

## SYNANTHEDON MESIAEFORMIS (HERRICH-SCHÄFFER) NEW TO THE CZECH REPUBLIC AND TO SPAIN (LEPIDOPTERA: SESIIDAE)

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### Abstract

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*Synanthedon mesiaeformis* (Herrich-Schäffer, 1846) has been found in the Czech Republic and in Spain for the first time. The species was found in the south-easternmost part of the Czech Republic, near the town of Břeclav (faunistic quadrat 7267) in May 2008. The holes and pupae were found only in one, solitary growing group of trees about 20 years old. This finding place lies at a distance of more than 250 km from the localities in SW Hungary and about 550 km from the localities in eastern Poland. In June 2008, the species was found also in alders growing in the flat river alluvium on gravel sands between La Jonquera and Figueres in northern Catalonia. This locality is in a close contact with the finding places near Perpignan and Beziers in southern France. The diagnostic morphological characters and bionomics of this species are briefly summarized and figured. The history of its distribution research is recapitulated and the causes of its disjunct range are discussed as follows. The present disjunct range represents a residual of the former distribution over the warmer and moister postglacial period; landscape modifications and elimination of solitary alder trees as „weeds“ from the 18th up to the mid-20th century in large areas of Europe; narrow and partly unknown habitat requirements and specific population ethology; an insufficient level of faunistic investigations in several parts of southern and eastern Europe.

Sesiidae, *Synanthedon mesiaeformis*, Czech Republic, Spain

The species of the genus *Synanthedon* Hübner, [1819] usually show continuous distribution, accompanying their host plant in most cases (cf., e.g. Špatenka et al., 1999, Laštůvka & Laštůvka, 2001). Among the European species, *Synanthedon mesiaeformis* (Herrich-Schäffer, 1846) is a rare exception. It shows very disjunct distribution yet its host plant is more or less widespread, and symptoms of its presence are quite characteristic and relatively conspicuous. We could find this species newly in the Czech Republic and subsequently in Spain in 2008. Hereunder, we describe and comment on this important findings, supply a concise morphological and biological characters, and recapitulate its research history in Europe.

### *Synanthedon mesiaeformis* (Herrich-Schäffer, 1846)

Material: **Czechia**, Moravia, Břeclav – Soutok (7267), 11. and 14.v.2008, pupae in trunks of *Alnus glutinosa*,

18.–30.v.2008, 5 ♂♂, 9 ♀♀ ex pupa, A. & Z. Laštůvka lgt., coll. Z. Laštůvka; other material under study: **Poland**, Macoszyn, 10.vii.1994, 1 ♂ ex l. (larva 2.vi.1994), M. Bąkowski lgt., coll. Z. Laštůvka; **Hungary**, Barcs, Darány, 10.vii.1992, 1 ♂, 1 ♀ ex l. (larvae 13.v.1992), 30.v.1993, 1 ♂ ex l. (larva 13.v.1993), Nagyatád, 29.v.1993, 2 ♀♀ ex p., 30 km E Nagykánizsa, Báhönye, 30.v.1993, 1 ♀ ex l. (larva 13.v.1993), all D. Hamborg lgt., coll. Z. Laštůvka; **Bulgaria**, Jasna Poljana, 20.–30.vi.1984, 1 ♀ ex p., Primorsko, 18.–28.vi.1984, 1 ♂ ex p., Mičurin, 18.–28.vi.1984, 1 ♂ ex p., all A. & Z. Laštůvka lgt., coll. Z. Laštůvka; **Greece**, Stomio, 8.vi.1999, 1 ♂, 9.vi.1999, 1 ♂, 2 ♀♀, 10.vi.1999, 1 ♂, 1 ♀, and 1 ♀ ex p. (pupa 25.v.1999), all A. & Z. Laštůvka lgt., coll. Z. Laštůvka.

