



Records of *Elasmus* species (Hymenoptera: Chalcidoidea: Eulophidae) from different States of India with thirteen new state records

Farmanur Rahman Khan

Department of Biology, Deanship of Educational Sciences, Qassim University, Al Qassim, Buraidah, 51452, Saudi Arabia; Email: insectqh11@gmail.com

Abstract

The present study deals with 19 species of the genus *Elasmus* Westwood, 1833 collected from different parts of India. Out of these recorded species, ten species are being recorded first time from the seven different states of India, such as Andaman Islands, Himachal Pradesh, Karnataka, Kerala, Odisha, Uttarakhand and Uttar Pradesh, amounting to thirteen new state records. All these recorded species are presented here with host specificity and geographical distribution.

Keywords: Distribution, Elasmini, Host, New Records

Introduction

The genus *Elasmus* Westwood, 1833 is the lone representative of the Elasmini tribe in the subfamily Eulophinae. It contains 258 species all over the world (Noyes, 2020) and 58 species are reported from India (Kazmi & Sheela, 2018). *Elasmus* species are mainly parasitoids of lepidopteran larvae and pupae as well as they parasitize coleoptera, diptera and hymenoptera while some species of *Elasmus* are hyperparasitoids of braconids and ichneumonids (Verma & Hayat, 1986; Coote, 1997). These species are distributed in all major zoogeographical regions of the world. The Indian species of the genus are well studied by Verma *et al.* (2002) and Narendran *et al.* (2008). Khan & Hayat (2011); Kazmi & Girish Kumar (2013, 2015) and Kazmi *et al.* (2017) recorded various species of *Elasmus* from different Indian states. The present paper provides information on 19 species of this genus collected from different states of India with the report of twelve new state records of ten species.

Material and Methods

The specimens collected from different states of India from 2006 to 2012 were used in the present study. Collection was carried out through sweep net by the author unless

noted otherwise, killed in the fumes of ethyl acetate and preserved in 70% alcohol. The species identification was done using keys provided in Verma *et al.* (2002) and Narendran *et al.* (2008). Besides, distribution and hosts of all recorded species are provided. Identified specimens were deposited in Insect collections of Department of Zoology, AMU, Aligarh (ZDAMU).

The following abbreviations are used: F = Female; M = Male; BMNH = The Natural History Museum, London; QMB = Queensland Museum, Brisbane; USNM = The U. S. National Museum, Washington D.C; UCD = Universal Chalcidoidea Database; ZDAMU = Department of Zoology, Aligarh Muslim University, Aligarh, India; DZUC = Department of Zoology, University of Calicut; ZSIC = Zoological Survey of India, Kolkata; ZSIJ = Zoological Survey of India, Jodhpur; YPT = Yellow Pan Trap.

Results

Systematic Account

Records of Species

1. *Elasmus anticles* Walker, 1846

1846. *Elasmus anticles* Walker, *Ann. Mag. Nat. Hist.*, 17(1): 181, F. Type F, India, Mumbai (=Bombay) (BMNH).

2008. *Elasmus anticles*: Narendran *et al.*, *Biospectra*, 3(1): 15 (female, diagnosis, key, host, distribution).

Material examined: INDIA: ANDAMAN ISLANDS, Garall Harman, 1 ♀, 22.ii.2012, *leg.* K. Veenakumari; UTTARAKHAND: Pauri, Byasi, 2 ♀♀, 17.xi.2011, *leg.* P.T. Anwar.

Hosts: Diptera, Hemiptera, and Lepidoptera as primary host and Hymenoptera as parasitoid hosts.

Distribution: INDIA: Andaman Islands, Bihar, Gujarat, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Tamil Nadu, Uttar Pradesh, Uttarakhand. *Elsewhere*: Bangladesh, Japan, Malaysia, Philippines.

Remarks: *Elasmus anticles* forms its first record from Andaman Islands.

2. *Elasmus brevicornis* Gahan, 1922

1922. *Elasmus brevicornis* Gahan, *Trebuia*, 3: 50, M, F. Type F: Indonesia: Java, Buitenzora (USNM).

2008. *Elasmus brevicornis*: Narendran *et al.*, *Biospectra*, 3(1): 15, female, diagnosis, key, host, distribution.

Material examined: INDIA: UTTARAKHAND: Dehradun, Kalsi, 5 ♀♀, 15.xi.2011; Pauri, Byasi, 1 ♀, 17.xi.2011, *leg.* P.T. Anwar; UTTAR PRADESH: Saharanpur, Shekhupura, 1 ♀, 16.iii.2011, *leg.* P.T. Anwar; KERALA: Pathanamithitta, Eraviperoor, 1 ♀, 15.i.2012.

