

**Association of Institutes for Bee Research  
Report of the 55th Seminar in Hohen Neuendorf  
11–13 March 2008**

**Arbeitsgemeinschaft der Institute für Bienenforschung e.V.  
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**Association des Instituts de Recherche sur les abeilles  
Comptes rendus du 55<sup>e</sup> Congrès à Hohen Neuendorf  
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**List of reports** (\* after the title indicates that no abstract of this report is published).

**Verzeichnis der Referate** (\* bedeutet, dass zu diesem Titel keine Zusammenfassung aufgeführt ist).

**Liste des communications** (\* après le titre indique que le résumé de la communication n'est pas publié dans ce numéro).

**Invited talk**

**Einführungsvortrag**

**Conférence inaugurale**

1. Parasites and humoral defense in the model of *Bombus* (Bumblebees). *P. Schmid-Hempel\**

Parasiten und Immunabwehr im Modellfall von *Bombus* (Hummeln).

Parasites et défense humorale chez le modèle *Bombus* (bourdons).

**Biology, physiology, behavior**

**Biologie, Physiologie, Verhalten**

**Biologie, physiologie, comportement**

2. Why do pollen foragers perform better in associative learning than nectar foragers? *R. Scheiner*  
Warum lernen Pollensammlerinnen besser als Nektarsammlerinnen?

Pourquoi les butineuses de pollen sont-elles plus performantes dans l'apprentissage associatif que les butineuses de nectar ?

3. "Sniffer Bees": Can honeybees learn the odor of queens with different kin relation? *R. Alkattee, H. Steidle, P. Rosenkranz*

„Schnüfflerbienen“: Können Bienen den Duft von Königinnen mit unterschiedlichen Verwandtschaftsbeziehungen lernen?

“Abeilles renifleuses”: les abeilles peuvent-elles apprendre l'odeur des reines ayant des parentés diverses ?

4. Sleep and Memory – why do bees sleep? *L. Bogusch, R. Menzel\**

Schlaf und Gedächtnis – Warum schlafen Bienen?

Sommeil et mémoire – pourquoi les abeilles dorment-elles ?

5. Localization of learning and memory processes within the honeybee brain: local anesthesia of the mushroom bodies. *B. Grünewald, C. Bartsch, M. Giurfa, J.-M. Devaud*

Lokalisierung von Lern- und Gedächtnisleistungen im Bienenhirn: Lokalanästhesie der Pilzkörper.

Localisation des processus d'apprentissage et de mémoire dans le cerveau de l'Abeille : anesthésie locale des corps pédonculés.

6. Experience contributes to an improvement of hygienic behaviour in honeybee workers, *Apis mellifera*. *S. Härtel, H.M.G. Lattorff, M.O. Schäfer, J.S. Pettis\**

Beitrag von Erfahrung zur Verbesserung des hygienischen Verhaltens von Honigbienenarbeiterinnen.

L'expérience contribue à améliorer le comportement hygiénique des ouvrières d'abeilles.

7. Heatseeker – heat as a trigger for trophallactic activities in the honeybee. *R. Basile, J. Tautz\**

Hitzesucher – Hitze als Auslöser trophallaktischer Aktivitäten bei Honigbienen.

whereas the conditioned response on the untreated side was unaffected. This shows that the ipsilateral mushroom body is essentially involved during memory retrieval; that procaine is a valuable local narcotic in bees and that it stays locally within the injected side. In a second experiment, we tested the dynamics of the memory transfer. For this, bees were injected unilaterally (ipsi- or contralateral) at different times during the learning process (unilateral conditioning), e.g. before or directly after the side-specific training or before the retention tests to investigate the dynamics of the information transfer between the brain hemispheres. Injections immediately before or after conditioning did not influence the contralateral response during later tests, whereas ipsilateral injections directly before retrieval reduced the contralateral performance. We therefore conclude that information transfer does not take place during acquisition. Rather, our results show that the memory trace after side-specific odour learning is limited to the trained side and that the information is transferred to the contralateral side via the  $\alpha$ -lobes only during retrieval.

