Northamptonshire
Beekeepers' Association

Beginner's Course

2025

Session 2

Lifecycle of the Honey bee

Housekeeping (Reminder!)

Agenda

Item	Description	Duration
1	What is the Honey Bee?	10 mins
2	Form, function and life cycle of individuals: Queen, drone, worker	20 mins
3	Honey bee development	10 mins
4	**Tea Break**	15 mins
5	How the colony works: the nest	25 mins
6	How the colony works: communication	10 mins
7	How the colony works: reproduction & through the seasons	10 mins
8	Wider environmental matters	5 mins
10	Q&A	10 mins

Classification of bees

CLASSIFICATION OF BEES

- Kingdom – Animalia
  - Phylum – Arthropoda
    - Class – Insecta
      - Order – Hymenoptera
        - Family – Apidae
          - Genus – *Apis*
            - Species – *mellifera*

- Binomial nomenclature (how we name things scientifically) uses both the genus and species names: ie. ***Apis mellifera*** is the honey bee

- We refer to ***Apis mellifera*** as the **species** name for the honey bee

Insects – three part body, three pairs of jointed legs, compound eyes and a pair of antennae

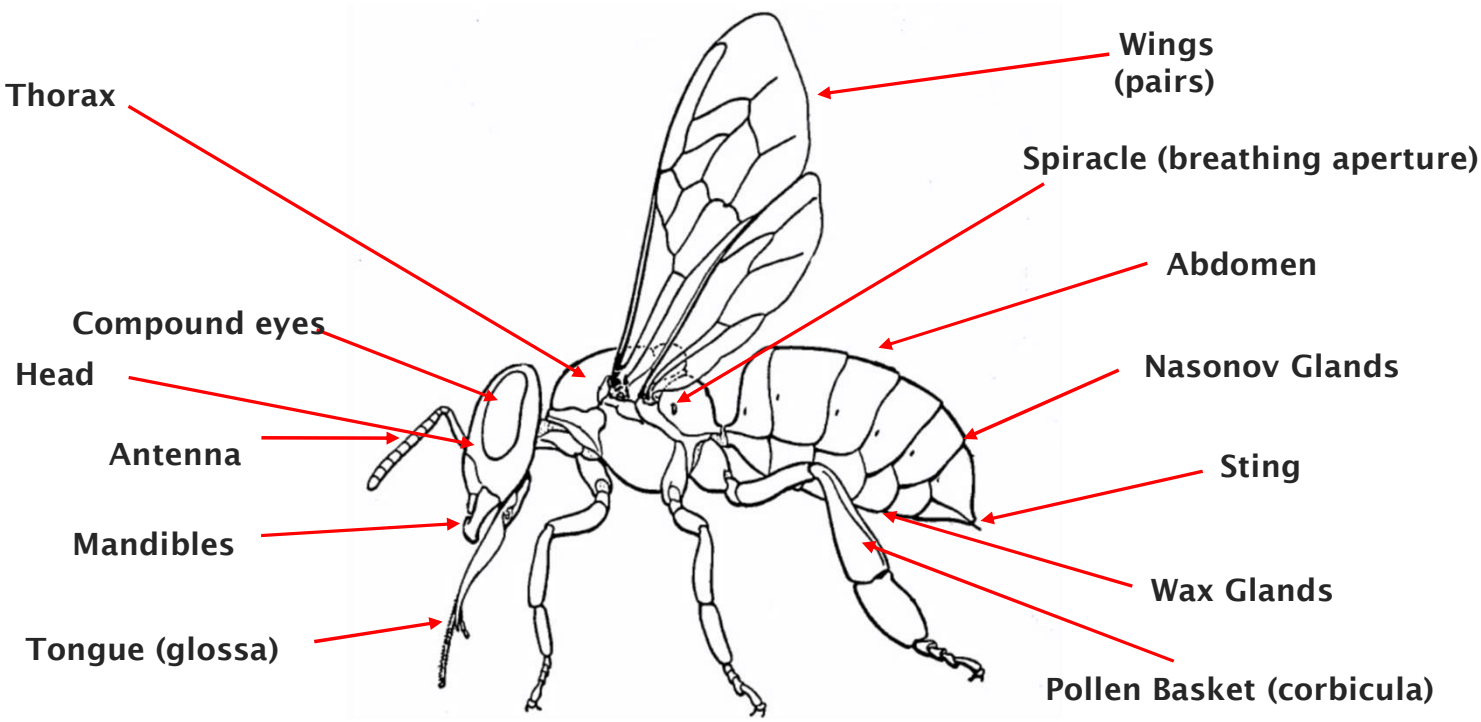
Hymenoptera – have a 'waist' & 2 pairs of wings – bees, ants, sawflies, wasps. Over 150,000 of species.