Hosts: Lepidoptera.

Distribution: INDIA: Andhra Pradesh, Chhattisgarh, Delhi, Goa, Daman & Diu, Haryana, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, Uttarakhand, West Bengal. *Elsewhere*: Congo, Indonesia, Japan, Malaysia, Myanmar, Pakistan, Russia, Sri Lanka, Thailand, Vietnam, Yemen.

3. *Elasmus caligenus* Narendran, 2008

2008. *Elasmus caligenus* Narendran *et al.*, *Biospectra*, 3(1): 2, 10, F. Type F: India: Kerala (ZSIC).

Material examined: INDIA: UTTAR PRADESH: Chandauli, Jasury, 1 ♀, 27.iii.2012, *leg.* P.T. Anwar.

Hosts: Unknown.

Distribution: INDIA: Kerala, Uttar Pradesh. *Elsewhere*: Not recorded.

Remarks: This species is endemic to India and forms the first record from Uttar Pradesh.

4. *Elasmus cavicolous* Verma & Hayat, 2002

2002. *Elasmus cavicolous* Verma & Hayat, in Verma *et al.*, *Oriental Insects*, 36: 251, F, Type F: India: Maharashtra (BMNH).

2008. *Elasmus cavicolous*: Narendran *et al.*, *Biospectra*, 3 (1): 20, female, diagnosis, key.

Material examined: INDIA: KERALA: Thrissur, Kadavallur, 1 ♀, 10.i.2012; Malappuram, Koottilangadi, 1 ♀, 09.i.2012; KARNATAKA: Bengaluru, Kengiri, 1 ♀, 01.ix.2012, *leg.* K. Veenakumari (YPT).

Hosts: Unknown

Distribution: INDIA: Maharashtra, Karnataka, Kerala. *Elsewhere*: Not recorded.

Remarks: *E. cavicolous* is an endemic species of India and it is being reported here first time from Karnataka and Kerala states, while it was known from Maharashtra only.

5. *Elasmus dextotus* Narendran, 2008

2008. *Elasmus dextotus* Narendran *et al.*, *Biospectra*, 3(1): 4, 6, F. Type F: India: Kerala (ZSIC).

Material examined: INDIA: KERALA: Kottayam, Kidangoor, 1 ♀, 14.i.2012.

Hosts: Unknown.

Distribution: INDIA: Kerala. *Elsewhere*: Not recorded.

6. *Elasmus flavocarpus* Husain & Kudeshia, 1984

1984. *Elasmus flavocarpus* Husain & Kudeshia, *Bangladesh J. Zool.*: 28, female, Holotype, India, Aligarh (lost?)

2008. *Elasmus flavocarpus*: Narendran *et al.*, *Biospectra*, 3(1): 18, female, diagnosis, key, host, distribution.

Material examined: INDIA: UTTARAKHAND: Pauri, Byasi, 1 ♀, 17.xi.2011, *leg.* P. T. Anwar.

Host: *Apanteles* sp. cocoons on *Ricinus communis*.

Distribution: INDIA: Delhi, Himachal Pradesh, Kerala, Uttar Pradesh, Uttarakhand. *Elsewhere*: Not recorded.

Remarks: *E. flavocarpus* is the first record from Uttarakhand and also endemic to India.

7. *Elasmus homonae* Ferriere, 1929

1929. *Elasmus homonae* Ferriere, *Bull. Entomol. Res.*, **20**: 415–416, ♀, ♂. Lectotype ♀. Sri Lanka (BMNH).

2008. *Elasmus homonae*: Narendran *et al.*, *Biospectra*, **3**(1): 13, female, diagnosis, key, host, distribution.

Material examined: INDIA: KERALA, Thrissur, Amballur, 2 ♀♀, 10.i.2012; KARNATAKA: Mandya, Narayan Gowda, 1 ♀, 02.i.2012.

Hosts: Lepidoptera.

Distribution: INDIA: Karnataka, Kerala, Tamil Nadu, Uttar Pradesh. *Elsewhere*: Sri Lanka, Taiwan, and Thailand.

Remarks: The present report forms its first record from Karnataka.

8. *Elasmus hyblaeae* Ferriere, 1929

1929. *Elasmus hyblaeae* Ferriere, *Bull. Entomol. Res.*, **20**: 414, F. Type F: India, Arvallica, Nilambur (BMNM).

2008. *Elasmus hyblaeae*: Narendran *et al.*, *Biospectra*, **3**(1): 13, female, diagnosis, key, host, distribution.

