جامعة الملك سعود
King Saud University

Applied Entomology and Parasitology 611 Zoo (2+0)

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Course

- Course title: Zoo 611 Applied Entomology and Parasitology
- Credit hours: 2 (2+0)
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Evaluation and Assessment

Activities	%
1- Midterm exam	30%
2- Assignment and reports	30%
3 -Final Examination	40
Total	100

25% absence from lectures, student will be deprived from the course.

Description of the course

- Advanced economical and pathological survey of arthropods and other parasites.
- Advanced studies on the arthropods of their economic importance.
- Advanced studies on the pathogenesis of some diseases caused by or transmitted by arthropods.
- Advanced studies on the pathogenesis of some parasitic diseases of man and his domesticated animals.

Definition of Applied Entomology

Applied entomology I s the study of insects that have impact on agriculture, forestry, stored products and the insects of medical and veterinary importance.

Introduction to the Arthropods

- The subject of this lecture is the arthropods that live among us, primarily the insects and some of their relatives, such as arachnids, millipedes, centipedes, and a few crustaceans.
- Arthropods comprise a huge number of species with a tremendous diversity of forms and habits.
- All arthropods share certain features that together define them as a distinct form of life.

What Is an Arthropod?

- An arthropod is any member of the phylum Arthropoda, the largest phylum in the animal kingdom, which includes such familiar forms as lobsters, crabs, spiders, mites, insects, centipedes, and millipedes. About 84 percent of all known species of animals are members of this phylum. Arthropods are represented in every habitat on Earth and show a great variety of adaptations. Several types live in aquatic environments, and others reside in terrestrial ones; some groups are even adapted for flight.

Objectives

- To identify the common characteristics of medical arthropods and its classification.
- To discuss the mechanisms of transmission and causation of diseases.
- To describe the diseases caused or transmitted by medical arthropods.
- To implement appropriate prevention, control, and treatment.

General features

- **All arthropods have a body supported by a hardened external skeleton (exoskeleton), a reverse type of engineering compared to our internal skeleton. To allow growth, this exoskeleton must be periodically shed, and a new one rebuilt.**
- **The body of an arthropod is divided into segments, a feature shared by some other animal groups, such as earthworms (phylum Annelida) and velvet worms (phylum Onychophora).**
- **The appendages of arthropods—their legs, antennae, and mouthparts—are jointed. This is the feature that defines the phylum. (In Greek, arthropod means “jointed foot.”)**

General features (Cont’)

- **Internally, the nerve cord runs along the lower (ventral) part of the body and is not enclosed in a protective spinal column.**
- **Blood is moved by the aid of a tube-like heart, located along the back (dorsal) part of the body.**
- **The overall body arrangement is bilaterally symmetrical.**

Distribution and abundance

- **Arthropods are found in almost all of the habitats that cover the Earth's surface.**
- **The numbers and diversity of arthropod insect pests are enormous.**
- **A bag filled with leaf mold from a forest floor, for example, will contain hundreds of arthropods, including mites, spiders, false scorpions, myriapods, a great variety of insects, and crustacean pill bugs.**
- **In the spring a temporary pool often teems with minute crustaceans.**

Importance

- Arthropods are of great direct and indirect importance to humans.
- The stings and bites of arthropods may be irritating or painful, but very few inject dangerous toxins.
- Medically, arthropods are more significant as carriers of diseases such as:

- malaria, yellow fever, dengue fever, and elephantiasis (via mosquitos),
- African sleeping sickness (via tsetse flies),
- typhus fever (via lice),
- bubonic plague (via fleas), and
- Rocky Mountain spotted fever and Lyme disease (via ticks).
- Many diseases of domesticated animals are also transmitted by arthropods.

Medical Arthropods

1- Arthropods related with human health.

2- These arthropods can be put into four main categories:

- Harmful cause nuisance, discomfort, and blood-loss by their bites (mosquitoes, bugs, fleas.

- Ectoparasites live & feed permanently on the exterior of the host without transmitting germs (head lice, pubic lice, scabies mites).

Medical Arthropods (Cont')

- Mechanical transporters transmit disease passively, by picking up infections from feces, and then contaminating human food so that disease is contracted orally (flies, cockroaches).
- Vectors actively transmit parasitic disease-causing organisms. The pathogen develops and multiplies in the vector, and is transmitted to humans via arthropod's bite or excreta (mosquitoes, tsetse-flies, body lice, fleas).

Medical Arthropods (Cont’)

3- Arthropods of medical importance include insects (class Insecta) and arachnids (class Arachnida). Of the arachnids, only mites and ticks (order Acarina) are vectors of diseases.

Class Arachnida

- includes 3 orders of medical importance
- Order Scorpiones.
- Order Araneae (spiders).
- Order Acari (ticks and mites).

Order Acari (ticks & mites)

- Ticks are divided into hard-bodied ticks (family Ixodidae) and soft-bodied ticks (family Argasidae)
- Ticks are blood-feeding ectoparasites