History of the investigation of the Lithuanian Nepticulidae

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Up to the present day, about forty various papers reporting on species from Lithuania or analysing the Lithuanian Nepticulidae fauna, have been published (Palionis, 1932; Prüffer, 1947; Stanionytė & Zajančkauskas, 1970; Puplesis, 1983, 1984, 1985, 1992, 1994; Puplesis & Ivinskis, 1985; Puplesis et al., 1990; Ivinskis et al, 1985; Ivinskis, 1993, 2004; van Nieukerken, 1996; Diškus & Juchnevič, 2001; Diškus, 2003a, 2003b, 2005; Puplesis & Diškus, 2003, 2004; Anisimovas & Puplesis, 2005; Anisimovas et al, 2006; Anisimov & Stonis, 2008a, 2008b; Diškus & Lendsbergaitė, 2008; Navickaitė & Diškus, 2008; Navickaitė et al., 2010, 2011, 2014; Diškus et al., 2011; Diškus & Stonis, 2012, 2016; Ivinskis et al., 2012; Ivinskis & Rimšaitė, 2013; Navickaitė, 2014; Zeleniūtė, 2015; Skorb et al., 2018, Paulavičiūtė & Inokaitis, 2018; Paulavičiūtė, 2020; Banytė et al., 2020).

Ninety years have passed since the history of the investigation of the Lithuanian Nepticulidae gained momentum. The first to mention Nepticulidae from the Lithuanian fauna was Alfonsas Palionis in his list of Lithuanian moths and butterflies (Palionis, 1932); at that time, however, he could list only one species of pygmy moths, *Stigmella aeneofasciella*. Some time later, Jan Prüffer listed not only *S. aeneofasciella* but also *Etainia sericopeza* occurring in the Vilnius Region (Prüffer, 1947). It is understandable that, at that time, because of unclear taxonomy of Nepticulidae, both these species of pygmy moths were not named as we conceive them today, i.e., the species of the *Stigmella* and *Etainia* genera.

The material of the Lithuanian Nepticulidae has been intensively collected by Povilas Ivinskis (Fig. 2) and Saulius Pakalniškis (the Institute of Zoology and Parasitology, later the Ecology Institute, at present the Nature Research Centre). It was by effort of these enthusiastic researchers that the investigation of the Lithuanian Nepticulidae fauna was initiated and successfully carried on. The first book on mining insects in Lithuania was initiated by Povilas Ivinskis (in co-authorship with Saulius Pakalniškis and Rimantas Puplesis) (Ivinskis et al., 1985). Povilas Ivinskis has also published various co-authored articles (Puplesis & Ivinskis, 1985; Puplesis et al., 1990) as well as a general list of the Lithuanian Lepidoptera, which included species of Nepticulidae (Ivinskis, 1993, 2004).

In 1979–1981, targeted research of the Nepticulidae fauna of Lithuania, as well as of neighbouring countries, was begun by Rimantas Puplesis (Fig. 1), who prepared a graduation thesis in biology in 1981, which received a diploma of distinction at a state (USSR) competition. During his doctoral studies at the Zoology Institute in Saint Petersburg (formerly Leningrad), Puplesis defended a doctoral dissertation in 1985, which reviewed Nepticulidae from eastern Asia and the Baltic States (Puplesis, 1985). Some time later, he defended another dissertation at the Zoology Institute of the Russian Academy of Sciences (Puplesis, 1992) and published a monograph describing and illustrating the Nepticulidae fauna of eastern Europe and Asia (Puplesis, 1994).

The system and diagnostics of pygmy moths was not fully clear until the last decades of the 20th century, and, therefore, not all data published at that time were sufficiently correct. The biggest problem at that time period was that discovery of many species in Lithuania was based on discovered empty (old) mines, which, without the dissection of adults, were not sufficient for reliable species identification. Furthermore, some Nepticulidae species within the Lithuanian fauna were mentioned incorrectly. For example, the southern species *Ectoedemia spinosella* was wrongly attributed to the Lithuanian fauna (Stanionytė & Zajančkauskas, 1970). In fact, the authors deal with the common species, *Prunus*-feeding *Stigmella plagicolella*, which was mistaken for *E. spinosella*. Some species were reported as species of the Lithuanian fauna without any collected material by drawing on their distribution in neighbouring countries. Consequently, the catalogue of the European Nepticulidae (van Nieukerken, 1996) to some extent repeated the same inaccuracy. Above all, works by Erik J. van Nieukerken and his colleagues (notably Johansson et al., 1990; Laštuvka & Laštuvka, 1997) were very helpful for identifying the Nepticulidae species occurring in Lithuania.

