

## **Evolution of tarsal comb in theridiid spiders (Arachnida: Araneae)**

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**Key words:** Araneiformia, Theridiidae, development.

### **ABSTRACT**

The evaluation of morphological characters was made and compared with other araneiform families. To establish the phylogenetic tree 'slow' and 'fast' features were used. It is supposed that ancestors of species with certain types of colulus developed in separate branches. Microscopic evaluation showed great differences in fine morphology of comb and allowed to divide the family into three groups. The genera of higher branches of the tree with excrescences transformed into weak hairs, confirm the tendency to lose the comb.

### **INTRODUCTION**

Theridiid spiders are supposed to be the oldest great family of the sub-order Araneiformia. Better knowledge of developmental trends can clarify many open taxonomic questions in this group of spiders. The only paper concerning the problem was published by Levi and Levi (1962). Here, the morphological features were classified according to their developmental progress and they are the basis for dividing the genera into groups. Unfortunately, many genera are characterized by several types of morphological features, which makes presentation of the phylogenetic tree impossible. Instead, the groups of related genera 'ellipses' are presented (Fig. 1).

### **MATERIAL AND METHODS**

The evaluation of morphological features was made in comparison with other araneiform families. 'Slow' features are those which last longer in the evolution and 'fast' features change faster in the same period of time. Colulus, the rudimental organ, can be considered as an example of a 'slow' feature as it is known, that rudimental organs remain in the development a long time without any changes. 'Fast' changes include the presence of radix, teeth on posterior cheliceral margin and position of paracymbium.

On the basis of the mentioned characteristics, the phylogenetic tree can be established (Fig. 2) based on the morphology of tarsal comb, the unique structure for the family. Up to now no detailed studies of tarsal comb in different genera of the Theridiid spiders were made.

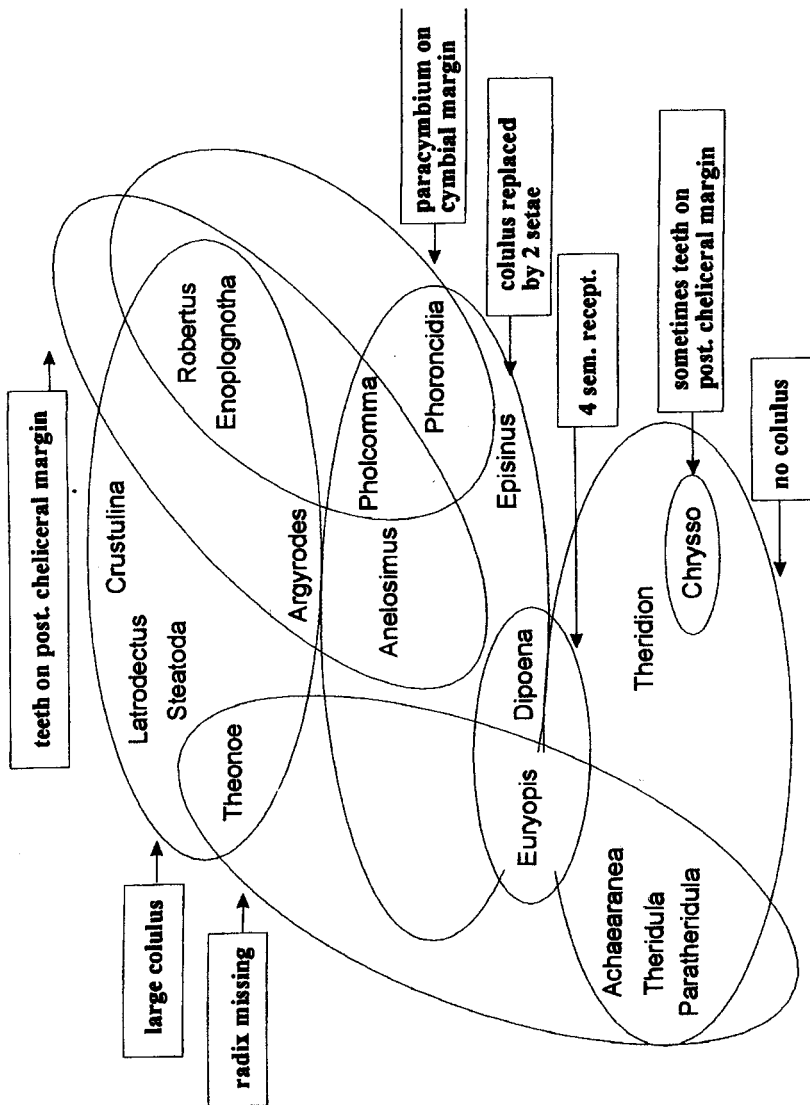


Fig. 1. Relations between Theridiid genera, from Levi and Levi (1962).

