

Intermediary Arthropod Hosts and Mechanical Carriers of Human Disease in the Australian Region.

By Frank H. Taylor, F.R.E.S., F.Z.S., School of Public Health and Tropical Medicine, University of Sydney.

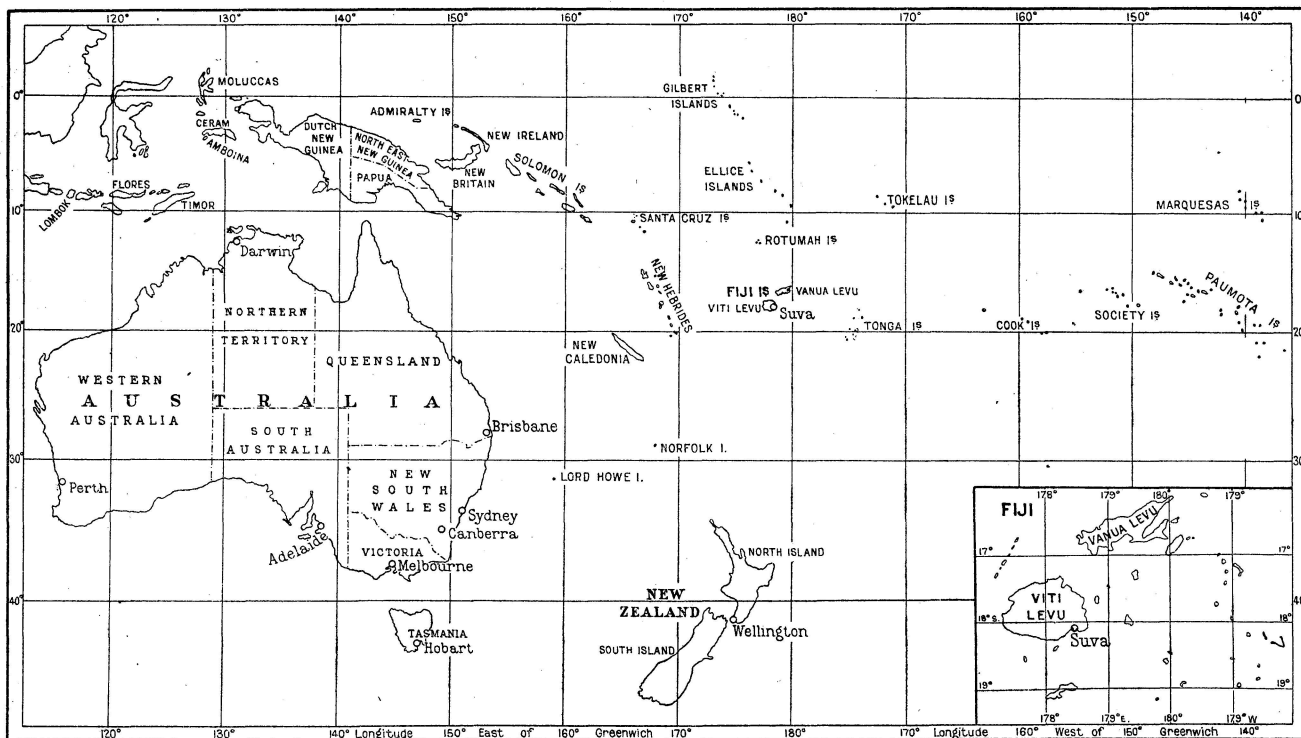
An attempt has been made to bring together in tabular form a list of the more important insects and other arthropods concerned in the causation of disease in the Australian region.

The list was prepared for the assistance of students in the Diploma of Tropical Medicine, and as a handy table of reference for the ordinary worker as distinct from the research worker, hence the absence of references to literature.

Exception may be taken that "man" is placed as the "normal host" of various mosquitoes. This has been done deliberately, although it is well known that some species of mosquitoes prefer the blood of cattle to that of man. Certain flies such as the blow-flies capable of carrying disease germs, but not proved to do so, have been deliberately omitted as tending to make the table too cumbersome.

My cordial thanks are due to Dr. A. H. Baldwin, of this school, for much helpful criticism.

