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Original article

Natural history of the trapdoor spider *Idiops joida* Gupta et al 2013 (Araneae: Idiopidae) from the Western Ghats in IndiaNeha Gupta^a, Sanjay Keshari Das^a, Manju Siliwal^{b,*}^aUniversity School of Environment Management, Guru Gobind Singh Indraprastha University, Dwarka, New Delhi, India^bWildlife Information Liaison Development Society, Coimbatore, Tamil Nadu, India

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ABSTRACT

We studied the habitat preferences and burrow characteristics of trapdoor spiders, *Idiops joida* Gupta et al 2013, within Dandeli Wildlife Sanctuary and nearby reserve forests of Uttara Kannada district of Karnataka, Western Ghats, India, from January 2010 to April 2010. We sampled 293 plots using 5 m² quadrats, randomly placed in six habitat types at four localities. Spiders showed patchy distribution throughout the study area. The density of *I. joida* was highest in uncanopied habitats having sparse vegetation or bare grounds. Steep slopes were strongly preferred by spiders. Burrow characteristics of *I. joida*, such as burrow diameter, depth, and lid thickness, were independent of habitat type.

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Introduction

Studies on mygalomorph spiders in the Western Ghats started during the British colonial period. This area has been relatively well explored as compared to other regions of the country (Siliwal et al 2013). The main focus of the study has been species documentation (Siliwal et al 2013). Information on the ecology, biology, and behavior remains poorly documented. The natural history and ecology of long-lived mygalomorphs need to be documented so that rational conservation plans can be implemented. This species was also selected because it is highly vulnerable to habitat modification and habitat destruction due to its sedentary habit, extended maturation time, and prolonged nesting time. Therefore, the present study was undertaken to understand habitat preference and burrow characteristics of *Idiops joida* Gupta et al 2013 (Mygalomorphae: Idiopidae) across different habitats.

Materials and methods

The study was carried out in Dandeli WLS and nearby reserve forests of the Uttara Kannada district (13°55'–15°32' N latitude; 74°05'–75°05' E longitude) of Karnataka, northern Western Ghats, India. The area is classified as the Northern Evergreen Zone

(Champion and Seth 1968; Daniels 1989), in which the moist deciduous and semi-evergreen forest types predominate.

We selected four different locations in the study site: Kulgi, Potoli, Kumbharwada, and Joida. Within each location, we sampled six habitat types: moist deciduous forest, mixed forest, semi-evergreen forest, teak plantations, human settlements, and agricultural fields.

The sampling was carried out between 0700 hours to 1300 hours from January 1, 2010 to April 30, 2010. In each habitat ($n = 6$), sample points were randomly selected using Global Positioning System (GPS) coordinates on Google maps. At each point, a 5 × 5 m² quadrat was laid out with a minimum distance of 250 m between quadrats. A total of 293 quadrats were placed in the study area (76 in Kulgi, 64 in Potoli, 85 in Joida, and 68 in Kumbharwada). Differences in the number of quadrats in each location are because some of the randomly generated quadrat points ($n = 100$) fell in areas that were not accessible and were omitted.

The number of active and inactive burrows was counted in each quadrat. Burrows with closed, intact lids and spiders inside were considered active, whereas those with missing or worn-out lids and no spiders inside were considered inactive. We also recorded microhabitat parameters (percentages of canopy cover, vegetation cover, rock cover, and bare ground) around every active burrow within a radius of 1 m.

For burrow characteristics, we measured diameter, depth, and lid thickness for 10 females and 10 juveniles in every habitat, except in moist deciduous and semi-evergreen forests, where we measured three and two burrows, respectively, because there were