Material examined: INDIA: KERALA: Thrissur, Kadavallur, 1 ♀, 10.i.2012.

Hosts: Lepidoptera.

Distribution: INDIA: Andhra Pradesh, Assam, Karnataka, Kerala, Madhya Pradesh, Meghalaya, Odisha, Tamil Nadu, Uttar Pradesh, Uttarakhand, West Bengal. *Elsewhere*: Malaysia, Pakistan, and Sri Lanka.

9. *Elasmus indicus* Rohwer, 1921

1921. *Elasmus indicus* Rohwer, *Ann. Mag. Nat. Hist.*, **9**(7): 123–124, F. M. Holotype F, India, Coimbatore (USNM).

2008. *Elasmus indicus*: Narendran *et al.*, *Biospectra*, **3**(1): 20–21, female, diagnosis, key, host, distribution.

Material examined: INDIA: HIMACHAL PRADESH: Mandi, Motipur, 1 ♀, 25.vi.2006, leg. F. R. Khan & S.M.A. Badruddin; ODISHA: Angul, Musapappoli, 1 ♀, 09.xii.2007.

Hosts: Hemiptera and Lepidoptera.

Distribution: INDIA: Himachal Pradesh, Karnataka, Kerala, Maharashtra, Odisha, Tamil Nadu, Uttar Pradesh, Uttarakhand. *Elsewhere*: Bangladesh, Japan, Russia, Sri Lanka, and Vietnam.

Remarks: *E. indicus* forms its first record from Himachal Pradesh and Odisha.

10. *Elasmus johnstoni* Ferriere, 1929

1929. *Elasmus johnstoni* Ferriere, *Bull. Entomol. Res.*, **20**: 258, F. M. Type F: Sudan, Wad Medani (BMNH).

2008. *Elasmus johnstoni*: Narendran *et al.*, *Biospectra*, **3**(1): 12–13, female, diagnosis, key, host, distribution.

Material examined: INDIA: KARNATAKA: Mandya, Edegatta, 1 ♀, 31.xi.2011.

Hosts: Lepidoptera.

Distribution: INDIA: Bihar, Chhattisgarh, Haryana, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Puducherry, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, Uttarakhand, West Bengal. *Elsewhere*: Myanmar, Pakistan, Senegal, Sri Lanka, Sudan, Thailand, Uganda, Zimbabwe.

Remarks: Although the species is widespread, this forms its first record from Karnataka.

11. *Elasmus longicornis* Verma & Hayat, 2002

2002. *Elasmus longicornis* Verma & Hayat, in Verma *et al.*, *Oriental Insects*, **36**: 276–277, F. Holotype F, India, Kerala (BMNH), description, key, distribution.

2009. *Elasmus longicornis*: Yefremova & Strakhova, *Oriental Insects*: 281, female, diagnosis, key, distribution.

Material examined: INDIA: KERALA: Pathanamthitta, Ommalaur, 1 ♀, 14.i.2012.

Hosts: Unknown.

Distribution: INDIA: Kerala. *Elsewhere*: Vietnam (Noyes, 2020).

12. *Elasmus longiventris* Verma & Hayat, 2002

2002. *Elasmus longiventris* Verma & Hayat, in Verma *et al.*, *Oriental Insects*, **36**: 277–278, F. Holotype F: India: Kerala, Periyar Animal Sanctuary (BMNH).

2008. *Elasmus longiventris*: Narendran *et al.*, *Biospectra*, **3**(1): 20, diagnosis, key, distribution.

Material examined: INDIA: KERALA: Kozhikode, Thattolikkara, 1 ♀, 08.i.2012.

Hosts: Unknown.

Distribution: INDIA: Kerala, West Bengal, Uttar Pradesh. *Elsewhere*: Vietnam.

13. *Elasmus neoflavocarpus* Narendran & Hema, 2008

2008. *Elasmus neoflavocarpus* Narendran & Hema, in Narendran *et al.*, *Biospectra*, **3**(1): 4, 9–10. F: Holotype F: India, Kerala (DZUC).

Material examined: INDIA: KARNATAKA: Bangalore, Nandi Hills, 1 ♀, 28.xii.2011; UTTAR PRADESH, Aligarh, Aligarh Fort, 1 ♀, 27.iv.2012.

Hosts: Unknown.

Distribution: INDIA: Chhattisgarh, Karnataka, Kerala, Odisha, Uttar Pradesh. *Elsewhere:* Not recorded.

Remarks: The present report forms its first record from Karnataka and also this species is endemic to India.

