



## SHORT COMMUNICATION

Clinical manifestations and progression, seasonal variation, and environmental factors associated with Paederus dermatitis among patients attending the outpatient dermatology clinic of Thailand's largest national tertiary referral center: a prospective cohort study

### AUTHORS

Sukhum Jiamton<sup>1</sup> MD, PhD, Associate Professor of Dermatology \*

Nuttagarn Jantanapornchai<sup>2</sup> MD, Research fellow

Ya-Nin Nokdhes<sup>3</sup> MD, Resident of Dermatology

Poramin Patthamalai<sup>4</sup> MD, Resident of Dermatology

Ploypailin Tantrapornpong<sup>5</sup> MD, Resident of Dermatology

Pichaya Limpoka<sup>6</sup> MD, Resident of Dermatology

Piphob Phonarsa<sup>7</sup> MSc, Scientist

Oraya Pochanapan<sup>8</sup> MD, Research Fellow

### CORRESPONDENCE

\*Dr Sukhum Jiamton [sukhum.jiamton@gmail.com](mailto:sukhum.jiamton@gmail.com)

### AFFILIATIONS

1, 2, 3, 4, 5, 6, 7, 8 Sexually Transmitted Disease and HIV Division, Department of Dermatology, Faculty of Medicine Siriraj Hospital, Mahidol University, 2 Wanglang Road, Bangkoknoi, Bangkok 10700, Thailand

### PUBLISHED

2 February 2021 Volume 21 Issue 1

### HISTORY

RECEIVED: 22 August 2020

REVISED: 27 November 2020

ACCEPTED: 16 December 2020

### CITATION

Jiamton S, Jantanapornchai N, Nokdhes Y, Patthamalai P, Tantrapornpong P, Limpoka P, Phonarsa P, Pochanapan O. Clinical manifestations and progression, seasonal variation, and environmental factors associated with Paederus dermatitis among patients attending the outpatient dermatology clinic of Thailand's largest national tertiary referral center: a prospective cohort study. Rural and Remote Health 2021; 21: 6378. <https://doi.org/10.22605/RRH6378>

This work is licensed under a Creative Commons Attribution 4.0 International Licence

## ABSTRACT:

**Introduction:** Paederus dermatitis (PD) is a skin reaction to a chemical substance called paederin, which emanates from a beetle of *Paederus* spp. This study's objective was to investigate the clinical manifestations and progression, seasonal variation, and environmental factors associated with PD among patients attending the outpatient dermatology clinic of Siriraj Hospital.

**Methods:** This prospective cohort study included patients who were diagnosed with PD at the Department of Dermatology, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand during the October 2017 to July 2018 study period. Sociodemographic and environmental data were collected by questionnaire.

**Results:** Twenty-five PD patients (16 females, 9 males) were included with a mean age of 40.9 years (range 17–69 years). The most common sites were the upper and lower extremities.

**Keywords:**

clinical manifestations, environmental factors, Paederus dermatitis, Thailand.

## FULL ARTICLE:

### Introduction

Paederus dermatitis (PD) is an acute irritant contact dermatitis caused by contact with a toxin principally found in the body fluid of a beetle of the genus *Paederus* (Fig1). The toxin is released when the beetle is crushed against the skin<sup>1</sup>. PD is characterized by vesicles and pustules on an erythematous base with sudden onset burning sensation on exposed areas of the body<sup>2</sup>. *Paederus* species are found worldwide, except in Antarctica<sup>3</sup>. *Paederus* is



**Figure 1: A beetle of the genus *Paederus*.**

### Methods

This prospective cohort study included patients diagnosed with PD at the Department of Dermatology, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand during the October 2017 to July 2018 study period. Patients with suspected but inconclusively diagnosed PD were excluded. Sociodemographic and environmental data were collected by questionnaire. Clinical data were collected at physical examination and from medical records.

### Statistical analysis

Erythema, linear, and kissing lesions (where two skin surfaces contact) were found in 100%, 32%, and 28% of patients, respectively. Seventy-six percent of patients demonstrated more than one lesion. Eighty percent of patients lived in Bangkok, and 44% of patients had a home near a farm or forest. Fluorescent lighting was used in the homes of 24 patients. All 25 patients were treated with topical steroid, and some received other supportive regimens. Two patients had post-inflammatory hyperpigmentation as a complication; only 7 of 25 patients attended the scheduled follow-up visit.

