

## Short Communication

# Report on *Colletes packeri* Kuhlmann and Proshchalykin from India after Records from Thailand and Laos

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**Abstract:** Bees are very significant part of the global ecosystem. They provide important ecological services through pollination of a number of crops, fruits and wild plants. There are approximately 20,000 bee species worldwide grouped into seven bee families. The present survey was conducted to understand the diversity pattern of bees from Colletidae family from Arunachal Pradesh and Assam. Field sampling was conducted from September 2018 to December 2020 in 41 grid cells of 6.3 × 6.3 km demarcated by Ashoka Trust for Research in Ecology and Environment (ATREE), India for long term monitoring of the biodiversity in northeast India. Within these grid cells, 5-12 transects of 25 × 1 m were selected for the study. A single species of Colletidae family, *Colletes packeri* was recorded from Namsai district of Arunachal Pradesh, and Dima Hasao and Karbi Anglong districts of Assam. All the specimens were recorded in the month of December. During the present survey, the mustard plant *Brassica nigra* has been recorded as the forager source of *Colletes packeri*. This is the first record for this species from India after its discovery from Thailand and Laos by Kuhlmann and Proshchalykin in 2015. The study also indicates the low population density of the Colletidae family in Arunachal Pradesh and Assam. Given its importance as a pollinator and its less abundance, the species may require conservation efforts.

**Key words:** Abundance, *Colletes packeri*, Global distribution, Northeast India

## Introduction

Bees are widely acknowledged for their ecological service and economic values (Corlett, 2004; Minarro and Twizell, 2014; Tayeng and Gogoi, 2018). These are categorized into 7 families – Megachilidae, Apidae, Melittidae, Andrenidae, Stenotritidae, Colletidae, Halictidae (Danforth et al., 2006; Michener, 2007). North-eastern part of India located in the Eastern Himalayan and Indo-Malayan biodiversity hotspots are however mostly unexplored in terms of the diversity of non-Apidae bees including bees of family Colletidae. The bees of Colletidae family are short tongued with bilobed glossa. They are usually solitary, but some are found to nest in aggregations. This family is most diversified and abundant in temperate parts of

South America and Australia. Only two common genera, *Colletes* and *Hylaeus* are found in the holarctic region. In the moist tropics, the family is relatively less reported, especially in the Indo-Malayan area. The genus *Colletes* is placed under the sub-family Colletinae and tribe Colletini and is recognized by the sigmoid second recurrent vein. They are generally a ground-nesting genus but, they also construct their nest in dead, pithy stems (Michener, 2007). Around 2,713 species of Colletidae has been recorded worldwide and 32 species from India. In India, only two genera has been recorded, *Colletes* with 14 species and *Hylaeus* with 18 species (Ascher and Pickering, 2020). This study reports the presence of *Colletes*

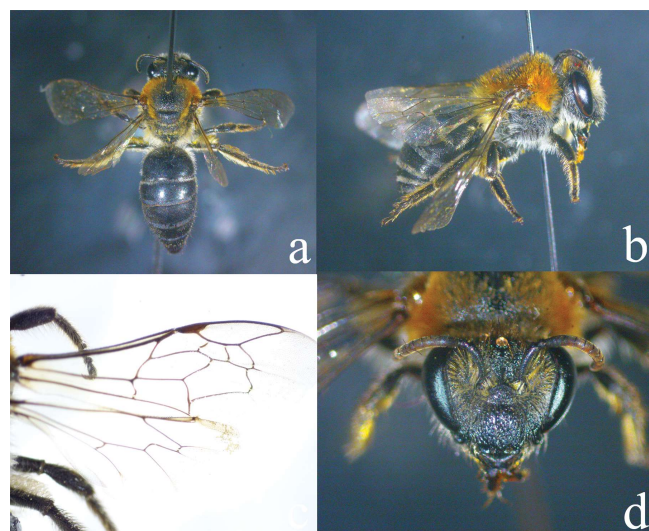
*packeri* in India. Earlier, *Colletes packeri* has been recorded only from Thailand and Laos (Kuhlmann and Proshchalykin, 2015).

