

## New records of *Segestria florentina* from Germany with observations on somatic and genitalic differences in juveniles and adults compared to *S. bavarica* (Araneae: Segestriidae)

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**Abstract.** New records of the large tube web spider *Segestria florentina* (Rossi, 1790) from Essen in North Rhine-Westphalia in Germany are presented. Genitalic characteristics of specimens from Germany are compared with those of the native *Segestria bavarica* C. L. Koch, 1843. For differentiation of juveniles of the two species, characteristics of the leg spination and opisthosomal colouration are described.

**Keywords:** faunistics, taxonomy, tubeweb spider

**Zusammenfassung.** Neue Nachweise der Mächtigen Fischernetzspinne *Segestria florentina* aus Deutschland mit Beschreibung von somatischen und genitalic diagnostischen Merkmalen bei Juvenilen und Adulten zu *S. bavarica* (Araneae: Segestriidae). Neue Funde von *Segestria florentina* (Rossi, 1790) werden aus Essen in Nordrhein-Westfalen berichtet. Genitalic Merkmale der Art bei Tieren aus Deutschland werden denen heimischer *Segestria bavarica* C. L. Koch, 1843 gegenübergestellt. Zur Unterscheidung der beiden Arten auch im Juvenilstadium werden charakteristische Merkmale der Beinbestachelung und Opisthosoma-Färbung dargestellt.

*Segestria florentina* (Rossi, 1790) is a member of the family Segestriidae Simon, 1893, the tube-web spiders. Members of this family are sensing web weavers, living inside cracks and crevices. Their silken tubes are open at both ends, with one opening facing the exterior. From here the spiders spin radiating, silken threads that function as tactile sensors for passing prey (Fig. 1a). Segestriidae are haplogyne spiders and therefore females possess a single genital opening, while the male bulbous appears rather simple. A morphological characteristic of this family is the forward-facing first three leg pairs, which are an adaptation to their lifestyle inside narrow tubes. They have six eyes arranged in three pairs (Nentwig et al. 2025). Two genera of the Segestriidae occur in Europe (*Segestria* Latreille, 1804 and *Ariadna* Audouin, 1826) comprising 19 species (one with two subspecies) in total. The genus *Segestria* is represented by eight species (Nentwig et al. 2025) in Europe. Only three species have been recorded from Germany. These include the largest species *S. florentina* (Fig. 1a, Fig. 1b) and two smaller species, *S. bavarica* (C. L. Koch, 1843, Fig. 1c) and *S. senoculata* (Linnaeus, 1758) (Blick et al. 2016, Arachnologische Gesellschaft 2025). *Segestria florentina* is the largest tube-web spider in Europe, with a documented maximum body length of 25 mm in Italy (Pepe & Caione 2006) and 22 mm in Germany (Schlegel 2012). Adults of *S. florentina* can be differentiated from the other European species by their larger size, their dark reddish brown to black opisthosoma colouration in females and the greenish iridescence of the chelicerae (Fig. 1a). Identification is more difficult in juveniles, as juvenile *S. florentina* closely resemble *S. bavarica*. Van Helsdingen (1990) described *S. florentina* as having a Mediterranean-Atlantic distribution, which extends from the Caucasus in the east, across southern Ukraine, the Balkans and along the southern Alps to the Iberian Peninsula. In France *S. florentina* can be found up until the northern coast (van Helsdingen 1990, Le Peru 2011). Furthermore, established populations of this species exist in the UK (Lavery 2019), Belgium and the Netherlands, especially along the coast and

in urban areas (Tutelaers 2024, van Helsdingen 2025, British Arachnological Society 2025). The southern part of its range includes North Africa (Nentwig et al. 2025), Jordan and Türkiye (World Spider Catalog 2025). In addition, the species was introduced to South America, where *S. florentina* has so far been recorded from Brazil, Uruguay and Argentina (Giroti & Brescovit 2011). A single record from Ireland did not seem to belong to an established population (Nolan 2008).

The first record of *S. florentina* in Germany was found in 1989 north of Neustadt an der Weinstraße, one of the warmest regions in Germany (Braunstein 1994). Subsequently, Wunderlich (1995) documented the species in Bad Dürkheim, very close to the first location. In 2012, Wolfgang Schlegel found another population in the harbour of Stuttgart (Schlegel 2012). In connection with this finding, Schlegel also raised the question of whether *S. florentina* occurs syntopically with other species of the genus and noted possible differences in colouration between juveniles of *S. florentina* and *S. bavarica*. However, according to Le Peru (2011) and Nentwig et al. (2025), juvenile specimens of these two species cannot be separated morphologically.

In this paper, we present new records of *S. florentina* from Germany. After observing specimens in Essen in August 2024, we began mapping the surrounding area to estimate the local extent of the population. We then searched relevant internet platforms for additional observations of *S. florentina* in Germany. As a result of this search, we identified further observations from North Rhine-Westphalia, some of which were subsequently verified by on-site inspections.

To address the question raised by Schlegel (2012) and to improve the identification of juvenile specimens, we examined adult and juvenile individuals of both species. The material comprised specimens collected by us from Germany, including *S. florentina* from the newly discovered sites, and from the Netherlands as well as comparative material from the Senckenberg Museum in Frankfurt.

