

CRITHIDIA SPP. AND LOTMARIA SPP., POSSIBLE EMERGING PATHOGENS IN HONEY BEES

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Trypanomatids are obligate parasites and their presence in European honey bees (*Apis mellifera*) has been recognised as highly prevalent. According to Schwartz et al. (2015), the current classification places all Hymenoptera trypanosomatidids within a novel clade (Clade 3) of the Leishmaninae subfamily that includes *Crithidia mellificae* (*C. mellificae*) and *Lotmaria passim* (*L. passim*).

C. mellificae Langridge and McGhee, 1967 was described in *A. mellifera* and is present in Asia, Australia, USA and Europe; it can infest a wide variety of hymenopteran hosts (e.g. *A. mellifera*, *Apis ceranae*, *Vespula squamosa*, *Osmia bicornis*, *Osmia cornuta*).

L. passim was described in *A. mellifera* and in *A. ceranae*. According to Ravoet et al. (2015), it is the dominant species in Belgium, Japan and Switzerland. It has also been found in Chile. Many isolates initially identified as *C. mellificae* were reclassified as *L. passim*, thus making this species the most predominant trypanosomatid in honey bees worldwide, while *C. mellificae* seems currently considered less frequent.

C. mellificae and *L. passim* colonize the honey bees at the digestive tract level (rectum tissue) being transmitted by fecal-oral route. The presence of infected feces in the hive promotes the presence of parasite cells on the surface of insect body and increases the number of honey bee workers able to transmit the parasite to other healthy bees.

Seasonal occurrence of these protozoa seems to be significantly lower in spring compared to summer and autumn even if their pathological effects on the honey bees are still not well known: some researchers state that they do not affect the health of the colony; other researchers report a positive correlation on honey bee winter losses or colony longevity, when associated with varroaosis and *Nosema ceranae*. Also bacterial infections by *Spiroplasma* spp. were associated with *C. mellificae* presence.

At present, the isolation methods for *C. mellificae* and *L. passim* are: axenic cell lines cultures isolated from the dissected ileum/rectum of adult honey bees; *in vivo* inoculations with trypanosomatid axenic cultures established from *A. mellifera*, genetic characterization (phylogenetic analyses) of the isolated strains and electron microscopy.

Keywords: *Crithidia* spp.; *Lotmaria* spp.; emerging; pathogen; honey bee