

Parasitic skin infestation



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Objectives

- 1. Describe medical importance of mites, lice, *Paederus* spp., caterpillars, bed bug, flea, tick & *Leishmania* spp.**
- 2. Describe prevention & control of diseases caused by mites, lice, *Paederus* spp., caterpillars, maggots, bed bug, flea, tick & *Leishmania* spp.**
- 3. Describe causative agents & symptoms of creeping eruption**

A decorative graphic in the top-left corner of the slide. It consists of a network of interconnected nodes and lines. The nodes are represented by circles of varying sizes and colors, including light blue, dark blue, and grey. Some nodes are highlighted with a double-circle effect. The lines connecting the nodes are thin and grey, creating a complex web-like structure that tapers off towards the right.

Mites (Acari)

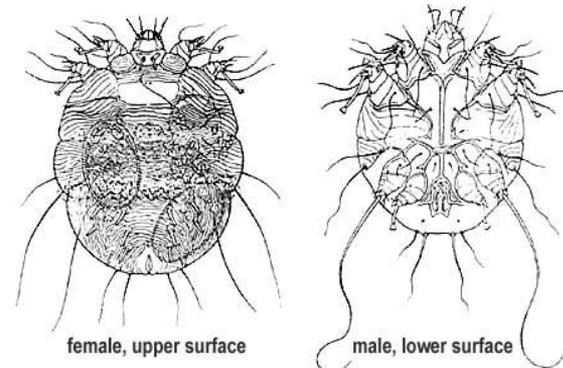
- Scabies mite
- House dust mite
- Biting mite
- Follicle mite

Human itch mite/Scabies mite

(*Sarcoptes scabiei* var. hominis)

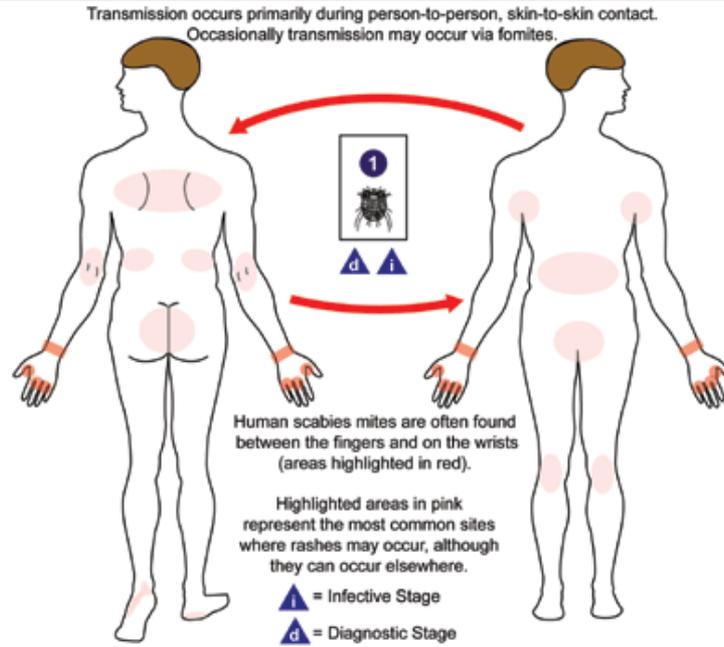
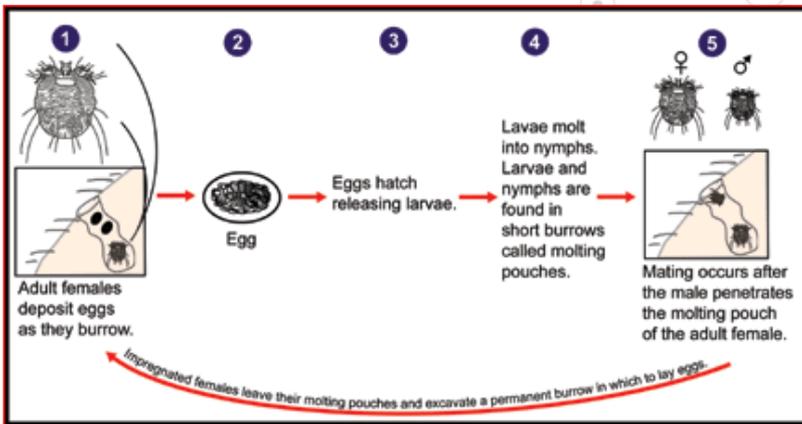
Morphology

- Size : less than 0.5 mm
- Whitish in color & disc-shaped
- Spines at dorsum
- 4 pairs of stout legs
- Pedicel & sucker at the end of tarsus



Sarcoptes scabiei

S. scabiei life cycle



Epidemiology & Risk Factors

A decorative network diagram in the top right corner, consisting of various sized grey circles connected by thin grey lines, representing a complex network structure.

Transmission: direct, prolonged skin-to-skin contact

Persons At Risk:

- Household members, sexual partners
 - Childcare facilities, nursing homes, extended-care facilities & prisons etc.
- 
- A decorative network diagram in the bottom left corner, consisting of various sized grey circles connected by thin grey lines, representing a complex network structure.

Common Symptoms

- A pimple-like (papular) itchy (pruritic) ▶ “scabies rash”
- Severe itching (pruritus) ▶ especially at night
- Itching & skin rash ▶ caused by sensitization (type of “allergic” reaction) to the proteins & feces of the parasite



Itching & rash may affect much of the body or be limited to common sites such as:

- Between the fingers
- Wrist
- Elbow
- Armpit
- Penis
- Nipple
- Waist
- Buttocks
- Shoulder blades

Crusted (Norwegian) Scabies

- **Some immunocompromised, elderly, disabled, or debilitated persons** are at risk for a severe form of scabies called **crusted, or Norwegian, scabies**.
- **Thick crusts of skin** contain large numbers of scabies mites & eggs (> 2 million per patient).



Crusted scabies presenting as plaque lesions around the pelvis

persons with crusted scabies

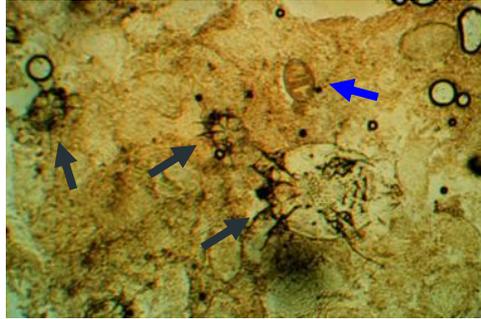
can transmit scabies indirectly by shedding mites



contaminate items ;
clothing, bedding & furniture

Diagnosis

- **Skin Scraping/ KOH preparation** ▶ mites, eggs, eggshell fragments, or scybala (feces)

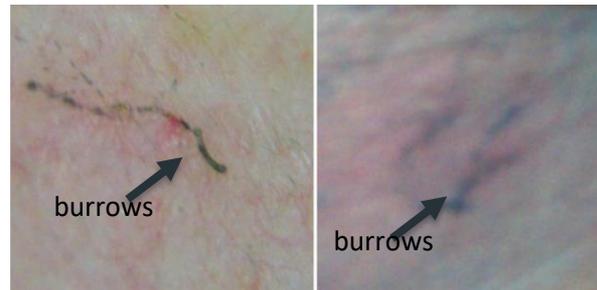


10 % Potassium hydroxide mount showing scabies mites (black arrow) & egg (blue arrow)



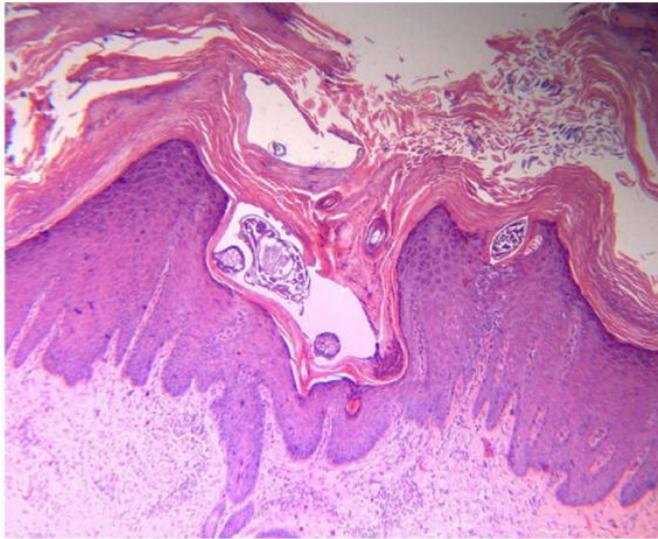
Sarcoptes scabiei mite in a skin scraping, stained with lactophenol cotton-blue

- **Burrow ink test** ▶ mite burrows

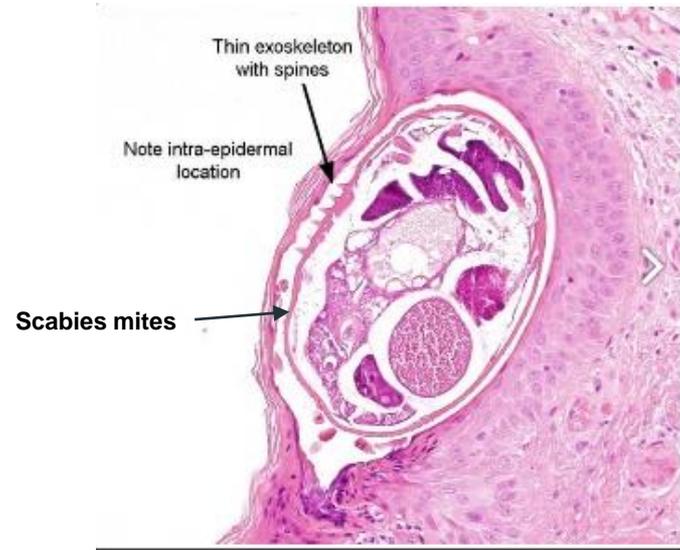


Diagnosis

- **Histologic Findings** ▶ mites, larvae, ova, and feces within the stratum corneum



Skin biopsy - hyperplastic superficial dermatitis with several *Sarcoptes scabiei* mites embedded within the hyperkeratotic stratum corneum



House dust mite; HDM

Genus

- *Dermatophagoides* spp.
 - D. pteronyssinus*, *D. farina* (Thailand)
- *Euroglyphus* spp.

