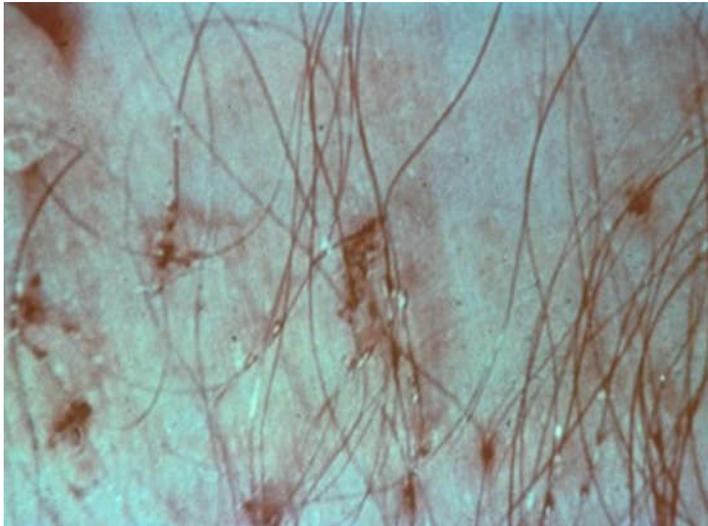


# Ectoparasitic infections

- Ectoparasites: parasitic organisms that live on the outer skin surfaces
- 2 common STIs caused by ectoparasites:
  - 1) pubic lice (*Phthirus pubis*)
  - 2) Scabies (*Sarcoptes scabiei*)

## ***Phthirus pubis***: Pubic louse infestation

- a parasitic insect which spends its entire life on human hair and skin,
- Feeds exclusively on blood 4-5 times daily.
- Humans are the only known host.



## Three types of lice:

- Head lice
- Body lice:
- Pubic lice (crabs)

Head lice found anywhere on the head (typically hair, but also can be found on the eyebrows.)

Body lice: typically found on the clothing, except when they need a blood meal. They then move to the skin (but usu found on the clothing NOT the skin)

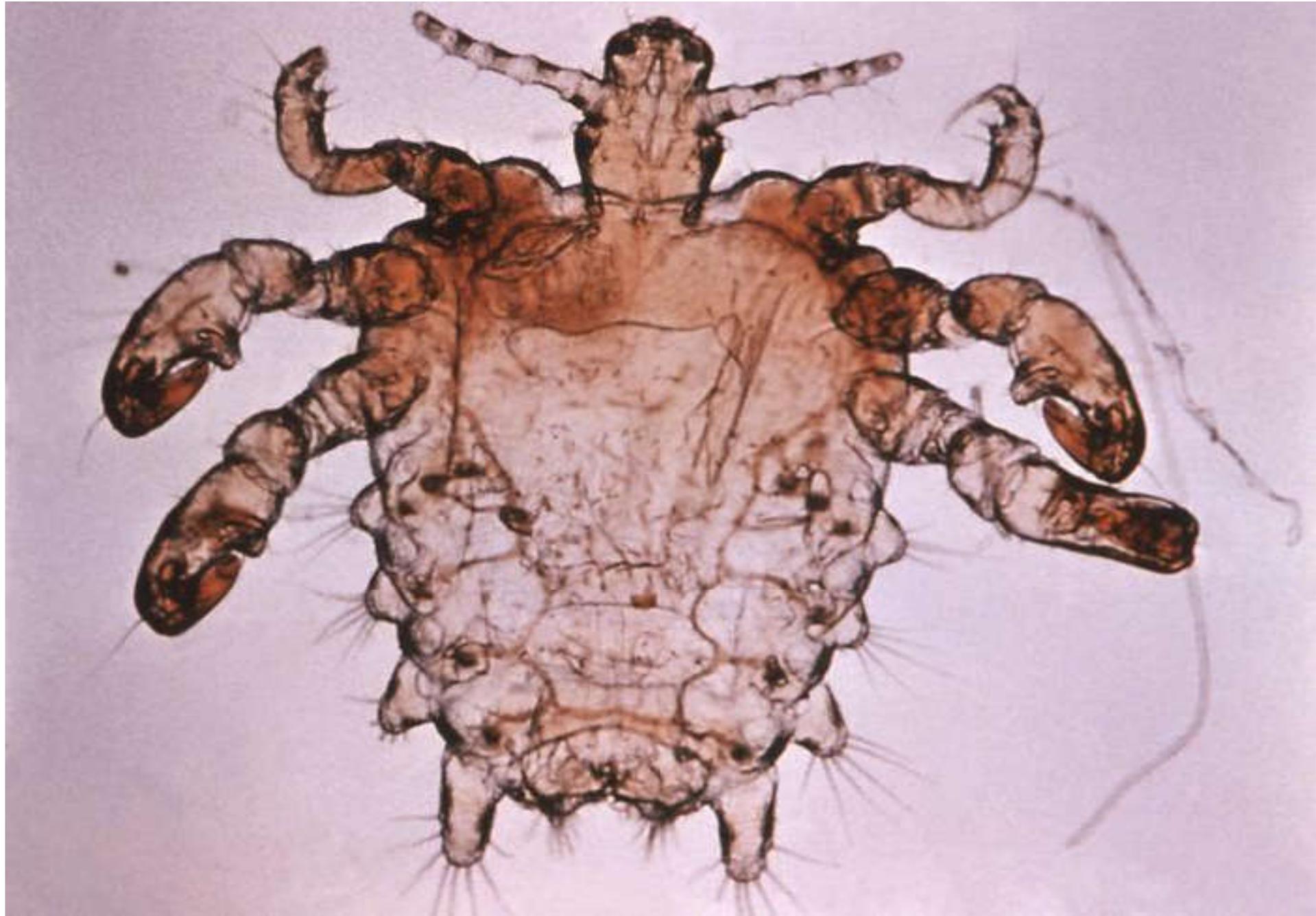
Pubic lice: usu found in pubic hair but are adapted to any other type of coarse hair (armpit region etc.)