Diagnostic characters. Wingspan 19–31 mm; antenna whitish yellow distally; eye with white border – without white border in *Synanthedon sphericiformis* (Denis & Schiffermüller, 1775); deep yellow rings on 2nd and 4th abdominal segments; ring on 4th segment distinctly broader, but there are differences between individual populations – narrow yellow rings on 2nd and 4th segments in *Synanthedon scoliaeformis*

(Borkhausen, 1789) and only very narrow, whitish yellow ring on 2nd segment in *S. spheciformis*; anal tuft black (rusty in *S. scoliaeformis*); hind tibia orange with black ring distally (partly yellow in *S. scoliaeformis* and black in *S. spheciformis*, Figs 1–3 a, 7). Differences in male genitalia of the related species are especially in the shape of the crista sacculi on valva and in the apical end of aedeagus. These characters are useful in the determination of material from pheromon traps (Figs 1–3 b).

Detailed morphological descriptions have been published by many authors, e. g. Popescu-Gorj et al. (1958), Fibiger & Kristensen (1974), de Freina (1997), Špatenka et al. (1999), Laštůvka & Laštůvka (2001). Important diagnostic characters have been mentioned already by classic authors, as by Bartel (1912), including the original description by Herrich-Schäffer (1846). Faithful colour figures of adults are given by Herrich-Schäffer (1846), Spuler (1910), Bartel (1912), Fibiger & Kristensen (1974), Laštůvka & Laštůvka (1995, 2001), de Freina (1997), and Špatenka et al. (1999). Both male and female genitalia are figured in the last five publications mentioned.

Bionomics (Figs 4–6). *Alnus glutinosa* (L.) Gaertn. has been mentioned as the host plant by Bartel (1912), and the bionomics of this species has been described by a number of authors, e. g. Popescu-Gorj et al. (1958), Saramo (1973), Fibiger & Kristensen (1974), Laštůvka & Laštůvka (1995, 2001), de Freina (1997), and Špatenka et al. (1999).

The larva develops in somewhat winding, flat tunnels between the bark and the wood, 6–8 cm in length, mainly in old trees, similarly as in *Synanthedon scoliaeformis*. The larvae have been found up to 3 m above ground level, but higher parts of trunks had not probably been examined. The larva pupates in a dense cocoon in the bark. The development is biennial according to most authors, de Freina (1997) gives a three-year cycle for northern Europe. The adults are on wing from the second half of May up to the end of July.

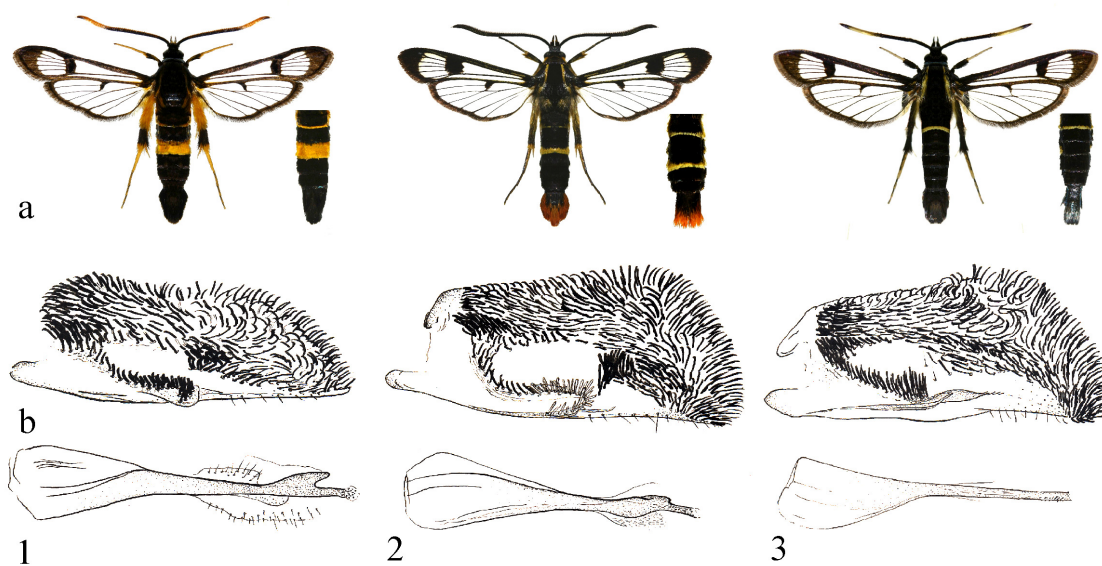
The species prefers solitary trees on meadows, in parks, along streams and communications; it rarely occurs in dense forests if the latter are closer to more suitable habitats.