House dust mite thrive in warm & moist environment

- Temp. 18–27°C
- Hum. 65–85% rH

Food source; hair, dandruff & skin rash, mold, Bacteria & fungus

Habitat; Bed clothes, mattresses, carpets & house dust



[https://commons.wikimedia.org/wiki/File:House_dust_mite_\(Dermatophagoides_pteronyssinus\).jpg](https://commons.wikimedia.org/wiki/File:House_dust_mite_(Dermatophagoides_pteronyssinus).jpg)

Life cycle :

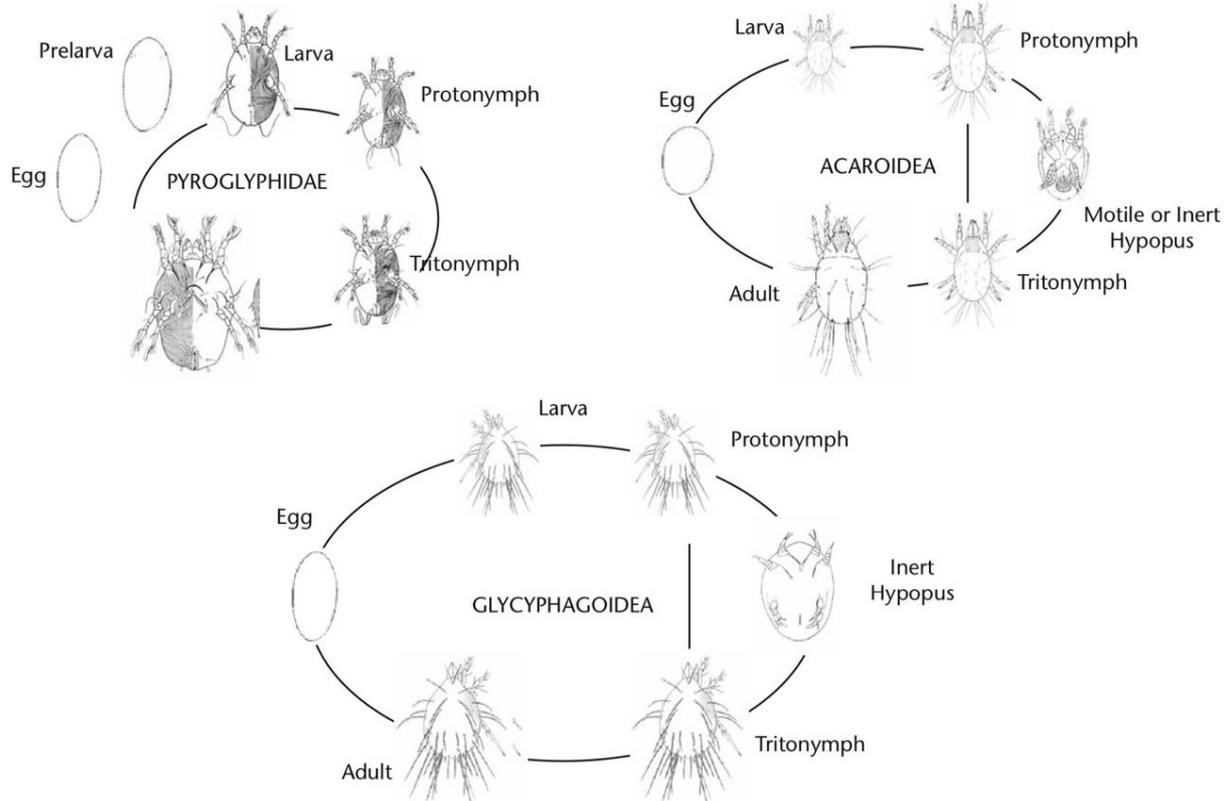
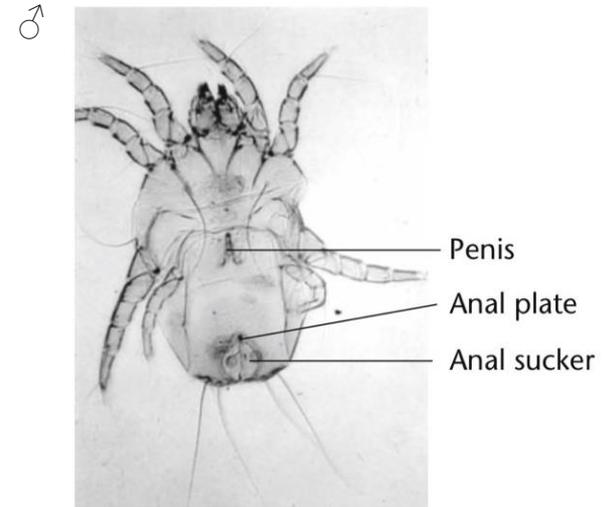
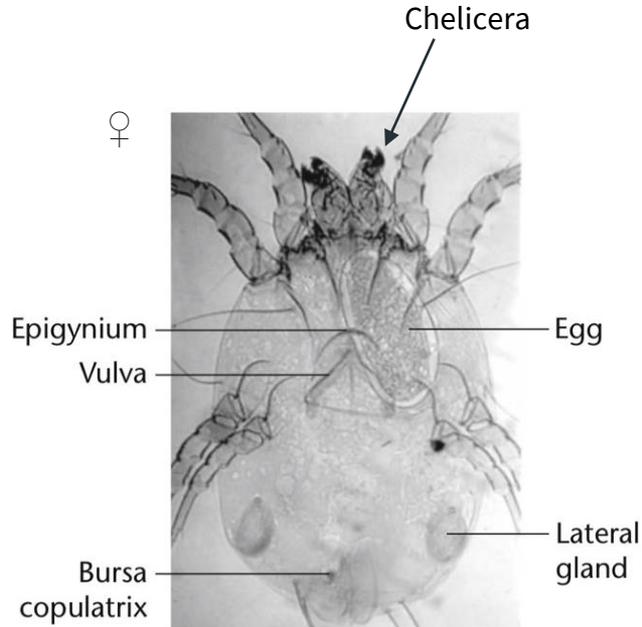


Figure 5.1 Stages in the life cycles of pyroglyphid, acaroid and glycyphagoid mites.

Morphology: Adult

- very small size (~0.3 mm)
- oval shape
- 4 pairs of elongate legs
- 1st + 2nd : anterior part of body
- 3rd + 4th : middle part of body



Medical importance: House dust allergy

➤ HDM ► Major source of human allergens in house

- **Mite feces** ► major source of the dust mite allergen

- **acute/ chronic allergy**
- **severe allergies**
- bronchial asthma
- allergic rhinitis
- sneezing
- runny nose
- itchy, red, or watery eyes
- stuffy nose
- itchy nose, mouth, or throat
- itchy, red skin
- cough

Diagnosis

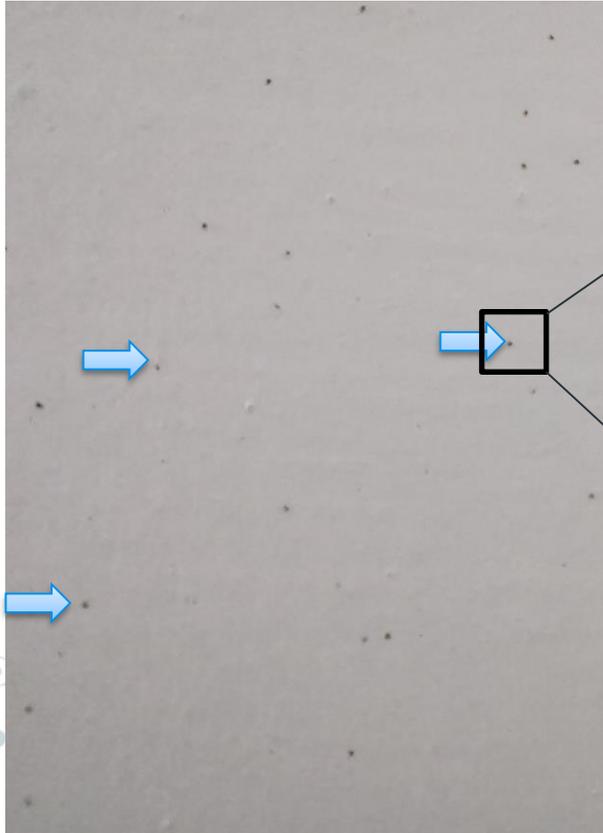
- **Skin prick test (SPT)**
- **Specific IgE Blood Test**



Prevention & Control

- Use allergen-proof bed covers
- Wash bedding weekly
- Keep humidity low
- Remove dust
- Vacuum regularly
- Install a high-efficiency media filter in air conditioning unit

Biting mite



<https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=44344>

- **Tropical rat mite;** *Ornithonyssus bacoti*

Host: rat

- **Northern fowl mite** (Bird mite); *Ornithonyssus sylviarum*

Host: Birds

Morphology: Adult

- very small size (~0.3 mm)
- oval shape
- 4 pairs of elongate legs
- **Slender chelicerae**





Medical importance

Biting area; pruritic, erythematous, papular rash



Vector; murine typhus, rickettsialpox, plague, tularemia, coxsackie virus disease and Hantaan virus (Korean hemorrhagic fever)

Follicle mites

1. *Demodex folliculorum*
(Hair follicle mite)



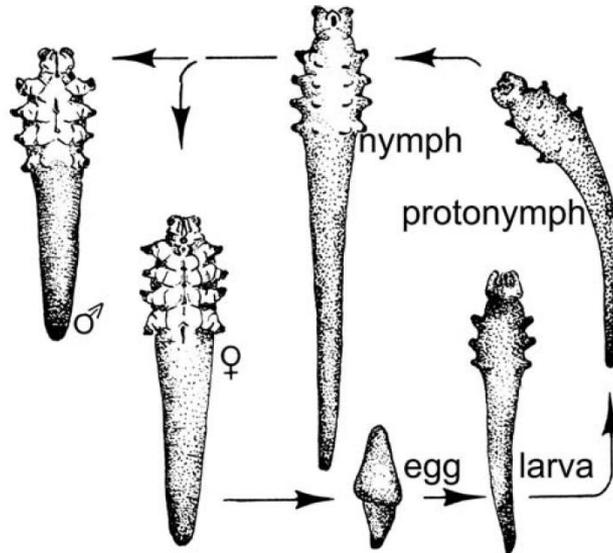
2. *Demodex brevis*
(Sebaceous gland)



Demodex spp.

