

Keeping and Breeding *Heterothele villosella* Strand, 1907
(Theraphosidae: Ischnocolinae)
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Preface

There are currently eleven described *Heterothele* species from the subfamily Ischnocolinae Simon, 1892: *H. affinis* Laurent, 1946; *H. atrophala* Simon, 1907; *H. caudicula* (Simon, 1886); *H. darcheni* (Benoit, 1966); *H. decemnotata* (Simon, 1891); *H. gabonensis* (Lucas, 1858); *H. honesta* Karsch 1879 (type species); *H. hullwilliamsi* Smith, 1990; *H. ogbunikia* Smith, 1990; *H. spinipes* Pocock, 1897; *H. villosella* Strand, 1907.

The distribution of this genus primarily stretches from Nigeria (West Africa) through Cameroon, the Democratic Republic of Congo (formerly Zaire) and into Tanzania (East Africa). It is alleged that *Heterothele caudicula* occurs in Argentina, but according to Smith this is probably due to incorrect labelling of the type material, and he concludes that the real locality of *H. caudicula* is most likely West Africa (Smith 1990).

Systematics and Taxonomy

Ferdinand Karsch (1853–1936) established the genus *Heterothele* based on *H. honesta*. Karsch described both the male and female of this species, but unfortunately he failed to designate a holotype in his publication (Karsch 1879). The name of the genus means “*the other thele*” (=chest) (Wagner 2005), which is probably meant to distinguish it from the genera *Holothele* and *Schismatothele*, both of which had been established by Karsch in the same year. Previously in 1858, 21 years prior to Karsch, Pierre Lucas (1814–1899) described *Mygale gabonensis*, which was later transferred to *Heterothele* by Reginald Innes Pocock (1863–1947). In his book *Baboon Spiders* Smith emphasised that the genus *Heterothele* needs to be revised (Smith 1990).

Laurent conducted a partial revision in 1946, which unfortunately covered only a few of the species. Richard Gallon has now taken on this task and is working on a complete revision of this genus (Gallon, pers. comm.).

The genus *Heterothele* differs from other Old World Ischnocolinae by its divided tarsal scopulae on all legs and pedipalps, the lack of a tibial apophysis, the presence of a third claw on the tarsus of leg IV and its elongated posterior lateral spinneret. Due to the extension of the spinneret there is a striking resemblance between *Heterothele* sp. and species of the family Dipluridae which are related to tarantulas (Theraphosidae).

On the tibia of leg I, the male of *H. villosella* has three proventral (i.e. downwards

lateral) spines which are situated apical (on the tip) of that tibia. They have a similar function to the tibial apophysis (pers. comm. R. Gallon). In addition, there is a brush of hairs ventral to the metatarsus of leg I, which consists of long setae (**Plate 1**). At first glance, both the brush and the spines on the tibia can be regarded as tibial apophysis. *Heterothele* species have a very simplified spermathecal structure, with receptacula seminis consisting of two lobes which are divided and either triangular shaped with lateral indentation (e.g. *H. villosella*) or square shaped with a rounded apex (like tombstones) (e.g. *H. gabonensis*).



Plate 1: Brush on metatarsus I of male *H. villosella* © Raab.

Heterothele villosella is a relatively large *Heterothele* species. Females reach a body length of c.3 cm, whereas the males get to a maximum body length of 2 cm. With a length of 2.8 cm only the male of *H. hullwilliamsi* is significantly larger. The female of this species is not yet known. It can be suggested that the females of this species, like other *Heterothele* species, are also growing significantly larger than the males. The basic colour of *H. villosella* is dark grey/black. On the carapace there is a conspicuous golden stripe, as wide as the ocular tubercle which extends straight to the rear of the carapace rim and which divides shortly after the fovea. The carapace is also fringed by gold-coloured hairs. On the female's abdomen there is a distinct pattern of gold coloured dots. Corresponding to the species' growth and ageing, this pattern gets gradually larger. The pattern on the upper side of the abdomen of the males appears more or less washy and faint. The fangs also gleam slightly golden.