### Material and methods

Following the incidental discovery of several individuals of *S. florentina* in an industrial estate on Münchener Straße in Essen-Holsterhausen on 29. Aug. 2024, we surveyed accessible buildings for additional individuals within the following three months (at 5. Sep. 2024, 18. Sep. 2024, 28. Sep. 2024, 5. Oct. 2024 and 22. Nov. 2024; Fig. 2a). The aim was to obtain

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**Fig. 1:** Habitus photographs of *S. florentina* and *S. bavarica*. **a.** adult *S. florentina* female in silken tube, with iridescent chelicera. DE, Essen, Münchener Straße. Photo by S. Lauterbach from 6. Mar. 2025; **b.** adult *S. florentina* male from Netherlands, Domburg, Traverse 2. Photo by Gudrun and Wolfgang Kairat, from May 2022; **c.** adult *S. bavarica* male. DE, Essen, Münchener Straße. Photo by S. Lauterbach from 21. Feb. 2025

an impression of the density and distribution of individuals in the wider surroundings of the initial location. The study area was partly constrained by restricted access to several buildings and locations, particularly in the west and northwest. As spiders of the genus *Segestria* are nocturnal and can easily be spotted at the entrance of their tubes at night, three surveys were conducted after nightfall (18. Sep. 2024, 28. Sep. 2024 and 22. Nov. 2024). Facades were divided into several sections

and all individuals attributable to *Segestria* were counted. Based on visual assessment, large individuals were categorized to either subadult or adult stage and recorded separately. Abandoned silken tubes were excluded. Random samples of different sized individuals were collected and preserved in 80% ethanol.

To assess the current distribution of *S. florentina* in Germany (Fig. 2b) we conducted an online search for reports of the species. First, we checked the Atlas of the German Arachnological Society (Arachnologische Gesellschaft 2025) for this. Furthermore, we searched the forum of the German Arachnological Society (Forum der Arachnologischen Gesellschaft e. V. 2025) and the forum of the website insektenfotos.de (Insektenfotos.de-Forum 2025) using relevant keywords. Reported observations were evaluated for plausibility based on the accompanying photographs. In particular, a clearly pronounced iridescence of the chelicerae was treated as an important diagnostic character, although this character has limitations in cases of weak iridescence (see results and Supplementary Tab. 1). We further screened the common citizen-science platforms iNaturalist.org (2025), naturgucker.de (2025) and Observation International (2025) for records of *S. florentina*. Based on this, field inspections were conducted at two promising locations using the methodology described above to validate records for *S. florentina*. Surveys were conducted on 4. Oct. 2024 at Ostermannplatz, Essen-Nordviertel and on 15. Oct. 2024 at the junction of Sandstraße and Schwermannstraße in Essen-Kupferdreh. The distribution map was generated using SimpleMappr (Shorthouse 2010) based on all available records.

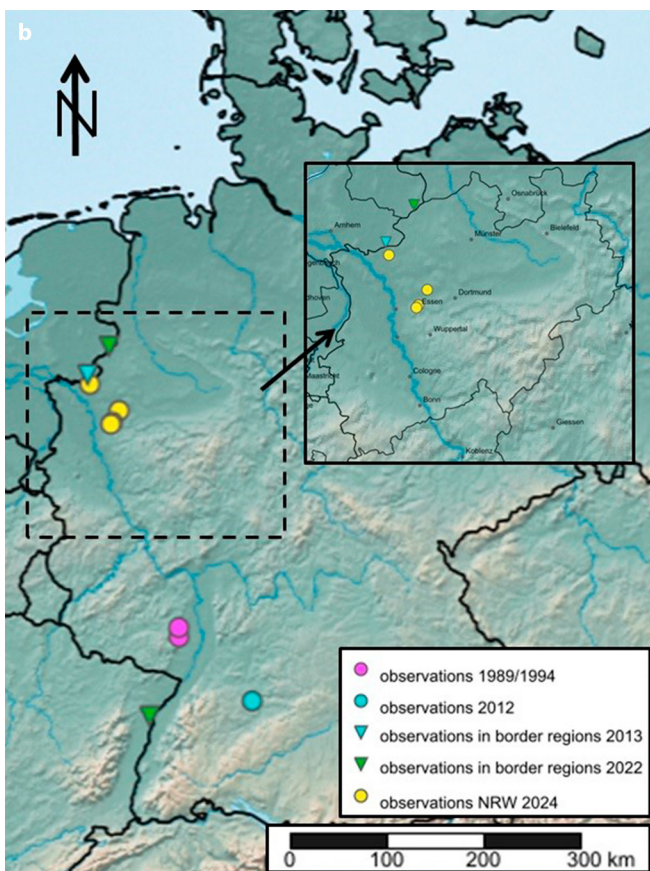
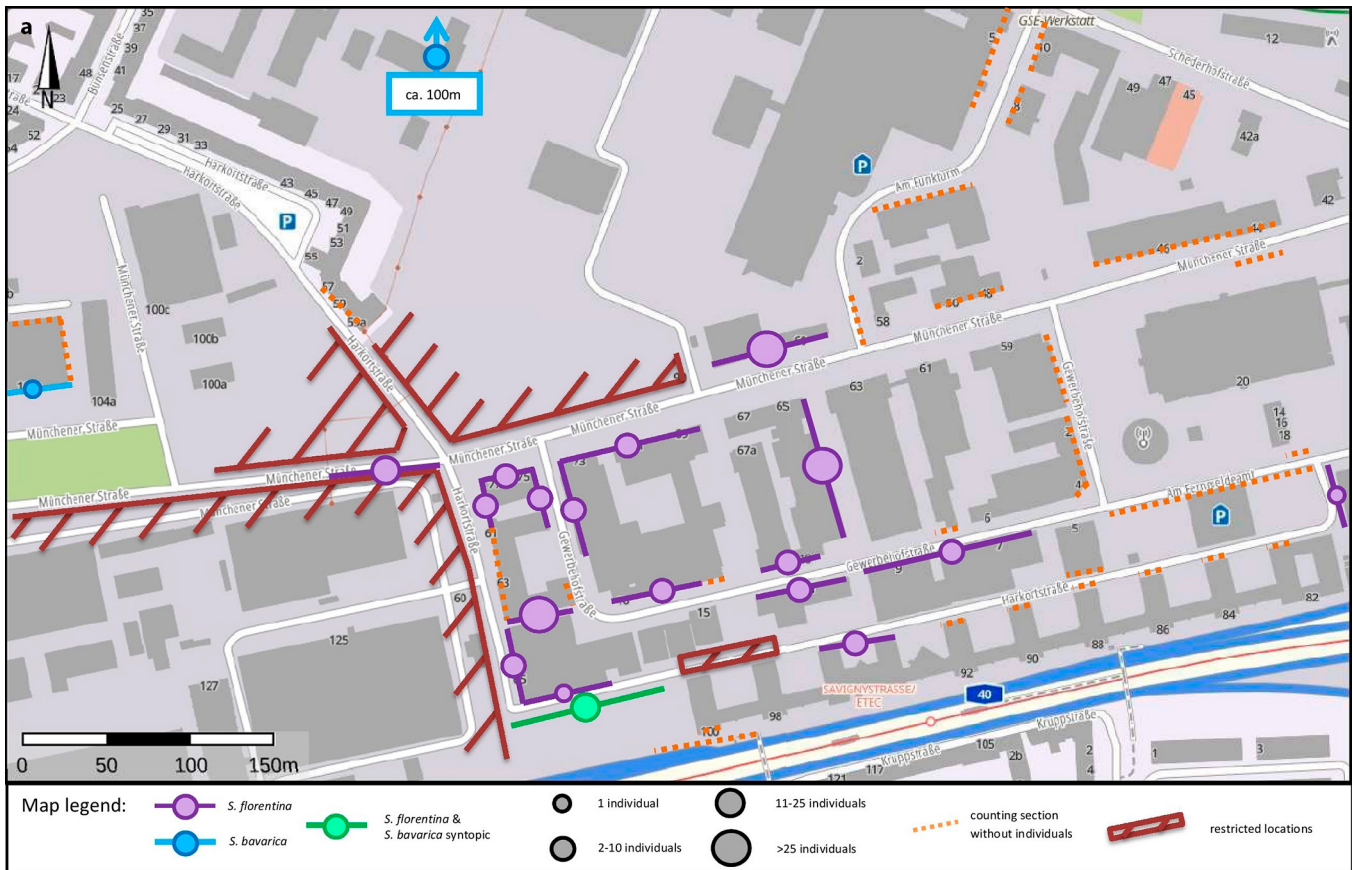
### Study of morphology

