INVASIVE SPIDER *ULOBORUS PLUMIPES* LUCAS, 1846 (ARANEAE: ULOBORIDAE), NEW TO SLOVAKIA

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Abstract: Feather–legged spider *Uloborus plumipes* Lucas, 1846 was found in the Botanical Garden of the P. J. Šafárik University in Košice. Population of this species, new to Slovak arachnofauna, was irregularly distributed in greenhouses of that place. Short information on spatial spread of this spider within specific environmental conditions there is presented in this paper.

Key words: *Uloborus plumipes*, Araneae, botanical garden, greenhouses, Slovakia.

INTRODUCTION

Uloborus plumipes Lucas, 1846 is a 3–6 mm long cribellate spider. It is characteristic especially with its dense long hairs on first tibia and two large humps on abdomen (females, Figs. 1, 2, 3). This spider spins horizontal web where it is usually hanging upside down with front legs stretched out in front. In contrast to more common non–cribellate spiders spinning webs with sticky droplets, the stickness of *U. plumipes* webs is achieved by dry fuzzy silk along visible threads.

Its original area of distribution is believed to be in tropical and subtropical Africa and Asia but, as a result of human activities, this spider is now known also from regions with colder climate, where it commonly survives in heated indoor spaces with plants (Machač 2009). According to Platnick (2013), to the date, *U. plumipes* was registered in Africa, Asia, Europe and South America (recent introduction to Argentina). Somewhere it is mentioned the occurrence of this species also in North America but according to Muma & Gertsch (1964) most American authors erroneously used the name *plumipes* for very similar species *Uloborus glomosus* (Walckenaer, 1842) until 1911. Blick et al. (2006) draw attention to the opposite cases of possible misidentifications and European records should be checked also from this point of view. Samples should be compared with morphological details of both *U. plumipes* (e.g. in Nentwig 2012) and *U. glomosus* (e.g. in Muma & Gertsch 1964).

Considering Europe, *U. plumipes* was registered in the following countries (Lissner 2011): Austria, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, France, Germany, Great Britain, Greece, Hungary, Italy, Malta, Netherlands, Norway, Poland, Portugal, Russia, Slovenia, Spain, Sweden and Switzerland. So far, this species is missing from the check–list of Slovak spiders (Gajdoš et al. 1999), though its occurrence is confirmed from nearly all countries neighbouring to Slovakia (with the exception of Ukraine) to the date (Blick et al 2004, Lissner 2011). First records were mentioned there in the late 20th century in Hungary (Szinetár 1992), Czech Republic (Kůrka 2006 – description of first record by M. Chochel in 1995), Austria (Horak & Kropf 1999) and in the early 21st century in Poland (Stankiewicz & Kupryjanowicz 2002).

It is highly probable that *U. plumipes* is much more common but it can be overlooked in some regions. It can usually reach high population densities. But on the other hand, even in countries with long–term presence of this species, its populations can be low in number somewhere (Machač 2009), or it may be

Suvák M, 2013: Invasive spider *Uloborus plumipes* Lucas, 1846 (Araneae: Uloboridae), new to Slovakia. *Folia faunistica Slovaca*, 18 (1): 39–45.

Received 4 December 2012 ~ Accepted 14 February 2013 ~ Published 31 May 2013

e–ISSN 1336–4529 ISSN 1335–7522

absent from some suitable sites completely (Kielhorn 2008). Its occurrence should be checked especially in botanical gardens and garden centres. Possible role of this spider in biological control of pests in greenhouses is sometimes considered (e.g. Klein et al. 1995, Machač 2009) but more data are needed from this point of view.

