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# **FAUNAL DIVERSITY AND RECENT TRENDS** in **ANIMAL TAXONOMY**

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## DIVERSITY OF KLEPTOPARASITES IN THE GROUP LIVING ERESID SPIDER *STEGODYPHUS SARASINORUM*

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### ABSTRACT

Kleptoparasitism is the form of feeding in which one animal steals the food or prey captured by another animal. Among spiders, web building spiders are the most frequent target of the kleptoparasites. Social spiders can build large sized web and nest cooperatively. Web and nest of social spiders harbour many species of spiders as kleptoparasites. So we observed the diversity of kleptoparasites in the social spider *Stegodyphus sarasinorum* Karsch 1891, in the Christ College campus Irinjalakuda, Kerala. The observations were made during the period of July 2016 - March 2017. We collected four species of spiders and two species of ants from the web and nest of *S. sarasinorum*. Male and females of *Argyrodes kumadai* Chida and Tanikawa 1999 were collected from the webs of *S. sarasinorum*. They usually consume the small preys entangled in the webs of *S. sarasinorum*. Spiders *Hyllus semicupreus*, *Oxyopes javanus*, *Phintella vittata* and ants *Oecophylla smaragdina* and *Monomorium pharaonis* were commonly found inside the nest of *S. sarasinorum*. They are probably attracted by the presence of small preys of the host and prey remains found inside the nest.

**Key words:** Diversity, kleptoparasites, social spider, *Stegodyphus sarasinorum*

### INTRODUCTION

Kleptoparasitism is a form of stealing, can be defined as every reciprocal interaction in which one organism takes advantage from the foraging investments of another (Brockmann & Barnard 1979; Morand-Ferron et al. 2007; Iyengar 2008). This behaviour is reported in various taxa, including cnidarians, annelids, arthropods, molluscs, echinoderms, fishes, reptiles, birds and mammals (Iyengar 2008). Among arthropods, web building spiders are the frequent targets of kleptoparasites because they are easily attracted by the prey captured by a forager (Vollrath 1987). Social spiders can build large sized capture webs (Shear 1970) and they cooperate in foraging and feeding. Vulnerability to kleptoparasitism is affected by various characteristics of the organism's foraging and food-handling behaviours (Brockmann & Barnard 1979; Giraldeau & Caraco 2000). Kleptoparasites are chiefly attracted by high-quality food items and/or ones that require difficult or lengthy handling (Giraldeau & Caraco 2000). *Stegodyphus sarasinorum* Karsch 1891 is an Indian social cooperative spider mainly found in the arid areas. Nowadays this spider is widely distributed in Kerala too. They are found in rocky areas and in open fields, where flying insects are most abundant (Bradoo 1972). All these characters of this spider were found to be interesting, so kleptoparasites can easily invade this social spider. Earliest studies (Bradoo 1967; Bradoo & Joseph 1970; Bradoo 1971) reported that remains of the prey and exuviae of *S.*

*sarasinorum* can serve as the food of other species like Embioptera and Microlepidopteran's larvae. Bradoo (1971) also reported that the some spiders of the genus Uloboridae occupied the damaged areas on the web of *S. sarasinorum*. So, the goal of the current study was to record the diverse kleptoparasites of social spider, *S. sarasinorum* in Christ College campus, Irinjalakuda, Kerala.

## MATERIALS AND METHODS

### Study organism and site

*Stegodyphus sarasinorum* Karsch, 1891 (Eresidae), is one of three permanently social spiders among the genus *Stegodyphus*. *S. sarasinorum* has been found in India, Sri Lanka, Nepal and Afghanistan (Kraus & Kraus 1988). Bradoo (1972) reported that *S. sarasinorum* made large complex silk nest of variable size on the bushes shrubs and branches of different kinds of thorny plants (Mimosoideae, Ramnaceae, Rutaceae and Tiliaceae). Tikader (1966) also reported the nests of this species found on the branches of *Acacia* sp. and *Zizyphus* sp. The nest is made by incorporating the fence, leaves, branches, their prey remains and also their own exuvia.

The site identified for the study was Christ College campus (N 10°21' E 76° 12'). Colonies of *S. sarasinorum* are widely distributed in the campus and are found on the branches of plants such as *Eugenia uniflora*, *Acacia dispartima*, *Acacia* sp., *Tamarindus indica*, *Artocarpus heterophyllus* and Nigeria grass (*Pennisetum pedicellatum*).