We compared characteristics of leg spination and opisthosomal colouration in adult individuals of *S. florentina* and *S. bavarica*, especially from the single-species populations surveyed in this study. Subsequently, these characteristics were analysed in juveniles from the same single-species populations. Nomenclature follows World Spider Catalog (2025). Terminology of genital structures follow mainly Řezáč et al. (2018), where applicable to the genus *Segestria*. In our interpretation, the lumen between the first two sclerotized arches ventral to the spermatheca and copulatory bursa represents the uterus. This interpretation agrees with Giroti & Brescovit (2015), who described a comparable structure in the segestrid genus *Citaroiceps* Chamberlin, 1924. The material examined is deposited in the collection of the first author, additional comparative material from Spain and France is housed in the collection of the Senckenberg Museum in Frankfurt (SMF).

Female genitalia were treated with concentrated lactic acid to enhance transparency and contrast. Although this causes the posterior receptaculum to deform after a few seconds, it improves the visibility of structural details. Drawings were made using an Olympus SZH stereomicroscope and a Zeiss microscope equipped with drawing attachments. Photographs were taken with a Panasonic Lumix DC-FZ82 and a Canon Powershot G11.

### Abbreviations

S – Spermatheca; EF – Epigastric furrow; CB – Copulatory bursa; PD – Posterior diverticle; U – Uterus; ASL – above sea level; j – juvenile; jj – juveniles



**Fig. 2:** Records of *S. florentina* and *S. bavaria*. **a.** map with monitoring results (18. Sep. 2024, 28. Sep. 2024 & 5. Oct. 2024) from the industrial estate Münchener Straße, Essen; **b.** distribution of *S. florentina* in Germany. Inlay: North Rhine-Westphalia

2024, 1 ♂, 1 ♀, S. Lauterbach leg. & det.; 18. Sep. 2024, 1 ♂, 4 jj, S. Lauterbach & G. Imbusch leg. & det.; alley at Harkortstraße 63, 51,446603°N, 6,991371°E, 89 m ASL, 28. Sep. 2024, 7 jj, S. Lauterbach & G. Imbusch leg. & det.; Kruppstraße, wall at parking space, 51,446133°N, 6,991897°E, 92 m ASL, 28. Sep. 2024, 1 ♂, 1 ♀, 1 j, S. Lauterbach & G. Imbusch leg. & det.; Ostermannstraße, Kiosk and neighborhood, 51,466942°N, 7,015243°E, 67 m ASL, 4. Oct. 2024, 2 ♂♂, 4 jj, S. Lauterbach & G. Imbusch leg. & det.; Münchener Straße 65 + alley at Harkortstr. 63, 51,447171°N, 6,99312°E, 87 m ASL, 5. Oct. 2024, 8 jj; S. Lauterbach & leg. & det.; NETHERLANDS, Zeeland, Domburg, Albert Hein Supermarket, Traverse 2, behind Billboard on external Wall, 51,560089°N, 3,500159°E, 0 m ASL, 7. May 2022, 1 ♂, 2 ♀♀, 1 j, S. Lauterbach leg. & det.; Zuid-Holland, Stellendam, Meester Snijderweg 1, 51,826328°N, 4,028378°E, 2 m ASL, 26. Oct. 2024, 1 j, S. Lauterbach leg. & det.; SPAIN, Tenerife, Puerto de la Cruz, 16.54778°N, 28.41083°E, 102 m ASL, 4. Sep. 1871, 1 ♀, 3 jj, Grenacher & Noll leg., E. Strand det., SMF 2894-104; Prov. Teruel, Albarraín, 40,40805°N, -1,44388°E, 1200 m ASL, 15. Sep. 1953, 1 ♂, 2 ♀♀, K. Schnellbacher det., SMF 8426-104; FRANCE, Gard, Aigues-Mortes, 2. Jul. 1953, 1 j, S. Bayer det., SMF 67997-104.