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One of the most prominent works on the Lithuanian Nepticulidae published up to date is a monograph investigating the world's (and Lithuania's) Nepticuloidea and Tischerioidea (Puplesis & Diškus, 2003). It was the first to provide a Lithuanian name for Nepticulidae, *mažieji gaubtagalviai*, and *gaubtagalviniai*, for the superfamily Nepticuloidea. A separate section of this monograph devoted to the Lithuanian fauna (Diškus, 2003a), as well as Arūnas Diškus's doctoral dissertation (Diškus, 2005), presented the results from targeted research by the author. Twelve Nepticulidae species were added to the Lithuanian fauna (Diškus, 2003a). Unlike some papers published earlier, this first survey of the Lithuanian Nepticulidae builds upon valuable collection material, which was mostly reared from mining larvae. Since much of Diškus's material was collected in the Klaipėda, Šilutė, Lazdijai, Alytus, and Kaišiadoriai Districts, the survey of the Lithuanian Nepticulidae was substantially supplemented with data from insufficiently investigated regions, including the Curonian Spit, which has been included into the UNESCO World Heritage List. The research by Arūnas Diškus identified many new host plants for Lithuanian pygmy moths and contributed to our knowledge of trophic relationships of the Lithuanian Nepticulidae.

Some time later, under the supervision of Arūnas Diškus (Figs 3, 4, 11) and Jonas Rimantas Stonis (Fig. 13), the investigation of the Lithuanian Nepticulidae was successfully continued by young researchers involved in biology study programs at the Lithuanian University of Educational Sciences: Eugenijus Anisimov, Violeta Juchnevič, Sonata Brusokaitė, Kristina Lensbergaitė, Giedrius Varačinskas, Viktorija Dobrynina (Fig. 6), and others. As a result of this research, several papers dealing with some regions of Lithuania have been published (Anisimovas et al., 2006; Anisimov & Stonis, 2008a, 2008b; Navickaitė & Diškus, 2008; Diškus & Lensbergaitė, 2008).

Worth mentioning is the first chorological analysis of the Lithuanian Nepticulidae drawing on material collected by the doctoral student Asta Navickaitė (Figs 4, 5) under the supervision of Arūnas Diškus and Jonas Rimantas Stonis. During the subsequent research, the survey and review of trophic relationships of the Lithuanian Nepticulidae fauna were supplemented with new analytical data. Standardisation and evaluation of the occurrence of common and rare species from Lithuania was also provided in this book (Diškus & Stonis, 2012). Of major importance to general knowledge of the Lithuanian Nepticulidae has been the doctoral dissertation by Dr. Asta Navickaitė "Taxonomic and chorological analysis, and trophic relationships of Nepticulidae (Insecta, Lepidoptera, Nepticulidae) of the Euronemorial fauna" (Navickaitė, 2014) and her co-authored publications (e.g., Navickaitė et al., 2010, 2011, 2014).

In the same year when the book by Diškus & Stonis (2012) was published, a paper describing a sensational discovery of *Trifurcula lituanica*, a species mining stems of *Silvia pratensis*, appeared in *Zootaxa* (van Nieukerken & Ivinskis, 2012; Ivinskis et al., 2012). This species, occurring in central and south-eastern Europe (which at present is classified as *Glaucolepis lituanica*, not as *Trifurcula lituanica*) was new not only to the Lithuanian fauna but also to science. It is an exceptional species within the Lithuanian fauna considering its unusual geographic distribution and its name.

