Affecting young queen production in *Bombus terrestris* L. (Hymenoptera, Apoidea) colonies reared in laboratory

Vladimír Ptáček
Masaryk University, Faculty of Science, Kotlářská 2, 611 37 Brno, Czech Republic
Phone: .420 5 41129562, fax: .420 5 41211214, e-mail: ptacek@sci.muni.cz

According to the scheme presented first by Duchateau (1991), in laboratory only some colonies produce queens. They are reared from the portion of diploid brood available in a colony when it reaches a physiological stage called as the "switch point". No other young queens emerge then in such colony as it's old queen turns to laying haploid eggs only. However a large proportion of colonies do not produce queens at all. After having reared several generations of workers, they turn to mail producers for the rest of their life. However, the methods of laboratory rearing bumble bee colonies will not be complete without having a possibility to rear young queens intentionally from any colony or even any laying queen.

Two possible ways of obtaining young queens in laboratory were tested:

1. To rear them in groups of workers taken from regular colonies.

2. To make the colonies queen-less in comparatively early stage of their development.

In 1997 four groups of four workers in each did not accept eggs an/or young diploid larvae either from their maternal colony or from the other one. Workers, which already established dominance in the groups, destroyed the inserted brood and laid their own eggs. The method (groups of workers) still has to be tested in spite of our unsuccessful results. Maybe the number of workers in groups or their age may be important.

From that time onward we used to instigate the production of young queens in a colony by removing its old queen at the stage of 15 - 30 workers (Fig1.) Under this situation remaining old larvae and those in cocoons develop into workers. The younger ones well fed by workers quickly enlarge their bodies (Fig. 2) and finely spine typically large cocoons (Fig. 3). They also behave according to the queen-model: consume lot of pollen in the first 3 days, mate, fill their honey stomachs and enter hibernation. Later on they are able to start egg laying on a normal way.

Fig. 1: The stage of a colony suitable for dequeening (the queen at he left in the middle, cocoons right above with young brood cells on them, older larvae in the middle and right, the younger ones under the queen).

Fig. 2: Large larvae developing into queens (compare the small worker cocoons).

Fig. 3: Some of the queen-larvae have spinned their cocoons, the small worker ones are situated above them.

The improvement of the method seems to be possible as shows the photo No 4, where are the queen cocoons reared by a few workers of a queen-less colony from offered young larvae in the year 2000.

Fig.4: The queen cocoons reared by workers from alien brood

Reference:
Duchateau, M. J.(1991) Regulation of colony development in bumble-bees. - Proc. 5th. Sympos. Pollin., Acta Horticulturae, 288 : 139-143.

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