14. *Elasmus punensis* Mani & Saraswat, 1972

1972. *Elasmus punensis* Mani & Saraswat, *Oriental Insects*, 6(4): 479, F. Holotype F: India, Pune, Khandakwasla Sinhagarh Fort (USNM).

2008. *Elasmus punensis*: Narendran *et al.*, *Biospectra*, 3(1): 17, female, diagnosis, key, distribution.

Material examined: INDIA: UTTAR PRADESH: Saharanpur, Shekhupura, 1 ♀, 16.iii.2011; KARNATAKA: Mandya, Narayan Gowda, 1 ♀, 02.i.2012; Mysore, Byadar Halli, 2 ♀♀, 04.i.2012; KERALA: Kozhikode, IISR Campus, 2 ♀♀, 07.i.2012; Alappuzha, Kayamkulam, 5 ♀♀, 17.i.2012.

Hosts: Unknown

Distribution: INDIA: Andhra Pradesh, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Odisha, Tamil Nadu, Uttar Pradesh, Uttarakhand, West Bengal. *Elsewhere:* Sri Lanka.

15. *Elasmus pulchellus* Verma & Hayat, 2002

2002. *Elasmus pulchellus* Verma & Hayat, in Verma *et al.*, *Oriental Insects*, 36: 274–275, F: Holotype F: India, Uttar Pradesh (BMNH).

2008. *Elasmus pulchellus* Narendran *et al.*, *Biospectra*, 3(1): 19, female, India, diagnosis, key, distribution.

Material examined: INDIA: KERALA: Eranakulam, Perumbavoor, 2 ♀♀, 12.i.2012.

Hosts: Not known.

Distribution: INDIA: Karnataka, Kerala, Uttar Pradesh. *Elsewhere:* UAE (Noyes, 2020).

16. *Elasmus queenslandicus* Girault, 1913

1913. *Elasmus queenslandicus* Girault, *Arch. Naturgesch.*: 82, F: Holotype F, Australia, Queensland, Kuranda (QMB).

2008. *Elasmus queenslandicus*: Narendran *et al.*, *Biospectra*, 3(1): 14, diagnosis, key, distribution.

Material examined: INDIA: KARNATAKA: Bangalore, Makarhalli, 1 ♀, 28.xii.2011; Mysore, Ambapura, 03.i.2012; Mandya, Narayan Gowda, 1 ♀, 02.i.2012; KERALA: Malappuram, Talakere, 3 ♀♀, 09.i.2012; Ernakulam, Muvattupuzha, 2 ♀♀, 12.i.2012; Thrissur, Alagappanagar, 1 ♀, 10.i.2012; Thrissur, Amballur, 1 ♀, 10.i.2012.

Hosts: Unknown.

Distribution: INDIA: Chhattisgarh, Delhi, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Maharashtra, Odisha, Tamil Nadu, Uttar Pradesh, Uttarakhand, West Bengal. *Elsewhere:* Australia, Thailand.

17. *Elasmus rajasthanicus* Verma & Hayat, 2002

2002. *Elasmus rajasthanicus* Verma & Hayat, in Verma *et al.*, *Oriental Insects*, 36: 262–263, F. Type F: India: Rajasthan, Arnajee (ZSIJ).

2008. *Elasmus rajasthanicus*: Narendran *et al.*, *Biospectra*, 3(1): 19, diagnosis, key, distribution.

Material examined: INDIA: UTTAR PRADESH: Aligarh, Rite, 3 ♀♀, 25.viii.2011, *leg.* SMA Badruddin.

Hosts: Unknown.

Distribution: INDIA: Kerala, Rajasthan, West Bengal, Uttar Pradesh. *Elsewhere:* Not recorded.

Remarks: *Elasmus rajasthanicus* is an endemic species of India and the present report forms new distributional record for Uttar Pradesh.

18. *Elasmus viridiscutelattus* Verma & Hayat, 2002

2002. *Elasmus viridiscutelattus* Verma & Hayat, in Verma *et al.*, *Oriental Insects*, 36: 270–271, F. Type F: India: Maharashtra, Elephanta, caves of Mumbai (BMNH).

Material examined: INDIA: KERALA, Alappuzha, Kayamkulam, 1 ♀, 17.i.2012; KARNATAKA: Mandya, Narayan Gowda, 1 ♀, 02.i.2012.

Hosts: Lepidoptera (Pyrallidae).

Distribution: INDIA: Andhra Pradesh, Assam, Bihar, Karnataka, Kerala, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal. *Elsewhere:* Not recorded.

