

# From the Middle East to the Mojave: on the introduction of *Plexippoides flavescens* (Araneae: Salticidae: Plexippina) to North America

Caleb Camilleri<sup>1</sup>

<sup>1</sup> email [calebj.camilleri@gmail.com](mailto:calebj.camilleri@gmail.com)

**Abstract.** The jumping spider *Plexippoides flavescens* O. Pickard-Cambridge 1872 is formally documented for the first time in North America, introduced and now established in the Las Vegas Valley. *P. flavescens* is believed to have been introduced through the transport of military equipment returning from the Middle East to Nellis AFB, and has now been present in the U.S. for over a decade. Photographs are provided of living specimens, along with notes on the behavior and distribution of this species.

**Keywords.** behavior, iNaturalist, invasive species, Las Vegas, military equipment, Nellis AFB, Nevada, synanthropic, jumping spider, urban environments

## Introduction

Urban ecosystems have increasingly been recognized as excellent initial footholds for invasive species due to their disturbed habitats and reduced biotic resistance (Marques et al. 2020). In Salticidae, nearly all introduced species in the United States have established strong ecological niches in urban environments, where they are closely associated with anthropogenic surfaces and structures (Kaldari 2019; Buckle 2022; Cutler & Parr 2020; Edwards 2023). These environments provide relatively stable microhabitats, abundant prey availability, and many shelter opportunities. Their success in these environments may be further supported by the behavioral flexibility and dietary generalism of salticids (Jackson & Pollard 1996), allowing them to utilize a wide variety of arthropod prey in urban settings.

In this paper, I examine the case of *Plexippoides flavescens* O. Pickard-Cambridge 1872, which has been introduced from the Old World and is now widespread and abundant in the Las Vegas Valley of Nevada, representing the first records of this species from North America. *P. flavescens* is a widely distributed species, naturally ranging from northeast Sudan and Yemen across the Arabian Peninsula, northeast to Afghanistan and Kyrgyzstan, and north to western Kazakhstan (Logunov 2021). Additionally, it can be found in a variety of microhabitats, and has been being taken from under bark and stones (Logunov 2021), and frequently from anthropogenic structures (Logunov et al. 2002).

The first published photographs of this species in the U.S. that I encountered were submitted to iNaturalist.org by the user “mandaismagic” in July 2019 (<https://www.inaturalist.org/observations/29483524>), depicting both an adult male and female in North Las Vegas. Later, a much older record from August 2014 was found misidentified as a *Habronattus* F. O. Pickard-Cambridge 1901 on BugGuide.net, published by the user “jsaubel85” (<https://bugguide.net/node/view/989045>), representing the earliest U.S. record of this species that I am aware of. Although I was initially quite puzzled by these spiders, after seeing further records on iNaturalist, I tentatively identified them as *Plexippoides flavescens*, which was

later confirmed by examination of the genitalia. Since then, many observations of *P. flavescens* from Las Vegas have been submitted to iNaturalist and BugGuide, confirming that this species has been present and possibly already established in the Las Vegas Valley since at least 2014.

## Methods & Materials

Specimens used in this study were collected by Julia O'Connor and N. T. Vivian Sam. All photos were taken myself using a Canon 80D camera affixed with various lenses/objectives. Some images were focus-stacked for greater clarity, or lightly edited to fix white balance or other artifacts, using Affinity Photo and/or GIMP. All *P. flavescens* specimens used in this study will be deposited at the Denver Museum of Nature and Science.

### *Plexippoides flavescens* O. Pickard-Cambridge 1872

Figures 1-6

*Material examined.* USA: Nevada: Clark Co.: 3♂ and 1♀ from North Las Vegas, 36.25°N, 115.18°W, August 2024, coll. Julia O'Connor; 1♀ from Las Vegas, 36.25°N, 115.23°W, June 2025, coll. N.T. Vivian Sam; 2♀ from North Las Vegas, 36.25°N, 115.18°W, July 2025, coll. Julia O'Connor; 1♂ from North Las Vegas, 36.25°N, 115.18°W, August 2025, coll. Julia O'Connor.

