A study on the distribution pattern of Genus *Stenomesius* Westwood (Hymenoptera: Eulophidae) from Chhattisgarh

Rajesh Kumar Ekka, Ankita Gupta and SS Shaw

**Abstract**

The genus *Stenomesius* Westwood was studied in different natural and agricultural ecosystem of Chhattisgarh. This study was conducted from October 2018 to February 2020. At present 22 specimens are studied from Chhattisgarh. The distribution pattern of *Stenomesius* Westwood was analyzed and digitized. It is distributed in five biogeographic realms, namely: Nearctic, Neotropical, Afrotropical, Oriental and Australasia. In India, it had been reported from Bihar, Delhi, Gujarat, Kerala, Madhya Pradesh, Maharashtra, Tamil Nadu, Uttar Pradesh, Uttarakhand and Karnataka. In present study, it was reported from Jashpur, Balrampur, Mahasamund, Dhamtari, Gariyaband, Surguja, Korba, Raipur and Jagdalpur districts of Chhattisgarh.

**Keywords:** distribution pattern, *Stenomesius* Westwood, Chhattisgarh

**Introduction**

The Chhattisgarh is the part of central India. The State falls under East Deccan physiographic zone and can be divided into three agro-climatic zones, viz. the Chhattisgarh Plains, the Northern Hills of Chhattisgarh and the Bastar Plateau. It covers an area of 1,35,192 sq km, which is 4.11 percent of the geographical area of the country. The state has forest area of 59,772 sq km, which is 44.21 percent of states geographical area and ranks third in the country in terms of forest covers. The state has three National Parks and eleven Wildlife Sanctuaries which constitute 4.93 percent of state geographical area. It has a tropical hot and humid climate. The average annual rainfall varies from about 1,100 mm to about 1,700 mm and the average annual temperature ranges between 11ºC to 47ºC.

Eulophidae is the largest family under superfamily Chalcidoidea representing more than 5,000 species in 330 genera worldwide. In India, it is represented by 636 species in 112 genera (Noyes, 2019) [6]. Kazmi & Girish (2015) [2] had made an attempt to describe the eulophidae genera from Chhattisgarh. They described three species of genus *Elasmus* viz., *Elasmus brevicornis* Gahan, *Elasmus johnstoni* Ferriere and *Elasmus queenslandicus* Girault with their distribution pattern.

The biodiversity of Chhattisgarh fauna of parasitic Hymenoptera has remained unexplored. Lack of information on basic knowledge of natural enemies, and their improper identification will hinder in the development of proper management practices. An advancement of taxonomic knowledge is greatly needed in the arena of basic studies in relation to biodiversity of faunal studies, host parasitoids relationship, etc. before going in for an adventure in the field of biological control (Singh, 2005) [9].

**Method and Materials**

The Chhattisgarh state lies between 17º47’ N to 24º06’ N latitude and 80º15’ E to 84º24’ E longitude. The different places surveyed during the study are as follows: Achanakmar Wildlife Sanctuary; Badalkhol Wildlife Sanctuary; Barnawapara Wildlife Sanctuary; Bhoramdev Wildlife Sanctuary; Gomardha Wildlife Sanctuary; Semarsot Wildlife Sanctuary; Sitanadi Wildlife Sanctuary; Tamor Pingla Wildlife Sanctuary; Udanti Wildlife Sanctuary; Kanger Valley National Park; College of Agriculture, Raipur; RMD CARS, Ambikapur; KVK, Mainpat; SG CARS, Jagdalpur; Bachha Batha, Dongargarh; KVK, Durg, Anjora; Badechakma, Jagdalpur; Devpahari, korba; KVK, Balrampur.
The permission was obtained from the Office of the Principal Chief Conservator of Forests (Wildlife Management & Biodiversity Conservation cum-Chief Wildlife Warden) Chhattisgarh for the sample collection with letter number 5581, dated 06/10/2018. *Stenomesius* Westwood was collected using yellow pan traps, malaise traps and sweep net. The traps were filled with solution (salt, liquid dish wash, water) and were placed at a distance of approximately one meter away from each other. One Malaise trap was installed for 5–7 days at each location. The collected insects were preserved in 70% ethyl alcohol. Sweep net (SN) was used for catching *Stenomesius* Westwood from the various ecosystems (natural and agro ecosystems). The collected specimens were killed using ethyl acetate and were later preserved in 70% ethyl alcohol.