#### Material examined

##### *Segestria florentina* (Rossi, 1790)

GERMANY, Nordrhein-Westfalen, Essen, Münchener Straße 65, 51,447686°N, 6,993688°E, 87 m ASL, 5. Sep.

##### *Segestria cf. florentina* (Rossi, 1790)

GERMANY, Nordrhein-Westfalen, Essen, Kruppstraße, wall at parking space, 51,446133°N, 6,991897°E, 92 m ASL, 28. Sep. 2024, 1 j, S. Lauterbach & G. Imbusch leg. & det.;

Münchener Str. 65 + alley at Harkortstr. 63, 51,447171°N, 6,99312°E, 87 m ASL, 5. Oct. 2024, 2 jj, S. Lauterbach leg. & det.

### *Segestria bavarica* C. L. Koch, 1843

GERMANY, Nordrhein-Westfalen, Essen, Griepersstraße, 51,466057°N, 6,972933°E, 61 m ASL, Oct. 2014, 1 ♂, S. Lauterbach leg. & det.; Krupp-Park, 51,463588°N, 6,985433°E, 53 m ASL, 28. Oct. 2014, 1 ♂, S. Lauterbach leg. & det.; Kruppstraße, wall at parking space, 51,446133°N, 6,991897°E, 92 m ASL, 28. Sep. 2024, 3 ♂♂, 3 ♀♀, 1 j, S. Lauterbach & G. Imbusch leg. & det.; Schederhofstraße 123, Laminatdepot north. external wall, 51,450824°N, 6,990314°E, 81 m ASL, 28. Sep. 2024, 5 jj, S. Lauterbach & G. Imbusch leg. & det.; Residenzaue Borbeck playground, 51,469122°N, 6,945087°E, 69 m ASL, 4. Oct. 2024, 2 ♀♀, 6 jj, S. Lauterbach leg. & det.; Münchener Straße 106a, 51,448121°N, 6,986817°E, 80 m ASL, 5. Oct. 2024, 1 ♀, S. Lauterbach & G. Imbusch leg. & det.; Münchener Straße, west. wall, 51,447364°N, 6,990169°E, 85 m ASL, 5. Oct. 2024, 1 ♂, 2 jj, S. Lauterbach leg. & det.; Im Mühlenbruch 39, Nr. 39, 51,480581°N, 7,035504°E, 41 m ASL, 7. Oct. 2024, 1 ♂, 1 ♀, S. Lauterbach leg. & det.; Solingen, botanical garden, 51,184245°N, 7,064402°E, 212 m ASL, 15. Mar. 2020, 1 ♂, 2 ♀♀, S. Lauterbach leg. & det.; Hesse, Frankfurt a.M., Wilhelmshöher Straße 25, 50,138642°N, 8,716862°E, 129 m ASL, 8. Apr. 2017, 1 ♀, S. Lauterbach leg. & det.; Bad Homburg, Römerkastell / Saalburg, 50,271545°N, 8,566782°E, 426 m ASL, 5. Jun. 2017, 1 j, S. Lauterbach leg. & det.; Berlin, botanical garden, 52,456503°N, 13,307405°E, 62 m ASL, 5. May 2019, 1 ♀, S. Lauterbach leg. & det.; NETHERLANDS, Zuid-Holland, Goedereede, Haveneind, 51,829862°N, 4,007301°E, 1 m ASL, 26. Oct. 2024, 1 ♂.

### *Segestria cf. bavarica* C. L. Koch 1843

GERMANY, Nordrhein-Westfalen, Essen, Schederhofstraße 123, Laminatdepot north. external wall, 51,450824°N, 6,990314°E, 81 m ASL, 28. Sep. 2024, 2 jj, S. Lauterbach & G. Imbusch leg. & det.; Münchener Straße 65, west. wall, 51,447364°N, 6,990169°E, 85 m ASL, 5. Oct. 2024, 1 j, S. Lauterbach leg. & det.

## Results

### Faunistic records

**Population „industrial estate Münchener Straße“.** During the inspections on the 18. and 28. Sep. 2024, 308 individuals of the genus *Segestria* were counted. Due to size, habitus and the greenish iridescence of the chelicerae 42 individuals were immediately identified as *S. florentina* in either subadult or adult status. Many further, smaller individuals displayed iridescent chelicerae as well. Most individuals were observed in typical ambush position inside their tubes with three leg pairs visible at the tube entrance (Fig. 1b). Only one ♀ and three ♂♂ were observed roaming around. By far, most individuals were found on the front of the building „Münchener Straße 60“ (Fig. 3a) with a count of 124. Plenty of *Segestria* tubes were built underneath the windowsills; some tubes were located only a few centimeters apart from each other. The results of the inspections with systematic counting from 18. Sep. 2024, 28. Sep. 2024 and 5. Oct. 2024 are displayed in Fig. 2a. During the days before the last nocturnal inspection on the 22. Oct.

2024 temperatures were already far below 10°C and below 0°C in some nights. No individuals were spotted in typical ambush position. During another inspection on 16. Jan. 2025 with snowfall and freezing temperatures at night, a large adult individual was spotted deep inside its tube. *Segestria*-tubes were found in a multitude of places: wallcreeks, boreholes, at junction boxes behind gutters, et cetera. Underneath eaves some tubes were located at a high level. On ground level, only one tube was found. The number of individuals living on a certain building depends on the structure of that building and the possibilities to build their tubes.