MAP SHOWING THE AUSTRALIAN REGION



The Australian Region includes Australia, New Guinea, the Moluccas, and the Pacific Islands. It is separated from the Oriental Region by a line drawn between Bali and Lombok islands (called Wallace's Line) passing thence through the Flores and Molucca Seas, between the islands of Celebes on the one side and Flores, &c., on the other. Besides this the Australian Region includes all the Islands of the Pacific from the Peleus and Ladrones in the north-west to the Sandwich Islands in the north-east, the Marquesas in the south-east and New Zealand and its neighbouring islands in the south-west—W. L. and P. L. Scater, *The Geography of Mammals*,

INTERMEDIARY ARTHROPOD HOSTS AND MECHANICAL CARRIERS OF DISEASE IN THE AUSTRALIAN REGION.

Family and Species.	Role played.	Normal host.	Disease.	Breeding habits.	Locality.
ORDER DIPTERA.					
Family Culicidae.					
1. <i>Anopheles amictus</i> Edwards	Intermediary host	Man	Filariasis — <i>Wuchereria bancrofti</i>	Permanent and casual sunlit water	North Australia, Dutch New Guinea.
2. <i>Anopheles annulipes</i> Walker	Intermediary host	Man	Malaria—B.T. (unpublished work of Dr. G. M. Heydon)	Permanent and casual sunlit water	Australia and Tasmania.
3. <i>Anopheles bancrofti</i> Giles	Intermediary host	Man	Malaria—type not stated.	Semi-shaded permanent and casual water	Australia, Dutch New Guinea, Territory of New Guinea and Papua.
4. <i>Anopheles barbirostris</i> Van der Wulp	Intermediary host	Man	Malaria—M.T., B.T.; Filariasis— <i>Filaria malayi</i>	Semi-shaded permanent and casual water	Dutch New Guinea, Moluccas, Timor.
5. <i>Anopheles kochi</i> Dönitz	Intermediary host	Man	Malaria—M.T., B.T.	Rice fields, buffalo wallows, wheel tracks, drains contaminated with sewage, &c.	Lombok, Amboina, Flores, &c.
6. <i>Anopheles maculatus</i> Theobald	Intermediary host	Man	Malaria—M.T.	Pools in cleared hill areas, running water free of vegetation	Flores, Timor.
7. <i>Anopheles minimus</i> Theobald	Intermediary host	Man	Malaria—M.T.	Rice fields, grassy streams, irrigation areas, &c.	Moluccas, Timor.
8. <i>Anopheles punctulatus</i> Dönitz	Intermediary host	Man	Malaria—M.T.; Filariasis <i>Wuchereria bancrofti</i>	Permanent and casual sunlit water	Moluccas to 170° of west longitude. ? North Australia.
9. <i>Anopheles punctulatus</i> var. <i>moluccensis</i> Swell. & Sw. de Graaf	Intermediary host	Man	Malaria—B.T., M.T., ? Q.M. Filariasis — <i>Wuchereria bancrofti</i>	Permanent and casual sunlit water	Moluccas to the 170° of west longitude. ? North Australia.
10. <i>Anopheles subpictus</i> Grassi	Intermediary host	Man	Malaria—B.T., M.T., Q.M.	Pools, often muddy rain pools, pools contaminated with sewage	Papua, Flores, Lombok, &c.
11. <i>Anopheles tessellatus</i> Theobald	Intermediary host	Man	Malaria—M.T.	Buffalo pools, clear overgrown pools, and swamps	Lombok, Amboina, Ceram, &c.
12. <i>Anopheles vagus</i> Dönitz	Intermediary host	Man	Malaria—B.T., M.T.	Small pools and puddles, brackish water, rice fields	Timor, Moluccas, &c.
13. <i>Mansonia (Mansonioides) uniformis</i> Theobald	Intermediary host	Man	Filariasis— <i>Filaria malayi</i>	Swamps	Australian and Oriental Regions, Africa.
14. <i>Aedes (Ochlerotatus) vigilax</i> Skuse	Intermediary host—relatively poor	Man	Filariasis— <i>Wuchereria bancrofti</i>	Swamps—water of which may be fresh to brackish	Australia, New Guinea, &c.