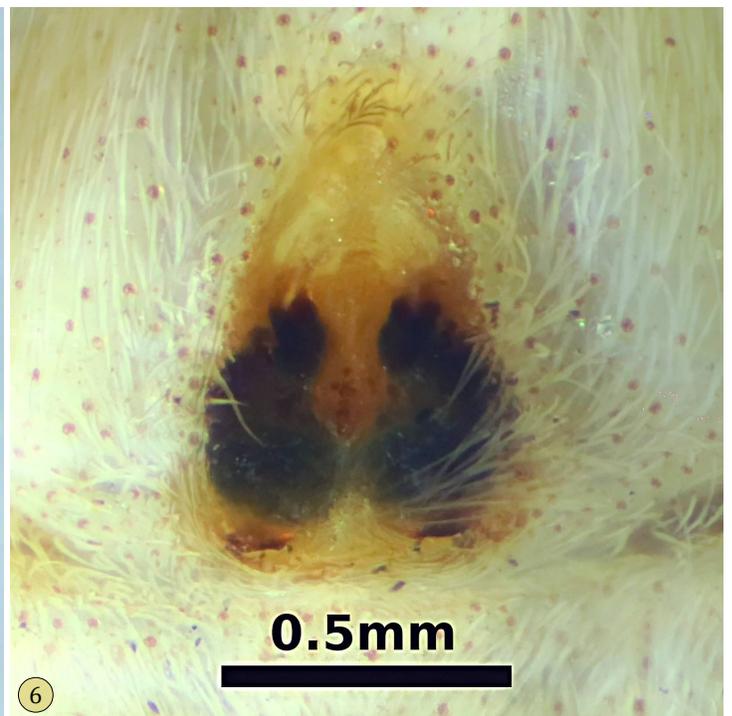
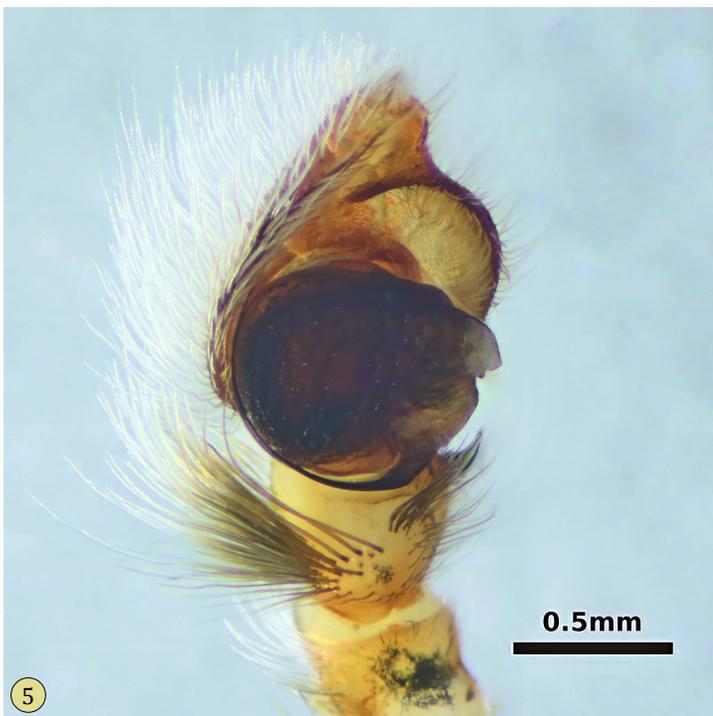
*Diagnosis.* The specimens from Las Vegas were identified as *P. flavescens* from the genitalia (Figures 5-6). On the male's palpal bulb, the tegular lobe is situated at about 1-2 o'clock, and the embolus originates at about 5 o'clock, differing from similar species in *Plexippoides*. The female's epigynum is bean shaped, with the sclerotized tip absent (Logunov 2021). The habitus and morphology of these spiders also match well with Logunov's recent photographs (2021: figs 1-4) of preserved *P. flavescens* from Kuwait.

