LASI STUDENT'S SUCCESS

Honey Bee Hygienic Behaviour

Professor Francis LW Ratnieks
(Laboratory of Apiculture and Social Insects, School of Life Sciences, University of Sussex)

Gianluigi Bigio successfully defended his PhD thesis, *Hygienic Behaviour in Honey Bees*, on 21 July 2014. He carried out his research at the Laboratory of Apiculture and Social Insects (LASI), the University of Sussex, under the supervision of Professor Francis Ratnieks, and worked closely with several other LASI researchers.

Karin Alton

Gianluigi Bigio and Francis Ratnieks

As most beekeepers know, hygienic behaviour is a natural (but not common) behaviour in which worker bees uncap and remove dead or diseased brood from capped cells. As a result, it is a defence mechanism against brood diseases.

Six Sub-projects

Gianluigi's research investigated several areas within hygienic behaviour, including both basic biology and practical issues relevant to beekeeping and breeding hygienic bees.

One of his six PhD sub-projects compared the level of hygienic behaviour in colonies headed by a queen bred from a hygienic 'mother' colony, in which these daughter queens were either open-mated to whatever drones were available naturally or instrumentally inseminated (II) with semen of drones from a hygienic colony. It turned out that the open-mated queens were highly hygienic and almost as good as the II queens, which is encouraging as it shows that standard queen rearing methods used by beekeepers are sufficient to produce hygienic queens.

Removal of Healthy Brood?

One puzzle in hygienic behaviour is that it is quite rare, as only about 10% of colonies are hygienic. Another of Gianluigi's sub-projects investigated whether this was because hygienic behaviour is costly because of the mistaken removal of healthy brood.

What he found was that hygienic colonies were no more likely to remove healthy brood than non-hygienic colonies. So, we still don't know why hygiene is rare but we know that it is not because it interferes with brood rearing.

Other Research

Gianluigi also made important contributions to LASI's wider research and outreach programme in hygienic behaviour. He helped with the arduous task of detecting hygienic colonies using the 'freeze-killed brood' bioassay, quantifying levels of hygienic behaviour in hundreds of colonies, selecting good stock and breeding the next generation of queens.

He also helped lay the foundations for further LASI work on hygienic behaviour, including research by current LASI PhD student Hasan al Toufailia, showing that hygienic behaviour has an important effect on controlling varroa and deformed wing virus (DWV).

Gianluigi helped with many LASI training workshops showing beekeepers how to screen colonies for hygienic behaviour and how to rear queens and he gave many talks to beekeeping associations.

Working with Bees in Italy

After completing his thesis in April, Gianluigi returned to his native Italy but he is still working with honey bees and hygienic behaviour with the AsProMiele (Associazione Produttori Miele Piemonte, Piemont Honey Producers' Association), where he is helping to breed hygienic bees and doing other projects on colony health.

Thank You BBKA

Gianluigi and Francis would like to give a special 'thank you' to the British Beekeepers' Association as this PhD would not have been possible without their financial support, which contributed around half the total cost of approximately £100,000. The research took four years from its start in April 2010.

Further Information

http://scholar.google.co.uk/citations?user=4gvhTA4AAAAJ&hl=en

www.sussex.ac.uk/lasi