Social and Solitary Hymenoptera

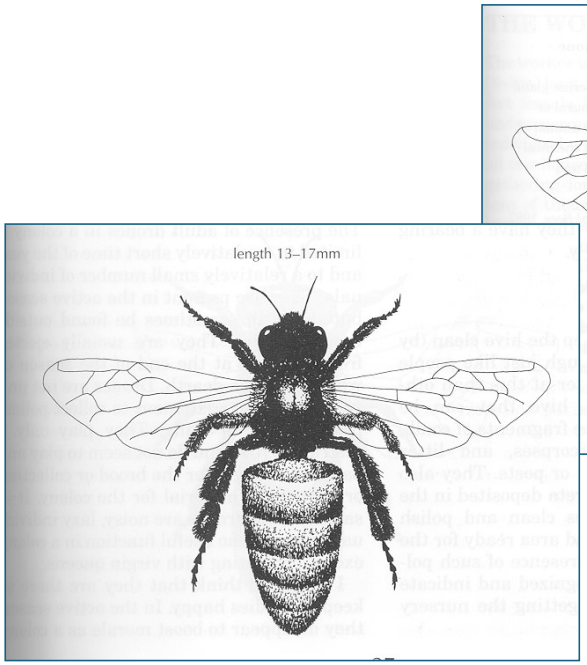
Bees: 20,000 species.

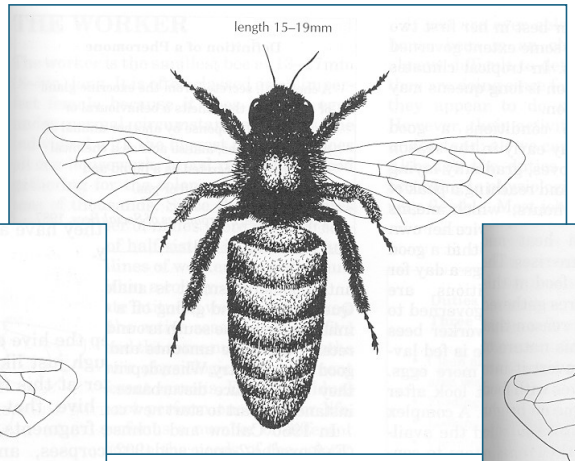
Colony forming bees: a few species including honeybee. (Apis mellifera).

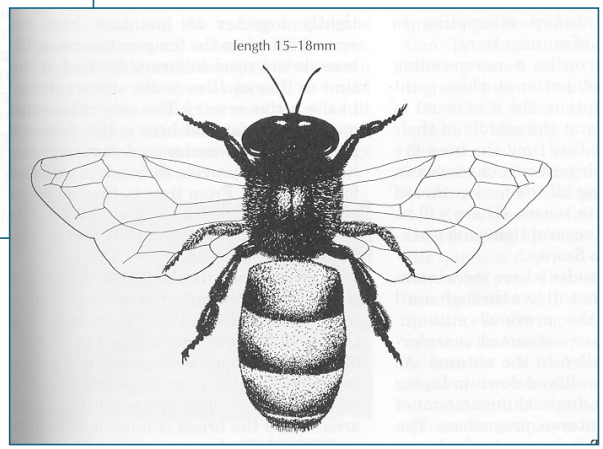
Anatomy of a Honey bee



Number of bees in a colony







~60,000 workers

1 queen

~2000 drones

In Winter:

~10,000 workers

1 queen

0 drones

The Queen

- Female
- Role = to lay eggs to produce more bees
- Lives for 3-5 years
- Controlled by the workers
- Mates in early life
- Anatomically different to other females
- Characterises the colony
- After mating only leaves colony when swarming
- Fights other queens only
    - Stylised fight to prevent damage

Queen Development

16 DAYS

Egg to Queen

- Fertilised egg laid in cup
  - 3 days to hatch
- Fed royal jelly from hatching
  - Fed for 5 days
  - Gets 1600 visits from workers to feed

    (150 visits for a worker larva)
- Queen Cell hangs downward

  Food in cell when sealed
- Development quite different, proteins switch on different genes.
- Emerges after 8 days as pupa

Sealed queen cell

Emerged queen cell

Adult Queen

- Maturity
  - 4 days to mature
  - Then fed by workers
- Goes on mating flights
  - 10 -15 days
  - Mates around 15-17 times
  - Stays in hive afterwards
- Lays up to 2,000 eggs a day
  - More than body weight
  - High energy digested food
  - Egg laying controlled by food intake

The Drone

- Male
- Role = to mate with a queen
- Drone's sex organs take up a large part of its abdomen
- Lives for up to 50 days
- Learns to beg for food
- Can move from hive to hive
- Strong flyers
- Good eyesight

