Arthropod infestation

MD 532 109 Skin and Related Connective Tissues

Date: 23 Jul 2025

Time: 10 AM – 12 PM

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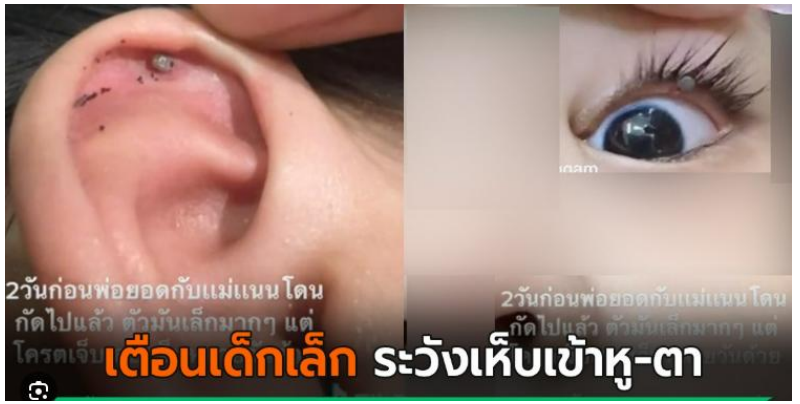
สาวโพสต์เตือน!! คนชอบเที่ยวเขาขี้นดอย ระวังโดนไรอ่อนกัด พาหะโรค 'สครับไทฟัส' หรือไข้รากสาดใหญ่ หลังกลับจากป่า หากพบมีแผลนุ่มสีน้ำตาลคล้ายบุหรี่จี้ ปวดหัว หนาวสั่น มีไข้ พื้นขึ้น ให้รีบไปพบแพทย์



แพทยสภา
The Medical Council of Thailand

ประกาศแพทยสภา
ที่ 4 /2567
เรื่อง เกณฑ์ความรู้ความสามารถในการประเมินเพื่อรับใบอนุญาต
เป็นผู้ประกอบวิชาชีพเวชกรรม พ.ศ. 2567

B4 Skin and related connective tissue

B4.2.2 Infectious/inflammatory/immunologic disorders

กลุ่มที่ 1 และ 2	กลุ่มที่ 3
(1) Acne	(1) Leprosy
(2) Abscess	(2) Gas gangrene
(3) Cellulitis	(3) Staphylococcal scaled skin syndrome
(4) Impetigo	(4) Cutaneous larva migrans
(5) Herpes simplex infection	(5) Bullous dermatoses (e.g. pemphigus, pemphigoid)
(6) Varicella zoster virus infections (chicken pox, zoster)	(6) Cutaneous lupus erythematosus
(7) Viral exanthemata (e.g., measles, rubella)	(7) Erythema multiforme, erythema nodosum
(8) Wart (verrucae)	(8) Papulosquamous disorders (e.g. psoriasis, pityriasis rosea, lichen planus)
(9) Superficial mycoses (tinea, pityriasis versicolor, candidiasis)	(9) Scleroderma
(10) Infestation by ectoparasites (e.g., scabiasis, pediculosis)	(10) Alopecia
(11) Eczema, dermatitis	
(12) Urticaria	
(13) Steven Johnson's syndrome, toxic epidermal necrolysis	
(14) Dyshidrosis, miliaria	

Objectives

After the class, students should be able to describe about medical arthropods on the following topics:

1) Overview of arthropod bites/infestations; pathology and symptoms related to skin and related connective tissues

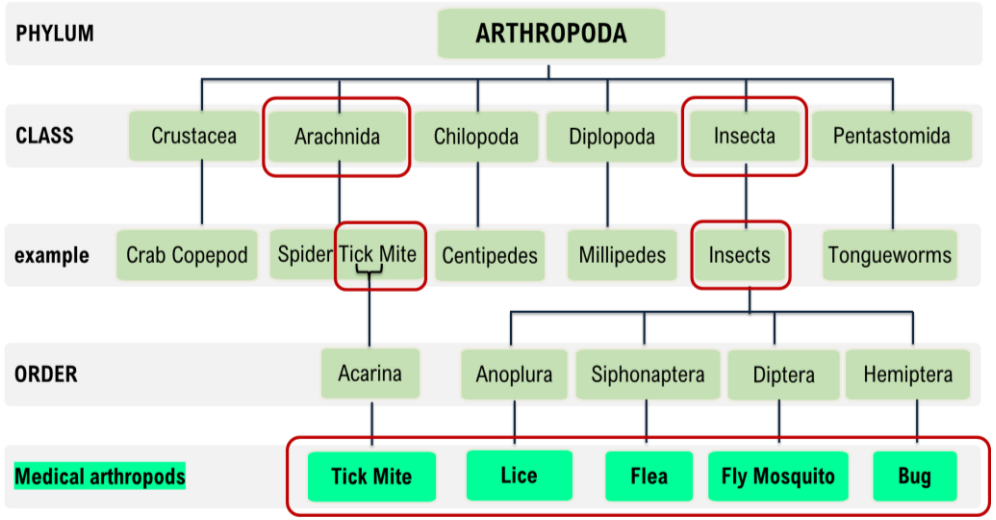
2) Specific of arthropod bites/infestations

- Acari : ticks, chiggers, house dust mite, scabies mite, follicle mites
- Insect : lice, bugs, flea, fly, mosquitoes
    - Skin reactions of arthropod bites/infestation
    - Risk behavior of patient related to biology of arthropods
    - Complication of arthropod bites (2^{nd} bacterial infection, persistent reaction, vector-borne diseases)
    - Definitive diagnosis and treatment of skin lesions caused by arthropods
    - Prevention & control of arthropods

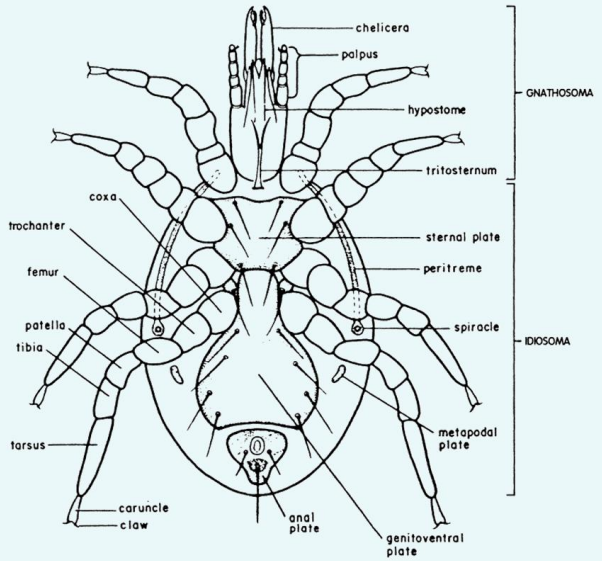
1) Overview of arthropod bites/infestations

Recall Gen III

- Arthropods (สัตว์ขาข้อ) = Any member of the phylum Arthropoda
- General characteristics of arthropods
  1. Invertebrates
  2. Jointed appendages
  3. Chitinous exoskeleton
  4. Bilateral symmetry
  5. Hemocoel (open circulatory system)
  6. Ventral nervous system

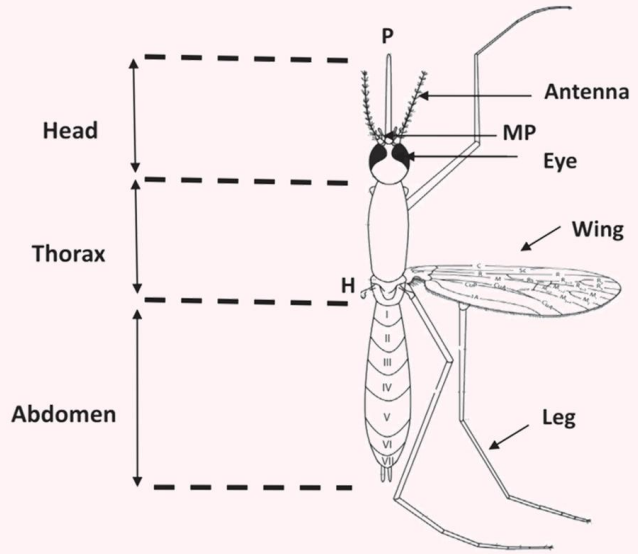


Medical Acari



Medical Entomology, Bruce F. Eldridge and John D. Edman

Medical Insects



Arthropods: definition and medical importance, Duvallet, 2018

Recall Gen III

Medical Acari

- Ticks (เห็บ)
  1. Ixodid or Hard tick
  2. Argasid or Soft tick
- Mites (ไร)
  1. Scabies mite หิด (*Sarcoptes scabiei* var. *hominis*)
  2. Follicle mite ไรรูขุมขน (*Demodex* spp.)
  3. House Dust mite ไรฝุ่นบ้าน (*Dermatophagoides* spp.)
  4. *Trombicula* mite (Chiggers ไรอ่อน)

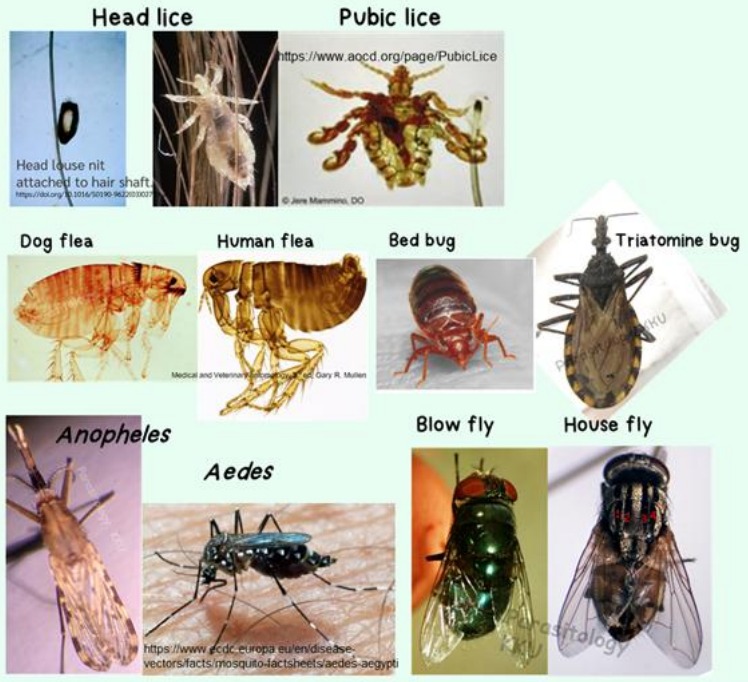
Ticks & Mites

Medical Insects

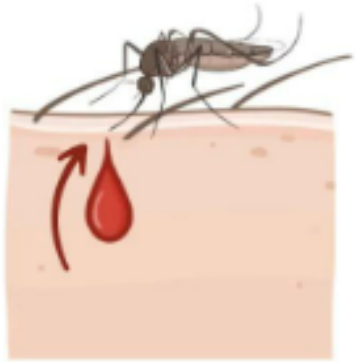
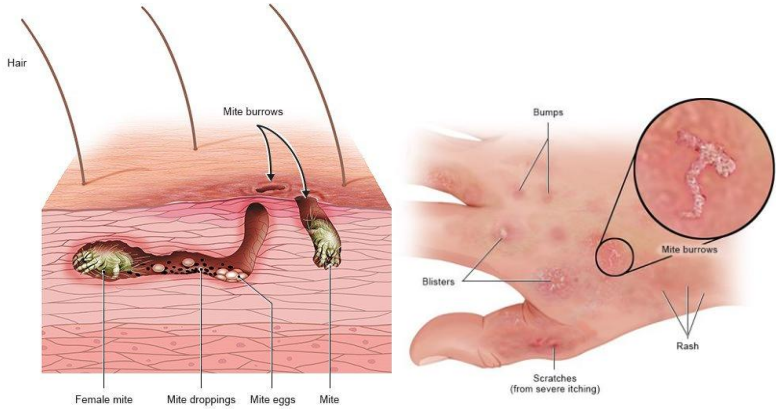
- Lice (เหาและโลน)
  1. Head louse (*Pediculus humanus* var. *capitis*)
  2. Body louse (*Pediculus humanus* var. *corporis*)
  3. Pubic/Crab louse (*Phthirus pubis*)
- Bugs
  1. Bed bug (เรือด) (*Cimex spp.*)
  2. Triatomine bug (มวน)
- Fleas (หมัด)
  1. Dog/Cat flea (*Ctenocephalides* spp.)
  2. Human flea (*Pulex irritant*)
  3. Rat flea (*Xenopsylla cheopis*)
- Flies (แมลงวัน)
  1. Blood sucking flies: stable flies (แมลงวันคอกม้า)
  2. Non-blood sucking: house/flesh/blow flies
- Mosquitoes (ยุง)

  Anopheles, Culex, Aedes, Mansonia spp.

Lice & Bugs & Fleas & Flies & Mosquitoes



Arthropod bites/stings/infestations: Term clarifying

Bite	Sting	Infestation
  https://www.fieldandstream.com/survival/tick-bite-symptoms/	  https://beeprofessor.com/longest-stingers/	
- Pierces skin with mouthparts - Inject saliva while feeding - Ex. mosquitoes, ticks, fleas, bed bugs	- Uses stinger to inject venom - Ex. bees, wasps	- Live on or inside your body for an extended period, feeding and reproducing. - Not a one-time event - Require treatment - Ex. lice, scabies

https://www.osmosis.org/learn/Insect_stings_%26_bites:_Nursing
https://www.informedhealth.org/scabies.html

Pathology of arthropod bites

Direct effects (local inflammation)

Allergic responses (Type I Hypersensitivity)

- **Direct effect :** local mechanical injury (bite, sting, infestatıon)
  - urticarial wheals, papules, vesicles, and less commonly, blisters.
  - arthropod bites consist of punctures made by the mouthparts of insects (**a central punctum**).
  - cause mechanical injury or **local inflammation** to human skin.
  - Most lesions on human skin are produced by host immune reactions to arthropod salivary secretions.
- **Hypersensitivity reactions (allergic responses)**
- Secondary infection (due to scratching or introduction of pathogens)
  - bite sites create tissue injury which can serve as a portal of entry for **secondary bacterial** infection.
- Envenomation (injection of toxins)
- Disease transmission (vector-borne diseases)

Pathology of arthropod bites: Direct effects (local inflammation)

Arthropod bites

Arthropod saliva is injected to the host

↓

Saliva effect;

↑ Blood flow (vasodilators),

↓ Coagulation (anticoagulants), anesthetics

Acute immune suppression (immunomodulators)

↓

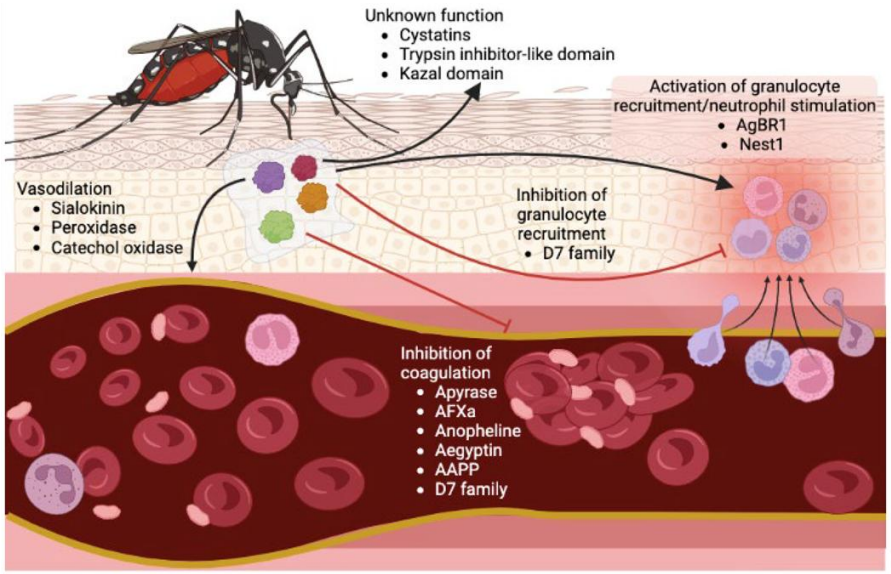
Host Response;

Immune system detects saliva antigens

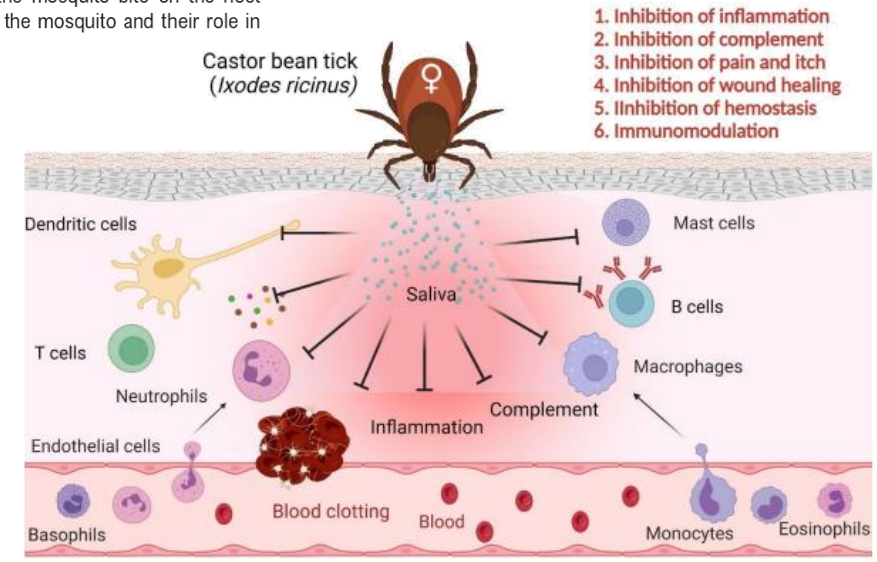
↓

Immune Activation

Inflammatory responses



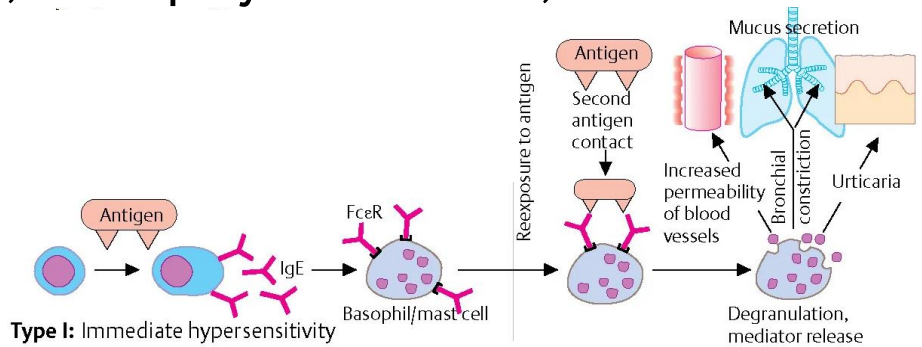
Schematic representation of the physiological effect performed by the mosquito bite on the host skin. The image shows the effect of some of the salivary proteins of the mosquito and their role in blood intake.
Pathogens 2023, 12(3), 371; https://doi.org/10.3390/pathogens12030371



The role of tick salivary serpins in the modulation of host's immune system, RNDr. Jindřich Chmelař, 2022
Figure 1. Effects of tick saliva on the host. Ticks can alter and impair all relevant host's defense mechanisms, ranging from hemostasis to adaptive immunity. (Created by BioRender)

Pathology of arthropod bites: Allergic responses (Type I Hypersensitivity)

- Arthropod saliva contains anticoagulants, enzymes, agglutinins, mucopolysaccharides, serve as sensitizing allergens.
- **Local Hypersensitivity Reactions**
  - Local allergic reactions involve the nose, lung, and **skin**.
    - Normal reaction to bites: redness, itching, swelling, pain. Appears within 2 to 3 min, abates within 2 h.
    - Severe local reaction to bite: painful, pruritic swelling of at least 5 cm in diameter and may involve an entire extremity. Usually peak within 48 h and last as long as 7 days.



Type I: Immediate hypersensitivity

https://microbenotes.com/hypersensitivity-introduction-causes-mechanism-and-types/

- **Systemic Hypersensitivity Reactions**
  - **Anaphylaxis** is the most severe type of allergic reaction.
  - Initial signs are often cutaneous, such as generalized pruritus, urticaria, and/or angioedema.
  - Generalized pruritus, urticaria, angioedema, respiratory difficulty, syncope, stridor, gastrointestinal distress, and hypotension.
  - **However, systemic hypersensitivity reactions to arthropod bites are much less common (almost rare) than those resulting from stings**.

Ref: Physician's guide to arthropods of medical importance / Jerome Goddard.—6th ed.

Pathology of arthropod bites: Allergic responses (Type I Hypersensitivity)

Ref: Physician's guide to arthropods of medical importance / Jerome Goddard.—6th ed.

Upon repeated exposure to a particular arthropod's salivary secretions, humans may become allergic to its bites. After becoming sensitized, it is not unusual to have large local reactions to bites by that particular arthropod. Interestingly, there seems to be a progression of sensitivity. **Hypersensitivity** to insect bites seems to be practically **nonexistent during the first year of life**, **then reaction intensity and lesion size may increase rapidly and peak in the 4- to 7-year-old group** (Figure), then taper off during adolescence.

Pathology of arthropod bites: Infectious complication

- **Secondary infection**
  - with common bacterial pathogens can occur in any lesion from bites.
  - Infection may result in cellulitis, impetigo, ecthyma, folliculitis, furunculosis, and other manifestations.
- **Vector-borne infectious diseases.**

Common arthropod vectors and vector-borne diseases **Recall Gen III**

Vector	Species	Pathogen	Disease
	Rat flea – *Xenopsylla cheopis*	*Rickettsia typhi* *Yersinia pestis*	Murine typhus Plague
	Kissing bug – *Triatoma* spp.	*Trypanosoma cruzi*	Chagas disease (American trypanosomiasis)
	Tsetse fly – *Glossina* spp.	*Trypanosoma brucei*	African trypanosomiasis (sleeping sickness)
	Body louse- *Pediculus humanus* var. *corporis*	*Bartonella quintana* *Borrelia recurrentis* *Rickettsia prowazekii*	Trench fever Relapsing fever Typhus
	Sandfly- *Phlebotomus* spp.	*Leishmania* spp.	Leishmaniasis
	Chigger – *Leptotrombidium* spp.	*Orientia tsutsugamushi*	Scrub typhus

Vector	Species	Pathogen	Disease
	Hard tick – > 900 extant species of ticks. (Jennifer E. Thomas, 2021) e.g. *Ixodes* spp., *Amblyomma* spp., *Dermacentor* spp., *Rhipicephalus* spp.	Tick-borne diseases e.g. *Borrelia* spp. *Rickettsi* spp. *Ehrlichia* spp. Arboviral *Flavivirus*	Lyme disease Spotted fever group (SFG) Ehrlichiosis Tick-borne encephalitis
	*Anopheles* spp.	*Plasmodium* spp. *W. bancrofti*	Malaria Lymphatic filariasis
	*Aedes* spp.	Dengue virus Chikungunya virus *Brugia* spp./ *W. bancrofti*	Dengue Chikungunya Lymphatic filariasis
	*Mansonia* spp.	*Brugia* spp./ *W. bancrofti*	Lymphatic filariasis
	*Culex* spp.	*W. bancrofti* Japanese encephalitis virus	Lymphatic filariasis Japanese encephalitis

Pathology of arthropod bites: Secondary infection

Figure 5. Secondary infection of scabies. Cultures of secondarily infected scabies lesions in children commonly yield *S. aureus* and group A streptococci; gram-negative rods also may be found in lesions on the lower trunk and legs (19). Systemic complications can arise from these secondary infections. Acute glomerulonephritis, for example, although extremely rarely, has been associated with secondary streptococcal infections of scabies

Bikowski, J. (1999). Secondarily infected wounds and dermatoses: a diagnosis and treatment guide. The Journal of Emergency Medicine.

Figs. 1–3. Extraoral photograph showing a collected abcess of 20mm of axis located on the labial commissure. The epithelial collarette surrounding the abscess is characteristic. Perilesional scratch and linear mark on the skin provides évidences of pruritus.

Abstract – Introduction: Impetiginization is defined as a surinfection of *Staphylococcus aureus* on a preexistent dermatosis: **Observation**: A 19-year-old patient in good general health was admitted to general emergency and then hospitalized in internal medicine for an abscess of the labial commissure. The anamnesis revealed a 24 hours old insect bite. An abscess of the labial commissure of 20 mm in diameter with a necrotic surroundings and associated induration was observed. After 3 days of antibiotic i.v (amoxicillin + clavulanic acid), the patient went home. By 14 days, healing was complete. Bacteriological examination detected numerous staphylococcus aureus (SA) that were sensitive to meticillin. **Discussion:** SA by their pathogenicity are responsible for many infections, potentially serious. For several decades, mainly in hospitals, SA have acquired resistance to penicillins A and G. Infections considered as banal could evolve into very serious necrotic infections. **Conclusion**: This case is unusual because of its localization and its quick evolution on a young adult. It underlines the importance of early bacteriological sampling before the introduction of probabilistic antibiotherapy in order to anticipate extremely serious necrotic infections that may lead to aesthetic and functional sequelae.

Clinical dermatology • **Concise report**

doi: 10.1111/j.1365-2230.2004.01706.x

Primary cutaneous cryptococcal cellulitis secondary to insect bite in an immunosupressed patient after liver transplantation

A. Bauzá, P. Redondo and M. Rubio*

*Departments of Dermatology and *Microbiology, University Clinic of Navarra. Spain*

Summary

Cutaneous cryptococcosis is usually a manifestation of disseminated disease, especially in immunosuppressed patients. Primary cutaneous cryptococcosis has also been described in some patients without evidence of systemic disease. Distinguishing between primary and secondary cutaneous cryptococcosis may be difficult as patients can be asymptomatic or cutaneous lesions may precede systemic involvement by some months. Features supporting primary disease are a history of cutaneous inoculation, and solitary superficial lesions on uncovered parts of the body. We present a liver transplant patient with cutaneous cryptococcal cellulitis subsequent to an insect bite, without systemic involvement and with excellent response to treatment with amphotericin B for 15 days and surgical debridement plus oral fluconazole for 3 months. In immunosupressed patients with cellulitis a cryptococcal infection must be excluded. If cutaneous cryptococcosis is diagnosed, systemic evaluation and prompt lengthy treatment are required.

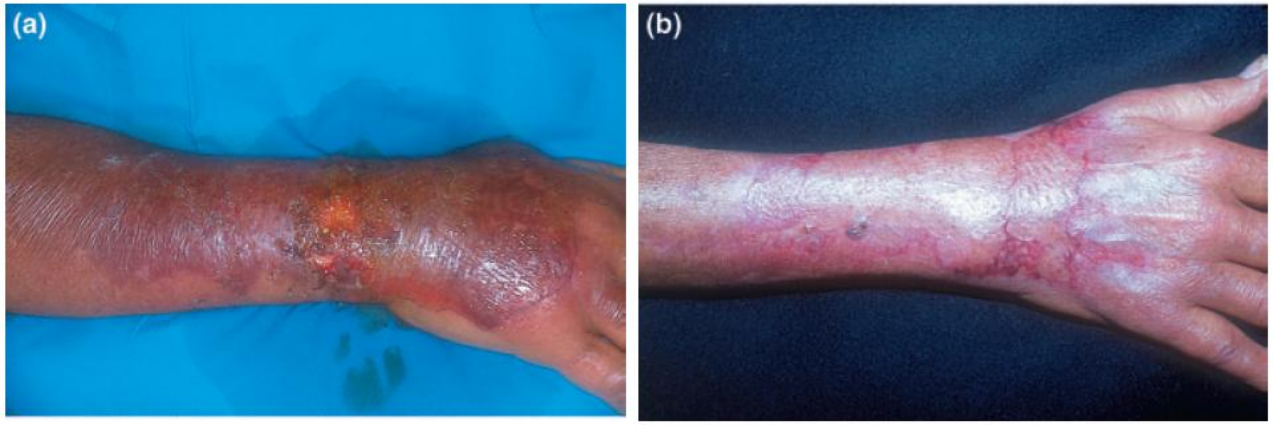


Figure 1 (a) Oedema and intense suppuration on the right arm increasing in the first days. (b) The arm 1 year after the infection.

Le Infezioni in Medicina, n. 2, 285-292, 2022
doi: 10.53854/liim-3002-15

CASE REPORT

Uncommon lymphocutaneous cellulitis after insect bite: a case report of primary cutaneous nocardiosis and literature review

SUMMARY

Nocardia is a genus of aerobic actinomycetes that are usually responsible for opportunistic infection in immunocompromised patients. Less frequently nocardiosis can interest immunocompetent population, causing especially primary cutaneous infections. Cutaneous involvement by *Nocardia* spp. may occur mostly as one of four clinical manifestations: superficial cellulitis or abscess, mycetoma, lymphocutaneous (also defined "sporotrichoid") infection and secondary cutaneous involvement from systemic disease. Infections usually present after minor local injury, especially in traumatic outdoor activities (*e.g.* gardeners, farmers, road accidents), with subsequent environmental contamination of the wound. In sporadic cases cutaneous infection follows an insect bite. Microbiological diagnosis is often difficult to obtain and *N. brasiliensis* is the species isolated in most cases (80%). We present the case of a 45-year-old female with fever and a painful and necrotizing lesion on her right leg with secondary ascending lesions occurred on the homolateral knee and consensual groin lymphadenopathy after insect sting (maybe a spider bite). Cultures on skin biopsy identified *Nocardia brasiliensis*. Infection was completely healed after 5 months of targeted antibiotic therapy. In addition, we performed a literature review of all cutaneous nocardiosis cases in immunocompetent individuals, finding that only in 22 cases the infection presented after insect bite; in most of these cases lymphocutaneous manifestation was seen and *N. brasiliensis* was the *Nocardia* species isolated. Our case, along with others in literature, reveals that the real burden of soft-tissues nocardiosis seems low but probably many cases might go undiagnosed because of difficulties in microbiology diagnosis. Primary cutaneous nocardiosis should be included in the diagnostic pathway in cases of cellulitis following insect bite or sting, especially when localized to extremities.

Keywords: nocardia, cutaneous nocardiosis, actinomycetes, insect bite, immunocompetent.

Figure 1 - Evolution of the tibial lesion at site of the insect bite (a, b); secondary ascending lesions (c) and outcome after treatment (d).

Factor for arthropod bites

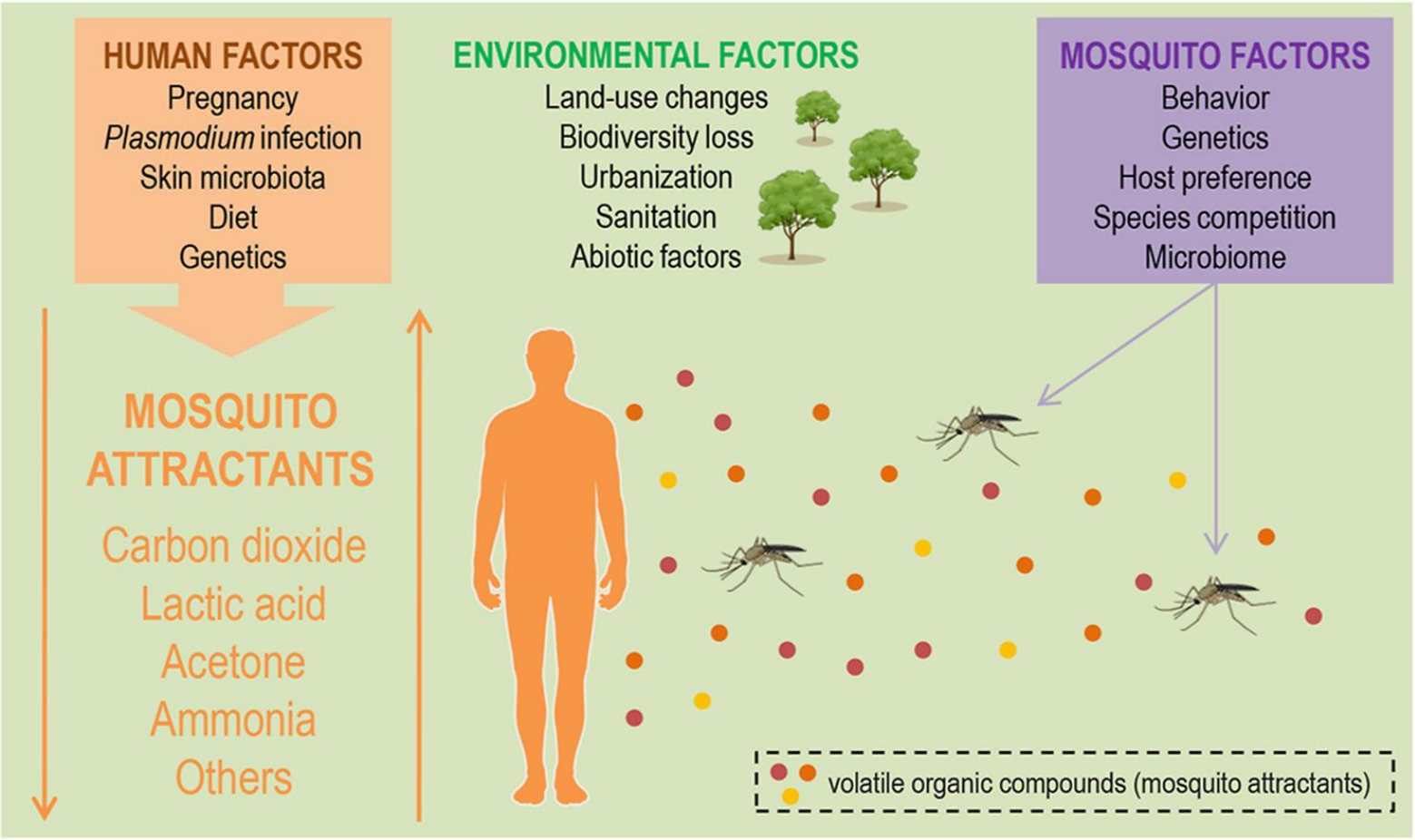
Variables influencing susceptibility of individuals to insect bites[4-11]			
	Who are susceptible?	**Insects attracted**	**Mechanism(s) involved**
Environmental factors	Persons living in tropical areas, summer in non-tropical areas	Any	Fewer clothes and expose large areas
	Spending time in garden	Any	Increased exposure to insects
	Overcrowding and poor hygiene	Lice, fleas, bed bugs	Increased re-infestation
	Shifting to a house in which previous owner kept pets	Cat and dog fleas	Cocoons hatch and attack humans in scarcity of natural host
	Dilapidated housing	Bedbugs	Source of crevices in which bedbugs multiply
	Tourism destinations, trains, cinemas, hospital wards and clinic waiting rooms, staff and student accommodation, hotels[4]	Bedbugs	Increased transfer of insects
Host factors	Body heat and carbon dioxide in exhaled air	Mosquitoes, fleas, bedbugs	Increased attractiveness to insects
	Vibrations caused by host	Fleas[5]	Displacement of air attracts insects
	Human sweat	Mosquitoes[6]	Increased attractiveness to insects
	Human skin flora	Mosquitoes[7]	Microflora produces compounds attracting insect
	Human body odour	Mosquitoes,[7] sandflies[8]	Increased attractiveness to insects
	Pregnancy[9]	*Anopheles gambiae* complex	Increased heat and increased release of volatile substances from skin surface
	Alcohol and beer[10]	Mosquitoes	Unknown
	Lipoatrophy in patients on antiretroviral therapy[11]	Mosquitoes	Lipoatrophic subcutaneous tissue may present more accessible capillary network and increased release of volatile substances from skin surface.