Distribution (Fig. 9). The species was described by Herrich-Schäffer (1846) from southern Russia without giving any concrete locality (the type material was deposited in the ZMHB, cf. Špatenka & Laštůvka, 1988). Additional known localities have increased very slowly, in contrast to other *Synanthedon* species. Staudinger & Rebel (1901) give Sarepta [Volgograd surroundings, S European Russia] and SE Hungary (probably the present SW Romania, Banat, mentioned by Abafi-Aigner et al., 1896) up to the end of the 19th century. Bartel (1912) added Herzegovina, which could mean the locality Konjica, later precised by Popescu-Gorj et al. (1958). Pázsicky (1941) found the species in the 1930s in SW Hungary, where it was later repeatedly collected in several localities (Kaposvár, Darány, Nagyatád, cf. e.g. Laštůvka, 1990, Fazekas, 2004, D. Hamborg, pers. comm.). Subsequently,

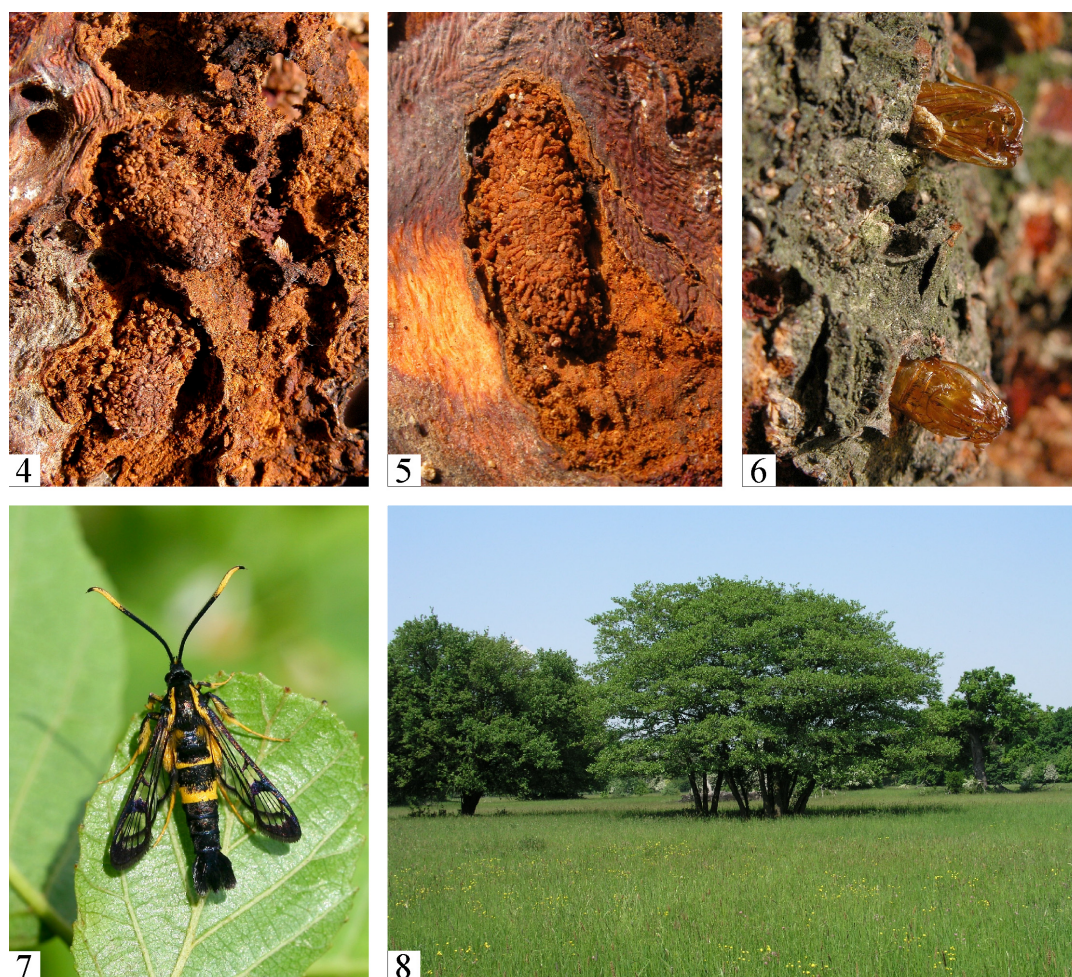
it was revealed on the southern coast of Finland (Nordman, 1945) where it was studied by later authors who described in detail its habitat and bionomics (Saramo, 1973, Vuola & Korpela, 1977). The occurrence in Romania was confirmed by the record from Buzau in 1952 (Popescu-Gorj et al., 1958). In 1970, the species was recorded in Lithuania (Šulcs et al., 1981) where it has recently been documented in numerous localities in the southern part of the country by means of sexual attractants (Karalius & Búda, 2006 a, b). In 1974, it was found on the Black Sea coast of Bulgaria (Engelhard, 1975) where it was repeatedly collected in 1982–1984 (own records) as well as in several localities along the coast (Primorsko, Mičurin, Achtopol) and in the Bulgarian inland (Sandanski). In 1988, it was recorded in one locality in Serbia (Ljig) by I. Toševski (pers. comm.). In 1990, it was found in the easternmost part of Poland and later collected in more localities after a detailed research (Buszko & Hołowiński, 1994, Bąkowski & Hołowiński, 1997, Bąkowski, pers. comm.). We observed the holes in alder trunks in Macedonia (Strumica – Dobrošinci) in 1998 and a heavy infestation of the host trees in Greece (Stomio) in 1999. The species was also recorded in S France, in two close localities N of Beziers (Vénéroux, D. Baumgarten