

Conclusion of my talk in Jarstrebarsko/ Croatia

In the recent systematics, the whole group of mites represent two branches of the phylogenetic tree. The corresponding major groups are called “Anactinotrichida” and “Actinotrichida”.

They are presumably, what the evolution biologists call “sistergroups”.

There are about 50000 species of mites known. The mites therefore represent one of the two largest groups within the Arachnida (besides the real spiders: Araneae). It is still in discussion, which group of Arachnida could be the sistergroup of the mites (Acari). These seem to be either the Ricinulei or the Solifugae.

Morphologically and also biologically, mites are very diverse. Many different habitats could be colonized such as all kinds of soil, water, trees, carnivorous plants, animal cadavers or the live body of animals (such as skin, nose- or ear- parasites of mammals).

Some groups appear as pests and cause damage to us human beings. This concerns mite groups or species from both of these two major lineages.

Interesting anactinotrichid mites are for example the ticks; blood sucking parasites of humans and other mammals, transferring several diseases; or the Gamasida, which represent a quite large group with mites of different life styles. Some are free living predators and only attach insects for a phoretic disperse. Others are parasites of insects, such as the *Varroa*-mite. This gamasid species became a serious parasite of the middle European honey bee. It was originally introduced as an invasive species from Asia, where it is associated with an Asian honey bee (*Apis cerana*) without damaging this bee significantly. The middle European bee has had no time to adapt to that parasite. Therefore the mites reduce the population growth of a colony distinctly when it gets infested. A mite infection in this case means that mites suck for a while on the hemolymph of bee larvae and pupae without killing them or preventing their hatching. But the bee's immune system loses stability and makes the bees sensitive for all kinds of secondary infections.

Important mite-groups belong also to the Actinotrichida. Within the Trombidiformes gall mites and spider mites represent parasites of cultivated plants.

A completely other importance for a scientific research is given by some Gamasida, uropodid mites and mites of the oribatida and Astigmata.

They are phoretically associated mostly with different insects and myriapods. Phoresy is defined as an interaction between two organisms, in which one uses the other as a carrier between (usually rapidly drying out) single habitats.

Terms like “phoret” for the phoretic animal and “carrier” for the corresponding insect can be used. Many insect pests have phoretic associates. These are usually represented by nematodes and mites. Examples are ants (the Red Imported Fire Ant *Solenopsis invicta* e.g.) or bark beetles. In some cases “hyperphoresy” was discovered. A mite riding on a bark beetle and transporting spores of a fungus (the spores are hyperphortic) can be given as an example of applied importance. Mites of the Genus *Tarsonemus* were discovered to carry spores of the entomopathogen fungus *Ophiostoma*, which for example causes the famous “elm disease”. Other mites, for example of the group Histiotomatidae, are phoretically associated in several species numbers to several bark beetle species. Their biology is still unknown and needs to be better observed due to the hypothesis that those mites might be used in future as vectors to introduce pathogens, which can attack the corresponding bark beetles or their broods.