**Result and Discussion**

*Stenomesius* Westwood, 1833  
**Synonymy**


**Diagnosis (Fig 1)**

Propodeum mediadly with two strong carinae connected before middle in form of ‘H’ or ‘X’; scutellum with lateral longitudinal groove; hind tibial spurs normal; pronotum without without transverse carinae; female funicle 4 segmented; mesosoma finely sculptured or partly smooth or shiny; propodeum smooth or finely reticulate or coarsely carinate reticulate; petiole shorter than hind coxa, gaster usually elongate.

**Specimen examined**

**INDIA:** Chhattisgarh: 5M and 5F, Badalkhol Wildlife Sanctuary, Jashpur 22°89’60”N 83°91’58”E, 596m, 04.ix.2018, Coll. Rajesh Kumar Ekka; 3M and 10F, Semarsot Wildlife Sanctuary, Dhamtari, 23°32’54”N 83°32’46”E, 668m, 10.xi.2018, Coll. Rajesh Kumar Ekka; 2M and 3F, Barnawapara Wildlife Sanctuary, Mahasamund, 21°29’83”N 81°57’39”E, 415m, Udanti Wildlife Sanctuary, Gariyaband, 20°07’09”N 82°22’57”E, 354m and Kanger Valley National Park, Jagdalpur (18°57’09”N, 82°14’68”E, 554m) under natural ecosystem were as from agro ecosystems.  

**Distribution pattern of genus *Stenomesius* Westwood**

**World:** Afrotropical, Australasia, Nearctic, Neotropical, and Oriental region.  
**India:** Bihar, Delhi, Gujarat, Kerala, Madhya Pradesh, Maharashtra, Tamil Nadu, Uttar Pradesh, Uttarakhand and Karnataka.  

**Chhattisgarh:** Jashpur, Balrampur, Mahasamund, Dhamtari, Gariyaband, Surguja Korba, Raipur and Jagdalpur.

The genus *Stenomesius* Westwood is distributed all over the five biogeographic realms, viz. Afrotropical, Australasia, Nearctic, Neotropical, and Oriental region (Noyes, 2019) and in India, it is distributed in Bihar (Rao and Hayat, 1986), Uttar Pradesh (Yadav et al., 1987), Maharashtra (Shetgar et al., 1993), Uttar Pradesh (Khan, 1994) and Uttarakhand (Khan et al., 2005), Delhi and Karnataka (Husain and Khan, 1986), from Kerala, Madhya Pradesh, Tamil Nadu it was reported by Narendran in 2011.

Table 1 shows the distribution of *Genus Stenomesius* Westwood in the three agro-climatic zones of Chhattisgarh. Fig 2, shows the distribution pattern more precisely on the map of Chhattisgarh. In Chhattisgarh it was observed from Badalkhol Wildlife Sanctuary, Jashpur (22°89’60”N, 83°91’58”E, 596m), Barnawapara Wildlife Sanctuary, Mahasamund (21°29’83”N, 82°31’67”E, 337m), Semarsot Wildlife Sanctuary, Balrampur (23°32’54”N, 83°32’46”E, 668m), Sitanadi Wildlife Sanctuary, Dhamtari (20°20’56”N, 81°57’39”E, 415m), Udanti Wildlife Sanctuary, Gariyaband (20°07’09”N, 82°22’57”E, 354m) and Kanger Valley National Park, Jagdalpur (18°57’09”N, 82°14’68”E, 554m) under natural ecosystem were as from agro-ecosystem it had been observed from College of Agriculture, Raipur (21°14’02.2”N, 81°42’42.5”E, 298m), RMD CARS, Ambikapur, Surguja (22°38’38”N, 83°08’60”E, 623m), KVK, Mainpat, Surguja (22°49’38”N, 83°16’28”E, 1095m, 05.xi.2018, Coll. Rajesh Kumar Ekka; 4M and 5F, KV, Balrampur, 23°36’23”N 83°36’23”E, 530m, 27.xi.2019, Coll. Rajesh Kumar Ekka; 3F, Devpahari, Korba, 22°38’12”N 82°48’41”E, 293m, 13.ii.2019 Coll. Rajesh Kumar Ekka; 10F, College of Agriculture, Raipur, 21°14’02.2”N 81°42’42.5”E, 298m, 23.viii.2018, Coll. Rajesh Kumar Ekka; 2M and 2F, Bana nursery, Raipur, 21°14’02.2”N 81°42’42.5”E, 298m, 03.ix.2018, Coll. Rajesh Kumar Ekka; 4M and 7F, SG CARS, Jagdalpur, 19°05’33.9”N 81°57’38.7”E, 557m, 14.ix.2018, Coll. Rajesh Kumar Ekka.