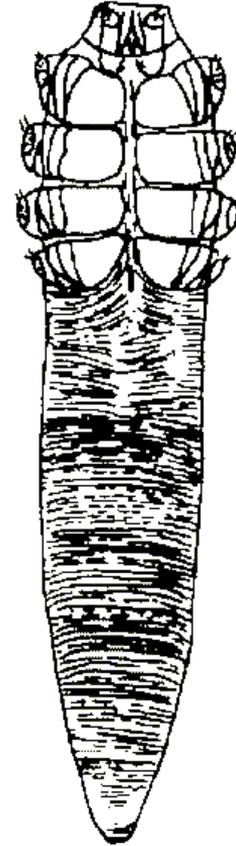
Habitat : Eye, nose, face

Life cycle : incomplete metamorphosis



Morphology

- small size (0.1-0.4 mm long)
- elongate abdomen with transverse striation
- 4 pairs of small stumpy legs



Demodex spp.



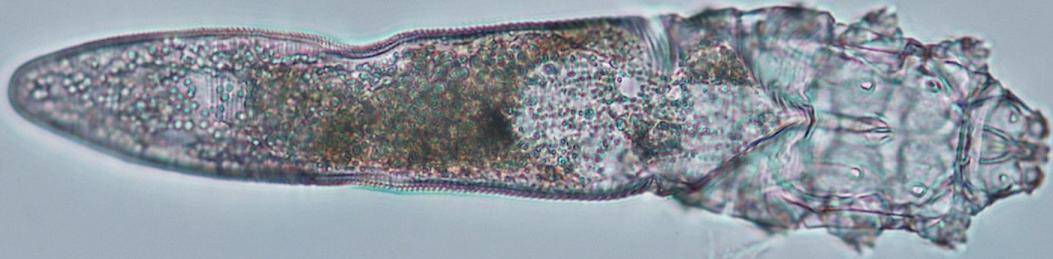
200 μ m



Egg



Egg



50 μ m

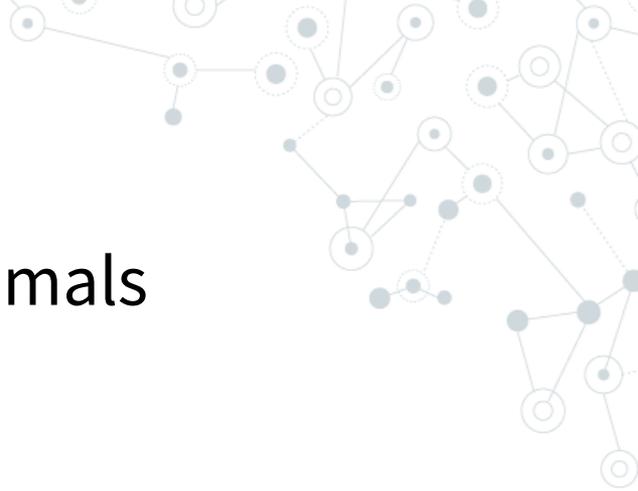
Medical importance

- **Dermatitis**
- **Blepharitus**
- **Glanulomatous acne**
- **Impetigo**

Treatment :

- daily washing with soap & water

Lice



- Ectoparasites of birds & mammals
- Blood-sucking insects

➤ Human lice

- *Pediculus capitis* (Head lice)
 - *Pediculus humanus* (Body lice)
 - *Pthirus pubis* (Pubic lice, Crab lice)
- 



Head louse

Photo: Lorenza Beati
Used with permission



Body louse

Photo: James Gathany
Public Health Image Library (PHIL)
Public domain



Crab louse

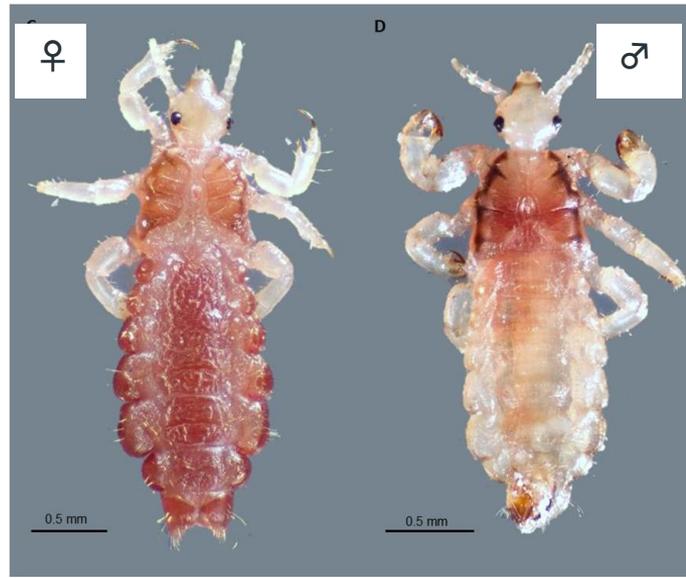
Photo: Matt Bertone
Used with permission

Compiled by: Siavash Taravati, UC IPM program

Morphology: Head lice & Body lice

- Small size (1 - 5 mm)
- Wingless
- Dorso-ventrally flattened
- Head: narrow
- Fused thoracic segments
- 7 abdominal segments + spiracles
- 6 legs with spines & claws
- **Piercing - sucking mouthparts**





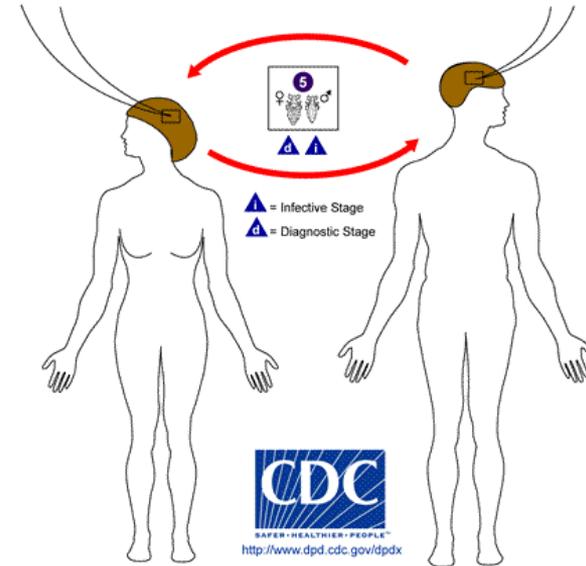
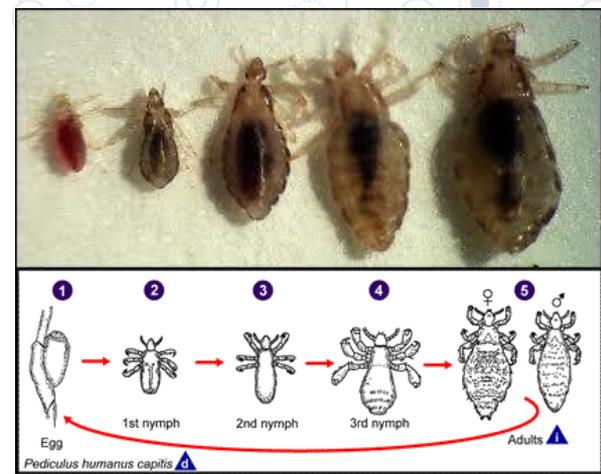
- **Male** is smaller than **female**
- Terminal abdomen:
 - **male:** round (penis)
 - **female:** bi-lobes (gonopods)

Head lice

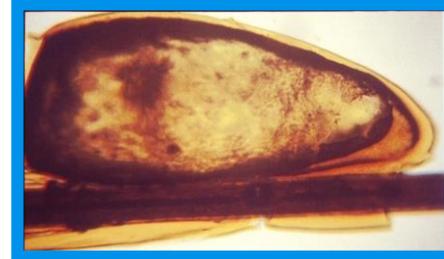
- Gravid females attach eggs (Nits) to the base of hair shaft
- move by crawling
- cannot hop/fly

Epidemiology & Risk Factors

- **Most common among preschool & elementary school-age children** & their household members & caretakers
- **Common transmission:** head-to-head
- **Uncommon transmission:**
 - Wearing clothing, such as hats, scarves, coats, sport uniforms
 - Using infested combs, brushes/ towels
 - Lying on a bed, couch, pillow, carpet



Pediculus capitis (Head lice)



Disease

Head lice are **not known to transmit any disease** & therefore are not considered a health hazard.

Head lice infestation:

- Asymptomatic; early/light infestation
- Itching (“pruritus”) ► allergic reaction to louse bites; most common symptom
- Tickling feeling / a sensation of something moving in the hair
- Irritability & sleeplessness
- Sores on the head caused by scratching ► bacteria infection

Body lice

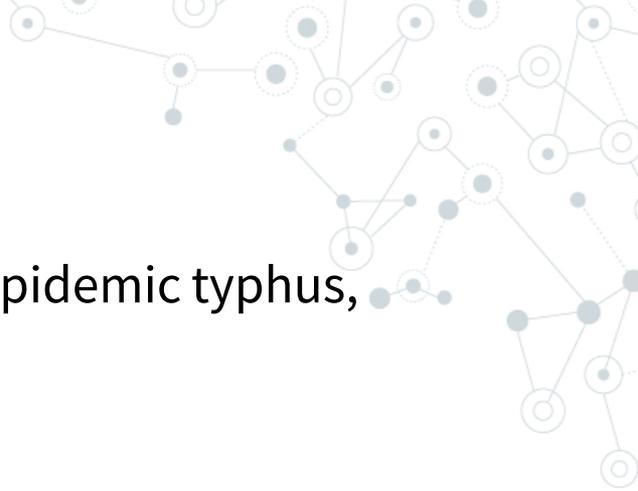
- **Live & lay eggs on clothing** & move to the skin to feed

Epidemiology & Risk Factors

- Body lice are spread through **direct contact; person-to-person**
 - persons who live under conditions of crowding & poor hygiene (homeless, refugees, etc.)



