

## Observations on web-invasion by the jumping spider *Thyene imperialis* in Israel (Araneae: Salticidae)

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**Abstract:** Observations on *Thyene imperialis* (Rossi, 1846) in Israel, Negev desert, invading a web of *Cyclosa deserticola* Levy, 1998 are reported. The female leapt into the orb-web to catch *Cyclosa* spiders. Photographs are provided, and a link to additional film material is given.

**Key words:** araneophagy, behaviour, Plexippinae

In jumping spiders, Salticidae Blackwall, 1841, diverse predatory strategies have evolved, including “araneophagy, aggressive mimicry, myrmicophagy and prey-specific prey catching behavior” (review: JACKSON & POLLARD 1996: 287). Probably one of the best reviewed cases is the genus *Portia* Karsch, 1878 (JACKSON 1986, JACKSON 1995, JACKSON & HALLAS 1990, JACKSON & WILCOX 1993, WILEY & JACKSON 1993). It not only enters webs, but also performs “specialised vibratory signals to trick the owner of the alien web” – as do other Spartaeinae (JACKSON 1990). In the same paper, Jackson states that all web-invading members of the subfamily Spartaeinae he studied “have the property of not adhering to either cribellate or ecribellate glue of sticky threads”. In the Mediterranean, the Spartaeinae *Cyrba algerina* Lucas, 1846 has been known to perform web-invasion based on aggressive mimicry (CERVEIRA et al. 2003: Israel, Portugal). These more complex types of behaviour have to be differentiated from simple leaping into alien webs, e.g. by *Plexippus paykulli* (Audouin, 1826) or others (discussed in JACKSON & MACNAB 1989).

During the 26th European Congress of Arachnology in Israel the author was able to observe an adult female of *Thyene imperialis* (Rossi, 1846) invading an orb-web of an Araneidae species. This short note provides information adding to our knowledge of the predatory behaviour of Salticidae and to raise questions about *Thyene* in particular.

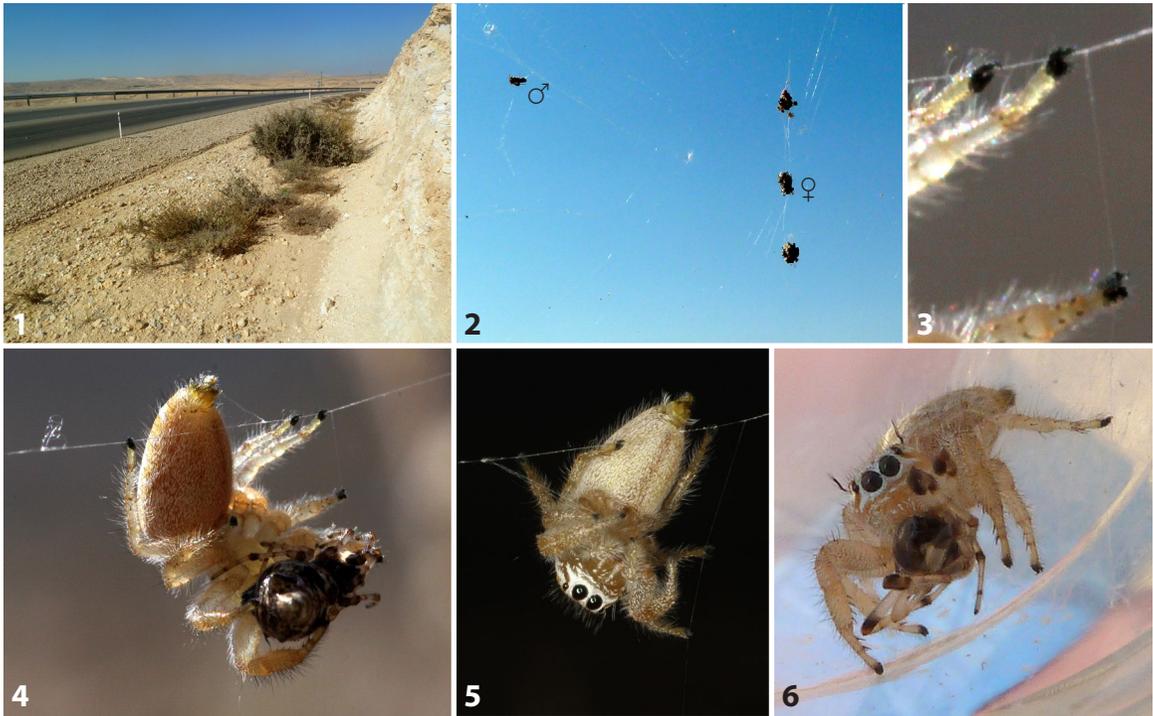
In the afternoon of 4.9.2011 several orb-webs of *Cyclosa deserticola* Levy, 1998 (preserved specimens identified using LEVY [1998] and deposited in Sen-

ckenberg, SMF 62339) were found beside road 40 from Be'er Sheva to Mizpe Ramon in the Negev desert. The site was ca. 5 km SW of Midreshet Ben-Gurion at 30°50'50.73"N and 34°45'4.91"E at ca. 500 m altitude. The webs were constructed in the wind shadow of a single group of shrubs which were between 50 and 150 cm high (Fig. 1). Characteristically the webs were decorated with one or two bunches of prey items below and/or above the hub (Fig. 2). In one female's web a male was waiting at the edge of the web (Fig. 2). In an area of 1–2 m<sup>2</sup> about 10 webs were found.

