

Paenibacillus larvae, Honey Bee Pathogen: What We Know So Far

Aim

To investigate the bacteria responsible for causing American foulbrood (AFB) and to determine which strains are capable of causing AFB symptoms.

Background

AFB is a serious disease of honey bee brood caused by *Paenibacillus larvae* subspecies (Figure 1, Figure 2). The classification of *Paenibacillus larvae* subspecies has been the focus of much research since its discovery. Correct classification of the organism is important and should relate to molecular characteristics rather than laboratory experiments targeting tiny differences in pathogenicity.

1. There are 2 subspecies: Virulent *Paenibacillus larvae* ssp larvae (*Pll*) and *Paenibacillus larvae* ssp *pulvificiens* (*Plp*) which is known to cause powdery scale disease
2. All *Pll* isolates cause AFB, but only some *Plp* isolates have the ability to cause AFB

Due to some *Plp* isolates being able to cause AFB, some scientists have called for the subspecies differentiation to be dropped. However the methods that have been used to determine the classification of the organism are somewhat dated. Therefore it is important to utilise the latest methods and study the genetics behind the organism to determine the true classification.



Figure 1 The Ropiness test, using the remains of the larvae

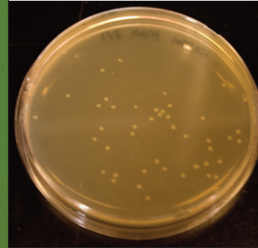


Figure 2 An agar plate showing *Paenibacillus larvae* growth

Experimental Plan

- To learn more about the variance between *Pll* and *Plp* by amplifying and sequencing a range of housekeeping genes
- To study existing isolates and any new isolates for the presence of plasmids, and then determining the significance of any plasmids found
- To attain a better level of understanding about the variance that exists between *Pll* and *Plp* (Figure 3)
- To identify epidemiological patterns and show undetected routes of transmission by the discovery of new emerging strains from abroad

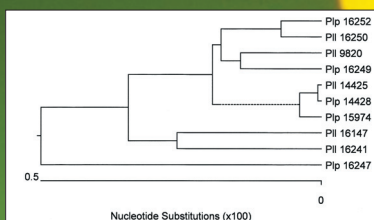


Figure 3 Shows how closely related the bacteria behind AFB and powdery scale actually are

<http://beebase.csl.gov.uk>



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