Disease



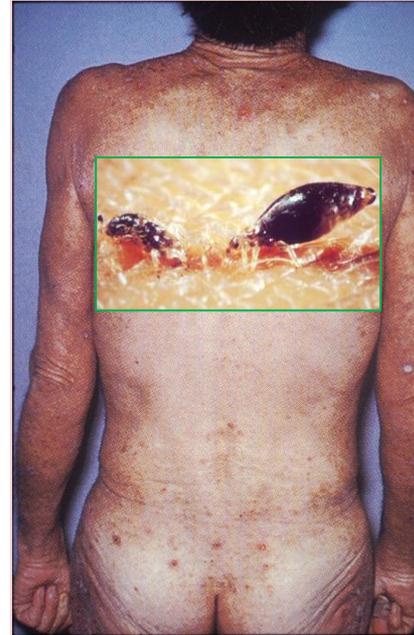
Body lice can transmit disease; epidemic typhus, trench fever & epidemic relapsing fever

Head lice infestation (pediculosis) :

- Intense itching (“pruritus”) & rash ► allergic reaction to louse bites; most common symptom
 - Vagabond's disease
- 

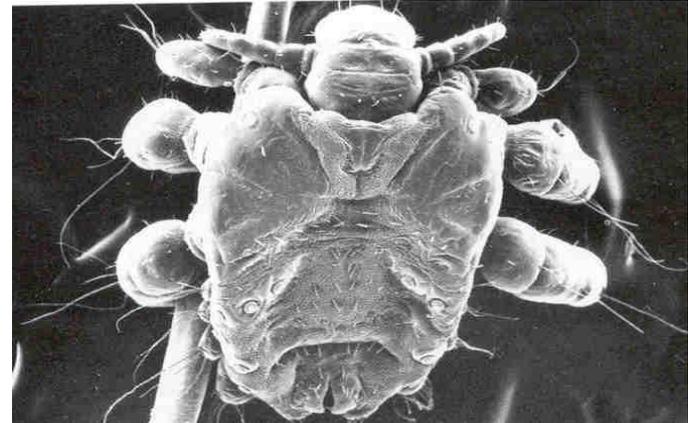
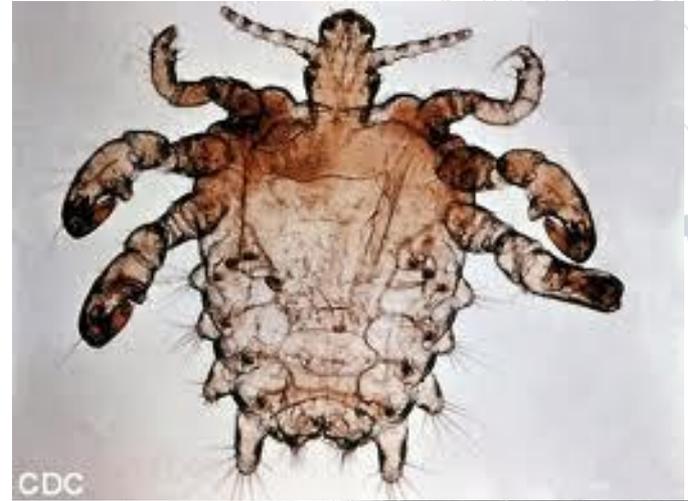
PEDICULOSIS (VAGABOND'S DISEASE)

- **Louse saliva:** itching, dermatitis, impetigo, pigmented tough skin



Pubic lice

- do not transmit disease
- **Size: small**
- **Shape: round**
- **Legs: big 2nd, 3rd pairs**
- **Abdomen: spiracles**



Epidemiology & Risk Factors

➤ **Pubic lice infestations (pthiriasis)**

are usually spread through sexual contact (most common in adults).

- Pubic area
- Eyebrows
- Eyelashes
- Beard
- Mustache
- Chest
- Armpits

➤ **Pubic lice** may be spread by contact with articles such as clothing, bed linens & towels.



Disease

Pubic (“crab”) lice are **not known to transmit any disease.**

Pubic lice infestation:

- Itching (“pruritus”) in the pubic & groin area
- Sores on the head caused by scratching ► secondary bacteria infection

Treatment & Control; Lice

Heat treatment: 60 °C (1/2 - 1 h)

Insecticides :

- 25% benzyl benzoate
- 0.5-1% permethrin
- 1% lindane
- 0.5% malathion
- 8% acetic acid

Head lice:

- lice comb ► eggs
- Shave





Flea



Dog flea
(*Ctenocephalides canis*)



Oriental rat flea
(*Xenopsylla cheopis*)

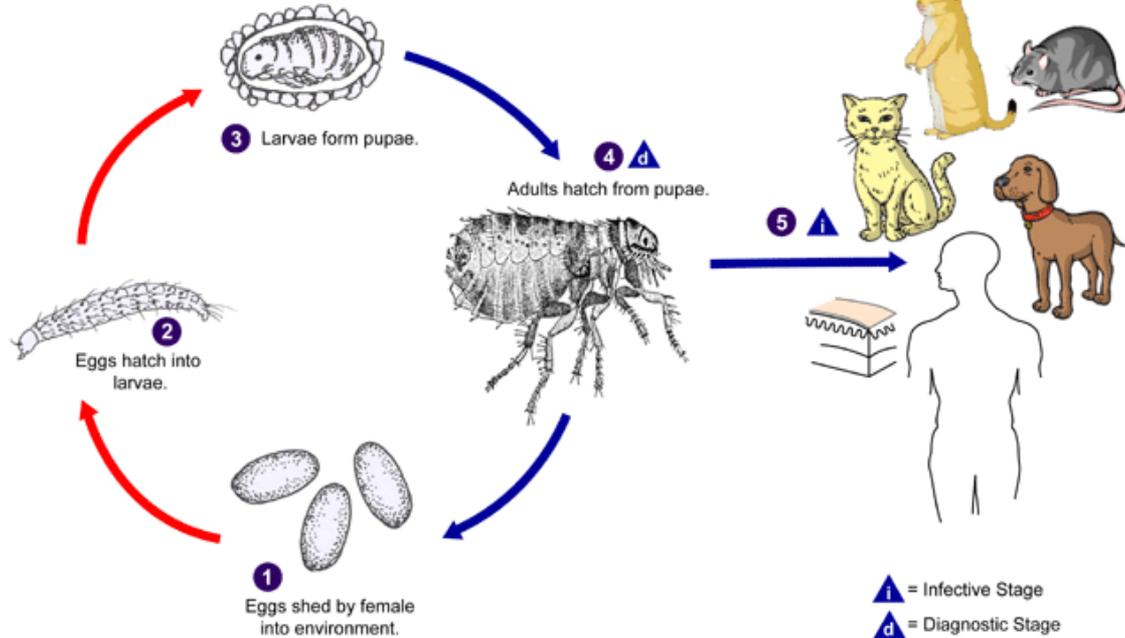


Cat flea
(*Ctenocephalides felis*)



Humans [jigger or sand flea]
(*Tunga penetrans*)

Life cycle: complete metamorphosis





Multiple cat flea bites on a human ankle
(Photograph by Elton J. Hansens)

PUBLIC HEALTH IMPORTANCE

- Annoyance
- Flea allergy dermatitis
- Purpura pulicosa (tiny purplish spot)
- Peseola pulicosa (tiny purplish spot surrounded by slightly swollen skin)
- Biting site → secondary infections
- Oriental rat flea, *X. cheopis* is a vector of *Yersinia pestis* → Plague (Black Death)

Tick

1. Family Ixodidae (hard ticks)



Brown dog tick
Rhipicephalus sanguineus

2. Family Argasidae (soft ticks)



Argasid tick
(*Carios kelleyi*)



Larva



Nymph



Adult Male



Adult Female



Fed 2-days

Fed 7-days

Fed 14-days



<https://tickapp.tamu.edu/tickbiology.html>

Medical importance

➤ **Blood loss, Dermatitis**

➤ **Tick paralysis** : only female of hard tick (neurotoxin in saliva)

Symptoms : acute ascending paralysis

- cannot walk or stand

- difficulty in speaking, swallowing, breathing

- death (respiratory failure)

➤ **Diagnosis** : history & symptoms

➤ **Treatment** : tick removal & symptomatic treatment

➤ Disease vector

Hard ticks:

- Rocky mountain spotted fever (RMSF)
- Tularemia
- Q-fever
- **Lyme disease** (*Borrelia* spp.)

(**Lyme disease in Thailand?, 2019**; The 47-year-old Thai woman went for an 8 day holiday in Turkey. 17 days after returning to Thailand symptoms started to show, similar to a cold.)

<https://www.facebook.com/page/604030819763686/search?q=lyme> หมอมมหนู ลีเซววงศ์ FC

Soft tick:

- Tick borne (endemic) relapsing fever
- Q-fever

Symptoms of Lyme disease



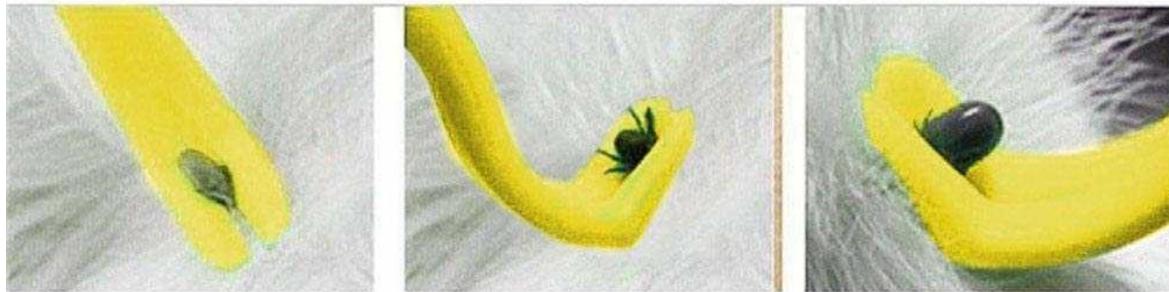
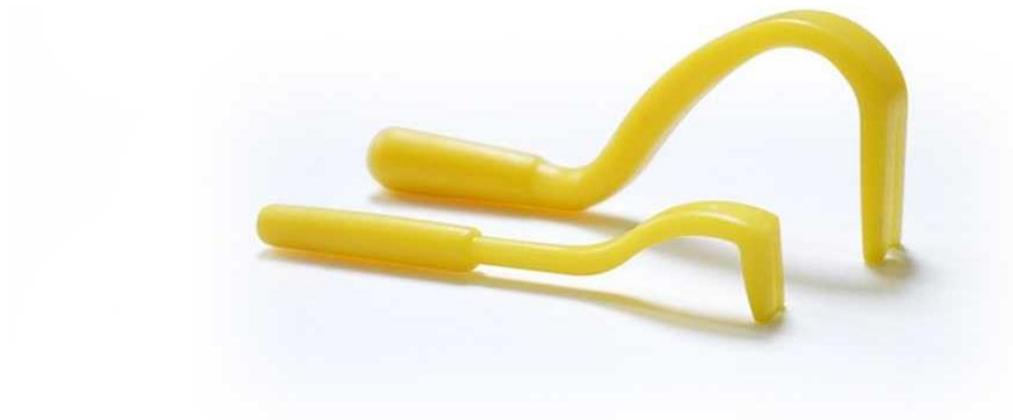
The rash is often described as looking like a bull's-eye on a dartboard