Drone Development

24 DAYS
Egg to Drone

- Unfertilised egg laid in large cell
- 3 days to hatch
- Fed brood food for 7 days
- Pupates for 14 days
- Adult matures for 10 days
- Dies when mating

Drone Mating

- Drone collection areas (thousands)
- Pheromone attractants
- Multiple flights and multiple matings by queen

The Worker Bee

- Female
- Role = to do most of the tasks necessary in the colony
- Lives for about 6-8 weeks in summer or up to 6 months in winter

Worker Development

21 DAYS
Egg to Worker

- Fertilised egg laid in normal ‘hexagon’ cell
- 3 days to hatch
- Fed brood food for 5 days
- Pupates for 13 days
- Adult has different stages
- Can lay eggs! Not fertile

Worker Development

https://youtu.be/f6mJ7e5YmnE

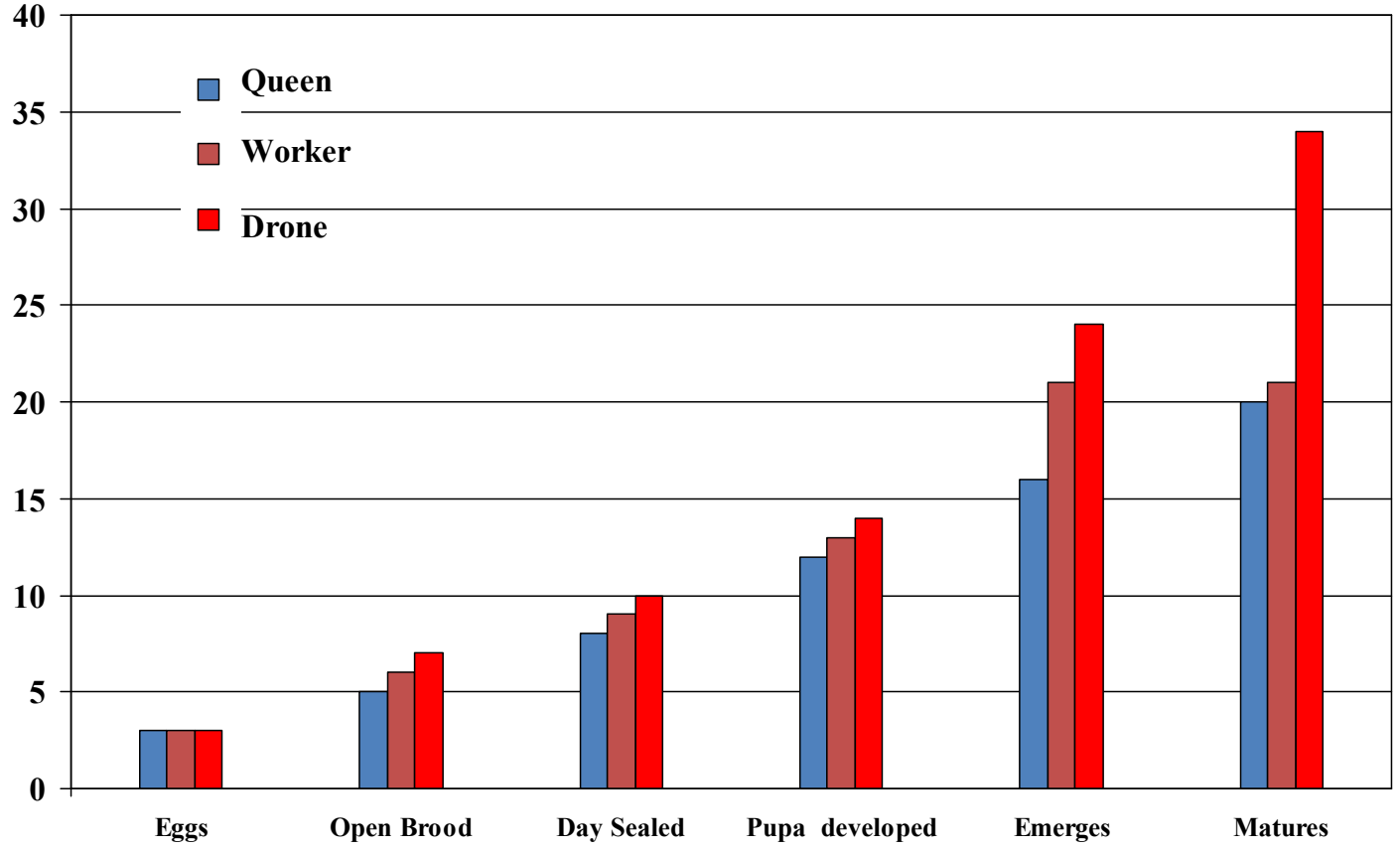
Workers - division of labour with age

➢ 0 - 6 days	cell cleaning, general hive cleaning
➢ 3 - 9 days	feeding the brood
➢ 3 - 15 days	attending the queen
➢ 6 - 18 days	honey processing
➢ 12 - 20 days	wax production and comb building
➢ 15 - 25 days	hive ventilation
➢ 18 - 35 days	guard duty
➢ 20 days - death	nectar collection
➢ 20 days - death	pollen collection
➢ 25 days - death	water & propolis collection