INTERMEDIARY ARTHROPOD HOSTS AND MECHANICAL CARRIERS OF DISEASE IN THE AUSTRALIAN REGION—*continued.*

Family and Species.	Role played.	Normal host.	Disease.	Breeding habits.	Locality.
ORDER DIPTERA—contd.					
Family Culicidae—continued.					
15. <i>Aedes (Finlaya) kochi</i> Dönitz	Intermediary host	Man	Filariasis— <i>Wuchereria bancrofti</i>	In the water collected in the axils of the leaves of Pandanus, banana and taro plants, &c.	New Guinea, Papua, Solomon Islands, Tonga.
16. <i>Aedes (Stegomyia) aegypti</i> Linn.	Intermediary host	Man	Dengue fever	Any clean domestic water, roof gutters, house tanks, &c.	Tropical and sub-tropical regions.
17. <i>Aedes (Stegomyia) scutellaris</i> var. <i>pseudoscutellaris</i> Theobald	Intermediary host	Man	Filariasis— <i>Wuchereria bancrofti</i> , non-periodic type	Broken coco-nut shells, &c.	Fiji, Samoa, Tahiti, and Marquesas Islands.
18. <i>Culex annulirostris</i> Skuse	Intermediary host	Man	Filariasis— <i>Wuchereria bancrofti</i>	Swamps	Australia and Islands, widely spread.
19. <i>Culex fatigans</i> Wiedemann	Intermediary host	Man	Filariasis— <i>Wuchereria bancrofti</i>	Dirty household water, street gutters, septic tanks, &c.	Tropical and sub-tropical.
20. <i>Culex sitiens</i> Wiedemann	Intermediary host, relatively poor	Man	Filariasis— <i>Wuchereria bancrofti</i>	Swamps	Widely distributed.
Family Phoridae.					
21. <i>Aphiochaeta scalaris</i> Loew	Parasitic ..		Intestinal myiasis. No authentic cases have, so far, been recorded in Australia	Normally feeds on decaying shell fish, &c.	This fly is known as the Trochus fly in the ports of Queensland and at Thursday Island.
Family Syrphidae.					
22. <i>Eristalis tenax</i> Linn. ..	Parasitic ..		Intestinal myiasis. No authentic cases have, so far, been recorded from Australia	Rat-tailed larva—breeds in contaminated water, sewage, &c.	Common in Eastern Australia.
Family Muscidae.					
23. <i>Fannia</i> sp.	Parasitic, mechanical		Intestinal myiasis. No recorded cases in Australia. Carriers of pathogenic organisms to human food	Decaying nitrogenous matter	The "lesser house-fly", common on house windows in Australia.
24. <i>Musca domestica</i> Linn.	Mechanical ..		Carrier of pathogenic organisms— <i>Bacillus typhosus</i> , <i>B. dysenteriae</i> , <i>Vibrio cholerae</i> , <i>Entameba histolytica</i> , <i>Giardia intestinalis</i> , <i>Balantidium coli</i> ; <i>Taenia solium</i> , <i>Taenia granulosum</i> , <i>Ascaris lumbricoides</i> , <i>Trichurus trichiura</i> , Larval <i>Necator</i> , and <i>Strongyloides stercoralis</i> sometimes carried by flies	Decaying nitrogenous matter	Widely spread over the world. The "house fly."

INTERMEDIARY ARTHROPOD HOSTS AND MECHANICAL CARRIERS OF DISEASE IN THE AUSTRALIAN REGION—continued.