### Method

The spider nest was examined in its field, occupied in the different locations of Christ College campus, Irinjalakkuda. The study covers both winter and summer seasons. *S. sarasinorum* occupy in the shrubs and lower branches of tall plants. The spider nest was observed to find out the kleptoparasites in it.

Handpicking and visual searching methods were employed for collecting the parasites. The specimen was collected by leading them into tubes containing alcohol with the help of a brush dipped in alcohol. The collected spiders and non-spider kleptoparasites were preserved in 70% alcohol. Specimens were kept in separate bottles with labels containing information regarding the collection such as locality and date. Preserved specimens were examined under Magnus MSZ TR stereo microscope for taxonomic identification. Spider kleptoparasites were identified with the help of available literature (Sebastian & Peter, 2009) and kleptoparasitic ants were identified using AntWeb online database (<http://www.antweb.org>).

## RESULTS

Web and nest of social spiders can invade many species of spiders. We collected four different kinds of spider species and also two kinds of ant from the web and nest of the *S. sarasinorum*. *Argyrodes kumadai* Chida and Tanikawa, 1999 (Male and female) was collected from the web of *S. sarasinorum*. They do not construct web for foraging. They are usually attracted to small preys entangled on the webs of the *S. sarasinorum*. They occupied around 25±5 cm far away from the nest of *S. sarasinorum* and also

they laid 4 or 5 eggs on the web. Other spiders include *Hyllus semicupreus* Simon 1885, *Oxyopes javanus* Thorell 1887, *Phintella vittata* Koch 1846. These spiders were found inside and outside the nest. The kleptoparasitic ants are *Oecophylla smaragdina* Fabricius 1775 and *Monomorium pharaonis* Linnaeus 1758. They scavenge inside nest of this social spider and collected the prey remains. They were attracted mainly by the prey remains.

**Table 1. List of kleptoparasites collected from web and nest of *S. sarasinorum***

<b>Spider kleptoparasites</b>	<b>Family</b>	<b>Abundance</b>
<i>Argyrodes kumadai</i> Chida and Tanikawa 1999	Theridiidae	8
<i>Hyllus semicupreus</i> Simon 1885	Salticidae	5
<i>Oxyopes javanus</i> Thorell 1887	Oxyopidae	4
<i>Phintella vittata</i> Koch 1846	Salticidae	2
<b>Non-spider kleptoparasites</b>	<b>Family</b>	<b>Abundance</b>
<i>Oecophylla smaragdina</i> Fabricius 1775	Formicidae	18
<i>Monomorium pharaonis</i> Linnaeus 1758	Formicidae	11

## DISCUSSION

The present investigation showed the presence of different kleptoparasites and also explained the effect of a most common kleptoparasite, ant on web building behaviour and prey capturing behaviour of a social spider *S. sarasinorum*. Brockmann & Barnard (1979) in a review of kleptoparasitism in birds explained some conditions that favour the kleptoparasitism. These conditions are also favourable for this social spider to make more susceptible to kleptoparasitic invasion. The conditions include large number of host, great amount of food availability, quality of food, habits of host, long prey handling time, and decreased possibility of host escape. Colonies of *S. sarasinorum* were found in the open area where the availability of food was very high.

Studies of Exline & Levi 1962; Gertsch 1979 explained spiders in the genus *Argyrodes* demeanor nearly all of their activities in the webs of other spiders rather than building webs of their own. *A. kumadai* is a specialist kleptoparasite in the web of a social spider *S. sarasinorum*. Bosenberg & Strand (1906) recorded *A. fissifrons* Pickard-Cambridge, 1869 as kleptoparasite from Japan. Chida & Tanikawa (1999) described this spider as a new species under the name *A. kumadai*. Our study is regarded as a first report of Theridiid kleptoparasitic species *A. kumadai* from Kerala. Male and female of this spider occur in the web of *S. sarasinorum* and it entangled the small insect which was trapped on this web. It attacked the prey as quickly as possible before the host notices them. Trail (1980) states that kleptoparasitic *Argyrodes* are usually smaller than their hosts, whereas they are known to prey upon other spiders which are of the same size or larger than their hosts. But in our study we didn't observe that. Other spiders include *Hyllus semicupreus*, *Oxyopes javanus* and *Phintella vittata*, are not complete kleptoparasitic spiders. They are the frequent visitors of the nest of *S. sarasinorum* and they mostly attracted for the prey remains



and also small preys. Ants are also effective kleptoparasites of this social spider. *O. smaragdina* steal the prey remains and preys from the nest of the spider. Leborgne et al. (2011) also reported that ants stole the prey of sub social spider *S. lineatus*. Ant raids are most common in the discarded nests.

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