In one of these webs a jumping spider was present instead of the expected *Cyclosa* spider. It was later identified as adult female of *Thyene imperialis* (deposited in Senckenberg, SMF 62300). It walked across the web, first approaching a bunch of prey remnants. Then it walked to the centre and pulled on radial threads above the hub using its front legs, as is also known to occur in orbweb spiders (Araneidae) during prey localization behaviour. Afterwards it continued to walk on the web's sticky spiral without any problems (the stickiness of the threads was confirmed later). Since no camera was at hand, the *Thyene* was caught alive and kept for the next day.

Next morning at ca. 9 o'clock the captured *T. imperialis* female was placed on a twig close to a thread of a *Cyclosa* web. When the *Cyclosa* female moved into the centre, *Thyene* oriented towards *Cyclosa* (as it also oriented towards cars on the nearby road) and maintained its orientation towards it [in the following text the term “detected” is used for this behaviour]. When touching the frame threads of the orb-web, *Thyene* did not enter the web. Afterwards, it was caught again and placed in an open vial near the *Cyclosa* (now at the top end of the orb-web). Here, it immediately detected *Cyclosa*, although the latter showed no movement. Steady wind, however, moved

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**Figs. 1-6:** 1. Israel, Negev desert, SW Midreshet Ben-Gurion, habitat with shrubs with *Cyclosa deserticola* webs. 2. Web of *C. deserticola*, female in centre with two bunches of prey remnants above and below the hub, male top left. 3. Tip of legs of *Thyene imperialis*, touching thread with paired tarsal claws. 4. Female *T. imperialis*, feeding on female *C. deserticola* on top frame thread of the *Cyclosa* orb-web. 5. Ditto directly after dropping *Cyclosa*. 6. Same female of *T. imperialis* feeding on male *C. deserticola* in plastic vial.

the web including *Cyclosa* and prey items. After a few seconds *Thyene* jumped from the vial onto the web and caught *Cyclosa* (Fig. 4). During the feeding process it changed its position from time to time and attached its dragline to the frame thread of *Cyclosa*. Fifteen minutes later it dropped *Cyclosa* (Fig. 5) and walked along the top frame thread of the orb-web to a twig (short films can be viewed at: <http://www.senckenberg.de/thyene>). Before it could escape it was again captured in a vial and retained for ten minutes. It was placed for a second time in front of a *Cyclosa*, this time a male in the centre of its web. Again, after few seconds *Thyene* detected the spider, although no active movement was performed by *Cyclosa*. This time *Thyene* pulled *Cyclosa* out of its web from its position on the vial (Fig. 6). Both spiders were kept within the vial and one hour later the dead *Cyclosa* male was dropped.

The behaviour of *Thyene imperialis* observed may be compared with that of *Plexippus paykulli* in terms of leaping into alien webs and attacking their residents (JACKSON & MCNAB 1989). *Thyene* is considered a member of the Plexippinae Blackwall, 1841 by PROSZYNSKI (1976), METZNER (1999) and MAD-

DISON et al. (2008). It cannot be stated from the single observation whether *Thyene* performs web-invasion occasionally or routinely. It remains also unclear whether web-invading behaviour of *Thyene* lacks components typical for Spartaeinae (e.g., producing signals that modify the behaviour of the resident spider; Jackson pers. comm.).

However, *Thyene* enters alien webs and walks within them, including on the web's sticky threads without a problem. It was clear from photos taken in the field that *Thyene* holds onto the threads with its paired claws (Fig. 3) and that it also touches parts of the sticky threads (which were confirmed to still be sticky). One possible explanation for *Thyene* not adhering to the silk could be that it uses a similar protective coating against sticky threads as proposed for orb-weavers by FABRE (1905: 114) and KROPP et al. (2012). Moreover, it would be interesting to know whether all *T. imperialis* individuals are web-invaders and whether other web types are involved. From some photos, *Thyene* appears to use the basal part of its paired and toothed claws, which are close to the claw tuft hairs (Fig. 3). Could there be a similar interaction between these two elements as present in

the unpaired claw with serrated bristles (carabiner effect) in web-building spiders? All these questions can be answered only after more observations and elaborate experiments.

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