Singh S, Mann BK. Insect bite reactions. Indian J Dermatol Venereol Leprol 2013;79:151-64

Factor for arthropod bites: How do mosquitoes find people to bite?

SDL

- Mosquitoes find their hosts by smell and vision



https://www.sciencedirect.com/science/article/pii/S2667114X21000522

- Metabolic rate, amount of CO_2 released, body temperature, clothing types and colors, and varying amounts of volatile organic compounds (VOCs) emanating from human skin
- Pregnancy and *Plasmodium* infection increase the host attractiveness to mosquitoes.
- Skin microbiota and human genetics (especially HLA alleles) modulate the production of mosquito attractants and therefore influence individual susceptibility to these insects.

2) Specific of arthropod bites/infestations

2.1 Acari : ticks, chiggers, house dust mite, scabies mite, follicle mites

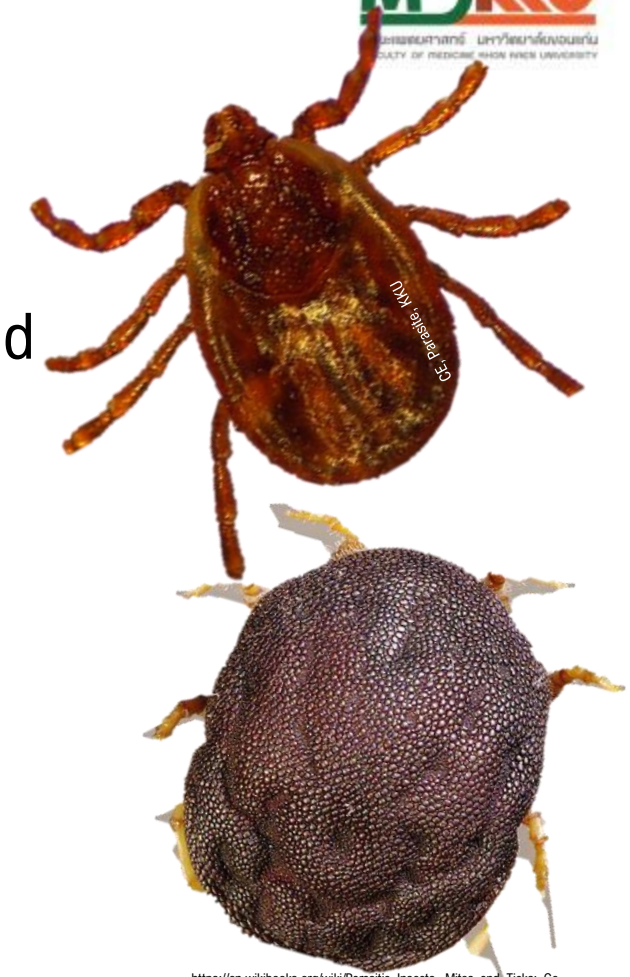
2.2 Insect : lice, bugs, flea, fly, mosquitoes

2) Specific of arthropod bites/infestations

2.1 Acari : ticks, chiggers, house dust mite, scabies mite, follicle mites

Tick (เห็บ)

- Blood sucking arthropods
- Worldwide, they are the most important vectors in the veterinary field and are second only to mosquitoes in terms of their public health importance.
- about 900 extant species of ticks known. (Jennifer E. Thomas, 2021)



https://en.wikibooks.org/wiki/Parasitic_Insects,_Mites_and_Ticks:_Genera_of_Medical_and_Veterinary_Importance/Soft_ticks

1. **Ixodid or Hard tick (Family Ixodidae)**
    - Cattle tick, dog tick (*Rhipicephalus* spp.)
    - *Ixodes* spp., *Amblyomma* spp., *Dermacentor* spp., etc.
2. **Argasid or Soft tick (Family Argasidae)**
    - Avian, bat, cattle (*Argus* spp., *Ornithodoros* spp.)

Tick : Medical importance

1. **Tick-borne diseases**

   Hard ticks

   - Spotted fever group rickettsiae (SFG) (case report in TH)
   - Severe Fever with Thrombocytopenia Syndrome virus (SFTSV) (case report in TH)
   - Tick-borne encephalitis (Eu,Rus,Chi,Jap)
   - Lyme disease (Eu,Aus,Chi,Jap,Afr)
   - Babesiosis (case report in TH)

   Soft ticks

   - Soft tick relapsing fever (STRF)

2. **Tick paralysis/tick toxicosis**:

   neurotoxin released by tick salivary glands (noninfectious) by hard ticks
   (Female ticks; *Dermacentor, Ixodes, Amblyomma*) (N. America, Eu, Aus, S. Africa)

Tick-borne diseases

SDL

Table 1. Zoonotic bacteria transmitted by ticks around the world.

ZOONOSIS	TRANSMITTED PATHOGEN	TICK VECTOR	REF
Human granulocytic anaplasmosis	*Anaplasma phagocytophilum*	*Ixodes scapularis Ixodes pacificus, Ixodes persulcatus, Ixodes ricinus*	(21)
	Ehrlichia chaffeensis	*Amblyomma americanum*	(22)
Human monocytic ehrlichiosis	*E. chaffeensis; E. ewingii*	*Rhipicephalus sanguineus* ?	(17)
	Ehrlichia canis	*Rhipicephalus sanguineus*	(25)
Lyme disease	*Borrelia burgdorferi* sensu lato	*Ixodes* spp. (*I. scapularis; I. pacificus; I. persulcatus; I. ricinus*)	(21,22,26)
Tick-borne African fever	*Rickettsia africae*	*Amblyomma hebraeum, Amblyomma variegatum*	(22,27)
Mediterranean spotted fever	*Rickettsia conorii*	*Rhipicephalus sanguineus*	(22, 28)
Rocky Mountain spotted fever "Tobia Disease"	*Rickettsia rickettsii*	*Amblyomma cajennense, Dermacentor andersoni, Dermacentor variabilis, Rhipicephalus sanguineus*	(9,22)
Q Fever	*Coxiella burnetii*	More than 40 species of different kinds. *Haemaphysalis* spp., and *Ixodes* spp., (of highest prevalence in Europe), and *Rhipicephalus* spp., *Amblyomma* spp., and *Dermacentor* spp., of highest prevalence in America.	(22,29)
Relapsing fever	*Borrelia* spp.	*Ornithodorus* spp.	(22)
Tularemia	*Francisella tularensis*	*Dermacentor andersonii, D. variabilis, D. occidentalis*, and *Amblyomma americanum*	(9)

Table 2. Zoonotic viruses transmitted by ticks around the world.

Powassan encephalitis	Flavivirus	*Ixodes* spp. (*I. cookei, I. marxi, I. spinipalpus, I. persulactus*), *Dermacentor* spp. (*D. andersoni, D. silvarum*), y *Haemaphysalis* sp (*H. longicornis*)	(1)
Tick-borne encephalitis	Flavivirus	*Ixodes* spp. (*I. ricinus; I. persulcatus*)	(1,22)
Kyasanur forest disease	Flavivirus	*Haemaphysalis spinigera*	(1,22)
Colorado tick fever	Coltivirus	*Dermacentor andersoni*	(22,30)
Omsk hemorrhagic fever	Flavivirus	*Dermacentor marginatus, D. reticulatus, Ixodes persulcatus*	(1,22)
Crimean-Congo haemorrhagic fever	Nairovirus	*Hyalomma marginatum*	(22,31)
Thrombocytopenia syndrome with severe fever	Flebovirus	*Haemaphysalis longicornis*	(32)
Langat Virus	Flavivirus	*Ixodes granulatus, I. persulcatus; Haemaphysalis papuana*	(1)
Tyuleniy Virus	Flavivirus	*Ixodes uriae*	(1)

Ref;
Importance of ticks in the transmission of zoonotic agents, Oscar Betancur H, 2015

Tick : Medical importance

3. Blood sucking & skin lesions

- Primary lesions
  - Occur with the tick attached to the host, due to toxicity and anticoagulating substances found in the saliva of ticks and inflammation due to the penetration and permanence of the mouthparts.
  - Ticks will attach to human skin and remain attached for several days.
  - A **red papule** is usually seen and can progress to **local swelling and erythema**.
  - Inflammation or even hypersensitivity reactions may occur after a few days of tick attachment
  - Even after tick removal, a reddened nodule may persist at the bite site for weeks or even months.
  - **Granulomatous foreign body** reactions occur when mouthparts are retained in the patient's skin after vigorous attempts at removal of the tick.

- Secondary lesions : Caused by **specific tick-borne disease** (rickettsia, bacterial, protozoan and fungal infections inoculated by the ticks).
  - Lyme disease (spirochetes of the *Borrelia burgdorferi*)
  - Rocky mountain spotted fever (RMSF) (*Rickettsia rickettsii)*
  - Ehrlichiosis (*Ehrlichia chaffeesis, E. ewingii)*

Tick : Medical importance

อุทาหรณ์! ลูกเป็นไข้ไม่มีสาเหตุ บ่นปวดศีรษะ ผงะเจอเห็บเกาะหัว

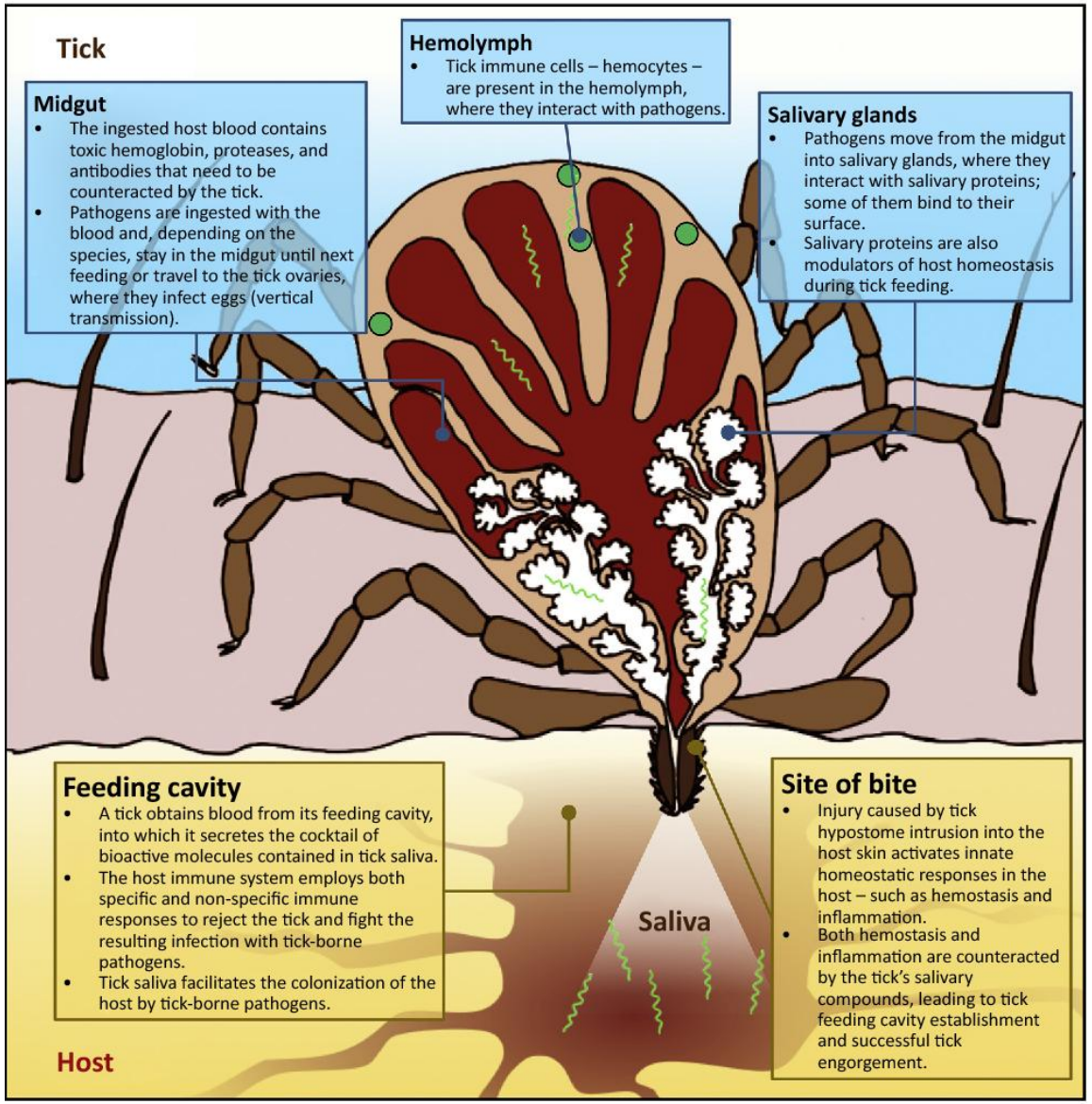
เผยแพร่: 14 ก.พ. 2561 11:57 ปรับปรุง: 14 ก.พ. 2561 14:29 โดย: MGR Online

8,817

พ่อแม่โพสต์แชร์อุทาหรณ์ ลูกชายไข้ขึ้น เจอเห็บเกาะหัวตัวใหญ่ พ่อแม่กลัวติดเชื้อ รีบส่งแพทย์ เตือนผู้ปกครองดูแลใส่ใจลูกในการเล่นกับสุนัขมากขึ้น

https://mgronline.com/onlinesection/detail/9610000015244

Tick : Medical importance : Primary lesions



Ref; Tick salivary compounds: their role in modulation of host defences and pathogen transmission, Frontiers in Cellular and Infection Microbiology, 2013
Trends Parasitol. 2016 Mar;32(3):242-254. doi: 10.1016/j.pt.2015.10.002.

https://www.ccfmed.com/tick-bite-first-aid

https://entomology.ca.uky.edu/ef618

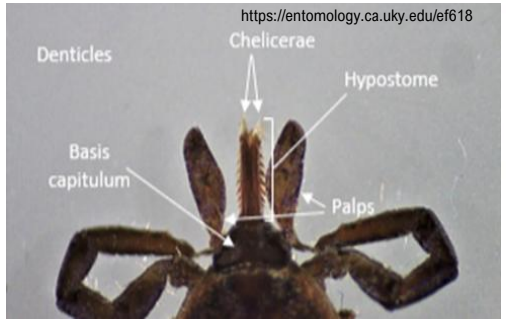


FIGURE 1: Adult ticks of the *Amblyomma* genus attached to human skin. The mouthparts of these arthropods are serrated and hard to extract. The permanence of fragments causes foreign body-type granulomas. Photos: Vidal Haddad Jr.
DOI: http://dx.doi.org/10.1590/abd1806-4841.20186378

FIGURE 1 | Hard ticks (Ixodidae) insert their mouthparts into the skin of their hosts and cause tissue injury. Tick mouthparts are anchored in the host skin by a cement cone. At the tick attachment site, a haemorrhagic pool is created. During the prolonged blood-meal ticks secrete a rich cocktail of bioactive salivary molecules to the host and modulate host defence responses (itch, pain, haemostasis, inflammation, immune reactions) to their benefit. The tick salivary cocktail contains molecules (SAT factors) that facilitate pathogen transmission and infection of the host.

Tick : Medical importance : Primary lesions

Yonago Acta medica 2015;58:51–52 *Patient Report*

Tick Bite Granuloma: Recommendations for Surgical Treatment

Keisuke Hirota,* Yoshinaga Kurosawa,* Keisuke Goto, Koji Adachi, Yuichi Yoshida and Osamu Yamamoto
Division of Dermatology, Department of Medicine of Sensory and Motor Organs, School of Medicine, Tottori University Faculty of Medicine, Yonago 683-8504, Japan

PATIENT REPORT

A 3-year-old boy was referred to our clinic for evaluation of a red nodule on the right forehead. A tick on his forehead had been removed by hand 5 months before. Although he had been treated with topical steroid ointment for 2 months, the response was poor. Physical examination revealed a red nodule with crusts, 13 × 8 mm in diameter, on the right forehead (Fig. 1). His general condition was good and his personal past medical history was unremarkable. The lesion was excised under local anesthesia. Histopathological examination showed focal parakeratosis, spongiosis and acanthosis in the epidermis (Fig. 2). In addition, there were mixed cell granulomas composed of lymphocytes, eosinophils, plasma cells and histiocytes in the dermis (Fig. 3). Fragments of the tick were not involved in the resected tissue.

Fig. 1. A red nodule with crusts on the right forehead.

insects
Insects 2025, 16, 389. https://doi.org/10.3390/insects16040389
MDPI

Case Report

Tick Bite Granuloma After Incomplete Removal of *Ixodes ricinus* Tick

Case Presentation

A 47-year-old female patient, a member of the research team, reported to a dermatology clinic with a skin lesion at the tick bite site in the lumbar region 9 weeks after tick removal. An erythematous-infiltrative lesion, with a diameter of approx. 4.5–5 cm without clear demarcation from the surrounding area, developed 24 h after the removal (Figure 1). The tick feeding site was visible as an erythematous papule in the central part. The diameter of infiltration and erythema gradually decreased (Figure 2) until complete reduction after 72 h. The tick attachment site exhibited skin erosion, which did not heal for 9 weeks.

The physical examination performed by a dermatologist showed an elevated solid purple nodular lesion with a size of 6 × 4 mm. In the dermatoscopic examination, the lesion was identified as centrally located erosion covered with crust. It exhibited peripheral hyperpigmentation and white linear streaks (Figure 4). The skin lesion caused subjective symptoms, such as persistent itching and burning, lasting from 3 days to 9 weeks after tick removal. The changed skin fragment with subcutaneous tissue (0.8 × 0.6 × 0.9 cm) with a brown lesion measuring 0.4 cm in diameter was excised surgically under local anesthesia for routine histological sectioning. The skin sample was placed in 10% buffered formalin

Figure 1. Small red solid nodule 24 h after *Ixodes ricinus* female tick removal with erythema due to skin inflammation around the tick bite area (photograph by Katarzyna Bartosik).

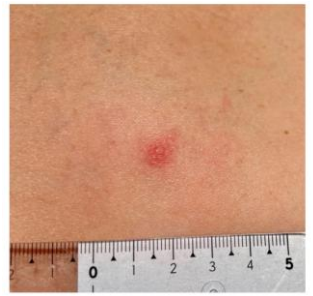


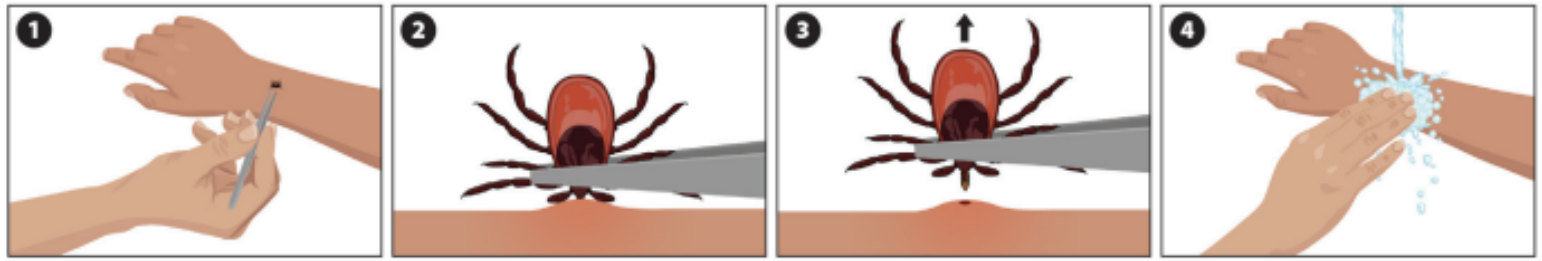
Figure 2. Small red solid nodule 48 h after *Ixodes ricinus* tick removal with centrally forming erosion. Mild erythema due to skin inflammation around the tick bite area (photograph by Katarzyna Bartosik).

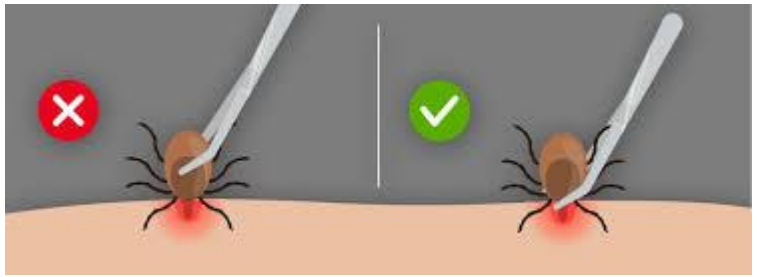
Tick : Medical importance : Primary lesions

- **Tick removal**
- Ticks should be removed right away with clean, fine-tipped tweezers.
- Grasp the tick as close to the skin as possible to avoid leaving the head inside the bite.
- After removing, clean the bite with rubbing alcohol, soap, and water.
- After the tick has been removed, watch for symptoms that indicate disease.

Remove the tick as soon as possible

1. Use fine-tipped tweezers to grasp the tick as close to the skin as you can.
2. Pull upward with steady, even pressure. Don't twist or jerk the tick.
3. After removing the tick, clean the bite area and your hands with rubbing alcohol or soap and water.
4. Dispose of the tick by flushing it down the toilet. If you would like to bring the tick to your healthcare provider for identification, put it in rubbing alcohol or place it in a sealed bag/container.





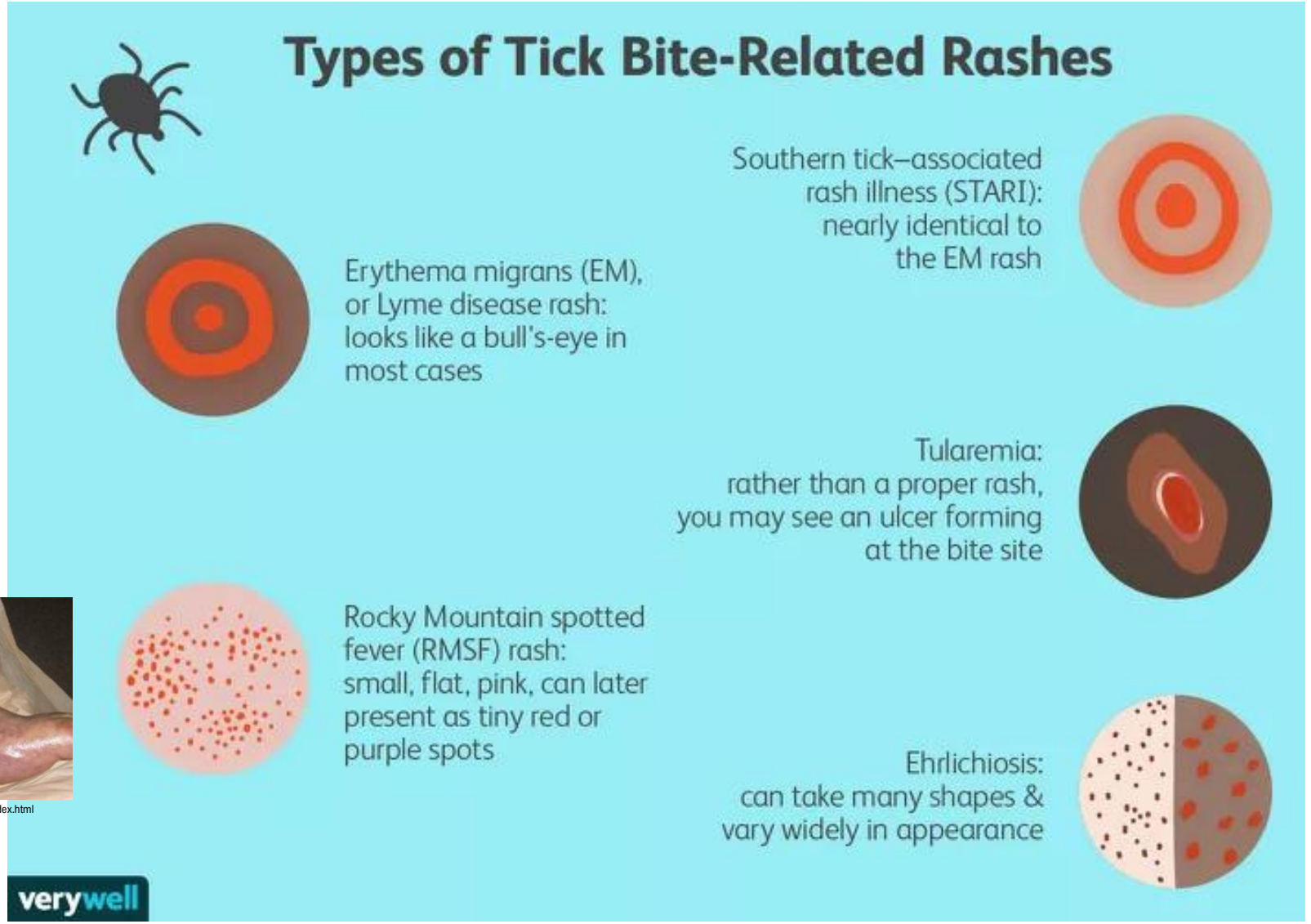
https://www.nice.org.uk/guidance/ng95, https://lymediseaseuk.com/lyme-rash/, https://www.cdc.gov/ticks/pdfs/FS_TickBite-508.pdf

https://www.vdh.virginia.gov/ticks/tick-removal/

Tick : Medical importance : Secondary lesions

Figure 5. Bull's-eye rash (erythema migrans) on a patient with Lyme disease.

https://www.cdc.gov/rocky-mountain-spotted-fever/about/index.html



https://www.verywellhealth.com/tick-bite-symptoms-5186154

https://www.cdc.gov/lyme/about/about-southern-tick-associated-rash-illness.html

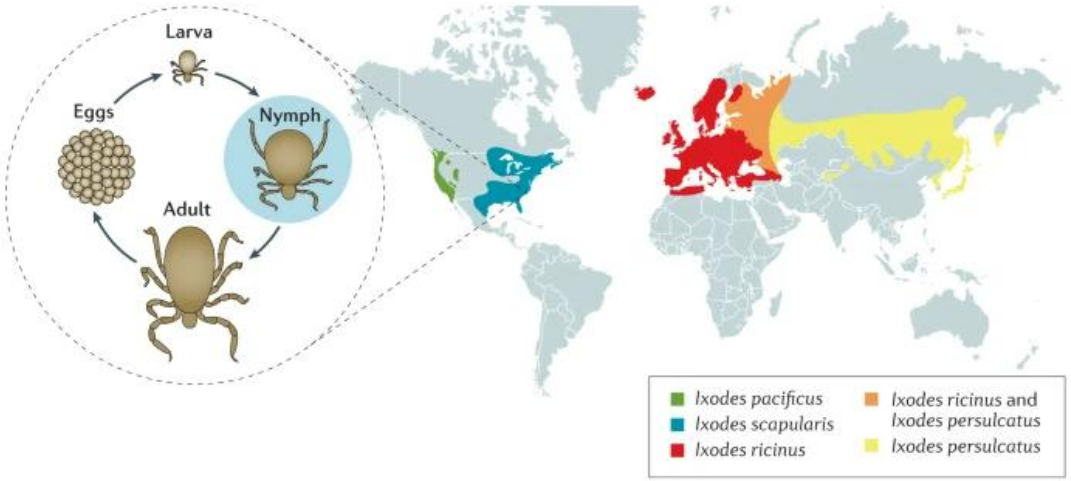
https://doi.org/10.3389/fpubh.2018.00325

Figure 1. Erythematous maculopapular rash without distinct margins was seen.
https://www.theijcp.org/index.php/ijcp/article/view/276/230

Tick : Medical importance : Secondary lesions ; Lyme disease

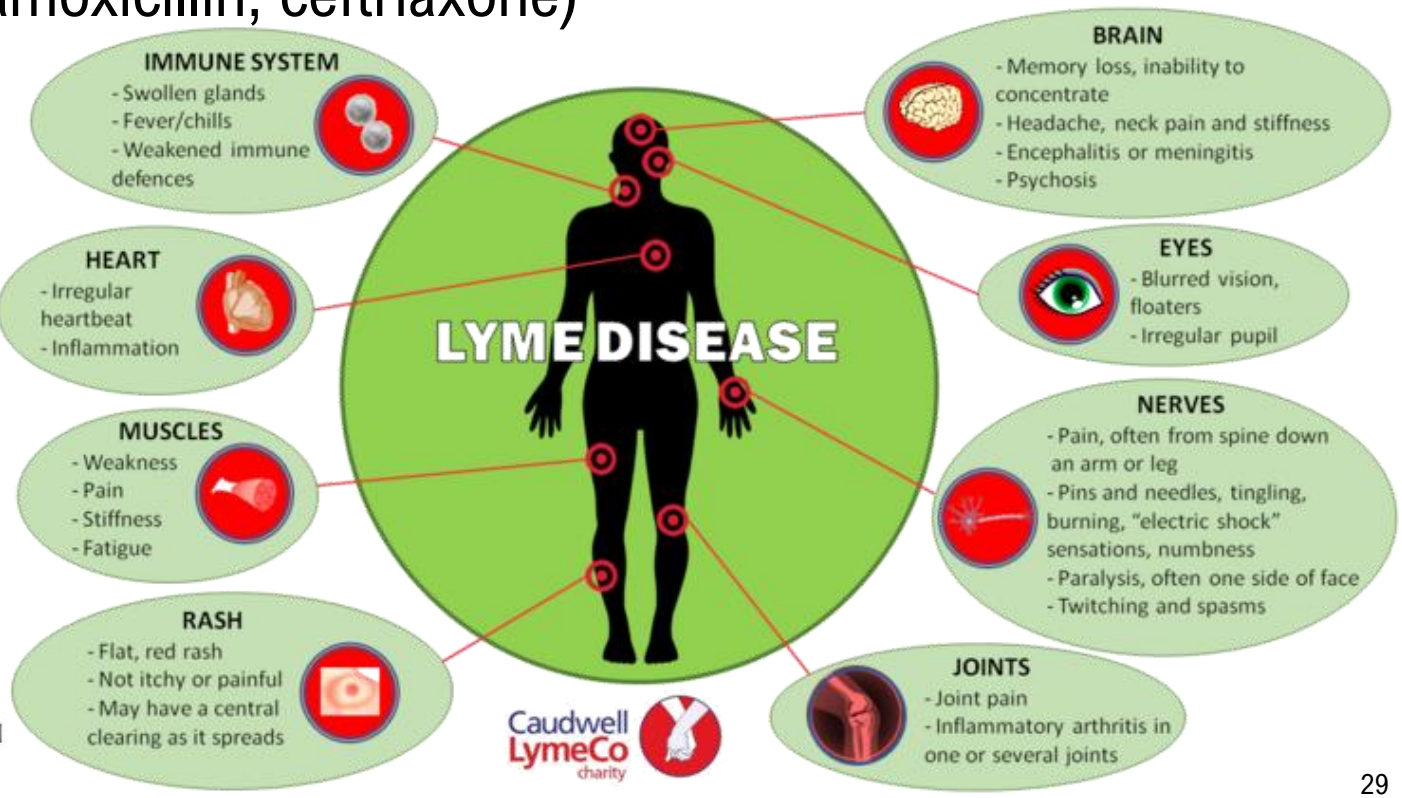
- **Lyme disease** (spirochetes of the *Borrelia burgdorferi*)
  - Eu, Aus, Chi, Jap, Afr
  - 3 stages: early localized, early disseminated, and late.
  - Antibiotics treatment (doxycycline, amoxicillin, ceftriaxone)

Figure 2: Distribution of *Ixodes* ticks that transmit *Borrelia burgdorferi* s.l. to humans.



Nature Reviews | Disease Primers

Borrelia burgdorferi s.l. are transmitted by ticks of the *Ixodes ricinus* complex. In Europe, the principal



Tick : Medical importance : Secondary lesions ; Lyme disease

- **Early symptoms** (3–30 days)
  - **Erythema migrans (bullseye rash)**(EM)(>70% of cases)
  - Flu, Fever, Fatigue, Headache, GI upset

EM rash key considerations:

- appear at the site of the bite and will grow outwards as it progresses.
- can be red, blue and/or purple.