**Conclusion:** In Thailand, PD presents throughout the year, but the most active month is December. Skin lesions vary from mild irritant dermatitis to severe dermatitis, and the average time to complete cure is 12 days. History and clinical manifestation are essential for accurate diagnosis.

more common in tropical and subtropical countries. PD is diagnosed in general practice throughout the year at the authors' center; however, data specific to PD in Thailand remain scarce. Accordingly, the aim of this study was to investigate the clinical manifestations and progression, seasonal variation, and environmental factors associated with PD among patients attending the outpatient dermatology clinic of Siriraj Hospital, Thailand's largest national tertiary referral center.

Patient characteristics were summarized using descriptive statistics. All data analyses were performed using the Statistical Package for the Social Sciences v18.0 (SPSS, <http://www.spss.com>).

### Ethics approval

This study was approved by the Siriraj Institutional Review Board of the Faculty of Medicine Siriraj Hospital (approval number 503/2560(EC1)). All patients provided written informed consent before enrolment into the study.

### Results

Twenty-five PD patients (16 females, 9 males) were included, with a mean age of 40.9 years (range 17–69 years). More than half of patients (60%) had an education higher than secondary education. Eight patients (32%) had underlying disease, and the most common disorders were hypertension (20.0%), diabetes mellitus (16.0%), and dyslipidaemia (16.0%). Lesion locations and characteristics are shown in Table 1. The most common sites were the upper (6, 24.0%) and lower (6, 24.0%) extremities. The neck and face were affected in five (20.0%) and three (12.0%) patients, respectively. Erythema, linear, and kissing lesions (where two skin surfaces contact) were found in 100%, 32%, and 28% of patients, respectively. Vesicle lesion was found in four (16.0%) patients, and pustule lesion was found in four (16.0%) patients. Central necrosis and bullous lesions were observed in two patients and one patient, respectively. Seventy-six percent of patients demonstrated more

than one lesion. Eighty percent of patients lived in Bangkok, and 44% of patients had a home near a farm or forest (Fig2). Three out of 25 patients lived in a multi-floor building, which was defined as more than 10 floors in this study. Fluorescent lighting was used in the homes of 24 patients. All 25 patients were treated with topical steroid, and some received other supportive regimens (Table 2). Supportive regimens that were given included antihistamine, topical antibiotic, wet dressing, and/or oral prednisolone. Two patients had post-inflammatory hyperpigmentation as a complication; only 7 of 25 patients attended the scheduled follow-up visit. No family members of patients had a history of PD symptoms. December was found to have the highest incidence, and January had the second highest number of cases. The mean time to complete cure was 12.6±1.3 days (min 5, max 21).

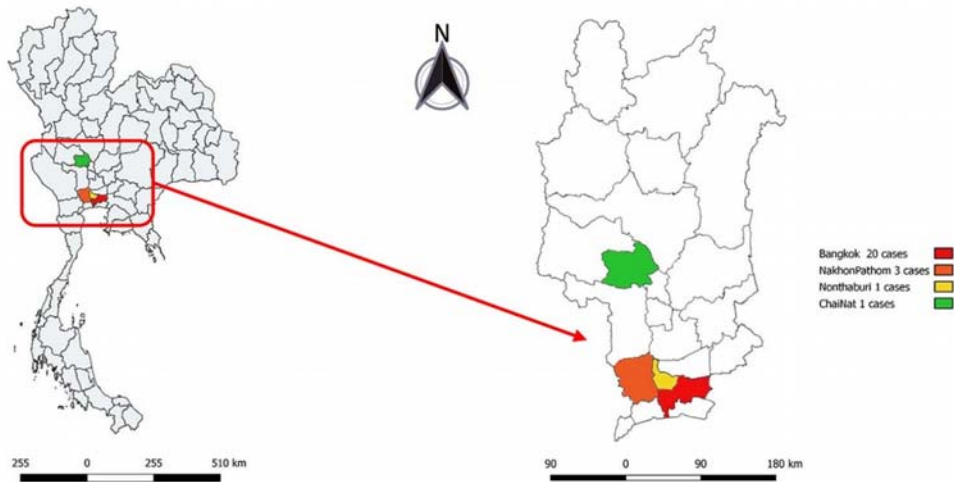
**Table 1: Location of Paederus dermatitis and lesion characteristics of 25 Paederus dermatitis patient**