**Materials and methods**

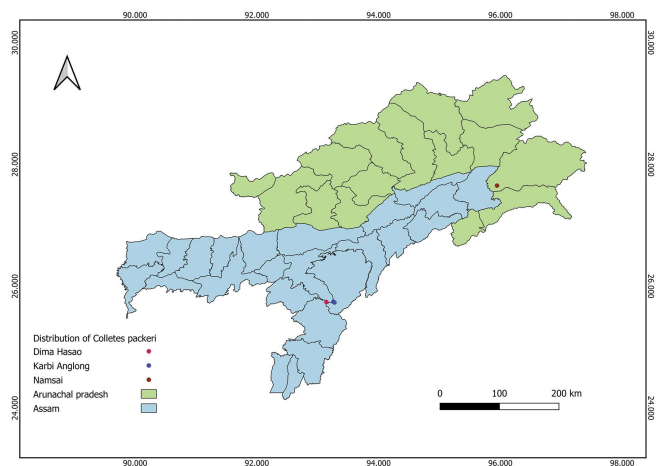
*Colletes packeri* reported here was documented during the field survey for the distributional study on Colletidae bees in Arunachal Pradesh and Assam, India conducted from September 2018 to December 2020 in 41 grid cells of 6.3 × 6.3 km demarcated by ATREE (Ashoka Trust for Research in Ecology and Environment) in 2018 for long term monitoring of the biodiversity in the region. Within these grid cells, 5-12 transects of 25 × 1 m was chosen randomly. To record the abundance of these bees, the investigator walked at a speed of ~ 0.3 km h<sup>-1</sup> to cover each transect (Pollard, 1977).

All the individuals of *Colletes packeri* recorded were female and were identified based on keys provided by Kuhlmann and Proshchalykin (2015). The head is wider than long; Mandible is slightly dark reddish brown; Face except clypeus, sparsely covered with long, yellowish white hairs; Clypeus has shallow longitudinal median depression; Clypeus coarse and punctate; Median malar region narrow, about one fourth as long as width of mandible base; Antenna is black coloured, its ventral part of flagellum dark brown; Mesocutum sparsely punctate; Mesoscutellum is anteriomedially

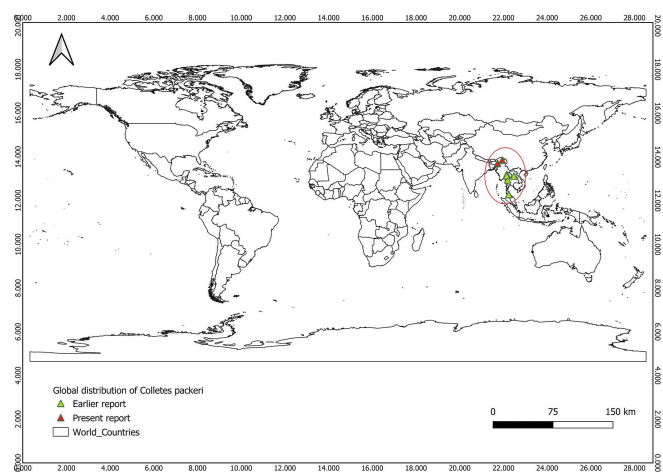
impunctate but apically punctate; Mesoscutum, mesepisternum and propodeum are densely covered with long bright orange brown hairs; Mesoscutum and mesoscutellum are intermixed with black hairs; Wings are slightly yellowish and its venation dark brown; Legs have black integument, scopa dorsally black coloured and ventrally dark grey to blackish; Tergum one sparsely covered with yellow brown hairs; Apical tergal hairs bands are narrow; Tergites are densely punctate (Kuhlmann and Proshchalykin 2015). Geo-coordinates were located using GPS Garmin Montana 680, Sunlight intensity (Lux) was recorded using digital lux meter. Temperature and humidity were recorded using Kestrel data logger Elite Ballistics, Data on altitude was recorded using barometric altimeter.



**Fig. 1.** *Colletes packeri* female. **a.** Dorsal view. **b.** Lateral view. **c.** Thorax. **d.** Head.



**Fig. 2.** Distribution of *Colletes packeri* in India. Red, blue and maroon dots represent geo-coordinates for *C. packeri* locality in Dima Hasao district and Karbi Anglong district of Assam and Namsai district of Arunachal Pradesh respectively.



