

**RECENT EXPANSION OF *PHANEROPTERA FALCATA* IN LITHUANIA  
(ORTHOPTERA: PHANEROPTERIDAE)**

EDUARDAS BUDRYS<sup>1,2,4</sup>, VITALIJUS BAČIANSKAS<sup>4</sup>, ANNA BUDRIENĖ<sup>1,4</sup>, ROMAS FERENCA<sup>3,4</sup>, BERND GLIWA<sup>4</sup>, TOMAS ŪSAITIS<sup>4</sup>

<sup>1</sup> Nature Research Centre, Akademijos 2, LT-08412 Vilnius, Lithuania. E-mail: ebudrys@ekoi.lt.

<sup>2</sup> Vilnius University, M.K.Čiurlionio 21/27, LT-03101 Vilnius, Lithuania.

<sup>3</sup> Kaunas T. Ivanauskas Zoological Museum, Laisvės al. 106, LT-44253 Kaunas, Lithuania.

<sup>4</sup> Lithuanian Entomological Society, Akademijos 2, LT-08412 Vilnius, Lithuania.

**Introduction**

Sickle-bearing bush-cricket *Phaneroptera falcata* (Poda, 1761) has a transpalearctic distribution and is considered as a Euro – Siberian forest-steppe species. Before 2000, the nearest to Lithuania known populations of it were in the Central Poland, Nizina Mazowiecka and Podlasie (Bazyluk & Liana, 2000). An expansion of the distribution area of the species was observed in the Central Europe (Kočárek *et al.*, 2008). During the years 2006 – 2015, it has reached the South of England and seems to have established permanent populations there (Beckmann & Sutton, 2015).

In 2008, *P. falcata* was found in the southern Lithuania, 2 km SE of Seirijai, for the first time (Ivinskis & Rimšaitė, 2008). In 2010, it was also recorded in the north-eastern Poland, close to Sejny; the record site was approximately 45 km from the record in Lithuania (Böhme *et al.*, 2011). In 2011, several specimens of the species were observed and collected in the south-eastern Latvia (Sokolovskis & Suveizda, 2012). In 2012, *P. falcata* was repeatedly recorded in Lithuania (Budrys & Budrienė, 2012), implying that permanent populations of the species have established here.

Aiming to summarise the available records and to clarify the current distribution of this southern species in the country, Lithuanian Entomological Society announced *P. falcata* as "The Insect of the Year 2015". The action intended to involve amateurs and volunteers interested in nature observation in the collection of new data on the occurrence of this bush-cricket species in Lithuania.

This publication summarises the available records of *P. falcata* in Lithuania.

**Material and Methods**

Most of the collected distribution data are based on the digital pictures with exact GPS- or orthophotomap-based coordinates. A part of the material was collected by Vilnius University students at their invertebrate zoology field practice. The authorship of the records in the observation list is as follows: V. Bačianskas (V.B.), A. Budrienė (A.B.), E. Budrys (E.B.), M. Čepulis (M.Č.), R. Ereminas (R.E.), R. Ferencas (R.F.), B. Gliwa (B.G.), M. Ilčiukas (M.I.), P. Kavaliauskas (P.K.), A. Našlėnienė (A.N.), V. Paznekaitė (V.P.), Ž. Putys (Ž.P.), D. Račkauskaitė (D.R.), M. Ružauskas (M.R.), D. Sabaitė, K. Svidlerytė & E. Žigis (D.S., K.S. & E.Ž.), G. Steiblys (G.S.), T. Ūsaitis (T.Ū.), R. Vakarė (R.V.), D. Venckus (D.V.), O. Venckus (O.V.), E. Vincevičiūtė (E.V.).