Lesion location and characteristic	n (%)
Location	
Upper extremities	6 (24.0)
Lower extremities	6 (24.0)
Neck	5 (20.0)
Face	3 (12.0)
Trunk	1 (4.0)
Back	1 (4.0)
Buttock	1 (4.0)
Upper and lower extremities	1 (4.0)
Face and upper extremities	1 (4.0)
Lesion characteristic	
Erythema	25 (100)
Linear	8 (32.0)
Kissing	7 (28.0)
Vesicle	4 (16.0)
Pustule	4 (16.0)
Central necrosis	2 (8.0)

**Table 2: Treatment-related data, environmental factors, time to cure and last known status of 25 Paederus dermatitis patients**

Variable	n (%)
Treatment	
Topical steroid	25 (100)
Topical antibiotic	3 (12.0)
Oral prednisolone	1 (4.0)
Antihistamine	7 (28.0)
Wet dressing	2 (8.0)
Complication	
Post-inflammatory hyper/hypopigmentation	2 (28.6)
Location	
Bangkok municipality	20 (80.0)
Another province in Thailand	5 (20.0)
Type of residence	
Farm or forest home	11 (44.0)
Building higher than 10 floors	3 (12.0)
Artificial light	
Luminescent	24 (96.0)
Using light at night	10 (40.0)
Using light during the day	19 (76.0)
History of Paederus dermatitis in family	0 (0.0)
Time to cure (days), mean±SD (min, max)	12.6±1.3 (5, 21)
Last known patient status	
Complete cure	3 (12.0)
Lost to follow-up with marked improvement	4 (16.0)
Lost to follow-up	17 (68.0)
No follow-up	1 (4.0)

SD, standard deviation.



**Figure 2: Location of *Paederus dermatitis* cases in central Thailand in present study.**

## Discussion

The genus *Paederus* (family Staphylinidae, order Coleoptera, class Insecta<sup>4</sup>) consists of more than 600 species distributed worldwide, especially in hot, damp climates<sup>5</sup>. These small flying insects usually appear at night and are attracted by artificial light. The beetles do not sting or bite. Transfer of the beetle's toxin to humans occurs accidentally via the inadvertent crushing of the beetle while on human skin. PD patients normally notice the symptoms of PD upon awakening in the morning<sup>6</sup>.

In the present study, all 25 PD patients had erythematous skin lesions, which are a sign of inflammation. This correlates with a study from Turkey that found erythematous lesions to be the most identified lesions<sup>7</sup>. Kissing lesion, a classic sign of PD, was found in only 25% of patients. The clinical signs of PD range from mild to severe. The severe form in this study was central necrosis. Skin lesions usually present on an uncovered part of the body, such as face, neck, or the upper and lower extremities<sup>2,8</sup>. Some patients also have lesions on unexposed areas, such as back and buttocks. In these cases, it is presumed that *Paederus* was crushed under the clothes. The clinical manifestations of PD mimic others diseases, such as herpes simplex, herpes zoster, allergic contact dermatitis, and liquid burns<sup>5,9</sup>. Diagnosis of PD is suggested by lesion characteristics, exposed sites, seasonal incidence, and case history.

Regarding the type and location of residence, more than half of patients lived near a forest or a farm, and three patients lived in a high-rise building. A 2016 study by Maryam et al found bright light sources and higher levels (ie multi-floor buildings) to be the main factors that attract *Paederus* to residential areas<sup>10</sup>.

Although PD presents all year round, it has variable seasonal incidence. In the present study, the month of December was found to have the highest incidence. In contrast to this study, Gnanaraj et al<sup>11</sup> and Zargari et al<sup>9</sup> found the incidence of PD to be highest in the months of April and September, respectively. These observed differences in peak incidence are likely explained by variations in humidity, season, latitude, and climate change. *Paederus* is not

active when the temperature is less than 18°C. In Thailand, December is the month with the lowest average temperature. The observed high incidence during December in this study may be due to people opening the window instead of using the air conditioner, which facilitates entry of *Paederus*.