The smallest extension of the creek seems to be the determining factor for the size of the tube and hence the individual, that lives inside (large creeks usually contained only large tubes). It seems, that during their lives *Segestria* individuals need to move and find suitable creeks for their tubes. Underneath some protruding surfaces a few tubes were found spun along facades and exposed on one side.

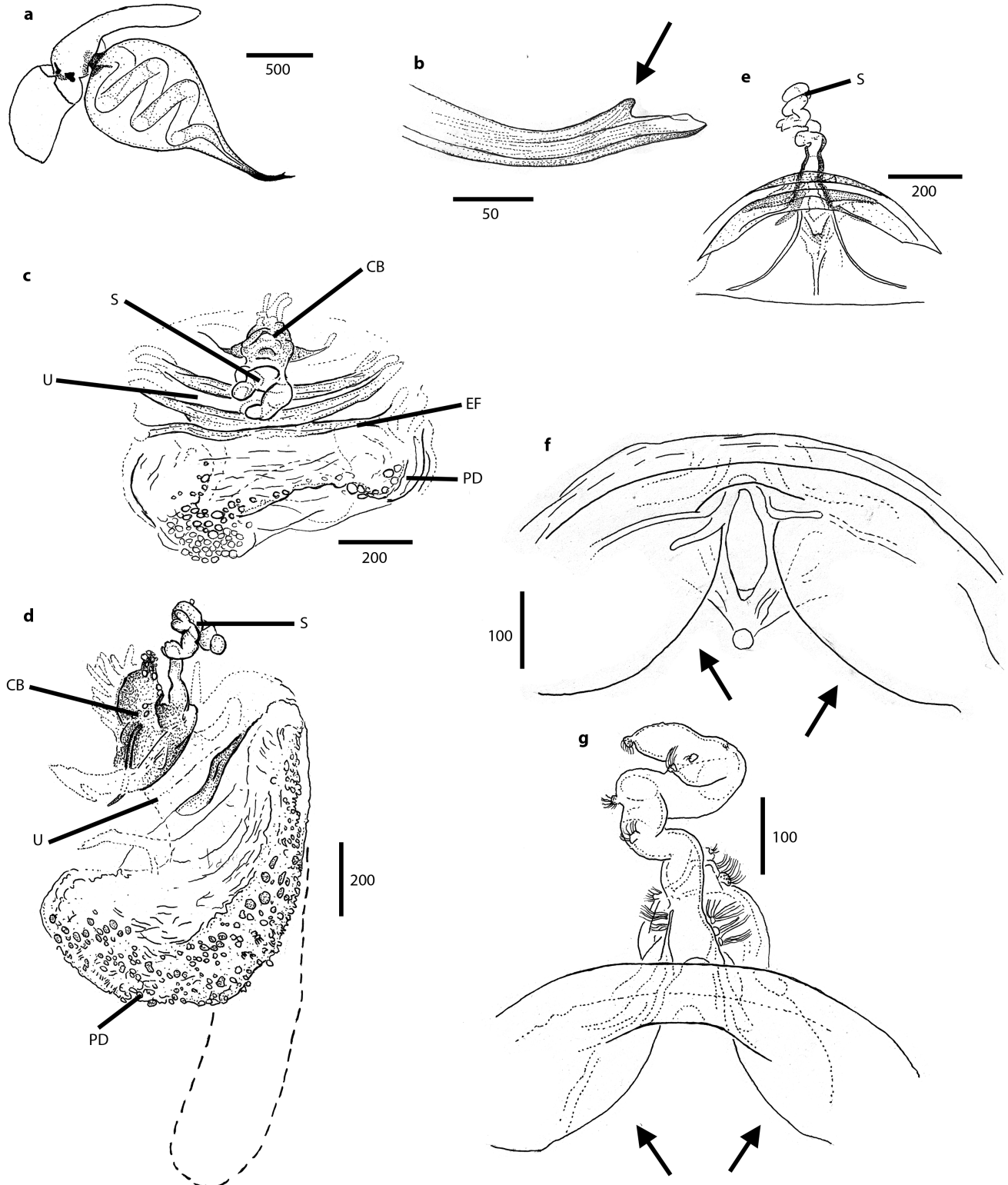
Within the same industrial complex (along the Kruppstraße) we found a mixed population of *S. florentina* and *S. bavarica* inside the crevices of a wall built of L-shaped concrete elements (Fig. 3b). Identification of the two species was confirmed via microscopic examination.



**Fig. 3:** Habitats of *S. florentina* and *S. bavarica*. **a.** location with the highest abundance of *S. florentina* in Essen-Holsterhausen, Münchener Straße 60, in the shaded part of the building underneath the windowsills. Photo by G. Imbusch from 3. Oct. 2024; **b.** wall at Kruppstraße with L-shaped concrete elements. At this location *S. florentina* and *S. bavarica* were found syntopically. Photo by G. Imbusch from 3. Oct. 2024

**Accompanying fauna.** The accompanying spider fauna found during the inspections of the industrial estate „Münchener Straße, Essen“ is composed of several, mostly common indigenous and neozooic species that can be found throughout Essen – only the species *Paratrachelas maculatus* (Thorell, 1875) is rarely found elsewhere: *Eratigena atrica* (C. L. Koch, 1843), *Tegenaria domestica* (Clerck, 1757), *Amaurobius* sp., *Araneus diadematus* Clerck, 1757, *Nuctenea umbratica* (Cler-

ck, 1757), *Zygiella x-notata* (Clerck, 1757), *Cheiracanthium mildei* L. Koch, 1864, *Clubiona corticalis* (Walckenaer, 1802), *Leptyphantes* s. l. sp., *Holocnemus pluchei* (Scopoli, 1763), *Pholcus* sp., *Scytodes thoracica* (Latreille, 1802), *Parasteatoda* cf. *tepidariorum* (C. L. Koch, 1841), *Steatoda bipunctata* (Linnaeus, 1758), *Steatoda grossa* (C. L. Koch, 1838), *Steatoda triangulosa* (Walckenaer, 1802) and *Paratrachelas maculatus*. Species determination was done in the field except for