**Fig. 3.** Global distribution of *Colletes packeri*.



Fig. 4. Habitats of *Colletes packeri*. a. *Brassica nigra* field. b. Tea estate.

area of the species in the world map. Out of 41 grid cells surveyed the specimens were recorded only from four grid cells. The specimens were collected from Agricultural fields and a tea estate.

The species were recorded during winter season (December) and the habitat parameters are presented in Table 1. This study expanded the distribution map of *C. packeri* to the north-west of Asia, compared to earlier distribution (Fig. 3). The species was recorded from Namsai district of Arunachal Pradesh and Karbi Anglong and Dima Hasao district of Assam at an altitude ranging from 85 m asl to 144 m asl (Table 1). The population density of *Colletes packeri* in the available grids is 0.008 ind./m<sup>2</sup>. In the present study *Colletes packeri* was found to forage only from *Brassica nigra* (Fig. 4).

## Discussion

Considering the area surveyed, the diversity of bees from Colletidae family in Arunachal Pradesh and Assam region is very low. Only a single species of Colletidae family was

Table 1. Habitat and sampling details of *Colletes packeri* in Arunachal Pradesh and Assam, India.

Parameters	Grid Cells			
	92A/2SW3	83G/6NW	83G/6NW	83G/2NE
Location	Namsai, Arunachal Pradesh	Karbi Anglong, Assam	Karbi Anglong, Assam	Dima Hasao, Assam
Longitude (°E)	95.944611	93.25541	93.27422	93.14119
Latitude (°N)	27.652838	25.74726	25.73292	25.74145
Land use land cover (LULC)	Tea estate	Agricultural area	Agricultural area	Agricultural area
Forage plant of <i>C. packeri</i>	-	<i>Brassica nigra</i>	<i>Brassica nigra</i>	<i>Brassica nigra</i>
Abundance of <i>C. packeri</i> (no. of ind./m <sup>2</sup> )±SE	0.008 ± 0.008	0.008 ± 0.008	0.008 ± 0.008	0.008 ± 0.008
Altitude (m asl)	144	144	142	85
Temperature (°C)	27.2 - 28.9	24.7 - 25.5	28.7 - 28.0	23.6 - 26.2
Relative humidity (%)	47 - 56	61.5 - 62.8	57.2 - 59.1	60.1 - 71.4
Sunlight intensity (lux)	3150 - 3900	10400 - 16700	6500 - 7460	11950 - 19150
Date of collection	27.12.2018	22.12.2020	22.12.2020	23.12.2020

## Results

During the present survey, only *Colletes packeri* was recorded from the family Colletidae (Fig. 1). All the collected specimens were female. These were recorded from one location in Arunachal Pradesh and three locations in Assam (Fig. 2). It is a new report to India and expansion of the distributional

recorded. Earlier studies also reported Colletidae bees to be scarce in the Indo-Malayan region (Michener, 2007). This study reports *Colletes packeri* for the first time from India after its discovery from Thailand and Laos (Kuhlmann and Proshchalykin, 2015). This is also the first report of the

Colletidae family from Arunachal Pradesh and Assam. The literature regarding Colletidae bees from India is very scarce. The recorded parameters such as altitude, temperature, humidity and sunlight intensity indicates their ability to forage at varying environmental conditions. Kuhlmann and Proshchalykin (2015) found this species at varying altitudes from tropical low land to 2500 m. Therefore, there are chances of finding this species at higher reaches of Arunachal Pradesh and Assam region as well.

During the study period of two years all the specimens were recorded during the month of December, which indicates their active period of life cycle during this particular time of the year. However, a more detailed study is required to completely understand the same. Most of the *Colletes packeri* specimens were recorded from the agricultural fields, it shows their foraging preference towards disturbed area and this also proves their importance from economic point of view. This also leads to the possibility of finding their nests nearby. Present study also reports the first Foraging resource of *Colletes packeri* that is *Brassica nigra*, which is also the only foraging resource reported for this species.

### Conclusion

This study shows that the Colletidae bees may also inhabit in the understudied countries located adjacent to Thailand and Laos due to their similar climatic and geographic conditions. In addition, it also shows that these bees may need conservation efforts. Since it is reported from the widely used crop *B. nigra*, further study may assist in use of these bees as pollinators of crops and fruits in the region.

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