lgt., and Villemagne-l'Argeñière, E. Bettag, D. Bartsch & R. Bläsus lgt.), NW of Nimes (Anduze, D. Bartsch lgt.) during the 1990s, and near Perpignan in 2008 (own record). K. Špatenka found it in NW Anatolia in that time (Špatenka et al., 1999, K. Špatenka, pers. comm.). Finally, we could find the holes and exuviae of this species in alders growing in the river alluvium on gravel sands between La Jonquera and Figueres in northern Catalonia in June 2008 as new for Spain. The trees grow along the stream here, but the valley is flat and the lower parts of trunks are clear, without bushes or herbaceous plants. This locality is in a close contact with the finding places near Perpignan and Beziers in southern France. The above records are well documented but there are several other literature statements, either lacking concrete data on localities or collection documentation (Estonia, Ukraine, Siberia, cf., e.g. Bartel, 1912, Heidema & Kesküla, 1992).

Even if the data on the distribution of this species increased distinctly in the past two decades the known range is still very disjunct. There are four both objective and subjective possible causes: 1) The present disjunct range represents a residual of the former distribution over the warmer and moister postglacial period; 2) Landscape modifications and elimination of solitary alder trees as „weeds“ from the 18th up to the mid-20th century in large areas of Europe; 3) Species specific and partly unknown habitat preferences and specific population ethology; 4) An insufficient level of faunistic investigations in several parts of southern and eastern Europe.

Occurrence in the Czech Republic. The species was recorded in the south-easternmost part of the Czech Republic, not far from the town of Břeclav, in the area called “Soutok” (faunistic quadrat 7267).



1-3: Differences in *Synanthedon* spp., 1 - *S. mesiaeformis*, 2 - *S. scoliaeformis*, 3 - *S. spheciformis*; a - male, and female abdomen, b - valva and aedeagus



4-8: 4 - Tunnels between the bark and the wood caused by the larvae of *S. mesiaeformis*, 5 - cocoon, 6 - exuviae in the bark, 7 - male adult, Czech Republic, 8 - habitat of *S. mesiaeformis*, Czech Republic, Břeclav env.



