

A school medical inspection carried out at a primary school in Gampaha district has revealed several children with itchy skin lesions in their finger webs.



SCABIES AND MEDICALLY IMPORTANT MITES

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Objectives:

- List medically important mites
- Describe medical importance of mites
- Able to identify Scabies mite and other medically important mites
- Discuss on clinical features, diagnosis and management of scabies

MITES :

- Morphologically similar to ticks
- Smallest arthropods (0.1mm – 2mm)
- Arachnida differ from Insects due to
 - Lack of antennae and wings
 - Unsegment body

Medical importance of mites;

1. Cause diseases in human

Scabies – infestation of *Sarcoptes scabiei* mite

Dermatitis - caused by follicle mites

House dust allergies - caused by house dust mite

Dermatophagoides pteronyssinus

2. Transmit infections

Scrub typhus – transmitted by Trombiculid mite

Sarcoptes scabiei Mite

Order: Astigmata

Class: Arthropod

Family: Sarcoptidae

Sarcoptes scabiei is an Obligatory parasite of man

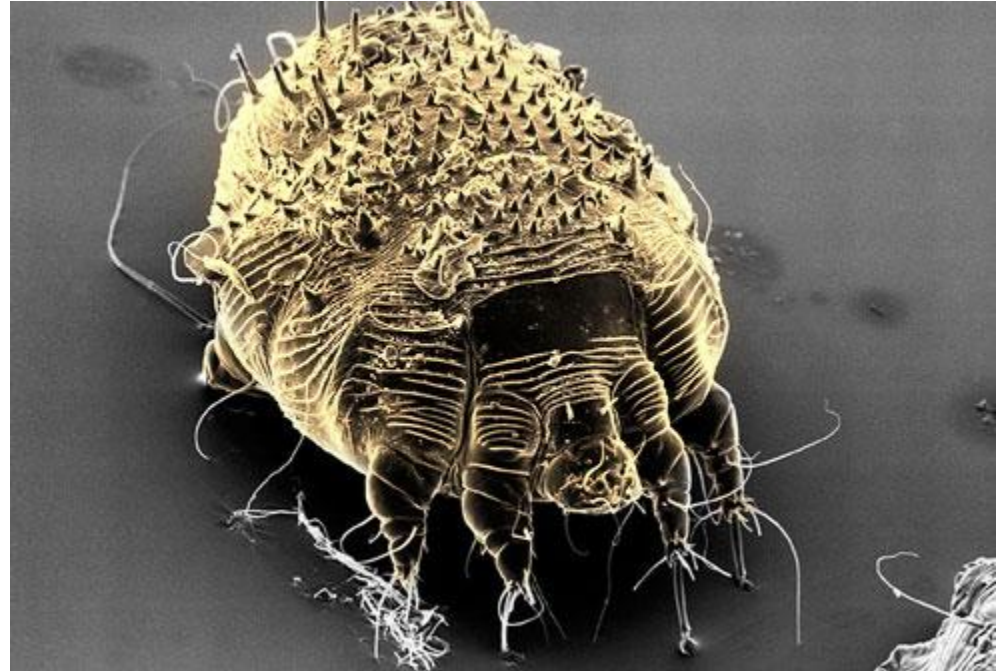
Sarcoptes scabiei var *hominis*

“Human itch mite”

Different biological forms in dogs, horses and other animals - but rarely infest humans

Distribution:

- Worldwide occurrence
- 300 million new cases each year
- Highest burden in developing world & tropics



Importance:

- Health issue in the developing countries
- Listed by WHO as a NTD in 2013
- Outbreaks in developing countries-significant cost to the health services
- International Alliance for the Control of scabies
 - Standardize diagnostic criteria
 - a point-of-care diagnostic test

Is a common skin condition,

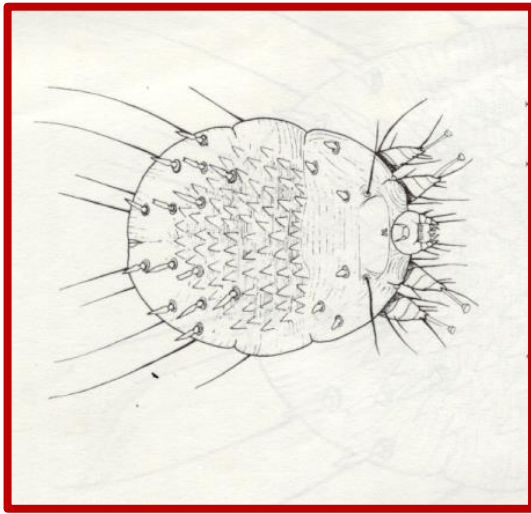
- Affecting any age, gender, ethnicity, socioeconomic status
 - Developed nations- all ages equally affected
 - Developing nations- higher among pre school children & elderly people
- Higher prevalence in institutional environments
- Overcrowding, poor hygiene and poverty are main risk factors