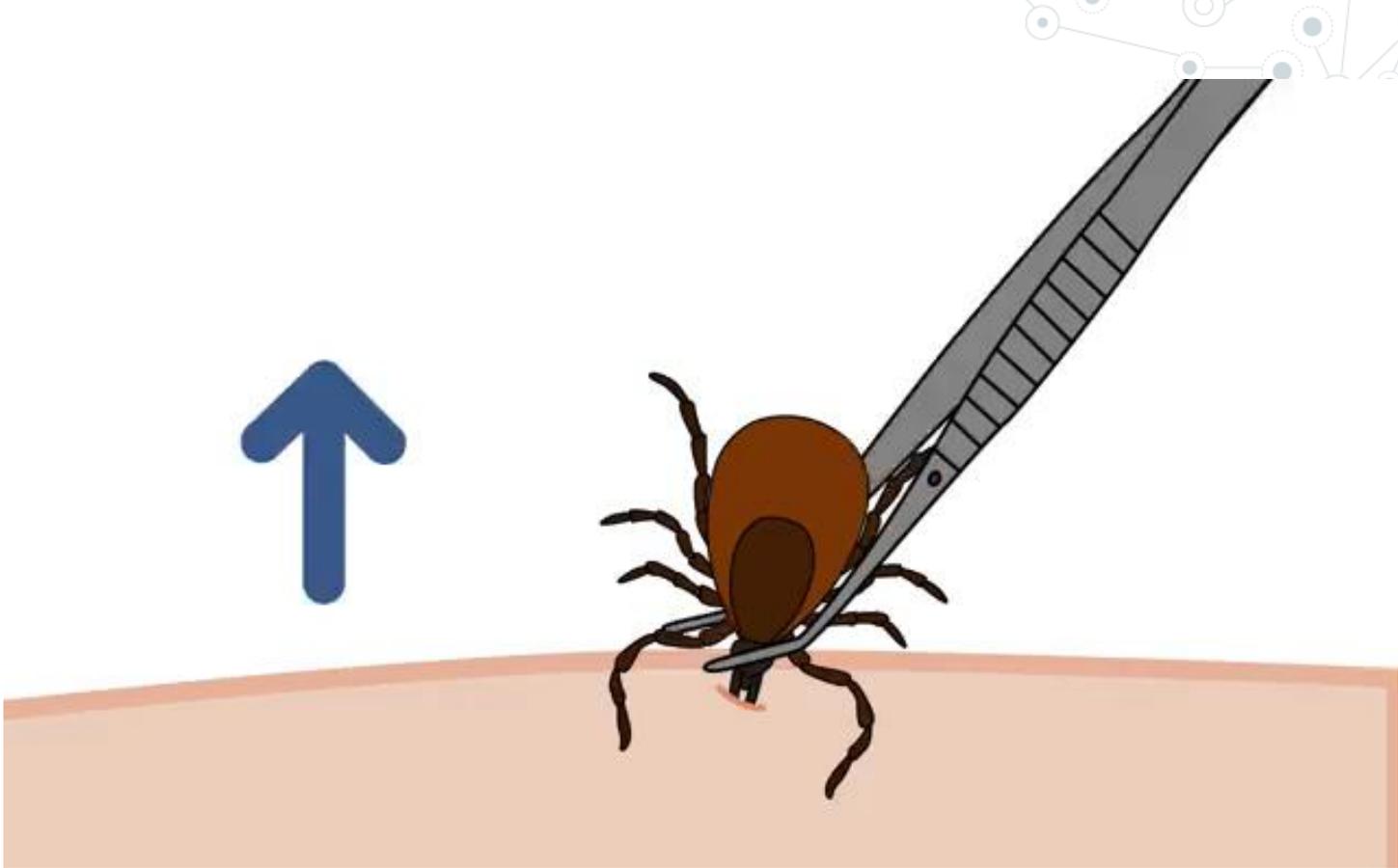
The skin will be red and the edges may feel slightly raised.



<https://www.youtube.com/watch?v=bVk2RkjA52E>



<https://th.aliexpress.com/i/33010921378.html>



<https://th.wikihow.com/%E0%B8%81%E0%B8%B3%E0%B8%88%E0%B8%B1%E0%B8%94%E0%B9%80%E0%B8%AB%E0%B9%87%E0%B8%9A>

Control : Ticks

1. Removal of ticks from hosts: chloroform, benzene

2. Using repellent

- dimethyl phthalate (DIMP)
- diethyl toluamide (DEET)
- dibutyl phthalate, etc

3. Spraying with insecticides

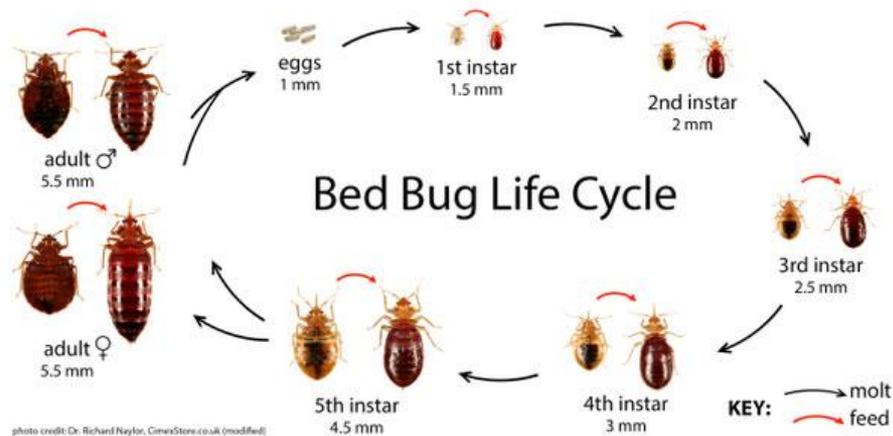
- 5% carbaryl (Sevin)
- 1% propoxur (Baygon)
- 2% malathion

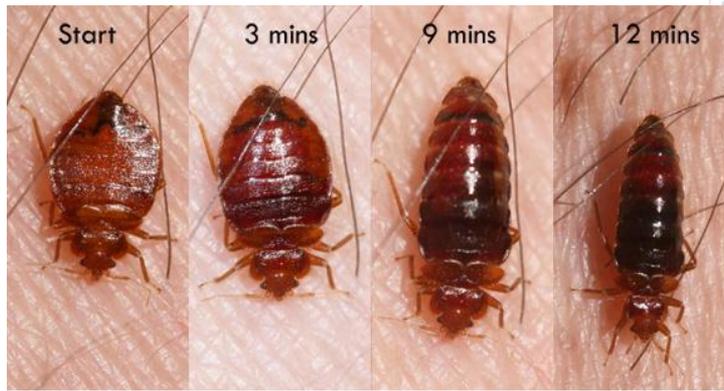
Bed bugs; *Cimex spp.*

Human

- *C. lectularius*
- *C. hemipterus*

Life cycle : incomplete metamorphosis





Human bed bugs change shape & color as they feed.
Photos courtesy Whitney Cranshaw, Colorado State University



❖ **difficult to distinguish bedbug bites from other insect bites or rashes**

- Red, often with a darker red spot in the middle
- Itchy
- Arranged in a rough line or in a cluster
- Located on the face, neck, arms & hands



➤ **Treating Bedbug Bites**

- Wash the bites with soap and water
- Apply a steroidal anti-itch over-the-counter (OTC) cream
- Use calamine lotion
- Take oral antihistamine
- Get pain relief

➤ **Prevention & Control**

- Household sanitation
 - Pyrethroids
 - Neonicotinoids
- 

Rove beetles; *Paederus* spp.

- ***P. fuscipes* : Thailand, China, Malaysia**
- *P. peregrinus* : Indonesia
- *P. melampus* : India
- *P. brasiliensis* : South America



Morphology

- 6.5-7.0 mm x 0.5 mm
- Antennae 12-13 segments
- **Dark-orange** in color with their head, front wings and tip of their abdomen colored black
- Their short front wings – **blue/green**



Identification. Adult beetles in the genus *Paederus* are small, soft-bodied and are roughly 1 cm ($\frac{1}{4}$ to $\frac{3}{8}$ inch) in length (see above photos). They are dark orange in color with their head, front wings (elytra) and the tip of their abdomen colored black. Their short front wings have a blue/green iridescent sheen to them when viewed under higher magnification.

Life cycle



Figure 7. Adult (A), pupa (B), second instar (C) and first larval instar (D) of *Paederus fuscipes* (Caspian Sea shore).



Medical importance

- **Pederin** – Toxin in hemolymph (*Pseudomonas* sp.)
- Paederus dermatitis/ Blister beetle dermatitis /Dermatitis linearis
- **Nairobi eye**





Kissing or mirror-image lesion



Erythema and vesicle formation

Treatment

- No specific first aid available for exposure to rove beetle toxin
- Avoid contact/ ingestion the beetle

If exposed to rove beetle toxin



Wash affected area immediately with **soapy water**

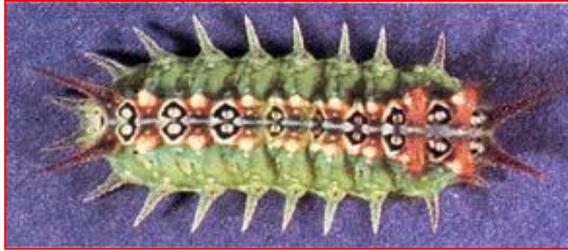


use cold compresses



Antihistamines, topical steroids, antibiotics/
apply aloe vera to alleviate the symptoms

Caterpillars, Butterflies & Moths



Medical importance

Caterpillar is larva of moths/butterflies;
spines & barbed hooks; various shapes, sizes & colors



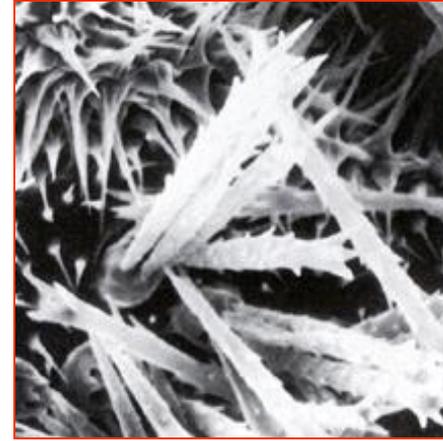
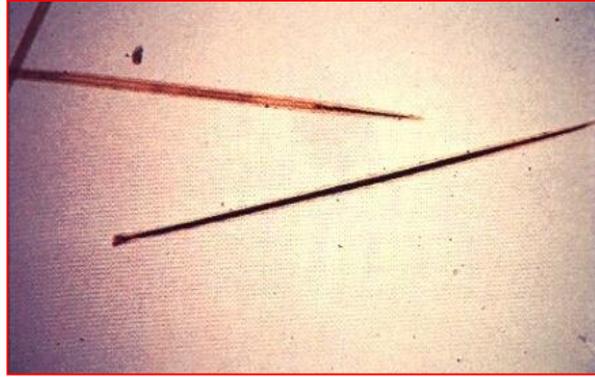
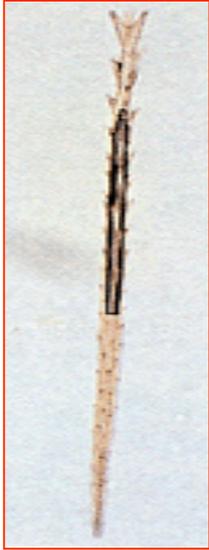
Hair & spine; hollow quill-like
hairs connected to poison sacs used as
defensive weapons