9: Documented records of *Synanthedon mesiaeformis*; the new records in the Czech Republic and in Spain are indicated by asterisks.

This is a relatively large remainder of floodplain landscape in the area of the confluence of the Dyje and Morava rivers, the elevation lying between 148 and 157 m a.s.l. The area is partly covered with floodplain forests (*Fraxino pannonicae-Ulmetum* in more dry and *Salicetum albae* in moist places), partly by mesophilous and hygrophilous meadows with scattered trees and shrubs. The whole area was a private property of the Liechtenstein family up to the middle of the 20th century; later, until 1990, it was a state border zone permitting no entry of common persons.

There have been found many remarkable plant and animal species, of the order Lepidoptera such as *Bohemannia auriciliella*, *Ectoedemia preisseckeri*, *Opostega spatulella*, *Pyroderces klimeschi*, *Monochroa di-*

*visella*, *Aglossa signicostalis*, *Ostrinia palustralis*, and *Gagiotodes sagittatus*, and, above all, of the family Sesiidae as *Chamaesphexia hungarica* and, on sandy elevations, *Pyropteron muscaeforme*.

The host plant, *Alnus glutinosa*, rather individually occurs in the study area. We found the holes and pupae of *Synanthedon mesiaeformis* only in one group of trees about 20 years old, having developed from a stump (Fig. 8). We could not observe any symptoms of infestation on other trees in the wider surroundings, with the exception of three old holes in an old alder in the distance of about 2 km. The Czech finding place lies at a distance of more than 250 km from the localities in SW Hungary and about 550 km from the localities in eastern Poland.

## SUMMARY

The paper describes the first records of the clearwing moth *Synanthedon mesiaeformis* (Herrich-Schäffer, 1846) in the Czech Republic and in Spain. The species was found in the south-easternmost part of the Czech Republic, not far from the town of Břeclav, in the area called "Soutok" (faunistic quadrat 7267) in May 2008. This is a relatively large remainder of floodplain landscape, with the elevation lying between 148 and 157 m a.s.l., covered with floodplain forests (*Fraxino pannonicae-Ulmetum* and *Salicetum albae*), and by mesophilous and hygrophilous meadows with scattered woody species. The holes and pupae of *Synanthedon mesiaeformis* were found only in one, solitary growing group of trees about 20 years old, having developed from a stump. The Czech finding place lies at a distance of more than 250 km from the localities in SW Hungary and about 550 km from the localities in eastern Poland. In June 2008, the species was found also in alders growing in the flat river alluvium on gravel sands between La Jonquera and Figueres in northern Catalonia. This locality is in a close contact with the finding places near Perpignan and Beziers in southern France.

The species was described from southern Russia in the middle of 19th century and recorded successively in SW Romania, Banat, Herzegovina, SW Hungary, S Finland, central Romania, Lithuania, Bulgaria, Serbia, Macedonia, Greece, S France, and NW Anatolia. Several records from other countries

are insufficiently documented. There are following objective and subjective causes for the disjunct distribution of this species. The present range represents a residual of the former distribution over the warmer and moister postglacial period; landscape modifications and elimination of solitary alder trees as „weeds“ from the 18th up to the mid-20th century in large areas of Europe; species specific and partly unknown habitat preferences and specific population ethology; an insufficient level of faunistic investigations in several parts of southern and eastern Europe.

*Synanthedon mesiaeformis* differs from similar species by whitish yellow antenna distally, eye with white border, deep yellow rings on 2nd and 4th abdominal segments, distinctly broader ring on 4th segment, black anal tuft, and hind tibia orange with black ring distally. The similar species *Synanthedon spheciformis* (Denis & Schiffermüller, 1775) has eye without white border, only very narrow, whitish yellow ring on 2nd abdominal segment, and hind tibia black. *Synanthedon scoliaeformis* (Borkhausen, 1789) has narrow yellow rings on 2nd and 4th segments, rusty anal tuft, and hind tibia only partly yellow.

