

## Distribution of sector orb-weavers of the genus *Leviellus* (Araneae: Araneidae) in Czechia with notes on their biology

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RÜCKL K. & MACHAČ O. 2021: Distribution of sector orb-weavers of the genus *Leviellus* (Araneae: Araneidae) in Czechia with notes on their biology. *Acta Musei Moraviae, Scientiae biologicae* **106(2)**: 197–204. New records and summarized published data about the distribution of *Leviellus* species in Czechia are provided. There are two species: *Leviellus thorelli* (Ausserer, 1871) and *L. stroemi* (Thorell, 1870). While *L. thorelli* is a rare thermophilic species associated mainly with solitary deciduous trees and in Czechia occurring only in southern Moravia, *L. stroemi* is locally common throughout the country, preferring a wider range of habitats. The paper also provides information about biology and ecology of both species in Czechia.

**Keywords.** faunistics, *Leviellus stroemi*, *Leviellus thorelli*, old trees, new records, Zygiellinae

### Introduction

Spiders of the genus *Leviellus* Wunderlich 2004 are orb-weavers of various sizes belonging to the subfamily Zygiellinae (family Araneidae) (WSC 2021). The genus is similar to *Zygiella* but differs by the flat tip of palpal embolus, presence of epigynal scape and typical chain shaped folium on opisthosoma (GREGORIČ *et al.* 2015, NENTWIG *et al.* 2021). These spiders build a specific form of orb-web with a free spiral sector in its upper part, which is typical for the whole subfamily Zygiellinae (GREGORIČ *et al.* 2015). The genus *Leviellus* includes six species. Three species live in Europe and two of them, *L. stroemi* (Thorell, 1870) and *L. thorelli* (Ausserer, 1871), can be found in Czechia (ČAS 2021, WSC 2021). While *L. stroemi* is distributed throughout most of Europe, Russia, Kazakhstan and Korea, *L. thorelli* is known only from France and Central, Southern and South-Eastern Europe. The third European orb-weaver, *L. kochi* (Thorell, 1870) inhabits Southern Europe, North Africa and Central Asia (WSC 2021).

*Leviellus thorelli* is a large thermophilic orb-weaver (female 11.5–13.5 mm, male 9–10 mm) living on old deciduous, often solitary trees (KŮRKA *et al.* 2015). Such a suitable tree can be inhabited by many individuals (PFLIEGLER 2014). In southern Europe, the occurrence of this species has also been reported on walls of ruins and old buildings (CRUVEILLIER *et al.* 2017, WIEHLE 1931). The first and only published record from Czechia is based on juveniles and dates back to 2003 from South Moravia (BRYJA *et al.* 2005).

*Leviellus stroemi* is a small orb-weaver (female 4–4.5 mm, male 3–3.5 mm) living on old deciduous and coniferous trees, but also on wooden buildings, less often on walls



**Figs 1–4.** *Leviellus thorelli* (1–2) and *L. stroemi* (3–4): 1 – adult female, Lednice Castle park, Aug. 2019 (photo: P. Beneš); 2 – adult male, Lednice Castle park, Sept. 2020 (photo: P. Beneš); 3 – adult female, Bílá Lhota, May 2020 (photo: P. Beneš); 4 – adult male, Moravský Krumlov, Oct. 2016 (photo: R. Šich).

(ROBERTS 1995, WIEHLE 1931). It is known from several localities in Bohemia, Moravia and Silesia (BUCHAR & RŮŽIČKA 2002, ČAS 2021).

Both *Leviellus* species are considered rare and endangered in Czechia (ŘEZÁČ *et al.* 2015). We summarized the data and new records about the distribution of both species and brought notes about their biology and ecology in Czechia.



**Figs 5–6.** *Leviellus thorelli*: 5 – sector orb-web (photo: O. Machač); 6 – tunnel-shaped retreat (photo: P. Beneš).

### Material and Methods

Majority of the new data come from individual collection and observation of spiders during the author's field trips. Other faunistic records are taken from the database of Czech Arachnological Society (ČAS 2021) and supplemented by several published records (BRYJA *et al.* 2005, KŮRKA 2004, SVATOŇ 2006) and one individual record from iNaturalist (2021). These records were omitted by the official Czech arachnological database for several reasons: 1.) BRYJA *et al.* (2005) published juveniles, all spiders were revised later, therefore we added them to the results; 2.) The data from Prof. F. Miller's collection (KŮRKA 2004) were processed after the publication of Catalogue of Spiders of the Czech Republic (BUCHAR & RŮŽIČKA 2002), which was the main source for the Czech database; 3.) spiders published by SVATOŇ (2006) contain some dubious identifications, and although the material could not be revised, *L. stroemi* is a recognizable species, which is why we included it in the records; 4.) records from the iNaturalist website were not included in the Czech database, but the specimen was observed by one of our collectors, who is skilled in identification, and we revised the photographs.

