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R. Nikhita

Venus Matriculation Higher
Secondary School, Chidambaram –
608 001, Tamil Nadu, India

R. Srithilak

Sherwood English School, Muthiah
Nagar, Annamalainagar – 608002,
Tamil Nadu, India

M.V. Radhakrishnan

Department of Zoology, Annamalai
University, Annamalainagar – 608
002, Tamil Nadu, India

Prevalence of *Paederus* spp. (Coleoptera; Staphylinidae) and dermatitis in Annamalainagar, Chidambaram, Tamilnadu

R. Nikhita, R. Srithilak and M.V. Radhakrishnan

Abstract

Majority of staphylinid beetles are predators of insect larvae and mites and nematodes and are regarded as biological agents to control agricultural pests. *Paederus* genus comprising 600 species are found in tropical and temperate climates. A survey was conducted to understand the prevalence of *Paederus* spp. in Annamalainagar, Chidambaram and Tamilnadu for a period of two years from January 2012 to December 2013. The "pedrin" poison in their body materials, causes skin and eye dermatitis in human. In the present study two species of rove beetles identified as *P. melampus* Linnaeus and *P. fuscipes* Curtis. These species are more prevalent during summer months (February to July) and the irritation was observed in all ages and sexes.

Keywords: *P. melampus*, *P. fuscipes*, Staphylinidae, Coleoptera.

1. Introduction

Paederus species are widely dispersed around the world and the skin irritation (dermatitis linearis) caused by the species to the authors pave the way to study about this creature. It is caused when the beetle is crushed, even partially, against the skin [1]. Once pederin is on the skin from the initial beetle contact, it may also be spread elsewhere on the skin. "Kissing" or "mirror-image" lesions where two skin areas come in contact (for example, the elbow flexure) are often seen [2]. Initial skin contact with pederin shows no immediate result. Within 12–36 hours, however, a reddish rash (erythema) appears, which develops into blisters. Irritation, including crusting and scaling, may last for two to three weeks [3]. The insect doesn't bite or sting, but releases haemolymph containing pederin, a potent vesicant which leads to linear dermatitis. Hence the present study has been designed to understand the prevalence of *Paederus* spp. (Coleoptera: Staphylinidae) in Annamalainagar, Chidambaram, Tamilnadu.

2. Materials and Methods

Collection of insect: *Paederus* species are attracted to bright lights after nightfall [4]. The insects were collected for a period of two years during night hours (7:00 pm to 10:00 pm) regularly. Maximum number was collected after a rain in summer months. The species were identified [5] and monthly average values calculated.

Life Cycle: Rove beetles have hardened forewings that cover the flight wings which are folded under short elytra [6] (Fig 1). *Paederus* eggs are laid singly, in moist habitats. Larvae go through two instars before pupation. Both larvae and adults are predatory on other insects [7]. Because of their preference for moist soil, large numbers of *Paederus* beetles may be attracted to irrigated farmland, where they provide some benefit by eating herbivorous insects but can cause problems for people working in fields or inhabiting in grassy areas [6].



Fig 1: Showing *Paederus* Spp.

Correspondence:

M.V. Radhakrishnan

Department of Zoology, Annamalai
University, Annamalainagar – 608
002, Tamil Nadu, India

3. Results and Discussion

The number of insects collected during the study period is given in Table 1. Maximum population was contributed by *P. melampus* as 112 and 108 in the month of June, 2012 and 2013, respectively. Likewise *P. fuscipes* was also recorded to

be highest in number during the same duration 89 and 86 individuals, respectively). In the present study, more insects were counted after a rainy day. After rain higher number of flies emerged and got attracted to the bright light.

Table 1: Number of *P. melampus* and *P. fuscipes* collected during the study period (January 2012 to December 2013)

| Species | Year | Months | | | | | | | | | | | |
|--------------------|------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| <i>P. melampus</i> | 2012 | 79 | 82 | 96 | 100 | 106 | 112 | 104 | 97 | 42 | 18 | 21 | 33 |
| | 2013 | 76 | 79 | 91 | 97 | 102 | 108 | 98 | 94 | 56 | 21 | 27 | 29 |
| <i>P. fuscipes</i> | 2012 | 71 | 73 | 74 | 81 | 87 | 89 | 76 | 74 | 37 | 19 | 20 | 22 |
| | 2013 | 78 | 72 | 71 | 80 | 82 | 86 | 81 | 76 | 38 | 20 | 16 | 11 |

*Average values for 30 days in every month

Paederus dermatitis also known as blister beetle dermatitis is caused by contact with chemical pederin contained in the body fluid of insects of genus *Paederus*^[8] and presents a characteristic clinical pattern of linear or oval lesions with erythematous papules and vesicles surrounding an area of necrosis, localised to the site of contact with the insect (Fig. 2).



Fig 2: Showing dermatitis

This beetle does not bite or sting but brushing or crushing the beetle over the skin provokes the release of its coelomic fluid, which contains pederin^[9]. Pederin is a potent vesicant. Pederin is believed to block mitosis, even at a concentration of 1 ng/ml, by inhibiting DNA and protein synthesis^[10]. Epidermal proteases which cause acantholysis and hence blister formation. Any part of body can be affected but exposed parts are mostly affected. A striking feature of *Paederus* dermatitis is presence of kissing lesions. They occur whenever apposition of primary lesion to previously intact skin occurs. They frequently occur on apposed surfaces e.g. flexures of elbow, axilla and apposed skin of arm. Ocular and genital involvement may occur as unilateral keratoconjunctivitis or periorbital dermatitis^[11]. Todd *et al* has reported widespread erythema and desquamation of the upper body as rare presentation^[12]. Treatment of the condition includes washing off the area and application of mupirocin ointment. Application of steroid may cause hyperpigmentation. Simple preventive measures like mosquito net, fixing mesh to windows can lower the incidence^[13-19]. In our observation, the prevalence of *Paederus* spp. was highest in the summer months of April, May and June and lowest in the winter months. Similar observations were reported by Padhi *et al*, Gnanaraj *et al* and Handa *et al*^[20-22]. In contrast, the incidence was greater during the last quarter of the year in South America and in the month of September in Iran and Guinea which could be explained by variations in habitat specificity and rainfall pattern^[23, 24].

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5. References

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