Touched
(hair & spine break through skin
releasing poison)



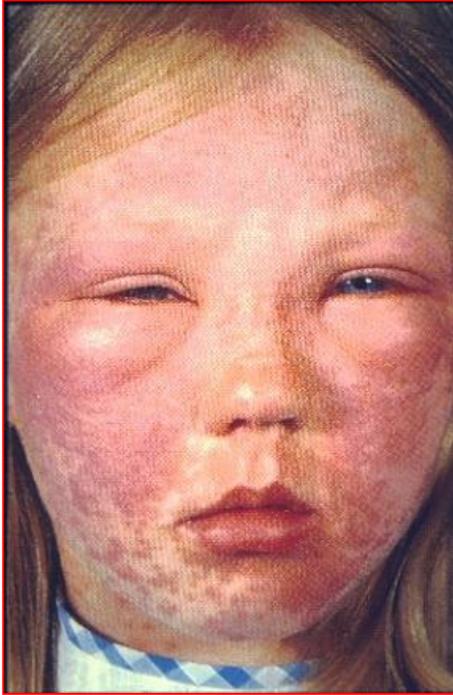
**Mild itching to more severe pain,
dermatitis, intestinal disturbances**



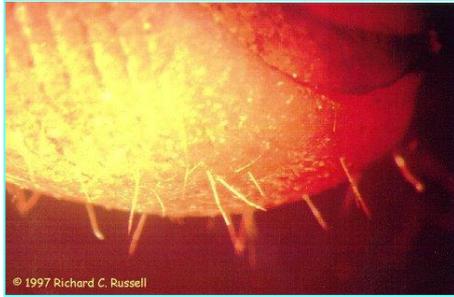
Hollow quill-like hairs

- **Cantharidin, Globulin**
- **Acetylcholine, Serotonin**

Dermatitis, Allergy



Severe dermatitis (erythema)



A finger full of urticating hairs from the Bag shelter moth, *Teara contraria*.



Marks from a puss caterpillar sting
(grid-like" appearance)



The welts on this arm are caused by the stinging hairs from the Cup moth (family Limacodidae).



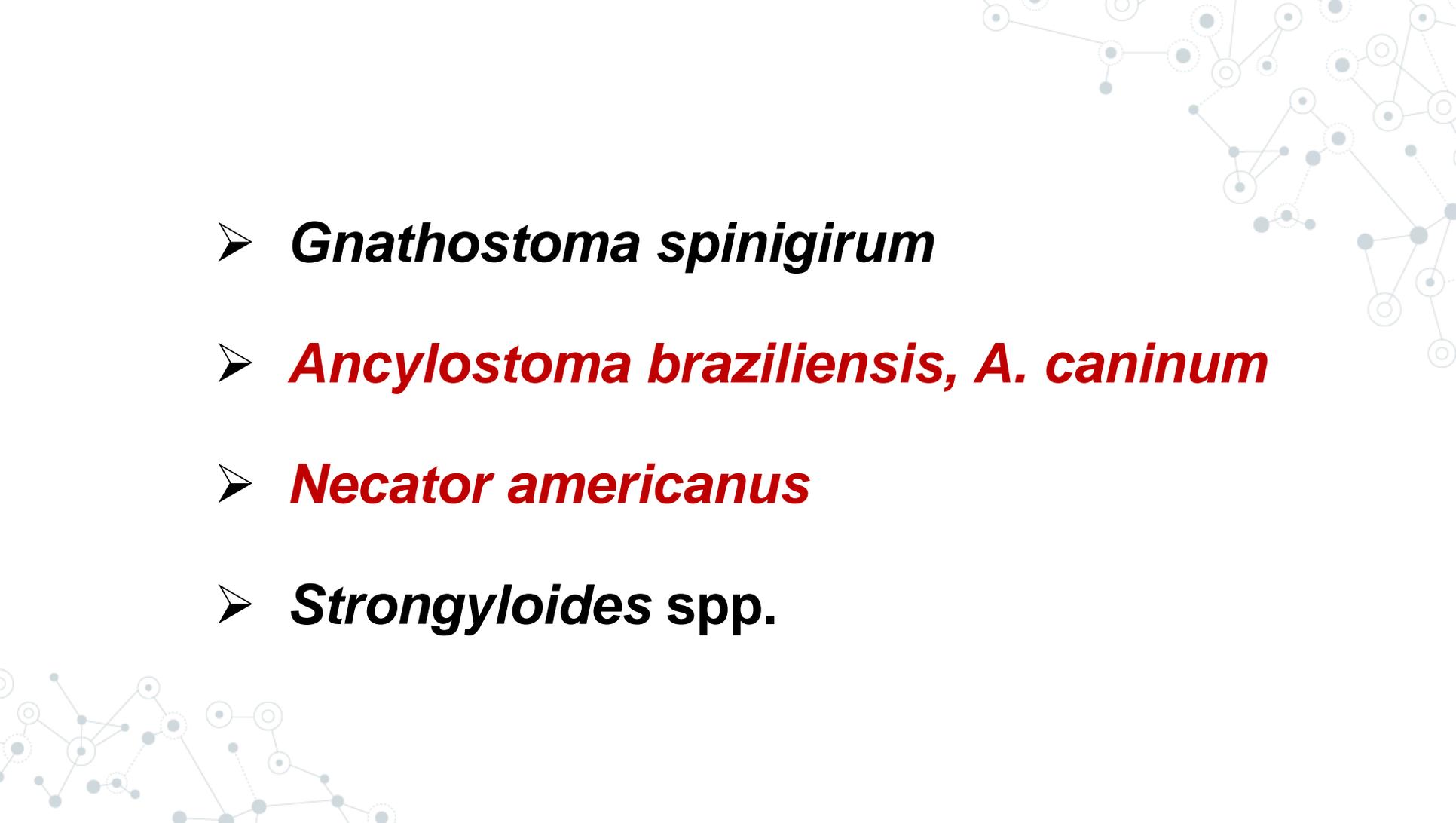
Caterpillar itch resulting from carrying wood covered in urticating hairs.

Treatment

- **No really effective first aid treatments** for caterpillar stings are available
 - **Adhesive tape/transparent tape** - pull out some of broken spines
 - **Washing** - soap & water
 - **Apply ice pack/baking soda** to reduce pain & prevent swelling
 - **Antihistaminic drugs**

Cutaneous larva migrans

- Parasitic skin infection caused by **hookworm larvae**
- **Humans** - infected with the larvae by **walking barefoot on sandy beaches / contacting moist soft soil,** contaminated with animal feces

- 
- ***Gnathostoma spinigirum***
 - ***Ancylostoma braziliensis, A. caninum***
 - ***Necator americanus***
 - ***Strongyloides* spp.**

Ground itch, Dew itch, Water sore



Creeping eruption

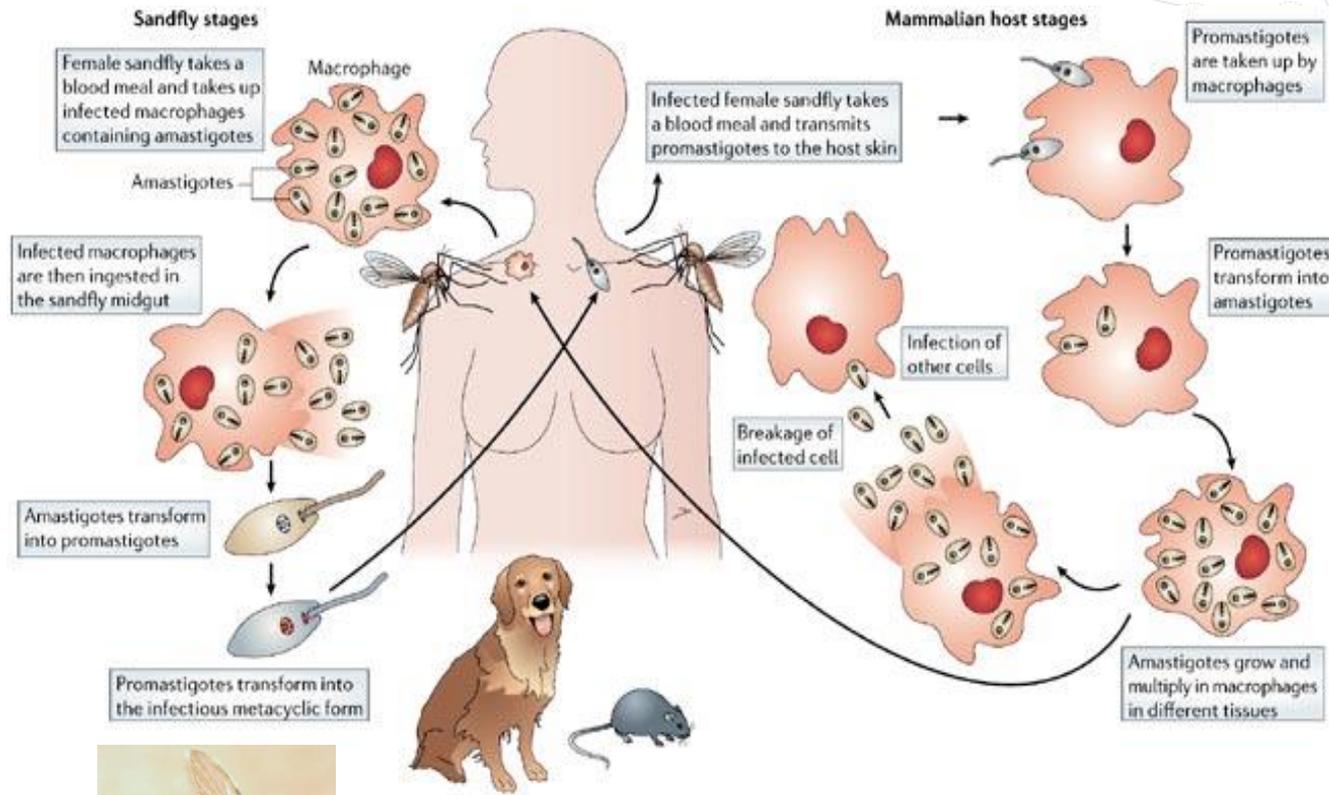
Self-limiting within 4-8 weeks

Anthelmintics - tiabendazole, albendazole, mebendazole and ivermectin

Cutaneous Leishmaniasis



- *Leishmania major*
- *L. maxicana*
- *L. tropica*
- *L. braziliensis*
- ***L. orientalis*** (*L. siamensis*)



Sandfly (vector) ? In Thailand ?