All of the lice types are six-legged

Differ on the basis of morphology (see pictures, especially pubic lice), where they can be found as discussed above, and size



A magnified crab louse



## All three types of lice:

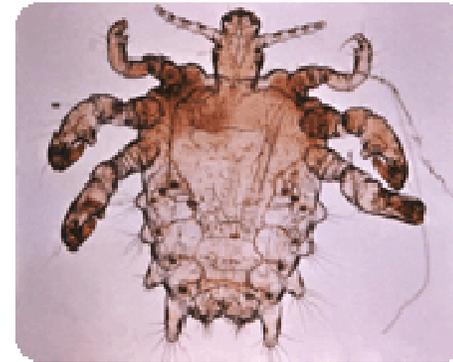
- Are ectoparasites: lice live on the surface of the host
- Move by crawling, as opposed to flying
- Have humans as their only host
- Have similar life cycles



Head Lice



Body Lice



Pubic Lice

Ectoparasite: lives on surface of host, as opposed to inside the body (endoparasite) as with many other parasites we've seen. **Do** need blood meals to survive.

Move by crawling: as opposed to flying or hopping, which affects the control and prevention measures needed. Feet are specifically adapted to human hair (cannot survive for that long if they fall off a human.) They can only live 1-2 days if they fall off of a human host. See photo on the top right of the slide for a zoomed-in look at the hooks on louse feet adapted to clinging to human hair.

Humans as only host. There is no animal reservoir, which makes control measures different and potentially simpler than other parasites.

# What Do Pubic Lice Look Like?

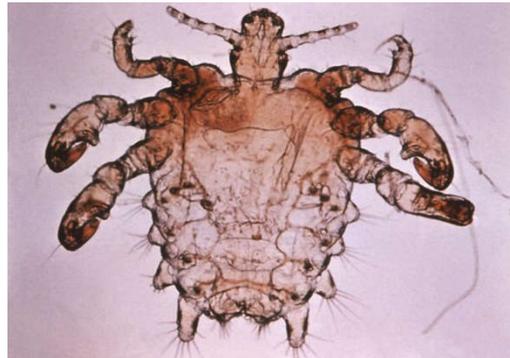
- Pubic lice have forms: the egg (also called a nit), the nymph, and the adult.
- **Nit**
  - Nits are lice eggs.
  - Hard to see and are found firmly attached to the hair shaft.
  - They are oval and usually yellow to white
  - Pubic lice nits take about 6-10 days to hatch.



- **Nymph:**
  - immature louse that hatches from the nit (egg). A nymph looks like an adult pubic louse but it is smaller.
  - Pubic lice nymphs take about 2-3 weeks after hatching to mature into adults capable of reproducing.
  - To live, a nymph must feed on blood.



- Adult:
  - Adult pubic louse resembles a miniature crab when viewed through a strong magnifying glass.
  - Pubic lice have six legs; their two front legs are very large and look like the pincher claws of a crab. This is how they got the nickname "crabs."
  - Pubic lice are tan to grayish-white in color.
  - Females lay nits and are usually larger than males.
  - To live, lice must feed on blood.
  - If the louse falls off a person, it dies within 1-2 days.



