Sustainability and Biodiversity Conservation

New record of Fan throated lizard, the mason wasp and Stick insect from Perumal hills, India with their notes

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Received: 12 September 2024 / Revised: 23 November 2024/ Accepted: 28 November 2024 / Published online: 5 March 2025. **How to cite:** Selvamurugan, S. (2025). New record of Fan throated lizard, the mason wasp and Stick insect, Tamil Nadu, India with their notes. Sustainability and Biodiversity Conservation, 4(1), 48-55. **DOI:** https://doi.org/10.5281/zenodo.14962988

Abstract

Few records describe the notes and their distributions, significant from Perumal hills, Madurai district, Tamil Nadu state, India. Our study provides a substantial basis for establishing a natural classification of the recorded species.

Keywords: *Delta* genus, Insect, New record, Perumal hills, Reptiles

Introduction

Biodiversity refers to the variety and variability among living organisms and ecological complexes which occur. This includes diversity within species, between species, and of the ecosystem. It is defined as the totality of genes, species, and ecosystems of a region. Biodiversity or Biological diversity comprises Genetic diversity, Species diversity, and Ecosystem diversity (level of biodiversity). Many widely distributed lizard species exhibit high intraspecific variation and often harbor cryptic diversity (e.g. Zamudio et al., 1997; Bergmann & Russell, 2007; Linkem et al., 2010; Smith et al., 2011; Ahmadzadeh et al., 2013; Oliver et al., 2014). These findings hint at the underestimated diversity of lizards across the world. The Indian subcontinent, a vast landscape, that is topologically and climatically heterogeneous, provides an ideal setting to further explore this issue. This large swathe of land harbors many widely distributed species and recent molecular studies indicate the presence of cryptic diversity among many lizard groups from India (Bansal & Karanth, 2010; Bauer et al., 2010; Agarwal et al., 2014a, Agarwal et al., 2014b). Phasmatodea (also known as Phasmida) comprises 3000 species worldwide Stick-insects are found in nearly all temperate and tropical ecosystems. Species are mostly nocturnal and phytophagous. Phasmatodea bears several common morphological characters that define the order: an emarginated labrum, a pair of exocrine glands located inside the prothorax, and a

thorax fused with the first abdominal sternum. Phasmids undergo incomplete metamorphosis (four to eight instars), with the young nymphs resembling miniature, albeit wingless, adults. They can regenerate or partially regenerate lost limbs and have compound eyes. They can be anywhere from 2.5 centimeters to a little over a foot in length. They live in tropical areas all over the world, including South America, Australia, Southeast Asia, and the United States. All species in the United States (except one in Florida) are wingless. They can be generally referred to as phasmatodeans, phasmids, or ghost insects, with phasmids in the family Phylliidae called leaf insects, leaf-bugs, walking leaves, or bug leaves. More than 3, 000 species are currently described. Walking sticks feed on the leaves of shrubs and trees. Females can lay eggs without a male and the eggs will all be exact female copies of the mother. The nymphs moult several times before becoming an adult. Walking sticks can be seen in the fossil record as far back as the Eocene. The first time report of *Delta conoideum* (Gmelin, 1790) mason wasp species in Perumal Malai, Tamil Nadu state, India. Fan-throated lizards and stick insects in these two species were also recorded during the study period. *Delta conoideum* (Gmelin, 1790) is a widely distributed potter wasp species in India. They usually make their nests on the walls of buildings using mud. Even though it is a widely distributed species in India, only limited distributional records have been published so far. The species is recorded for the first time from Andhra Pradesh, Assam, Diu, Jharkhand, Karnataka, Madhya Pradesh, Meghalaya, Pondicherry and Telangana. (Kumar et al., 2015) Hence, first time a report of Stick Insect (Order Phasmida) species in Perumal Malai, Tamil Nadu state, India.

Material and methods

Study area

Perumalmalai Backwoods town is situated in Melur taluka of Madurai area in Tamil Nadu, India. The all-out topographical area of the town is 445.5 hectares. Melur is the closest town to Perumal Malai backwoods town for all major financial exercises. The survey was conducted in July 2023. Three species were recorded namely Fan-throated lizard, stick insect, and the mason wasp (Fig. 1, 2, and 3).