Case Report: Consecutive Cutaneous and Visceral Leishmaniasis Manifestations Involving a Novel *Leishmania* Species in Two HIV Patients in Thailand

Sarunyou Chusri,* Thanaporn Hortiwakul, Khachornsakdi Silpapojakul, and Padet Siriyasatien

Division of Infectious Diseases, Department of Internal Medicine, Faculty of Medicine, Prince of Songkla University, Songkhla, Thailand; Department of Parasitology, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand

Am J Trop Med Hyg 2012;87:76-80.



Images in Clinical Tropical Medicine

Disseminated Dermal Leishmaniasis Caused by *Leishmania siamensis* In a Systemic Steroid Therapy Patient

Nopadon Noppakun, Kanyarat Kraivichian, and Padet Siriyasatien*

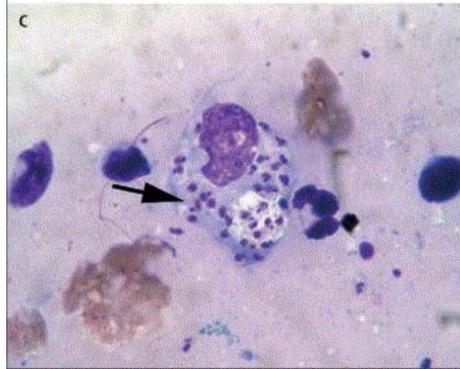
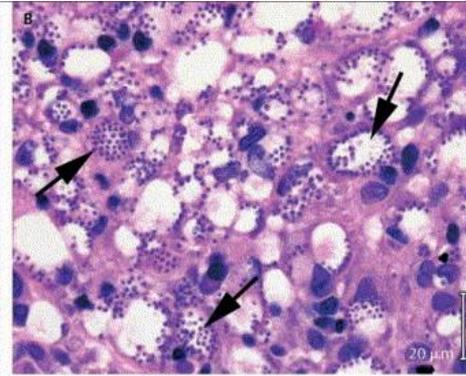
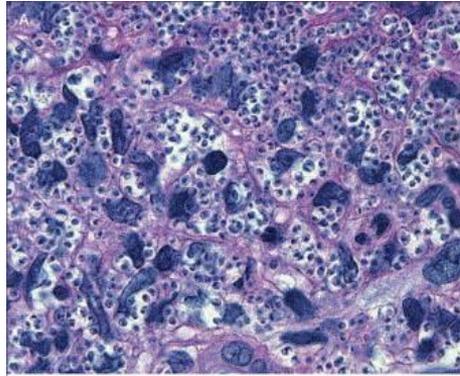
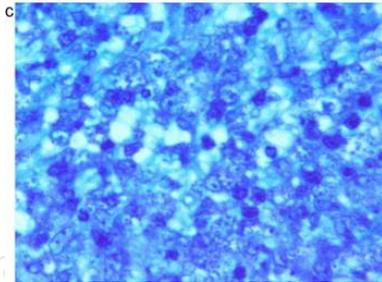
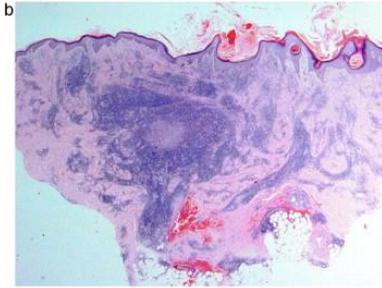
Division of Dermatology, Department of Medicine, Faculty of Medicine, Chulalongkorn University, Bangkok 10330 Thailand; Bumrungrad International Hospital, Bangkok 10110 Thailand; Department of Parasitology, Faculty of Medicine, Chulalongkorn University, Bangkok 10330 Thailand; Excellence Center for Emerging Infectious Diseases, King Chulalongkorn Memorial Hospital, Thai Red Cross Society, Bangkok 10330 Thailand



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Cutaneous leishmaniasis

Wright's stain, H&E stain



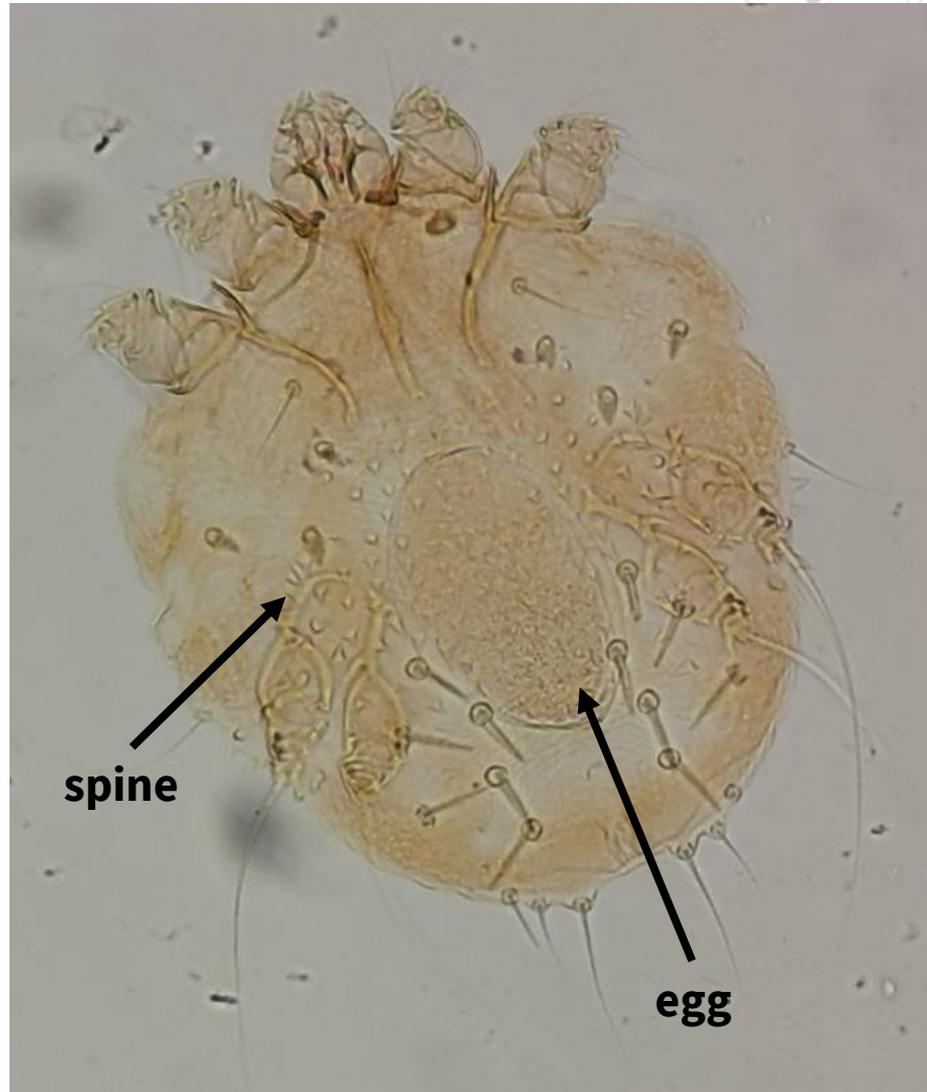
Labolatory

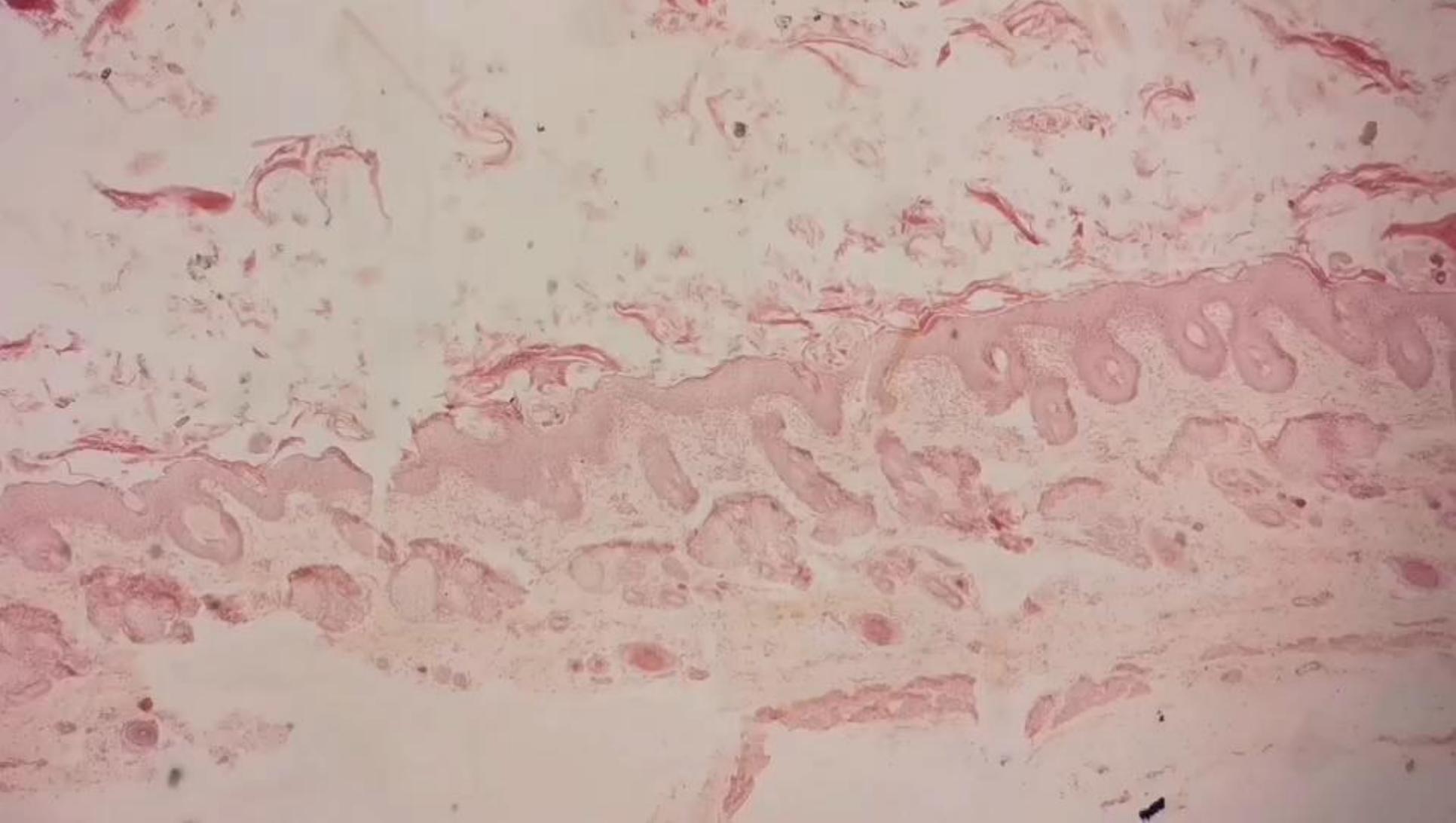


Mites (Acari)