MATERIAL AND METHODS

Botanical Garden of the Pavol Jozef Šafárik University in Košice (hereinafter BG PJŠU) is known by application of biological control methods against pests in greenhouses with tropical and subtropical plants. Since 2006, no classical pesticides were used in greenhouses accessible for visitors. As a result, continual increase of phytophagous species and their natural enemies were registered in regular monitoring, though only predatory and parasitic insects were discussed in detail so far (Suvák 2011). Along with it, data on spiders were also collected during these examinations (total arachnofauna of greenhouses of BG PJŠU will be summarized in the future). Within these observations, a new strange looking spider species identified as *U. plumipes* was found in greenhouses of BG PJŠU latterly. Specimens in ethanol (3 individuals of females) were deposited in collections of BG PJŠU. Series of photographs were also taken with the use of Canon 20 D digital camera and Canon MP–E 65 mm 1–5 × macro lens. Special attention was paid to this species in relation to its spatial distribution here and behaviour. To check its potential prey spectrum, contents of spider webs were inspected and living individuals of different flying insects occurring within greenhouse space were collected into

Figure 1. Examples of the variability in colour of the adult females (a – d) and the juveniles (e – f) of *U. plumipes* in BG PJŠU. Scale bars: 1 mm.

Figure 2. Detail of the female prosoma of *U. plumipes*. Scale bar: 1 mm.

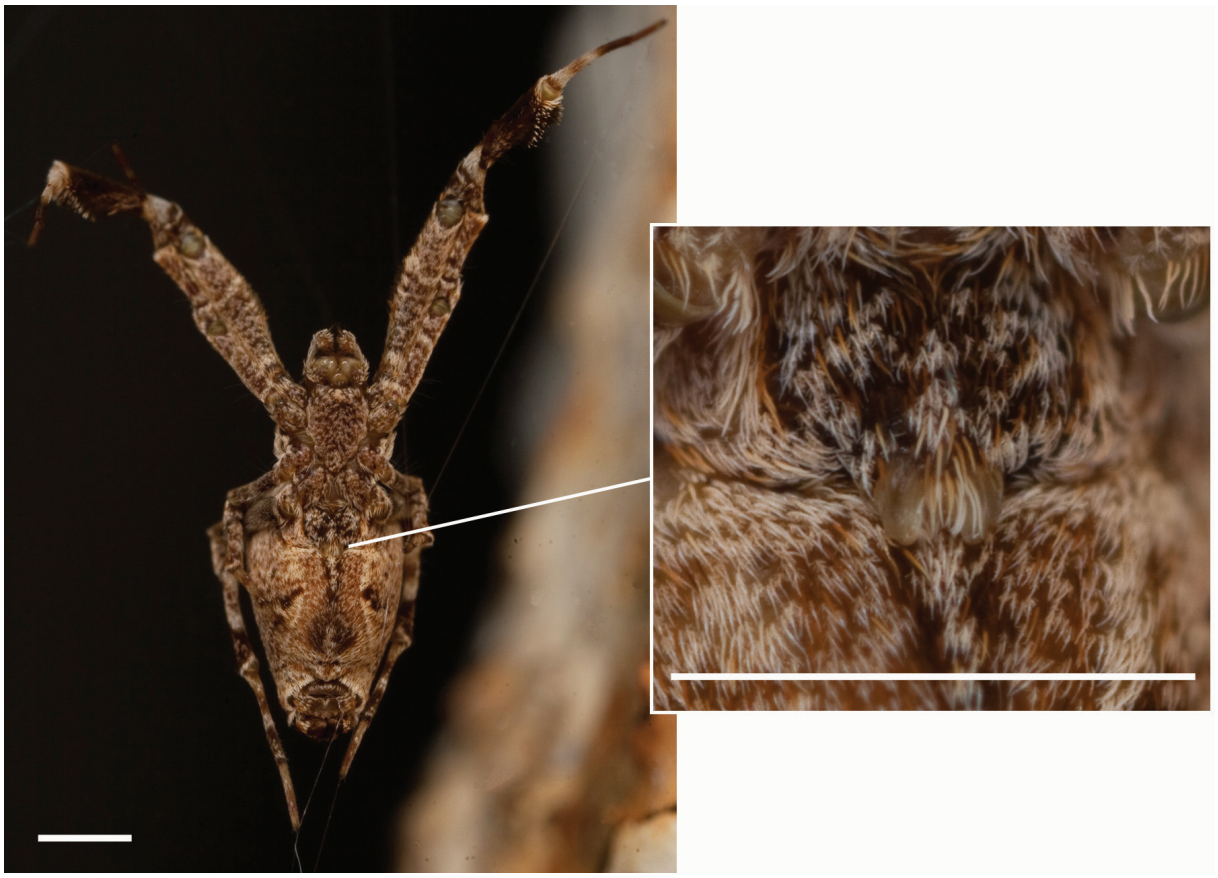

Figure 3. Ventral view of the female *U. plumipes* and detail of the area with epigyne. Scale bars: 1 mm.