Shortly after that, a new article appeared reporting a new Nepticulidae species for the Lithuanian fauna, *Stigmella centifoliella*, a species mining leaves of thorn (*Rosa*). It had been collected by Jolanta Rimšaitė (Fig. 8) and reared from mining larvae by Povilas Ivinskis (Fig. 2) (Ivinskis & Rimšaitė, 2013). In the subsequent year, a survey of the most interesting and significant features of the Lithuanian Nepticulidae fauna was reviewed (Navickaitė et al., 2014). The investigation of various, especially insufficiently studied, regions of Lithuania was successfully continued by the biology students from the Lithuanian University of Educational Sciences Jolita Čeputytė (Fig. 12), Eglė Poškaitė, Vilija Zeleniūtė (Fig. 98), Dovilė Aržuolaitytė, Jovita Prakapavičiūtė, Dovilė Čepukoit, Sigita Šutaitė, Rūta Mankutė, Angelina Bobnis, Justina Vertelytė, Inga Banytė, Kristina Riksaitė, Agata Skorb, Gabrielė Bandzevičiūtė, and others. The master thesis by Vilija Zeleniūtė "Trophic relationships and chorological analysis of pygmy moths (Lepidoptera, Nepticulidae) of the Šakiai District" was evaluated as the best student graduation thesis of the year and was published as a separate volume of *Mažoji mokslinė serija* ("Minor Scientific Series") issued by the Lithuanian University of Educational Sciences. This study presented a taxonomic review of pygmy moths occurring in the Šakiai District, which included the results from chorological analysis as well as original data on trophic relationships of pygmy moths from south-western Lithuania. This book dealing with rare and common species of Lithuanian pygmy moths is illustrated with photographs of Nepticulidae mines (Zeleniūtė, 2015).

There were also other articles on Nepticulidae published recently. One of them, by drawing on material collected in Vilnius City in 2014–2016, reports *Stigmella vimineticola*, a new species for the Lithuanian fauna (Diškus & Stonis, 2016). The article states that *S. vimineticola* is often confused with the closely related *S. zelleriella*; however, it differs from the latter and other species of the *S. salicis* group by long and very narrow mines as well as by external characters of adults and the genitalia (Diškus & Stonis, 2016). However, the fact of the discovery of *S. vimineticola* in Lithuania was not approved by colleagues because Erik J. van Nieukerken, an expert of the *S. salicis* group, stated that the morphology of these species was varied and that what had been discovered in Lithuania were atypical specimens of *S. zelleriella* (E. J. van Nieukerken, pers. comm., 2017). Therefore, here we excluded *S. vimineticola* from the list of the

Figures 1–13. Some Lithuanian Nepticulidae researchers. 1 – Rimantas Puplesis (1982; currently, J. R. Stonis, see 12); 2 – Povilas Ivinskis (2012); 3–5 – Arūnas Diškus and Asta Navickaitė (2009–2012); 6 – Viktorija Dobrynina (2021); 7 – Andrius Remeikis (2007); 8 – Jolanta Rimšaitė (2010); 9 – Vilija Zeleniūtė (2014); 10 – Brigita Paulavičiūtė (2008); 11 – Arūnas Diškus (2012); 12 – Jolita Čeputytė (2009); 13 – Jonas Rimantas Stonis

Lithuanian Nepticulidae until additional material will be collected and new data received. Thus, currently the Lithuanian fauna comprises 77 species (not 78).

Another recently published article surveyed 58 species of pygmy moths discovered in the Šalčininkai District in 2015 (Skorb et al., 2018). These species make up about 74% of the Lithuanian fauna and are trophically associated with 13 families of host plants. The authors also reported on 10 host-plant species new to the Lithuanian pygmy moths (Skorb et al., 2018).

The investigation of the Lithuanian Nepticulidae has been continued by the researcher at the Kaunas Tadas Ivanauskas Zoological Museum Brigita Paulavičiūtė (Fig. 19) (Paulavičiūtė & Inokaitis, 2018; Paulavičiūtė, 2020).

Another recent publication prepared by Inga Banytė and co-authors (Banytė et al., 2020) surveyed the species of Nepticulidae from the Kaunas and Kaišiadorys Districts and provided photographs of leaf mines of pygmy moths.

During the entire history of the investigation of the Lithuanian Nepticulidae, two species new to science were included into the list of the fauna of Lithuania. One of them, *Stigmella sakhalinella* Puplesis, which was discovered and described by the Lithuanian researcher Rimantas Puplesis from eastern Asia (Puplesis, 1984). Shortly it became clear that this species was also distributed in Europe and had been identified in Lithuania drawing on discovered leaf mines (Anisimov & Stonis, 2008a, 2008b). Another species new to science, the above-mentioned *Glaucolepis lituanica* (van Nieukerken & Ivinskis), is even more exceptional because its "Lithuanian" holotype and the primary species description is partly based on material from Lithuania (Ivinskis et al., 2012).