Workers – wax production

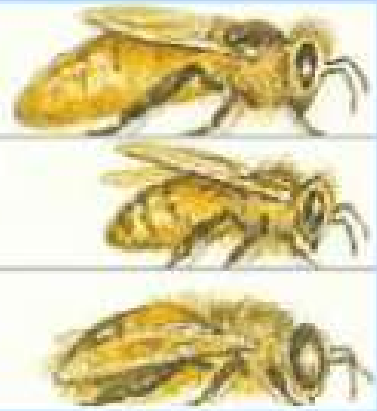
- Workers cluster
- Raise temp. to 35°-37° Celsius
- Plates of wax from glands
- Collect and chew them
- Formed into circular cells
- Heat changes shape to hexagons

Honey bee - development



Larval development

	Egg	Larva	Pupa	Adult
Queen	Days 1 - 3	Days 4 - 9	Days 10 - 15	Day 16
Worker	Days 1 - 3	Days 4 - 9	Days 10 - 20	Day 21
Drone	Days 1 - 3	Days 4 - 9	Days 10 - 23	Day 24



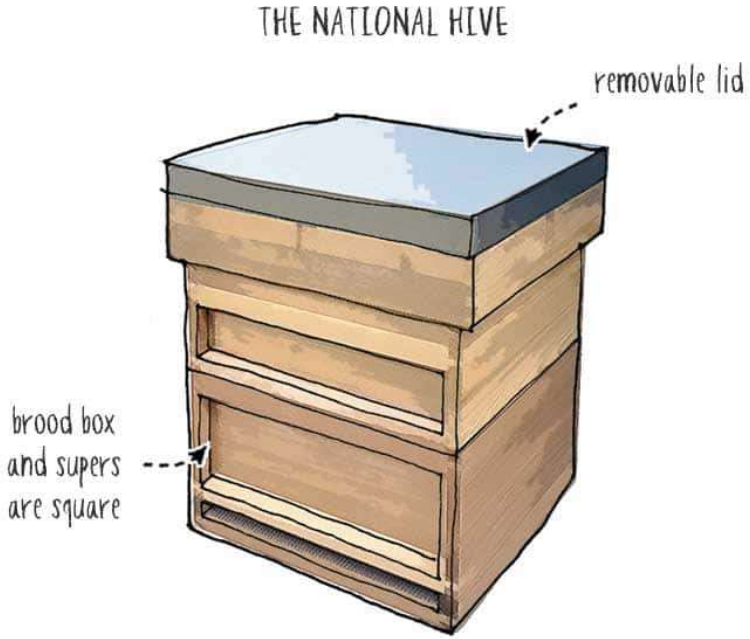
COFFEE/
TEA BREAK

How the Colony works

The Physical Nest - In the wild

The Physical Nest – Human's first interventions: Skeps

