



FROM NATURE TO LAB AND FROM LAB TO NATURE – A CONCEPT TO SUPPORT BUMBLEBEE (*Bombus*, APOIDEA) DIVERSITY

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In early eighties we were successful in using young honey bee workers to encourage egg laying in *Bombus terrestris* in laboratory (Ptacek, 1983). After Rösseler (1985) found the possibility to break diapause by the CO₂ the year round rearing of the species was possible. The method was then quickly improved, especially by the scientists in Netherlands and Belgium, in order to have the colonies for commercial greenhouse pollination. Welthuis and Doorn (2006) summarized the essential knowledge in the field.

Besides the reasons of commercial vegetable pollination, rearing bumblebees in lab has also its scientific and ecological impacts. They can be used as cage pollinators in plant breeding and/or plant species conservation (Ptacek and Drobna 2006). The interest in rearing of non-terrestrial species may consist also in their scarcity in a given region and may become a part of the conservative and re-introductory efforts directed to bumble bees themselves.

To rear other species in lab, basic procedures may be similar to those known in *B. terrestris*, like equipment, food, and storing young queens; the other may be different – feeding started colonies, placing colonies outside, supplemental feeding, taking of young queens and males, their pre-mating treatment. Having used as standard the “terrestrial method” in the lab at M.U., we were able to rear *B. lapidarius*, *B. lucorum* and partially *B. pratorum*, *B. soroeensis*, *B. hypnorum*.

Satisfactory results in starting queens' egg laying seem to be possible also in the group of the long tongued species – the so called “pocket makers”. Feeding brood needs here some help from the staff, who have to insert fresh pollen into the pockets made by queens close to brood. Having the first workers and supplied by food, colonies develop better outside. *B. pascuorum* responded best to the lab conditions, and became a standard for similar species (*B. hortorum*, *B. ruderarius*, *B. sylvarum* and partially *B. humilis*), which have been testing, now.

Near Prague, J. Čížek found the locality, where 2 species previously considered as scarce or endangered – *B. ruderatus* and *B. subterraneus*, do occur regularly. He could start their colonies keeping pairs of queens partially separated in a special device that had the warmth gradient at the bottom, where queens choose the optimum place for cell construction. Recently, this 2 species response well also to the common rearing conditions applied to other species in his home lab.

In order to enable using knowledge in rearing bumblebees for propagation of scarce species, the authors suggest more intensive EU collaboration in following items:

1. Evidence of natural sources of the scarce species
2. Protection such refuges by the national or EU legislation
3. Improvement of propagation methods for the selected species inclusive the laboratory rearing
4. Research on methods for their re-entry into the nature.

Literature:

Ptacek V. (1983): Indukce plodování samic čmeláků (Hymenoptera, Bombidae) pomocí kontaktu se včelami medonosnými (*Apis mellifera* L.). (Predběžné sdělení) (Induction of bumblebee queens to egg laying by means of their contact with honey bees. The pilot study). Sborník věd. prací VŠUP Troubsko (8): 157-161.

Ptacek V. and Drobna J. 2006: Cría y uso de los abejorros para la polinización de los recursos genéticos de legumbres forrajeras. (Rearing and using bumblebees for pollination of forage legume genetic resources.). In *II Jornadas de Polinización en Plantas Hortícolas*. 1. Iss., Almería: CIFA La Majonera-La Cañada IFAPA, 2006. od s. 124-153, 272 s. 2 nd Course of pollination. URL: <http://www.agrobio.es/jornadas/jornadas.pdf>

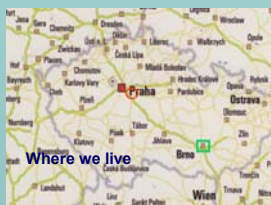
Rösseler P. F. (1985): A technique for year-round rearing of *Bombus terrestris* (Apidae Bombini) in captivity. *Apidologie* 16, 165-170.

Welthuis H. H. V. and Van Doorn A. (2006): A century of advances in bumble bee domestication and the economic and environmental aspects of its commercialization for pollination. *Apidologie* 37, 421-451.

Several examples of colonies started in lab. The species belong to the group called as „pollen storers. Successful mating in laboratory is also necessary.



The standard for the group of pocket makers became *B. pascuorum*. According to it *B. ruderarius*, *B. sylvarum* and *B. hortorum* can be reared



J. Čížek with his bumble bees



The country side friendly for bees



A device for warmth gradient