Some old records lack information on the number and gender of specimens and the year of collection. The map was created using on-line application BioLib (Biolib.cz). The faunistic data are provided based on a grid mapping system using four-digit codes of individual fields (BUCHAR 1982, NOVÁK 1989, PRUNER & MÍKA 1996). The division of Czechia into Bohemia and Moravia is taken over according to KMENT (2009).

The following abbreviations are used: coll. – collection, det. – identified, ex. – specimens, juv. – juvenile, NM – nature monument, NMP – National Museum, Prague, NNR – national nature reserve, NR – nature reserve, leg. – collected, observ. – observed, rev. – reidentified, sub. – subadult.

## Results and Conclusions

### *Leviellus thorelli* (Ausserer, 1871)

(Fig. 1–2)

#### Moravia:

**7165:** Klentnice, Klentnický potok, 48.84159N, 16.64777E, 22. IV. 2004, 5 juv., leg. J. Chytil, det. & coll. V. Bryja (rev. M. Řezáč) (BRYJA *et al.* 2005); Mikulov, 48.80502N, 16.64082E, 8. X. 2010, 1 ♂, leg., det. & coll. O. Machač;

**7166:** Nové Mlýny, Křivé jezero NNR, 48.84824N, 16.72964E, 2. V. 2003, 1 juv., leg. J. Chytil, det. & coll. V. Bryja (rev. M. Řezáč) (BRYJA *et al.* 2005);

**7166–7266:** Lednice, Lednice Castle park, 48.80751N, 16.81884E (GPS – the middle of the park), 6. VIII. 2013, 1 ♀, leg., det. & coll. R. Šich; 11. IV. 2014, 1 ♀, leg., det. & coll. R. Šich; 26. IV. 2014, 10 juv., observ. R. Šich; 8. VII. 2014, 10 juv., observ. R. Šich; 2. V. 2020, 20 ♀♀, 10 juv., observ. K. Rückl, V. Kroc, R. Šich & O. Zimmermann; 6. VII. 2020, 1 sub. ♂, leg., det. & coll. R. Šich; 11. IX. 2020, 4 ♂♂, 10 ♀♀, 10 juv., observ. R. Šich & K. Rückl;

**7267:** Břeclav, Pohansko, 48.71868N, 16.90502E, 19. VIII. 2009, 1 ♀, 1 juv., leg. O. Machač, L. Sentenská, E. Líznarová, det. & coll. O. Machač; 6. VII. 2014, 2 juv., observ. R. Šich;

**7367:** Cahnov NNR, 48.65552N, 16.94199E, 6. VI. 2003, 1 juv., leg. J. Chytil, det. & coll. V. Bryja (rev. M. Řezáč) (BRYJA *et al.* 2005).

*Leviellus thorelli* is a rare thermophilic species distributed in Czechia only in the warm region of South Moravia. So far, including the unpublished records presented here, it has been found at six localities (Fig 8.). Occurrence of numerous populations of this species was documented only in two localities: Lednice Castle Park and Pohansko (ČAS 2021). In Czechia this species prefers trunks of old trees, mainly solitary oaks with wrinkled bark, where spiders can build webs with tunnel shaped retreat. In southern Europe, this species also inhabits walls of ruins and old buildings (CRUVEILLIER *et al.* 2017, WIEHLE 1931). In the town of Mikulov only one adult male was recorded on a wall, but spiders with webs were not found.

Due to the large size of *L. thorelli* and its web, it is easy to find. Webs (Fig. 5) are on tree trunks, often close to the entrance to tree hollows. The spider has nocturnal activity, waiting for prey in its retreat near the web during the day (Fig. 6). Ants *Liometopum microcephalum* were documented as prey on the oaks in Hungary (PFLIEGLER 2014). We assume that the spiders can catch these ants also in Moravian localities, but they probably feed primarily on flying insects. We recorded adult females from April to October, males only in September and October.