The next step for beekeepers



There are many other types which be covered later

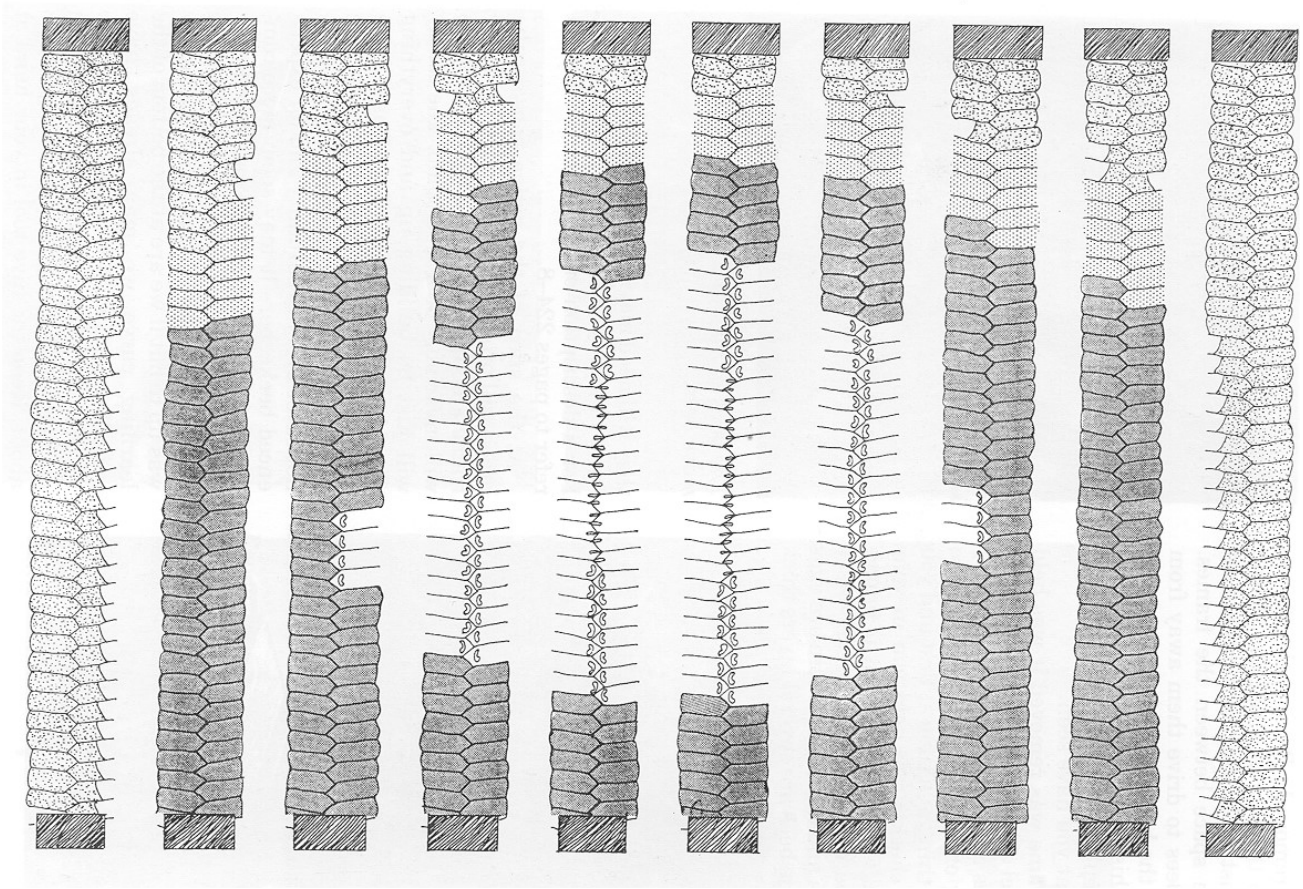
The Physical Nest – Modern Approach: Frames and Foundation

The Physical Nest – Modern Approach: In a hive

The Physical Nest – Environment

- Eggs and larvae tended by workers
- Larvae kept warm (35°C)
- Nest temperature between 34°C - 36°C
- Nest workers maintain temperature and humidity

The Physical Bee Nest



Cross – section through Honeybee nest/ frames in a hive

The Physical Bee Nest

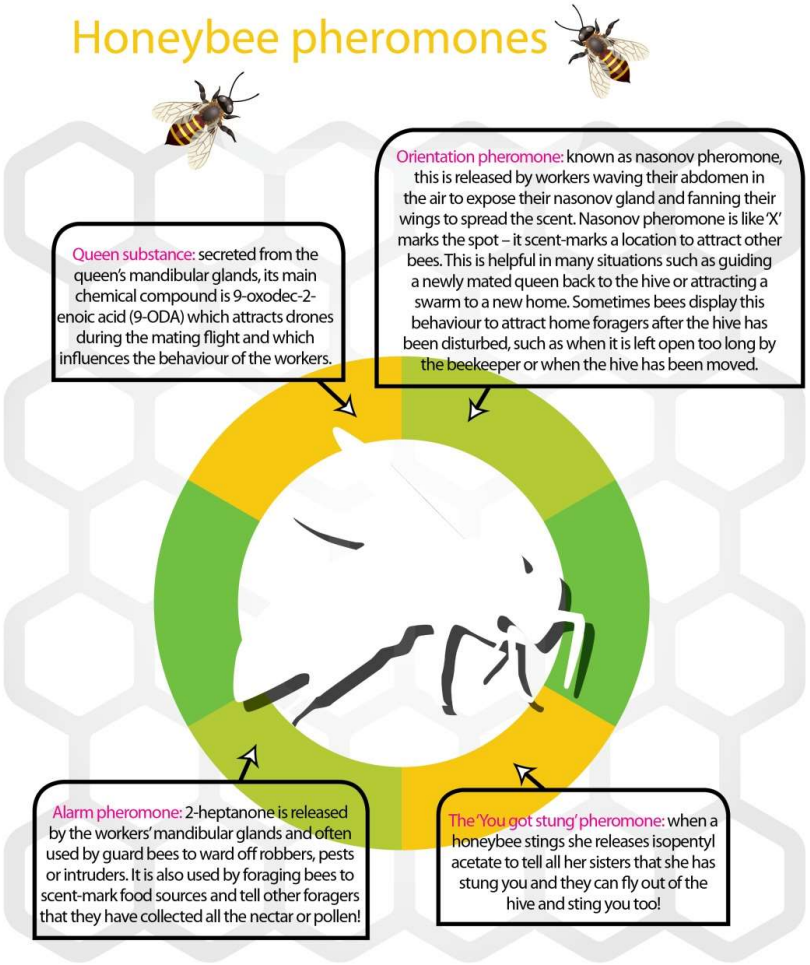
Full view of part of the Honeybee nest on one of the frames in a hive

