

**Male palp morphology and copulatory mechanism in
Pholcus phalangioides (Fuesslin, 1775) (Pholcidae, Araneae)**

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Male pedipalps of *Pholcidae* have always been considered to present a special case because of their aberrant morphology and the resulting difficulties to homologize their structures with male palps of other species. As one of the most accurate observers of spider mating behaviour GERHARDT (1921, 1927), who investigated *Pholcus phalangioides* and *Ph. opilionoides*, gave a detailed description of the palpal morphology and its movement during courtship and subsequent copulation. Concerning the question of which parts of the male palp are actually inserted during copulation, he stated that the appendix and embolus are inserted together with the unculus whereas the procurus is kept outside of the female genital tract.

We reinvestigated Gerhardt's results on the palpal movements and mode of insertion in *Ph. phalangioides*. A prerequisite for understanding the copulatory mechanism was the morphological investigation of the various palpal features by means of light-microscopy and scanning electron microscopy. Video recording and cryofixation of spiders in copula helped to understand the movement of the male palps prior to insertion and the actual position of the parts during copulation. Additionally, cryofixed spiders were serially sectioned to investigate the position of the inserted parts within the female.

Our results demonstrate that Gerhardt's findings have to be corrected as to the position of the palpal parts during copulation. The procurus was always inserted into the female. The embolus lay close to the pore plate where a secretion is exuded from associated glandular tissue (UHL, 1994a, b). Apparently the spermatozoa are directly injected into the secretion. Only part of the unculus was inserted into the female. During copulation, males performed twisting movements with their palps

that resulted in extrusion of a mass containing spermatozoa and secretion from the female genital tract, no matter whether the females were virgins or had mated once before. Palpal movements slowed down during the course of copulation. Possible correlations between genital morphology and female choice as well as sperm competition were briefly discussed.

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