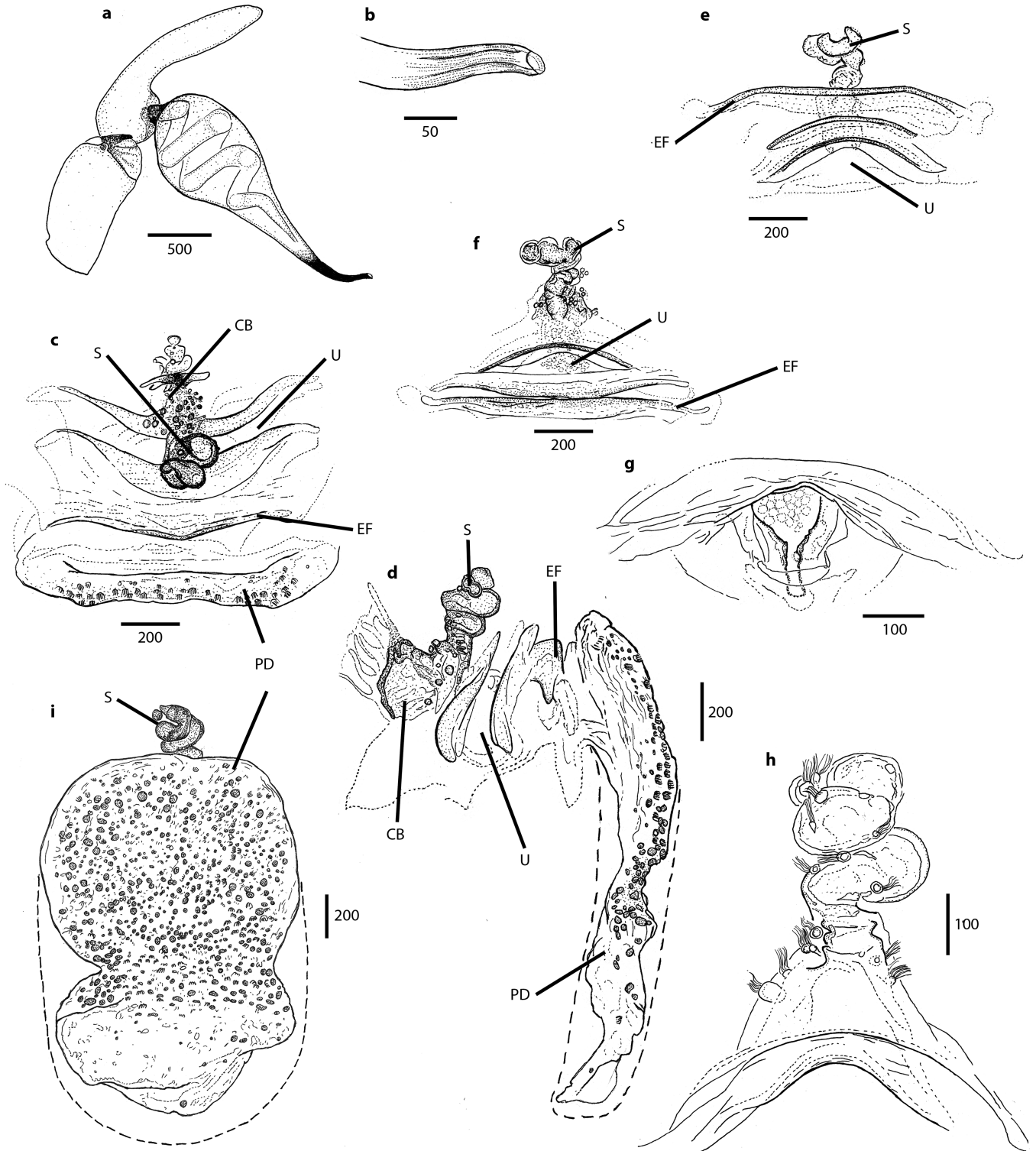


**Fig. 4:** Male bulb (a-b) and female genital structures (c-g) of *Segestria bavarica*. **a.** bulb, lateral view; **b.** embolus tip, lateral view; **c.** vulva, anterior view; **d.** vulva, lateral view; **e.** vulva, posterior diverticle removed, ventral view; **f.** opening of the copulatory bursa from the uterus, posteroventral view; **g.** copulatory bursa and spermatheca, with anterior wall of uterus externus, ventral view; Dashed line showing dimensions of posterior diverticle before preparation in lactic acid. Scales in µm

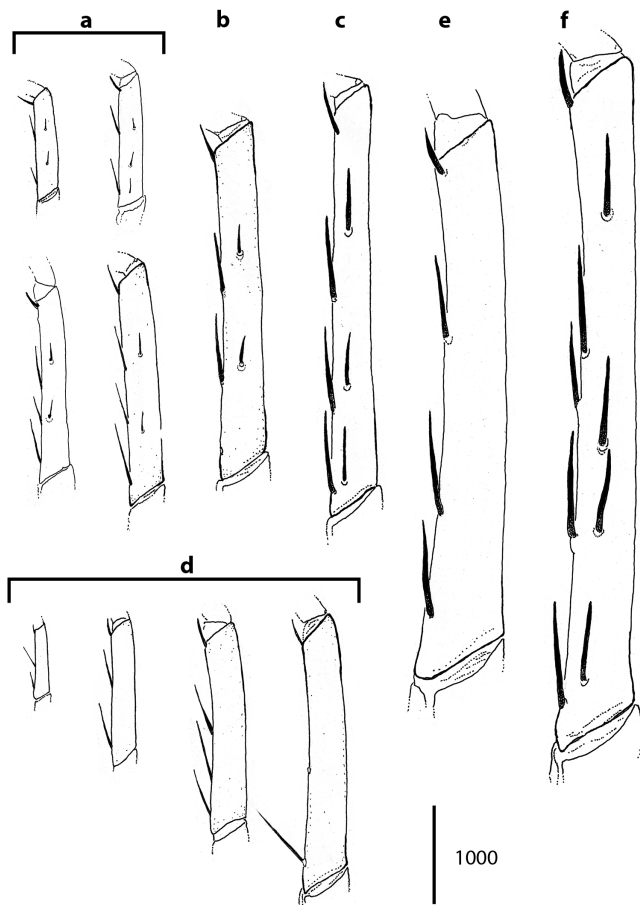
the species *Tegenaria domestica* and *Paratrachelas maculatus* which were identified using genital examination. An individual of *P. maculatus* was found roaming on the pathway near Münchener Straße 77 (Imbusch et al. 2026). This is the second record of *P. maculatus* in North Rhine-Westphalia after Bauer & Grabolle (2012).