PD is a self-healing disease. However, supportive treatment may be helpful, such as topical steroids, oral antihistamines for itching, and wet dressing for wounds. In severe irritant dermatitis cases, systemic steroid is often required. Secondary bacterial infection, which can be treated by topical or oral antibiotics depending on severity, is a complication that may develop. The symptoms appear after 24–48 hours after contact and take a week or more to disappear. The mean time to complete cure in the present study was  $12.6 \pm 1.3$  days (min 5, max 21), which is consistent with the findings of Gnanaraj et al<sup>11</sup>.

PD can be prevented by avoiding human–beetle contact such as by closing windows and/or installing insect screens on windows and doors. Turning off the lights at dusk, which is the time when beetles are the most active, is another effective prevention measure. In addition to avoiding contact with beetles, PD patients should be advised to avoid rubbing, scratching, or otherwise touching the primary lesion.

## Conclusion

PD is a form of irritant contact dermatitis caused by skin contact with the toxin of *Paederus* beetles. PD presents throughout the year, but the most active month was found in this Thailand study to be December. Skin lesions vary from mild irritant dermatitis to severe dermatitis, and the average time to complete cure is 12 days. History and clinical manifestation are essential for accurate diagnosis.

## Acknowledgements

The authors would like to thank the patients that agreed to participate in this study, and Assistant Professor Dr Chulaluk Komoltri for assistance with statistical analysis.

## REFERENCES:

- 1** Gelmetti C, Grimalt R. Paederus dermatitis: an easy diagnosable but misdiagnosed eruption. *European Journal of Pediatrics* 1993; **152**: 6-8. DOI link
- 2** Caceres L, Suarez JA, Jackman C, Galbster A, Miranda R, Murgas I, et al. Dermatitis due to Paederus colombinus: report of an epidemic outbreak of 68 cases in the province of Darien, Panama. *The Cureus Journal of Medical Science* 2017; **9**: e1158. DOI link
- 3** Gibbs LM. Beware of the beetle: a case report of severe vesicating dermatitis. *Journal of Military Medicine* 2015; **180**: e1293-1295. DOI link
- 4** Borroni G, Brazzelli V, Rosso R, Pavan M. Paederus fuscipes dermatitis. A histopathological study. *The American Journal of Dermatopathology* 1991; **13**: 467-474. DOI link
- 5** You DO, Kang JD, Youn NH, Park SD. Bullous contact dermatitis caused by self-applied crushed Paederus fuscipes for the treatment of vitiligo. *Cutis* 2003; **72**: 385-388.
- 6** Karthikeyan K, Kumar A. Paederus dermatitis. *Indian Journal of Dermatology, Venereology and Leprology* 2017; **83**: 424-431. DOI link
- 7** Uzunoğlu E, Oguz ID, Kir B, Akdemir C. Clinical and epidemiological features of Paederus dermatitis among nut farm workers in Turkey. *The American Journal of Tropical Medicine and Hygiene* 2017; **96**: 483-487. DOI link
- 8** Verma CR, Agarwal S. Blistering beetle dermatitis: an outbreak. *Medical Journal Armed Forces India* 2006; **62**: 42-44. DOI link
- 9** Zargari O, Kimyai-Asadi A, Fathalikhani F, Panahi M. Paederus dermatitis in northern Iran: a report of 156 cases. *International Journal of Dermatology* 2003; **42**: 608-612. DOI link
- 10** Maryam S, Fadzly N, Zuharah WF. The effects of light and height of building in attracting Paederus fuscipes Curtis to disperse towards human residential areas. *Tropical Life Sciences Research* 2016; **27**: 95-101. DOI link
- 11** Gnanaraj P, Venugopal V, Mozhi MK, Pandurangan CN. An outbreak of Paederus dermatitis in a suburban hospital in South India: a report of 123 cases and review of literature. *Journal of the American Academy of Dermatology* 2007; **57**: 297-300. DOI link

This PDF has been produced for your convenience. Always refer to the live site <https://www.rrh.org.au/journal/article/6378> for the Version of Record.