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Burrowing Habit Play Thermoregulation Role in *Geolycosa Montgomery*, T. H., 1904 (Araneae, Lycosidae).

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Abstract: ***The placement of the burrow of Geolycosa may be related to function in both thermoregulation [5] and prey capture [2]. The field study was described survivorship of the Geolycosa sp. with reference to burrowing behavior. The Vairat is the highest point in Melghat tiger reserve (MTR) in the Satpuda hill ranges of Central India's Maharashtra state where patterns of burrowing habit of Geolycosa sp. was studied during summer season 2011. The total 50 burrows of Geolycosa sp. and diameters were measured. During study period, the atmospheric temperature was 42 ± 3^{0}C was recorded. At the same time we recorded 20 ± 3^{0}C temperatures of burrows. The major thermoregulatory attribute of the burrow is its depth and not its location relative to the surrounding vegetation [5]. For investigation of the structure of burrows, we were carefully dig 10 numbers of burrows. The total lengths of burrows were 54.86 cm ±3 and V- shaped. Behavioral thermoregulation is a highly effective method of maintaining preferred body temperatures. The creation temperature modifying structures of burrows in Geolycosa sp. provides a great deal of flexibility for thermoregulation. Behavioral thermoregulation has been a topic of research for decades and remains a field of active research. We suggest that future research not only continue to investigate these behaviors but also attempt to discover the genetic roots of these behaviors of Geolycosa sp. form Melghat Tiger Reserve (MTR).***

Keywords: Spider, *Geolycosa sp*., Burrowing habitat, Thermoregulation, Vairat, Melghat Tiger Reserve.

1. Introduction

Burrows serve many functions for animals by providing a location for rearing young, sleeping, hibernation, food storage, and protection from predators and environmental extremes [10]. In particular, burrow architecture across many taxa and habitats plays a major role in thermoregulation [12]. Burrows may offer spiders protection from predators, amelioration of climatic stresses, and a concealed location from which to ambush prey. Burrowing has been reported in many genera of wolf spiders, and it appears to have evolved several times independently in the family Lycosidae [5]. Burrow building is characteristic of Geolycosa spiders. The burrowing habitat play important role in the survival of Geolycosa spiders. However, there is no proper study done in India in reference to thermoregulation. The burrow characteristics and hunting behaviour of *Geolycosa sp.*have been studied [15, 16].Many aspects of the behaviour of *Geolycosa sp.*inside the burrows are unknown. However, several questions regarding to thermoregulation burrowing behavior of it remain unanswered. Hence the aim of our research was to describe the thermoregulation role of the burrows of *Geolycosa sp* [1].

2. Study Area and Methods

Melghat tiger reserve (MTR) is located in the Satpuda hill ranges of central India's Maharashtra and annual rainfall between 950 to 1400 mm and average mean temperature varies from 4^{0}c (minimum) to 46^0 c (maximum). Distribution of Geolycosa Species is patchy and only after through searching was study site chosen at Vairat during summer season 2011. Vairat is located at 1178m above MSL which has the highest point in Melghat tiger reserve (MTR) and hence has a typical habitat.

During study period burrow diameter was measured in cm by using Vernier Caliper (PICD, ASI, and COMP. INDIA) and depth was measured in cm by a length of rubber tube. The burrows were carefully dug to determine their structure and to collect spiders for identification. Rough sketch of burrows with major features were done with observations. The atmospheric and burrows temperature were recorded during 9.30 am to 12.30 pm. with help of mercury thermometer.The identification done up to the generic level.

3. Result and Discussion

The placement of the burrow of *Geolycosa* may be related to function in both thermoregulation [5] and prey capture [2]. To describe the thermoregulation role of the burrows of *Geolycosa sp.*, we measured diameter of total 50 burrows of *Geolycosa sp*. by using Vernier Caliper and burrow diameter were 1.6 cm ±0.2 and also carefully dig total 10 numbers of burrows. Inner side of burrow is plastered with some clay soil, sand, straw, dead leaf, body secretion and silk with high interstitial humidity. The soil around burrow is porous. The pattern of burrowing construction is somewhat V-shaped. The total length of burrows was 54.86 cm ±3. The major thermoregulatory characteristic of the burrow is its depth and not its location relative to the surrounding vegetation [5]. There are obvious benefits and costs of having a deep, large burrow for a burrowing wolf spider [5]. During study period, the atmospheric temperature was 42 ± 3^{0}C was recorded. At the same time we recorded 20 ± 3^{0}C temperature of burrows.Carrel, 1980 [8] described that daily fluctuations in soil temperature are much less at 15 cm depth than at 2.5–5 cm depth. Anderson and Ultsch, 1987 [9] study that a deep retreat would allow a spider to live in a thermally buffered zone and still have good exchange of respiratory gasses. Halloran et al., 2000 [11], state that deep burrows require much time and energy to excavate and to maintain.In our observation, *Geolycosa sp.* digs burrows and makes a turret around the mouth of the burrow, sometimes only a narrow ring of dead grass, but often rising an half inch or more above the surface of the ground and covers with straw, chips or any fine, loose. That type arrangement of turret as airflow controller. Airflow across it will draw air up and out of the upper reaches of the burrow [6]. So enough air should pass through moist sandy soil and become humidified to maintain a supply of water vapour for condensation. That the porosity of the soil around these burrows is helping the pressure reduction needed to draw air out of burrows together with wind-induced pressure reduction [14].

We recorded that *Geolycosa sp*.was frequently moving up or down the tunnel. According to Vogel, 2006 [14], spider might obtain water by moving up and down within its burrow, climbing up near the top with a cool body and condensing water, and then retreating to the bottom to absorb the water and cool again. But the soils around their burrows contain substantial amounts of interstitial water with, as a result, very high interstitial humidity – as noted earlier, as do soils beneath the immediate surface, even in hot conditions [14]. While some spiders can extract interstitial water [3], *Geolycosa* have not been reported to do so. Nor can they directly extract water from the air, even at 98% humidity [5]. It should be spider obtain water by moving up and down within its burrow, climbing up near the top with a cool body and condensing water, and then retreating to the bottom to absorb the water and cool again.

In our study *Geolycosa sp*. sealed the entry door of their burrows with silk or debris during day time and those burrows were blocked and their entrance were sealed by silk was indicated their appearance in burrows. But at night our observation is that burrows do not block by silk and spider were seen at the opening turret. Main (1978) [7] and Gray (1968) [4] recorded door sealing behavior of trapdoor spider associated with seasonal weather conditions. In the Florida, Carrel (2003) [13] recorded that *Geolycosa* are typified as having open burrows, but during cold spells and heavy rainstorms revealed that these spiders can rapidly close their burrow entrances until weather conditions improve.

Behavioral thermoregulation is a highly effective method of maintaining preferred body temperatures. The creation temperature modifying structures of burrows in *Geolycosa sp.* provides a great deal of flexibility for thermoregulation. Behavioral thermoregulation has been a topic of research for decades and remains a field of active research. We suggest that future research not only continue to investigate these behaviors but also attempt to discover the genetic roots of these behaviors of *Geolycosa sp*. form Melghat Tiger Reserve (MTR).

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