The investigation of the Lithuanian Nepticulidae continues, though not so actively as, let us say, in 2003–2012. Recently, J. R. Stonis, Arūnas Diškus, Viktorija Dobrynina, and Peter Buchner presented a tool for the identification of leaf and stem mines and taxa, which would be freely accessible for today's users (Stonis et al., 2022a, 2022b). Together with this guide, J. R. Stonis, Arūnas Diškus (in cooperation with Andrius Remeikis and Akvilė Remeikienė), developed and provided for use the first electronic diagnostic system for mines and species of the Lithuanian Nepticulidae: "The identification of mines on host plants of the Lithuanian Nepticulidae". This identification tool is freely accessible with smart electronic devices (e.g., smart phones): https://leafmines.info. Such an easy-to-use and involving system is a rather innovative product of biotaxonomy and, we hope, will provide users with the means and ability to identify Nepticulidae themselves.

References

Anisimov, E. & Stonis, J.R. (2008a) Čepkeliuose ieškojome sachalininio lapinuko. *Žurnalas apie gamtą*, 3, 32–33.

Anisimov, E. & Stonis, J.R. (2008b) Sachalininio lapinuko – *Stigmella sakhalinella* Pupl. (Insecta, Lepidoptera, Nepticulidae) paieškos Čepkelių gamtiniame rezervate. *Lietuvos biologinė įvairovė: būklė, struktūra, apsauga*, 3, 52–57. http://www.balticamerican.org/files/publications/122__Kosta_Rikos_biologines_ivairoves_faktai_ar_artefaktai_99_106pp.pdf

Anisimovas, E. & Puplesis, R. (2005) Nauji atradimai Čepkelių gamtiniame rezervate. *Žurnalas apie gamtą*, 2, 37–38.

Anisimovas, E., Diškus, A. & Stonis, J.R. (2006) First survey of Nepticulidae (Insecta: Lepidoptera) in Čepkeliai State Nature Reserve, Lithuania. *Acta Zoologica Lituanica*, 16 (3), 221–228. https://doi.org/10.1080/13921657.2006.10512735

Banytė, I., Diškus, A. & Podėnas, S. (2020) Taxonomical list of Nepticulidae (Lepidoptera) new to Kaunas Lagoon Regional Park. *Bulletin of the Lithuanian Entomological Society*, 4 (32), 20–24. https://www.entomologai.lt/leidiniai/category/54-volume-4-32-2020?download=344:bles-vol4-32-p020-024-banyte-etal-nepticulidae

Diškus, A. (2003a) Revised fauna of the Nepticulidae of Lithuania. *In:* Puplesis, R. & Diškus, A. (Eds.), *The Nepticuloidea & Tischerioidea (Lepidoptera) – a global review, with strategic regional revisions*. Lututė Publishers, Kaunas, pp. 290–317. [in Lithuanian]

Diškus, A. (2003b) Revizuota Lietuvos Nepticulidae (Lepidoptera) fauna. *Lietuvos biologinė įvairovė (būklė, struktūra, apsauga)*. Lututė Publishers, Vilnius, pp. 23–24. https://hdl.handle.net/20.500.12512/5964

Diškus, A. (2005) *The Nepticuloidea & Tischerioidea: strategic regional revisions with a global review (Insecta: Lepidoptera)*. Summary of doctoral dissertation Biomedical Sciences, Zoology (05B). VPU leidykla, Vilnius, 52 pp.

Diškus, A. & Juchnevič, V. (2001) Nepticulidae (Lepidoptera) minavimo laikas Lietuvoje. VPU Gamtos mokslų fakulteto bakalaurų ir magistrantų mokslinės konferencijos pranešimų medžiaga. Vilnius, pp. 125–128.

Diškus, A. & Lensbergaitė, K. (2008) Pirmieji duomenys apie Akmenės rajono mažųjų gaubtagalvių (Lepidoptera, Nepticulidae) fauną ir įvairovę. *Lietuvos biologinė įvairovė: būklė, struktūra, apsauga*, 3, 65–70. http://www.balticamerican.org/files/publications/122__Kosta_Rikos_biologines_ivairoves_faktai_ar_artefaktai_99_106pp.pdf

Diškus, A. & Stonis, J.R. (2012) *Leaf-mining insects of Lithuania. The Nepticulidae (Lepidoptera): taxonomy, chorological composition and trophic relationships. Monograph.* Lututė Publishers, Kaunas, 220 pp. [in Lithuanian]