# Lice Life Cycle

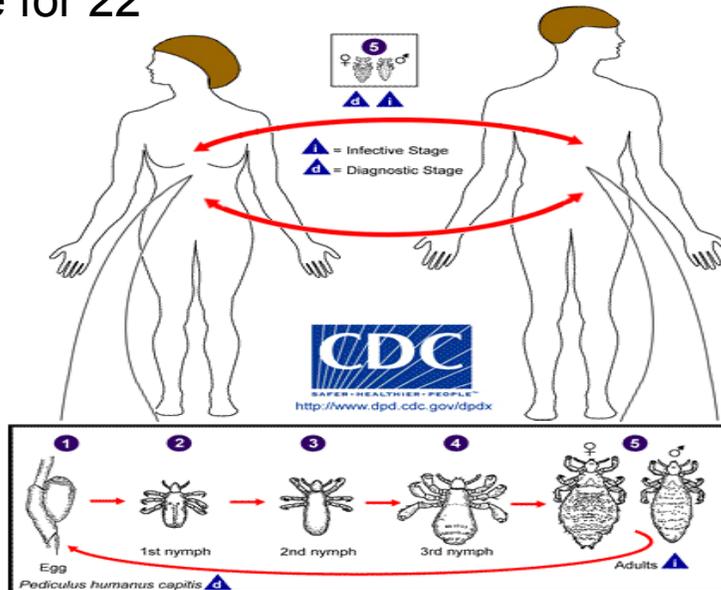
## Lice stages:

1. Egg/nit (The incubation period of the egg is 6-10 days)
2. Nymph (3 molts)
3. Adult

Both nymphs and adults take blood meals from the human host.

The life-cycle from egg to adult is 22-27 days.

The average adult female lives for 17 and the male for 22 days.



## Egg/nit

The egg/nit is usually located no more than 1/4 inches from the base of the human hair scalp.

It's attached by a sticky glue-like substance secreted by the adult louse, which is what allows it to stick to the human hair. Takes 8-9 days to hatch.

## Nymph

There are three molting stages. Takes the nymphs approximately one week in total to move into the adult stage. The nymphs must take a blood meal in order to move on the next molting stage (therefore need three blood meals in total.)

## Adult stage.

Can live up to 30 days on the human host. Die within 1-2 days without the human host.

All adult lice need a blood meal in order to survive (nutrients). Females need it in particular for oviposition.

All of these stages are SMALL! See reference photo of the stages.

## Epidemiology

- Pubic lice usually infect a new host only by close contact between individuals, usually through sexual contact.
- Parent to child infestations are more likely to occur through routes of shared towels, clothing, beds or closets.
- Adults are more frequently infested than children.

# Transmission

- During sexual contact when two people bring their pubic areas together
- Lice can live away from the body for as long as 2 days-- can drop off onto underclothes, bedsheets, etc...
- Therefore, it is possible to get pubic lice by sleeping in someone's bed or wearing someone's clothes
- Condoms do not prevent the spread of pubic lice.
- Nonsexual transmission of public lice is also possible

## Clinical Manifestations

- Infestation with pubic lice is called Phthiriasis or Pediculosis pubis.
- Although any part of the body may be colonized, crab lice favour the hairs of the genital and peri-anal region.
- Especially in male patients, pubic lice and eggs can also be found in hair on the abdomen and under the armpits as well as on the beard.

- The main symptom is itching, usually in the pubic hair area. It results from hypersensitivity to louse saliva, and it becomes strong enough two or more weeks following initial infestation.
- In the majority of infestations a characteristic grey-blue or slate coloration appears (maculae caeruleae) at the feeding site, which may last for days and is also characteristic for the infestation.



## Diagnosis

- A pubic louse infestation is usually diagnosed by carefully examining pubic hair for nits, nymphs and adults.
- Lice and nits could be removed either with forceps or by cutting the infested hair with scissors.
- A magnifying glass or a stereo-microscope can be used for the exact identification.
- If lice are detected in one family member, the entire family needs to be checked and only those who are infested with living lice should be treated.

