the suborder Tubulifera. The genus *Thrips* had the maximum of 5 species, while the genera *Elaphrothrips*, *Dolicothrips*, and *Megalurothrips* had 3 species each, and the rest with either 1 or 2 species. 2 terebrantians and 11 tubuliferans marked with an asterisk (*) are endemic to India. Foliage inhabiting thrips had the highest number of 17 species, followed by 15 species of flower inhabiting forms. The species, namely *Rhipiphorothrips cruentatus*, *Scirtothrips dorsalis*, *Stenchaetothrips biformis*, *Thrips hawaiiensis*, *T. palmi*, *T. palmi* have been reported to be serious pests of crops. A single aquatic form (*Organothrips indicus*) was also recorded occurring on the weed *Eichhornia crassipes*. From the total collected specimens, majority of them are phytophagous while about 24% are spore and mycelia feeders. As many as 33 different plant species from 24 families were screened for thrips during the survey.

Acknowledgements

The authors are highly indebted to the Head, Department of Life Sciences, Manipur University for the encouragement and facilities. Thanks are due to the forest officials for granting permission to collect specimens from the reserve areas. One of the authors, Mr. Th. Johnson would like to thank UGC (New Delhi) for providing fellowship under the CSIR UGC JRF scheme.

References

- Ananthakrishnan, T.N. 1969. Indian Thysanoptera. C.S.I.R. Zoological Monograph 1: 1-171.
Ananthakrishnan, T.N. 1982. Thrips and Pollination Biology. Current Science 51(4): 168-172.

- Ananthakrishnan, T.N. 1984. Bioecology of thrips. USA: Indira Publishing House. 205 pp.
- Ananthakrishnan, T.N. and Sen, S. 1980. Taxonomy of Indian Thysanoptera. Handbook series No.1. Zoological Survey of India. 234 pp.
- Bhatti, J.S. 1980. Species of the genus Thrips from India (Thysanoptera). Systematic Entomology 5: 109-166.
- Bhatti, J.S. 1990. Catalogue of insects of the Order Terebrantia from Indian subregion. Zoology 2(4): 205-352.
- Bhatti, J.S. 1997. Thysanoptera. Fauna of Delhi, State Fauna Series, Zoological Survey of India: Dehradun 6: 291-332.
- Champion, H.G. and Seth, S.K. 1968. A Revised Survey of the Forest Types of India. Manager of Publication, Government of India, Delhi.
- Chingthangkomba S.H. and Varatharajan, R. 2013. Thrips (Insecta: Thysanoptera) fauna of Kaziranga National Park, Assam. Current Science 105(10): 1219-1223.
- Dang, L.H., Mound, L.A. and Qiao, G.X. 2014. Conspectus of the Phlaeothripinae genera from China and Southeast Asia (Thysanoptera, Phlaeothripidae). Zootaxa 3807(1): 001-082.
- Mound, L.A. 2005. Thysanoptera: diversity and interactions. Annual Review of Entomology 50: 247-269.
- Mound, L.A. and Marullo, R. 1996. The thrips of Central and South America: an introduction (Insecta: Arthropoda) 6: 1-487.
- Mound, L.A. and Minaei, K. 2007. Australian thrips of the Haplothrips lineage (Insecta: Thysanoptera). Journal of Natural History 41(45-48): 2919-2978.
- Mound, L.A. and Ng. Y.F. 2009. An illustrated key to the genera of Thripinae (Thysanoptera) from South East Asia. Zootaxa 2265: 27-47.
- Nishikanta S.K. and Varatharajan, R. 2014. Thysanoptera (Insecta) Fauna of Keibul Lamjao National Park, Manipur, NE India. Journal of the Bombay Natural History Society 111(1): 19-28.
- Palmer, J.M., Mound, L.A. and du Heaume, G.J. 1989. CIE guides to insects of importance to man. 2. Thysanoptera. Wallingford: CAB Int. 73 pp.
- Parrella, G., Gognalons, P., Gebre-Selassie, K. and Marchoux, G. 2003. An update of the host range of tomato spotted wilt virus. Journal of Plant Pathology 85: 227-264.
- Rachana, R.R. and Varatharajan, R. 2017. Checklist of Terebrantian thrips (Insecta: Thysanoptera) recorded from India. Journal of Threatened Taxa 9(1): 9748 – 9755.
- Raman T.R.S., Rawat G.S. and Johnsingh A. J.T. 1998. Recovery of tropical rainforest avifauna in relation to vegetation succession following shifting cultivation in Mizoram, northeast India. Journal of Applied Ecology 35: 214-231.
- Sen S., Pramanik, N.K. and Sengupta, C.K. 1988. Thysanoptera fauna of North Eastern India. Records of Zoological Survey of India, Occasional paper, No. 100: 1-123.
- Shyam, M., Varatharajan, R., Tarunkumar S.O. and Chakravorty, J. 2012. Thysanoptera Fauna of the Itanagar Wildlife Sanctuary, (Arunachal Pradesh). Record of the Zoological Survey of India 112(3): 35-43.
- Tarunkumar S.O. and Varatharajan, R. 2010. Comparative study on the diversity of Thysanoptera in monoculture and natural forests of Nagaland. Indian Journal of Entomology 72(3):223-227.
- ThripsWiki. 2015 & 2017. Thrips Wiki—providing information on the World thrips. Accessed online at http://thrips.info/wiki/Main_Page [accessed on 14 December, 2015 & 11 September, 2017].
- Tyagi, K. and Kumar, V. 2016. Thrips (Insecta: Thysanoptera) of India – An Updated Checklist. Halteres 7: 64-98.
- Varatharajan, R. 2005. Faunistic Diversity of Thrips (Thysanoptera) of North Eastern India. Silver Jubilee Publication of Manipur University. 73 pp.