Diškus, A. & Stonis, J.R. (2016) *Stigmella vimineticola* (Lepidoptera, Nepticulidae), a new addition to the Lithuanian fauna. *New and Rare for Lithuania Insect Species*, 28, 42–46. https://www.entomologai.lt/leidiniai/category/49-volume-28-2016?download=270:vol28p042-46-diskus-stonis-new-stigmella-vimineticola

Diškus, A., Navickaitė, A. & Stonis, J.R. (2011) New records of four rare species of Nepticulidae (Lepidoptera) discovered in western Lithuania. *New and Rare for Lithuania Insect Species. Records and descriptions*, 23, 57–60. https://www.entomologai.lt/leidiniai/category/29-volume-23-2011?download=130:vol-23-p-057-060-diskus-a-navickaite-a-stonis-j-r

Diškus, A., Navickaitė, A. & Stonis, J.R. (2012a) Taksonominė Lietuvos Nepticulidae sudėtis ir papildytas faunos sąvadas. *In*: Diškus, A. & Stonis, J.R. (Eds.), *Leaf-mining insects of Lithuania. The Nepticulidae (Lepidoptera): taxonomy, chorological composition and trophic relationships*. Monograph. Lututė Publishers, Kaunas, pp. 73–100. [in Lithuanian]

Diškus, A., Navickaitė, A. & Stonis, J.R. (2012b) Nepticulidae rūšių apibūdinimas pagal gyvybinės veiklos pėdsakus – minas. *In*: Diškus, A. & Stonis, J.R. (Eds.), *Leaf-mining insects of Lithuania. The Nepticulidae (Lepidoptera): taxonomy, chorological composition and trophic relationships*. Monograph. Lututė Publishers, Kaunas, pp. 127–167. [in Lithuanian]

Ivinskis, P. (1993) *Check-list of Lithuanian Lepidoptera*. Institute of Ecology Publishers, Vilnius, 210 pp. [in Lithuanian]

Ivinskis, P. (2004) *Lepidoptera of Lithuania*. *Annotated catalogue*. Institute of Ecology of Vilnius University Publishers, Vilnius, 380 pp.

Ivinskis, P., Nieukerken, E.J. van & Rimšaite, J. (2012) *Trifurcula* (*Glaucolepis*) *lituanica* sp. nov., an unexpected new stem-miner on *Salvia pratensis* occuring in eastern Europe (Lepidoptera: Nepticulidae). *Zootaxa*, 3570 (1), 41–55. https://doi.org/10.11646/zootaxa.3570.1.3

Ivinskis, P., Pakalniškis, S. & Puplesis, R. (1985) *Augalus minuojantys vabzdžiai.* Mokslas, Vilnius, 240 pp. [in Lithuanian]

Ivinskis, P. & Rimšaitė, J. (2013) Data on new and rare Lepidoptera species for Lithuanian fauna. *New and Rare for Lithuania Insect Species. Records and descriptions*, 25, 31–36. https://www.entomologai.lt/leidiniai/category/31-new-and-rare-for-lithuania-insect-species-volume-25-2013?download=214:vol25p031-036-ivinskis-rimsaite-lepidoptera

Johansson, R., Nielsen, E.S., Nieukerken, E.J. van & Gustafsson, B. (1990) The Nepticulidae and Opostegidae (Lepidoptera) of North West Europe. *Fauna Entomologica Scandinavica*, 23 (1/2), 1–739.

Laštuvka, A. & Laštuvka, Z. (1997) Nepticulidae Mitteleuropas. Ein illustrierter Begleiter (Lepidoptera). Konvoj Publishers, Brno, 230 pp.

Navickaitė, A. (2014) *Euronemoralinės faunos mažųjų gaubtagalvių (Insecta, Lepidoptera, Nepticulidae) taksonominė ir chorologinė analizė bei trofiniai ryšiai:* Daktaro disertacija. Lietuvos edukologijos universiteto leidykla, Vilnius, 326 pp. [in Lithuanian]

Navickaitė, A. & Diškus, A. (2008) Nepticulidae (Lepidoptera) of Vilkaviškis district (Lithuania): fauna and trophic relationships. *Lietuvos biologinė įvairovė: būklė, struktūra, apsauga*, 3, 79–85. [in Lithuanian] http://www.balticamerican.org/files/publications/122__Kosta_Rikos_biologines_ivairoves_faktai_ar_artefaktai_99_106pp.pdf

Navickaitė, A., Diškus, A. & Stonis, J.R. (2010) First survey of Nepticulidae (Insecta: Lepidoptera) of the Curonian Spit (Baltic Coast of Lithuania). *V International Conference of Young Naturalists "From Biotechnology to Environment Protection"*. University of Zielona Góra Publishers, Zielona Góra, p. 31.