- Scabies mite
- 

**10 % Potassium
hydroxide
preparation**







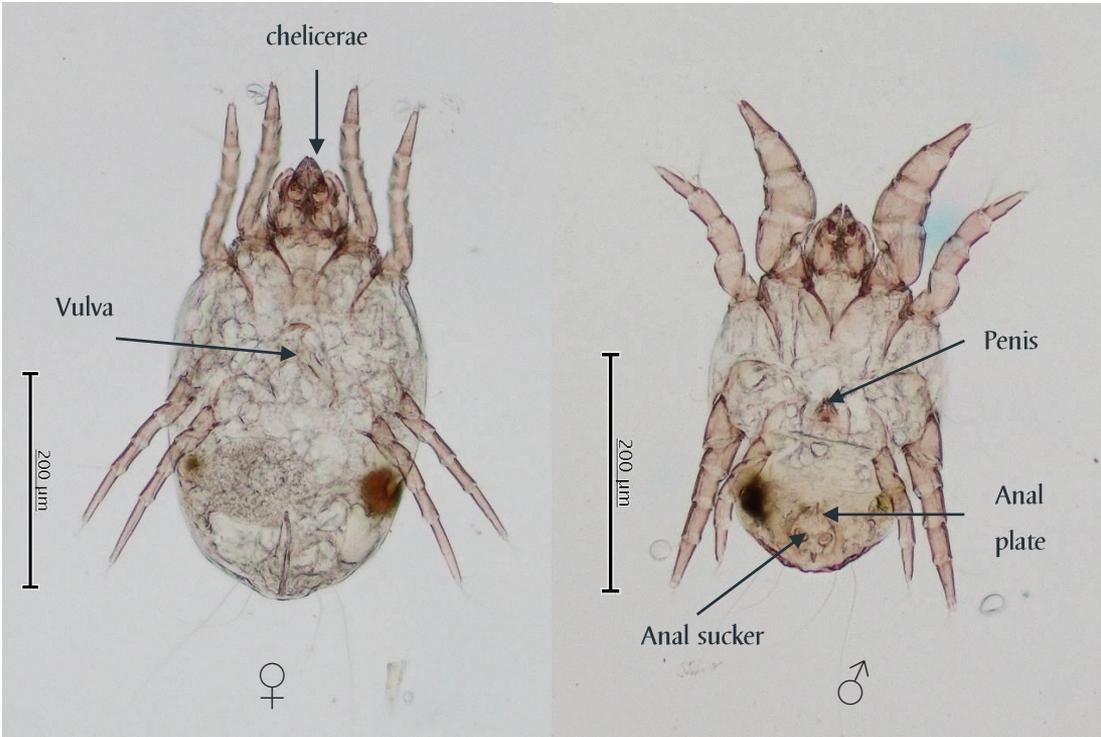
spine →

↑
spine



Mites (Acari)

- House dust mite
 - Biting mite
 - Scabies mite
- 



Dust mite
Dermatophagoides farinae



Biting mite
Ornithonyssus bacoti

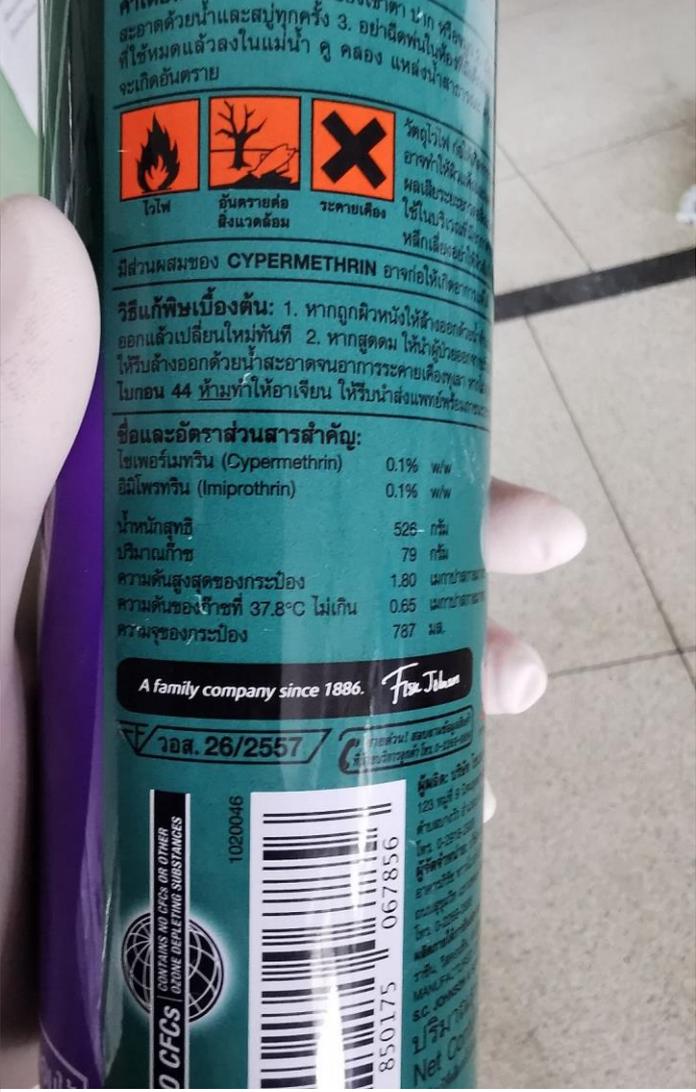
Case study 2019



permethrin 1% w/w







คำเตือน: ห้ามสูดดมและสูดดมทุกครั้งที่ฉีดพ่นยา หรือฉีดพ่นยาในบริเวณที่ปิดหรือกึ่งปิด เพราะจะทำให้เกิดอันตราย



ห้ามสูดดมหรือสูดดมยา
อาจทำให้ผิวหนัง
ผลเสียระยะยาว
ใช้ในบริเวณที่ปิดหรือกึ่งปิด
หลีกเลี่ยงยาอื่นที่ฉีดพ่น

มีส่วนผสมของ **CYPERMETHRIN** อาจก่อให้เกิดอาการแพ้

วิธีใช้แก๊พพิษเบื้องต้น: 1. หากถูกผิวหนังให้ล้างออกด้วยน้ำสะอาดแล้วเปลี่ยนใหม่ทันที 2. หากสูดดม ให้รีบสูดอากาศบริสุทธิ์
ให้รีบล้างออกด้วยน้ำสะอาดจนอาการระคายเคืองหายไป
ไม่ถอน 44 ห้ามทำให้อาเจียน ให้รีบนำส่งแพทย์พร้อมประวัติ

ชื่อและอัตราส่วนสารสำคัญ:

ไซเพอร์เมทริน (Cypermethrin)	0.1%	w/w
อิมิโพรทริน (Imiprothrin)	0.1%	w/w
น้ำหนักสุทธิ	526	กรัม
ปริมาณก๊าซ	79	กรัม
ความดันสูงสุดของกระป๋อง	1.80	เมกกาปาสกาล
ความดันของก๊าซที่ 37.8°C ไม่เกิน	0.65	เมกกาปาสกาล
มวลสุทธิของกระป๋อง	787	มล.

A family company since 1886. **Fox-John**

วอส. 26/2557

NO CFCs
CONTAINS NO CFCs OR OTHER
HAZARDOUS SUBSTANCES



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รังสิต กรุงเทพฯ
โทร: 0-2-555-5678
Net Content



Mites (Acari)

- Follicle mite
- 

VDO



VDO



Lice





1 mm

Head lice



1 mm

Pubic lice



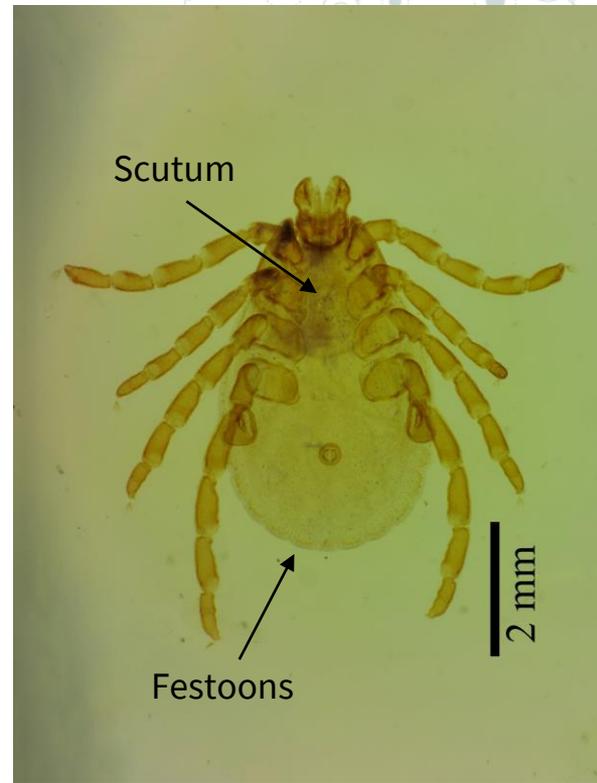
Flea & Tick



Flea



Soft tick



Hard tick



Bed bugs

Cimex spp.





1 mm



Sandfly