*Distribution and habitat.* In the U.S., *P. flavescens* is only known from urbanized regions in the Las Vegas Valley (Figure 7), and seems to be strongly associated with anthropogenic structures. All of the iNaturalist observations which I reviewed depict these spiders on anthropogenic surfaces, most commonly on walls and windows. Additionally, the specimens collected for this study were mostly found indoors, suggesting a potential synanthropic association.

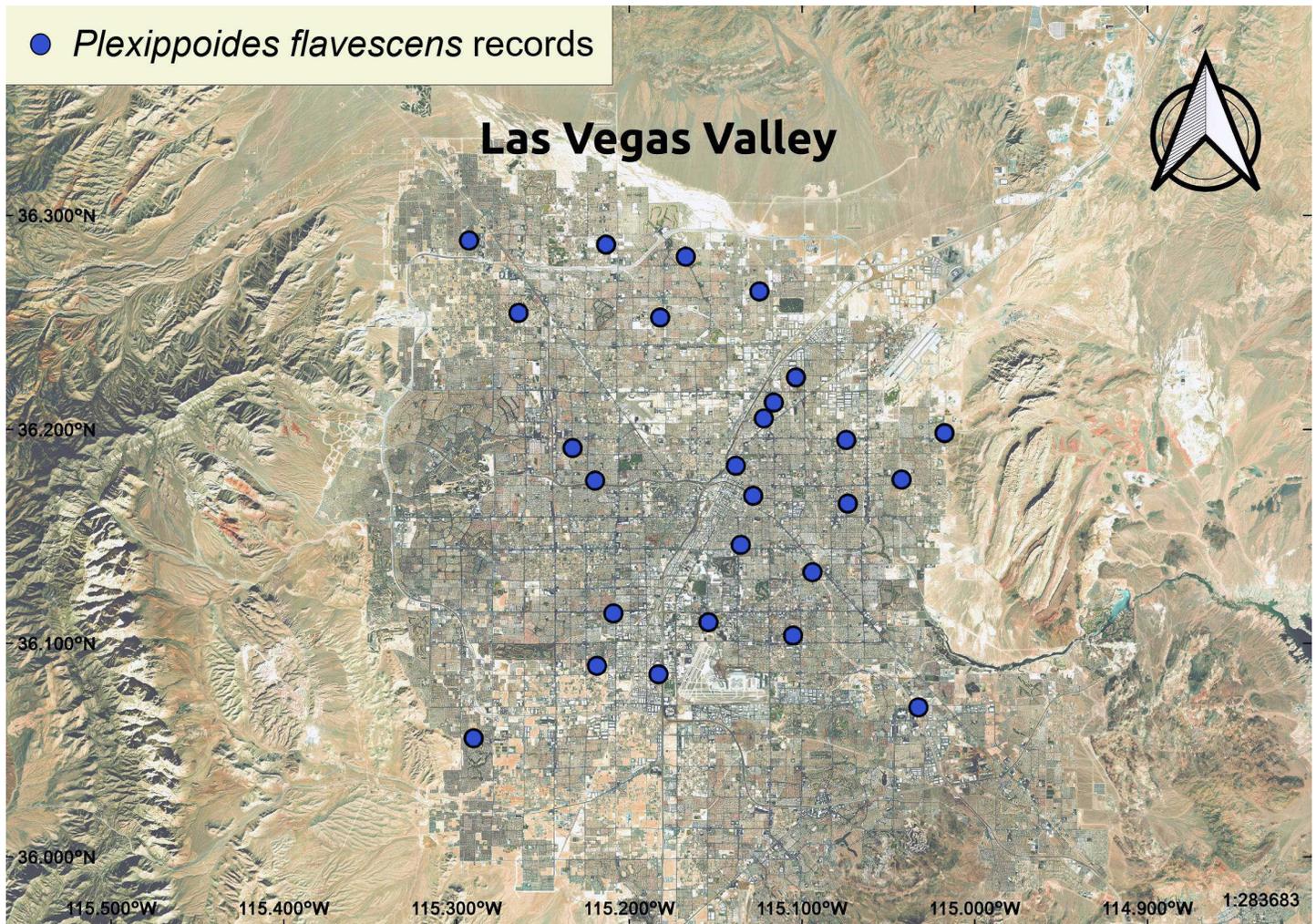
*Biology.* *P. flavescens* is a relatively large species when compared to native U.S. salticids, with the largest male examined measuring 9.1 mm and the largest female 12.0 mm in body length. Although *P. flavescens* is assumed to exhibit the intraspecific aggression typical of most salticids, Julia O'Connor (personal communication, 2024) observed groups of more than ten individuals congregating daily on her garbage bin lids for about a week following a period of heavy monsoon rainfall. This may represent a temporary aggregation in response to very specific environmental conditions, and further observations of this behavior would be of great interest. The courtship of this species involves the male spreading both the first and second legs laterally and moving side to side as he approaches the female, with the abdomen tilting slightly in the opposite direction of his movement. A short video of the courtship can be accessed at <https://www.youtube.com/watch?v=-002leDlkx8>.



