

OR115*Caste determination in eusocial bees: A key role of terpenoids?***Stefan Jarau**

Reproductive division of labour is an identifying feature of eusocial insects. It is based on the ability of female larvae to develop into either of two distinct female castes, queens and workers. A key to castes in eusocial insects lies in the regulation of growth and development in the larval stages by colony internal factors, particularly by a modification of the larval food. The food modifications subsequently translate into endocrine signals that control the caste specific developmental patterns. The importance of royal jelly for queen development and, thus, caste determination in honeybees is well known. Information about proximate caste determining mechanisms in the remaining eusocial bees is rare. The only species for which a direct influence of a compound from larval food on caste development has been demonstrated is the stingless bee *Melipona beecheii*. We found that in this species the terpene geraniol, secreted from labial glands of nurse bees, can induce queen development in larvae when mixed to the larval food in brood cells. We recently identified terpenoid compounds from labial gland secretions of another stingless bee species, *Plebeia remota*, as well as in the bumblebee *Bombus terrestris*. These terpenoids are abundant in the gland secretions of nurse bees but almost lacking in foragers, indicating their importance for larval nutrition and, potentially, for caste determination. I hypothesize that the mode of action of terpenoids in queen development is linked to the biosynthesis of juvenile hormone, which is a terpenoid compound, too, and which is produced in higher amounts by queen larvae as compared to worker larvae. Terpenoids are also common in pollen and nectar, the primary food of bee larvae. Thus, caste determining mechanisms in eusocial bees may have their evolutionary origin in phenotypic plasticity during larval development due to variations in terpenoid contents in larval provision.