American Family Physician https://www.aafp.org/pubs/afp/issues/2013/1215/p841.pdf
https://lymediseaseuk.com/lyme-rash/

Thairath - ไทยรัฐออนไลน์
16 กรกฎาคม 2019 ·

Lyme disease

สาวไทยคนแรกป่วย "โรคลายม์" อาการโคม่า รักษาหาย จำเหตุการณ์ย้อนหลังไม่ได้ แพทย์เตือน เที่ยวต่างประเทศ ต้องป้องกันให้ดี

THAIRATH.CO.TH

รู้จัก "โรคลายม์" สาวไทยเที่ยวเมืองนอก ป่วย โคม่า ความทรงจำหาย คาดโดนเห็บกัด

หมอมนูญ ลีเชวงวงศ์ FC
July 14, 2019 ·

โรคลายม์ (Lyme disease) เกิดจากการติดเชื้อแบคทีเรียโบเรลเลีย (borrelia) ซึ่งจัดอยู่ในกลุ่ม spirochetes (ดูรูป) เห็บ(ticks)เป็นพาหะนำโรคนี้ โดยกินเลือดจากสัตว์จำพวกสุนัข ม้า กวาง วัว ควาย หนู ที่เป็นตัวกักตุนโรค และนำเชื้อโรคเข้าสู่คนเมื่อมากัดกินเลือดคน โรคนี้พบในหลายประเทศรวมทั้งประเทศตุรกี(ดูแผนที่) ยังไม่มีรายงานโรคนี้ในประเทศไทย อาการของโรคลายม์ในคนจะแสดงออกหลังได้รับเชื้อ 2-4 สัปดาห์ อาการที่พบได้บ่อยคือมีผื่นบริเวณที่ถูกเห็บกัด ไข้ ปวดหัว อ่อนเพลีย เชื้อนี้เล่นงานหลายอวัยวะในคน(ดูรูป)

ผู้ป่วยหญิงไทยอายุ 47 ปี เพิ่งไปเที่ยวหลายเมืองในประเทศตุรกีนาน 8 วัน หลังกลับมา 17 วัน เริ่มมีไข้ ไอ ปวดหัว ปวดตัว อ่อนเพลีย ไม่มีผื่น เข้านอนรักษาในโรงพยาบาล ตรวจไม่เป็นไข้หวัดใหญ่ หรือไข้เลือดออก เอกซเรย์ปอดปกติ หลังจากนั้นอีก 4 วัน มีไข้ หัวใจเต้นช้า โคม่า หมดสติ มีชักกระตุกใบหน้าขวา แขนขวา ต้องใส่เครื่องช่วยหายใจ ทำคอมพิวเตอร์สมอง CT Brain ปกติ ทำคลื่นไฟฟ้าสมอง EEG พบมีสัญญาณเป็นโรคลมชัก ได้ส่งเลือดและน้ำไขสันหลังตรวจหาแบคทีเรียทั่วไป โรคฉี่หนู โรค Rickettsia วัณโรค เชื้อรา ไวรัสต่างๆรวมทั้ง Nipah virus, West Nile virus, Hantavirus, JE virus ,Adenovirus, Flavivirus,Herpes simplex virus, Varicella zoster virus,Epstei-Barr virus, Cytomegalovirus ผลกลับมาปกติ ให้ยากันชักต่อเนื่อง และยาปฏิชีวนะ 2 ขนานคือ Ceftriaxone และ doxycycline 7 วันแรก ต้องทำการเจาะคอเพราะต้องใส่เครื่องช่วยหายใจนาน อาการค่อยๆดีขึ้น ในที่สุดหายใจเอง ถอดเครื่องช่วยหายใจได้ ตื่นดี กลับมารู้เรื่อง หลังกลับจากตุรกี 40 วันได้ส่งเลือด Borrelia antibody ตรวจหาโรคลายม์ ผล Borrelia antibody IgG เป็นบวก เข้าได้กับโรคลายม์ ตรวจสมองด้วยคลื่นแม่เหล็กไฟฟ้า MRI Brain พบความผิดปกติที่สมองส่วนหน้าด้านซ้าย(left frontal lobe) ผู้ป่วยดีขึ้นช้าๆ นอนรักษาในรพ.2 เดือน หลังจากนั้นอีก 5 เดือนกลับไปทำงานได้ตามปกติ แต่จำเหตุการณ์ย้อนหลังไม่ได้ จำไม่ได้ว่าเคยไปเที่ยวประเทศตุรกี จำไม่ได้ว่าเคยป่วยหนักนอนในรพ.

ผู้ป่วยรายนี้น่าจะรับเชื้อ Borrelia ในประเทศตุรกี หลังจากนั้น 3-4 สัปดาห์ มีไข้ สมองอักเสบ (Neuroborreliosis) หัวใจเต้นช้า ต่อมาต้องใส่เครื่องกระตุ้นหัวใจไฟฟ้าอีก 4 เดือนถัดมา วินิจฉัยเป็นโรคลายม์โดยการตรวจทางห้องปฏิบัติการหาภูมิคุ้มกันต่อเชื้อ Borrelia ในเลือด ผู้ป่วยรายนี้ได้รับยาปฏิชีวนะ doxycycline และ ceftriaxone ตรงกับโรคนี้ตั้งแต่ต้น อาการจึงค่อยๆดีขึ้นช้าๆ โรคนี้ไม่พบในประเทศไทยและ

ญี่ปุ่นพบ"ไวรัสเห็บ" โรคอุบัติใหม่ติดจากสัตว์สู่คน | TNN ข่าวค่ำ | 7 ต.ค. 64 Watch >

Tick : Medical importance

Clue for history taking of tick bites;

- Environmental exposure
- Humans often become infested by
  - their association with domestic animals, such as cats, dogs, cows.
  - by their contact with tall grass or brush that harbors the unfed ticks, waiting to attach to a passing host. (Ask if the patient has recently spent time in environments where ticks are commonly found (e.g., hiking, camping, gardening in tall grass, or wooded areas).

Things need to be concerned after tick bites;

- The risk of tick-borne diseases / Presence of any symptoms (fever, rash, flu-like, any symptoms)
- Proper removal of the tick (was it removed fully).

Mite (ไร)

- Size is smaller than ticks
- Ranging from 0.1 to 3 mm in length
- Cover with hair
- Lesions caused by mites are **pruritic**, somewhat **erythematous eruptions composed of papules**

Figure 24.3
House dust mites, actual size (left) and magnified (right). (Photographs copyright 2011 by Jerome Goddard, Ph.D.)

DOI: 10.1186/s12879-019-4299-2

Physician's guide to arthropods of medical importance by Jerome Goddard. 6th ed

Mite

- **Mites that bite** include chiggers and occasionally mites that are ectoparasites of birds, rodents, or pets and mites that contaminate plant materials or stored food or feed.
- **Mites that bite and burrow** include *Sarcoptes scabiei*, which causes scabies, and *Demodex mites*.
- **Allergic dermatitis, or grocer's itch,** is caused by several species of mites that contaminate stored grain products, cheese, and other foods. These mites **do not bite** but cause allergic dermatitis because people become sensitized to allergens on the mites or their waste products.
- Topical corticosteroids or oral antihistamines are used as needed to control pruritus

TABLE 208-1
Mites

Ref: Fitzpatrick Dermatology in general medicine, 7th ed

TYPE OF MITE	SCIENTIFIC NAME	CLINICAL FEATURES—DISEASE ASSOCIATIONS
Scabies mites	*Sarcoptes scabei*	See the section Scabies
Follicle mites	*Demodex folliculorum hominis* and *D. brevis*	Questionable association with rosacea, idiopathic facial burning
Food mites	Grain mite: *Acarus siro* Cheese mite: *Tyrolichus casei* Grocery mite: *Tyrophagus putrescentiae*	Mild dermatitis known as *baker's itch* or *grocer's itch*
Fowl mites	*Dermanyssus gallinae* and *D. avium*	Pruritic papules, sometimes with a hemorrhagic center
Straw itch mites	*Pyemotes tritici* and *P. ventricosus*	Patchy dermatitis on trunk and arms during or after harvesting
Harvest or red mites (chiggers)	Genus *Trombicula* *Eurotrombicula alfreddugesi* and *E. splendidus* most common in United States	Scrub typhus vector (*Leptotrombidium* sp.) Papular to vesicular lesion found on ankles, waist, or warm skinfolds
Animal mites	*Ornithonyssus bacoti* *Liponyssoides sanguineus* *Cheyletiella* "walking dandruff"	Endemic/murine typhus vector Rickettsialpox vector Non-specific, pruritic eruption on body parts in close contact with infested pets
House dust mites	*Dermatophagoides* sp.	Questionable association with atopic dermatitis

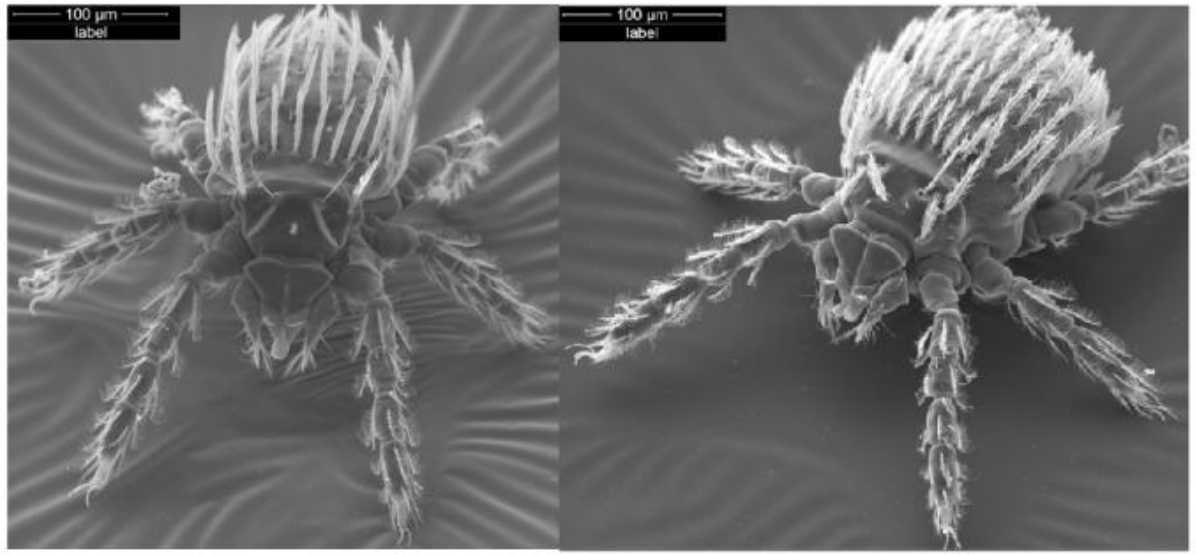
SDL

Mite

- Mites of medical importance in Thailand
  - *Trombicula* mite (Chiggers) ไรอ่อน
  - House Dust mite ไรฝุ่นบ้าน
  - Scabies mite (*Sarcoptes*) หิด
  - Follicle mite (*Demodex*) ไรรูขุมขน

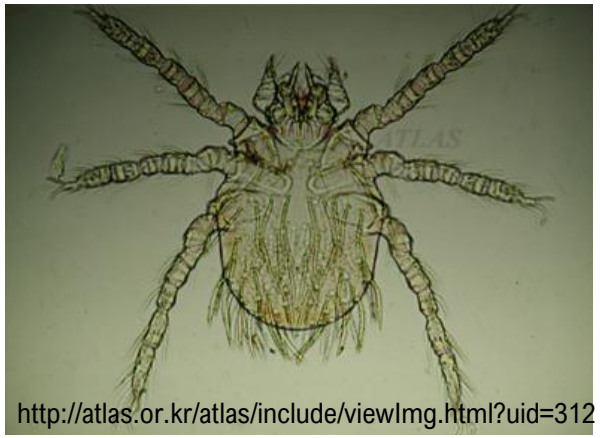
Mite : Chigger mite (ไรอ่อน)

- **Larvae** of mites in the **family Trombiculidae** (Trombiculid mites/*Trombicula* mites/Harvest mites)
- >2000 species of trombiculid mites, ~ 20 species attack people
- **Larvae called chiggers**



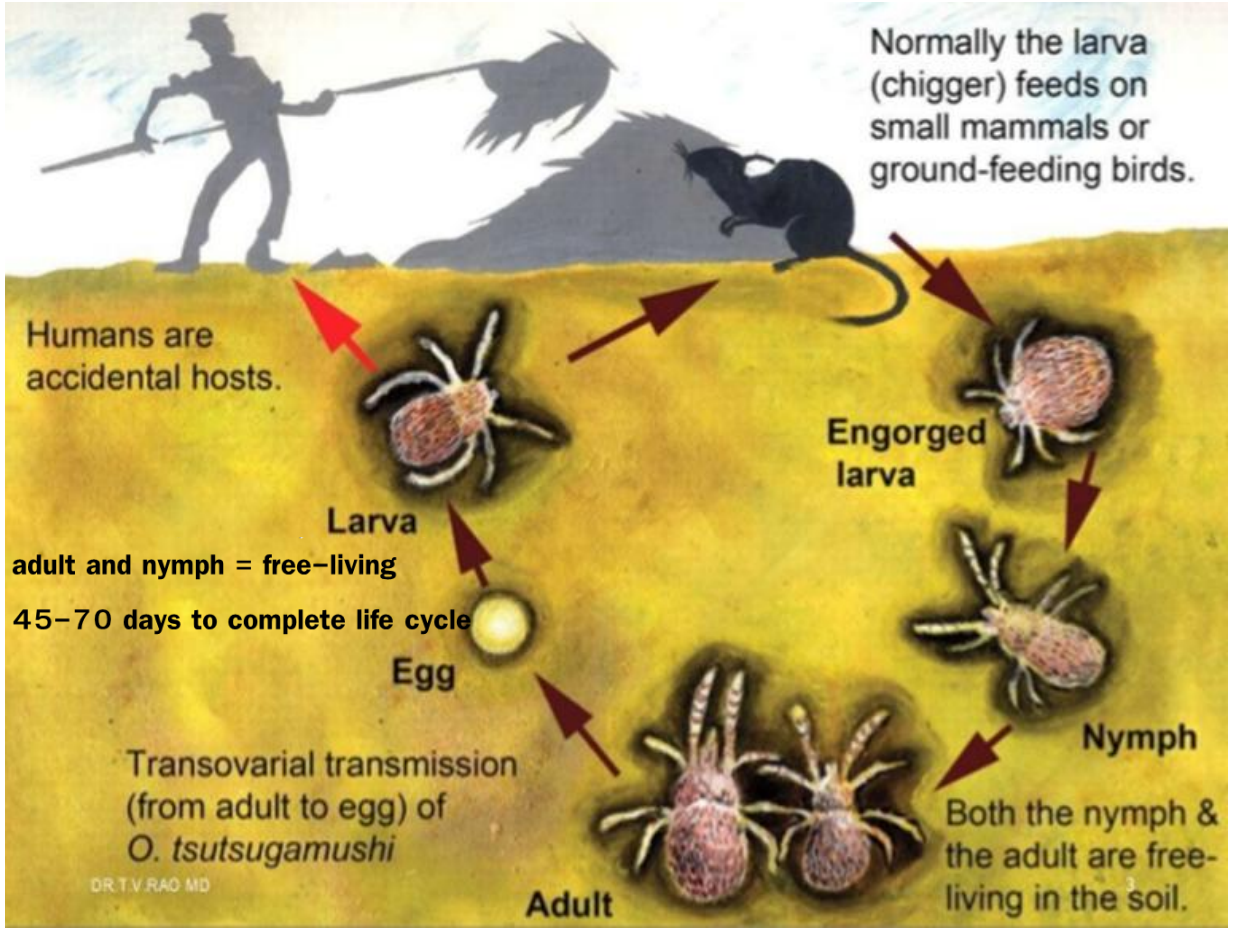
Spp. in Asia

Figure 2.
Leptotrombidium intermedium (left) and Leptotrombidium pallidum (right). Provided by Dr. Shatrov.



Mite : Chigger mite

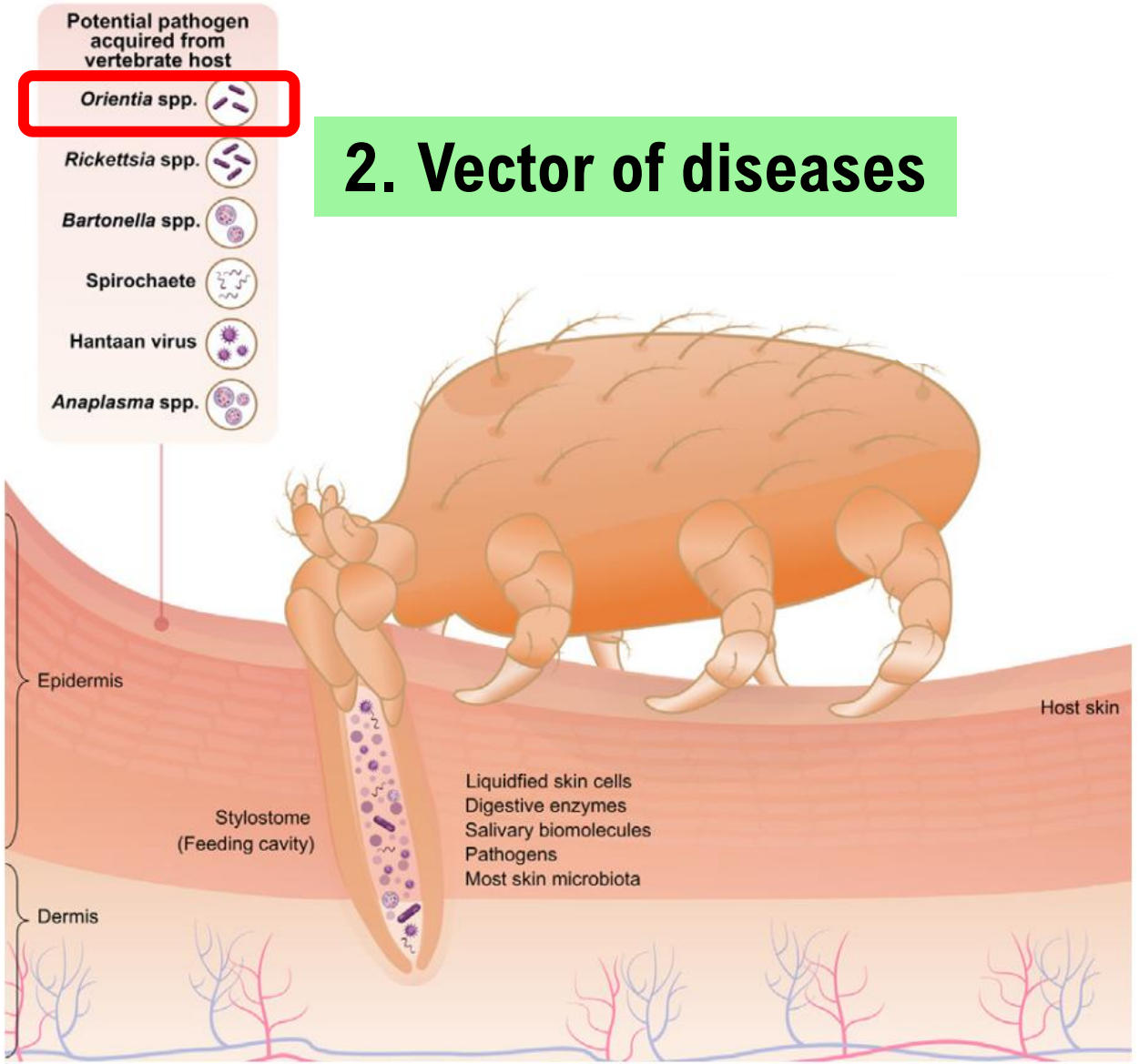
- Larva = chiggers → parasitic
- Larva size 0.1-0.3 mm, 3 pairs of legs, hairy
- Found in moist microenvironments with **grassy field, wooded areas, neglected garden.**
- Life cycle of *Trombicula* mite
  - Female lays eggs on soil or leaf-litter, and eggs hatch around 1 wk. and become chiggers
  - Chiggers attach to the human around the **waist or ankles**



Life cycle of *Trombicula* mite and transmission dynamics of *Orientia*

Ref: https://microbeonline.com/scrub-typhus-overview-pathogenesis-and-lab-diagnosis/

Mite : Chigger mite: Medical importance



2. Vector of diseases

1. Chigger bite (skin lesion)

Trends in Parasitology https://doi.org/10.1016/j.pt.2023.05.002

Mite : Chigger mite: Medical importance

- Within 3-6 hrs after biting; intense itching, papules and wheals.
- The lesion often develops a central vesicle or a small blister.
- **chigger dermatitis, trombiculid dermatitis, trombiculiasis**
- Trombiculiasis will **resolve spontaneously** within a few weeks as long as there is no re-exposure, and since the serious complications of a super-imposed bacterial infection are rare, the prognosis is good.
- Antihistamines and corticosteroid creams are used as treatments to minimize itching.

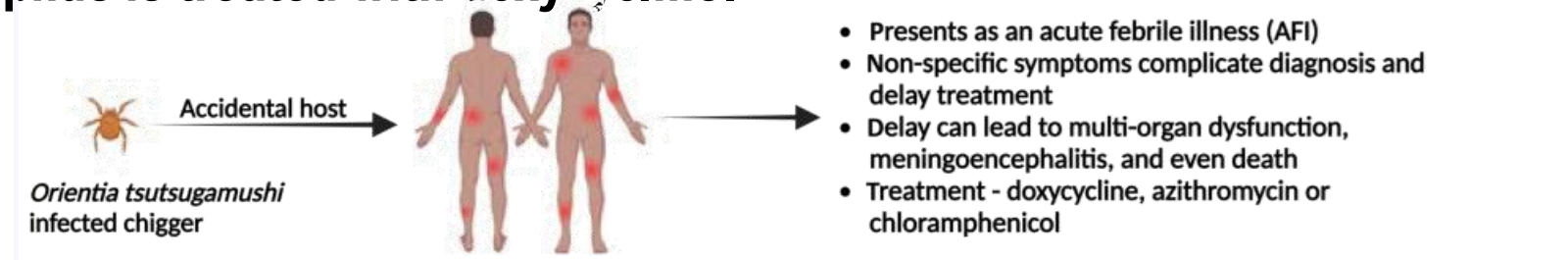
Figure 3. Trombiculiasis: farmer's arm bitten by chiggers (white arrows).

https://doi.org/10.32473/edis-ig085-1999

- Vector of **Scrub typhus** (*Orientia* (*Rickettsia*) *tsutsugamushi*)
- Scrub typhus = fever and chills, headache, body aches, and sometimes rash.
- Site of chigger bite = **Eschar** (A dark, scab-like region)
- Rodents are major reservoir host.
- **Scrub typhus is treated with doxycycline.**

Fig. 2 Mite colonies in the ear of a rodent

DOI: 10.1186/s12879-019-4299-2



https://doi.org/10.1016/j.pt.2024.10.013 Trends in Parasitology

Mite : Chigger mite: Medical importance

DOI: 10.1007/s11606-015-3371-x

Figure 2 Infiltrative erythema (diameter, 20 mm) with a black eschar in the center.

https://kathmandupost.com/national/2017/07/06/scrub-typhus-kills-4-people-infects-504-in-one-year

The NEW ENGLAND JOURNAL of MEDICINE

CURRENT ISSUE SPECIALTIES TOPICS

IMAGES IN CLINICAL MEDICINE

Scrub Typhus

Authors: Chang-Seop Lee, M.D., Ph.D., and Jeong-Hwan Hwang, M.D. Author Info & Affiliations

Published December 17, 2015 | N Engl J Med 2015;373:2455 | DOI: 10.1056/NEJMicm1503639 | VOL. 373 NO. 25

A 65-year-old woman was admitted with fever and rash that had developed 3 days and 1 day before admission, respectively. On physical examination, an erosion 1.5 cm by 1.5 cm with a torn bulla was observed in the right axilla, and a generalized, nonpruritic, maculopapular rash was found over the whole body (Panels A and B). The daily appearance of eschar was evaluated by dermoscopy, and routine photography was performed from the first through the fourth hospital day (Panels C through F). Over time, the center of the eschar developed a black crust covering the ulcer, which was surrounded by an erythematous rim. On the fourth day, the rash became faint. Indirect immunofluorescence assay revealed an *Orientia tsutsugamushi* (formerly known as *Rickettsia tsutsugamushi*) antibody titer of 1:640. The clinical course was improved after administration of oral doxycycline at a dose of 100 mg twice daily for 7 days. The patient continued to do well, and her condition was stable 2 weeks after discharge. Scrub typhus is a miteborne disease caused by *O. tsutsugamushi*. Symptoms of acute scrub typhus typically include a fever and maculopapular rash with a primary lesion that evolves over time, as described in this clinical vignette. The disease is transmitted by trombiculid mites, also known as chiggers, and is endemic in parts of Asia. The clinical scenario and typical black eschar are often key to the diagnosis.

Images in Clinical Tropical Medicine

Evolution of Eschar in Scrub Typhus

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A 60-year-old man presented with fever that developed 1 day before admission. The patient had recently returned from collecting acorns in the mountains 8 days before admission. Physical examination revealed a 0.5 × 0.5-cm eschar on the right chest wall. Indirect immunofluorescent antibody testing revealed an *Orientia tsutsugamushi* antibody titer of 1:2,560. The appearance of eschar was evaluated by dermoscopy and routine photography.

Figure 1A–E clinical images show similar eschar morphology: a central black crust and peripheral erythematous rim visible to the naked eye. The visualization of subtle changes in eschar appearance can be improved by dermoscopy. In the early stages, a central vesicle surrounded by erythema can be observed, and whitish scales are seldom detected (Figure 1A; 3 days from symptom onset to eschar formation). With the progression of the lesion, a typical black crust appears in the center, and more apparent surrounding erythema can be seen (Figure 1B). The scales overlaying the crust gradually increase, and finally, the typical eschar is formed 6–8 days after onset (Figure 1C and D). After that, the crust slowly shrinks, and at the same time, the overlaying scales diminish (Figure 1E). After stage F, the crust disappears completely, leaving only a whitish scar-like macule (indicating fibrosis) (Figure 1F). The lesion heals with red-brown colored hyperpigmentation in place of surrounding erythema (Figure 1G). In the described case, the clinical course improved after 7 days of oral doxycycline treatment, and the patient was discharged.

Scrub typhus is an acute febrile illness caused by *O. tsutsugamushi*. Eschar is a necrotic lesion of the skin at the site of a chigger mite bite. The overall prevalence of eschar ranges widely in patients with scrub typhus.[1] Eschar is a critical pathognomonic finding for clinical diagnosis of scrub typhus.[2] The absence of eschar has been reported to be an independent predictive risk factor for fatal outcome.[3] Therefore, the clinicians could early diagnose a scrub typhus if they are aware of the changing form of eschar over time, and would be able to promptly manage the patient with appropriate antibiotics.

Received July 19, 2016. Accepted for publication August 23, 2016.

FIGURE 1. **(A)** Three days from symptom onset (SE03): central yellowish vesicle with mild whitish scale, and peripheral erythematous patch. **(B)** SE05: central vesicle turned into brown to black-colored crusts and scales are increased. **(C)** SE06: formation of typical eschar lesion having central black crusts and conspicuous erythematous patch with overlaying scale. **(D)** SE08: well-established eschar composed of three concentric components; innermost black crust outlined by inner scaly line, middle erythematous patch, and outermost whitish scaly layer. **(E)** SE14: shrinkage of central crusts and diminished peripheral scale. **(F)** SE17: central crust completely disappeared, and changed into central scar-like whitish area with peripheral erythematous area showing prominent vascular pattern. **(G)** SE20: dull reddish-brown hyperpigmentation.


ทำงานปลอดภัย
ไม่ป่วยสครับไทฟัส
เมื่อเข้าไปในป่าอาจทำให้ถูกไรอ่อนกัด โดยไรอ่อนมักกระโดดเกาะตามเสื้อผ้า และกัดผิวหนังตามข้อพับ หากถูกตัวไรอ่อนที่มีเชื้อกัด จะมีอาการ มีไข้ ปวดหัว ปวดเมื่อยตัว ตาแดง อ่อนเพลีย อาจมีผื่นลักษณะนูนแดงละเอียด และบางรายอาจจะพบแผลคล้ายบุหรี่จี้
ตัวไรอ่อน
วิธีป้องกัน
ใช้สารไล่แมลง ทาหรือฉีดพ่นบริเวณผิวหนังและเสื้อผ้า
สวมใส่เสื้อผ้าให้มิดชิด ปกปิดแขนขา
หลังออกจากป่า ทำความสะอาดร่างกาย และนำเสื้อผ้าที่ใส่มาซัก ทำความสะอาดทันที
"สังเกตอาการทุกครั้งหลังออกจากป่า หากมีอาการดังกล่าวให้รีบพบแพทย์ พร้อมแจ้งประวัติการเข้าไปในพื้นที่เสี่ยง"
ข้อมูล ณ วันที่ 8 ก.ย. 66


ไรอ่อน
พาหะนำโรคสครับไทฟัส
ตัวเล็กมาก มองไม่เห็นด้วยตาเปล่า
อาศัยตามพุ่มไม้ ทุ่งหญ้าหรือพืชเตี้ย ๆ
เตือน
เกษตรกร
หาของป่า
นักท่องเที่ยว
หากจำเป็นต้องเข้าป่า ควรสวมใส่เสื้อผ้าให้มิดชิด ส่วนนอกร่มผ้าให้ทาโลชั่นกันยุงที่มีส่วนผสมของสาร DEET
กองโรคติดต่อนำโดยแมลง
ข้อมูล ณ วันที่ 24 ต.ค. 66


ใครชอบหาของป่า
เสี่ยงเป็นโรคสครับไทฟัส
การเข้าป่าเพื่อหาของป่าไปขาย หรือกินเอง ก็มีความเสี่ยงที่จะถูกไรอ่อนซึ่งเป็นพาหะนำโรคกัด เพราะแหล่งอาศัยของไรอ่อน ได้แก่ ป่า พื้นที่เกษตร ใกล้ป่า บริเวณที่มีทุ่งหญ้า พุ่มไม้เตี้ย ๆ รวมถึง ไร่ สวนยางและสวนผลไม้ ดังนั้นควรป้องกันตนเอง เพื่อลดความเสี่ยงจากการถูกไรอ่อนกัด


โรคสครับไทฟัส หรือโรคไข้รากสาดใหญ่
ลักษณะเฉพาะของโรค
ผิวหนังที่ถูก "ไรอ่อนกัด" อาจพบแผลนุ่มสีดำ รูปร่างกลมออกรีขอบนูนเรียบ ไม่เจ็บ ลักษณะคล้ายแผลถูกบุหรี่จี้ (Eschar) แผลมักอยู่บริเวณที่อับชื้น ในร่มผ้า ข้อพับ รักแร้ ขาหนีบ เอว อวัยวะเพศ เป็นต้น
หากมีภาวะแทรกซ้อน อาจทำให้มีอาการรุนแรง จนนำไปสู่การเสียชีวิตได้
"กรมควบคุมโรคห่วงใย อยากเห็นคนไทยมีสุขภาพดี"
สายด่วน กรมควบคุมโรค 1422


โรคสครับไทฟัส หรือโรคไข้รากสาดใหญ่
อาการ
ไข้สูง ปวดศีรษะ ปวดเมื่อยตามตัว
ไอแห้ง
ปวดกระบอกตา ตาแดง
ต่อมน้ำเหลืองโตโดยเฉพาะบริเวณที่อยู่ใกล้แผลที่ถูกไรอ่อนกัด อาจมีผื่นลักษณะนูนแดงละเอียด (Maculopapular rash) ตามลำตัว ซึ่งกระจายไปยังแขน ขา ภายหลังมีไข้ 4 - 5 วัน
หากมีภาวะแทรกซ้อน อาจทำให้มีอาการรุนแรง จนนำไปสู่การเสียชีวิตได้
"กรมควบคุมโรคห่วงใย อยากเห็นคนไทยมีสุขภาพดี"
สายด่วน กรมควบคุมโรค 1422

สถานการณ์โรคติดต่อนำโดยแมลง ประเทศไทย พ.ศ. 2568

กองโรคติดต่อนำโดยแมลง กรมควบคุมโรค กระทรวงสาธารณสุข

https://ddc.moph.go.th/dvb/pagecontent.php?page=1269&dept=dvb

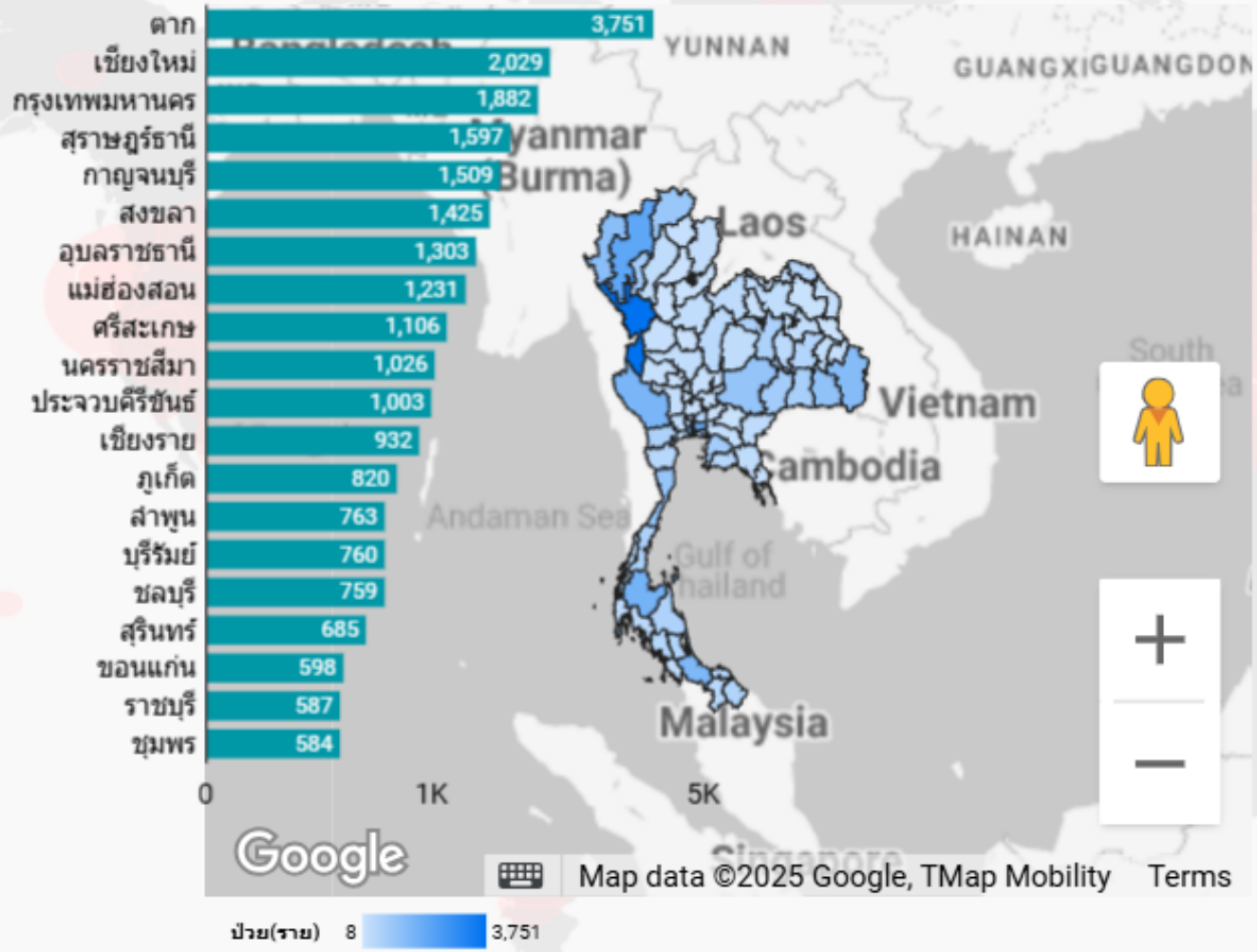
ข้อมูล ตั้งแต่วันที่ 1 มกราคม 2568- 9 กรกฎาคม 2568