Fan-throated lizards

Fan-throated lizards are small, colorful reptiles found in South Asia's dry shrublands and coastal areas. Males have a loose patch of skin drooping from their throats – it doesn't sound like much but it comes into its own when the lizards' dating game begins. That's when males scamper up a rock, strike a cobra pose, and unfurl the loose skin into a beautiful fan. This fan called a 'dewlap', earns the lizards their name and comes in hues of metallic black, orange,

blue, and cream – or all in one. Since their discovery in India in 1829, a detailed assessment of the diversity of fan-throated lizards found in the country has been due. Scientists have now searched in almost all of their likely habitats and concluded that there are at least 15 different species in India. These belong to two genera – *Sitana* and *Sarada*. Though six species (five *Sitana* and one *Sarada*) out of the 15 are still to be described, their discovery is already giving insights into the evolution of this group of lizards. Hence, it is necessary to monitor populations of Indian reptiles in the wild by surveying a large number of sites periodically during specific periods, based on their activity pattern and breeding season. This will help in assessing changes in the species abundance. Such data represented as indices, using the first/pilot year as a base year, are essential for assessing the present status and also for long-term monitoring of the population dynamics (Zuiderwijk et al., 1993; Zuiderwijk et al., 1998). The findings of such studies will help in evolving conservation and policy-making strategies.

Sitana ponticeriana is a medium-sized (adult snout-vent length, 5–8 cm), ground-dwelling agamid lizard observed first time in Perumal Malai, Madurai, Tamil Nadu, India. (Fig.1) distributed throughout India, preferably in dry and more or less open country (Daniel, 1983). They are diurnal and insectivorous. The body of these lizards is brown above with a series of dark brown, black-margined, rhomboidal, vertebral spots on the back. The throat fan in males is brilliantly colored with red, blue, and dark shades during the breeding months. These lizards run with a considerable speed and on the approach of danger dash away with tail tips erect, until they find refuge in some bushes or crevices in the ground. When dashing they often adopt the bipedal mode of locomotion. These lizards are oviparous, polyautochronic, multi-clutched, and breed from May to August in Southern India (Subba Rao et al., 1972; Shanbhag, 2002; Radder et al., 2003). During morning hours *S.ponticeriana* were extremely dynamic furthermore, by and large, participated in luxuriating or taking care of. With the climb in air temperature by early afternoon they bound themselves to obscure regions or normal tunnels and turned out to be less dynamic. During night by and by they showed up in the open field but showed just a moderate movement. The females were perpetually gravid and showed swell midsections assailed with oviductal eggs. The guys displayed dazzling fan throats. Accordingly, the examples were grown-ups and in rearing conditions. Regardless of its wide dispersion in India, the segment concentrates on the fan-throated reptiles that are deficient. The current segment work however limited to a cotton field uncovers many fascinating parts of reptile science. It shows that the study of any reptile species is best done during proper weather examples and time/month

considering the data on its intermittent/everyday development plans. Since proliferation-related occasions in *S. ponticeriana* happen between April, May, and June when they emerge from their asylums in enormous numbers looking for mates and reasonable locales for egg-laying, etc, the current status overview was embraced in these months. To be sure, the review shows that during the positive piece of the day (morning hours), the reptiles draw in themselves in different reproducing related exercises like mate looking, sexual showcase, region monitoring, and so forth.

Fig 1. Fan-throated lizard (Sitana *ponticeriana)* species

Stick Insects (Order Phasmida)

Distribution

Phasmids are mostly tropical and subtropical throughout the world, although some hardy species persist in temperate areas. There even are three species of stick insects well-established in the United Kingdom. Pet keepers occasionally deliberately discard stocks in the wild, and there also are accidental releases. Tropical species do not normally survive long in the United Kingdom, but escapees can become established in warmer climates.

Habitat

Found in a variety of habitats, phasmids can be abundant in wet and dry forests and grasslands. In some countries, they are common in gardens. Although they sometimes are found resting on or near their food plants in the daytime, they often are well hidden under leaves on the forest floor or in crevices. Tropical forests teem with these insects at night, when they move from their hiding places under cover of darkness. Some species frequent treetops and hence are seen rarely.