**Online records and verification surveys.** Online sources yielded several indications of *S. florentina* in Germany. A re-

cord shown in the Atlas of the European Arachnids could be traced to a forum post by Michael Bierkant, who documented a specimen from Gelsenkirchen-Resse on 30 Aug. 2024; the photographs clearly show *S. florentina* (Arachnologische Gesellschaft 2025, Forum der Arachnologischen Gesellschaft e. V. 2025). The same post led us to a further reliable observation on Reddit, where Dennis Tomczak photographed a specimen inside a building near the Aasee in Bocholt on 14. Jul. 2024.



**Fig. 5:** Male bulb (a-b) and female genital structures (c-i) of *Segestria florentina*. **a.** bulb, lateral view; **b.** embolus tip, lateral view; **c.** vulva, anterior view; **d.** vulva, lateral view; **e.** & **f.** vulva, ventral view, different positions of the sclerotized arches of uterus externus and epigastric fold after preparation of the posterior diverticle; **g.** opening of the copulatory bursa from the uterus, posteroventral view; **h.** copulatory bursa and spermatheca, with anterior wall of uterus externus, ventral view; **i.** vulva, ventral view. Dashed line showing dimensions of posterior diverticle before preparation in lactic acid. Scales in  $\mu\text{m}$



**Fig. 6:** Prolateral leg spination of tibia III of *Segestria bavarica* (a–c) and *Segestria florentina* (d–f). **a.** juveniles; **b.** adult ♀; **c.** adult ♂; **d.** juveniles; **e.** adult ♀; **f.** adult ♂. Scale in µm

This currently represents the earliest confirmed record of the species in North Rhine-Westphalia. In addition, naturgucker.de contained one plausible photographic record from Essen-Nordviertel and one unverified entry from Essen-Kupferdreh, both of which were subsequently checked in the field (Naturgucker 2025). During a survey of Ostermannplatz in Essen on 4. Oct. 2024, we counted 46 spiders of the genus *Segestria*, 12 of which were identified as subadult or adult *S. florentina*. Most individuals ( $n = 42$ ) were found at a freestanding kiosk building, where the positions of the burrows were comparable to those observed at the industrial estate in Münchener Straße (see above). Only four additional specimens were found away from the kiosk building, including one juvenile beneath protruding bark of a plane tree (*Platanus × hispanica*) and one adult male *S. florentina* at a transformer station. By contrast, a site inspection carried out on 15. Oct. 2024 around the intersection of Sandstraße and Schwermannstraße in Essen-Kupferdreh, prompted by the unverified naturgucker.de record, did not reveal any specimens of *Segestria* using our above-mentioned methodology. No valid German records were found on insektenfotos.de, iNaturalist, or Observation.org, although Observation.org contained numerous records from nearby areas in the Netherlands (Insektenfotos.de-Forum 2025, iNaturalist 2025, Observation International 2025). Based on our observations and the results of the internet research, the currently known distribution of *S. florentina* in Germany is shown in Fig. 2b.

## Morphological study

**Genital differences.** The differences between the bulbi of *S. bavarica* and *S. florentina* have already been well described (Roberts 1996, Brignoli 1976). The bulb of *S. bavarica* is relatively short and terminates in an embolus with a small lateral tooth (Fig. 4a, 4b). In *S. florentina*, the bulb is more elongate and ends bluntly, lacking a lateral tooth (Fig. 5a, 5b). Brignoli (1976) illustrated species-specific differences in the spermatheca in the anterior part of the vulva: these structures are longer and more slender in *S. bavarica* than in *S. florentina* (Fig. 4c–e, 4g and Fig. 5c–f, 5h). Another difference lies in the shape of the entrance to the copulatory bursa from the uterus. In *S. bavarica* the entrance is narrow and elliptical (Fig. 4f), with steeply sloping side walls (Fig. 4f, 4g), in *S. florentina* it is narrowed dorsally and wide open ventrally (Fig. 5g). The posterior diverticle is, in both species, oval and flat, sac-shaped (Fig. 4d, Fig. 5d).

## Somatic characters

**Spination of Tibia III.** In males of both species, tibia III bears two to four spines (Fig. 6c, 6f). In all examined specimens of *S. bavarica* and *S. florentina*, the retrolateral spination of tibia III was consistent in females: females of *S. bavarica* always bear two or three spines (Fig. 6b), whereas these spines are absent in females of *S. florentina* (Fig. 6e). No subadult males were available for examination.

**Colouration and pattern.** In *S. bavarica*, the median dark patches on the opisthosoma are posteriorly rounded or lobed laterally, whereas in *S. florentina* they are usually more trapezoidal or triangular. The lighter areas within the spots are usually larger and break through the dark spots in *S. bavarica*, therefore macroscopically an impression of a bright center band appears. Typical individuals of *S. florentina* do not display a bright center band because the light-coloured areas are enclosed by dark spots or are completely missing. Transitional forms between the typical *S. florentina* pattern and those of the other two species may occur. The general body colouration, especially of the carapace tends to be more yellowish brown in *S. bavarica*, whereas *S. florentina* is more often reddish brown (Fig. 7).

