The cuticular sensilla are small and complex organs, which consists of a cuticular apparatus (plates, hairs, pegs), one or numerous sense cells and two or more sheat cells. Since the first morphological description of a cuticular sensillum was published by ERICHSON in 1847, numerous studies with the light microscope, SEM and TEM have resulted in a strong increace of our knowledge about these organs, as the reviews of SLIFER (1970), MCIVER (1975), ALTNER (1977) and ZACHARUK (1980) have shown. The numerous different structures of the cuticular apparatuses, stimulus transmitting pore systems, dendrites and sheat cells is as remarkable as the different densities, positions and arrangements of the sensilla on the antennas. Cuticular apparatuses of the sense organs can be positioned on the surface of the antennas, in pits (Sensilla coeloconica) and in chambers near the longitudinal axis of the antennas (Sensilla ampullacea).

The graet number of different sense organs and patterns of sensilla, which had already been described during the second half of the 19th century, provoked some entomologists to search for a classification of the different types of sensilla. Important investigations concerning this questions have been published by KRAEPELIN (1883) ans SCHENCK (1903). Another problem, in which many entomologists had very early been interested, was the evolutionary development of the different types of sensilla. In 1885, FOREL proposed a hypothesis as to the homology of the plate organs and their development from sense organs with vertical hairs during evolution. Another important contribution to this problem was published by WACKER (1925), who discussed FOREL's hypothesis in relation to the results of this intensive morphological study of the sense organs of many Hymenoptera. As far as I know, BÖRNER (1919) was the first entomologist to use cuticular sense organs as characters for taxonomic studies. In his classification of the Hymenoptera, he outlined some taxa corresponding to their different Sensilla placodea (plate organs) on the antennas with long, round or elliptic pore plates.

To come to a decision as to whether the antennal patterns of sensilla can be used as characters for phylogenetic reconstructions or not, I have been studying a great number of species from the Symphyta and Aculeata, as well as some Terebrantes, using the light microscope, SEM and TEM (WALTHER 1979 a, in prep.). The results of these investigations show clearly that usually 6-8 different types of sensilla are to be found on the antennas. For these different types of sensilla, their districution and arrangement, the new term "patterns of sensilla" is used.

On the antennal flagellas of the female and worker of *Formica rufa* L. for example, three olfactory, one gustatorical and mechanosensitive and two mechanosensitive sensilla are to be found. For two other types of sensilla, thermo-, hygro- and carbondioxide-sensitive function is presumed. On the male's flagellas, only two olfactory sensilla, but additionally a peg with an unknown function, belong to the pattern of sensilla.

If such patterns of sensilla are to be used as characters for phylogenetic reconstructions, first of all, it is necessary to demonstrate the homologies of the different types of sensilla (MCIVER 1980), for which the criterions of homology of REMANE (1952) could be very helpful. To support the assumption that a number of species belong to a monophyletic group, it must be determined furthermore, whether the characters are to be evaluated as plesiomorphous or apomorphous. The monophyletic descendence of a group of species is only justified if all species of this group possess the same apomorphous characters (HENNIG 1950, 1969, 1980; KÖNIGSMANN 1975; SCHLEE 1978).

The results of my previous investigations show that the antennal patterns of sensilla are characters of high complexity, which are composed of some sub-characters. The whole patterns of sensilla as well as parts of them, can be regarded as synapomorphous characters for higher taxa such as tribes, subfamilies, families and superfamilies and thereby justify or support the monophyly of these taxa concerned. As subcharacters of the patterns of sensilla, we may consider for example the density and the distribution and arrangements of the sensilla on the antennas. A very low density of sensilla is to be seen on the antennas of male and female of the woodwasp *Syntexis libocedrii* Rohwer (Syntexidae) which occurs in northern California and Oregon. In contrast, we find a high density of sensilla on the antennas of the American fossorial wasp *Myzinim maculatum* Fabricius (Myzinidae). Another sub-character is the distribution and arrangement of the sensilla on the antennas. It may be directly related to the morphology of the antennas, as is to be seen very clearly on the branched antennas of the males of *Diprion pini* (Linnaeus) (Diprionidae) as well as of both sexes of *Megalodontes cephalotes* Fabricius (Megalodontidae). In both species, we can recognize that most of the mechanosensitive sensilla are on the antennal axis, but we find the olfactory sensilla on the branches of the antennas.

On the antennal flagella of the wood wasps from the families Siricidae, Xiphydriidae and Orussidae, the chemosensitive sense organs are concentrated on one half and the mechano-sensitive tactile hairs on the other. This distribution may be also considered as a special sub-character.

Many hymenoptera from Aculeata, which show noumerous sexual dimorphisms, possess also a great number of sex-specific differences between the antennal patterns of sensilla of female and male. In both sexes, we may find different types of sensilla or different numbers of types. The densities and the distributions of the sensilla in male and female may also show great differences.

The genus *Thynnoides* and some other genera of the aculeate family Thynnidae, which is distributed over the