## List of localities

Braziūkai,	Kaunas distr.,	54°54'08"N, 23°29'00"E (54.90211, 23.48328)
Buivyčiai, 0.75 km W,	Vilnius distr.,	54°49'24"N, 24°56'41"E (54.82322, 24.94483)
Eičiai,	Tauragė distr.,	55°10'00"N, 22°28'40"E (55.16667, 22.47778)
Eivorų miškas f.,	Alytus distr.,	54°18'22"N, 24°05'53"E (54.30611, 24.09806)
Gailiūnai,	Vilnius distr.,	54°44'25"N, 25°26'49"E (54.74028, 25.44706)
Gaižiūnai, 3.3 km S,	Jonava distr.,	55°00'32"N, 24°20'24"E (55.00900, 24.34014)
Gerdašiai,	Druskininkai mun.,	53°56'40"N, 23°52'50"E (53.94444, 23.88056)
Joniškis, 1.3 km W,	Zarasai distr.,	55°33'23"N, 25°59'52"E (55.55639, 25.99778)
Karčiupis env.,	Kaunas distr.,	54°54'44"N, 24°05'52"E (54.91228, 24.09775)
Kernavė,	Širvintos distr.,	54°53'00"N, 24°50'08"E (54.88339, 24.83564)
Kiemeliai,	Vilnius distr.,	54°51'04"N, 25°00'10"E (54.85111, 25.00275)
Lapės,	Kaunas distr.,	54°59'03"N, 24°00'06"E (54.98419, 24.00158)
Maksimai,	Varėna distr.,	54°07'02"N, 24°08'14"E (54.11722, 24.13711)
Meškerinė (1),	Švenčionys distr.,	55°02'58"N, 25°51'24"E (55.04944, 25.85669)
Meškerinė (2),	Švenčionys distr.,	55°03'32"N, 25°51'40"E (55.05897, 25.86103)
Neveronys env.,	Kaunas distr.,	54°55'34"N, 24°07'10"E (54.92597, 24.11944)
Pagavė	Ignalina distr.,	55°19'19"N, 26°07'19"E (55.32206, 26.12186)
Paluobiai (1),	Šakiai distr.,	55°02'01"N, 23°26'21"E (55.03347, 23.43914)
Paluobiai (2),	Šakiai distr.,	55°01'52"N, 23°26'37"E (55.03117, 23.44353)
Pavyžupys,	Kalvarija mun.,	54°23'11"N, 23°06'13"E (54.38633, 23.10361)
Pilaitė,	Vilnius city,	54°42'40"N, 25°11'07"E (54.71111, 25.18528)
Pravieniškių miškas f.,	Kaišiadorys distr.,	54°56'58"N, 24°12'16"E (54.94953, 24.20447)
Puvočiai	Varėna distr.,	54°06'50"N, 24°18'18"E (54.11397, 24.30486)
Puvočiai, 1.4 km S,	Varėna distr.,	54°06'09"N, 24°18'27"E (54.10250, 24.30750)
Rūdninkai military training area,	Šalčininkai distr.,	54°22'58"N, 25°06'39"E (54.38286, 25.11078)
Suktiškės,	Vilnius distr.,	54°47'34"N, 25°33'09"E (54.79275, 25.55242)
Šakiai,	Molėtai distr.,	55°21'14"N, 25°34'20"E (55.35389, 25.57222)
Šilutė,	Šilutė distr.,	55°20'17"N, 21°29'21"E (55.33814, 21.48908)
Šukėtai (1),	Šakiai distr.,	55°01'32"N, 23°26'18"E (55.02567, 23.43819)
Šukėtai (2),	Šakiai distr.,	55°01'29"N, 23°26'13"E (55.02481, 23.43689)
Tarvydžiai	Šiauliai distr.,	56°03'48"N, 22°45'11"E (56.06344, 22.75306)
Tendžiogala, 0.8 km S	Raseiniai distr.,	55°29'12"N, 23°30'30"E (55.48678, 23.50842)
Tendžiogala, 1 km SE	Raseiniai distr.,	55°29'18"N, 23°30'53"E (55.48819, 23.51461)
Tervydoniai,	Šakiai distr.,	55°01'39"N, 23°26'44"E (55.02744, 23.44564)
Vaidučiai,	Kaišiadorys distr.,	55°00'55"N, 24°27'20"E (55.01528, 24.45556)
Vaiguvos miškas f.	Kaišiadorys distr.,	54°46'48"N, 24°12'31"E (54.78000, 24.20872)
Vaišvydava (1),	Kaunas distr.,	54°51'13"N, 24°01'21"E (54.85364, 24.02256)
Vaišvydava (2),	Kaunas distr.,	54°51'15"N, 24°01'40"E (54.85408, 24.02769)
Vaišvydava (3),	Kaunas distr.,	54°51'15"N, 24°01'45"E (54.85425, 24.02906)
Verkiai	Vilnius city,	54°45'17"N, 25°18'04"E (54.75472, 25.30100)
Vilijampolė,	Kaunas city,	54°54'09"N, 23°52'16"E (54.90239, 23.87117)
Visoriai	Vilnius city,	54°45'11"N, 25°15'47"E (54.75306, 25.26306)
Zapyškis,	Kaunas distr.,	54°55'43"N, 23°39'12"E (54.92847, 23.65333)

## List of species

***Phaneroptera falcata* (Poda, 1761)**

Braziūkai, 27 08 2012, 1♂ (G.S.); Buivydai, 0.75 km W, 25 07 2015, 1♂ (A.N.); Eičiai, 29 08 2015, 1 spec. (R.V.); Einorų Miškas f., 12 09 2014, 1♀1♂ (E.B.); Gailiūnai, 04 09 2015, 1♀ (M.Č.); Gaižiūnai, 3.3 km S, 11 08 2015, 1 spec. (V.B.); Gerdašiai, 03 08 2010, 1♀ (R.F.); Joniškis, 1.3 km W, 11 09 2015, 1♀ (M.I.); Karčiupis env., 02 08 2015, 2 spec. (V.B.); Kernavė, 25 08 2015, ~30 spec. (T.Ū.); Kiemeliai, 0.5 km S, 06 09 2014, 1♂, 22 08 2015, 4 spec. (A.N.); Lapės, 11 08 2015, 1 spec. (T.Ū.); Maksimai, 01 09 2015, 3 spec. (T.Ū.); Meškerinė (1), 15 09 2015, 1 spec. (T.Ū.); Meškerinė (2), 30 08 2015, 1 spec. (T.Ū.); Neveronys env., 15 08 2015, 5 spec. (M.R.); