

A Study on the Diversity and Distribution of Sphecoid fauna in Thrissur District, Kerala, INDIA.

Baaby Job¹, Joseph Louis Olakkengil²
(Department of Zoology, St.Thomas College, Thrissur).

Abstract: Sphecoid wasps comes under the Superfamily Apoidea, with species distributed throughout the world. They are mainly beneficial and relatively harmless to man. This paper provides a report on Sphecoid wasps collected from six localities in and around Thrissur district, Kerala. The wasps were collected using hand nets. Ten species belonging to two subfamilies- Ampulicinae and Sphecinae were identified. Of the ten species, *Chalybion bengalense* Dahlbom showed highest distribution. The dominant genus was *Sceliphron* Klug (3species), while *Ampulex* Jurine and *Trirogma* Westwood were represented by one species each. A short note on biology is provided. A comparative analysis of species reported from Kerala and India is also provided.

Keywords: Ampulicinae, Distribution, Sphecidae, Sphecinae, Thrissur.

I. Introduction

Sphecidae (Latreille, 1802) is a cosmopolitan family of wasps with 9716 described species coming under 318 genera [1]. They are represented in all bio geographical regions and show great diversity in morphological and biological characters. Adult sphecids feed on a variety of food from nectar and honeydew to spiders and insects belonging to several orders. Prey paralysis and provisioning of nest is a common feature. Nests are constructed in soil, wood, plant stems, twigs and crevices or holes in rocks, stones, walls etc. Mating strategies include prenuptial flights, territorial defenses and courtship activities [2, 3].

The sphecid wasps can be readily distinguished from their closest relatives, bees by the presence of simple unbranched hairs, pronotal lobe not touching tegulae and presence of cleaning pectan on inner side of hind basitarsus opposed to inner tibial spur. These wasps are associated with mankind in the field of agriculture and general ecology, acting as predators, pollinators, parasites and parasitoids. They are valuable bio indicators and biocontrol agents [4, 5]. The relationship of these insects with man has been unfriendly due to fear from their over rated stinging powers.

Though most species of Spheciformes have been collected and described from Central and Northern parts of India, the sphecoid fauna of the country is still imperfectly known. The pioneer studies of Indian Spheciformes were done by Fabricius [6]. Bingham [7] has recorded as many as one sixty eight species of Sphecoid wasps as occurring in the Indian Sub Continent. Later Cameron [8], Turner[9] has published on the Indian fauna. Bohart and Menke[3]published generic revision on the world fauna. The recent works on Indian sphecidae is by Gupta [10], Jonathan et.al [11,12] and Kundu et.al[13]. In Kerala 47 species of sphecoid wasps has been listed [14,15,16].The Sphecidae has been treated as a single family with 11 subfamilies [3] or as Superfamily with the subfamilies raised to family status[17].But later cladistic treatment has divided the sphecoid wasps in four monophyletic families [18, 19].This paper follows the classification proposed by Bohart and Menke[3], as it is an authenticated revision on world Sphecidae, even till date.

The present papers aim to generate valuable information about the diversity and distribution of Sphecoid wasps belonging to Subfamilies Ampulicinae and Sphecinae in Thrissur District of Kerala, as of now research on the sphecoid wasp diversity has not been available for this area.

II. Materials And Methods

2.1. STUDY AREA: The study area includes six locations around Thrissur district-Ayyanthole, Chelakkottukara, Eravu, Peechi, Thumburmuzhi and Vazhani (Fig:1). Thrissur district lies at central part of kerala at sea level (10.52⁰N and 76.21⁰E). The district is bounded on east by Western Ghats and consists of three natural divisions-highlands, plains and sea shore. The district has tropical humid climate with average temperature of 31⁰C and annual rain fall 3000mm.



Figure1: Collection areas in Thrissur District

2.2. COLLECTION AND PRESERVATION: The insects were collected using hand nets, killed with Acetone, pinned with No. 3 Entomological pins and preserved in insect boxes for identification studies. The insects were collected random between 9 AM and 5 PM from August 2009 to February 2012.

2.3. IDENTIFICATION: The collected specimens were identified using Leica MZ6 Stereozoom microscope with camera lucida with the help of literature [3,7,11,12,14]

III. Results

A total of ten species belonging to six genera under two subfamilies- Ampulicinae and Sphecini, were collected from Thrissur district (TABLE 1).

Subfamily Ampulicinae

Tribe Ampulicini

Genus *Ampulex* Jurine, 1807

1. *Ampulex compressa* (Fabricius, 1781)

Sphex compressus Fabricius, 1781

Material Examined: 3♀, Ayyanthole (10°32'12"N, 76°11'8"E), 02.VI.2010, 11.II.2011 and 04.VI.2011.

Kerala records: Fabricius, 1781 (Malabar)[20]; Sudheendrakumar and Narendran, 1989(Malabar).

Tribe Dolichurini

Genus *Trirogma* Westwood, 1841

2. *Trirogma caerulea* (Westwood, 1841)

Trirogma caerulea Westwood, 1841

Material Examined: 3♀, Ayyanthole (10°32'12"N, 76°11'8"E), 05.II.2010 and 15.I.2011.

Kerala records: Sudheendrakumar and Narendran, 1989(Malabar); Sudheendrakumar and Mathew, 1999 (Parambikulam Wildlife Sanctuary).

Subfamily Sphecinae

Tribe Ammophilini

Genus *Ammopila* W.Kirby, 1798.

3. *Ammophila clavus* (Fabricius, 1775)

Sphex clavus Fabricius, 1775

Material Examined: 1♀, Ayyanthole, 03.III.2009; 1♀, Vazhani, 03.01.2010.

Kerala Records: Sudheendrakumar and Narendran, 1989(Malabar); Sudheendrakumar and Mathew, 1999 (Parambikulam Wildlife Sanctuary).

4. *Ammophila laevigata* (F.Smith, 1856).

Ammophila laevigata (F.Smith, 1856).

Material Examined: 1♀, Ayyanthole (10°32'12"N, 76°11'8"E), 07.VII.2009; 1♀, Eravu (10°47'N, 76°15'E), 11.III.2011.

Kerala Records: Sudheendrakumar and Narendran, 1989(Malabar); Sudheendrakumar and Mathew, 1999 (Parambikulam Wildlife Sanctuary).

Tribe Sceliphriini

Genus *Sceliphron* Klug, 1801

5. *Sceliphron coromandelicum* (Lepeletier, 1845)

Pelopaeus coromandelicus Lepeletier de Saint Fargeau, 1845.

Material Examined: 1♀, Peechi (10°31'47"N, 76°22'13"E), 12.II.2012.

Kerala Records: Sudheendrakumar and Narendran, 1989(Malabar); Sudheendrakumar and Mathew, 1999 (Parambikulam Wildlife Sanctuary).

6. *Sceliphron javanum nalandicum* (Strand, 1915)

Pelopeus spinolae: F. Smith, 1856.

Material Examined: 1♀, Thumburmuzhi (10°29' N, 76°46' E), 05.V.2012.

Kerala Records: Sudheendrakumar and Narendran, 1989(Malabar); Sudheendrakumar and Mathew, 1999 (Parambikulam Wildlife Sanctuary).

7. *Sceliphron madraspatanum* (Fabricius, 1781)

Sphex madraspatanus Fabricius, 1781

Materials examined: 3♀, Ayyanthole(10°32'12"N, 76°11'8"E), 02.I.2010 and 13.IV.2010.

Kerala Records: Fabricius, 1781(Malabar); Sudheendrakumar and Narendran, 1989(Malabar); Sudheendrakumar and Mathew, 1999 (Parambikulam Wildlife Sanctuary).

Genus *Chalybion* Dahlbom, 1843.

8. *Chalybion bengalense* (Dahlbom, 1845)

Sphex violaceus Fabricius, 1775.

Materials examined: 2♀, Ayyanthole(10°32'12"N, 76°11'8"E), 02.I.2010; 1♀, Eravu (10°47'N, 76°15'E), 11.III.2011; 2♀, Chelakkottukara (10°39'57" N, 76°21'4"E). 30. VI.2011; 1♀, Thumburmuzhi(10°29' N, 76°46' E), 05.II.2012.

Kerala Records: Sudheendrakumar and Narendran, 1989(Malabar); Sudheendrakumar and Mathew, 1999 (Parambikulam Wildlife Sanctuary).

Tribe Sphecini

Genus *Sphex* Linnaeus, 1758.

9. *Sphex argentatus* (Fabricius, 1787)

Sphex argentatus Fabricius, 1787

Materials examined: 3♂, Peechi(10°31'47"N 76°22'13"E), 12.II.2012.

Kerala Records: Sudheendrakumar and Narendran, 1989(Malabar); Sudheendrakumar and Mathew, 1999 (Parambikulam Wildlife Sanctuary).

10. *Sphex sericeus* (Fabricius, 1793)