Keeping and Breeding

Heterothele villosella require only small enclosures, because this species remains quite small. In its natural habitat (Amani, Eastern Usambara Mountains, Tanzania) *H. villosella* probably lives under roots and stones, which is similar to other *Heterothele* species (Smith 1990). In a tank *H. villosella* should be kept under similar conditions. It is recommended that the soil should be relatively high to enable the spiders to dig burrows. Usually the entire surface of the tank will be extensively covered with its web. It is recommended to provide branches, leaves, roots and similar artefacts. The way of spinning and the design of the webs can be compared to some species from the family Dipluridae; the web centres on a funnel, in which the spider lurks for prey and to which it retreats when disturbed.



Plate 2: *Heterothele villosella* adult female © Timo Raab.



Plate 3: *Heterothele villosella* adult male © Timo Raab.

This funnel can be extended by a few centimetres into the ground. The substrate should be neither excessively humid nor completely dry. It is not recommended to let the ground get dry for a longer period of time. *H. villosella* is a rather modest fellow which might forgive less than ideal tank conditions.

The feeding of this species does not usually cause any problems. This spider moves very quickly within its web and can easily subdue prey that are equal or larger in size to itself. This very often happens by involving its entire body, whereby the little spider may turn on its back in order to subdue the prey with all possible means. If regularly fed, the spiders can grow quickly, so that they should be mature after approximately one year.

Adult males reach a body length of up to 2 cm, whereas females get to *c.*3 cm. However, the sexual maturity of the females develops much earlier, so it is not a problem to mate animals of the same age.

When the male has reached the female's web, he very often remains motionless. After a few minutes he starts with his courtship; in some instances this process is even started by the female. It is characteristic for *H. villosella* that it beats very quickly on the web with both its pedipalps and leg pairs I and II. This leg-tapping is accompanied by forward and backward movements. While beating with leg pairs I and II, the male very often moves slowly towards the female. If the female responds hastily the male may retreat or flee for a while.

Without any noticeable reason the male begins with the copulation. He lifts the (in most cases) larger female with leg pair I and holds the female's fangs with his three prolateral tibial spines (**Plate 4**). When mating *H. villosella* females very often lift their abdomen steeply in the air. This behaviour most likely helps to further open the epigastric furrow.

During the mating the male should always be watched, because the females sometimes tend to capture their sexual partner after intercourse. In case of an attack by the female, the male can be saved by timely intervention. The mating might take a very long time. Raab observed in 2005 that the mutual courtship took several hours, whereas Drolshagen noticed that this process was finished after a much shorter time.

Upon conclusion of their mating they both clean themselves intensely and the male normally retreats from the female's web. This could be the same type of cleaning which had been observed by von Wirth, who in 1996 described such a behaviour in detail for the first time referring it to displacement activity (von Wirth 1996). Occasionally the male cleans himself within the female's web, despite an increased risk of being attacked by the female.



Plate 4: *Heterothele villosella* mating pair © Timo Raab.



Plate 5: *Heterothele villosella* young group feeding © Timo Raab.

The building of an egg-sac normally takes place only a few weeks after mating. It is possible that the mating was just 1–2 weeks before. The egg-sac is actively guarded by the female by carrying it between her fangs (**Plate 6**). It is only rarely observed that the female lays her egg-sac down. If an egg-sac is found that has been left alone by the female, there is a very high possibility that the eggs are infertile.