Navickaitė, A., Diškus, A. & Stonis, J.R. (2011) Review of Nepticulidae (Insecta: Lepidoptera) occurring in the Curonian Spit (Baltic Coast of Lithuania). *Acta Zoologica Lituanica*, 21 (3), 221–231. https://doi.org/10.2478/v10043-011-0023-1

Navickaitė, A., Diškus, A. & Stonis, J.R. (2014) What is new and most interesting about the Nepticulidae of

the Crimea and Lithuania. *In*: Stonis, J.R., Hill, S.R., Diškus, A. & Auškalnis, T. (Eds.), *Selected abstracts and papers of the First Baltic International Conference on Field Entomology and Faunistics*. Edukologija Publishers, Vilnius, pp. 96–117.

Navickaitė, A. & Stonis, J.R. (2012) Chorologinis Lietuvos Nepticulidae faunos įvertinimas. *In*: Diškus, A. & Stonis, J.R. (Eds.), *Leaf-mining insects of Lithuania. The Nepticulidae (Lepidoptera): taxonomy, chorological composition and trophic relationships*. Monograph. Lututė Publishers, Kaunas, pp. 101–111. [in Lithuanian]

Nieukerken, E.J. van (1996) Nepticulidae. *In*: Karsholt, O. & Razowski, J. (Eds.), *The Lepidoptera of Europe. A Distributional Checklist*. Apollo Books, Stenstrup, pp. 21–27.

Palionis, A. (1932) *Įdėlis Lietuvos drugių faunai pažinti*. Kaunas, 187 pp.

Paulavičiūtė, B. (2020) Rare and very rare for Lithuanian fauna species of moth (Lepidoptera). *Bulletin of the Lithuanian Entomological Society*, 4 (32), 46–53. https://www.entomologai.lt/leidiniai/category/54-volume-4-32-2020?download=347:bles-vol4-32-p046-053-paulaviciute-lepidoptera

Paulavičiūtė, B. & Inokaitis, V (2018) New data on 63 rare moth (Lepidoptera) species for the Lithuanian fauna. *Bulletin of the Lithuanian Entomological Society*, 2 (30), 47–54. https://www.entomologai.lt/leidiniai/category/52-volume-2-30-2018?download=310:bles-vol2-30-p047-54-paulaviciute-inokaitis-lepidoptera

Prüffer, J. (1947) *Studia nad motylami Wileńszczyzny*. Wydano z zasiłku Wydziału nauki Ministerstwa Oświaty, Torun, 488 pp.

Puplesis, R.K. (1983) 17 species of nepticulids (Lepidoptera, Nepticulidae, new to the Lithuanian SSR, found in 1980–1981. *In*: Jonaitis, V. (Ed.), *New and Rare for the Lithuanian SSR Insect Species. Reports and descriptions of 1983.* Vilnius, pp. 35–41. [in Russian]

Puplesis, R.K. (1984) A contribution to the knowledge of the *Stigmella* Schrank genus (Lepidoptera, Nepticulidae) from nepticulid moths of the Lithuanian SSR. *Acta entomologica Lituanica*, 7, 72–85. [in Russian]

Puplesis, R.K. (1985) *Moli-malyutki* (*Lepidoptera, Nepticulidae*) *Pribaltiki i Dal'nego Vostoka*. Avtoreferat. Ordena Trudovogo Krasnogo Znameni Zoologicheskii Institut AN SSSR, Leningrad, 23 pp. [in Russian]

Puplesis, R.K. (1992) *Sistema i evolyutsiya neptikulid* (*Nepticulidae*) *s obzorom miniruyushchego obraza zhizni gusenits v otryade Lepidoptera*. Avtoreferat. Zoologicheskii Institut Rossiiskoi Akademii Nauk, Sankt-Peterburg, 45 pp. [in Rusian]

Puplesis, R. (1994) *The Nepticulidae of Eastern Europe and Asia: western, central and eastern parts*. Backhuys Publishers, Leiden, 552 pp., figs 840.