Morphology:

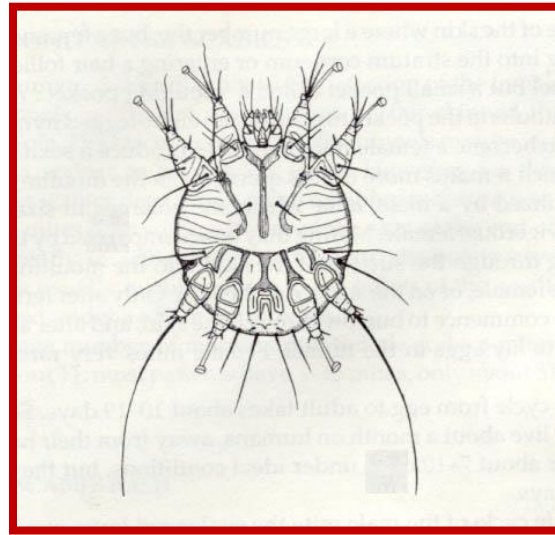
- Female (0.3-0.4mm) are just visible to naked eye
- Whitish disk shaped
- Convex dorsally and flattened ventrally



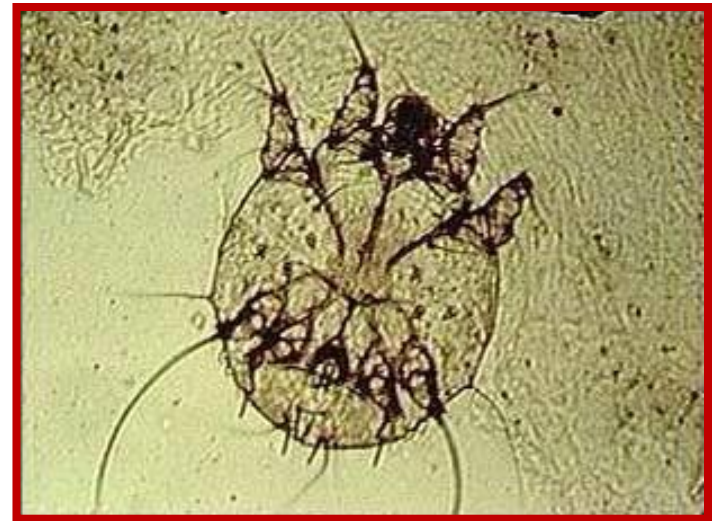
- Many peg like projections on the dorsal surface
- Few bristles on the dorsal surface
- Series of cross lines on the dorsal and ventral surfaces gives a striated appearance
- Head not well developed
- Mouth parts project from body