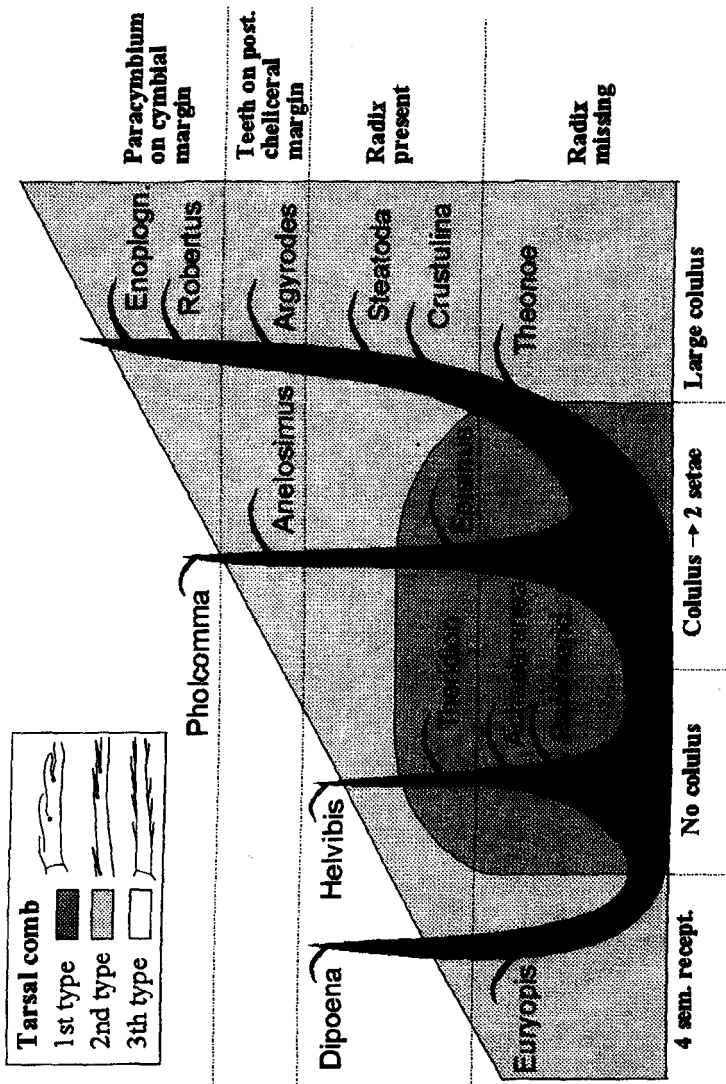


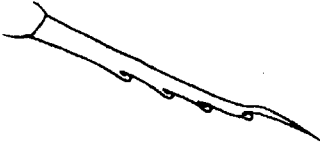
Fig. 2. Theridiid genera - developmental tree.



*Theridion varians*  
1:1000

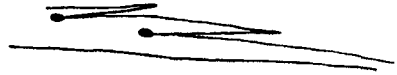


*Anelosimus vittatus*  
1:3000



*Episinus truncatus*  
1:1000

↑ type I



*Robertus lividus*  
1:3000

↑ type II



*Pholcomma gibbum*  
1:3000



*Dipoena tristis*  
1:2000

↑ type III

Fig. 3. Tarsal combs.

## RESULTS

1. The spines of tarsal comb bear the sagged excrescences (present in the oldest genus in developmental tree) (Fig. 3, type I).
2. In more developed genera the straight excrescences are present (Fig. 3, type II).
3. Excrescences transformed into weak hairs are typical for the genera occupying the highest branches of the phylogenetic tree (Fig. 3, type III).

## DISCUSSION

This characteristics presented fit the diagram well and confirm, to a certain degree, the correctness of it. That indicate the direct continuity of ancestors to other families (Jocqué 1984). It seems that the comb of primitive genera gradually disappears in highly developed genera. The latter seem related to more developed families.

## REFERENCES

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