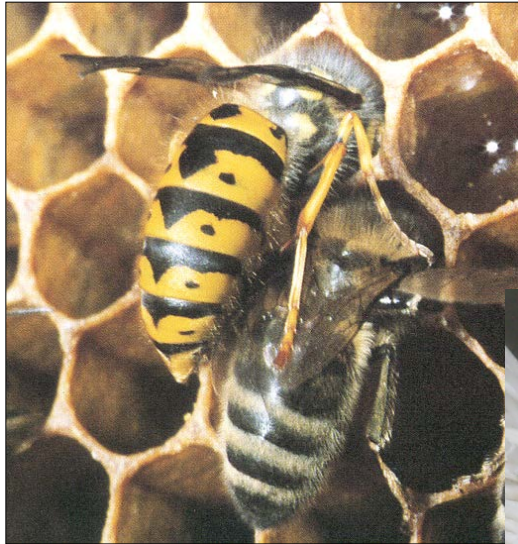


Honey bees and other insects



Honey bee
Apis mellifera



Wasp
Vespula vulgaris



Solitary bee *Osmia lignaria*



Bumble bee
Bombus terrestris

Honey bee castes and sexes





Eggs and very young larvae

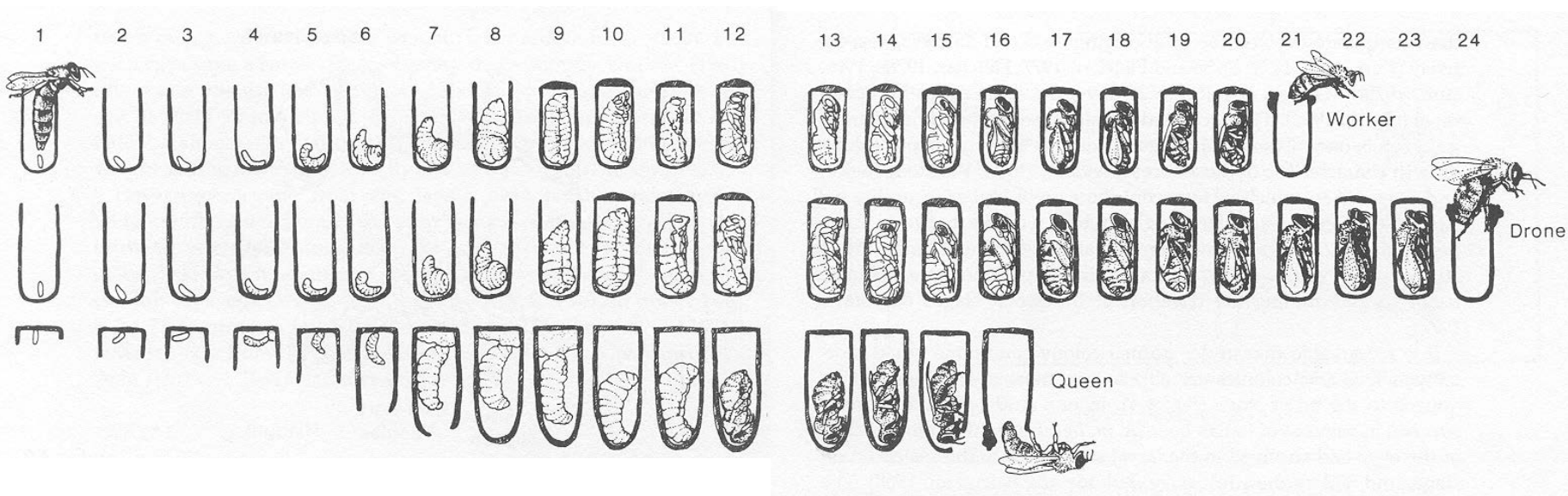


Larvae



Bees on sealed brood - pupae

Larval development



Ex: Biology of the Honeybee by Mark Winston

NB: Worker and drones are laid in cells that are approximately horizontal whereas queens are laid and developed in cells that hang downwards

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

- from 20 days nectar collection
- from 20 days pollen collection
- from 25 days water & propolis collection



Summer & winter bees

- Summer bees
 - Up to 2000 a day
 - 3 weeks
 - Exhaustion
 - Away from colony
- Winter bees
 - About 20 a day
 - Up to 6 months
 - Disease and old age
 - Adaptation



Drone development

- Unfertilised egg laid in large cell
 - 3 days to hatch
- Fed brood food for 7 days
- Pupates for 14 days
- Adult matures in 10 days
 - Feeds itself
 - Accepted in any colony
 - Lives ~3 months
 - Dies when mating



Queen development

- Egg laid in cup
 - 3 days to hatch
- Fed royal jelly from hatching
 - Fed for 5 days
 - Gets 1600 visits from workers to feed cf 150 visits for a worker larva
- Cell hangs downward
 - Lots of food in cell when sealed
- Pupal development quite different
 - Proteins switch on different genes
- Emerges after 8 days as pupa



Adult queen

- 4 days to mature
- Then fed high energy digested food by workers
- Goes on mating flights between 5 days and 3 weeks old
- Stays in hive afterwards unless swarming
- Lays up to 2000 eggs a day (more than body weight)
- Egg laying controlled by food intake



Stimuli and communication

- Pheramones - especially from the queen but also from the brood.
- Colony scent
- Vibrations - direct “shaking” or transmitted through the comb, eg: waggle dance
- Nectar quantity
- Vision
- Orientation to nest