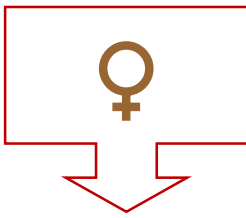
Dorsal view - Female



Ventral view - female



Ventral view - Male



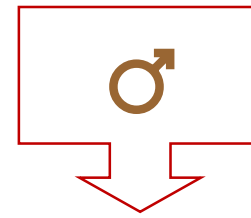
0.3mm – 0.4mm

Twice the size of male

**1st and 2nd pairs contain
suckers**

**Surface of the ♀ is
covered with fine
transverse striations.**

**Dorsal surface bears a
number of specialized
spines**

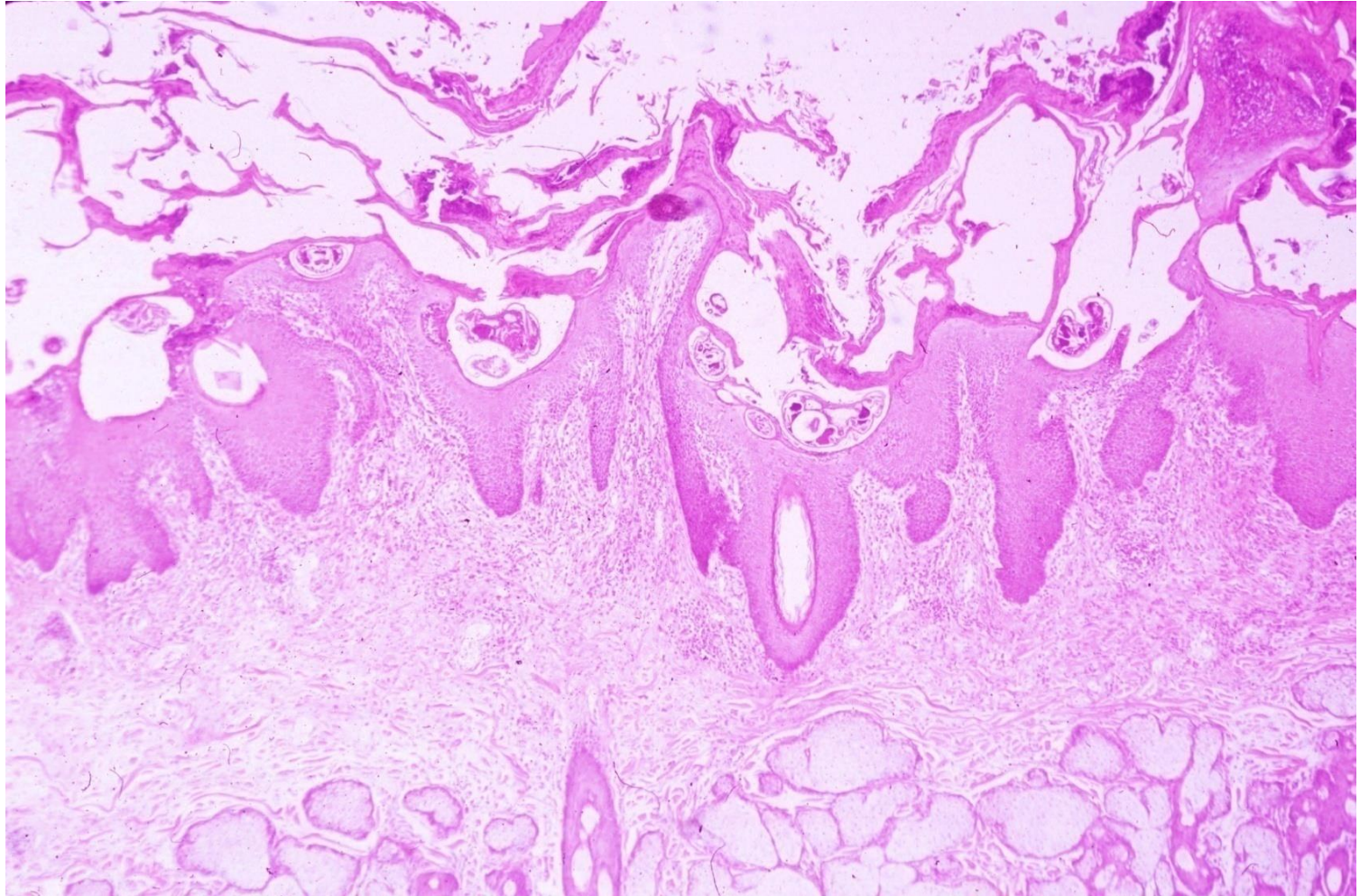


0.2mm

Smaller

**1st 2nd 4th pairs contain
suckers**

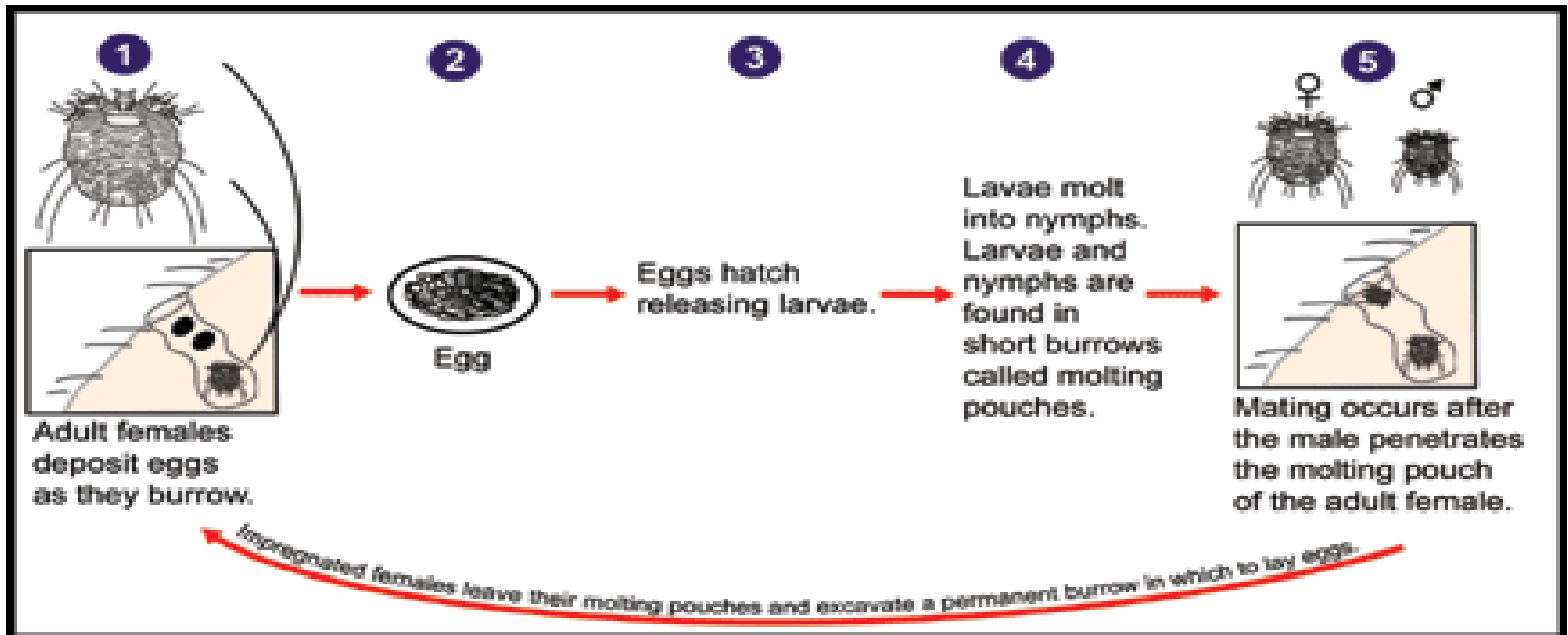
Scabies mite in situ;



The mites burrow into the upper layer of the skin but never below the stratum corneum.

LIFE CYCLE :

- Female mites select places of the body, where the skin is thin and wrinkled
- Between fingers, elbows, feet, penis, scrotum, buttocks, axillae etc.
- Majority in hands, do not affect the face of adults



Mites dig into the surface layer of the skin
(Stratum corneum)



Using the cutting edges of the tibia of the front pair of
legs and sharp chelicerae of the mouth parts



Burry themselves within one hour

Females excavate in winding tunnels(2-3mm per day)



Results in thin twisting lines on the skin (few mm to several cm)



Mites feed on liquids oozing from the dermal cells



Lay 2 - 3 large eggs; defecates daily



Six legged larvae emerge, crawl out of tunnel to surface



Large number die and few burrow into the surface layers



Few enter into hair follicle to produce a pocket called ‘molting pocket’

