

PRACTICAL 2

DIFFERENT SPECIES OF HONEY BEES

Aim: 1) To become familiar with different species and sub-species of honey bees found in the world and know their economic importance.

2) Differentiating hive bees from wild bees and species from subspecies.

There are four well known species of true honey bees (belonging to genus *Apis*) in the world:

- i. Rock bee, *Apis dorsata* F.
- ii. Little bee, *A. florea* F.
- iii. Asian bee, *A. cerana* F.
- iv. European bee, *A. mellifera* L.

Characteristics of four well known species of honey bees:

	<i>Apis dorsata</i>	<i>Apis florea</i>	<i>Apis cerana</i>	<i>Apis mellifera</i>
Nesting	Open nesting. Builds single large comb (ca 1m ²) attached to branches of trees or rocks etc.	Open nesting. Builds single small comb (ca size of palm of hand) fixed to branches of bushes.	Cavity nesting. Builds many parallel combs in cavities of tree trunks, hollows of rocks, poles and other covered places	Cavity nesting and similar in habits to <i>Apis cerana</i> and builds parallel combs.
Distribution in India	Found in plains as well as hills up to 1600 metres above sea level. Highly migratory.	Found in plains up to 300 metres above sea level. Highly migratory.	Found throughout India having 3 subspecies	Exotic bee to India. Introduced successfully in 1962. It has many subspecies (more than 23) throughout world
Size	Biggest honey bee (16-18mm)	Smallest <i>Apis</i> bee (9-10mm)	Medium size (14-15mm)	Medium size (14-16mm)
Swarming/Absconding	Strong tendency	Strong tendency	Strong tendency	Strong tendency only in African sub species
Temperament	Furious	Mild	Furious	Gentle except African sub species
Average honey yield per colony/year	40 kg (wild bees; cannot be domesticated)	500 g (wild bees; cannot be domesticated)	5 kg (Hive bees; can be domesticated)	15 kg (Hive bees; can be domesticated)

Method of Honey extraction	By squeezing (unhygienic)	By squeezing (unhygienic)	By centrifugal honey extractor from the hived bees (hygienic).	By centrifugal honey extractor from the hived bees (hygienic).
Number of cells/10cm comb (worker cells)	18-19	32-36	21-25	17-19

Species and subspecies of hive bees:

It is important to know difference between a species and subspecies. Species are reproductively isolated from each other and these cannot interbreed where as subspecies are geographically isolated and can interbreed

Among the two domestic bee species, each has many subspecies in different parts of the world e.g. *Apis cerana* has three subspecies in India:

A. cerana cerana in Himachal Pradesh and Jammu and Kashmir (North India)

A. cerana indica in Kerala, Tamilnadu and Karnataka. (South India)

A. cerana himalaya in Nagaland, Manipur, Mizoram, Assam and Meghalaya. (Eastern parts of India)

In addition to above three subspecies, *A. cerana japonica* has been identified from Japan.

A. mellifera has many subspecies which can be placed under three groups:

1. Eastern subspecies
2. European subspecies
3. African subspecies

Eastern subspecies:

i. *Apis mellifera remipes* (in Iran)

ii. *A. mellifera syriaca* (in Syria, Israel and Lebanon)

These subspecies are not suitable for modern beekeeping

European subspecies:

i. *A. mellifera mellifera* (Dark Dutch or German bee)

ii. *A. mellifera carnica* (Carniolan bee; in Southern Austria)

iii. *A. mellifera ligustica* (Italian bee; Italy)

iv. *A. mellifera caucasica* (Caucasian bee; USSR)

African subspecies: Some of the important subspecies are:

i. *A. mellifera intermissa* (Tellian bee; Morocco and Lybia)

ii. *A. mellifera lamarckii* (Egyptian bee; restricted to the Nile Valley)

iii. *A. mellifera capensis* (Cape bee; the only bee which can rear queen from eggs laid by workers)

iv. *A. mellifera adansonii* (African bee; also known as killer bee)

In India, all the four bee species are found. *A. mellifera* is an exotic bee which was introduced in India for the first time successfully in 1962 at Nagrota Bagwan, Himachal Pradesh. Honey yield from this species from stationary bee keeping varies from 10-15 kg/colony but through migration yield increases to 45-60 kg/colony. One bee keeper in Himachal has extracted as much as 110kg honey from a single colony of *A. mellifera* which is indicative of its potentials.

Other species found in different parts of the world: In addition to the four *Apis* honey bee species, more species have been reported from some parts of the World.

i. *Apis laboriosa* (from Bhutan, Yunnan and Nepal)

ii. *A. breviligula* (from Philippines)

iii. *A. binghami* (from Sulawesi)

Above three species resemble *A. dorsata* and are wild

iv. *A. andreniformis* (from China) It resembles *A. florea*.

v. *A. koschevnikovi* (from Malaysia)

vi. *A. nuluensis* (from Malaysia, Indonesia)

vii. *A. nigrocincta* (from Indonesia).

These three species (v - vii) resemble *A. cerana*.

Stingless honey bees:

In addition to honey bees of genus *Apis*, stingless honey bees also provide honey which are:

i) *Melipona* sp.

ii) *Trigona* sp.

These bees are also domesticated, but produce little amount of honey.

Pollen bees: All the honey bee species are good pollinators besides being honey producers. In addition to these, there are more than 20000 species of other bees which help in pollination. It should be clear that all bees are not honey bees. Batra (1992) has even separated non *Apis* bees in a separate group of 'pollen bees' that includes all bees except honey bees which help in pollination.

Practical things to do:

i. Note the distinguishing characters of workers of the four bee species and draw diagrams proportionate to the body size.

ii. Measure the body size (length of body and wing size)

iii. Record the number of cells per 10 linear cm of the worker, drone and honey combs of the given bee species at three different positions and calculate average of 3 readings.