Additional somatic traits, including spination of other leg segments and general body colouration, were also examined, but most did not prove suitable for the formulation of generalized diagnostic characters, particularly in alcohol-preserved material. Corresponding observations are therefore provided in Supplementary Tab. 1. The cheliceral iridescence of *S. florentina* may already be visible in juveniles but is usually not clearly discernible without suitable lighting and strongly depends on the angle of observation.

**Differentiation of juveniles.** Based on the combined differences in opisthosomal pattern and the retrolateral spination of tibia III, a few juvenile specimens above a certain size could be tentatively assigned to one of the two species. These results are consistent with the results from adult specimens: juveniles attributable to both species were found only in the mixed population at Kruppstraße, the only site where adults of both species were also recorded. All examined juveniles assigned to *S. bavarica* have one to three retrolateral spines on tibia III (Fig. 6c), whereas all examined presumed juveniles of *S. florentina* lack such spines entirely (Fig. 6f). In very early juvenile stages, with a body length of about 2–3 mm or less,



**Fig. 7:** Opisthosoma patterns of *S. bavarica* (a-c) and *S. florentina* (d-h) in dorsal view. **a.** 4. Oct. 2024, Essen, Residenzauwe Borbeck, adult ♀; **b.** 4. Oct. 2024, Essen, Residenzauwe Borbeck, adult ♂; **c.** 28. Sep. 2024, Essen, Kruppstraße, juvenile; **d.** 5. Sep. 2024, Essen, Münchener Str. 65, adult ♂; **e.** 5. Sep. 2024, Essen, Münchener Straße 65, adult ♀; **f.** 4. Oct. 2024, Essen, Ostermannstraße, adult ♂; **g.** 28. Sep. 2024, Essen, Kruppstraße, adult ♂; **h.** 4. Oct. 2024, Essen, Ostermannstraße, juvenile

spines cannot yet be reliably distinguished from body hairs. Nevertheless, species-specific opisthosomal patterns may occasionally already be visible at this stage and therefore formed the basis for identifications marked “cf.” in the material list.

### Discussion

The possibility of identifying juveniles of *S. bavarica* and *S. florentina* by the opisthosoma pattern and the spination of the tibia III should be further tested in practice; and could be verified by DNA barcoding. There is still a residual uncertainty in the identification with the mentioned criteria and they have limited usability as field identification features. Assuming, that our identification is correct, we identified only one site with both species and an area with a quite high abundance of *S. florentina* without any records of *S. bavarica*. In general, *S. bavarica* is not rare in Essen and could be detected in some places in the vicinity of the study area (see Fig. 2a). Both species appear to inhabit the same habitats, so their syntopic occurrence is not surprising. Whether *S. florentina*, with its very large population on Münchener Straße, has displaced or will displace *S. bavarica* in some areas remains to be seen.

The increased occurrence of *S. florentina* on the wall of the house at Münchener Straße 60, specifically under the windowsills, cannot be explained by the availability of preferred habitats. Several south-facing walls were examined, all of which provided sufficient crevices for web construction, yet *S. florentina* was only found sporadically at those locations. In the absence of suitable crevices, individuals occasionally construct “exposed” tubes along edges, without protruding into crevices. Therefore, the difference in abundance may be due to variations in sun exposure (i.e., shaded conditions at Münchener Straße 60 vs. sun-exposed conditions at all other sites). Alternatively, Münchener Straße 60 may be located near the point of origin of the lo-

cal *S. florentina* population, from which dispersal occurred. Due to the size and the occurrences of both juveniles and adults, the *S. florentina* populations in Essen are estimated to be at least a few years old and seem to be established. We believe that the species has probably been introduced into the Ruhr area several times due to the observation of a single individual in Gelsenkirchen, the potentially isolated distribution area within the industrial estate around Münchener Straße and the isolated population at Ostermannplatz, which seems to be confined to a kiosk building. The observed specimens of *S. florentina* in Stuttgart were probably transported by inland waterways (Schlegel 2012). However, this assumption is implausible for the newly discovered populations discussed in this paper since the site in Essen on Münchener Straße is about 6.5 kilometres, the site at Ostermannplatz 5 kilometres and the find from Gelsenkirchen about 4 kilometres away from the nearest waterway (Rhine-Herne Canal). We would rather assume a distribution via overland transport, especially due to the commercial character of the sites. The mentioned findings in France and the Netherlands near the German border suggest, that a continuous immigration or introduction of *S. florentina* to Germany is taking place. The species is common in the Netherlands and has been known since the 19th century (van Helsdingen 2025, Observation International 2025). With regard to the citizen science platform observation.org, it should be noted that the platform originates from the Netherlands. Here, more than three times as many observers were active in 2023 as in Germany and documented around 6.5 times as many nature observations (Observation International 2025). Therefore, reports of *S. florentina* from the Netherlands are not directly comparable to those from Germany.

Due to the very sporadic occurrence of the species in Germany with large distances between the observations and

established populations (see Fig. 2b, Arachnologische Gesellschaft 2025) we do not agree with Wunderlich's (1995) assumption that *S. florentina* migrated independently to Germany. Notwithstanding, it is likely that *S. florentina* might have been overlooked in other places due to the *Segestria*-typical nocturnal, hidden lifestyle. Therefore, further occurrences of *S. florentina* in North Rhine-Westphalia cannot be ruled out.

**Conflicts of Interest.** The authors have no conflicts of interest to declare that are relevant to the content of this article.

**Use of AI-based technologies.** No generative AI and AI-assisted technologies were used in the writing process.

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