How the Colony works

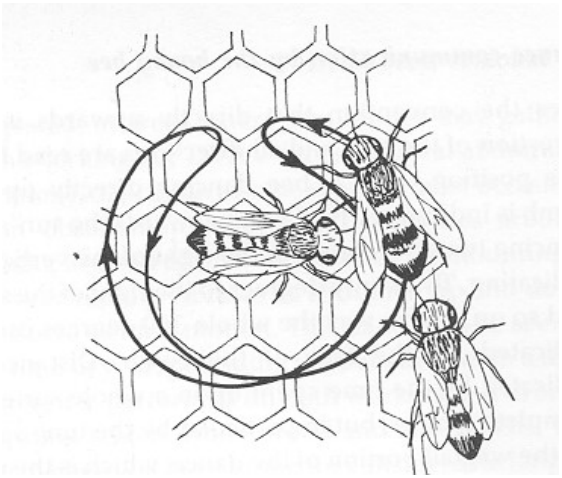
Communication

- Most of Communication using Pheromones (chemical messages)
  - QMP (Queen Mandibular pheromone) – Queen
  - Brood Pheromone
  - Nasonov (workers – nasonov gland)
  - Alarm (Workers – mandibles)
  - Attack (Workers – sting)
- Dances
- Sharing Food

Communication - Pheromones



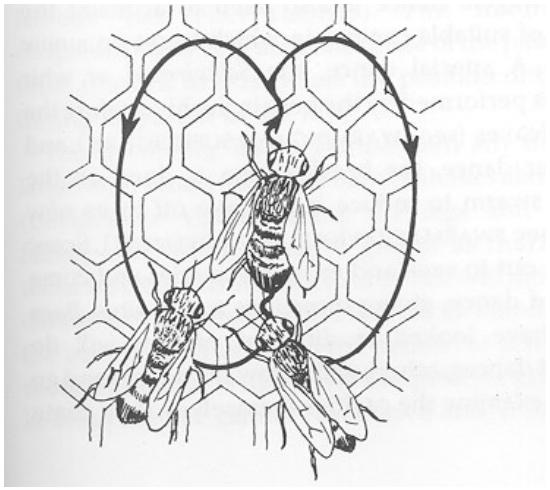
Communication – Bee Dances



Round Dance –

(General location)