Figures 1-4. Living *Plexippoides flavescens* from the Las Vegas Valley. 1-2. Adult ♂. 3-4, Adult ♀



Figures 5-6. *Plexippoides flavescens* from the Las Vegas Valley. 5, ♂, ventral view of left pedipalp. 6, ♀, ventral view of epigynum.



**Figure 7.** Known localities where *Plexippoides flavescens* has been found in the Las Vegas Valley, based on reviewed research grade iNaturalist records. Basemap data © Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community. Observation numbers (iNaturalist) used: 212692970, 130301805, 109882972, 312839108, 218800034, 217889433, 289040490, 224797867, 178652100, 158281222, 240454269, 234989424, 287781940, 164700843, 207953633, 162223753, 125222711, 216111545, 183233275, 223184768, 167122074, 117197260, 127436069, 57582806, 226087305, 29483524.

## Discussion

The Mojave Desert, with its extreme temperatures, minimal rainfall, and sparse vegetation, has presented a challenge for the colonization of introduced salticids up until this point, and widespread U.S. non-natives like *Salticus scenicus* Clerck 1757 and *Attulus fasciger* Simon 1880 have never been reported from the region. This environmental barrier appears to have resulted in an underserved niche in the urban environments of Las Vegas which *P. flavescens* was quite well-suited for, as it thrives in arid environments, its native range falls within the same latitude as Las Vegas, and it is often found natively on urban structures. As a result, *P. flavescens* appears to be both dominant and widespread in urban Las Vegas now, being the most commonly reported species from this region on iNaturalist by a large margin. The geographical isolation of the Las Vegas Valley is probably the limiting factor affecting the further spread of this species, as nearby cities have corresponding niches with similar climates that would seem to suit *P. flavescens* well.

The question of how this species established itself in the U.S. is also intriguing, as *P. flavescens* is closely associated with arid habitats and does not have a history of invasions, making it unlikely that this species was a fortuitous adventive. The most likely route for this species' introduction in the U.S. is through Nellis AFB, hitchhiking on equipment returning from the Middle East. Historically, deployments and the associated transport of troops and supplies have been shown to serve as effective invasion pathways for non-native species (Santini et al. 2023), boosting the plausibility that the species was transported on equipment returning from overseas, possibly associated to the Iraq War (2003-2011) based on the currently known timeline. Although this is the first introduced salticid to be reported from Las Vegas, it is not the only species present: One of the specimens sent to me by N. T. Vivian Sam (<https://www.inaturalist.org/observations/266179513>) was examined and identified as an adult female *Plexippus paykulli* Audouin 1826. While *P. paykulli* is already a widespread introduced species in the U.S., this does represent the first documented record of this species in Clark Co. and suggests that *P. flavescens* may be facing increasing competition in the Las Vegas Valley.

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