### *Leviellus stroemi* (Thorell, 1870)

(Fig. 3–4)

#### Bohemia:

**5358:** Mříčná, Peřimov, 50.61696N, 15.46321E, 9. VIII. 2008, 27. VII. 2012, 9. VII. 2017, dozens, observ. K. Rückl;

**5454:** Doksy, Břehyně, 50.57186N, 14.69261E, 6. IX. 2020, 10 ex., observ. K. Rückl;

**5457:** Sedmihorky, Bažantník NR, 50.55724N, 15.19381E, 7. IX. 2013, 1 ♀, leg., det. & coll. O. Machač;

**5762:** Opočno, 50.26638N, 16.11467E, 16. II. 2000, 1 ♂, leg., det. & coll. J. Dolanský;

**5840:** Františkovy Lázně, 50.12148N, 12.35152E, 23. XI. 1873, leg. A. Palliard, det. & coll. L. Koch (NOSEK 1895);

**5848:** Lišany, 50.14785N, 13.74322E, 31. XII. 1941, leg., det. & coll. F. Miller (MILLER 1941);

**5959:** Přelouč, Slavíkovy ostrovy, 50.05174N, 15.55997E, 12. VIII. 2020, 1 ♂, 1 ♀, leg., det. & coll. O. Machač;



Fig 7. Typical habitat of *Leviellus thorelli* and *L. stroemi*, Lednice (photo: Ondřej Machač).

- 6044:** Nečtiny, 49,98079N, 13,16369E, 13. V. 2017, 1 ♀, observ. V. Kroc;  
**6356:** Loket, Borovsko, 49.68861N, 15.10880E, 3. VI. 1972, leg. & det. J. Buchar, coll. NMP;  
**6549:** Blatná, 49.42266N, 13.88006E, 16. VI. 2016, 1 ex., observ. E. Legátová;  
**6659:** Jihlava, Stará plovárna, 49.3900N, 15.6031E, 24. X. 2020, 1 ♂, observation from iNaturalist (2021) website;  
**6855–6856:** Jindřichův Hradec, 49.14404N, 15.00301E (GPS – the centre of the town), II. 1960, 2 ♀♀, 31. I. 1961, 2 ♀♀, leg. & det. F. Miller, coll. NMP (KŮRKA 2004).
- Moravia:**  
**5769:** Zlaté Hory, Rejvíz NNR, 50.22020N, 17.28862E, 31.VII. 1946, leg. J. Kratochvíl, det. & coll. F. Miller (KRATOCHVÍL & MILLER 1947);  
**6070:** Bruntál, Uhlířský vrch NM, 49.97244N, 17.43923E, 20. V. 1965, 1 ♂, 1 ♀, leg. E. Laštovková, det. J. Buchar, coll. NMP;  
**6268:** Bílá Lhota, Kamenný kříž, 49.74523N, 17.00209E, 22. V. 2020, 1 ♀, observ. P. Beneš;  
**6374:** Bartošovice, Bartošovický luh NR, 49.67773N, 18.03004E, 1. VIII. 2011, 1 ♀, leg., det. & coll. O. Machač;  
**6461:** Budeč, 49.53637N, 15.91232E (GPS – the centre of the village), 27. VII. 1992, 1 ♀, 5 juv., 31. VII. 1992, 6 juv., leg., det. & coll. J. Svatoň (SVATOŇ 2006);  
**6569:** Tovačov, Kolečko pond, 49.42848N, 17.29521E, 13. IV. 2013, 1 ♂, leg., det. & coll. O. Machač;  
**6773:** Vizovice, 49.21994N, 17.85088E, 4. VII. 2017, 1 ♂, leg., det. & coll. O. Machač;  
**6963:** Moravský Krumlov, 49.04890N, 16.30750E, 20. VIII. 2016, leg., 3 sub. ♂♂, 3 sub. ♀♀, leg., det. & coll. R. Šich;  
**7161:** Podmolí, Hluboká, Podyjí NP, 48.81990N, 15.93457E, 1 ♂, leg., det. & coll. O. Machač;