food nearby



Waggle Dance –

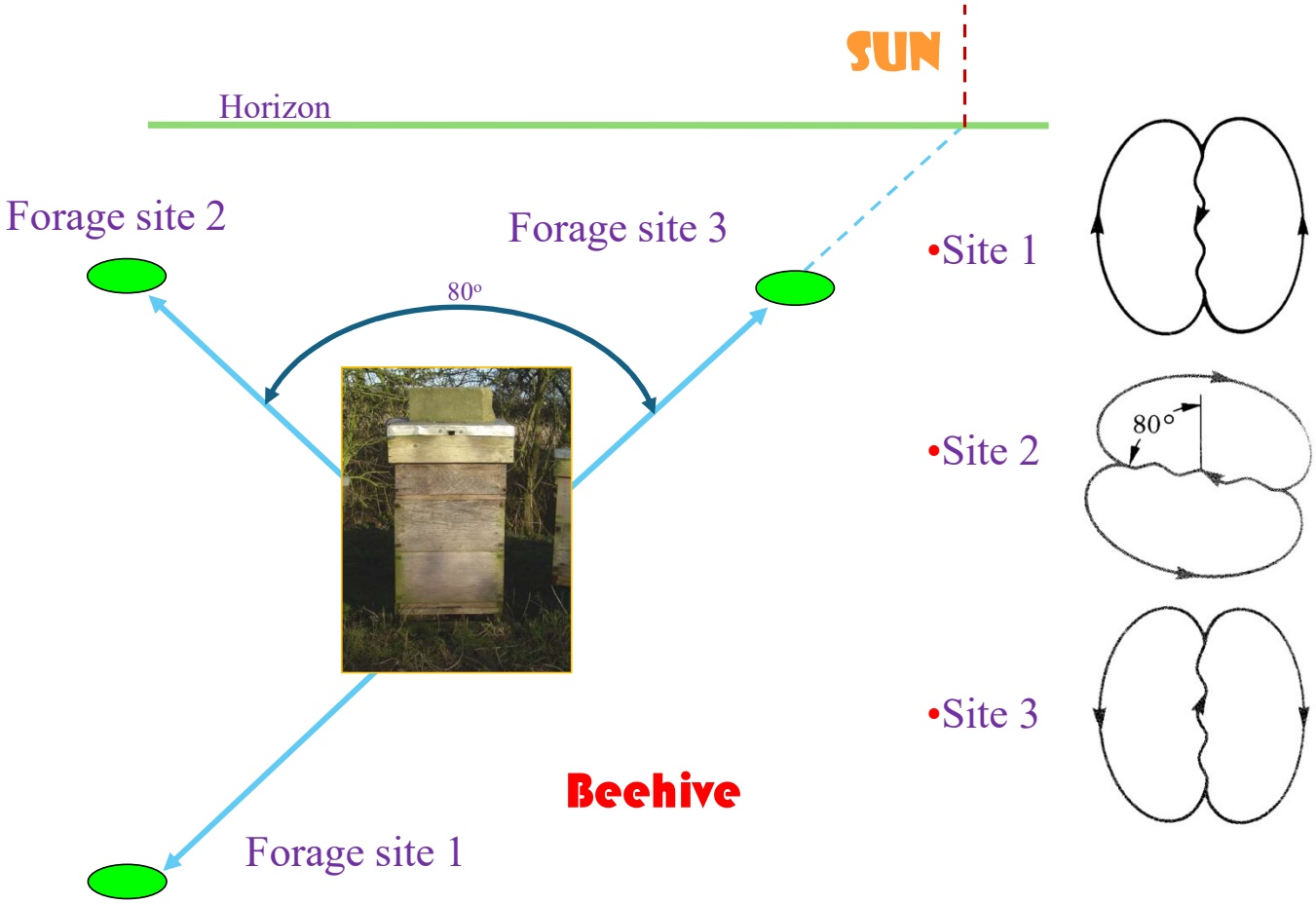
(Precise location)

food further away

Ex: Encyclopaedia of Beekeeping by Morse & Hooper

Waggle dance

Bee Dances


SUN
Horizon
Forage site 2
Forage site 3
80º
Forage site 1
Beehive
•Site 1
•Site 2
•Site 3
80°

How the Colony works

Reproduction

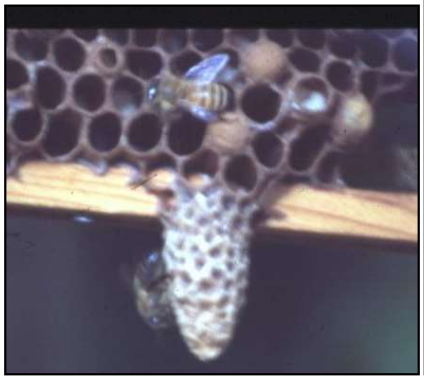
Swarming

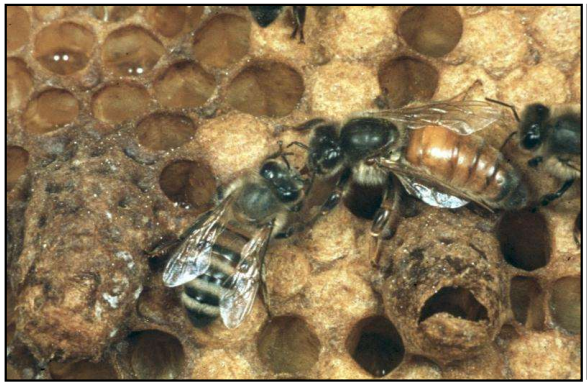
Reasons for swarming

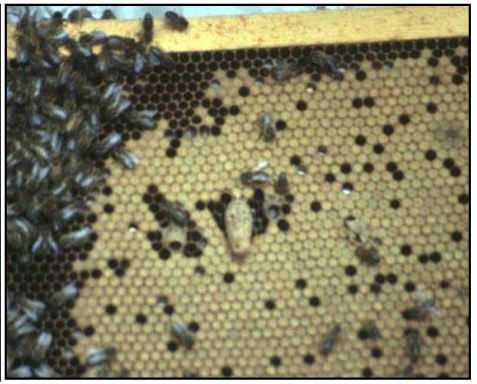
- Natural means of colony reproduction
- Colony too crowded
- Because they will

Preparation for Swarming

- Diet and fitness regime for old queen
- Eggs in Queen cells
- Queen cells ready to be sealed
- Old Queen ready to fly off