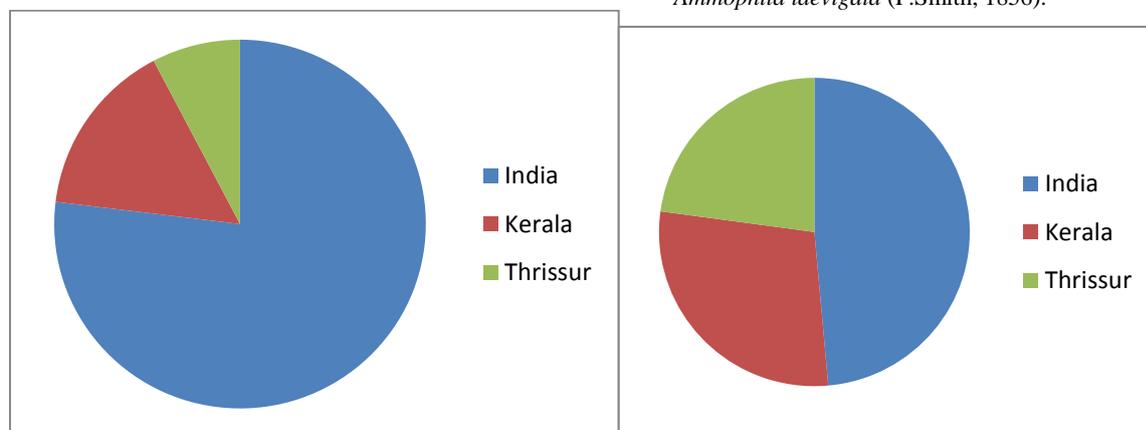
Sphex aurulentus Fabricius, 1793

Materials examined: 1♀, Thumburmuzhi(10°29' N, 76°46' E), 05.V.2012; 4♂, Chelakkottukara (10°39'57" N, 76°21'4"E). 30. VI.2011 and 18.VII.2011.

Kerala Records: Sudheendrakumar and Narendran, 1989(Malabar); Sudheendrakumar and Mathew, 1999 (Parambikulam Wildlife Sanctuary).

Table: 1 Systematic position of Sphecoid wasps in Thrissur District, Kerala.

Subfamily	Genus	Species collected.
Ampulicinae	<i>Ampulex</i> Jurine, 1807	<i>Ampulex compressa</i> (Fabricius, 1781)
	<i>Trirogma</i> Westwood, 1841	<i>Trirogma caerulea</i> (Westwood, 1841)
Sphecinae	<i>Sphex</i> Linnaeus, 1758	<i>Sphex sericeus</i> (Fabricius, 1793)
		<i>Sphex argentatus</i> (Fabricius, 1787)
	<i>Sceliphron</i> Klug, 1801	<i>Sceliphron javanum nalandicum</i> (Strand, 1915)
		<i>Sceliphron coromanandelicum</i> (Lepletier, 1845)
		<i>Sceliphron madraspatanum</i> (Fabricius, 1781)
	<i>Chalybion</i> Dahlbom, 1843	<i>Chalybion bengalense</i> (Dahlbom, 1845)
<i>Ammophila</i> W.Kirby, 1798	<i>Ammophila clavus</i> (Fabricius, 1775)	
	<i>Ammophila laevigata</i> (F. Smith, 1856).	



a: Subfamily Ampulicinae

b: Subfamily Sphecinae

Figure 2: Pie diagram comparing number of Species reported from Thrissur to Kerala and India.

IV. Discussions

In the present study ten species of sphecoid wasps in six genera representing two subfamilies were recorded. The subfamily Sphecinae recorded eight species under four genera, while subfamily Ampulicinae represented two species under two genera.

Among the genus *Sceliphron* Klug recorded the most number of species. These together with *Chalybion bengalense* Dahlbom are called mud-dauber wasps, on account of their habit of building multicellular mud nests. These can be readily recognized in the fields by their black and yellow body, while *C.bengalense* has metallic blue body. They mass provision their nests with spiders. Among the species *C.bengalense* was the most represented with collections recorded from four of the six localities, a possible outcome of prey abundance. *Sceliphron javanum nalandicum* Strand was recorded only from Thumburmuzhy area.

Sphex Linnaeus are fossorial wasps, their nests are holes dug in soil and provisioned with Acrididae. *Sphex sericeus* Fabricius females are readily recognized by their golden yellow body, while males have black and red body with white hairs. The males were collected feeding from flowers of *Murraya koenigii* (L) Spreng. *Sphex argentatus* Fabricius are robust black species. Ammophilini are called thread waisted wasps, with slender, black and red body. Their petiole is two segmented. These are solitary nesters feeding on lepidopteran larva. They were the most difficult to catch usually escaping from the nests while sweeping.

Ampulex compressa Fabricius and *Trirogma caerulea* Westwood were collected from Ayyanthole locality only. *A.compressa* are metallic green blue body and were collected from trunks of *Coccus nucifera* Linnaeus, possibly in search of their prey, *Periplaneta americana* Linnaeus.

A pie diagram showing the comparison between the number of species reported from Thrissur to species recorded from the above genus' in Kerala and India is given for both subfamilies. In India, the number of species reported from the four genus of Subfamily Sphecinae is 17 and from Kerala is 10 (Fig.2a), while the number of species reported from Subfamily Ampulicinae in India is 20 and in Kerala is 4 (Fig 2b).

V. Conclusions

The occurrence of Spheciformes in a habitat is conditioned by moisture, the soil exposure, soil type and prey abundance [21]. The collection of these wasps are a tedious process, yet they have to be catalogued because of their economic importance. In determining the fauna of a country, faunistic studies on small regions is very important because individual habitats and the micro climate in a small region plays an important role on the distribution of insects [21]. These wasps are mainly feared by humans due to their overrated stinging powers and their close association with human habitats results in the destructions of nests by humans. These wasps perform many ecological roles as predators, pollinators, bio control agents and biodiversity indicators [22]. Present study has revealed valuable information on the wasps of Thrissur region and future studies may result in further elaboration of these wasp species. Also studies on the ecology of these diverse wasps need to be carried out.

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