

European Honey Bee - Queen Caste Development Stages

Robt Burns Handout 7/11/2006; updaed 03/02/2017

	Day	Stage			
Egg is laid	1	egg	1	FERTILIZED EGG TYPE	Kingdom: Animalia
	2	egg	2		Phylum: Arthropoda
	3	egg	3	hatching	Class: Insecta
Cell is sealed	4	1st larval	1	1st instar (moult)	*Juvenile Hormone (JH) switch is known to be involved in the queen-worker caste differentiation during the larval stage. Order: Hymenoptera
	5	2nd larval	2	2nd instar (moult)	Food: Royal jelly - glandular secretion / 2 copies of working protein (2nd protein <i>feminizer</i> - ovipositor/venom) Family: Apidae
	6	3rd larval	3	3rd instar (moult)	Food: Royal jelly - glandular secretion / 2 copies of working protein (2nd protein <i>feminizer</i> - ovipositor/venom) Genus: Apis
	7	4th larval	4	4th instar (no moult)	Sealing begins Species: Apis mellifera
	8	larva	5	gorging	Sealed; gorging on remaining food in cell
	9	larva / pre-pupa	1	gorging	Cocoon spinning begins
	10	pre-pupa	2	5th moult	Pupal form develops
	11	pupa	3		
	12	pupa	4		Color develops in the eye
	13	pupa	5		Color begins to develop in the thorax
	14	pupa	6		Color begins to develop in the abdomen
	15	pupa	7	6th moult	The wings, legs, and mouth parts are freed; the pupa becomes an adult
	Emergence	16	adult	8	(emerging)
Orientation Flights	18-22	adult	16	Day's Cycle	2-6 Adult takes orientation flights 3-5 days later.
Mating	23-31*	adult			6-13 Adult takes mating/nuptial flights
Egg laying	2-5 days	adult			10+ Mated adult begins to lay after mating 2-5 days later
Life Span	Winter	Summer			Adult Queen
	3 - 4 Years				
Body Length	15 - 27 mm				Adult Queen
Hatching Body Weight	nearly 200 mg				Adult Queen
Sex	Female				Adult Queen
Queen Cell Position	Vertical				Queen
Standard E. Cell Size	*peanut shape				Queen

Kingdom: Animalia	Order: Hymenoptera	Species: Apis mellifera (common western honey bee)
Phylum: Arthropoda	Family: Apidae	Apis mellifera carnica Apis mellifera caucasia Apis mellifera ligustica
Class: Insecta	Genus: Apis	Apis mellifera mellifera Apis mellifera scutellata

Apis mellifera carnica *Slovenia, eastern Alps, Balkans
caucasia *Central Caucous (Georgia, Turkey, Armenia, Black Sea area)
ligustica *Italian (dark banded, light banded, & golden)
mellifera *dark bee of northern Europe
scutellata *Africa (central, west) S.&C. America Southern USA
*Russian *neither Italian nor Carniolian but most characteristics of
Caucasian...originates from Primorsky Krai (providence of far
south-eastern Russia -borders China, N. Korea)

BASIC GENETICS

Haploid - unpaired, single set chromosomes

*Haplo-diploidy is a sex-determination system. Each worker is 50% of the queen's and 100% of the drone's genetics

Bees, most ants, and wasps work like this sytem.

Diploid - 2 complete sets of chromosomes, 1 from each parent

50% + 100% = 150 / 2 = 75%
RELATIVE TO MOTHER QUEEN & SAME DRONE

Super-sister - Workers

Sister is the relationship between female siblings of the same father and mother. Males are the combination clone of their mothers.

75% genetically related resulting from the same sub-family members. (75% average relations). Workers are more related to each other than even to their mother queen. These are workers in a colony from the same drone father. They inherit exactly the same genes from their father drone.

Drones

100% related to the queen of the hive. Father-less but have a grand-father. Drones are full brothers to each-other. Queen is only 50% related to each drone and 50% related to each worker.