Puplesis, R. & Diškus, A. (2003) *The Nepticuloidea & Tischerioidea (Lepidoptera) – a global review, with strategic regional revisions*. Lututė Publishers, Kaunas. 512 pp., figs 612.

Puplesis, R. & Diškus, A. (2004) Ar Lietuvoje gyvena mažieji gaubtagalviai? *Žurnalas apie gamtą*, 6, 26–29.

Puplesis, R. & Ivinskis, P.P. (1985) Review of nepticulid moths fauna of the *Obrussa* Braun genus in the USSR and a description of 4 new species—*Obrussa capesella* sp. n., *O. tigrinella* sp. n., *O. peterseni* sp. n., *O. sabina* sp. n. *Lietuvos TSR Mokslų Akademijos darbai (C)*, 4 (92), 36–46. [in Russian]

Puplesis, R.K., Ivinskis, P.P. & Pakalniškis, S.A. (1990) 6 species of nepticulid moths (Lepidoptera, Nepticulidae) new to Lithuania, found in 1972–1987. *In*: Jonaitis, V. (Ed.), *New and Rare for Lithuania Insect Species. Records and descriptions of 1990*. Vilnius, pp. 14–18.

Skorb, A., Diškus, A. & Stonis, J.R. (2018) A taxonomic list of Nepticulidae (Lepidoptera) recorded in the Šalčininkai District, A hitherto largely unstudied area in aoutheastern Lithuania. *Bulletin of The Lithuanian Entomology Society*, 2 (30), 66–70. https://www.entomologai.lt/leidiniai/category/52-volume-2-30-2018?download=312:bles-vol2-30-p060-77-skorb-etal-nepticulidae

Sruoga, V., Stonis, J.R. & Auksoriūtė, A. (2012) Svarbesnių su endobiotiniais vabzdžiais susijusių terminų aiškinimai. *In*: Diškus, A. & Stonis, J.R. (Eds.), *Leaf-mining insects of Lithuania. The Nepticulidae (Lepidoptera): taxonomy, chorological composition and trophic relationships*. Monograph. Lututė Publishers, Kaunas, pp. 168–174. [in Lithuanian]

Stanionytė, A. & Zajančkauskas, P. (1970) Lietuvos slyvų entomofauna ir jos gausumas. *Acta Entomologica Lituanica*, 1, 73–81.

Stonis, J.R., Diškus, A. & Dobrynina, V. (2022a) What are the most typical leaf mines of Nepticulidae? Identified diagnostic characters and their detection frequency. *Biologija*, 68 (1), 1–13.

Stonis, J.R., Diškus, A., Dobrynina, V., Remeikis, A. & Buchner, P. (2022b). *Vadovas Lietuvos mažųjų gaubtagalvių minoms pažinti (su nuoroda į elektroninę minų diagnostinę priemonę)* [in Lithuanian]. Vilnius, Gamtos tyrimų centras, 122 p. https://doi.org/10.35513/2022.Nepticulidae

Stonis, J.R., Diškus, A., Remeikis, A. & Solis, M.A. (2018) The American *Brachinepticula* gen. nov. and *Manoneura* Davis (Nepticulidae): a new generic concept based on a reinforced cathrema in the phallus. *Biologija*, 64 (2), 99–128. https://doi.org/10.6001/biologija.v64i2.3735

Stonis, J.R., Navickaitė, A. & Diškus, A. (2012) Lietuvos mažųjų gaubtagalvių rūšių aptinkamumo grupės. *In*: Diškus, A. & Stonis, J.R. (*Eds.*), *Leaf-mining insects of Lithuania. The Nepticulidae (Lepidoptera): taxonomy, chorological composition and trophic relationships. Monograph.* Lututė Publishers, Kaunas, pp. 168–174. [in Lithuanian]

Stonis, J.R., Remeikis, A., Diškus, A., Baryshnikova, S. & Solis, M.A. (2021) What are the smallest moths (Lepidoptera) in the world? *Zootaxa*, 4942 (2), 269–289. https://doi.org/10.11646/zootaxa.4942.2.8

Zeleniūtė, V. (2015) *Šakių rajono mažųjų gaubtagalvių (Lepidoptera, Nepticulidae) fauna. Mokslo studija.* Lietuvos edukologijos universiteto leidykla, Vilnius, 100 pp.