# Quadrant II – Transcript and Related Materials

**Programme: Bachelor of Science (Third Year)**

**Subject: Zoology**

**Paper Code: ZOC 110**

**Paper Title: Parasitology**

**Unit: Unit 5 Parasitic Arthropoda**

**Module Name: Biology of Mites**

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**Notes**

**Introduction**

Mites are diverse and abundant group of arachnids and belong to order Acarina which also includes ticks.

**Morphology**

The majority of the species are round or oval with a head, thorax and abdomen, while many may have a distinct cephalothorax marked off from the abdomen. A few are also worm-like.

Some mites have mouthparts attached to a basal piece articulated with the body called capitulum, however is not a true head. Mites usually have two pairs of mouthparts and four pairs of legs. The last pair of legs is not acquired until after the first moult.

The first pair of mouth-parts- chelicerae, are occasionally needlelike, sometimes shaped like a grapnel hook and often pincerlike, with the pincers sometimes positioned at the tip of a long, needlelike structure. The second pair of mouth-parts- pedipalps are simple segmented palpi.

In some the anterior end of the ventral side of the body is produced as a type lower lip, hypostome, which may be needlelike or barbed and even rasp like.

The legs have six or seven segments- coxa, trochanter, femur, tibia, protarsus, and tarsus. The tarsus may be composed of numerous segments and is often terminated by one or more claws.

**Anatomy**

Digestive tract is well developed. Stomach has pouches that can act as food reservoirs. Intestine is commonly short and excretory organs (malpighian tubules) open into it close to the anus. The reproductive organs open on the ventral surface of the abdomen. Many possess tracheae and a pair of spiracles, while soft-skinned forms can absorb oxygen through the body surface.

**Classification**

Order Acarina is divided into six suborders which include:

- Suborder Notostigmata
- Suborder Tetrastigmata
- Suborder Mesostigmata
- Suborder Prostigmata
- Suborder Astigmata
- Suborder Cryptostigmata (Cheng,1986).

Suborder Mesostigmata includes free living, parasitic and symbiotic mites. Members of suborder Astigmata are free living as well as parasitic and include parasites of invertebrates, vertebrates and even birds. Members of Notostigmata are brightly colored, omnivorous and live in leaf litter and beneath stones.

Members of the Tetrastigmata (also known as Holothyroidea) are large and predatory found in Australia, New Zealand, and the Indo-Pacific. The Prostigmata (also known as Trombidiformes) also includes many parasitic species, as does Astigmata (also known as Sarcoptiformes). Few species of suborder Prostigmata are parasitic as adults and others as larvae. Some are predators, while some are parasitic on plants as well as animals. The members of Cryptostigmata are commonly referred to as the oribatid or beetle mites and are common in soil and leaf mold. These also act as intermediate hosts of some tapeworms

The Sarcoptoidea (itch or mange mites) and Demodi-coidea (hair follicle mites) live their entire lives, generation after generation, as parasites.

Itch and Mange Mites are minute rounded or oval, short-legged, flattened mites of the family Sarcoptidae cause scabies or "itch " in man and of mange or scab in different animals.

Tarsonematoidea contains some species that attack insects (and man or other animals when the insects fail them) and even plants. One of the species is also found to be parasitic in the tracheae of honeybees

Redbugs are six-legged larvae of mites of the family Trombiculidae and are parasitic on vertebrates. Trombidoidea are free-living except in larval stage

Bloodsucking Mites (Dermanyssidae)

Dermanyssidae contains a number of mites species that suck blood from mammals, chiefly rodents and from birds or reptiles as well.

**Ecology**

Many mites are free-living and feed on decaying matter, vegetation, stored foods, etc. Some are predatory and feed upon smaller animals;  Some are aquatic, even marine and many are parasitic on other animals during all or part of their life cycle.

Some of the parasitic forms are important disease vectors, and the members of at least one group of free-living mites (Oribatoidea) serve as intermediate hosts for tapeworms (Anoplocephalidae). Some mites are adapted to live as internal parasites in the lungs and air sacs of snakes, birds, and mammals. There are records of mites which are not usually parasitic at all but live and multiply in the human urinary bladder, but all the species normally infesting man are either external or subcutaneous.

**Life cycle**

There are usually four stages in the development of mites- the egg, the larva, the nymph, and adult. The eggs are frequently laid under the surface of the soil or in crevices. In some parasites, on the skin of the host.

Incubation period varies and larvae hatches often unlike the adult. After a single good feed, the larva rests, sheds its skin, and appears with an extra pair of legs and a body form closely resembling that of the adult but without developed reproductive organs.

The nymph feeds and moults once or several times and finally after a period of rest during which the body is remodeled, moults again and comes forth as an adult mite.