

## Medical Entomology in Australia

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**Scope:** lice, mites, bugs, fleas, biting flies.

- University of Sydney **Medical Entomology website**

## Medical significance

- Antigen present in saliva, but some reactions are atypical
- Urticarial – hairy caterpillars
- Venoms – anaphylactic reactions, toxicosis (e.g. ticks bites)
- Infections
- Mental trauma

**Lice.** Many animals have resident lice. Few persist or survive on humans, but we have our own human lice species. Both male & females have a blood meal. Body & head lice difficult to distinguish – ecological species. Infectious agents are inoculated with louse faeces during scratching, but by body lice only. Head lice are common in children, have reduced motility in wet hair. Body lice prefer to live on clothing, increasingly resistant to insecticides. Infections associated with lice include:

- Epidemic typhus (*Rickettsia prowazekii*)
- Relapsing fever (*Borellia recurrentis*)
- Trench fever (*Bartonella quintana*)
- Head lice – nits = vacated eggs

Public lice may attach to eyelashes in children, following transmission from parents. No disease convincingly associated. Treatment with Lindane, permethrin based cream.

**Mites.** For humans this includes scabies mites, the follicle mite (*Demodex folliculorum*, not associated with human disease) and house dust mites. Also bird & rat mites, chiggers. Scabies may be difficult – may not be there in the first place, or may be there but impossible to prove.

The rash does not occur at adult mite location. They burrow around wrists and hands. Crusted scabies (aka 'Norwegian scabies') causes very thick skin. Lowered immune response & unable

to scratch. To demonstrate mite, keratin needs dispersing with KOH or lactic acid. Burrows difficult to see. Scraping around nodules. Treatment – permethrin = insecticide of choice. Itch may continue for more than a month afterwards.

Garden mites. *Leptotrombidium deliense* in wet tropical parts of northern Australia. Vector for *Orientia tsutsugamushi*,

cause of

[scrub typhus](#)

. Rodents = part of life cycle. Infection often causes eschar at bite site.

**Bugs.** No blood-sucking Triatomid bugs in Australia, but related species are present. Still capable of causing pain and skin reaction at site of bite. [Bedbugs](#) are common, proliferating worldwide as a result of travel, particularly backpacker & budget hotels. No transmission of infection, but considerable nuisance value, allergic reactions, anaemia, asthma & mental trauma.

**Fleas.** “cat” flea, *Ctenocephalides felis* on cats & dogs. Human flea, *Pulex irritans*, also on pigs). Most other animals species have fleas close to the skin of the host. *Xenopsylla cheopis*, rat flea, is plague vector. Has no combs and a distinctive shape to bursa populatrix. Bite reactions vary from mild to severe. Murine typhus has been documented in Australia. Highly specialised species

*Tunga penetrans*

(chigoe) in Africa & South America. Female buries herself head first into skin and becomes an egg factory.

**Ticks**, arachnids. Soft ticks include vectors for relapsing fever (*Borrellia duttoni*) but not in Australia. Kangaroo soft tick around nesting areas. Hard ticks transmit arboviruses (not in Australia, rickettsias and possible

*Ehrlichia*

. Many eggs are laid since most die before finding a host. Male tick lacks blood sack, doesn't take blood meal directly. In Australia,

*Ixodes holocyclus*

– rickettsias & toxicosis. Has caused deaths, mainly in children. Also unsteady gait, progressive paralysis, Bell's palsy & respiratory paralysis. Doesn't stop with removal of tick. Mild, severe or lethal anaphylactic reactions.

*Ix cornuatus*

– toxicosis only.

*Ix* holocyclus also responsible for spotted fever rickettsioses including Queensland tick typhus. Flinders Island spotted fever and Australian spotted fever. Triad of fever, rash & eschar. Others include

*Amblyomma triguttatum*

– kangaroo hard tick in WA.

*Rhipicephalus sanguineus*

– can bite humans.

**Butterflies & moths.** Larval stages have urticating hairs of various structures, some hollow or with fragile tips, leading to different delivery mechanism. E.g cup moth & white-stemmed gum moth.

### Biting flies

- Biting midges ('sandflies')
- Mosquitoes
- March flies, following floods, Tabanidae, anaphylaxis in Pilbara & Kimberley
- Black flies

**Mosquitoes.** Mosquito-borne diseases: local & introduced

Surveillance of [mosquito vectors important in Australia](#)

- *Aedes notoscriptus* associated with domestic containers
- *Culex quinquefasciatus*, brown house mosquito mainly of nuisance value, not that significant as disease vector
- *Culex annulirostris*, important as main arbovirus vector in Australia
- *Aedes vigilax*, salt marsh species left after high spring tides

**Non-biting flies** – chironomids, nuisance, moth flies; rat-tail maggots & hover flies

**Myiasis.** Invasion of tissues by larvae of non-biting flies. *Dermatobia hominis*, south & central

America. Human bot fly causes lesion with appearance of a boil.

This species captures biting fly and uses it to lay its own eggs.

*Cordylobia anthropophagia*,

Tumbu fly in Africa. Facultative myiasis – blowflies, use in debridement of wounds & ulcers, reintroduced due to antibiotic resistance. Avoid in fistulas & bleeding wounds [

*Lucilia sericata*

– sheep blowfly for maggot therapy]

**Notes by MicroGnome, AUG-2010**

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