Larvae feed on damaged skin cells



In 2-3 days

Eight legged nymphs

Nymph



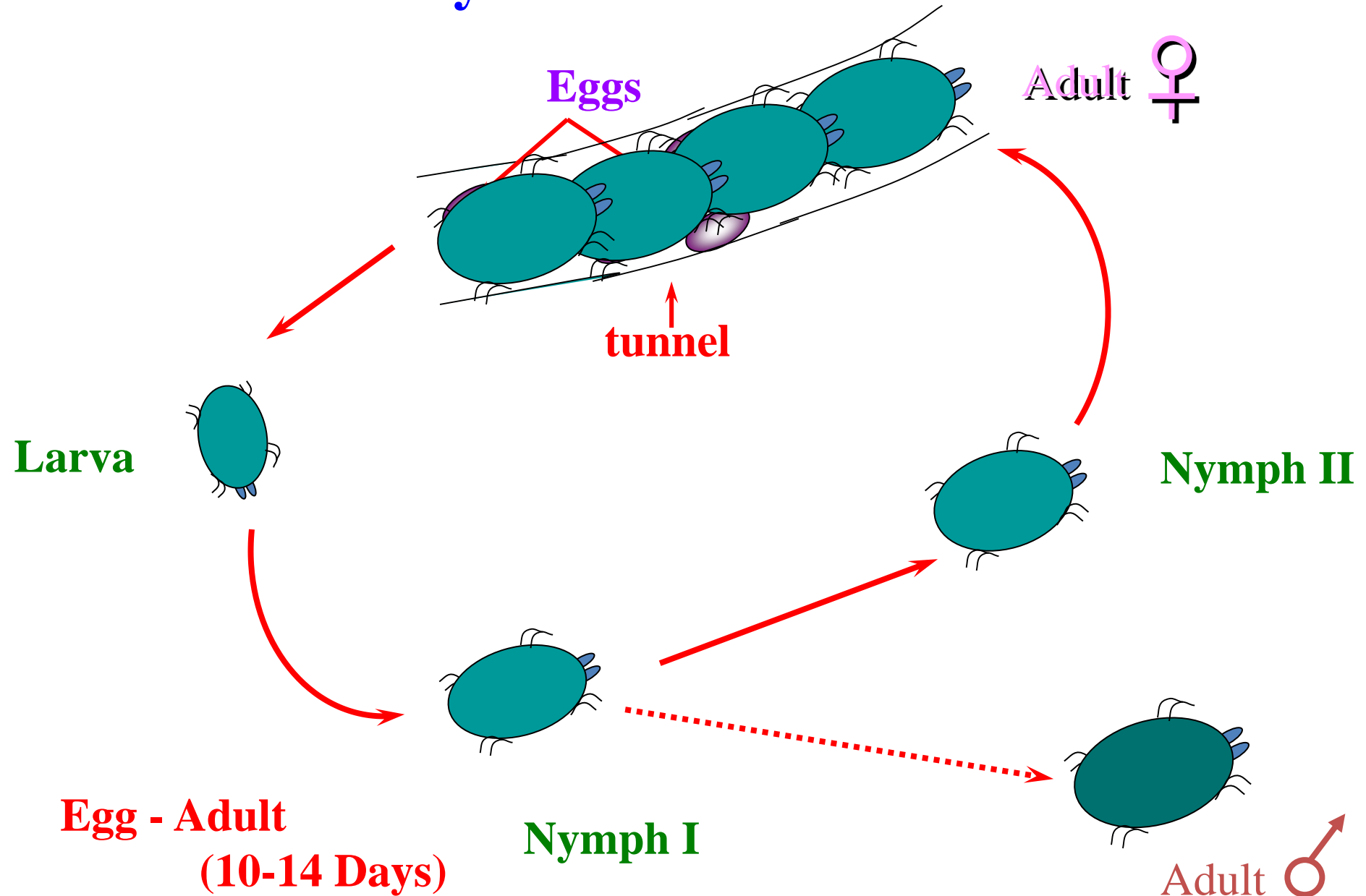
Immature female mite



Remains in the pocket till mature and mates with a male

Mating takes place when a male burrows through the surface of the skin to molting pocket or on the surface

S. scabiei Life cycle



Transmission:

- Either larvae or female mites spread the infestation

- Transmitted only by **close contact**

“a family infection”

- Living in close association
 - when sleep together in the same bed
- In overcrowded situations with inadequate water supply and poor hygiene
- Possible to get infected by sleeping in a bed formerly used by an infected person

Incubation period: 6 - 8 weeks

When a person is infested with scabies mites for the first time,

- symptoms do not appear for up to two months
(2-6 weeks) after being infested

But, an infested person can spread scabies during this time even though he/she does not have symptoms

Clinical features:

- Start as slightly raised, itchy papule at the site of each mite
- Scratching may destroy the mite and papule
- Become a pustule
- Local sensitization followed by appearance of a rash

Nocturnal itching

- Later may progress to a generalized rash
- Distribution does not correspond to the site of mite
- Difficult to demonstrate mites
- Eruption occurs most commonly in axillae, around waist, inner thighs, back of legs etc.