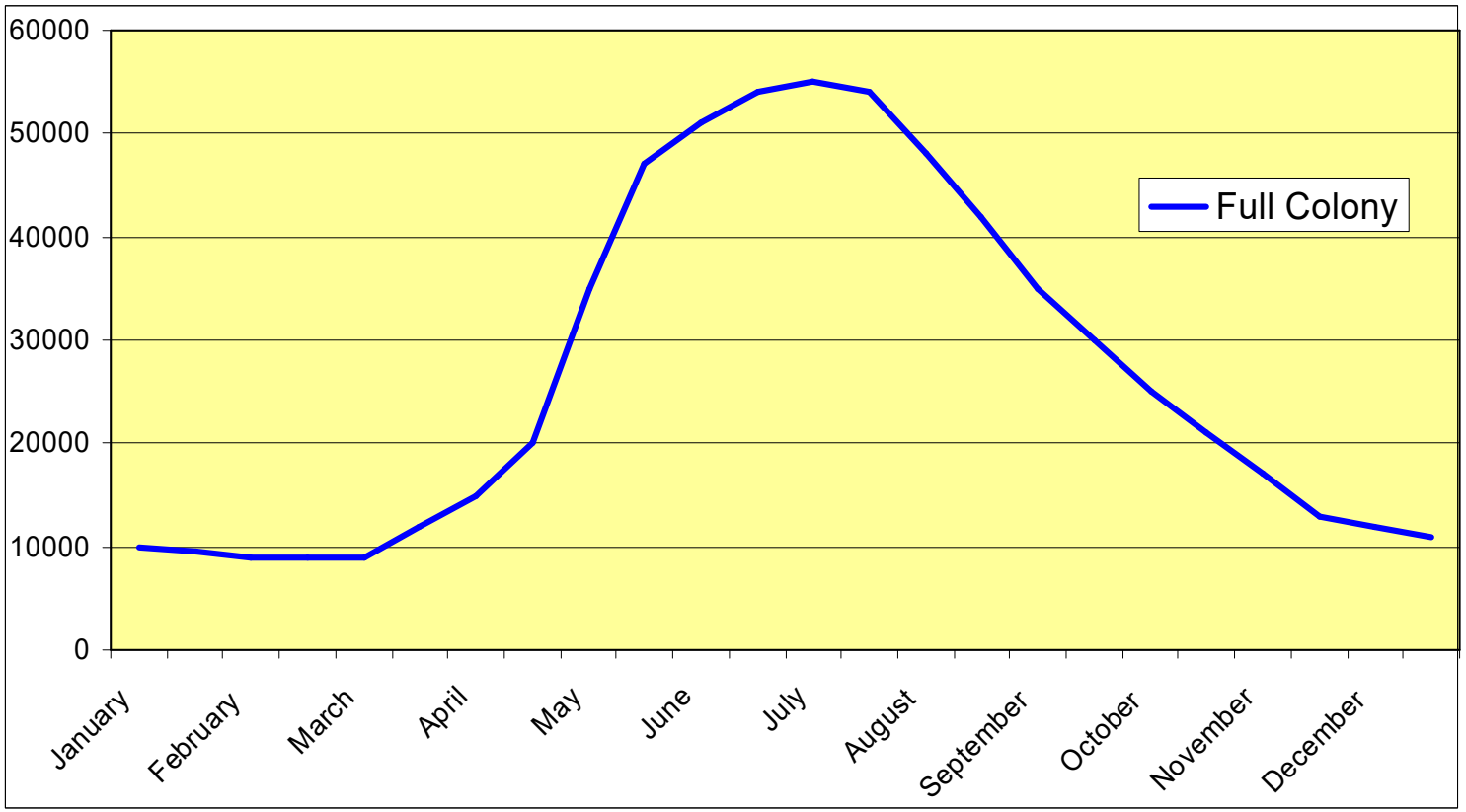




Do not cut out queen cells until you have a plan and looked through the whole colony

Colony through the Seasons

Number of bees in a colony



Colony through the Seasons

Summer & winter bees

- Summer bees
  - Up to 2000 a day
  - 6 weeks
  - Exhaustion

- Winter bees
  - About 20 a day
  - Up to 6 months
  - Disease and old age

Wider Environmental Matters

Hard Work

- Bee flight
- 0.5 mg honey per Km
- Bees carry nectar (& pollen)
  - approx. 40 mg
  - ~30,000 trips per pound of honey
  - Trip approx 30 mins
- Phenomenal rate of collection
- Big numbers, big impact

Plants for Bees

References

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- http://www.sustainweb.org/foodfacts/bee_industry/ at 25/03/2013


Next Session
1st February - Equipment
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Q&A

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or email: nbkatrainingeducation@gmail.com if you have questions after we've finished