Swarming in Honey Bees

Part IB
The Role of the Worker and Queen Bee in Honey Bee Swarming

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The role of the queen in swarming

A colony deprived of an incipient queen may still swarm but without the queen. That swarm, itself being queenless, and having no potential to survive, will almost invariably return to the parent hive[25]. Since the swarming propensity is not lost by removal of queen cells and stray virgin queens – and even just one of these is easily missed – colonies will often subsequently achieve their pre-programmed goal of swarming. The well established practices of clipping queen wings and removing all queen cells therefore would appear to do little to prevent swarming and usually only delay it.

Queen status is a critical factor in determining the readiness of a colony to swarm. In the normal course of events, the queen is the singular mother of any and all hive progeny, adult as well as laying workers, drones and that special caste of female bees we have already visited, gynes. Workers, under the influence of queen mandibular pheromones, remove potential usurpers and even remove drones and drone larvae, if present, in a failed honey flow. Under conditions of dearth, they may also cannibalise worker larvae surplus to colony needs.

Evidence of atypical supersedure induced swarming at Jerrabomberra Wetlands in early November 2016

While regular removal of all queen cells and all virgin queens will always prevent a colony swarming, culling all cells at the very least every ten days (see table) is essential since poor queens can be developed from worker larvae even older than three days of age. Further missing one such hard-to-find queen cell will anyway result in swarming. The take home message is not to rely on cutting out queen cells to prevent or even delay swarming. This said, the successful swarm control technique of removing the old queen and leaving only one swarm cell advocated by Karl Killon[26] is testament to the importance of the physiological status of both the queen and worker bees.

	Queen				**Worker**				**Drone**			
Species	Egg	Larva	Pupa	***Emergence***	Egg	Larva	Pupa	***Emergence***	Egg	Larva	Pupa	***Emergence***
Apis mellifera	3	5	5	**13**	3	6	12	**21**	3	7	14	**24**
Apis cerana	3	4-5.5	6-7.5	**13-16**	3	5	11	**19**	3	6	14	**23**
Apis dorsata	3	4.5	7	**14.5**	2.9	4.6	10.9	**18.4**	2.9	4.6	14.3	**21.8**
Apis florea	3	6.8	7.7	**17.5**	3	6.3	11.2	**20.5**	3	6.7	12.8	**22.5**

Source: Oldroyd and Wongsiri (2006)[27]

These findings can be employed to understand other hive phenomena that occur in the lead up to swarming, notably idle bees disengaged from hive activities being those that encourage and engage in building of drone comb and the phenomenon of swarm queen cells usually being found at the

periphery of the brood nest.

Other genetic and environmental factors influencing swarming, reviewed in Part II, and the special case of non-reproductive swarming, absconding, will be discussed in terms of its importance for honey bee survival. Non reproductive swarming has special adaptive value across all honey bees. Its role in optimising survival of tropical bees and amongst species of honey bees other than European *Apis mellifera* in the phenomenon of colony migration provides further insight into underlying factors controlling swarming.

In Part I of this series we have reviewed the historical context of honey bee swarming control measures and examined the role of the worker and the queen as agents of reproductive swarming. In follow up Part II we will examine the full range of swarming behaviours in honey bees and expand our perspective of swarming to include honey bees across the *Apis* genus.

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[25] A.I. Root (1980). *The ABC and XYZ of Bee Culture*, p. 507. A.I. Root Company, Medina, Ohio. See also Huber (1806, loc. cit.).

[26] Killon, K. (1981). *Honey in the Comb.* Dadant and Sons, Hamilton, Illinois.

[27] Oldroyd, B.P. and Wongsiri, S. (2006). *Asian honey bees: Biology, conservation and human interactions*. Harvard University Press. http://trove.nla.gov.au/version/45924294 Australian National Library Dewey Number N 595.799 044