Detection and identification of Scabies infestation:

- By detecting females in twisting tunnels
- Tunnels – readily seen in fair skinned than in dark skinned people
- Pepper like spots in tunnels are due to faeces



- Removing and identifying mites is more reliable
- Surface layer of the skin at the end of the tunnel
scratched away with a fine needle and mount on to
a glass slide and examine under x40 of light
microscope

Treatment and Control

- Curable
- No resistant to available treatment
- Use Scabicides to treat primary infection
- Secondary infections are treated with antibiotics
- Health education
- Treat to contacts

Scabicides

Numerous organic and inorganic compounds are in use;

- Benzyl Benzoate

25% Adults ,12.5% Children

- 10% Sulphur preparations (for infants)

- 5% Permethrin (above 2 months of age)

- 1% Lindane solution (not for infants & pregnant women)

- After a bath apply BB emulsion neck down wards
- After 5-10 min. patient can redress
- Second bath after 24 hrs.
- Repeat treatment in 7 days time
- Important to treat whole family

- Wash clothes using hot water
 - 10 minutes at 50°C kill mites
- All the personal items need to be dry-cleaned
- Change the bedding or keep bedding unused for 4 days

Crusted (Norwegian) scabies:

- Rare
- Patient has very large no of mites but little itching
- Thick crusts form on hands and feet
- Scaling eruptions over rest of the body
- Seen among elderly and immuno-compromised patients (esp. HIV)
- Highly infectious



Scrub typhus mites: (Trombiculid mites)

Order: Prostigmata

Family: Trombiculidae

Important spp. are,

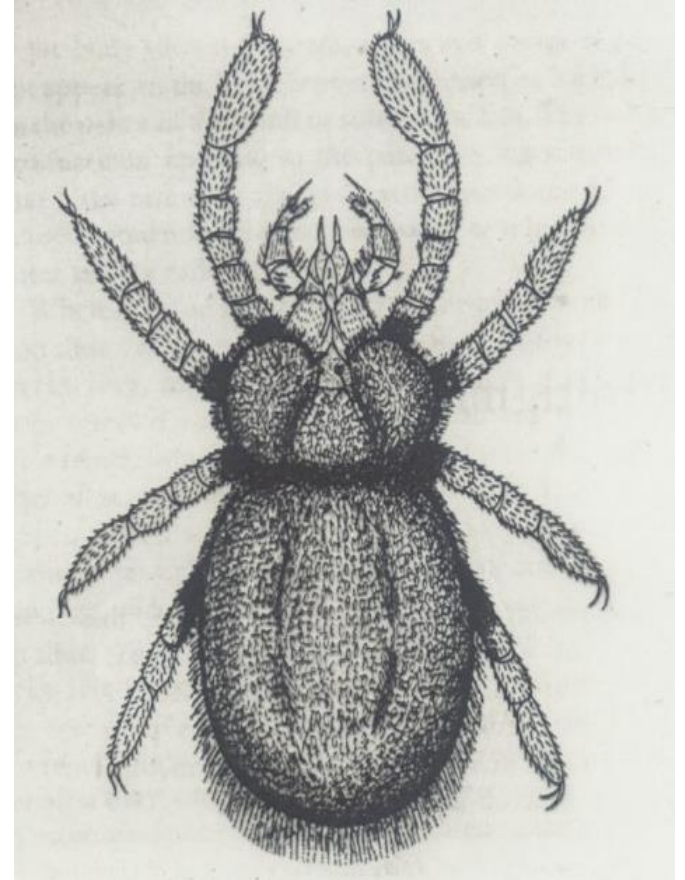
Leptotrombidium akamushi

Leptotrombidium fletcheri

Larval trombiculid mites are called “chiggers” or “red bugs”

Morphology:

- Adults small 1-2mm
- Usually reddish
- Numerous feathered hairs on dorsal & ventral sides
- Velvety appearance
- Four pair of legs ending in paired claws