**13. Social dynamics of brood warming: simultaneous measurements of honeybee temperatures and brood cell temperatures of a brood area.** *J. Lein*<sup>1</sup>, *M. Becher*<sup>2</sup>, *R.F.A. Moritz*<sup>2</sup>, *S. Fuchs*<sup>1</sup> (<sup>1</sup>Institut für Bienenkunde (Polytechnische Gesellschaft) FB Biowissenschaften der Goethe-Universität Frankfurt am Main, Germany; <sup>2</sup>Institut für Biologie, Martin Luther Universität Halle-Wittenberg, Germany)

Social activities in honey bees are thought to be based on a division of labor, depending on the readiness for work of the individual workers. Though many highly developed theoretical models exist, there are very few empirical analyses. We studied the extent to which a small group of honeybee workers engage in brood warming, how they react to a warming stimulus, and how the performance of the group is composed of the individual contributions. The bees were studied within an experimental set-up integrating for the first time infrared thermography with temperature measurements of a sealed brood area. The infrared thermography allows us to quantify all thorax temperatures of individual brood warming honeybee workers, leading to a detailed picture of the group's activities. A temperature-multiplexer simultaneously measured the temperature of the brood area through 248 sensors inserted from the back of the brood comb into the opposing brood cells. The graphical illustration of the data shows a detailed picture of the temperature distri-

bution of the brood comb and allowed us to investigate the heating success of the whole group. This experimental set-up enabled us to analyse in detail the brood warming behaviour of composite groups of genetically diverse honeybees, e.g. races or patriline. Using this method we can study numbers and intensities of individual brood warming efforts, and their effect on the temperature of the comb, thus providing a better understanding of the regulatory processes in social activities.

**14. Improvement in the pupal development of artificially reared honeybee larvae.** *U. Riessberger-Gallé*<sup>1</sup>, *J. Vollmann*<sup>1</sup>, *R. Brodschneider*<sup>1</sup>, *P. Aupinel*<sup>2</sup>, *K. Crailsheim*<sup>1</sup> (<sup>1</sup>Institut für Zoologie, Karl-Franzens-Universität Graz, 8010 Graz, Austria; <sup>2</sup>Unité expérimentale d'entomologie, INRA, Le Magneraud, Surgères, France)

The feeding protocols to rear honeybee larvae artificially in the laboratory have been improved during past years (Aupinel et al. (2005), *Bull. Insectol.* 58, 107–111), but rearing of morphologically intact adults has been ignored. Horizontal microtiter plates with plastic queen cups lead to wing deformations and humpbacks in adult bees, because larvae and pupae hold vertical positions. Since these morphological deformations may affect the behaviour of adult bees, we developed a method to rear honeybees horizontally in the pupal stage. The (white eyed) pupae are rotated carefully inside their plastic cups facing towards the opening on the 11th day after grafting to ensure later emergence. Capping of brood cells is simulated by sealing the rearing plates with a thin, almost transparent and perforated wax layer to prevent pupae from falling out when plates are positioned vertically. The wax layer is prepared by melting 2.5 g of wax foundation between two sheets of baking paper and shaping it with a rolling pin. Plates held in a vertical position (like combs in a colony) allow pupae to develop horizontally as in natural brood cells. When metamorphosis is finished the honeybees can emerge from the cups autonomously by biting through the thin wax layer, a parameter for their viability and fitness. None of the individuals reared this way displayed humpbacks or other morphological deformations. This simple and cost-efficient improvement guarantees the optimal morphological development of artificially reared adult honeybees.

**15. Dynamics of body weight in honeybee larvae: artificially versus naturally raised.** *U. Riessberger-Gallé*, *J. Vollmann*, *K. Crailsheim*