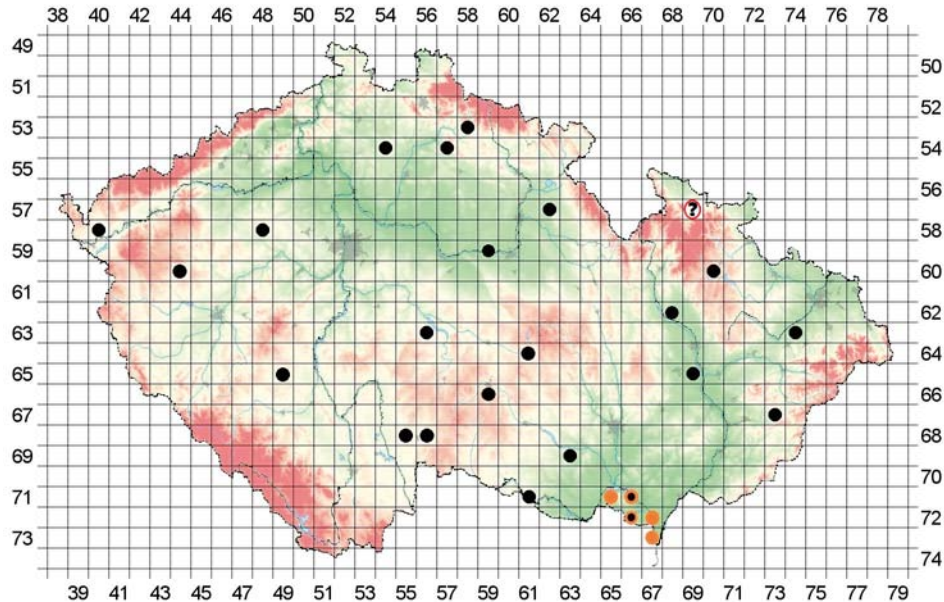


Fig 8. Distribution of spiders from genus *Leviellus* in Czechia (orange dot – *L. thorelli*, black dot – *L. stroemi*, red oval with question mark – doubtful record of *L. stroemi* from Rejvíz).

**7166:** Horní les, 48.83084N, 16.76145E, 19. IV. 2004, 1 ♀, leg. J. Chytil, det. & coll. V. Bryja; Lednice, 48.79968N, 16.81617E (GPS – the centre of the town), 18. V. 19??, 1 ♂, leg. & det. F. Miller, coll. NMP (KŮRKA 2004);

**7166–7266:** Lednice, Lednice Castle park, 48.80751N, 16.81884E (GPS – the middle of the park), 2. V. 2020, 5 ex., observ. K. Rückl, V. Kroc, R. Šich & O. Zimmermann; 11. IX. 2020, 2 ♀♀, observ. R. Šich & K. Rückl;

**7266:** Břeclav, Apollo pond, 48,7846N, 16,82462E, 26. VII. 2020, 3 ex., observ. R. Šich & K. Rückl.

*Leviellus stroemi* is widespread in Czechia, but the records are not abundant and not very local (BUCHAR & RŮŽIČKA 2002, ČAS 2021). However, we assume that the species probably tends to be overlooked, due to its specific habitat preferences. It lives on old deciduous and coniferous trees in open forests and on solitary trees in parks and alleys. It also occurs on trees deep in forests, for example in the floodplain forests in central Moravia. In southern Moravia, it often inhabits the same trees as *L. thorelli* (Fig. 7). However, fewer specimens of *L. stroemi* live on trees with a high abundance of *L. thorelli* because the larger species has probably bigger space requirements for the retreat and web. Numerous specimens of *L. stroemi* were observed on walls of old buildings, e.g. castles (Blatná, Vizovice, Moravský Krumlov). Most Czech records are from lowlands (Fig. 8). The record from Rejvíz seems to be dubious because it was probably based on juveniles (KRATOCHVÍL & MILLER 1947). According to our observations, it might be misidentified *Zygiella montana* (C. L. Koch, 1834), which is very abundant on this locality.

The spider builds small webs. Like *L. thorelli* it has nocturnal activity. Based on our own observation during the day it appears on the web only for the time necessary to catch prey. Its range of prey is limited to small flying insects. This species usually avoids larger and harder insects including ants caught in the web.

Due to the small size of the spider and its web, it is difficult to find. ROBERTS (1995) describes *L. stroemi* as a rare but sometimes locally abundant species. The records of adult males and females in Czechia come throughout all year, most of records coming from summer (ČAS 2021).

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