Behavior

Mostly nocturnal and remaining motionless in the daytime, phasmids blend in with the background; hence procrypsis (concealment from predators) is the primary defense. Some species even can change color to match their surroundings better, perhaps becoming a darker shade toward nighttime. Two-tone species with darker undersides are not uncommon. Many species feign death when disturbed, falling to the ground and remaining motionless; they may willingly shed a limb ("autotomy") to escape.

Feeding ecology and diet

Phasmids feed on leaves, taking large, circular bites out of the edges. A few species also eat flowers or bark. Some species have very few host plants, whereas many others accept the leaves of numerous different plants. It therefore is not surprising that pet keepers in different parts of the world often successfully rear phasmids in captivity on Eucalyptus, Psidium, Rubus, and Quercus species, regardless of their natural host plants.

Significance to humans

There are few reports of phasmids being eaten by humans. An old report states that natives of Goodenough Island, New Guinea, used the boldly spined hind legs of an Eurycantha species as fishhooks. The spectacular appearance of phasmids has led to their commercial use for framing (like butterflies, they are sold mainly to tourists as home decorations), in films, and on T-shirts, postcards, and toys. Phasmids are showy and relatively easy to look after, making them very popular insects in the pet trade. Nearly all species are harmless, but some need to be handled carefully since they have shown aggressive defensive behavior. In extreme cases a few species squirt defensive sprays that have been known to cause temporary blindness in humans. Certain species are regarded as pests, with occasional population explosions resulting in severe defoliation of plants.

Fig 2. Stick Insects (Order Phasmida)

The mason wasp (*Delta conoideum)*

In 1981-82 we conducted studies of mud wasps in a field cage and crops in open fields at ICRISAT Center. We recorded that *D. pyriforrne* (Fab.) and *D. campaniforrne esuriens* (Fab.) as well as *D. conoideum* preyed upon *Heliothis larvas*. *D. campaniforme esuriens* preyed mainly upon 2nd and 3rd instar larvae while the other two species preferred the larger 4th-6th instar larvae. Several other lepidopteran larvae were also collected by these wasps including' Plusia spp (Bhatnagar, 1981). The wasps were seen to drink water and then regurgitate onto the soil to make a small mud ball. The mud ball was then carried between the forelegs and mouthparts to a solid surface and used for the construction of the cells making up a "nest." In the cage the nests were built on the metal cage supports while in the fields they were found on rocks, trees, and buildings. A single drink of water appeared to be sufficient for the preparation of two or three mud balls and five or six balls were generally required to construct each cell. In the cage, the nests consisted of five to eight cells but in the field, there were up to 16 cells in a nest. Most nests found in the field were constructed with red soil (Bhatnagar, 1981).

Diagnosis

Apical half of gastral tergite II and whole of the remaining tergites red; clypeus, lower half of frons and ocelli sinus yellow; antennal scape in front yellow; broad black band above between eyes; mesosoma and metasoma dark red but legs pale reddish; dark line on mesoscutum medially, base and middle of tergite II dark (tergite II interrupted medially); wing fuscohyaline.

Fig 3. The mason wasp (*Delta conoideum)* species

Distributions

Bhutan (Loc. 13), India, Arabia, China, Malaysia, Myanmar, Nepal, Pakistan, Sri Lanka, Thailand, Vietnam. Reptiles, especially snakes are in crisis due to people's poor knowledge of these creatures, influenced by superstitious beliefs. To protect these animals, education of the general public regarding their biology, and ecological value, and eradication of associated myths must take the front stage. Our study provides a substantial basis for establishing a natural classification of the stick and leaf insects and for further developing the role of phasmatodeans as emerging model systems in evolutionary research. Thick vegetation appears to favor the wasps, and the presence of flowering trees, and buildings suitable for the construction of the hives in a peaceful environment might be favoring bees' diversity in the area. Further studies involving observations throughout the year would be necessary to get comprehensive information. However, the present study forms a good basis to take up necessary precautions and measures to conserve the diversity in the Perumal hills, Madurai, Tamil Nadu, India.

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