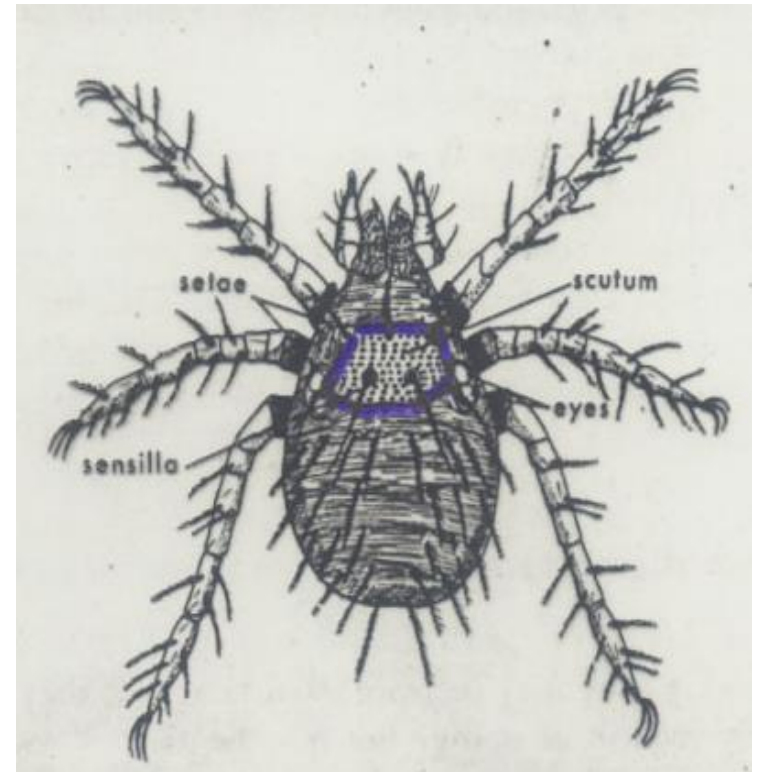


- Body is constricted between 3rd & 4th pairs of legs ----- resembles figure of 8
- Palp & mouth parts clearly visible from above
- Nymphs resemble adults; smaller
- Only larvae are parasitic
- Larvae very small 0.13-0.3mm
- May increase six folds when engorged

- Both legs & body are covered with fine feathered hairs
- Pentagonal or rectangular scutum present on dorsal side (hardly visible)