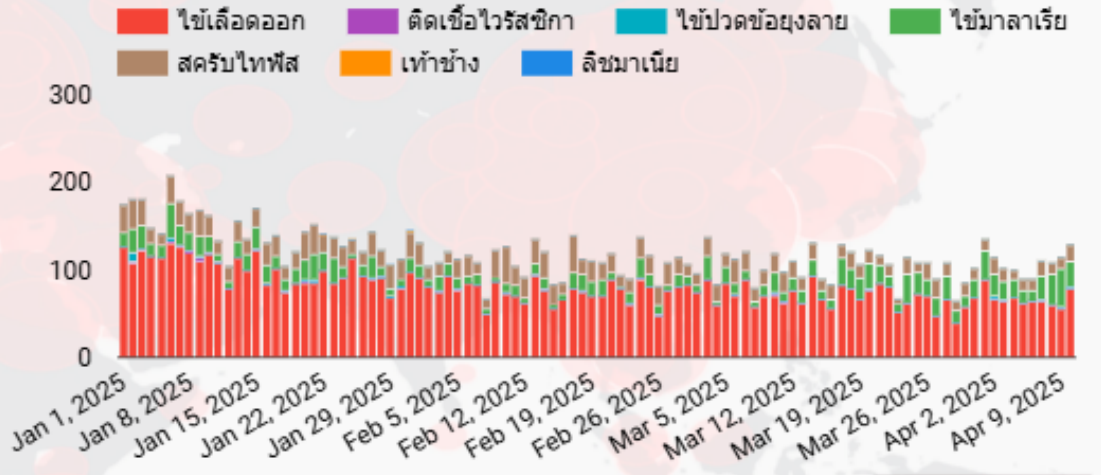
ไข้มาลาเรีย ตั้งแต่วันที่ 1 มกราคม - 11 กรกฎาคม 2568

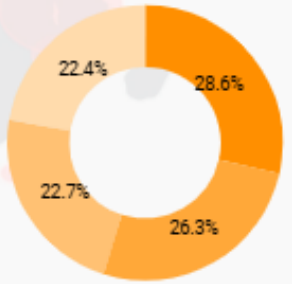
ผู้ป่วยสะสม	จำนวนจังหวัดที่รายงาน	จำนวนผู้เสียชีวิต
37,020	77	38

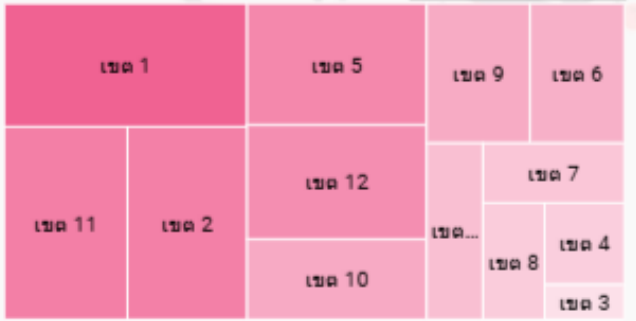
ไข้เลือดออก	ติดเชื้อไวรัสซิกา	ไข้ปวดข้อยุงลาย
24,793	90	513

ไข้มาลาเรีย	สครับไทฟัส	พยาธิฟิลาเรีย	ลิชมาเนีย
7,907	3,712	14	2









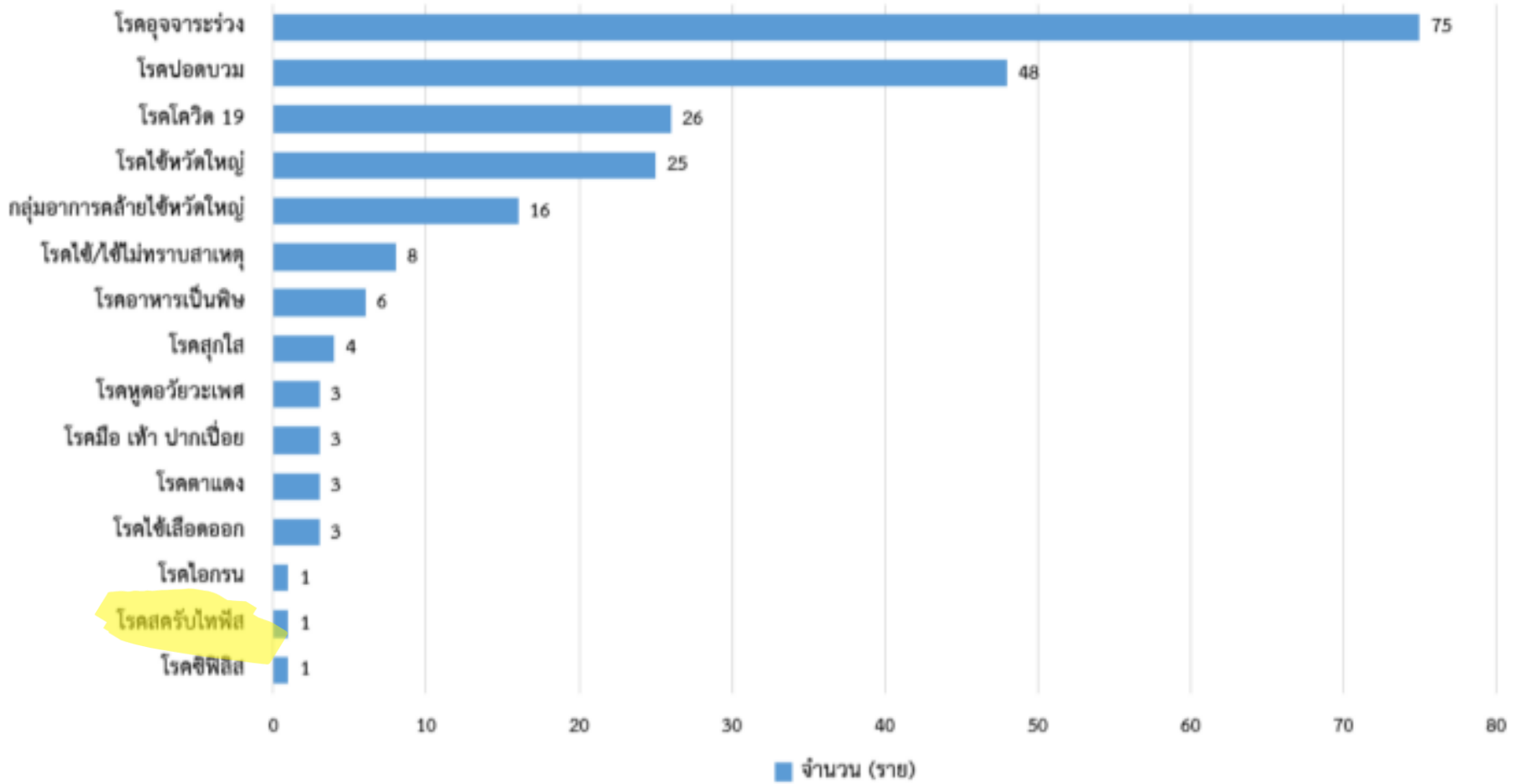
จัดทำโดยกลุ่มเฝ้าระวังสถานการณ์และสื่อสารความเสี่ยง กองโรคติดต่อนำโดยแมลง 0 2590 3133 dvbdresponse@gmail.com ผยแพร่ทางเว็บไซต์ https://ddc.moph.go.th/dvb

Looker Studio

รายงานสถานการณ์การเฝ้าระวังโรคที่สำคัญทางระบาดวิทยา ในโรงพยาบาลศรีนครินทร์ คณะแพทยศาสตร์ มหาวิทยาลัยขอนแก่น

ประจำเดือน มกราคม พ.ศ. 2568

10 อันดับโรคที่มีจำนวนผู้ป่วยสูงสุดที่เข้ามารับการรักษาในโรงพยาบาลศรีนครินทร์ เดือนมกราคม 2568



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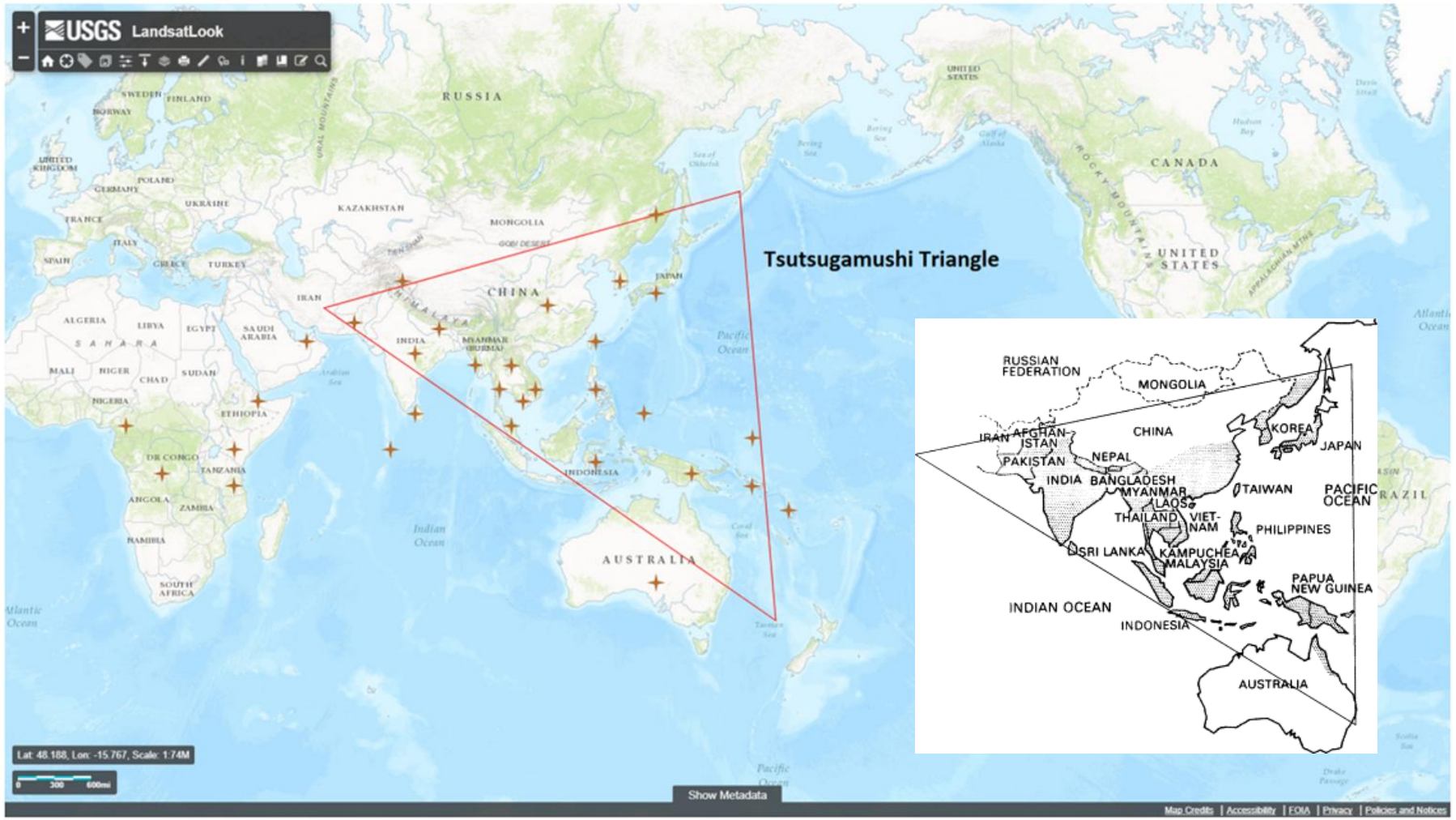


Fig 1. Worldwide map of countries with reported scrub typhus cases. The majority of scrub typhus cases occur in the "tsutsugamushi triangle" in the Asia-Pacific area. Countries with human cases are labeled with a star. [Modified from https://landsatlook.usgs.gov/viewer.html].

https://doi.org/10.1371/journal.pntd.0006062.g001

Table 22.1. Common names used for trombiculid larvae in various part of the world. Collected from numerous papers and books in the reference list. Toomey (1921) gives a long list containing many not included here

Common name	Country
Harvest mite; harvest bug; red bug; berry bug	United Kingdom
Orange tawny	Ireland
Mower's mite	United Kingdom
Aoutat; *rouget*	France
Herbstgrasmilbe; *Erntemilbe*; *Grasmilbe*	Germany
Chigger; red bug	USA
Tlalzuatl	Mexico
Bicho colorado	Panama; Argentina
Coloradillo	Mexico; Panama; Honduras
Kedani; *akamushi*	Japan
Gonone	Celebes, Indonesia
Scrub itch; ti-tree itch	Australia
Mokka	New Guinea

DOI: 10.1007/978-1-4471-1356-0_22

The Tsutsugamushi Triangle: Geographical Distribution of Scrub Typhus Caused by *Orientia tsutsugamushi.*

Mite : House dust mite (ไรฝุ่นบ้าน)

- ~20 species of house dust mites ; 3 Species for medical importance
  - *Dermatophagoides pteronyssinus* ; the most common, Worldwide esp. Europe and Asia (Most abundant in TH)
  - *D. farinae* ; the American house dust mite (also found in TH)
  - *Euroglyphus maynei* ; Worldwide in humid regions
- Live among bedclothes, mattresses, carpets and general house dust.
- Mites feed on fungi growing on floors and mattresses, discarded skin scales, and other organic debris.

SEM of dust mite
on fine woven fabric.
(https://doi.org/10.1016/j.jaip.2017.10.003)

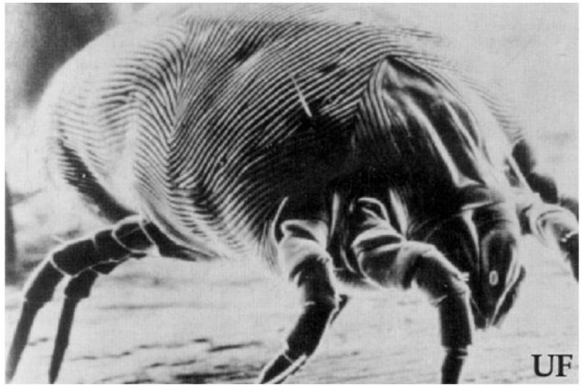
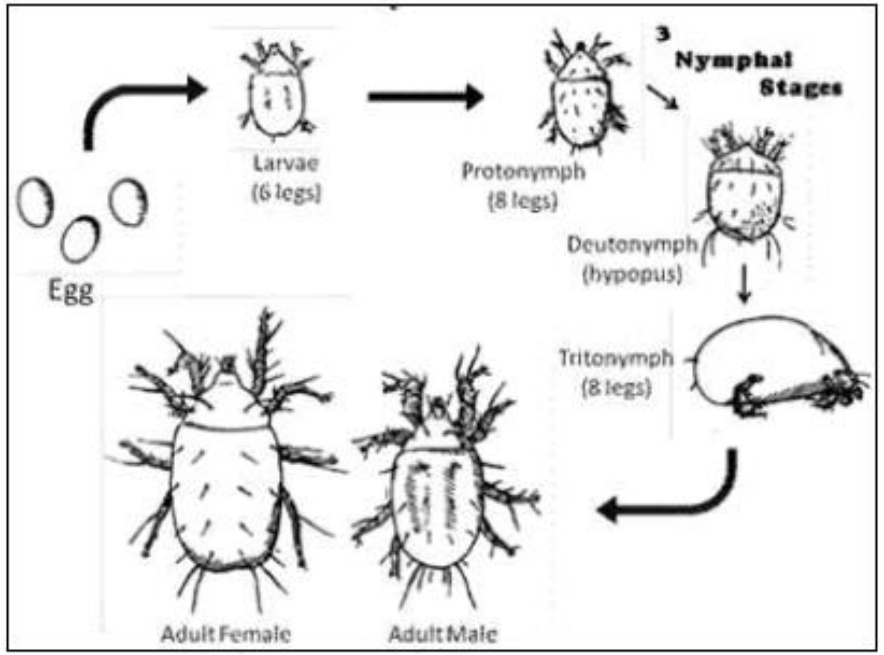


Figure 2. Scanning electron micrograph of a female house dust mite, *Dermatophagoides farinae* Hughes, approximately 2000× magnification. Photograph by G.W. Wharton.
https://entnemdept.ufl.edu/creatures/urban/house_dust_mite.htm



Vatandoost H. Biology of house dust mites as an allergens and methods for their control. J Clin Resp Med. 2022;6(1):105

- Females lay 1-3 eggs/day. Eggs hatch after 6-12 days.
- Life cycle takes 3-4 weeks, Adults live for 1-2 months
- Typically, 300 mites per/gram of house dust.
  - Under ideal breeding conditions; 5000 mites/gram dust
  - Above 100 mites/gram dust is considered a risk for allergies.
  - 500 mites/gram a major risk factor in the development of acute asthma in those allergic to house-dust mites
- HDM survival prefer: High humidity (65- 70%), 25ºC (Kenneth S, Babe,1995).

Mite : House dust mite: Medical importance

- **House dust mites (HDM; *Dermatophagoides* sp.) do not sting or bite.**
- HDM are one of the commonest **allergens** worldwide and up to 85% of asthmatics are typically HDM allergic. HDM is an important etiological factor **in allergic rhinitis, allergic asthma and atopic dermatitis.**
- The diagnosis of allergy to mites includes analysis of clinical history, skin tests (prick tests), and determination of allergen-specific IgE antibodies.

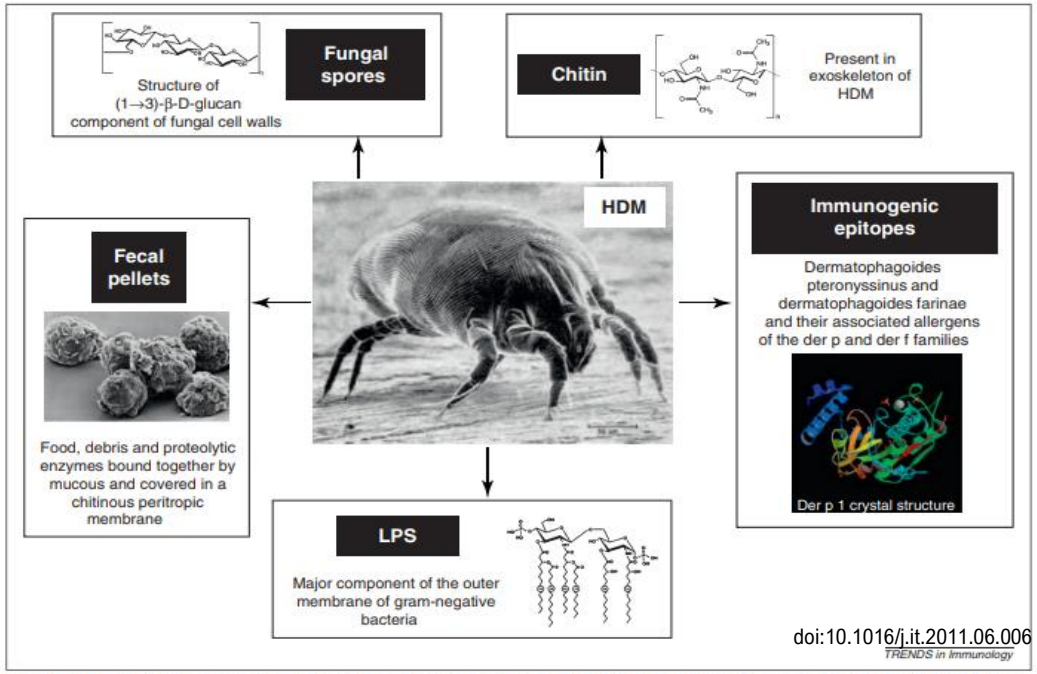


Figure 1. House dust mite allergenicity. The various components of HDM, and their associated fecal pellets and dust, which activate the immune system to initiate an inflammatory response, are illustrated.

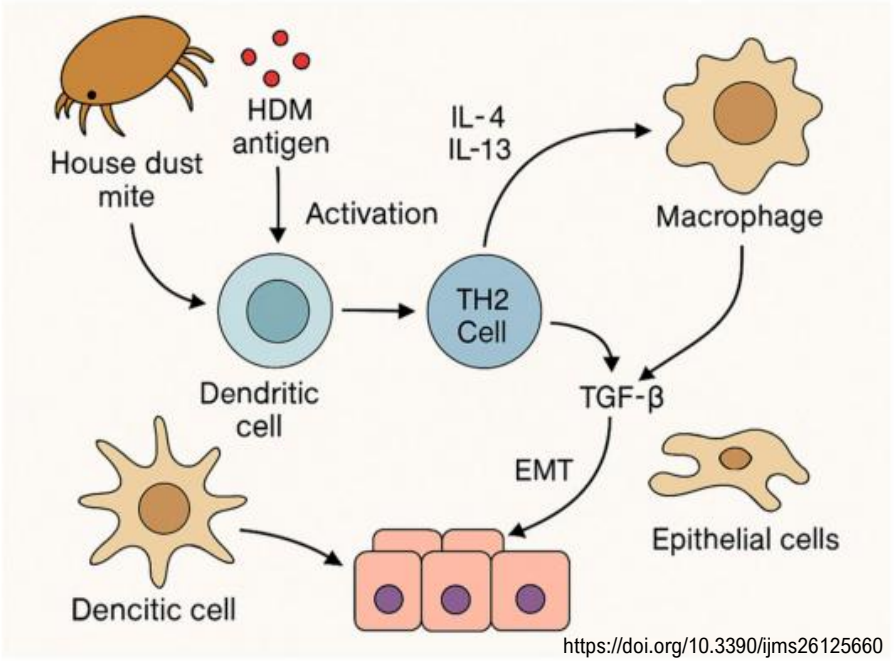


Figure 2. A diagram of Th2 response activation by house dust mite antigens involving dendritic cells, IL-4, IL-13 and TGF-β cytokines, leading to macrophage activation and EMT in epithelial cells.

Mite : House dust mite

Vol.41 No.2 April-June 2018 9

Original Article/นิพนธ์ต้นฉบับ

ความชุกของสารก่อภูมิแพ้ในอากาศจากการทดสอบภูมิแพ้ทางผิวหนัง ในคลินิกโรคภูมิแพ้ โรงพยาบาลรามาธิบดี

สุภา อ่อนแช่ม[1], มาลินี ทองดี[1], ณิชาภา เดชาปภาพิทักษ์[1], ธนัชพร กาฝากส้ม[1], ชามาศ วงค์ษา[2], วรรณดา ไล้สวน[1]

[1] ภาควิชาอายุรศาสตร์ คณะแพทยศาสตร์โรงพยาบาลรามาธิบดี มหาวิทยาลัยมหิดล

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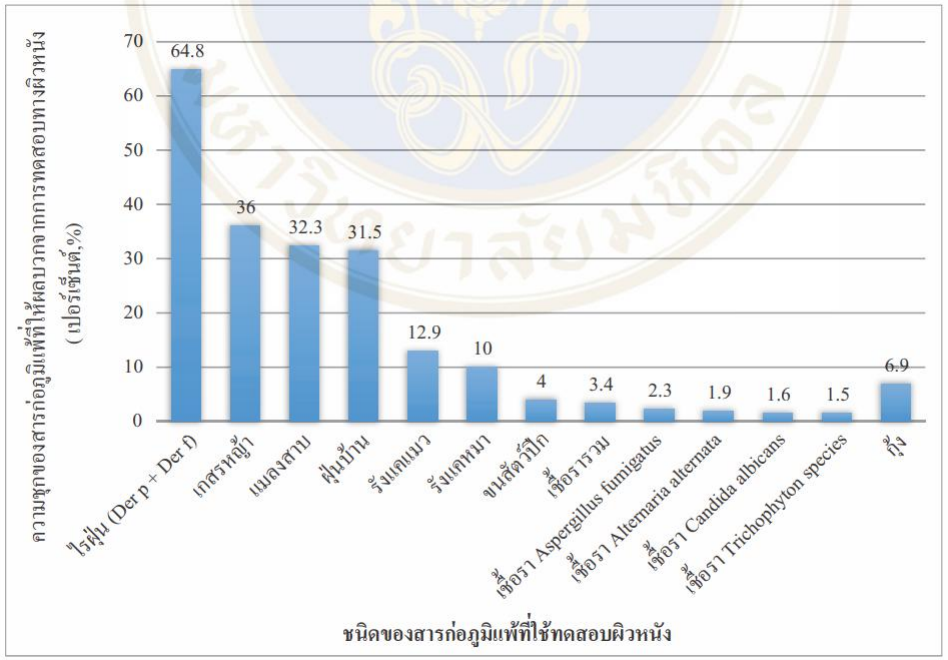


HDM is a common cause of asthma in children.

วารสารวิชาการแพทย์เขต 11 ปีที่ 36 ฉบับที่ 3 ตุลาคม - ธันวาคม 2565

Skin Prick test Reactivity to Aeroallergen among Allergic children in Suratthani Hospital

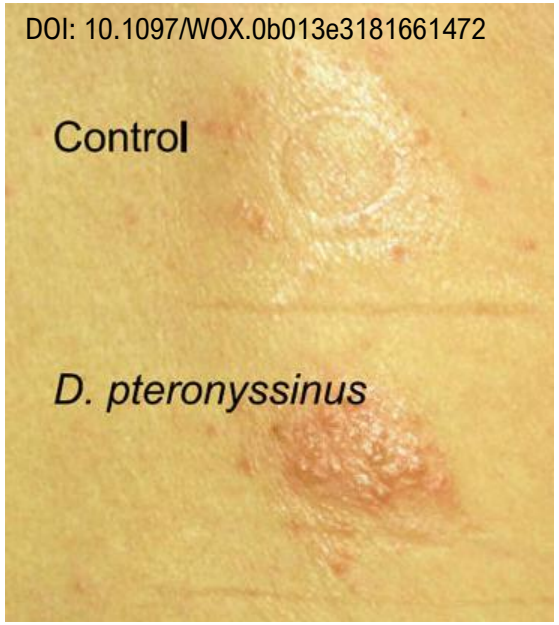
Nattiya Kitiphipat, MD.

Professional level, Pediatric Unit, Suratthani Hospital

สารก่อภูมิแพ้ในอากาศ (Aeroallergen)	ผลบวกต่อการทดสอบ
ผลการทดสอบให้ผลบวกชนิดใดชนิดหนึ่ง (Skin prick test positive at least 1 allergen)	104 (88.1%)
ไรฝุ่น House dust mite (D. pteronyssinus, D. farina)	97 (82.2%)
แมลงสาบ Cockroach (Periplaneta americana, Blattella germanica)	56 (47.5%)
ขนสัตว์ Pet dander	29 (24.6%)
- สุนัข (Dog epithelium)	16 (13.6%)
- แมว (Cat pelt)	17 (14.4%)
ละอองเกสรพืช (Pollens)	20 (16.9%)
- หญ้าพง (Johnson)	13 (11%)
- ผักโขม (Carelessweed)	7 (5.9%)
- กระถินณรงค์ (Acacia)	7 (5.9%)

Mite : House dust mite allergy

Atopic dermatitis causes itchy, dry and scaly skin rashes.

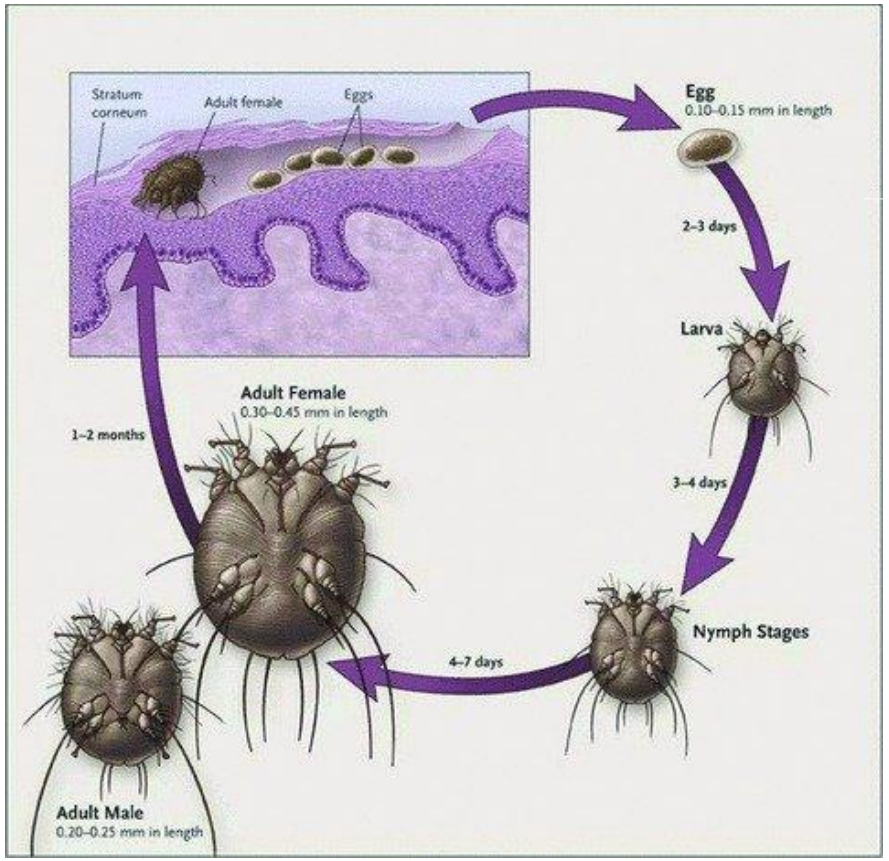


The APT
(atopy patch test)
with HDM in a patient
with atopic eczema.
Eczematous reaction
after 48 hours.