Remarks: It forms the first record of species from Karnataka and Kerala states.

19. *Elasmus zehntneri* Ferriere, 1929

1929. *Elasmus zehntneri* Ferriere, *Bull. Entomol. Res.*, 20: 417, F, M. Type F: Indonesia, West Java (BMNH).

2008. *Elasmus zehntneri*: Narendran *et al.*, *Biospectra*, 3(1): 13, female, diagnosis, key, distribution.

Material examined: INDIA: KERALA: Alappuzha, Kayamkulam, 1 ♀, 17.i.2012.

Hosts: Lepidoptera.

Distribution: INDIA: Andhra Pradesh, Bihar, Delhi, Karnataka, Kerala, Maharashtra, Punjab, Tamil Nadu, Uttar Pradesh, West Bengal. *Elsewhere*: Antilles, Bangladesh, Indonesia, Mauritius, Mexico, Pakistan, Philippines, Sri Lanka, Trinidad & Tobago, USA.

Discussion

The genus *Elasmus* can be distinguished from other genera of Eulophidae due to its peculiar straight body shape, with wedge-shaped and densely setose fore wings having elongated marginal vein, short post marginal and slightly reduced stigmal veins (Yefremova & Strakhova, 2009). The genus *Elasmus* has been studied taxonomically well in India as well as in other parts of the world but still it lacks the significant information on the biology of many species due to various sampling techniques, as these are either collected by sweep net or by some trap

methods. The genus is distributed in Afro-tropical, Australian, Nearctic, Neotropical, Oriental, Palearctic regions of the world. Among the 19 species of *Elasmus* presently reported here, five species are endemic to India, namely: *E. caligenus*, *E. cavicolous*, *E. flavocarpus*, *E. neoflavocarpus* and *E. rajasthanicus*. The present study confirms occurrence of ten *Elasmus* species from seven different states, totalling to thirteen new state records. These states with corresponding new record of species are namely Andaman Islands (*E. anticles*); Himachal Pradesh (*E. indicus*); Karnataka (*E. cavicolous*, *E. homonae*, *E. johnstoni*, *E. neoflavocarpus* and *E. viridiscutellatus*); Kerala (*E. cavicolous* and *E. viridiscutellatus*); Odisha (*E. indicus*); Uttarakhand (*E. flavocarpus*) and Uttar Pradesh (*E. caligenus* and *E. rajasthanicus*).

Acknowledgements

Author extends his sincere thanks to Dr. Saleh S. Alhewairini, Dean, and Deanship of Educational Services for suggestions and encouragement. The author is highly thankful to Dr. (Mrs.) K. Veenakumari, National Bureau of Agricultural Insects Resources, Bengaluru, Karnataka, India and Dr. P. T. Anwar, Department of Zoology, Aligarh Muslim University, Aligarh, India to dispense their collection for the study. Author is highly obliged to Dr. L. Roni Kumar Singh, IARI, and New Delhi for help in the photography.

References

- Coote, L.D. 1997. 'Chapter 7. Elasmidae': pp.165-169. In: Gibson, G.A.P, Huber J.T. and Woolley, J.B. (eds): *Annotated Keys to the Genera of Nearctic Chalcidoidea (Hymenoptera)*. NRC Research Press, Ottawa, Ontario, Canada: 794.
- Kazmi S.I. and Sheela, S. 2018. Annotated checklist of Indian *Elasmus* (Hymenoptera: Chalcidoidea: Eulophidae) with a new synonymy. *Journal of Entomological Research Society*, 20(1): 73-85.
- Kazmi, S.I. and Girish Kumar, P. 2013. The species of *Elasmus Westwood* (Hymenoptera: Eulophidae: Eulophinae) from West Bengal, India. *Prommalia I*, 79-92.
- Kazmi, S.I. and Girish Kumar, P. 2015. *Elasmus Westwood* (Hymenoptera: Chalcidoidea: Eulophidae: Eulophinae: Elasmini) of Maharashtra, India. *Munis Entomology and Zoology*, 10(2): 460-467.
- Kazmi, S.I., Sheela, S. and Prahlad, C.M. 2017. Record of *Elasmus Westwood* (Hymenoptera: Eulophidae: Elasmini) from Indian, Thar Desert. *Munis Entomology and Zoology*, 12(2): 470-74.
- Khan, F.R. and Hayat, M. 2011. Records of some species of *Elasmus* from India (Hymenoptera: Chalcidoidea: Eulophidae). *Bionotes*, 13(1): 7-10.
- Narendran, T.C., Sheeba, M. and Kulkarni, H. 2008. A review on the taxonomy of the Indian species of *Elasmus Westwood* (Hymenoptera: Chalcidoidea: Eulophidae: Eulophinae: Elasmini). *Biospectra*, 3(1): 1-26.
- Noyes, J.S. 2020. Universal Chalcidoidea Database. World Wide Web Electronic Publication. 2020. Accessed on 19 February. <http://www.nhm.ac.uk/chalcidoids>.
- Verma, M. and Hayat, M. 1986. 'Family Elasmidae': pp. 173-178. In: B.R. Subba Rao & M. Hayat (eds): *The Chalcidoidea (Insecta: Hymenoptera) of India and the Adjacent Countries. Part. II. Oriental Insects*, 20: 1-430. <https://doi.org/10.1080/00305316.1986.10433726>.
- Verma, M., Hayat, M. and Kazmi, S.I. 2002. The species of *Elasmus* from India (Hymenoptera: Chalcidoidea: Eulophidae), *Oriental Insects*, 36: 245-306. <https://doi.org/10.1080/00305316.2002.10417334>.
- Yefremova, Z.A. and Strakhova, I.S. 2009. New species of *Elasmus* (Hymenoptera: Eulophidae) from Vietnam, *Oriental Insects*, 43: 275-95. <https://doi.org/10.1080/00305316.2009.10417589>.

