

Přednáška poskytuje přehled základních fenoménů spojených s eusociální organizací hmyzích společenstev, především: evoluce eusociálních skupin, vznik sociálního chování, ontogeneze, komunikace, ekologický a ekonomický význam sociálního hmyzu apod. Přednáška zahrnuje úplný přehled nejdůležitějších aspektů života sociálního hmyzu a zařazuje je do evolučního a funkčního kontextu.

## **MB170P23 Biology of social insects (Šobotník, Straka, Klimeš)**

The course provides survey of the basic phenomena related to organization of insect societies; particularly: evolution of eusocial taxa, origination of social behaviour, ontogeny, communication, ecological and economical importance of social insects etc. The lecture includes total survey of the most important aspects of life of social insects and place them into the evolutionary and functional context.

1: Introduction, definition of terms.

What (eu)sociality means, its origin and evolution. Subsocial and social groups of insects. Exclusive features of eusocial organisms. Eusociality in aphids and thrips. Definition of the most important terms.

2: Termites I

Evolution, taxonomy and phylogeny. Ontogeny and polymorphism. Regulation of ontogeny, social homeostasis. Evolution of soldier and true worker caste. Colony development.

### 3: Termites II

Nutritional ecology. Ecological groups, relation between ecology and ontogeny. Symbiotic organisms. Competition. Economic importance of termites, synantropic species.

### 4: Termites III

Behavioral ecology. Chemical ecology and sensory physiology. Recognition of relatives. Division of labour, polyethism. Defence of societies. Social parasites and their integration into societies.

### 5: Hymenoptera I

The origin and evolution of (eu)sociality. Structure of eusocial colonies. Kin selection, altruism. Haplodiploid sex theory and its criticisms. Parental manipulation. Earlier stages of sociality as the predecessors of eusociality. Reduction of social behaviour.

### 6: Hymenoptera II

Sex ration theory in Hymenoptera and the reality. Conflicts within colony and their solutions; sex allocation & policing. Sex manipulation. Evolution of monogynous and polygynous colonies. Role of sexes.

### 7: Ants I

Life and development of individual and colony. Systematic and evolution of major ant groups.

Role and evolution of castes. Social relations within colony. Social homeostasis. Division of labour and its regulation.

#### 8: Ants II

Ethology and behavioural ecology. Elements of behaviour. Recruitment. Social recognition and social parasitism. Navigation, self-organisation. Role of food within colony. Symbioses with other organisms. Host-parasitic relationships. Predatory behaviour. Mimesis.

#### 9: Ants III

Ant role in ecosystem. Overview of life strategies of ants (army ants, legionary ants, leaf-cutter ants, harvester-ants, weaver ants & etc.) and their biogeography.

#### 10: Wasps

Systematics and origin of sociality. Colony development and social organization. Division of labour, behaviour, communication and nourishment sources. Recognition of relatives and social parasitism. Economic significance.

#### 11: Bees

Systematics and social evolution. Colony development and organization in primitively eusocial and highly eusocial species. Division of labour, polyethism. Communication, navigation, chemical and optical orientation and sensory physiology. Foraging strategy. Aggressiveness, social parasitism, nest parasitism and defensive strategies. Importance and utilization of bees.

#### 12: Bees and Wasps

Unexpected cases of social organization and analysis of observed situations in relation to present theories and definitions. Social polymorphism and colony fitness, worker reproduction ability, "eusociality" with no worker cooperation, etc.