



# New haplotypes of the parasitic mite *Varroa destructor* on *Apis mellifera* in Asia: a permanent threat for apiculture

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onset of egg-laying. Hence, the most parsimonious explanation for this phenomenon is the pleiotropic action of the thelytoky locus. Since not all workers will start to reproduce, even if they carry the thelytoky allele, there must be other influences as well. We used measurements of fluctuating asymmetry, a sensitive indicator for developmental stability, for determining an influence of previous development on the success of reproduction. Measurements of 14 characters show that reproducing workers are more symmetric than non-reproducing workers, which indicates that developmental homeostasis is important for high direct fitness gains.

### **New haplotypes of the parasitic mite *Varroa destructor* on *Apis mellifera* in Asia: a permanent threat for apiculture?**

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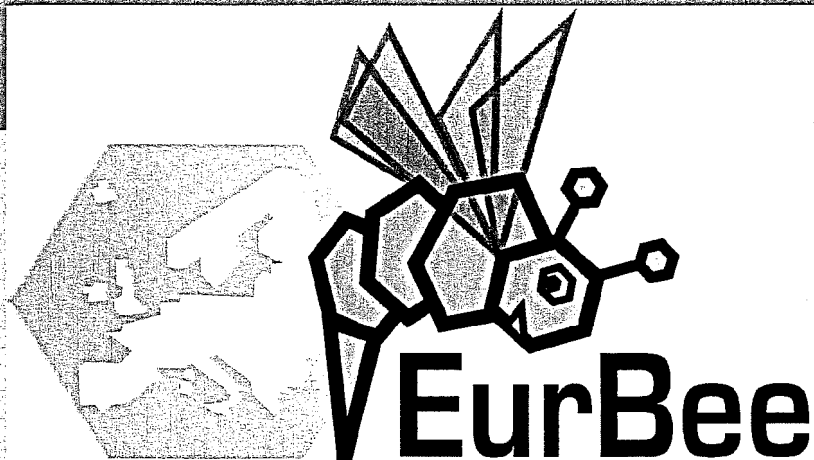
The invasion of *Apis mellifera* by *Varroa destructor* is attributed to two haplotypes (K and J) that shifted from *A. cerana*, in north-east Asia last century. Of the eight known haplotypes of *V. destructor* on *A. cerana*, only two, the so-called Japan 1 (J1) and Korea 1 (K1) haplotypes, have colonized *A. mellifera*. We have gained further insights into the invasion of *A. mellifera* by *V. destructor* by identifying and genotyping the mite infesting both *A. cerana* and *A. mellifera* in regions where the J1 and K1 host shifts occurred and in a broader area along the mite geographic range in Asia. Mitochondrial sequences were used and mite samples were first genotyped on the basis of fragment of the COI to connect new samples to the known haplotypes. Based on the analysis of expanded mtDNA sequences, new *Varroa* mitochondrial lineages were uncovered. New variants of each of the K and J haplotypes were found on Western honeybees and are potential new threats for Western honeybees outside of Asia. The extreme lack of polymorphism now seen in the K and J haplotypes on Western honeybees outside of Asia can be plausibly explained from bottlenecks that occurred in Asia before and after mites shifted from their primary host. The presence of novel haplotypes of *V. destructor* parasitizing *A. mellifera* in Asia highlight the permanent risk that a new *Varroa* type might extend on *A. mellifera* outside Asia, representing a new threat for apiculture.

### **Bees foraging on native *Impatiens* (*Impatiens* spp.) in Korea**

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Biodiversity and foraging behavior of bees visiting on seven native *impatiens* species, *Impatiens* spp. (Balsaminaceae), was surveyed in Korea. Three Bumblebees were dominating, followed by two honeybees (*Apis mellifera* and *A. cerana*). With the long



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