Plate 1

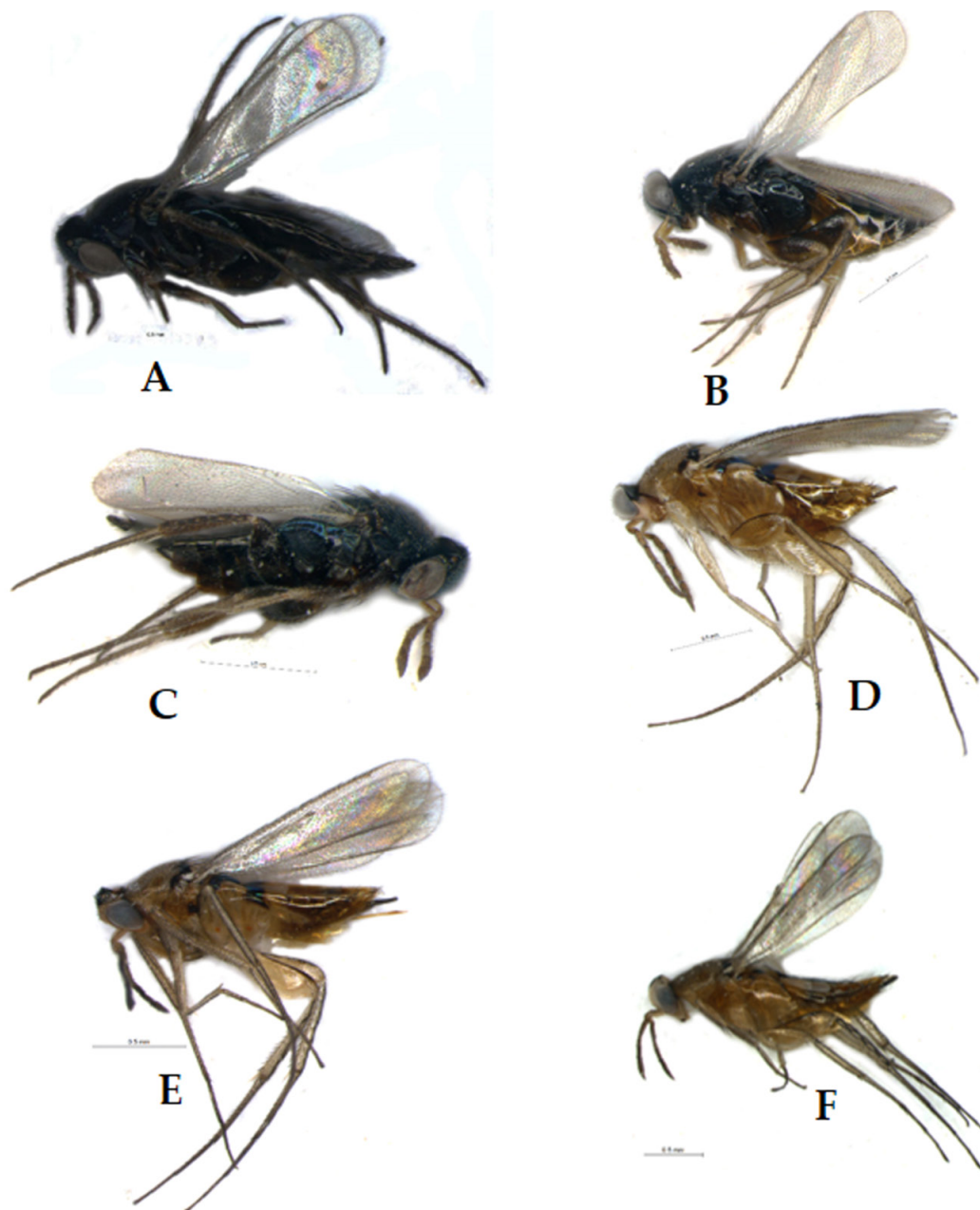


Figure 1. A - *Elasmus anticles*; B - *Elasmus brevicornis*; C - *Elasmus caligenus*; D - *Elasmus cavicolus*; E - *Elasmus dextotus*; F - *Elasmus flavocorpus*.