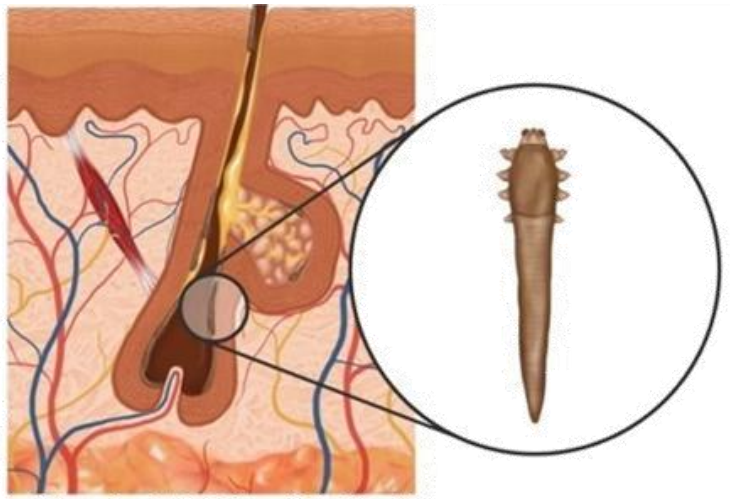
Mite : Scabies mites & Follicle mites

- Burrow in human skin

Scabies mites (หิด)

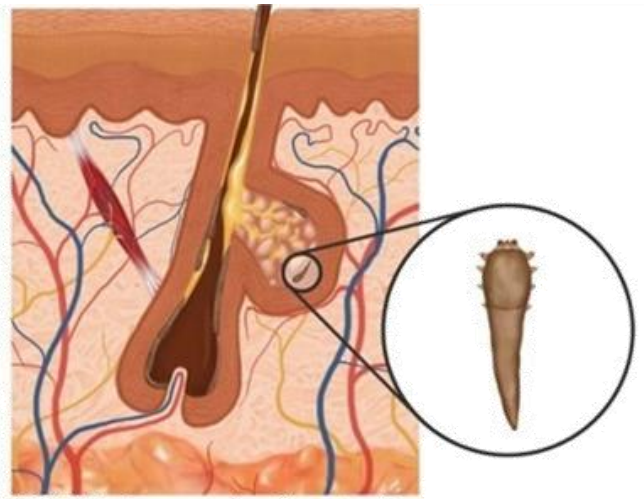


Follicle mites (ไรรูขุมขน)



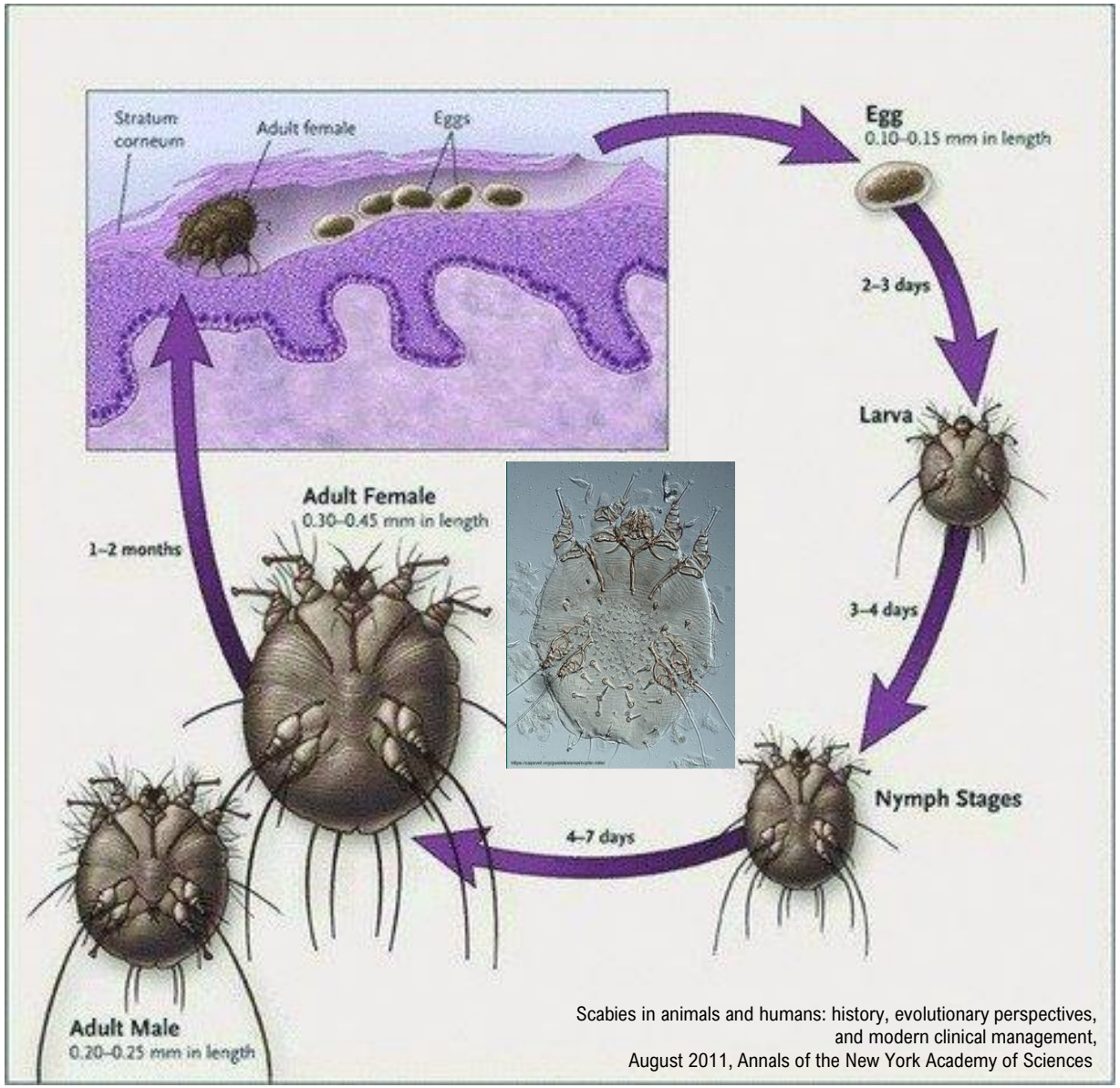
Demodex folliculorum

https://www.ungexau.com/en/more-about-mites/



Demodex brevis

Mite : Scabies mites (หิด)



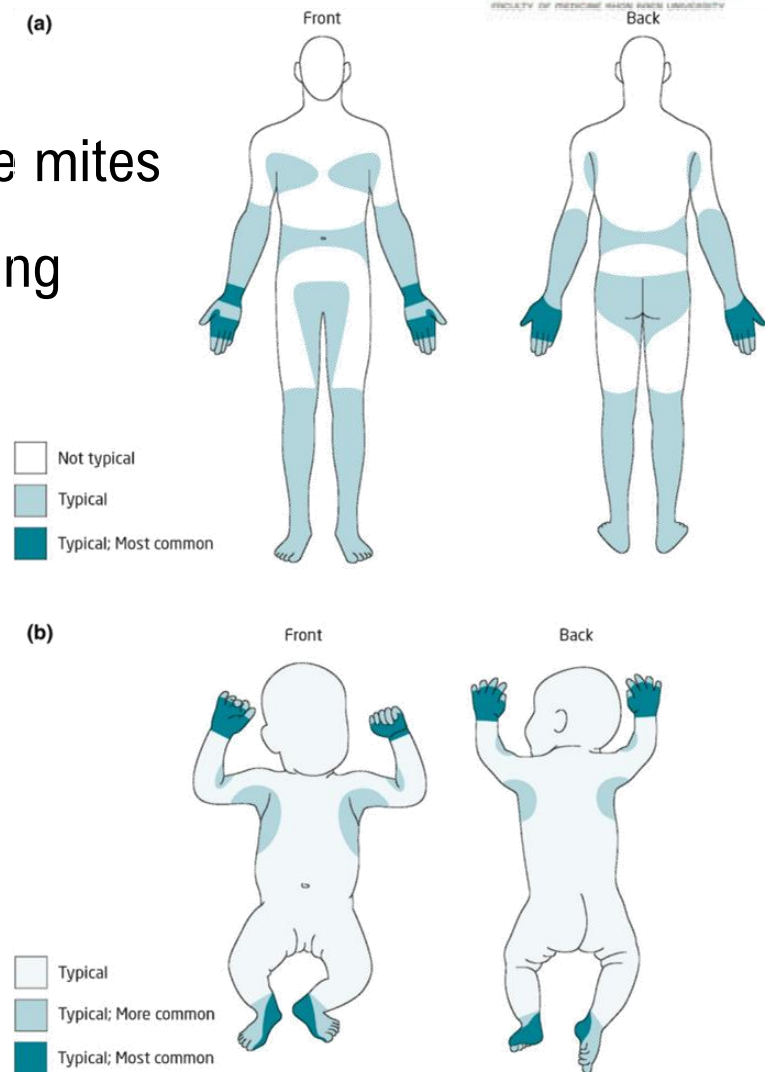
Scabies in animals and humans: history, evolutionary perspectives, and modern clinical management, August 2011, Annals of the New York Academy of Sciences

- **Human itch mite/ Mange mites/ 7-year itch mite**
- ***Sarcoptes scabiei* var. *hominis***
- **Scabies = disease caused by *S. scabei***
- Worldwide. Associated with poverty, overcrowding and poor hygiene.
- Transmit by close contact (15-20 mins of contact)
- Occasionally transmission may occur via fomites (e.g., bedding or clothing).
- WHO designated scabies as a neglected tropical disease in 2017 and have roadmap for 2021–2030.

- Female mites excavate the skin tunnel and bury herself into **epidermis** by using the mouthpart digs the surface layer of the skin.
- The mite burrow leaving **small open sores** and **linear burrows** that contain the mites and their eggs.
- Deposit 2-3 eggs per day. Egg to adult ~10–14 days.

Mite : Scabies mites: Clinical findings

- Lesion: **Burrows and papules** (found **burrow track** on the skin) where mites are located; generalized rash may occur in other areas. Crusted, scaling patches can be found.
- **Severe itching, especially at night.**
- Found on the body where the skin **is thin and wrinkled**; between the fingers, wrists, elbows, feet, penis, scrotum, buttocks and axillae.
- Severe itching --> scratch vigorously --> secondary infections such as impetigo, eczema, pustules, and boils
- **Immunocompromised** --> develop more serious scabies
  = **Norwegian scabies** or **Crusted scabies** or **Scabies crustosa** (hyperkeratotic and vesicles over the skin)

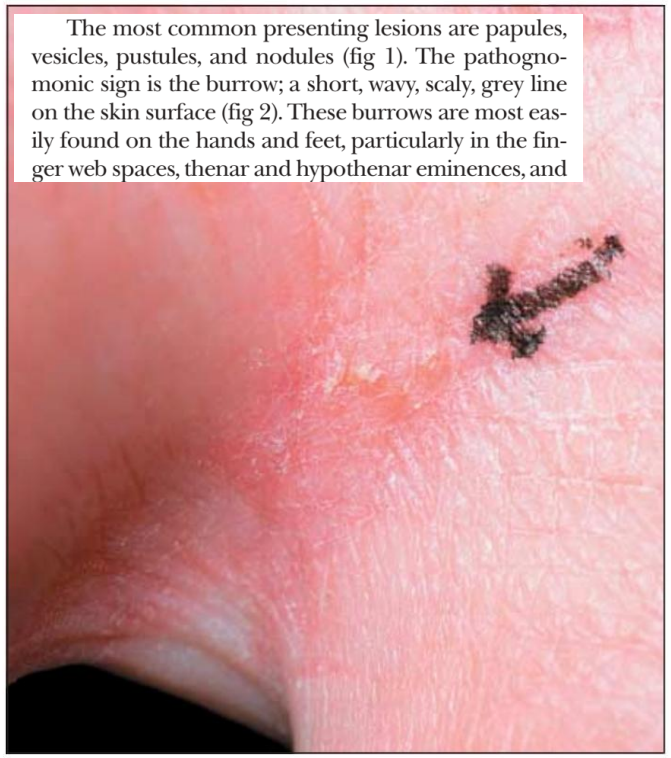


Typical distribution of scabies lesions.
(a) Children aged > 2 years and adults.
(b) Infants aged < 2 years.
doi: 10.1111/bjd.18943.

Mite : Scabies mites: Clinical findings

- **The pathognomonic sign** is the burrow; a short, wavy, scaly, grayish-white line, and 1-10 mm in length on the skin surface.

Fig 1 Childhood scabies, showing multiple pruritic papules, vesicles, and pustules. The burrows are arrowed



The most common presenting lesions are papules, vesicles, pustules, and nodules (fig 1). The pathognomonic sign is the burrow; a short, wavy, scaly, grey line on the skin surface (fig 2). These burrows are most easily found on the hands and feet, particularly in the finger web spaces, thenar and hypothenar eminences, and

Fig 2 Scabies burrow in web space between fingers

▲ **FIGURE 208-2** Scabies. Several, slightly scaling, thread-like burrows are seen on the lateral aspect of the palm, associated with a more generalized eczematous process.

Tract burrow

Fitzpatrick Dermatology in general medicine, 7th ed

Mite : Scabies mites: Norwegian scabies (Crusted scabies)

Norwegian scabies
Hiroki Matsuura, Akemi Senoo, Mari Saito, Yuko Fujimoto
Cleveland Clinic Journal of Medicine Mar 2019, 86 (3) 163-164

▲ **FIGURE 208-4** Crusted scabies. Hyperkeratotic plaques populated with thousands of mites.

Figure 1. Clinical presentation: (**a**) Hyperkeratosis with dry crusts on arms, hands and legs; (**b**) erythematous rash causing intense pruritus; (**c**,**d**) nail involvement (onychogryphosis).

https://doi.org/10.3390/diagnostics15060680

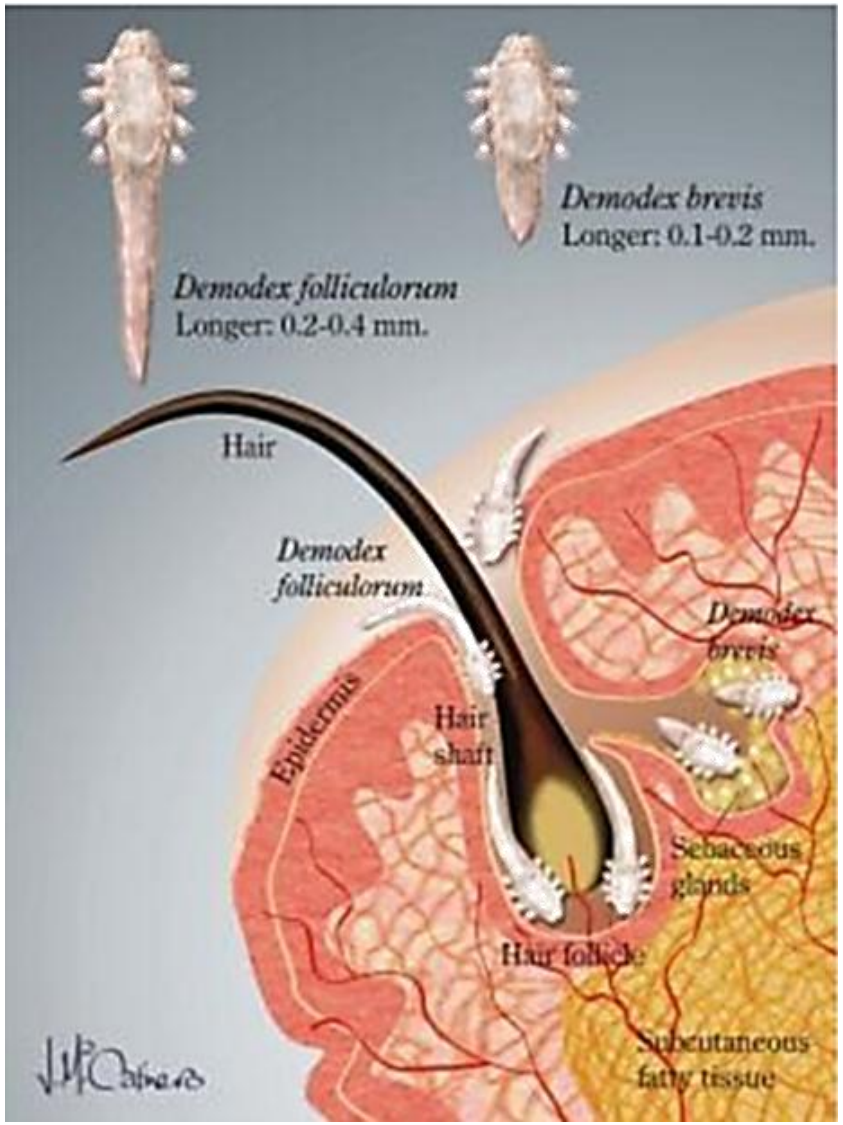
Usually occurs in patients with impaired cell-mediated immunity such as HIV/AIDS, diabetes mellitus, organ transplant, and those receiving systemic or topical corticosteroids.

Mite : Scabies : Treatment

- Topical scabicides
  - **5% permethrin cream,** 10% crotamiton cream, 25% benzyl benzoate lotion, Sulfur (5%-10%) ointment, 1% lindane lotion, **Ivermectin (oral)**(Norwegian scabies)
- Steroid cream: reduce itch and inflammation
- **Post-scabietic pruritus** due to the response to dead mites (Johnston, 2005).
- Itching can persist for up to six weeks as the eczematous reaction settles down.
- Individuals in close contact with the infected person should be treated with scabicide.
- Fomites, bed sheets, pillowcases, towel, clothes should be washed and dried in hot cycle.

Mite : Follicle mites: *Demodex* spp. (ไรรูขุมขน)

- Two species of *Demodex* commonly infect humans
- ***D. folliculorum*** ; hair follicles and eyelash hair follicles
- ***D. brevis*** ; the sebaceous glands of hairs and eyelashes
- The entire life cycle of *Demodex* is spent on their human host.
- Feed on subcutaneous tissues, especially sebum
- Commonly found on the forehead, nose, eyelids, cheeks

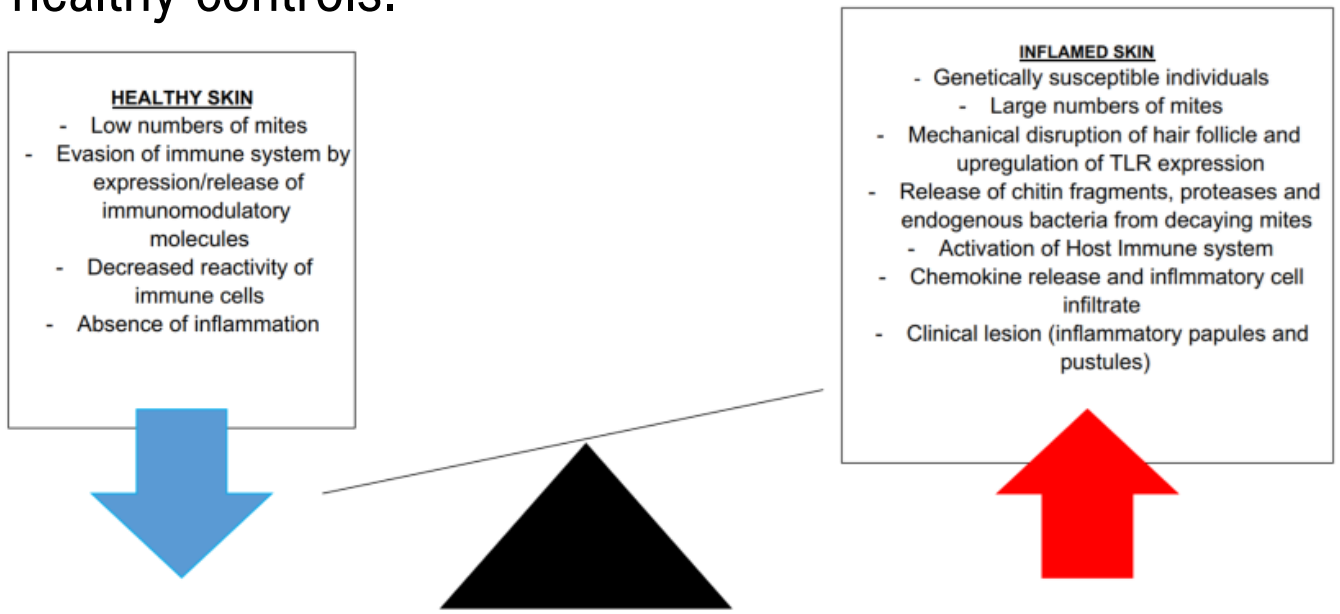


The ocular surface / july 2015, vol. 13 no. 3 /Juan Murube

Mite : Follicle mites: Clinical findings

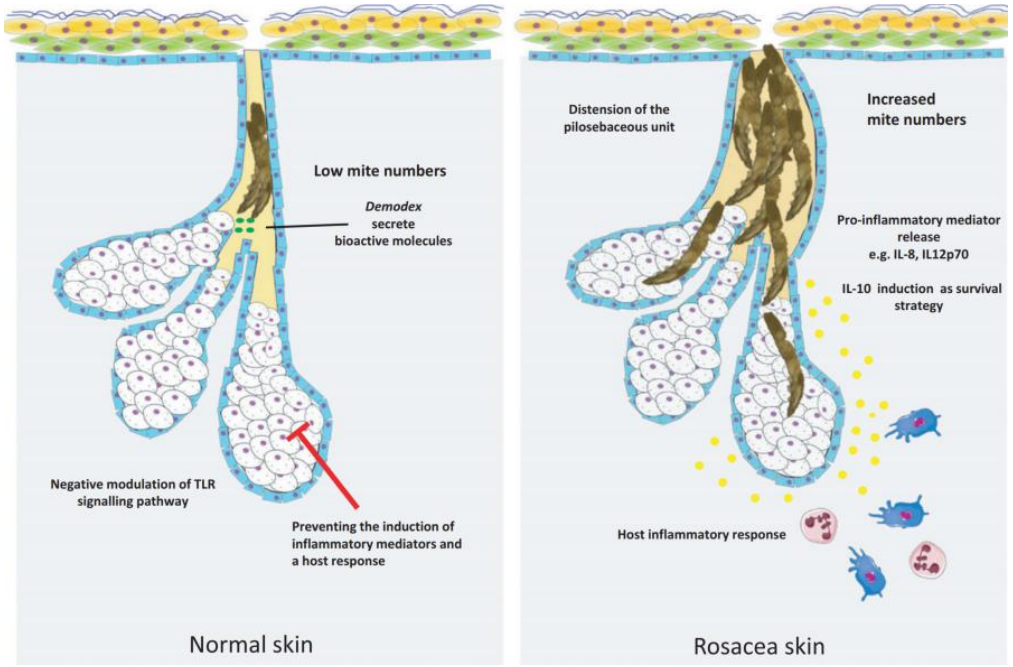
- *Demodex* mites are part of the normal adult human facial skin flora.
- Only under circumstances (weakened immune system, host's body chemistry)

  => cause clinical problems : **Demodicosis**
- The *Demodex* mite population is markedly increased in patients with rosacea compared with healthy controls.



Postulated interaction of *Demodex* mites with the host immune system in healthy versus inflamed skin.

DOI 10.1111/bjd.16540



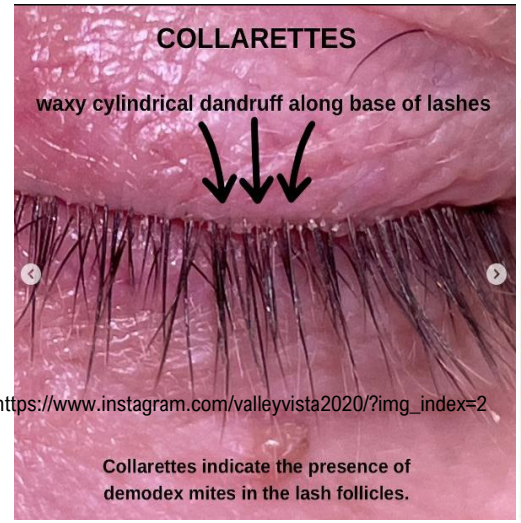
DOI 10.1016/j.clindermatol.2016.10.014

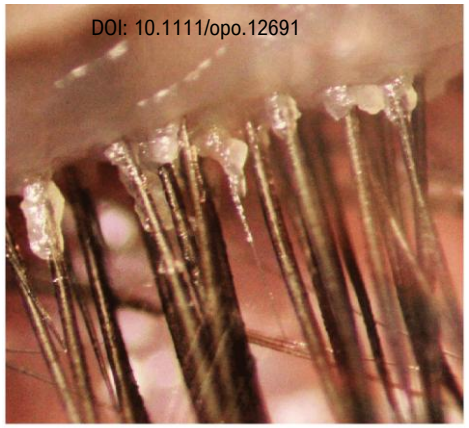
Mite : Follicle mites: Clinical findings

- The patient present with a dry, rough, fine scaly skin on the cheeks, forehead and chin.
- ***D. folliculorum*** mostly found on face, rosacea-like skin lesions (pityriasis folliculorum) (red papules, scales, tiny pustules), irritation and burning sensation.
- **Ocular demodicosis**, is an inflammation of the hair follicles of the eyelids.
- The association between *Demodex* infestation and blepharitis was statistically significant. In blepharitis patients => more than 50% found Demodex. (Zhao, Y. E, 2012, https://doi.org/10.3109/09286586.2011.642052)

Mite : Follicle mites: Clinical findings

Rosacea-like demodicidosis, Larios, George et al.
The Lancet Infectious Diseases, Volume 8, Issue 12, 804





Collarettes, the pathognomonic sign of *D.* blepharitis, can be readily identified at the base of the upper lash margin on downward gaze at the slit lamp.

Fig. 1. A 25-year old man with papulopustular rosacea and extensive demodicosis involving the entire head. (A, C) Papulopustular rosacea on the face; (B) typical cylindrical dandruff at the base of the eyelashes (*black arrows*); (B, D) visible pityriasis folliculorum (*blue arrows*) on the upper left eyelid and on the pre-auricular zone; (D) papulopustular rosacea involving the left ear lobe. He also had dandruff on the scalp.

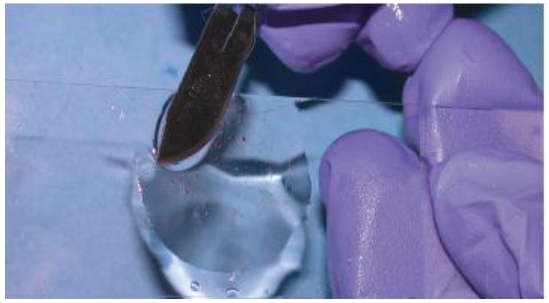
Acta Derm Venereol 2019; 99: 47–52.

Mite : Follicle mites: Treatment

- In most cases demodicosis **does not** require treatment with medication.
- Home treatments
  - Wash the hair and eyelashes
  - Clean the face twice daily
  - Avoid oily makeup and facial creams
- Medication treatment
  - Topical insecticides; permethrin cream
  - Oral medication; ivermectin
  - Mercury oxide 1% ointment (for blepharitis)
  - Topical antibiotics

Mite : Scabies mites & Follicle mites : Diagnosis

- Microscopic examination
  - **Skin scraping (oil preparation)**
  - Scotch tape
  - Dermatoscopy
  - Standardized skin surface biopsy (SSSB) for *Demodex spp.*
  - Blepharitis; Slit lamp examination



https://youtu.be/kuXEyo7zUbo
https://cdn.sanity.io/files/0vv8moc6/dvm360/7ee11c3de72207455b14ea37b600c3a13c276457.pdf

Summary of the 2020 International Alliance for the Control of Scabies Consensus Criteria for the Diagnosis of Scabies

A. Confirmed scabies

At least one of:

A1: Mites, eggs or faeces on light microscopy of skin samples

A2: Mites, eggs or faeces visualized on an individual using a high-powered imaging device

A3: Mite visualized on an individual using dermoscopy

B. Clinical scabies

At least one of:

B1: Scabies burrows

B2: Typical lesions affecting male genitalia

B3: Typical lesions in a typical distribution and two history features

C. Suspected scabies

One of:

C1: Typical lesions in a typical distribution and one history feature

C2: Atypical lesions or atypical distribution and two history features

History features

H1: Itch

H2: Positive contact history

doi: 10.1111/bjd.18943.

Open in a new tab

Diagnosis can be made at one of the three levels (A, B or C). A diagnosis of clinical or suspected scabies should only be made if other differential diagnoses are considered less likely than scabies.

Mite : Scabies mites & Follicle mites : Diagnosis

- **Microscopic examination**

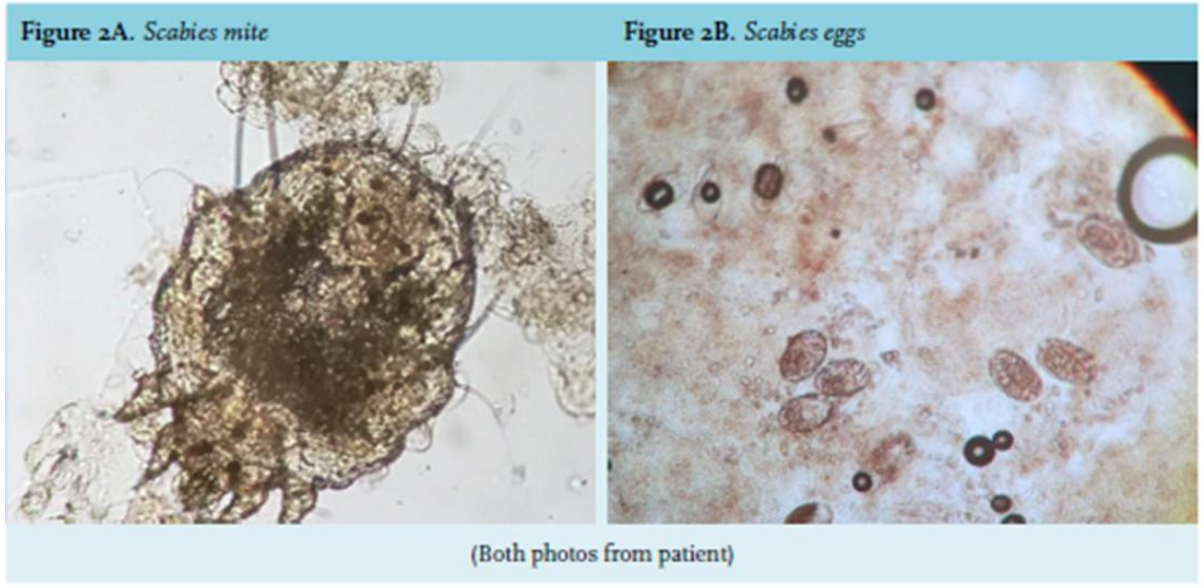


Photo: The Netherlands Journal of Medicine, MAY 2019, VOL. 77, NO. 04

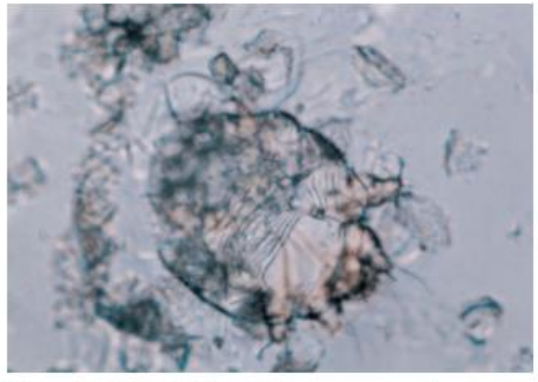
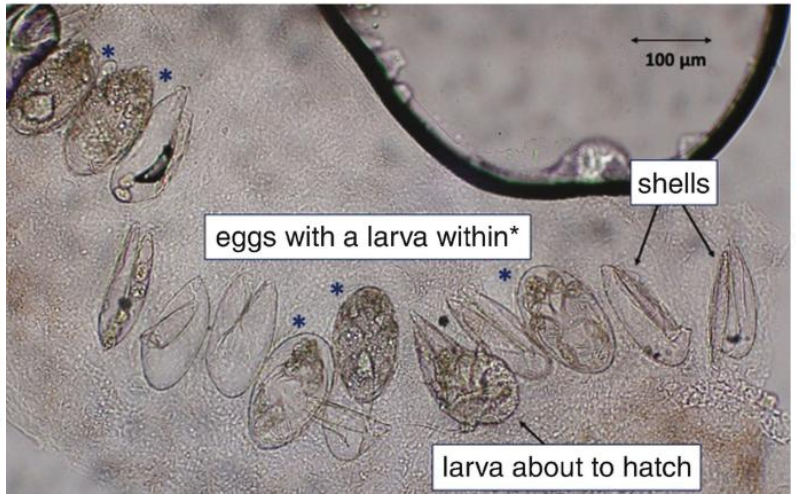


Figure 2. View of a live moving sarcoptes scabies mite with striated structure, weak red in color, on the adhesive tape. (×400)



https://doi.org/10.1007/978-3-031-26070-4_2

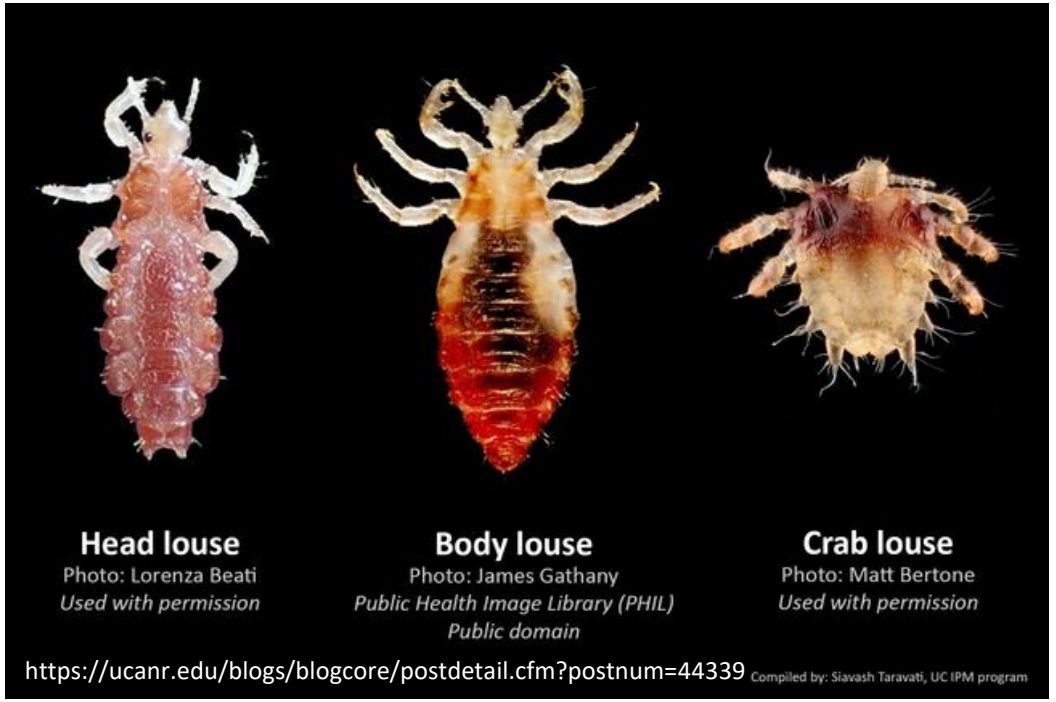
Demodex species mites and nymphs (10X).

2) Specific of arthropod bites/infestations

2.2 Insect : lice, bugs, flea, fly, mosquitoes

Lice (เหาและโลน)

- Order : Anoplura
- Family : Pediculidae
- Genus : *Pediculus / Phthirus*
  - ***Pediculus humanus* var. *capitis* (Head louse)**
  - ***Pediculus humanus* var. *corporis* (Body louse)**
  - ***Phthirus pubis* (Crab louse or Pubic louse)**



https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=44339 Compiled by: Siavash Taravati, UC IPM program

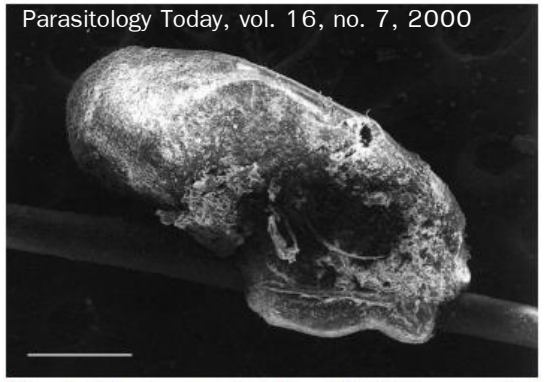
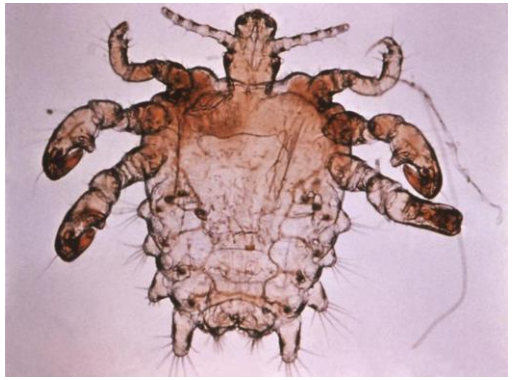


Fig. 1. Photograph of a 10 000-year-old louse egg attached to a strand of human hair. Scale bar ≈ 0.26 mm.



https://www.mdpi.com/1660-4601/6/2/592

Louse (plural: lice)
var. = variety

Lice

LAB

Head louse vs Crab louse

Narrow thorax

6 segments of abdomen

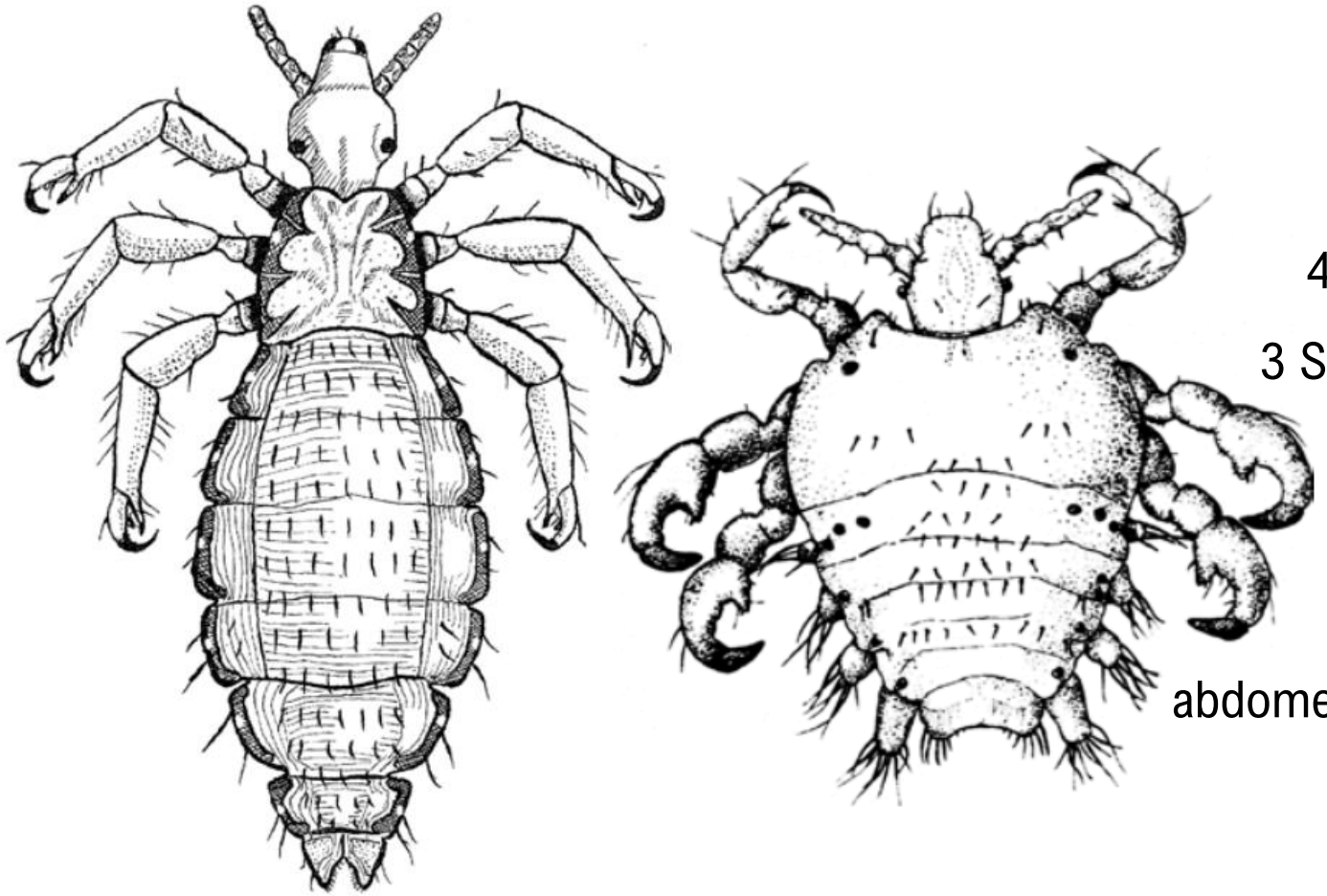
1 Spiracle each abdomen

Size of all legs are similar

Without lateral process

Abdomen elongate

Size 2-4 mm.