The larva of *Synanthedon mesiaeformis* develops in somewhat winding, flat tunnels between the bark and the wood in trunks of *Alnus glutinosa* (L.) Gaertn. and pupates in a dense cocoon in the bark. The development is probably biennial. The adults are on wing from the second half of May up to the end of July. The species prefers solitary trees on meadows, in parks, along streams and communications.

## SOUHRN

### *Synanthedon mesiaeformis* (Herrich-Schäffer) nově v České republice a ve Španělsku (Lepidoptera: Sesiidae)

Práce popisuje první nálezy nesytky *Synanthedon mesiaeformis* (Herrich-Schäffer, 1846) v České republice a ve Španělsku. Byla nalezena v jihovýchodní části České republiky, nedaleko města Břeclav v oblasti Soutoku (faunistický čtverec 7267) v květnu 2008. Území představuje poměrně rozsáhlý zbytek lužní krajiny s nadmořskou výškou mezi 148 a 157 m, pokrytý lužním lesem (*Fraxino pannonicae-Ulmetum* and *Salicetum albae*) a mezofilními až hygrofilními loukami s jednotlivými dřevinami. Výletové otvory a kukly *Synanthedon mesiaeformis* byly nalezeny na jediné, soliterně rostoucí, zhruba 20 let staré skupině stromů vzniklé z pařezových výmladků. Naleziště v České republice je vzdálené více než 250 km od míst výskytu v JZ Maďarsku a asi 550 km od lokalit ve východním Polsku. V červnu 2008 byl druh nalezen také na olších rostoucích v plochem říčním aluviu na šterkopiscích mezi městečky La Jonquera a Figueres v severním Katalánsku. Tato lokalita se nachází v těsném kontaktu s jihofrancouzskými nalezišti v okolí měst Perpignan a Beziers.

Druh byl popsán v polovině 19. století z jižního Ruska a zjištěn později postupně v JZ Rumunsku, Hercegovině, JZ Maďarsku, J Finsku, středním Rumunsku, Litvě, Bulharsku, Srbsku, Makedonii, Řecku, J Francii a SZ Anatolii. Několik údajů z dalších zemí není spolehlivě dokumentováno. Existují následující možné, objektivní i subjektivní příčiny ostrůvkovitého rozšíření tohoto druhu. Současný disjunktivní areál je zbytkem někdejšího rozšíření z teplejšího a vlhčího období v postglaciálu; změny krajiny a eliminace soliterních olší jako plevelných dřevin od 18. do poloviny 20. století v řadě oblastí Evropy; druhově specifické a částečně neznámé biotopové nároky a specifická populační etologie; nedostatečná úroveň faunistické prozkoumanosti v některých částech jižní a východní Evropy.

*Synanthedon mesiaeformis* se liší od blízkých druhů bělavě žlutým koncem tykadla, bílým lemlem očí, sytě žlutými kroužky na 2. a 4. článku zadečku, přičemž kroužek na 4. článku je výrazně širší, černým chvostkem a oranžovou zadní holení s černým kroužkem na konci. Podobný druh *Synanthedon spheciformis* (Denis & Schiffermüller, 1775) má oči bez bílého orámování, pouze velmi úzký, bělavě žlutý kroužek na 2. článku zadečku a zadní holeň černou. *Synanthedon scoliaeformis* (Borkhausen, 1789) má úzké žluté kroužky na 2. a 4. článku zadečku, chvostek rezavý a zadní holeň jen částečně žlutou.

Housenka *Synanthedon mesiaeformis* se vyvíjí v poněkud klikatých, plochých chodbách mezi kůrou a dřevem ve kmenech olše lepkavé *Alnus glutinosa* (L.) Gaertn. a kuklí se v pevném kokonu v kůře. Vývoj je patrně dvouletý. Dospělci se objevují od druhé poloviny května do konce července. Druh preferuje soliterní stromy na loukách, v parcích, podle vodotečí a komunikací.

Sesiidae, *Synanthedon mesiaeformis*, Česká republika, Španělsko

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