Plate 2

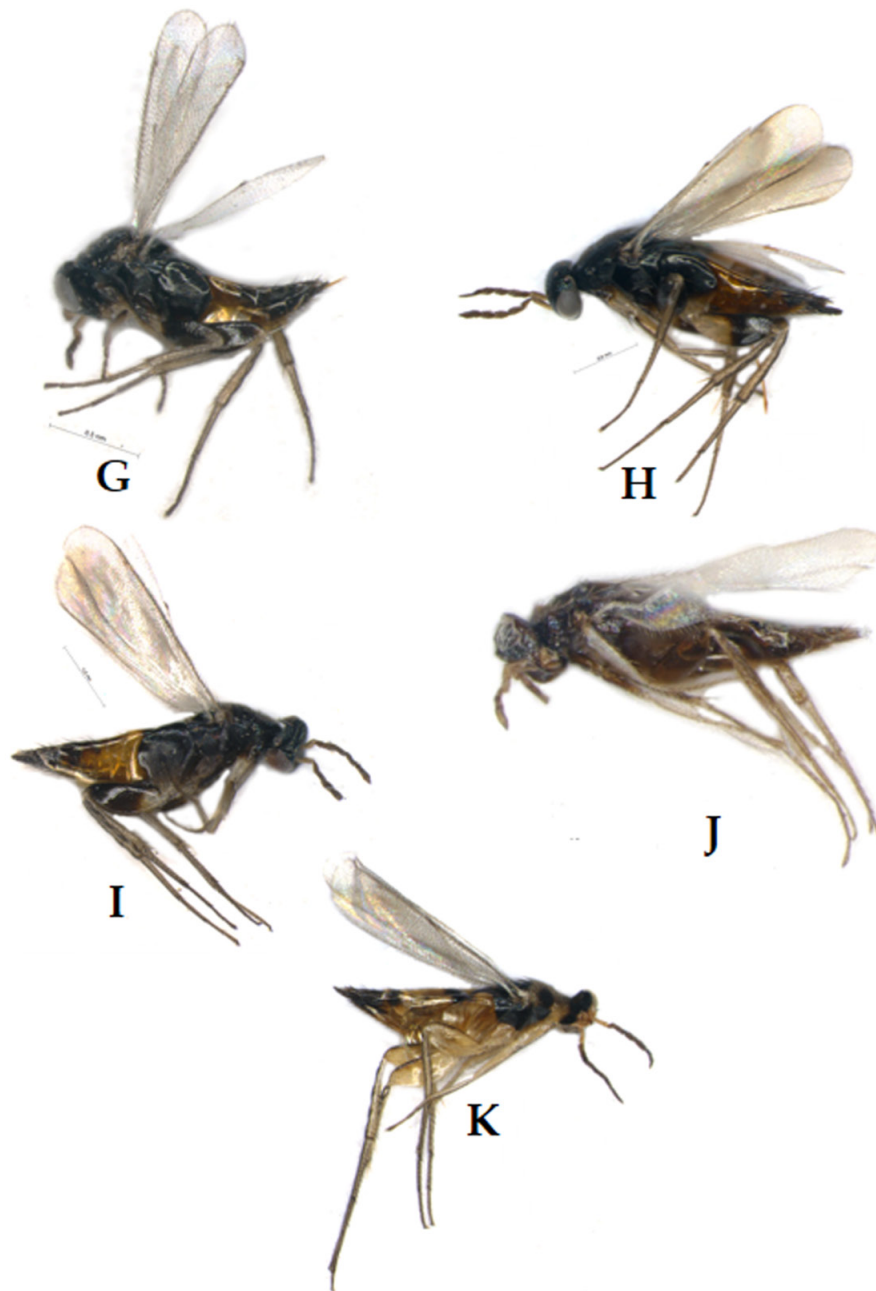


Figure 2. G - *Elasmus homonae*; H - *Elasmus hyblae*; I - *Elasmus indicus*; J - *Elasmus jhonstoni*; K - *Elasmus longicornis*.