Wide thorax

4 segments of abdomen

3 Spiracles at 1st abdomen

Forelegs; smaller

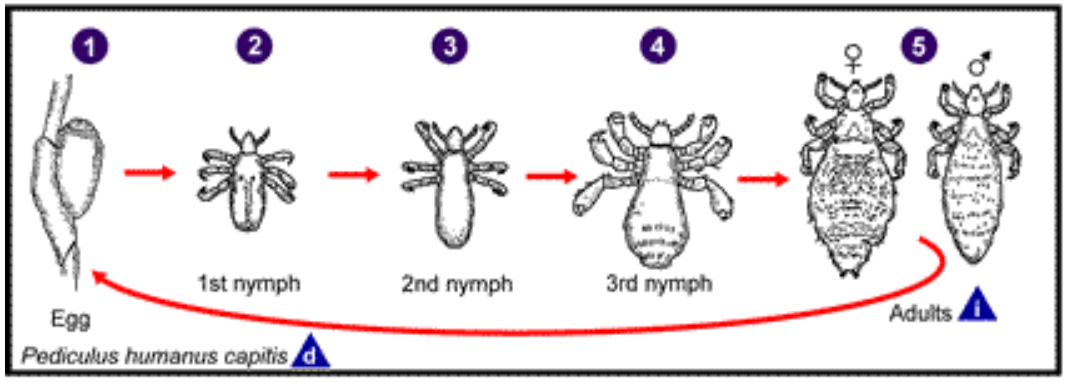
Other legs; bigger

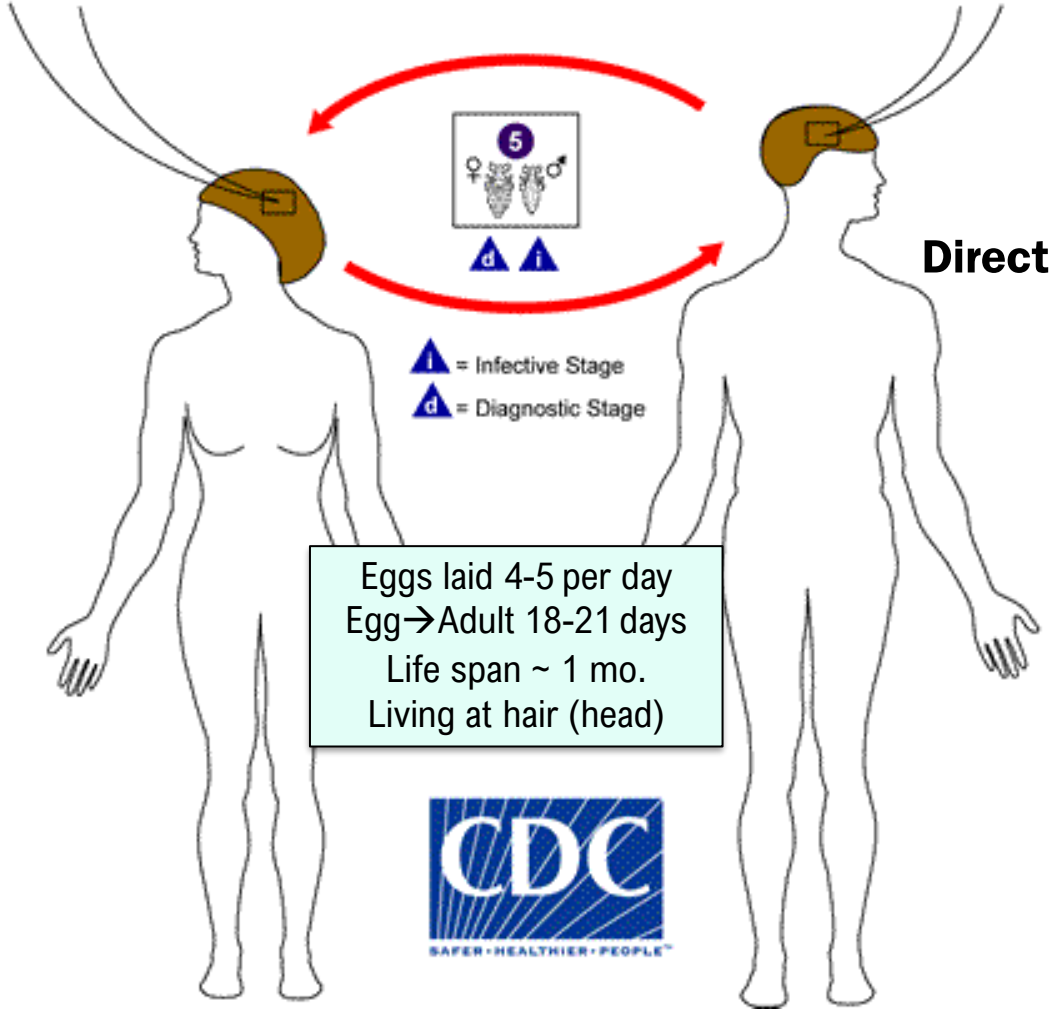
With lateral process

abdomen very short and broad

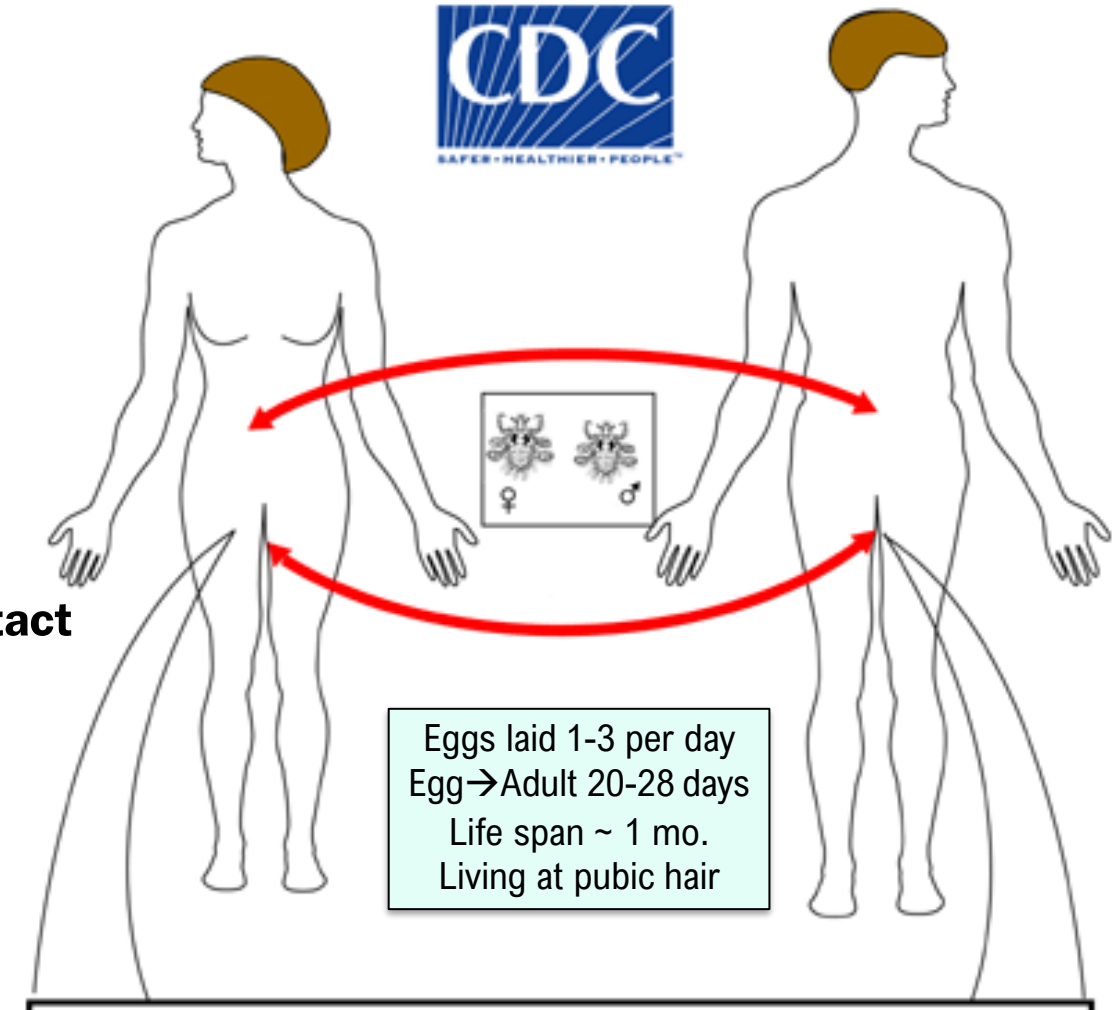
Size 1.5-2 mm.

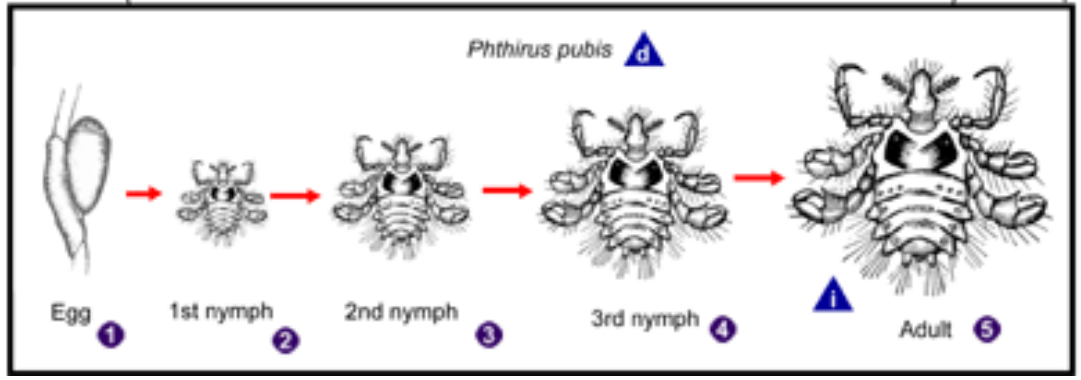
Medical entomology for students, 5th ed., Mike Service





Direct contact





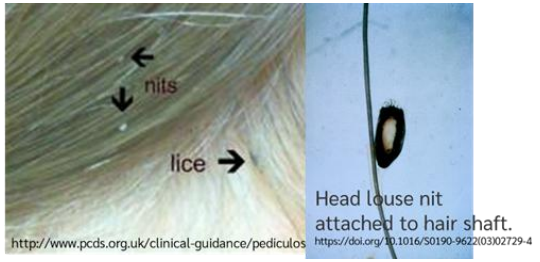
Lice : Medical importance

Pediculus humanus var. *capitis*	*Pediculus humanus* var. *corporis*	*Phthirus pubis*

• Head louse
• **Pediculosis capitis**
• Found worldwide
• High incidence in
  • Crowded condition
  • Children aged 3-12 yrs, Girls > boys
  •47% in Thailand, 57% in KK (Rassami et al., 2012, Pinlaor 2013)
	• Body louse
	• **Pediculosis corporis**
	• **Vagabond's syndrome**
	• Disease of poverty; homeless, crowded unsanitary conditions
	• Vector of
	  Louse-borne relapsing fever (*Borrelia recurrentis*),
	  Epidemic typhus (*Rickettsia prowazekii*),
	  Trench fever and endocarditis (*Bartonella quintana*)
		• Crab louse
		• **Phthiriasis, Pediculosis pubis**
		• Transmission through sexual intercourse
		• Incidence is slightly higher in men than female.
		• Most frequently seen in the 15-40 age group secondary to increased promiscuous sexual activity.

Lice : Pediculosis capitis: Clinical findings

- **Pruritus**
- Tiny hemorrhagic crust at the site to indicate the louse has taken its blood meal.
- Head lice bites may be pustular in appearance.
- Most often found at occipital and retroauricular regions.
- Itchy scalp, often secondarily infected as lesions of impetigo contagiosa.



https://skinsight.com/skin-conditions/pediculosis-capitis-head-lice/child/

Lice : Pediculosis corporis: Clinical findings

- Pruritus is the most common complaint.
- The direct effect of body lice feeding is **intense irritation**, probably due to proteins in their saliva. This leads to widespread **excoriation.**
- The usual clinical presentation for body lice are **pyoderma, erythematous macules, wheals**
- In chronic infestation, frequently bitten areas of the skin can develop notable thickening, darkly pigmented and discoloration, a condition known as **vagabond's disease."**
- Unlike head and pubic lice, infestation with body lice is typically diagnosed by finding eggs and lice in seams of clothing rather than on the skin.

https://www.ncbi.nlm.nih.gov/books/NBK482148/
https://cdn.mdedge.com/files/s3fs-public/Nyers%20lice%20CT105003118.PDF

Lice : Phthiriasis or Pediculosis pubis: Clinical findings

- Sexually transmitted disease
- Lice at **pubic or perianal areas** and **rarely on eyelashes, eyebrows**, or other coarse-haired areas.
- **Maculae caeruleae** (sky-blue, grey-blue macules)
- **Pruritus**

The NEW ENGLAND JOURNAL of MEDICINE

2,668 likes

nejm A 59-year-old man presented to the dermatology department with a 4-week history of severe itching in his pubic region. On physical exam, small, brown nits and mobile, crab-shaped lice were seen attached to the shafts and bases, respectively, of pubic hairs. View the full case and video at the link in our bio.

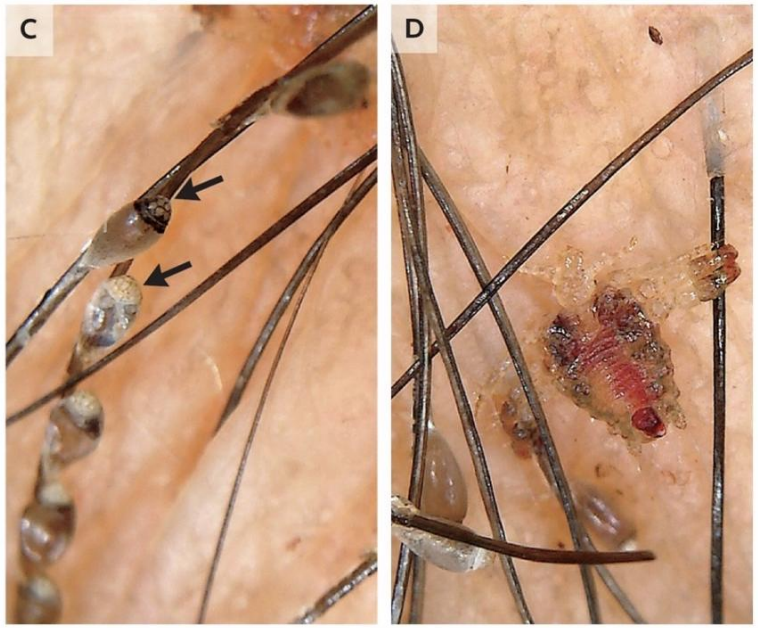
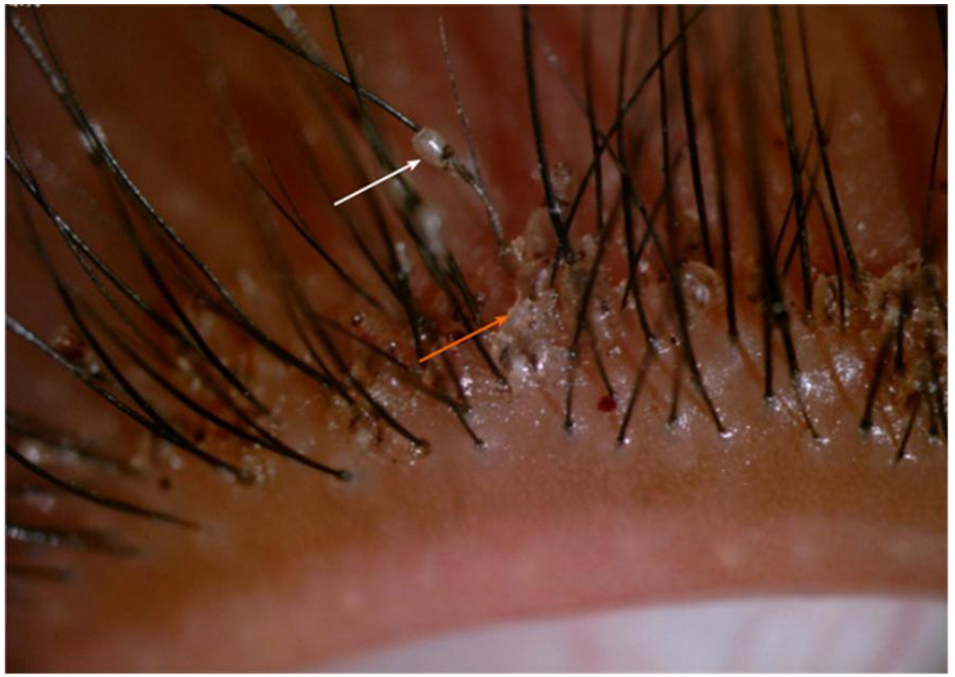
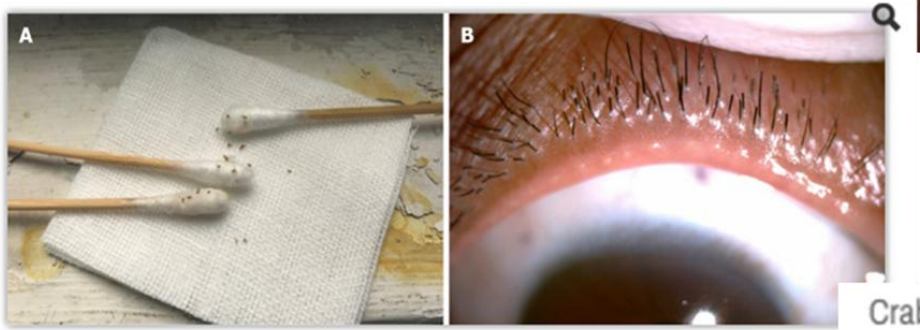


Figure 2. *Phthirus pubis* motionless, hooked onto the hair shafts. Dark-red fecal granules can be seen on the skin.

DOI: 10.1056/NEJMicm2303713

Lice : Phthiriasis or Pediculosis pubis: Clinical findings





Photos of parasites and empty shells on the patient's right eyelashes and adjacent eyelids. Empty shells are denoted by white arrow; Parasites are denoted by orange arrow.

Crab lice infestation in unilateral eyelashes and adjacent eyelids: A case report

World J Clin Cases. 2021 Nov 26; 9(33): 10323–10327.

Open in a separate window

Some of crab lice taken from the patient and recovered eyelashes and eyelids. A: Twenty crab lice removed on cotton swabs and gauze and 6 were subjected to examination under a light microscope; B: Cleared eyelashes (regrowth) and adjacent eyelids at 2-wk after treatment.

Lice

สุดสะพรึง! ชายพบ'โลน' แมลงตัวจิ๋ว คล้ายเหา เต็มขนน้องชาย หลังไปแช่น้ำพุร้อน

Khaosod
อัพเดต 6 ชั่วโมงที่ผ่านมา · เผยแพร่ 6 ชั่วโมงที่ผ่านมา

ติดตาม

สุดสะพรึง! ชายไต้หวันพบ'โลน' แมลงตัวจิ๋วคล้ายเหา เต็มขนน้องชาย หลังไปแช่บ่อน้ำพุร้อน คันไม่ไหว แถมเมียเกือบจะหย่า เพราะติดเชื้อไปด้วย

ระบาดหนัก! เด็กนักเรียนเป็นเหาพรึบ ครูทำสมุนไพร รักษากันเอง

Lice: Diagnosis and treatment

- **Diagnosis**
  - Visualizing adult lice, nymphs, or viable nits on the area of infestation
  - Body lice; more commonly within inner clothing seams
- **Treatment**
  - Chemical treatment and natural product
  - Topical Permethrin, Malathion, Lindane shampoo 1%
  - Oral ivermectin
  - Personal hygiene

Bugs (Bed bugs & Triatomine bugs)

- Order Hemiptera (insects with piercing-sucking mouthparts)
  - Suborder Heteroptera (true bugs) (hemelytra wings)

    true bugs comprises ~ 45,000 species in ~88 families

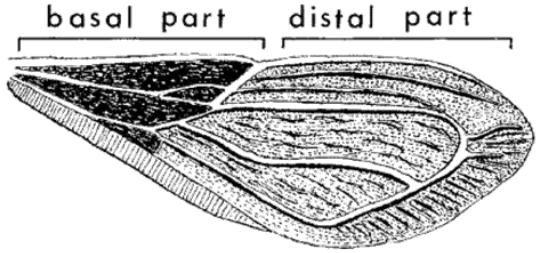


Figure 14.3 Fore-wing (hemelytron) of a triatomine bug, showing thickened basal part and more membranous distal part.
Medical entomology for students, 5th ed., Mike Service

- Family Cimicidae **Bed bug** (เรือด)
- Family Reduviidae **Triatomine bug** (มวน)

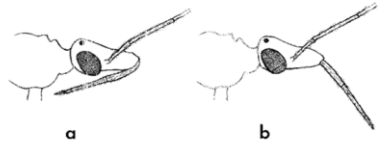
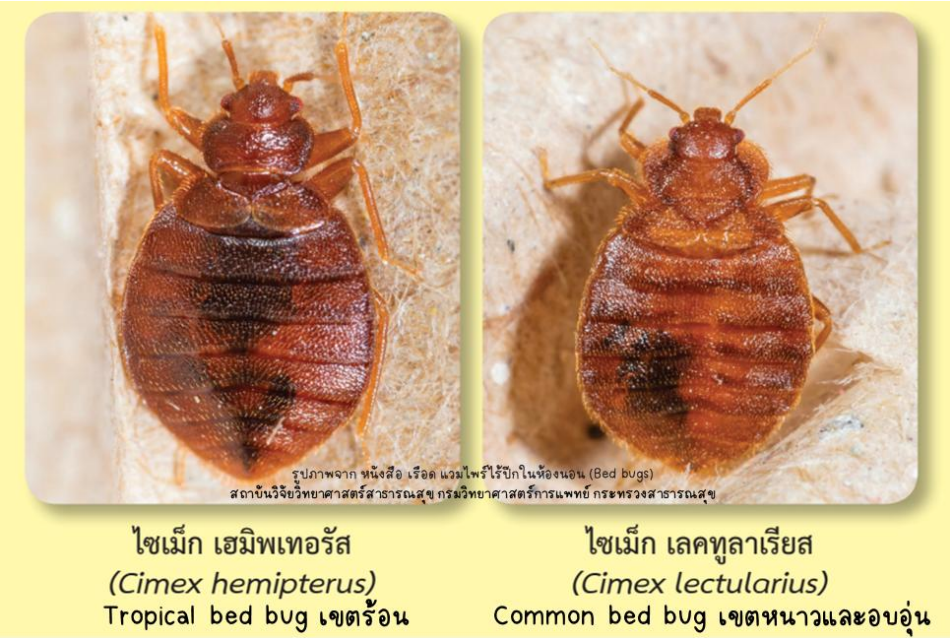


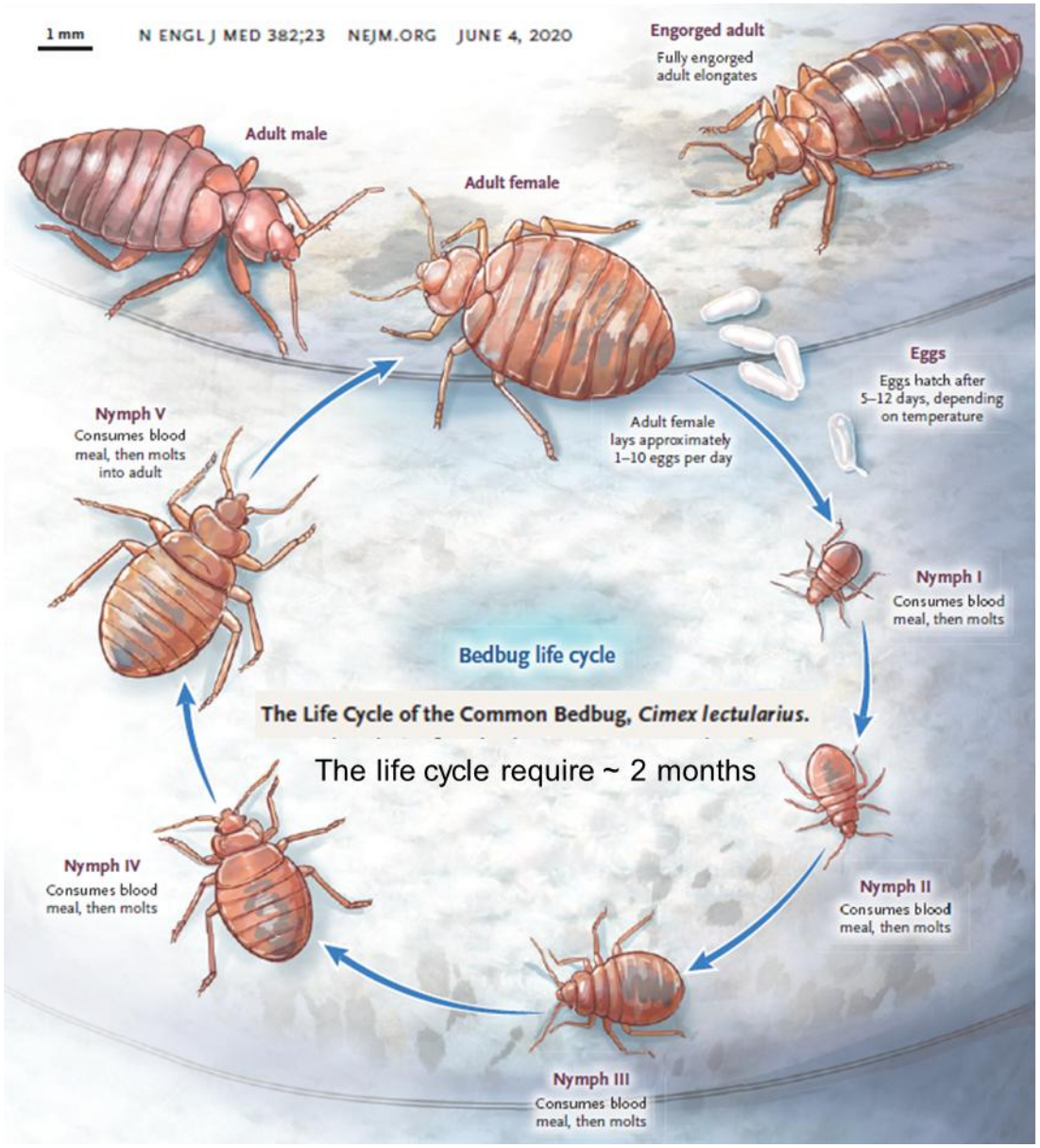
Figure 14.2 Lateral views of the head of a *Triatoma* species: (a) proboscis closely appressed to ventral side of the head; (b) proboscis swung forward in a blood-feeding position.

Bugs: Bed bugs (เรือด)



- Size 4-6 mm., Oval-shaped, Red-brown color, Pad-like wings, Dorso-ventrally flattened
- Adult lives in a sheltered location (mattress seams, crevices in box springs, spaces under baseboards, etc).

Bugs: Bed bugs

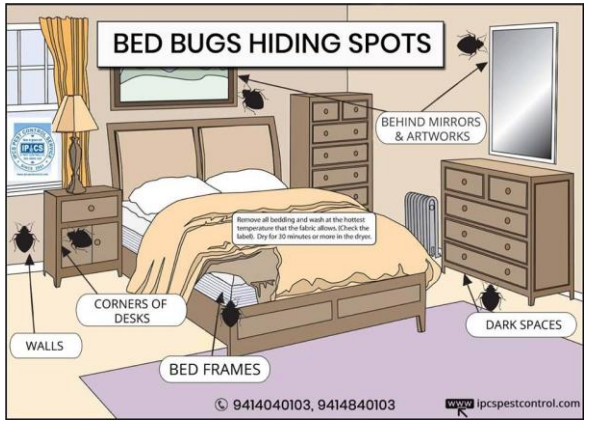


- Bed bugs are nocturnal, blood-feeding insects.
- Blood meals are necessary for growth, molting, and reproduction
- Bed bug eggs are sticky (contain a glue-like substance) so they can firmly attach to cracks and crevices, keeping them safe and hidden until they hatch.

Dark spots on mattress and box spring are a telltale sign of bed bugs, occasionally accompanied by reddish smears or stains.

Bed Bugs By Michael F. Potter, Extension Entomologist, University of Kentucky

Bed bugs can be introduced on backpacks, luggage, and other belongings.



Travel > News & Advice

British Airways apologises after passengers left 'covered' in bedbug bites

The airline has apologised and upgraded the passengers on the return journey

Julia Buckley • Friday 20 October 2017 09:49 • Comments

News > World > Europe

France launches bedbug hotline after insects make resurgence

Rise in infestations is caused by international travel and bugs' resistance to insecticides

Rory Sullivan • Sunday 23 February 2020 01:23 • Comments

https://www.independent.co.uk/news/world/europe/france-bedbug-hotline-insects-infestation-a9352696.html

Athens-Clarke library remains closed through Saturday for bed bug extermination

Wayne Ford Athens Banner-Herald

Published 11:17 a.m. ET Oct. 3, 2022 | Updated 5:55 p.m. ET Oct. 4, 2022

View Comments

Photos: The Friends of Athens-Clarke County Library Book Sale

The Book Sale is open to the public Thursday through Saturday.

The Athens-Clarke County Library announced late Monday that the library will remain closed through Saturday after bed bugs were discovered last Thursday on a

MGR Online

เพจดังห่วง! นักท่องเที่ยวชาวไทยเผยพิกัดรายงานพบตัวเรือดในโรงแรมทั่วทั้งญี่ปุ่น

เพจ "Outwander" ได้ออกมาโพสต์เตือนนักท่องเที่ยวชาวไทยที่ตั้งใจไปเที่ยวญี่ปุ่น ระวังหลังพบการระบาดของตัวเรือด โดยออกมาเผยพิกัดรายงานพบตัวเรือดในโรงแรมทั่วทั้งญี่ปุ่น.

Mar 19, 2567 BE

CNN travel Destinations Food & Drink News Stay Video

South Korea declares war on bedbugs after surge in reported cases

By Yoonjung Seo, CNN

5 minute read · Updated 2:01 AM EST, Thu November 9, 2023

The Seoul City Government is committed to preventing bedbug infestations in facilities such as subways and cinemas, which are frequently used by citizens. Seoul City Government

NHK WORLD-JAPAN · Follow

December 12, 2023 ·

Insecticide-resistant bedbugs have swept France and South Korea, and one expert warns they may be headed for Japan next.

WWW3.NHK.OR.JP

South Korea's bedbug outbreak raises fears in Japan | NHK WORLD-JAPAN News

Insecticide-resistant bedbugs have swept France and South Korea, and one expert warns they ...

Bugs: Bed bugs: Medical importance

Clin Infect Dis, Volume 52, Issue 2, 15 January 2011, Pages 200–210, https://doi.org/10.1093/cid/ciq102

Presentation of bedbug bites:
The typical skin lesion is a pruritic erythematous

(A) **maculopapule** that is 5 mm to 2 cm in diameter with **a central hemorrhagic crust or vesicle** at the bite site, similar to other arthropod bites.

(B) A series of bites in a line is characteristic of bedbug bites.

(C) Lesion numbers range from a few to numerous, depending on habitat-infestation intensity, and are preferentially located in unclothed zones.

(D) In some cases, the eruption mimics **urticaria.**

Some patients experience more serious cutaneous reactions : pruritic wheals around a central punctum, papular urticaria, and diffuse urticaria at bite sites usually **noted on arising in the morning**. Bullous lesions may occur upon subsequent biting events days later

Bugs: Bed bugs: Medical importance


Photo courtesy : Dr.Harold Harlan

Treatment

- Cutaneous symptoms are frequently self-limiting and typically resolve within 1 to 2 weeks.
- Topical glucocorticoids (e.g., hydrocortisone [1%] once or twice a day for up to 7 days) and antihistamine medications may help for highly pruritic lesions.