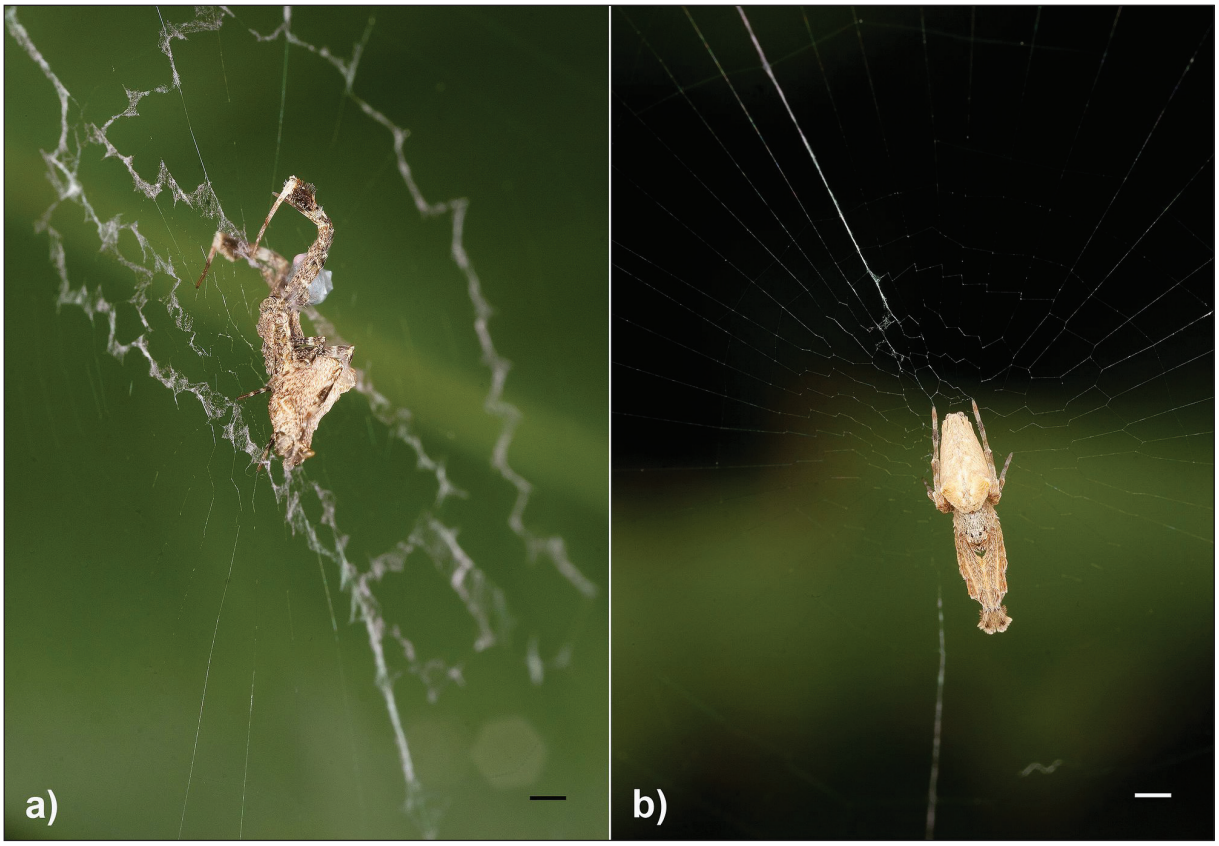

Figure 4. Examples of spider webs of *U. plumipes*: a) web with stabilimentum, b) without it but with lower proportion of visible white silk pattern. Scale bars: 1 mm.

Figure 5. Egg cocoons of *U. plumipes*: a) at the white iron pipe of greenhouse heating system, b) within vegetation (on *Nicolaia elatior*). Scale bars: 1 mm.

plastic vials and released near selected horizontal spider webs of *U. plumipes*. Such observations provide also some preliminary data on possible role of *U. plumipes* in biological control.

