

**Information about the Environment and for travellers in Crete:**

## Carpenter ants (*Camponotus*) “milk” aphids (*Aphis*) Fossil ants: origin and early stage of development



Ants (see fig.) are a family of the insects within the order of the hymenopter insects (*Hymenoptera*, *Apocrita*). The data for the number of kinds of ant vary between 11.000 and 12.500; in Europe it might be about 200 kinds. “The giants of the forest“ occur nearly everywhere on earth, also on islands, like e.g. Crete. Details to ants can be found at: [ <http://en.wikipedia.org/wiki/Ant> ]



Aphids (see fig. left) belong to the plant lice (*Sternorrhyncha*). Of the well-known 3.000 species live about 850 in Central Europe; among them also the Aphididae, from which about 2.000 species are known and domestic in Europe about 650 kinds. Details for this find you under: [ <http://en.wikipedia.org/wiki/Aphid> ]. They are also represented on Crete; therefore see fig right: colony of oleander aphid (*Aphis nerii*).



### Ants in symbiosis with plant lice

Many species of ant live in symbiosis with plant-absorptive insects and thus in interdependence. Mainly these are phloem absorbent scale insects (*Coccoidea*), **plant lice** (*Aphidoidea*) and psyllids (*Psylloidea*). Phloem is rich on carbohydrate, however it contains only very little protein. Phloem absorbent use therefore only about ten percent of carbohydrate; the surplus is separated as sugar-rich honeydew - most important source of carbohydrate of the ants -. The ants „milk“ the plant absorbers and guard them from natural enemies in return; see following fig.: **Ants “milk“ plant lice on a walnut tree sheet.**



## Fossil Ants

About the development of the ants in the early Neozoic era there are no realizations at present. While the ants probably were only insignificant during the Cretaceous and the find situation there sparsely, they experienced in the middle Neozoic era, approximately 50 million years ago (middle Eocene) a strong diversification; see in addition fig.: “**Fossil ant in amber milks plant louse**“. In this earth age all modern groups of the ants are already found, with the whole abundance at most different ways of life. They thereby belonged already in the Eocene to the prevailing groups of insects on earth. For the strong development and spreading of the ants in the Eocene essentially two causes are accepted: on the one hand the spreading flowering plants (Angiosperms) provided an up to then not known variety of plant wastes, which could be used as food for ants. On the other hand the same development led to the origin of many new kinds of insect, which opened numerous new habitats for the predatory living ants.



From the today living kinds of ant, the only 2008 in the Brazilian jungle discovered kind *Martialis heureka* seems to be the originally and oldest kind; see picture and detail information at:

[ [http://en.wikipedia.org/wiki/Martialis\\_heureka](http://en.wikipedia.org/wiki/Martialis_heureka) ]

However the origin and the early development of the ants are still not completely clarified. Current molecularly biological studies however support the acceptance of a monophyletic beginning, thus the development of the entire group from only one master form. The earliest assigned to ants find (e. g. *Gerontofornica cretacea*; see in addition also the following link to a pdf file at:

[ <http://redalyc.uaemex.mx/pdf/505/50500104.pdf> ] are dated on approximately 100 million years, thus come from the early Upper Cretaceous (the late earth Middle Ages, *Cenomanian*). *Gerontofornica* cannot be assigned exactly to that time. It possessed already the characteristics of modern ants, against what the proven from same time *Sphecomyrminae* was very original and had, apart from ant characteristics, still characteristics of the wasps. At the end of the cretaceous ages they extinct. Likewise proven for approximately 100 million years is the group of the *Myrmeciinae*, respectively their ancestor, which today are only found in Australia and New Caledonia. This from the beginning existing variety of the ants with original and highly developed forms suggests a substantially higher age of the group. Newer investigations on the basis of DNA divergence process let assume that the ants inhabit already at least 140 million years the earth.