To date, there is **no epidemiological evidence** to incriminate human bed bugs as vectors of pathogens. However, from experimental models shown that bed bugs can acquire, maintain, and transmit microorganisms and more 50 pathogenic microorganisms have been detected in bed bugs (e.g. Hepatitis B, *Leishmania donovani*). (Insects 2023, 14(4), 392)

Bugs: Triatomine bugs, Cone nose bug, Kissing bug (มวน)

- The conenoses, referring to the shape of the anterior part of the head.

  The region in front of the eyes is cylindrical to conical.

- “Assassinate” or kill other insects.

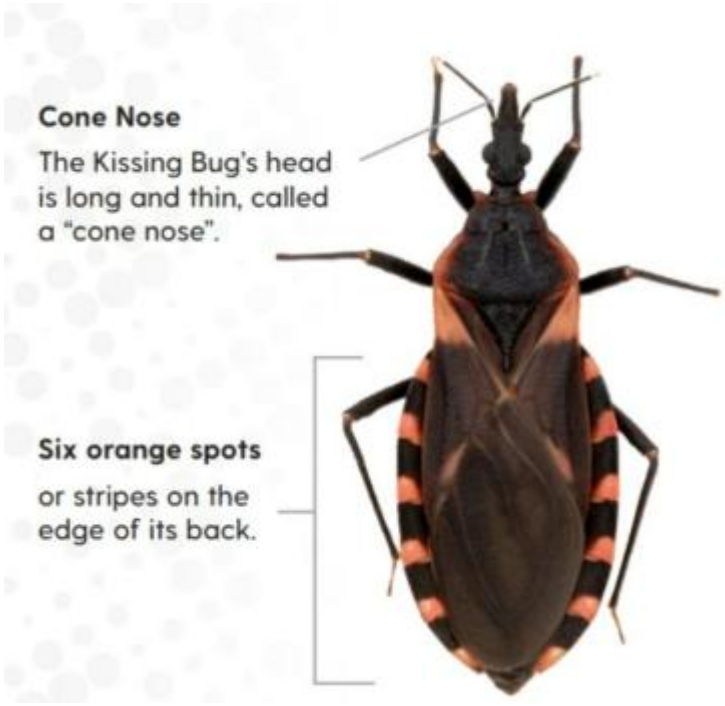
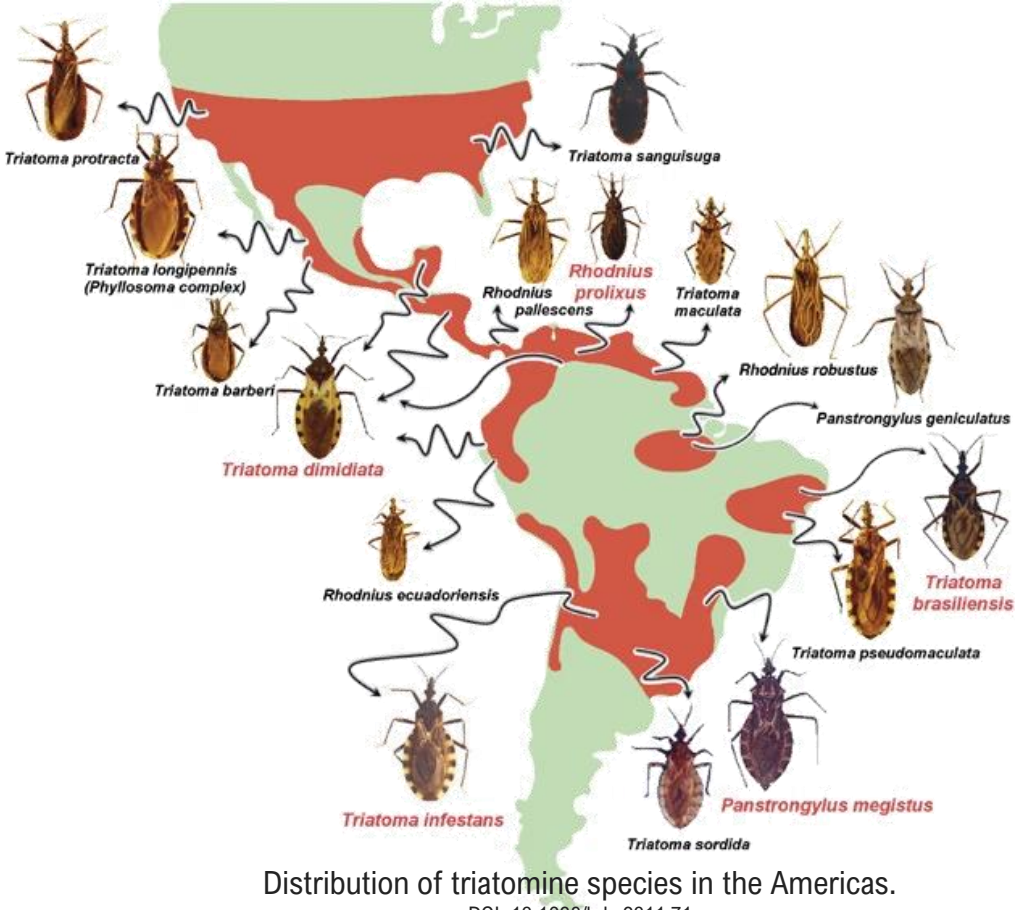


FIGURE 8.3 Adult *Triatoma pallidipennis*. *From Centers for Diseases Control and Prevention Public Health Image Library; Photograph by James L. Gathany.*

https://www.udel.edu/academics/colleges/canr/cooperative-extension/fact-sheets/kissing-bug/
Medical entomology for students, 5th ed., Mike Service
Medical and Veterinary entomology, 3rd ed., Gary R. Mullen
Physician's guide to arthropods of medical importance / Jerome Goddard.—4th ed.



Distribution of triatomine species in the Americas.
DOI: 10.1038/hdy.2011.71

Bugs: Triatomine bugs

- Where Triatomine Bugs Live: indoors and outdoors.
  - Indoors: cracks and holes of poorly constructed houses, found near where pets sleep
  - Outdoors: between rocky structures, wood, brush piles, or beneath bark

    rodent nests or animal burrows, outdoor dog houses, chicken coops or houses
  - Hide in cracks during the day. Come out to bite and feed on blood in the night.

Bug collectors searching for Triatominae in an adobe-walled house.
DOI: 10.1051/vetres/2009009

DOI: 10.1186/s13071-019-3546-0

Bugs: Triatomine bugs: Medical importance

- Very often, their bites are painless; however, reactions to their bites range from a single **papule**, to **giant urticarial lesions**, to **anaphylaxis**, depending on the degree of allergic sensitivity.
- **Vector of Chagas disease (American trypanosomiasis) (*Trypanosoma cruzi*)**

(endemic in large parts of Latin America (WHO, 2017d))

Cutaneous lesion on the right thigh with erythema, edema, and a small central punctum of ecchymosis the "bite site (black arrow)".

Courtesy photo of skin reactions to the bites from a kissing bug on the leg of Olney resident Jennifer Bankston. *Courtesy Photo*

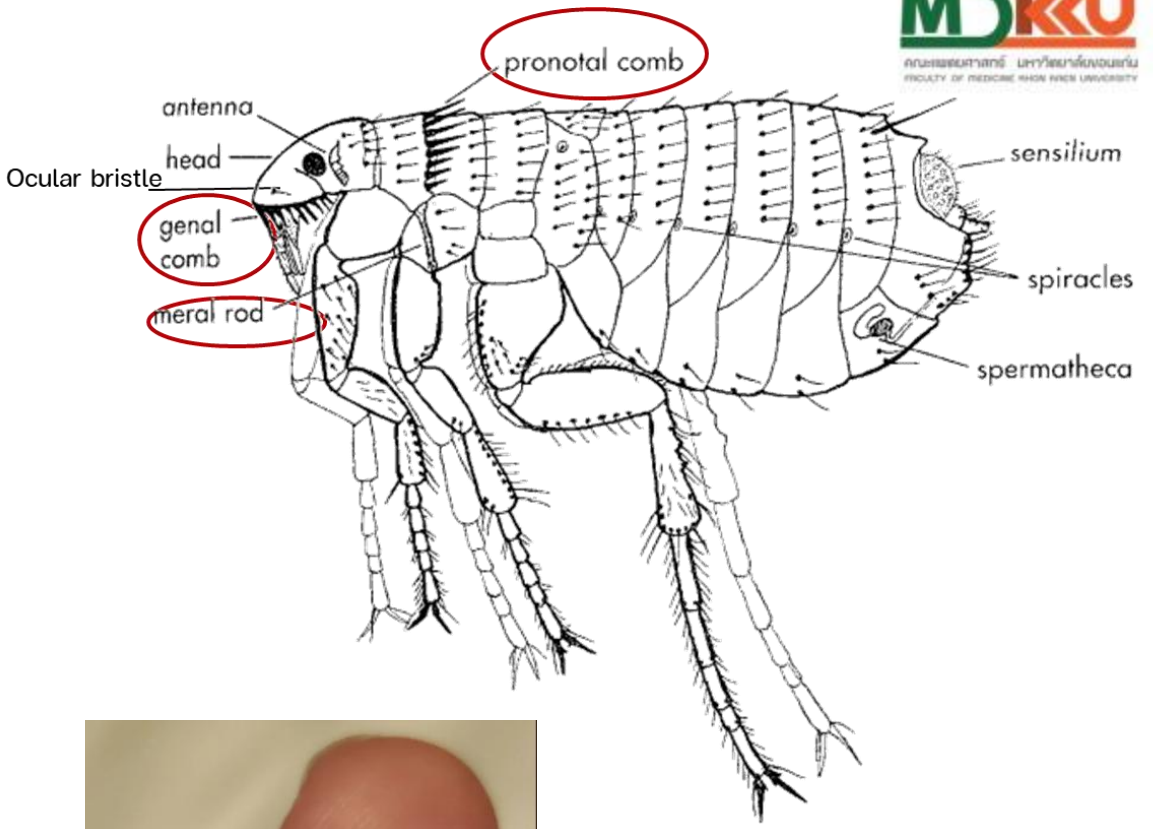
Romana's sign.
(unilateral periorbital swelling)
= is a hallmark of Chagas disease.
This happens when *the T. cruzi* parasite gets into the eyelid, usually by accidentally rubbing the bug feces into your eye or into a bug bite near your eye.

The country where Chagas disease is endemic - -> Insecticide is needed to control triatomine bugs.

Flea (หมัด)

- **Oriental Rat flea** *Xenopsylla cheopis*
- **Dog flea** *Ctenocephalides canis*
- **Cat flea** *Ctenocephalides felis*
- **Human flea** *Pulex irritant*

- Small in sect, wingless
- piercing–sucking mouthparts
- Size 1-8 mm. long
- laterally flatten
- The pair of hind limbs well adapted for jumping.



https://preview.redd.it/please-tell-me-i-didnt-just-find-a-flea-in-my-bed-

https://www.healthline.com/health/identification

Flea: Medical importance

Rat flea	Dog and Cat flea	Human flea
Vectors of Plague (*Yersinia pestis*), Murine typhus (*Rickettsia typhi*)	Vectors of Flea-borne diseases (Cat scratch fever, *Bartonella henselael/ B. quintana*)	Biting; annoyance; papular urticaria
Intermediate host; *Hymenolepis diminuta*	Intermediate host; *Dipylidium caninum*	
Worldwide wherever *Rattus rattus* is found.	Worldwide in and around homes with pets.	Worldwide, North and South America, Asia; Nepal, India, Pakistan, Japan

Flea: Medical importance

SDL

TABLE 10.2 Pathogens and Parasites Transmitted by Fleas

Disease Agent	Disease	Vector(s)	Host(s)	Geographical Area
Viruses:				
Myxoma virus	Myxomatosis	*Spilopsyllus cuniculi*	Rabbits	Europe, Australia
Parapoxvirus	Squirrel pox	Squirrel fleas	Squirrels	Britain
Bacteria:				
Bartonella henselae	Cat scratch disease	*Ctenocephalides felis*	Cats, humans	Widespread
Coxiella burnetii	Q fever	Several fleas	Mammals	Global
Francisella tularensis	Tularemia	Several fleas	Mammals	Global
Rickettsia felis	Cat flea rickettsiosis	*Ctenocephalides felis*	Cats, humans	Widespread
Rickettsia typhi	Murine typhus	*Xenopsylla, Ctenocephalides*	Mammals	Global
Rickettsia prowazekii	Sylvatic epidemic typhus	*Orchopeas howardi*	Flying squirrels, humans	North America
Yersinia pestis	Plague	Mainly *Xenopsylla*	Humans, rodents, cats	Widespread
Protozoa:				
Trypanosoma lewisi	Murine trypanosomiasis	*Nosopsyllus, Xenopsylla*	Rats	Global
Trypanosoma nabiasi	Rabbit trypanosomiasis	*Spilopsyllus cuniculi*	Rabbits	Global
Nematoda:				
Acanthocheilonema reconditum[a]	Canine filariasis	*Ctenocephalides*	Carnivores	Global
Cestoda:				
Dipylidium caninum[a]	Double-pored tapeworm	*Ctenocephalides*	Dogs, cats, humans	Global
Hymenolepis diminuta[a]	Rodent tapeworm	*Nosopsyllus, Xenopsylla*	Rodents, humans	Global
Hymenolepis nana[a]	Dwarf tapeworm	*Nosopsyllus, Xenopsylla*	Rodents	Global

[a]*Fleas are not vectors for these parasites but instead serve as intermediate hosts.*

Medical and Veterinary entomology, 3rd ed., Gary R. Mullen

Flea bites: Clinical findings

- A punctate hemorrhagic area representing the site of flea bite.
- Pruritus, papular lesion, vesicle, wheal
- Generally, require no medical treatment.
- Oral antihistamines may help relieve the itching

FIGURE 2. Vesicular papules on an exposed area of the arm from flea bites *(Pulex irritans)*.

Figure 1. Multiple popular urticaria lesions covering the back of a 28 ye old woman

Extreme human annoyance caused by *Ctenocephalides felis felis* (cat flea)

Asian Pac J Trop Biomed 2014; 4(4): 334-336

A 28 years old woman who lives with her parents in Azizac, a rural residential area, Babol city, Mazandaran Province, Iran, referred to a dermatology department in Babol with complaining of multiple bites in different parts of body especially back and hips by very tiny insects which were collected by her in a small container. She complained about discomfort, itching and being anxious especially at night and having uncontrolled tendency for scratching of lesions. She noted that she had been suffering for 7 d.

Typical urticarial papules with erythema concentrated on her back and hips, with the size of 3–20 mm were observed in her primary examination. And also a red hemorrhagic punctum was seen in the center of some lesions. The bites were normally multiple, often with a tendency to clustering and sometimes dispersed in a linear form (Figure 1). The number of bites was approximately 150. After inquiring she mentioned that she lives in rural area and she just enjoys having hens and roosters as a pet but stray animals particularly cat can be seen in her vicinity.

Flies (แมลงวัน)

1. Non-blood sucking flies (กลุ่มรบกวนแต่ไม่กัด)

House flies (แมลงวันบ้าน) : *Musca domestica*

Flesh flies (แมลงวันหลังลาย) : *Parasarcophaga ruficornis*

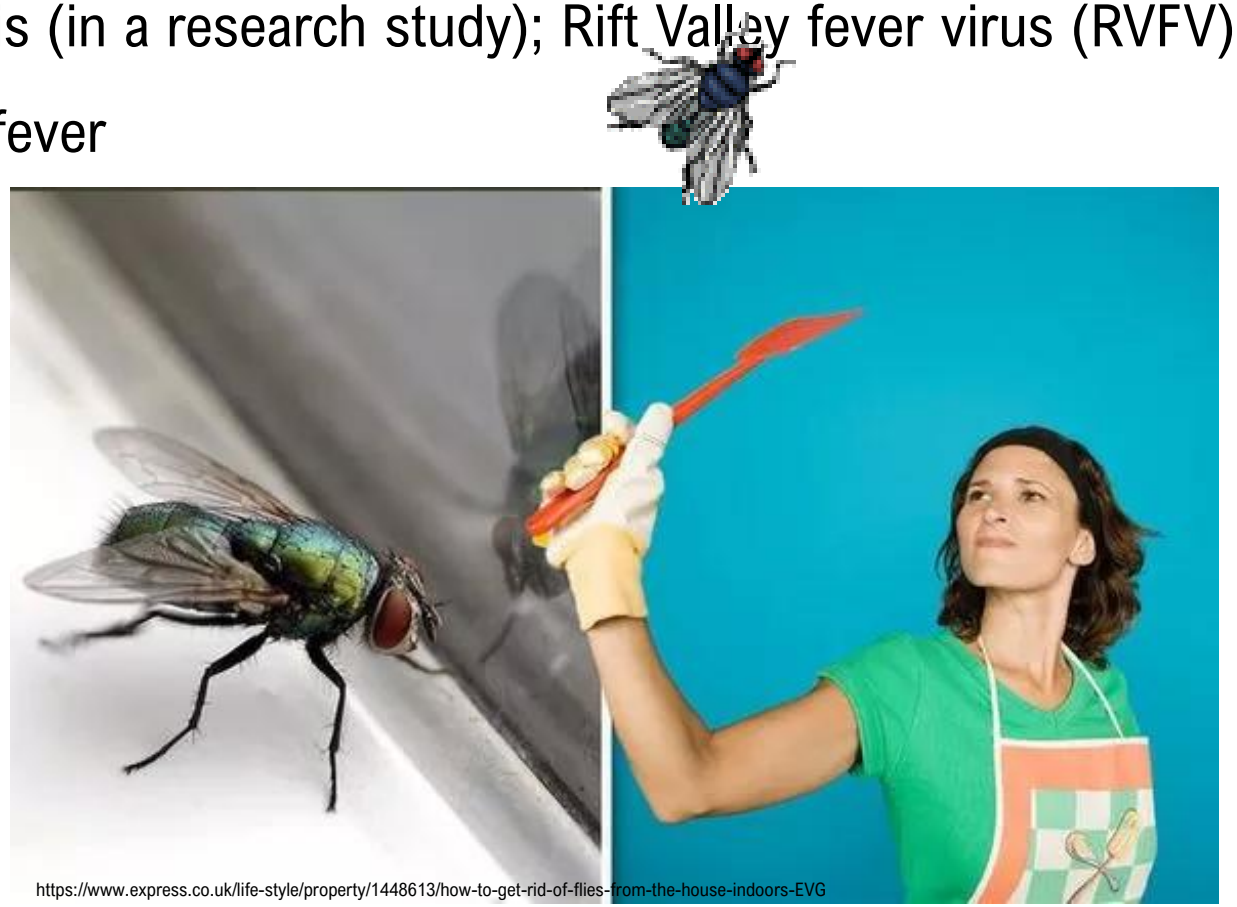
Blow flies, Metallic flies (แมลงวันหัวเขียว) : most abundance in TH = *Chrysomya megacephala*

2. Blood sucking (กลุ่มกัดดูดเลือด)

Stable flies (แมลงวันคอกม้า) : *Stomoxys calcitrans*

Flies: Medical importance

- Disturbance
- Mechanical vectors of bacteria, virus, protozoa
- Stable flies; **painful bite**, vector of zoonosis (in a research study); Rift Valley fever virus (RVFV), West Nile fever virus (WNFV), Anthrax, Q fever
- **Myiasis** caused by larva of flies



https://www.express.co.uk/life-style/property/1448613/how-to-get-rid-of-flies-from-the-house-indoors-EVG

Flies: Stable flies

- *Stomoxys calcitrans*
- Blood sucking, bite people and animals during the daytime.
- Major pests for livestock
- The female lays eggs in plant waste, cut grass, old haystacks, piles of fermenting seaweed.
- **Lesion: painful welts, papules (self limiting)**
- Antiseptic and soothing lotions may relieve pain and itching.

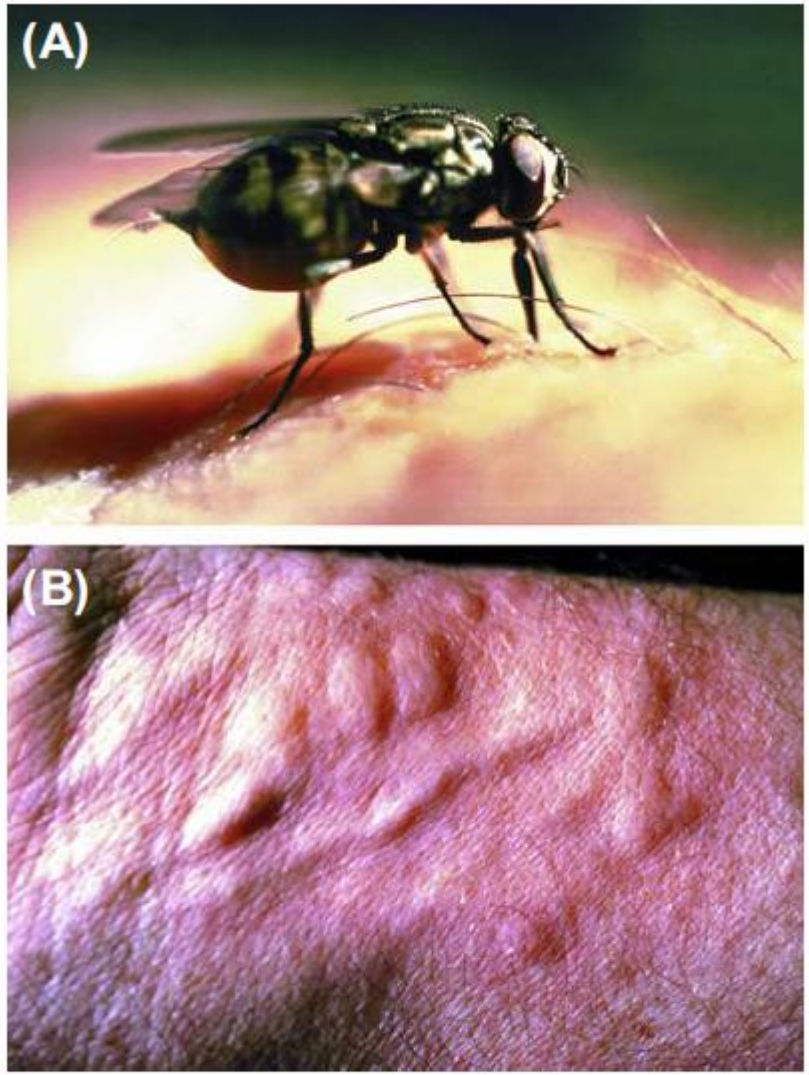


FIGURE 17.12 Stable fly (*Stomoxys calcitrans*) feeding on human. (A) Fully fed female, abdomen distended with blood. (B) Resultant bite reaction in form of welts. *Courtesy of Elton J. Hansens.*

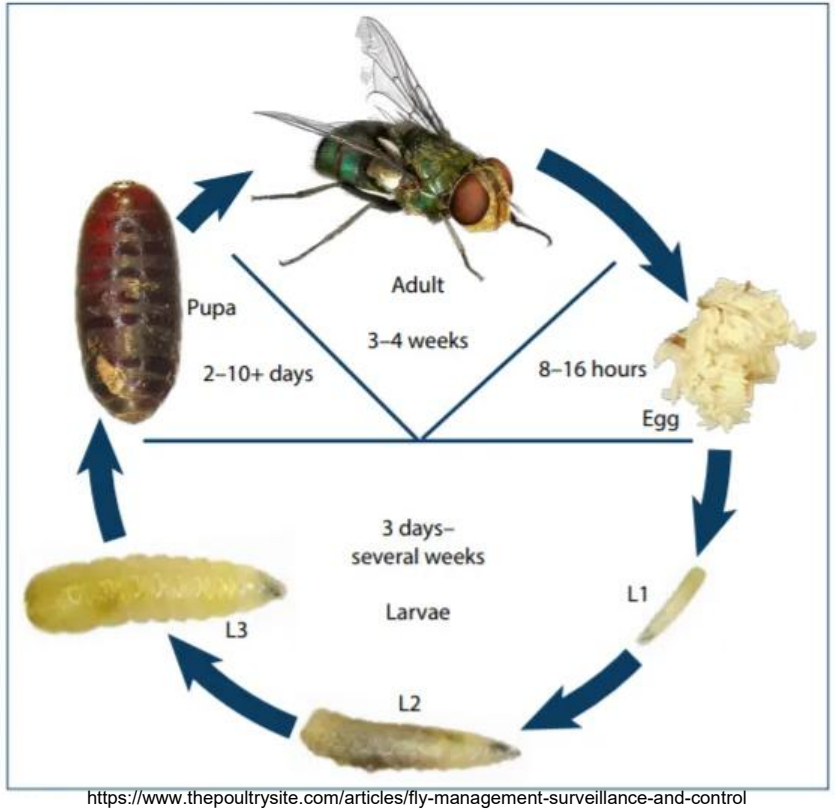
Medical and Veterinary entomology, 3rd ed., Gary R. Mullen

Flies: Myiasis

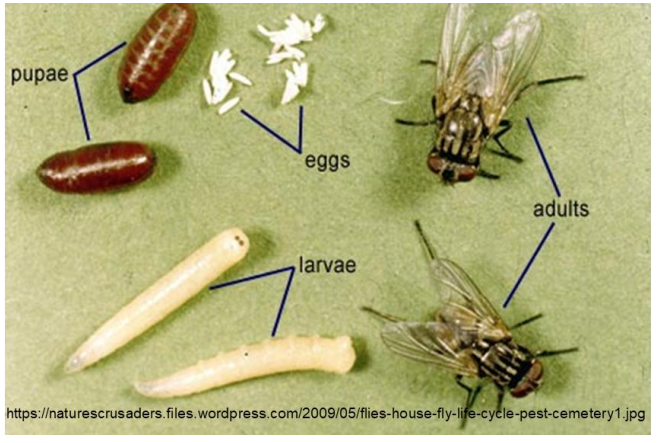
- Myiasis is the invasion of a living vertebrate animal by fly larvae.
- An ectoparasitic infestation of viable or necrotic tissues by the dipterous larvae of higher flies. (James H.Diaz, 2015)

- สภาพของอวัยวะหรือเนื้อเยื่อของคนหรือสัตว์ที่ถูกรุกรานโดยตัวอ่อน (maggot) ของแมลงกลุ่ม Diptera โดยตัวอ่อนจะกินเนื้อเยื่อทั้งที่มีชีวิตและตายแล้ว
- ประเทศไทย มีรายงานว่าพบ Myiasis ที่ ผิวหนังและแผลได้บ่อยที่สุด และพบว่ามักจะเกิดจากแมลงวันหัวเขียวที่จัดอยู่ในวงศ์ Calliphoridae

(วารสารวิชาการแพทย์เขต 11 ปีที่ 30 ฉบับที่ 1 ม.ค. - มี.ค. 2559)



https://www.thepoultrysite.com/articles/fly-management-surveillance-and-control



https://naturescrusaders.files.wordpress.com/2009/05/flies-house-fly-life-cycle-pest-cemetery1.jpg

Flies: Myiasis

- There are several ways for flies to transmit their larvae to people.
  - Deposit their eggs on or near a wound or sore.
  - Some flies attach their eggs to mosquitoes, other flies or ticks and wait for those insects to bite people. Their larvae then enter these bites.
  - One type of fly found in Africa lays its eggs on the ground or on damp cloth that are hung out to dry. People get infected by contact with the ground or clothes that have fly larvae attached to them.
- **People with untreated and open wounds are more at risk for getting myiasis.**

Flies: Myiasis: Type of myiasis

SDL

- **Based on biological classification**

1. Obligatory myiasis / Specific myiasis = maggots live on a live host for their life. The larvae of the parasitic fly species (e.g., bots) require the host for nutrition and development for larval development. ; metallic flies, flesh flies

ตัวอ่อนของแมลงวันต้องอาศัยอยู่ตามเนื้อเยื่อของคนหรือสัตว์เพื่อพึ่งพาอาหารจากโฮตส์อย่างเต็มที่ตลอดชีวิตการเจริญเติบโต (มักพบในสัตว์)

2. Facultative myiasis / Semi specific myiasis = Free-living maggot. It is a consequence of an opportunistic behavior of nonparasitic flies that use organic material for laying eggs and an open wound or soiled hair just happens to be available for them. ตัวอ่อนของแมลงวัน โดยปกติอาศัยแบบอิสระ แต่บางครั้งอาจบุกรุกเข้าไปอยู่ตามบาดแผลที่ผิวหนังหรือตามอวัยวะต่าง ๆ ของคนหรือสัตว์ได้เนื่องจากแมลงวันวางไข่ไว้ตามบาดแผล

3. Accidental myiasis = a pseudoparasitosis when ingested larvae are present in feces or vomit without any clinical signs—the larvae are not able to develop further in the intestines if they are eaten. ; House flies

ตัวอ่อนของแมลงวันโดยปกติจะเจริญเติบโตในซากพืช-สัตว์ที่เน่าเปื่อยหรือสิ่งปฏิกูลเท่านั้น แต่เข้าสู่ Host โดยบังเอิญ เช่นปนเปื้อนน้ำ อาหาร แล้วมีความสามารถทนต่อสภาพแวดล้อมที่ไม่เหมาะสมได้ แต่ไม่มีการเจริญเติบโต

Flies: Myiasis: Type of myiasis

- **Based on clinical presentation**

1. Furuncular myiasis (subcutaneous) ; pustular lesions that resemble boils or furuncles.
2. Wound or traumatic ; superficial cutaneous
3. Creeping or migratory ; Commencing as a small itching papule, within a day or two a thin (1.5-mm wide) red, slightly raised, often tortuous line appears, which extends daily at an average of 1.5 cm, but may reach up to 30 cm daily

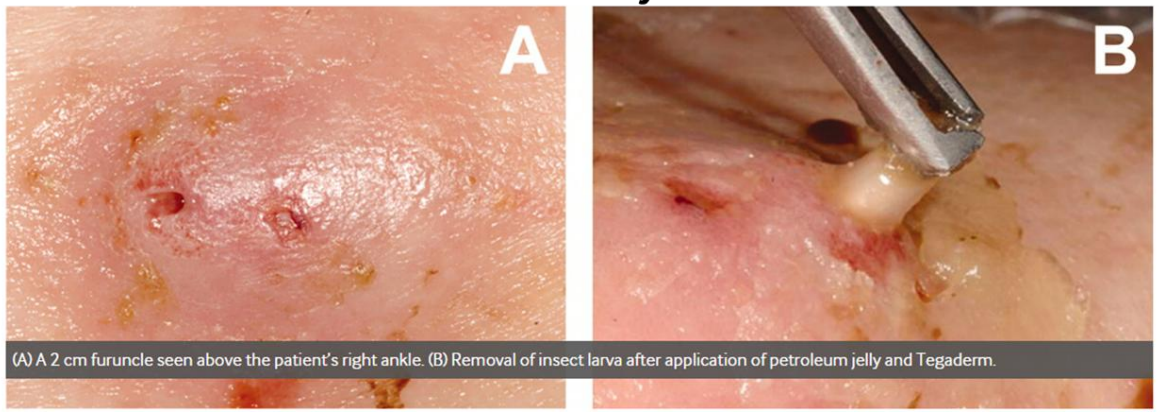
- **Based on the site of larval invasion, or subsequent development in the host.**

1. Cutaneous myiasis
2. Cavitary myiasis ; invade natural body cavities (e.g. ophthalmic myiasis, nasopharyngeal myiasis, auricularmyiasis, urogenital myaisis, oral myaisis) and internal organs (e.g. cerebral myiasis, gastrointestinal myiasis)

Flies: Myiasis: Type of myiasis

- **Based on clinical presentation**

Furuncular myiasis



- **Based on the site of larval invasion, or subsequent development in the host.**

Oral Myiasis

Carlos Alberto Medeiros Martins,March 2012, The Journal of craniofacial surgery 23(2):e69-71

หมอฟันสุดอึ้งนึกว่ามีแต่ในตำรา พบรังหนอนแมลงวันเต็มปากผู้ป่วยติดเตียง ผ่าเจอ 15 ตัว (คลิป)

2.4k 7 พ.ค. 63

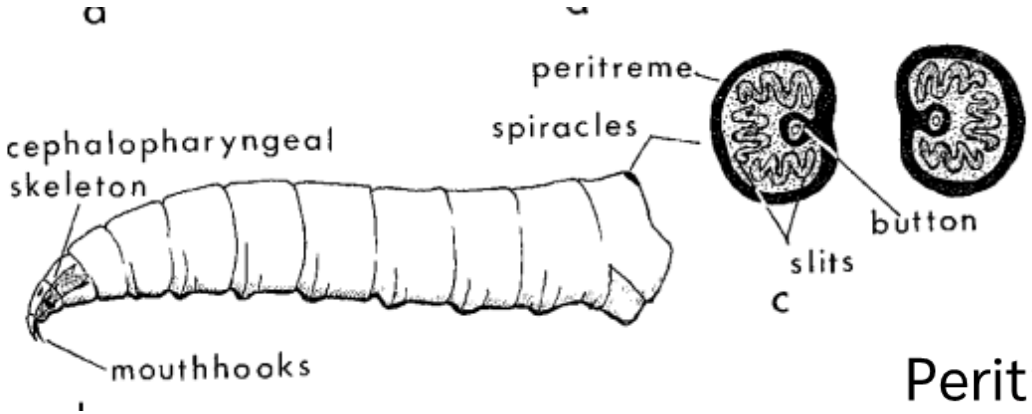
กรณีเฟซบุ๊กชื่อ Thanatnon Rong Assava ซึ่งเป็นทันตแพทย์ รพ.พระพรหม อ.ลานสกา จ.นครศรีธรรมราช ได้โพสต์ข้อความพร้อมภาพหนอนหลายตัวที่อยู่ในถ้วย ระบุว่า เป็นหนอนแมลงวันในปากคนไข้ มีจำนวนทั้งสิ้น 15 ตัว ยังมีชีวิตดิ้นได้

Flies: Myiasis: Treatment

- The aim of treatment is to **remove all the larvae.**
- Covering the opening of the lesion by an oily ointment (e.g., paraffin) leads to suffocation of the larva and then it can be extracted manually more easily.
- Debridement with irrigation
- Maggot infestation of the nose, eyes, ears, and other areas may require surgery if larvae cannot be removed via natural orifices.
- Treatment for secondary bacterial and fungal infections as needed.