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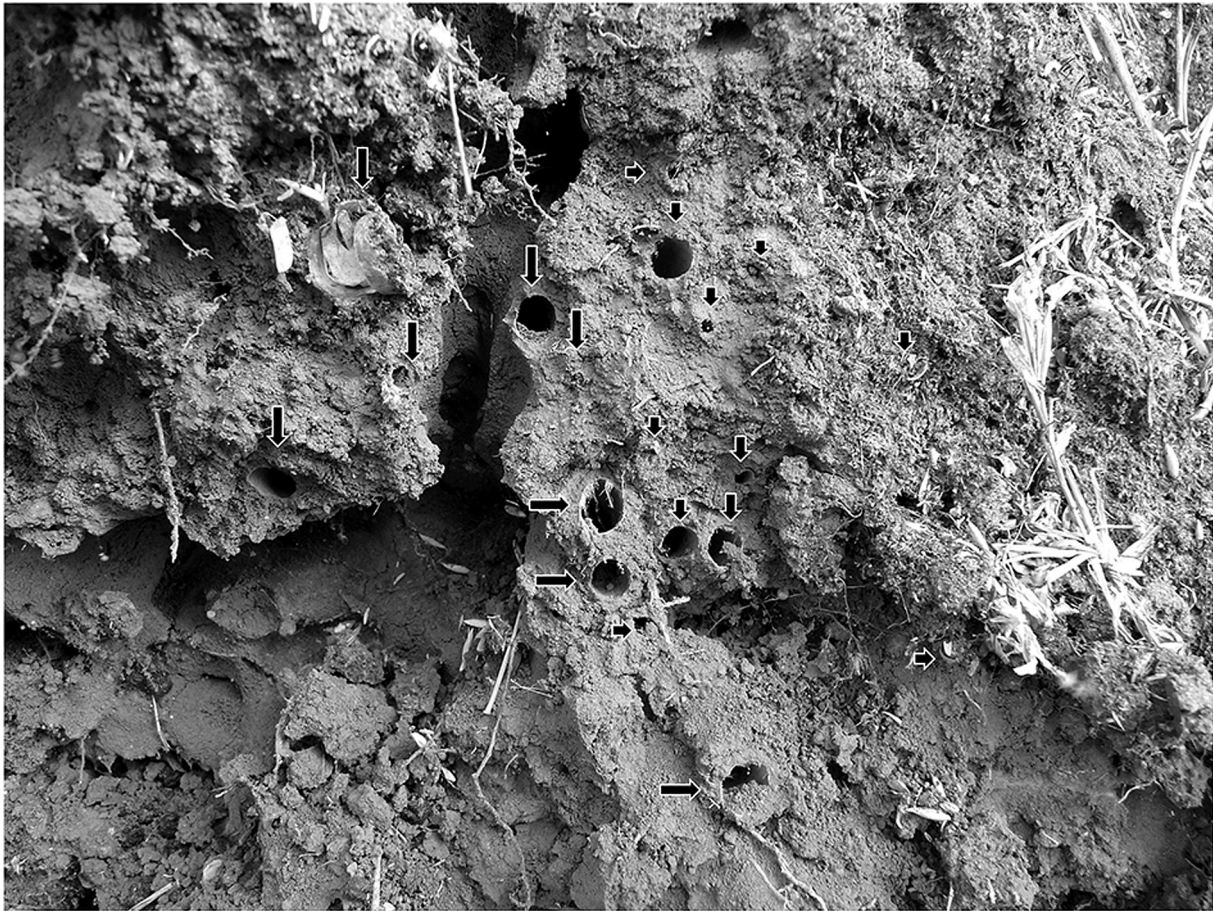


Figure 1. Partially excavated area, showing multiple burrows (shown with arrows) of *Idiops* in close vicinity.

fewer active burrows. Female and juvenile burrows were identified by body size. For burrow morphometry, we directly measured the depth of excavated burrows (in cross-section). Burrow characteristics of males were not recorded because males were found wandering, hidden in temporary hideouts, and not in their burrow during the study hour. A few burrows of gravid females were also excavated to collect the egg sacs.

From each quadrat, one to two adult specimens were collected for confirmation of the species and preserved in 70% ethanol.

Variations in active burrow density (number of active burrows/area surveyed), area of occupancy (quadrats with active burrows/total quadrats \times 100), microhabitat parameters (see above), and burrow characteristics (diameter, depth, and lid thickness) across different habitat types were tested using Kruskal–Wallis test, Wilcoxon signed rank test, and regression analysis.

All specimens collected are deposited in the museum collection of Wildlife Information Liaison Development Society, Coimbatore, Tamil Nadu, India.

Table 1. Record of *Idiops joida* across different habitat types and ecological parameters.

Habitat type	Total area sampled (ha)	Total quadrats	Quadrats with burrows	Burrows with spiders or occupied burrows (total number of burrows)	No. of nesting females	Active (occupied) burrow density/ha	Area of occupancy or % quadrats with active burrows (total number of quadrats)	Elevation range	Canopy cover (%)	Vegetation cover	Rock cover (%)	Bare ground (%)
Mixed forest	0.165	66	33	87 (114)	5	527.27	50.00 (66)	490–655	18	22.6	0.2	77.2
Moist deciduous forest	0.103	41	10	25 (46)	2	242.72	24.39 (41)	468–631	28.8	22.4	0.1	77.5
Semi-evergreen forest	0.088	35	4	9 (9)	2	102.27	11.43 (35)	521–682	59.8	53.5	0.1	46.4
Teak plantations	0.103	41	11	87 (87)	0	844.66	26.83 (41)	499–626	10.4	26.6	0	73.4
Human settlements	0.118	47	13	121 (121)	0	1025.42	27.66 (47)	497–634	16.9	9.7	0	90.3
Agriculture fields	0.158	63	11	101 (101)	1	639.24	17.46 (63)	522–615	12	10.9	0.3	88.8
Total	0.735	293	82	430 (554)	10	3381.58	27.99 (293)		—	—	—	—

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