Plate 3

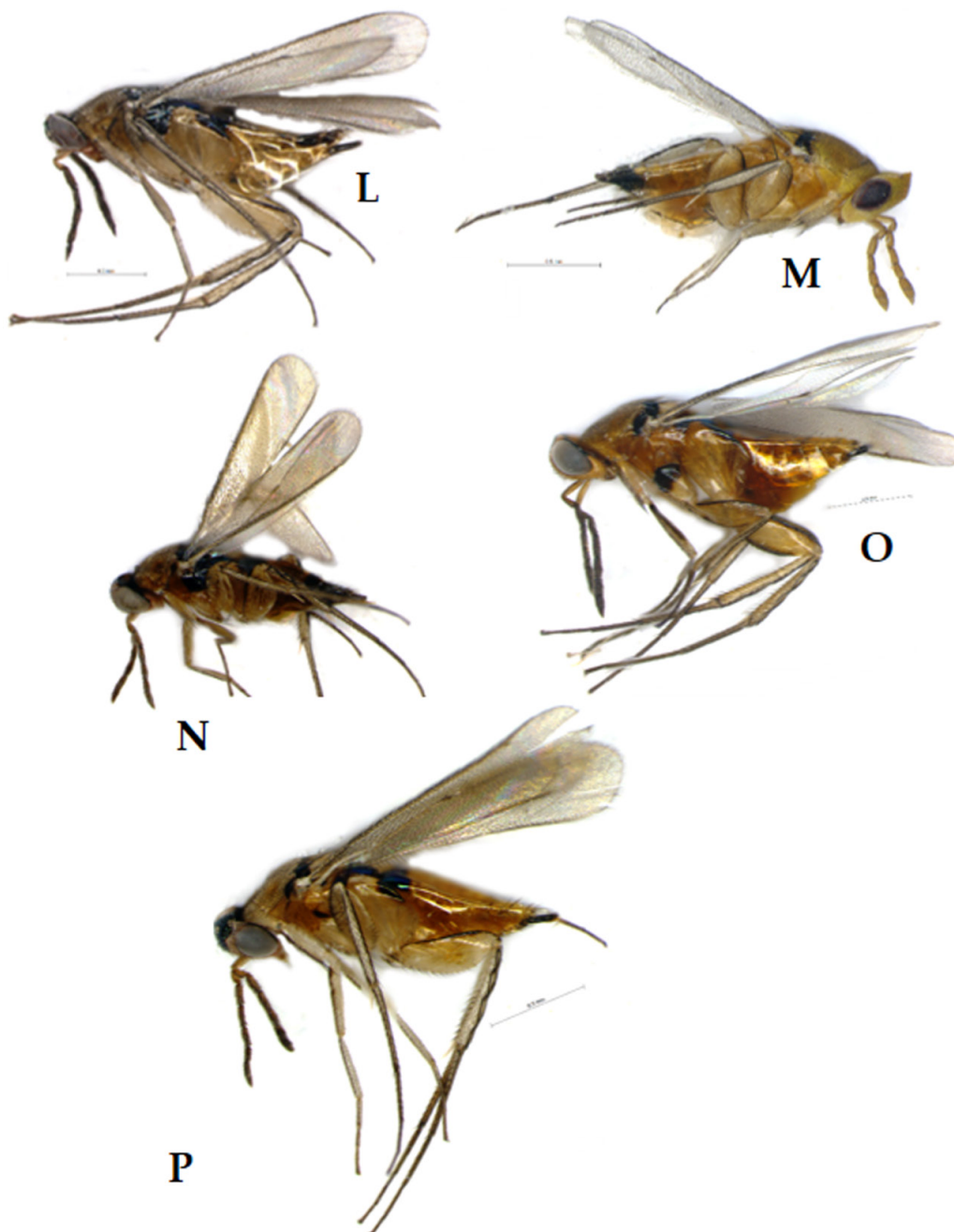


Figure 3. L - *Elasmus longiventris*; M - *Elasmus neoflavocarpus*; N - *Elasmus pulchellus*; O - *Elasmus punensis*; P - *Elasmus queenslandicus*.

Plate 4



Figure 4. Q - *Elasmus rajasthanicus*; R - *Elasmus viridiscutelattus*; S - *Elasmus zehntneri*.