Differentiation of maggot by posterior spiracle of maggot

LAB



Common house fly

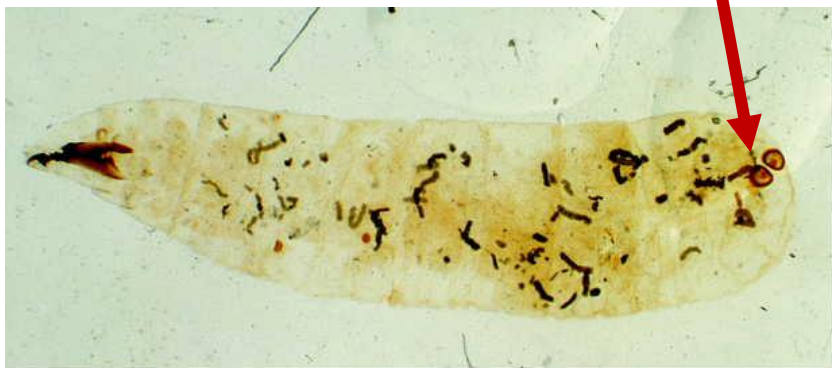
D-shape Peritreme

3 Sinuous slits, coiled like M letter

Peritreme

Slit

Posterior spiracle



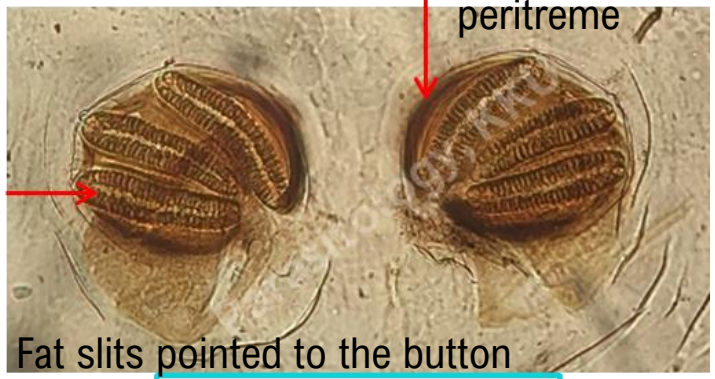
Incompleted peritreme

Slit

Flesh fly

Peritreme

Incompleted peritreme



Blow fly

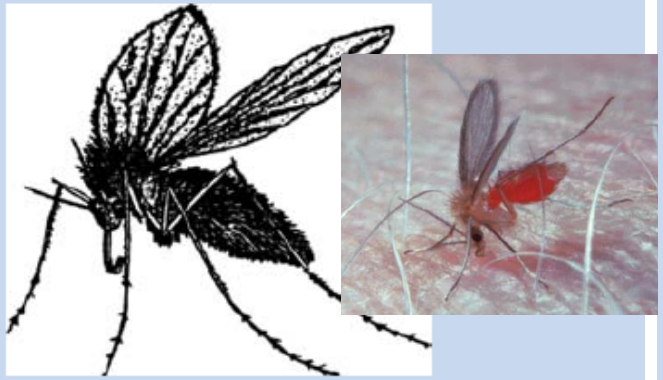
Medical entomology for students, 5th ed., Mike Service

Table 1 Summary of human cutaneous myiasis [Adapted from Baird et al. [4]]

	Larvae	Common name	Geographic location	Presentation	Time of year	Treatment
Travel related	*Dermatobia hominis*	Human bot fly, *torsalo*	Central and South America	Furuncular	Year-round	Occlusion, squeezing out the larva; possible excision
	Cordylobia anthropophaga	Tumbu fly, skin maggot fly, putzi fly mango fly, *ver du Cayor*	Tropical Africa	Furuncular	Year-round	Occlusion, squeezing out the larva; possible excision
	Cordylobia rodhaini		Africa	Furuncular	Year-round	Occlusion, squeezing out the larva; possible excision
	Cochliomyia hominivorax	New World screwworm	Central and South America	Wound	Year-round	Occlusion, tissue irrigation, manual removal; ± larvicides
Non-travel related	*Cuterebra* species	Rabbit bot fly, rodent bot fly	Eastern US, Ontario, Pacific Northwest	Furuncular	August–October	Occlusion, squeezing out the larva; possible excision
	Wohlfahrtia vigil	None	Eastern and central North America, central and southern Europe, Russia, Pakistan	Furuncular	June–September	Occlusion, squeezing out the larva; possible excision
	Wohlfahrtia opaca	None	Western and southwestern North America	Furuncular	June-September	Occlusion, squeezing out the larva; possible excision
	Gasterophilus intestinalis	Horse bot fly	Worldwide	Migratory	Year-round	Needle extraction
	Hypoderma bovis, Hypoderma lineatum	Heel fly, gad fly, cattle grubs	Northern hemisphere	Migratory/furuncular	Winter months	Occlusion, squeezing out the larva; possible excision
	Chrysomya bezziana	Old World screwworm	Africa, India, Southeast Asia	Wound	Year-round	Occlusion, tissue irrigation, manual removal; ± larvicides
	Wohlfahrtia magnifica	Wohlfahrt's wound myiasis fly	Southeastern Europe, southern and Asiatic Russia, North Africa, Middle East	Wound	Year-round	Occlusion, tissue irrigation, manual removal; ± larvicides

Biting flies

SAND FLIES



Adult sand fly. (From Bowles, E., The Mosquito Book, Mississippi State Department of Health, Jackson, MS, 1989.)

Importance
Vectors of several important diseases

Distribution
Numerous species almost worldwide

Lesion
Sometimes red papules or urticarial wheals

Disease Transmission
Leishmaniasis, bartonellosis, sand fly fever

TSETSE FLIES

Adult tsetse fly. (Figure courtesy of U.S. Department of Agriculture.)

Importance
Vectors of sleeping sickness

Distribution
Tropical Africa

Lesion
Small punctate hemorrhages unless sensitive to saliva (in which case, itchy wheals result)

Disease Transmission
African trypanosomiasis

DEER FLIES

Adult deer fly, Chrysops discalis. *(Figure courtesy of U.S. Centers for Disease Control and Prevention, Atlanta, GA.)*

Importance
Annoyance; painful bites

Distribution
Numerous species worldwide

Lesion
Deep and painful singular lesions, sometimes leading to cellulitis

Disease Transmission
Tularemia; loiasis (Africa)

Physician's guide to arthropods of medical importance / Jerome Goddard.—6th ed.

เข้าป่ากางเต็นท์
ระวังโรคติดต่อนำโดยแมลง

ในวันหยุดสุดสัปดาห์ หลายคนชอบไปกางเต็นท์
แต่ในวันหยุดแสนสบาย อาจกลายเป็นวันอันแสนเศร้า
ถ้าเราไม่ระวังตัวเอง จากแมลงตัวเล็ก ๆ
ที่นำโรคติดต่อมาสู่เรา

ยุงก้นปล่อง พาหะนำโรคไข้มาลาเรีย
มักพบตามแนวป่าเขา ริมลำธาร
ออกหากินช่วงพลบค่ำถึงช่วงเช้า

ยุงลายสวน พาหะนำโรค 3 โรค
มักพบได้บริเวณชายป่า ซึ่งเป็นพาหะ
นำโรคไข้เลือดออก โรคไข้ปวดข้อยุงลาย
และโรคติดเชื้อไวรัสซิกา

ตัวไรอ่อน พาหะนำโรคสครับไทฟัส
ชอบอาศัยตามพุ่มไม้เล็กๆ พงหญ้า
ตัวมีขนาดเล็กมากมองไม่เห็นด้วยตาเปล่า

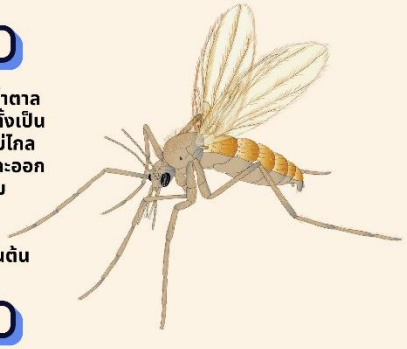
กองโรคติดต่อนำโดยแมลง ข้อมูล ณ วันที่ 11 ส.ค. 66

ตัวเล็กแต่ร้าย
พาหะนำโรคลิชมาเนีย

รื้นฝอยทราย!

มาทำความรู้จักตัวรื้นฝอยทราย

ตัวมีขนาดเล็กกว่ายุง 4-5 เท่า อาจมีสีดำ ขาว น้ำตาล
มีขนปกคลุมทั่วตัว รูปปีกเหมือนปลายหอก ปีกตั้งเป็น
รูปตัว V ตัวเมียกินเลือดทั้งคนและสัตว์ หากินไม่ไกล
จากแหล่งอาหาร ออกหากินมากตอนพลบค่ำ และออก
หากินตลอดทั้งคืน ช่วงกลางวันบริเวณที่มืดครึ้ม
ก็ออกหากินได้เหมือนกัน ตัวเมียจะวางไข่ตาม
พื้นดินชื้นแฉะที่มีอินทรีย์สารสูง เช่น คอกสัตว์
กองขยะ ใบไม้ทับถม รูหนู โพรงไม้ โพรงดิน เป็นต้น



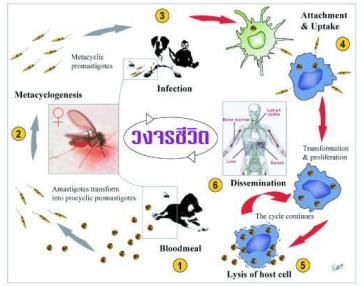
แหล่งเชื้อโรคอยู่ที่ไหนบ้าง

โรคลิชมาเนียสามารถติดต่อสู่คนที่อาศัยอยู่ใกล้แหล่งเพาะพันธุ์ของรื้นฝอยทราย เช่น พื้นที่ป่า พื้นที่
เกษตรกรรม หากเข้าป่าไปตัดฟืน หาของป่า ล่าสัตว์ อยู่เป็นประจำ ควรสวมเสื้อผ้าปกปิดทั่วร่างกาย
และเก็บกวาดบริเวณใกล้บ้านให้ปราศจากรูหนู กองไม้ กองขยะ กองฟืน แหล่งใบไม้ทับถม โพรงไม้
เพื่อป้องกันเป็นแหล่งเพาะพันธุ์รื้นฝอยทราย รวมถึงดูแลสัตว์เลี้ยง ได้แก่ สุนัข แมว วัว ควาย
ไม่ให้รื้นฝอยทรายมากัดกินเลือดได้

กองโรคติดต่อนำโดยแมลง ข้อมูล ณ วันที่ 22 พ.ย. 66

ไขความลับ...โรคลิชมาเนีย

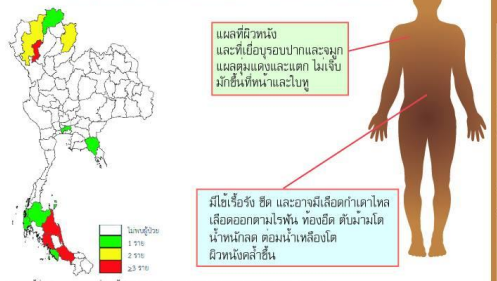
รื้นฝอยทราย



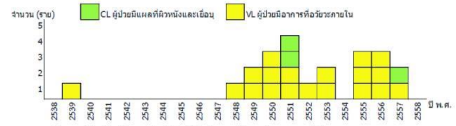
โรคลิชมาเนียหรือโรคคาลาอาซาร์แพร่มาสู่คนโดย
รื้นฝอยทรายจะดูดเลือดของสัตว์ที่มีตัวเชื้อโปรโตซัว
ลิชมาเนีย (Leishmania) ซึ่งอยู่ใน เซลล์เม็ดเลือดขาว
สัตว์ และมากัดคนต่อ หลังคน ติดเชื้อจะมีระยะฟักตัว
โดยเฉลี่ยประมาณ 3 - 6 เดือน

สัตว์ที่เป็นแหล่งรังโรค กระรอก กระแต หนู สุนัข

สถานการณ์โรคประเทศไทยตั้งแต่ปี 2539-2557
พบผู้ป่วยสะสมทั้งหมด 23 ราย ไม่พบผู้เสียชีวิต



จำนวนผู้ป่วยโรคลิชมาเนียที่ติดเชื้อในประเทศไทย จำแนกรายจังหวัด ปี พ.ศ. 2539 - 2557



จำนวนผู้ป่วยโรคลิชมาเนียที่ติดเชื้อในประเทศไทย จำแนกรายปี ปี พ.ศ. 2539 - 2557

แหล่งข้อมูล สำนักโรคติดต่อนำโดยแมลง กรมควบคุมโรค

การป้องกันโรคลิชมาเนีย

1. ประชาชนที่เข้าป่า ไปถ้ำ ทำสวน ทำไร่ ควรสวมใส่เสื้อผ้าให้มิดชิดปกปิดร่างกาย
2. นอนในมุ้ง และไม่ควรอยู่นอกบ้าน ช่วงพลบค่ำ
3. ทายากันแมลงบริเวณผิวหนังที่อยู่นอกมุ้งผ้านอนกางมุ้งที่ชุบด้วยสารเคมีป้องกันยุงและแมลง
4. ดูแลบริเวณบ้านเรือนให้สะอาด
5. ผู้ที่เดินทางกลับจากพื้นที่ที่มีการระบาดของโรคภายใน 3 -6 เดือน หากมีไข้ต่ำ ๆ อ่อนเพลีย มีอาการท้องเดิน ท้องผูก เบื่ออาหาร ปวดเมื่อยตามกล้ามเนื้อ ให้พบแพทย์และแจ้งประวัติการเดินทาง เพื่อการรักษาอย่างรวดเร็วและถูกต้อง
6. ประชาชนสามารถโทรสอบถามข้อมูลเพิ่มเติมได้ที่ สายด่วนกรมควบคุมโรค หมายเลข 1422

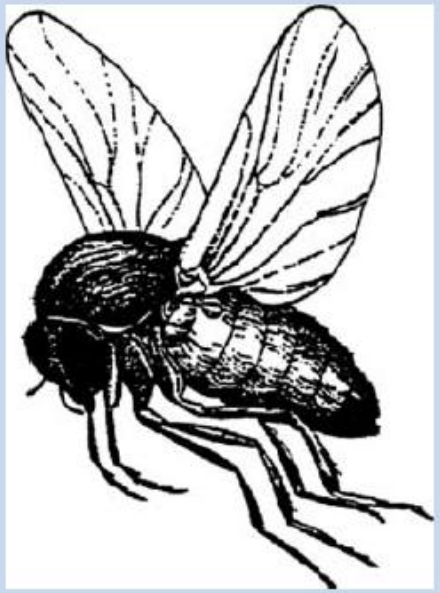
สำนักระบาดวิทยา กรมควบคุมโรค กระทรวงสาธารณสุข

อย่าให้รื้นฝอยทรายกัด
ดูแลบ้านเรือนให้สะอาด ป้องกันโรคลิชมาเนีย

Biting flies

SDL

BLACK FLIES



Typical adult black fly. (From Bowles, E., The Mosquito Book, Mississippi State Department of Health, Jackson, MS, 1989.)

Importance
Fierce biters; possible systemic reactions

Distribution
Numerous species worldwide

Lesion
Variable—often small itching papules, sometimes erythematous wheals and swelling

Disease Transmission
Onchocerciasis (tropics)

HORSE FLIES

Adult horse fly. (From USDA, The Yearbook of Agriculture, U.S. Department of Agriculture, Washington, DC, 1952.)

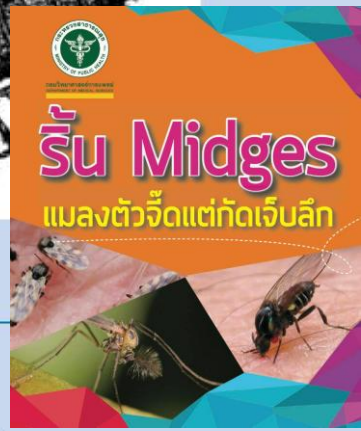
Importance
Annoyance; painful bites; possible systemic reactions

Distribution
Numerous species worldwide

Lesion
Deep and painful singular lesions sometimes leading to cellulitis

Disease Transmission
None

BITING MIDGES



Adult biting midge.

Importance
Annoyance from biting

Distribution
Numerous species occurring worldwide

Lesion
Minute papular lesions with erythematous halo; wheals may occur in sensitized persons

Disease Transmission
Oropouche fever (tropics)

Physician's guide to arthropods of medical importance / Jerome Goddard. 6th ed.

Recall Gen III

Mosquitoes

- Mosquitoes
  - 3 Subfamiles

1. Subfamily : Anophelinae

Genus : ***Anopheles*** ยุงก้นปล่อง

2. Subfamily : Culicinae

Genus : ***Culex*** ยุงรำคาญ

: ***Aedes*** ยุงลาย

: ***Mansonia*** ยุงเสือ/ยุงแมนโซเนีย

3. Subfamily

: Toxorhynchitinae

Mosquito bites

- **Local reactions**
  - Local pain, pruritus, and erythema are typical reactions
  - The typical wheal-and-flare reaction is evident approximately 30 minutes after the bite.
  - An indurated pruritic papule that peaks at two to three days and resolves over the ensuing days to weeks
- **Systemic allergic reactions**
  - **Rarely**, patients can develop classical anaphylaxis in response to mosquito bites, presenting with some combination of generalized urticaria, angioedema, wheezing, vomiting, hypotension, loss of consciousness, or other manifestations of anaphylaxis

Mosquito bites

Figure 4.15
Numerous mosquito bites on arm after 10-minute exposure outdoors. (Photograph courtesy of Wendy C. Varnado and used with permission.)

Figure 25.4
Mosquito bite on person's arm, 20 minutes after bite. (Photograph copyright 2005 by Jerome Goddard, Ph.D.)

Figure 4.14
Wheal-and-flare reactions may occur from mosquito bites within 30 minutes of biting.

Ref: Physician's guide to arthropods of medical importance by Jerome Goddard. 6th ed

Ref: Physician's guide to arthropods of medical importance by Jerome Goddard. 6th ed

CLUES TO RECOGNIZING INSECT BITES

A. Diagnosis
B. Characteristics of Lesions
C. Number of Lesions and Their Location on the Body

Clues to Biting Arthropods Based on Number of Lesions on the Body

Number of Lesions	Possible Arthropods
Single	Tick Spider Centipede Wheel bug Kissing bug
Few	Fleas Mosquitoes Stable flies Horse flies and deer flies Kissing bugs Sand flies
Multiple	Bed bugs Mosquitoes Black flies Biting midges (*Culicoides*) Fleas Lice Chiggers Seed ticks Mites Scabies

Location of Lesions	Possible Arthropods
Predominantly on left side of body (if right-handed) or right side of body (if left-handed)	Imaginary bugs (see Chapter 7)
Legs or feet	Fleas Mosquitoes Spiders Chiggers Centipedes
Trunk	Chiggers Bed bugs Scabies Ticks Body lice Pubic lice Spiders *Cheyletiella* mites
Genitals[a]	Scabies Chiggers
Arms or hands	Mosquitoes Black flies Mites Biting midges Spiders Fleas *Cheyletiella* mites Centipedes Sand flies Wheel bugs
Head, neck, or face	Bed bugs[b] Mosquitoes Black flies Biting midges Sand flies Head lice Kissing bugs

[a] *The presence of crusted, pruritic papules on the penis and buttocks is highly indicative of scabies.*
[b] *Mysterious bites on the face, neck, or upper trunk noticed after arising from sleep are highly indicative of bed bugs.*

Ref: Physician's guide to arthropods of medical importance by Jerome Goddard. 6th ed

CLUES TO RECOGNIZING INSECT BITES

Cutaneous Sequelae Resulting from Arthropod Bites

Sequelae	Location on Body	Possible Arthropods
Single nodule	Scalp or trunk	Tick
Multiple nodules	Legs or ankles	Black fly
Bullae	Anywhere	Bed bug
Purpuric spots	Trunk	Bed bug
Bluish spots	Pubic and perianal area	Pubic lice
Hyperpigmentation	Waistline and genitals	Chigger
Hyperpigmentation	Trunk, arms, legs	Bed bug, body lice

Diagnostic Patterns of Arthropod Bites

Pattern of Bite Lesions	Possible Arthropods
Scattered	Mosquitoes Horse flies and deer flies Black flies Biting midges Head and body lice
Grouped	Fleas Pubic lice Chiggers Scabies
Linear	Bed bugs Chiggers

Source: Adapted in part from Frazier, C.A., Insect Allergy: Allergic Reactions to Bites of Insects and Other Arthropods, Warren H. Green, St. Louis, MO, 1969, chap. 9. With permission.

How are arthropod bites diagnosed?

Differential diagnosis

The differential diagnosis for suspected arthropod bites and stings presenting with localized dermatological manifestations is extensive and includes;

- Contact dermatitis
- Drug eruption
- Mastocytosis
- Bullous diseases
- Eczema
- Vasculitis
- Erythema multiforme
- Viral exanthem
- Cellulitis
- Abscess
- Impetigo
- Folliculitis
- Necrotizing fasciitis
- And many others …….

Ref: Insect Bites by Jim Powers; Rachel H. McDowell.

How are arthropod bites diagnosed?

Diagnosis of insect bites depends on **History taking**

- The insect fauna in patient's area
- It is very important to find out what the patient has been doing lately

(e.g., hiking, fishing, gardening, cleaning out a shed).

- Occupations and hobbies that increase arthropods exposure

(for example, forestry workers, hunters and hikers).

Other clues that might be helpful in diagnosing insect bites include;

- size, shape, and number of lesions and specific location on the body

Ref: Physician's guide to arthropods of medical importance by Jerome Goddard.—6th ed.

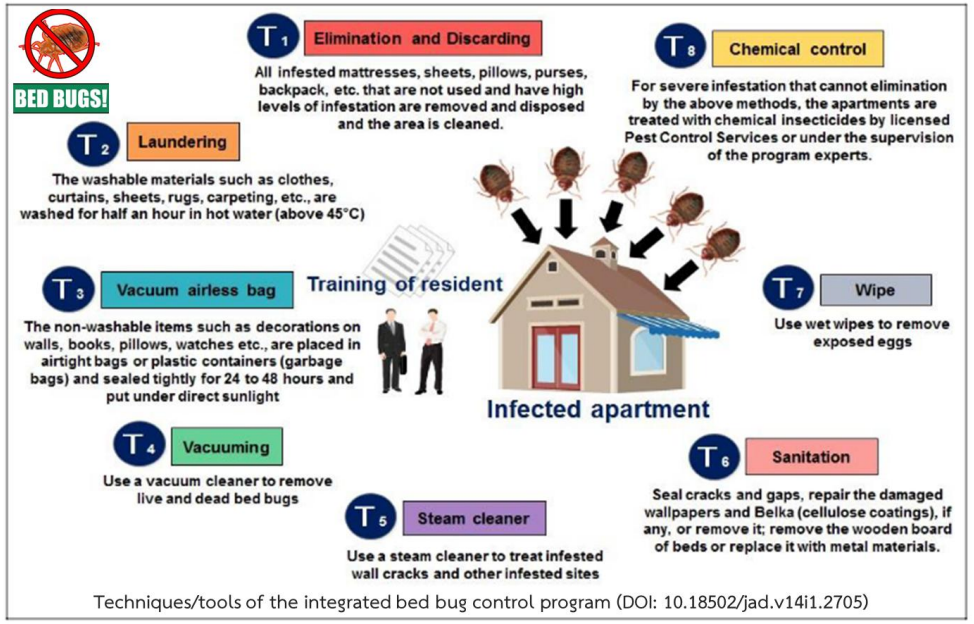
How are arthropod bites treated?

- The ideal treatment is **identification of arthropod and removal of its cause.**
- However, such a response may be difficult, if not impossible, and patients should undergo treatment for symptoms while the source of the rash and lesion is sought.
- Mild topical steroids and systemic antihistamines for control of pruritus is recommended.
- Antibiotics for secondary infection is needed in some cases.
- Disinfection of **all pets**, along with fumigation of the home, may produce a dramatic cure.
- Patients should apply insect repellent to the skin before they go outdoors.

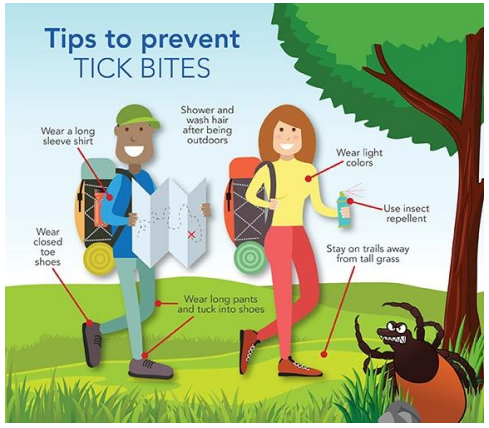
Vector control

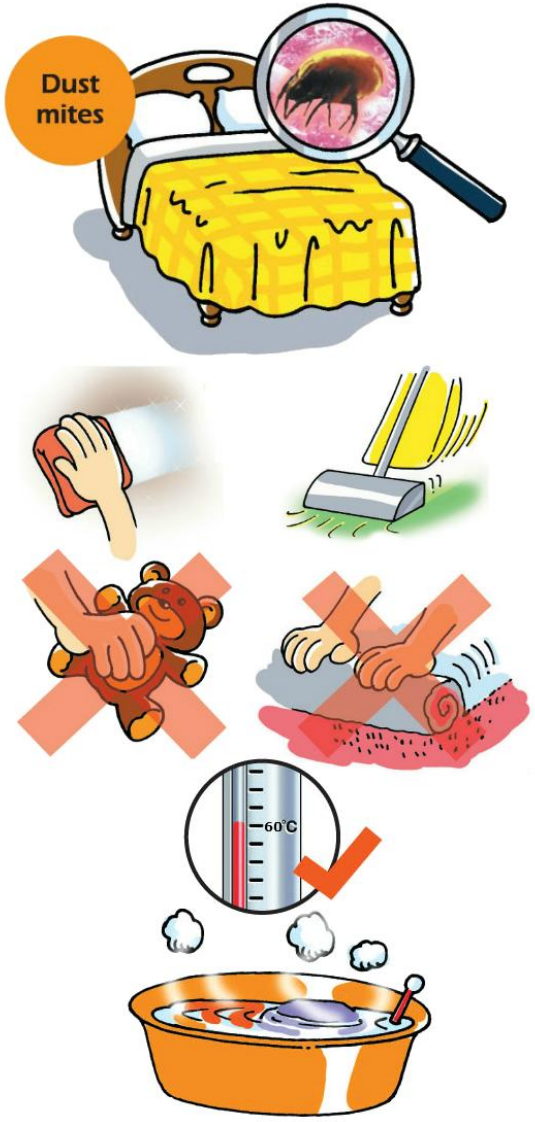
Consider;
Vector biology
Vector habitat
Personal protection
using a combination of strategies

Heat treatments are an effective way to eliminate bed bugs quickly, but may be more costly than conventional treatment methods.
https://entomology.ca.uky.edu/files/efpdf3/ef636.pdf



Techniques/tools of the integrated bed bug control program (DOI: 10.18502/jad.v14i1.2705)





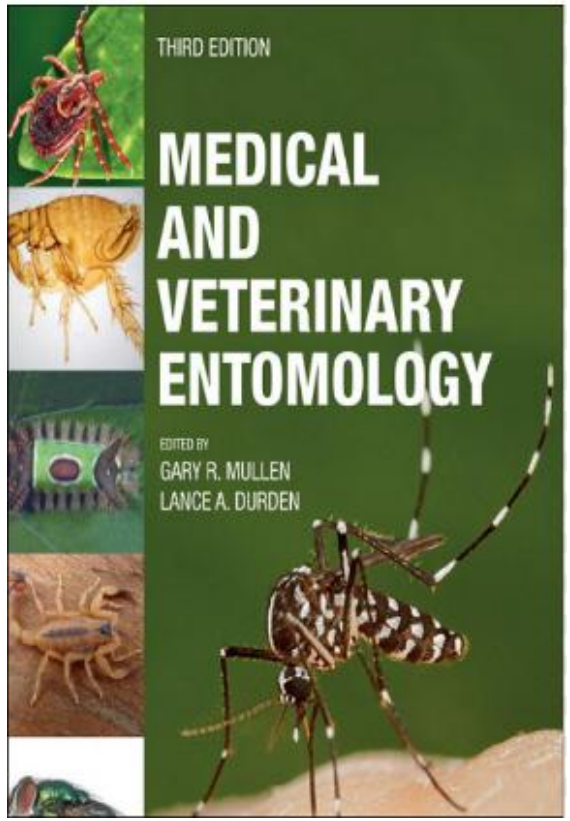
https://www.dgpu.org/?u=how-to-get-rid-of-flies-indoors-pest-control-aa-AYx95gsI
https://www.thespruce.com/how-to-get-rid-of-ticks-in-your-house-5224951
https://www.thespruce.com/what-are-chiggers-and-how-do-i-get-rid-of-them-5079919
https://hkasthma.org.hk/en/about-asthma/house-dust-mites

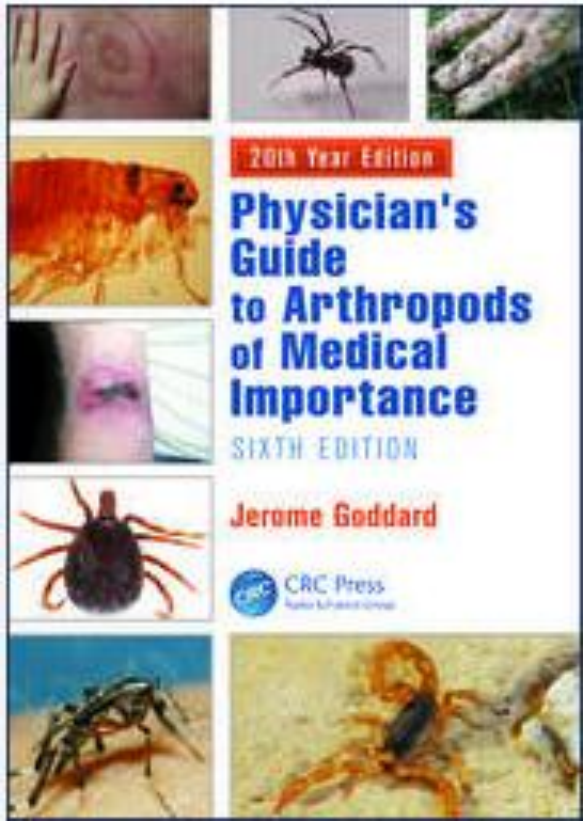
Summary ; After the class, students must know;

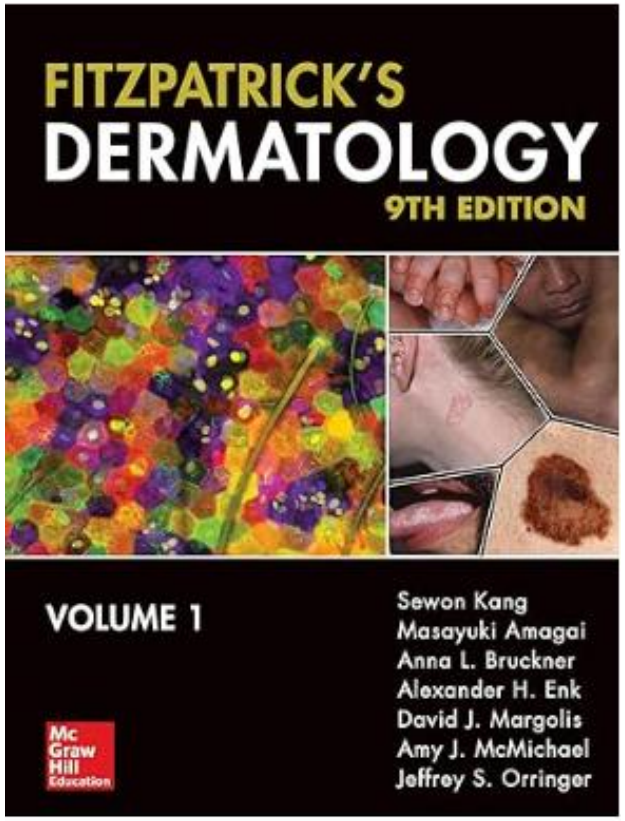
- General view of arthropod infestation : local reaction / hypersensitivity
- Specific view of each acari and insect bites ; biology of arthropods, where to find, clues for diagnosis, consequences after biting, treatment.
- Pathognomic signs/ specific location on the body
- Vector-borne diseases of medical importance in Thailand.

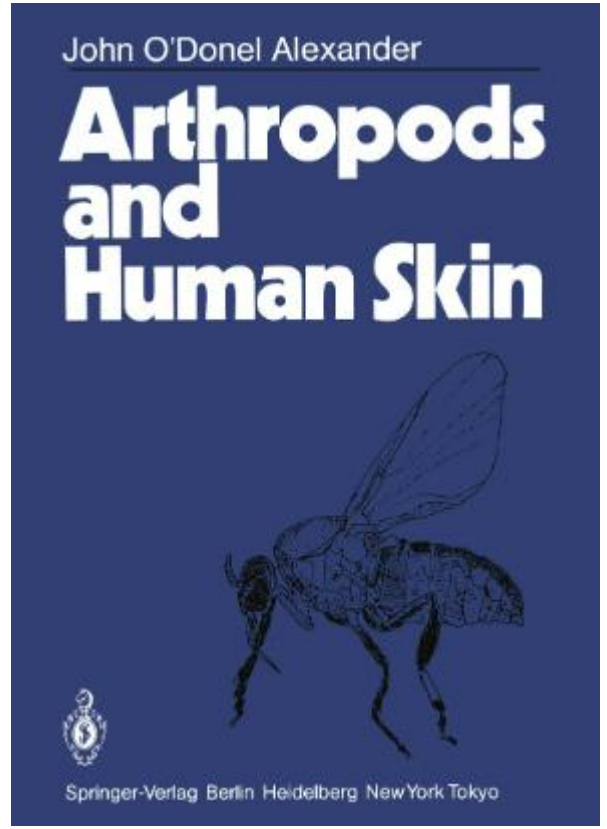
- 2 hr of lecture = 10 MCQ

Suggested reading









https://www.ncbi.nlm.nih.gov/books/NBK537235/
https://parasitewonders.blogspot.com/

Any questions ??

chatea@kku.ac.th

The last MOSQUITO that bit me was HUNGOVER for a week