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### Table 1: Distribution of genera *Stenomesius* Westwood from different natural and agricultural Ecosystems of Chhattisgarh

<table>
<thead>
<tr>
<th>Genus</th>
<th>AMWLS</th>
<th>BKWLS</th>
<th>BNWLS</th>
<th>BDWLS</th>
<th>GWLS</th>
<th>SSWLS</th>
<th>SNWLS</th>
<th>TPWLS</th>
<th>UWLS</th>
<th>KVNP</th>
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</thead>
<tbody>
<tr>
<td><em>Stenomesius</em> Westwood</td>
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</table>

**Natural Ecosystem**

**Agricultural Ecosystem**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Sites surveyed during study</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMWLS</td>
<td>Achanakmar Wildlife Sanctuary</td>
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<td>BKWLS</td>
<td>Badalkhol Wildlife Sanctuary</td>
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<td>BNWLS</td>
<td>Barnawapara Wildlife Sanctuary</td>
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<td>BDWLS</td>
<td>Bhoramdev Wildlife Sanctuary</td>
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<td>GWLS</td>
<td>Gomardha Wildlife Sanctuary</td>
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<tr>
<td>UWLS</td>
<td>Udanti Wildlife Sanctuary</td>
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<td>KVWLS</td>
<td>Kanger Valley National Park</td>
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<tr>
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<td>College of Agriculture, Raipur</td>
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<tr>
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<td>RMD CARS, Ambikapur</td>
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<td>KVK-M</td>
<td>KVK, Mainpat</td>
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<td>SG-J</td>
<td>SG CARS, Jagdalpur</td>
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<tr>
<td>BB-R</td>
<td>Bachha Batha, Dongargarh</td>
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<td>KVK-D</td>
<td>KVK, Durg, Anjora</td>
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<tr>
<td>BCK-J</td>
<td>Badechakma, Jagdalpur</td>
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<td>DP-K</td>
<td>Devpahari, Korba</td>
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<td>KVK-B</td>
<td>KVK, Balrampur</td>
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<td>BN-R</td>
<td>Bana Nursery, Raipur</td>
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</tbody>
</table>

"+" = Present; "-" = Absent

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**Abbreviation used in the text for survey area**

- AMWLS: Achanakmar Wildlife Sanctuary
- BKWLS: Badalkhol Wildlife Sanctuary
- BNWLS: Barnawapara Wildlife Sanctuary
- BDWLS: Bhoramdev Wildlife Sanctuary
- GWLS: Gomardha Wildlife Sanctuary
- SSWLS: Semarsot Wildlife Sanctuary
- SNWLS: Sitanadi Wildlife Sanctuary
- TPWLS: Tamor Pingla Wildlife Sanctuary
- UWLS: Udanti Wildlife Sanctuary
- KVWLS: Kanger Valley National Park
- COA-R: College of Agriculture, Raipur
- RMD-A: RMD CARS, Ambikapur
- KVK-M: KVK, Mainpat
- SG-J: SG CARS, Jagdalpur
- BB-R: Bachha Batha, Dongargarh
- KVK-D: KVK, Durg, Anjora
- BCK-J: Badechakma, Jagdalpur
- DP-K: Devpahari, Korba
- KVK-B: KVK, Balrampur
- BN-R: Bana Nursery, Raipur

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**Fig 1**: *Stenomesius* Westwood, 1833; Female: A. Habitus image; B. Head; C. Wings D. mesocutum; E. Propodeum.

**Fig 2**: Distribution pattern of *Stenomesius* Westwood in the three Agro-climatic zone of Chhattisgarh

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**Legends**

- Badalkhol Wildlife Sanctuary
- Barnawapara Wildlife Sanctuary
- Semarsot Wildlife Sanctuary
- Sitanadi Wildlife Sanctuary
- Udanti Wildlife Sanctuary
- Kanger Valley National Park
- College of Agriculture, Raipur
- RMDCARS, Ambikapur
- Krushi Vidyan Kendra, Mainpat
- SGCARS, Jagdalpur
- Devpahari, Korba
- Krushi Vidyan Kendra, Balrampur
References