Strangely, females tend to eat their egg-sac within the first two weeks. However without mating a second time, the female builds another egg-sac shortly afterwards. The reason for this odd behaviour is as yet unknown. The size of the egg-sac and its contents vary significantly. Small females with a size of 2 cm often have an egg-sac with a diameter of *c.*0.5 cm which includes only a few eggs. Raab counted in two separate egg-sacs 20 nymphs apiece. Larger egg-sacs can include a significantly larger number of eggs. In a dried egg-sac with a diameter of *c.*1.5 cm from a grown female which had a body length of 3 cm, Raab counted 146 dry eggs. It can be deduced that a fertile egg-sac contains a similar amount of eggs.

Depending on temperature, the female opens the egg-sac after about 4 to 6 weeks, just when the nymphs emerge. They can remain with their mother for a while, which actively exercises brood care. This means that prey is captured, killed and then offered to the nymphs (**Plate 5**). Only when the nymphs have finished their joint meal will the female eat the remainder. Raab additionally observed that in some cases the nymphs were sitting on the female's labium eating food from the area around her mouth. This behaviour is very unusual for Theraphosidae; such a way of feeding by the female was also documented by Heller & Heller-Dohmen in *Holothele incei* (Heller & Heller-Dohmen 2004). Only a few other Ischnocolinae (*Holothele* sp.), Eumenophorinae (*Hysterocrates* sp.) and almost all species of the genus *Poecilotheria* can be deemed semi-social like *Heterothele villosella*. Breeding in a group should be no problem providing there is enough food. Nymphs grow faster when fed by the female, which are then much easier to raise (Gallon, pers. comm.).

Concluding Remarks

Unfortunately the small Ischnocolinae *Heterothele villosella* is rarely kept and has barely been bred in Germany. So far, *H. villosella* is the only *Heterothele* species which has found its way into the hobby. The reason for this is most likely that animals of this genus are very small and were so far only rarely imported. From time-to-time wild caught specimens of *H. villosella* are offered, but in most instances it is in fact not *H. villosella*, but a Barychelidae of the genus *Pisenor*. These can be easily distinguished from *H. villosella*, because they grow significantly larger. They also have no pattern on the carapace or abdomen, short cone-shaped spinnerets and contrary to *Heterothele* species no extensive webbing; in contrast they live in burrows which they seal with a trap door. One can only hope that *Heterothele villosella* can be seen more often in our enclosures in the near future.



Plate 6: Female *H. villosella* with egg-sac © Timo Raab.

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References

- Laurent, R. 1946. Notes arachnologiques africaines II.-Sur quelques thérâphosides du Congo Belge (Ichnocolinae, Eumenophorinae, Selenocosmiinae). *Revue Zool. Bot. afr.* **39**: 293–326.
- Heller, M. & M. Heller-Dohmen 2004. Bemerkungen und Beobachtungen zur Haltung und Zucht von *Holothele incei* (F.O. P.-Cambridge, 1898). *Arachne*, **9**(6): 18–29.
- Karsch, F. 1879. Zwei neue afrikanische Vogelspinnen. *Sitz.-ber. Ges. naturf. Freu. Berlin*, **1879**: 63–65.
- Platnick, N. I. 2005. *The world spider catalog*, version 6.5. American Museum of Natural History. - (Last updated December 19, 2005). Online at <http://research.amnh.org/entomology/spiders/catalog/>
- Smith, A. M. 1990. *Baboon spiders: Tarantulas of Africa and the Middle East*. London, Fitzgerald.
- Strand, E. 1907. Vorläufige Diagnosen afrikanischer und süd-amerikanischer Spinnen. *Zool. Anz.*, **31**: 525–558.
- Strand, E. 1907. Afrikanische und südamerikanische Aviculariiden, hauptsächlich aus dem naturhistorischen Museum zu Lübeck. *Zeitschr. Naturw.* **79**: 170–266.
- von Wirth, V. 1996. Vogelspinnen richtig pflegen und verstehen. *GU Verlag*, München.
- Wagner, T. 2005. Eine Einführung in die Etymologie von Gattungs- und Artnamen bei Vogelspinnen (Araneae: Theraphosidae). *Arachne*, **10**(2): 13–19.