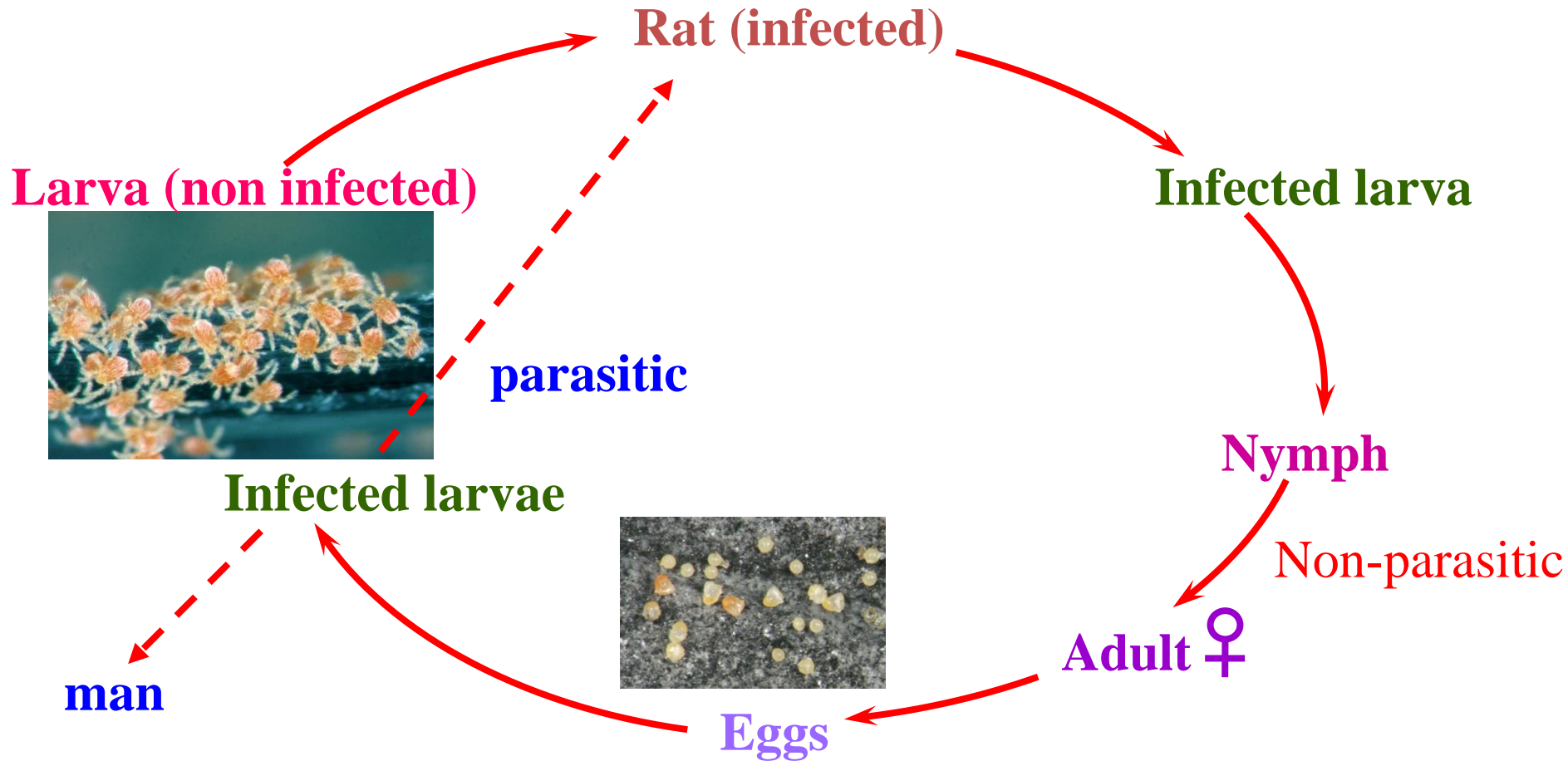
Eggs



Larvel trombiculid

Scrub typhus

Maintenance in wild rodents



Once a larva is infected, the infection is passed onto next generation - **transstadial** and **transovarial passage**

Medical Importance :

1. Nuisance

Several spp. of trombiculids attack man. Do not transmit disease. But causes intense itching & irritation (Scrub Itch)

2. Scrub Typhus (Tustsugamushi disease)

- Caused by *Rickettsia tustsugamushi*
- Restricted to Asia (including Sri Lanka)
- Regarded as a zoonosis (from mice & rats)
- Larvae are found on ground and climb up on grasses
- In man they search for areas where clothing is tight against skin - waist, ankles

- Main symptoms of the disease are
 - fever
 - wound at the site of the bite
 - spotted rash on the trunk
 - lymphadenopathy
- Complications: alteration of consciousness, splenomegaly, myocarditis
- untreated cases mortality - 30%



Diagnosis:

- Clinically
- Serology

Weil- Felix reaction – non specific

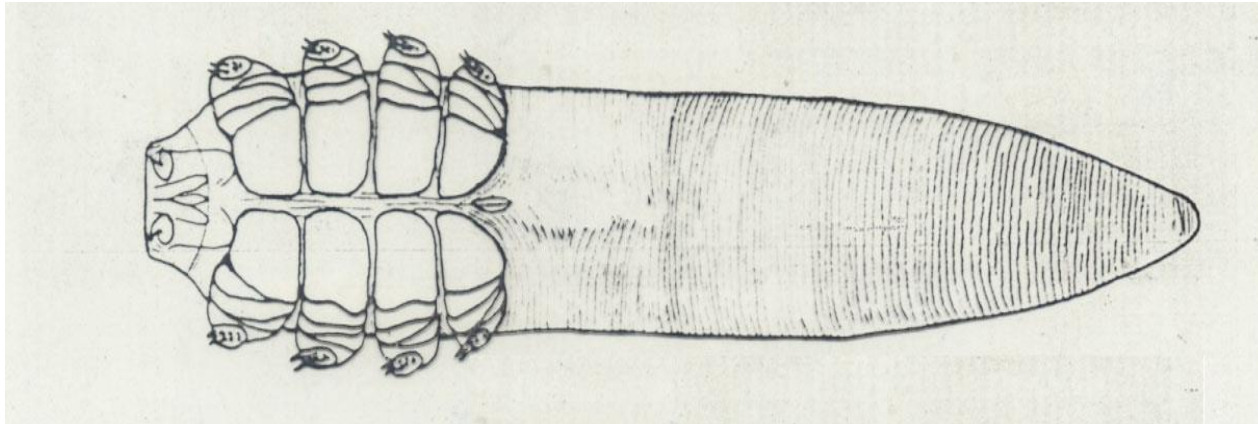
Complement Fixation - Specific

Treatment:

Antibiotics – Tetracycline / Chloramphenicol

Follicle Mites

Demodex folliculorum



- Striated body, four pairs of short stubby legs
- Remarkably non-mite like
- Found in hair follicles & sebaceous glands
- Feeds on subcutaneous tissue
- Common on nose, eye lids, cheeks
(adjacent to nose)
- Usually no adverse effects, sometimes
dermatitis

House dust mite:

- * Many species found in house dust



- * Sensitised individuals –
Bronchial Asthma



- Extensive Dermatitis

- * Potent allergens in – Living mites

- Dead mites

- Mite feaces



Thank you