## Treatment

- medicinal lotion (1% permethrin or pyrethrin) applied to all affected areas + all areas w/body hair (genitals, armpits, scalp, even eyebrows);
- They can be used for this purpose and are the drugs of choice for pregnant or lactating women. These agents should be applied to the affected areas and washed off after 10 minutes.
- Ivermectin paralyzes and kills lice and their eggs

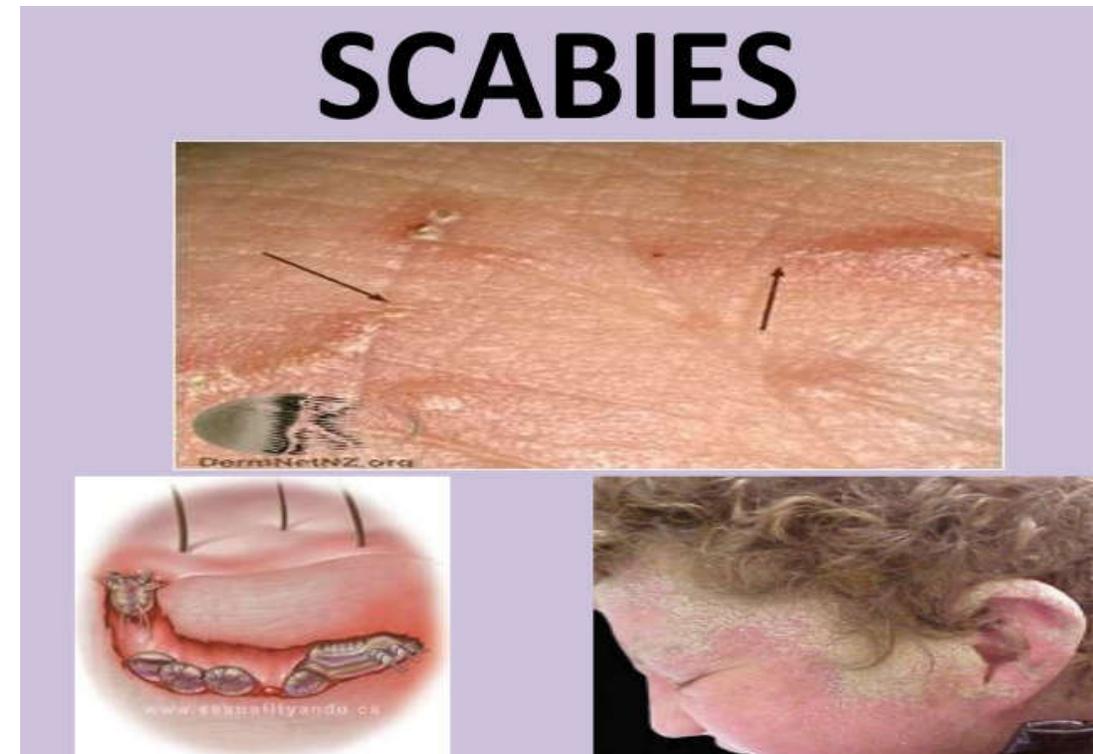
- Shaving off or grooming any hair in the affected areas with a fine-toothed comb is necessary to ensure full removal of the dead lice and nits, though it does not suffice as treatment on its own.
- Wash all clothes and bedding that were exposed

**Scabies** is a contagious ectoparasite skin infestation characterized by superficial burrows and intense pruritus (itching).

It is caused by the mite *Sarcoptes scabiei*.

The word *scabies* itself is derived from the Latin word for "scratch" (scabere).

<https://www.youtube.com/watch?v=5Fsp4z710dw>



# Scabies

Scabies is highly contagious and can be spread by scratching, picking up the mites under the fingernails and simply touching another person's skin.

They can also be spread onto other objects like keyboards, toilets, clothing, towels, bedding, furniture, and anything else that the mite may be rubbed off onto, especially if a person is heavily infested.