Family and Species.	Role played.	Normal host.	Disease.	Breeding habits.	Locality.
ORDER SIPHONAPTERA.					
25. <i>Ceratophyllus fasciatus</i> Bosc.	Intermediary host. Plague mechanical*	Rat	Tape worm— <i>Hymenolepis diminuta</i> Plague—possibly	In dust, &c., fleas, in general are common in unoccupied houses	Introduced.
26. <i>Xenopsylla cheopis</i> Rothschild	Intermediary host. Plague mechanical	Rat	Tape worm— <i>Hymenolepis diminuta</i> Plague— <i>B. pestis</i>	In dust, &c., fleas, in general are common in unoccupied houses	Introduced. The "plague flea."
27. <i>Ctenocephalides felis</i> Bouché	Intermediary host. Plague mechanical	Dog	Tape worm— <i>Dipylidium caninum</i> . Plague—possibly	In dust, &c., fleas, in general, are common in unoccupied houses	Introduced.
28. <i>Pulex irritans</i> Linn. ..	Intermediary host. Plague mechanical	Man Dog, occasionally.	Tape worm— <i>Dipylidium caninum</i> . Plague— <i>B. pestis</i>	In dust, &c., fleas, in general, are common in unoccupied houses	Introduced.
29. <i>Leptopsylla Segnis</i> Schon.	Mechanical	Rat, Mouse	Plague—possibly ..	In dust, &c., fleas, in general, are common in unoccupied houses	Introduced.
ORDER ANOPLERA.					
Family Pediculidae.					
30. <i>Pediculus humanus</i> var. <i>capitis</i> De Geer	Mechanical	Man	Louse typhus	Eggs laid on hair of human head	Widely distributed—introduced. The "head louse".
30A. <i>Pediculus humanus</i> var. <i>corporeo</i> De Geer	Mechanical	Man	Mechanical irritation ..	Eggs laid on seams of under clothing	Widely distributed—introduced. The "body louse".
31. <i>Phthirus pubis</i> Leach ..	Mechanical	Man	Mechanical irritation ..	Eyebrows and pubic hairs	Widely distributed—introduced. The "crab louse".
ORDER LEPIDOPTERA.					
Family Limacodidae.					
32. <i>Doratifera vulnerans</i> Lewin. Common name—Cup moth	Toxic irritation from hairs	..	Severe dermatitis caused by larva falling on unprotected part of one's body	Feeds on gum-tree leaves..	New South Wales—fairly common in the Sydney district.
ORDER COLEOPTERA.					
Family Tenebrionidae.					
33. <i>Tenebrio molitor</i> Linn ..	Intermediary host	..	Tape worm— <i>Hymenolepis diminuta</i>	Common in store-houses, granaries, &c., nocturnal in habit, feed mill-sweepings, under bags of chaff, barley, oatmeal, &c.	Common all over the world.

* In addition to the mechanical transference the possibility of multiplication of micro-organism is admitted.

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Family and Species.	Role played.	Normal host.	Disease.	Breeding habits.	Locality.
ORDER ACARINA.					
Family Ixodidae.					
34. <i>Ixodes holocyclus</i> Neumann	Toxaemia from bite	Bandicoot	Paralysis and other symptoms—possibly due to toxaemia	Eggs laid on ground; larvae crawl up grass stems and shrubs and wait for suitable host to come by	Coast line of Eastern Australia to a little south of Sydney. The scrub tick.
Family Sarcoptidae.					
35. <i>Sarcoptes scabiei</i> De Geer	Parasitic ..	Man	Mechanical irritation due to itch of scabies resulting from the invasion of the human skin	Burrows into skin and breeds therein	Widely distributed.
Family Tyroglyphidae.					
36. <i>Glycyphagus domesticus</i> ? De Geer	Irritation from bites		Transient cutaneous eruptions	Found in grain, bran, hay and meals for the most part	Widely distributed.
37. <i>Aleurobius</i> sp. ..	Irritation from bites		Transient cutaneous eruptions	Found in grain, bran, hay and meals for the most part	Widely distributed.
Family Demodicidae.					
38. <i>Demodex folliculorum</i> Simon	Parasitic ..	Man	Condition known as "black-heads"	Subcutaneous in man ..	Widely distributed.
Family Trombidiidae.					
39. <i>Trombicula hirsti</i> Sambon	Irritation from bites	Probably birds	Severe dermatitis ..	Probably feed on birds such as the "scrub hen" and breed in their nests	North Queensland.
40. <i>Leeuwenhoekia australiense</i> Hirst	Irritation from bites	?	Severe dermatitis ..	Found on grass	New South Wales. South Australia.
ORDER ARANEAE.					
41. <i>Atrax robustus</i> O.P. Cambridge	Poisoning from bite	?	General symptoms of toxæmia, may be very severe	Builds a funnel web under stones, logs, &c.	Comparatively common in Sydney district.
42. <i>Latrodectus hasselti</i> Thorell. ("Red-back" spider)	Poisoning from bite	?	General symptoms of toxæmia	Builds webs in empty tins, boxes, &c.	Common in Eastern Australia, also found in New Zealand, New Guinea, &c.

An Intermediary Host among the Arthropoda implies a necessary agent in the distribution of a parasite among individuals of the main host species, part of the life cycle of the parasite taking place within the intermediary host, the sexual phase of the parasite occurring in the main host.

A mechanical carrier is an arthropod which acts as a "porter" or vector for an organism of disease which organism does not undergo any change while in the arthropod.