RESULTS AND DISCUSSION

U. plumipes in BG PJŠU was registered, for the first time, on 28. 9. 2012 as 2 females with their nets in central part of tropical greenhouses on *Coccoloba diversifolia* tree, cca 3 m above ground. Following search for other individuals within vegetation was unsuccessful. But examination of adjacent walls of the greenhouse showed numerous and very variable individuals (Fig. 1) of this spider species. They were mostly juvenile females, adult ones were rarer and no males were found. Their nets were usually attached to iron framework of the greenhouse and/

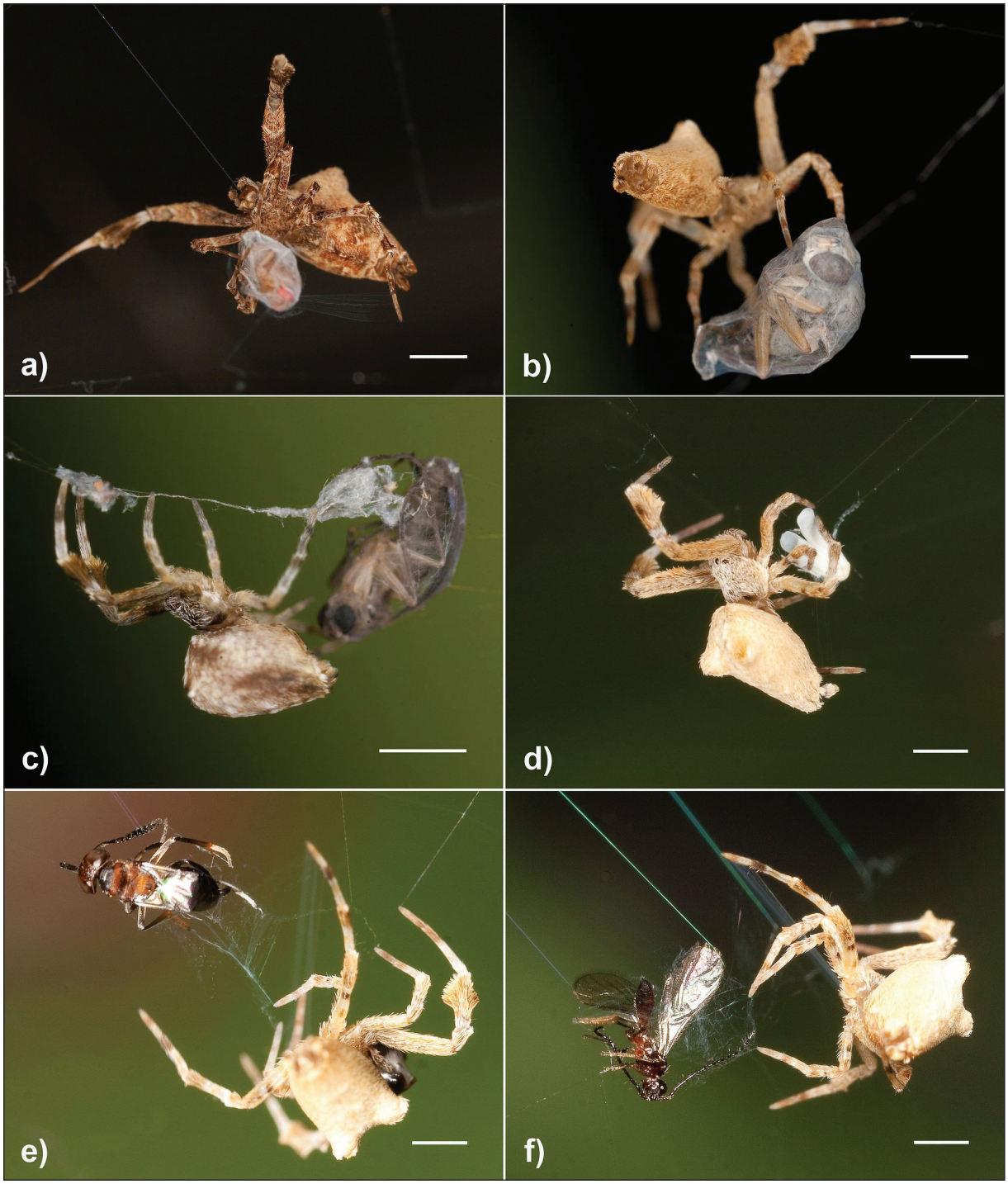

Figure 6. Examples of prey attacked by *U. plumipes*: a) *Drosophila* sp. Fallén, 1823 (Diptera: Drosophilidae), b) *Coenosia attenuata* Stein, 1903 (Diptera: Muscidae), c) Sciaridae (Diptera), d) *Trialeurodes vaporariorum* (Westwood, 1856) (Hemiptera: Aleyrodidae), e) *Encyrtus* sp. (Hymenoptera: Encyrtidae), f) *Synacra paupera* Macek, 1995 (Hymenoptera: Diapriidae). Scale bars: 1 mm.

or to heating system tubes along glass walls. Sometimes the web stabilimentum could be seen (Fig. 4) though most webs were without such conspicuous patterns even in the cases of adult females. Typical flat egg sacs with horn–like projections were also found near some nets (Fig. 5). Subsequent inspections of other greenhouses showed that individuals of *U. plumipes* were mostly concentrated in a restricted part of indoor space, especially on southern sides of two main neighbouring greenhouses. In other greenhouses, no individuals were found that time (September 2012). It is supposed that this species was introduced to BG PJŠU with plant material from external sources. It could be brought into greenhouses probably with orchids (most of them imported from the Netherlands) arranged to special exhibition just in the mentioned greenhouses in January – February 2012 and this spider could gradually spread from these sites into other greenhouses. But it cannot be excluded that *U. plumipes* could occur here unnoticed longer time before, despite the mentioned monitoring (Suvák 2011).

Two months later (November 2012), these spiders were found also in other greenhouses of BG PJŠU, even within vegetation. Usually more individuals of different size were seen closely to one another in some spots. Still no males were registered to the date. Similar situation was reported from other sites in Europe (e.g. Dawson 2001) but supposed parthenogenesis in this species (e.g. Machač 2009) was rejected in the work by Oxford (2011) and usual absence of observations of males was explained by their lower numbers and cryptic life style in comparison with females.