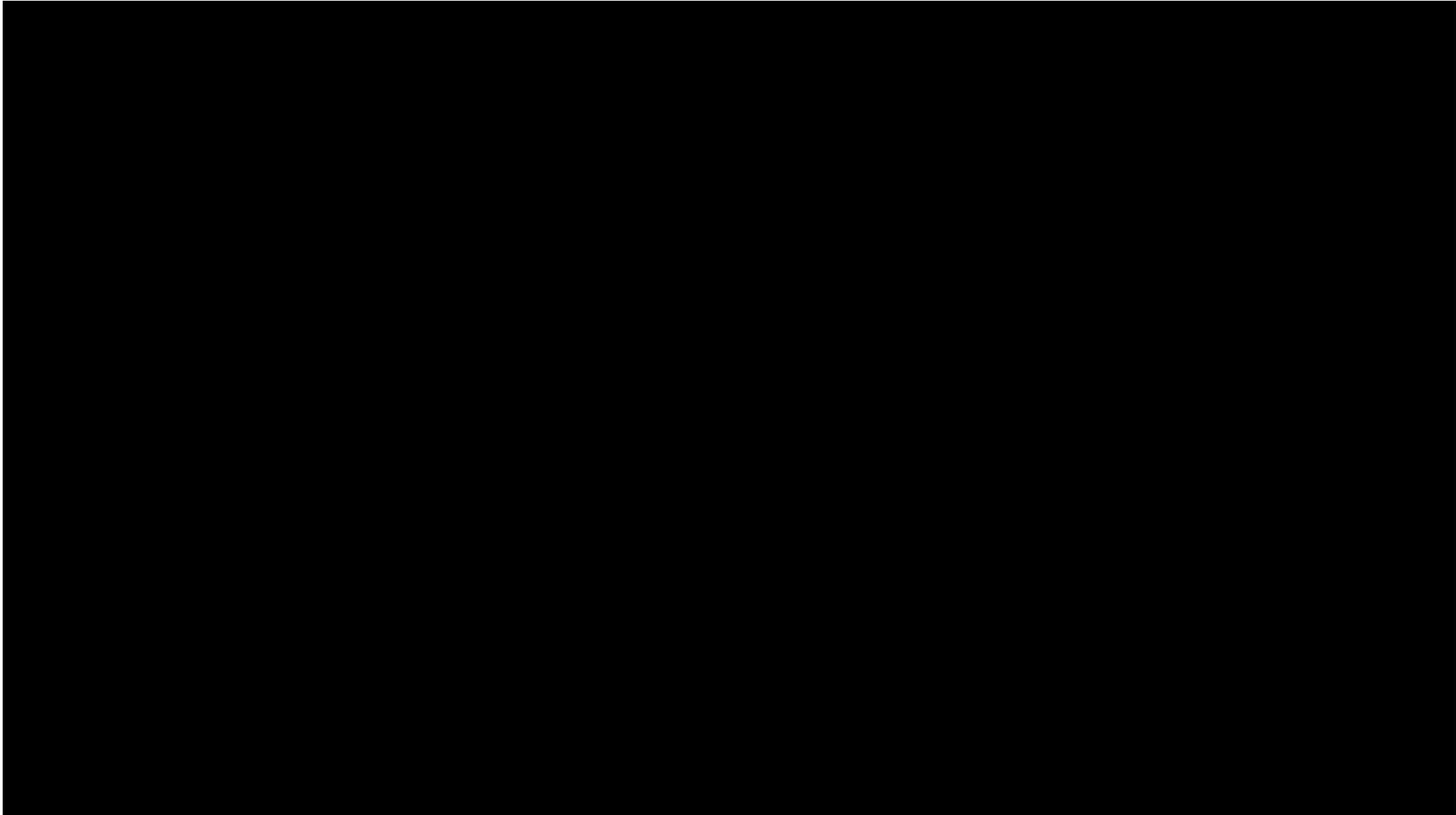
The parasite can survive up to 14 days away from a host, but often do not survive longer than two or three days away from human skin.<sup>[</sup>

Feed on dissolve tissue not blood

# Scabies

When a human comes into contact with the female mite, it burrows under the skin, laying eggs along the lines of its burrow. These eggs hatch, and the resulting offspring rise to the surface of the skin; mate; and repeat the cycle causing red lesions.

A delayed hypersensitivity (allergic) response resulting in a papular eruption (red, elevated area on skin) often occurs 30-40 days after infestation. While there may be hundreds of papules, fewer than 10 burrows are typically found.



## The burrow

- A fine, wavy and slightly scaly line
- A few mm to one cm long.
- A tiny mite may sometimes be seen at the end of the burrow.
- Mostly in the webs of fingers, flexing surfaces of the wrists, around elbows and armpits, areolae of the breasts in females and on genitals of males, along the belt line, and on the lower buttocks.
- The face is usually not involved.



## Classical Scabies



## Diagnosis

- Diagnosis can be made simply by observing the characteristic burrows of the mites causing scabies.
- A sterilized needle can be used to explore the pearly bump at the end of a burrow, remove its contents, and place it on a slide to be examined. The mite itself may then be identified.

## Treatment

- Treatment by several types of lotions (usually containing 5% **Permethrin**) can be applied to the body and left on for 12 to 24 hours. One topical application is usually sufficient.
- Itching can be lessened by the use of **calamine lotion** or antihistamines.

## Prevention

- Good hygiene is essential in the prevention of scabies.
- When a member of a household is diagnosed with scabies, all that person's recently worn clothing and bedding should be washed in very hot water.



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