As for prey spectrum of *U. plumipes*, it could be supposed that all flying insects of smaller sizes are potential prey for this spider species. In greenhouses of BG PJŠU, according to long–term observations (Suvák 2011), they are mostly representatives of Diptera (Dolichopodidae, Drosophilidae, Chironomidae, Muscidae, Psychodidae, Sciaridae), Hemiptera (Aleyrodidae, Aphididae), Hymenoptera (Aphelinidae, Braconidae, Diapriidae, Encyrtidae, Figitidae), Psocoptera (Ectopsocidae) and Thysanoptera (Thripidae). But remnants of prey items usually could not be identified in webs, unless spider attacks would be observed directly. Prey is usually rapidly covered by dense spider silk after capturing and later, after influence of digestive enzymes and sucking up by the spider, it is unidentifiable. Though sometimes motionless or very small insects trapped in the net did not draw immediate spider‘s attention and such type of prey could persist here some time untouched. Several tests

Figure 7. *U. plumipes* with 3 prey items. The spider is attacking a snagged prey (*Drosophila* sp.) while holding 2 older prey items connected together by silk. Scale bar: 1 mm.

showed that practically all common flying insects from the discussed greenhouses could be trapped in the nets of *U. plumipes* (some examples in Figs. 6, 7), though some of them are more or less able to free themselves shortly after contact with wooly threads. As generalist predator, *U. plumipes* can reduce plant pests, their natural enemies (predators, parasitoids), hyperparasitoids and indiferent species, so the resulted effect of this spider in biological control in greenhouses of BG PJŠU could be considered only after detailed study of multilevel trophic system there.

Inspecting other botanical gardens, garden centres, flower shops and similar heated sites with plants should bring more information on actual distribution of *U. plumipes* in Slovakia. It cannot be excluded that some potentially suitable sites are not occupied by this spider species for other reasons than purely it had not been introduced there in the past. Competition from other spider species, using or avoiding pesticides and other site specific factors may be limiting. From this viewpoint, monitoring population density and study on relations between *U. plumipes* and other arthropod species in BG PJŠU in more detail can bring new information on ecology of this spider species in such types of artificial environments.

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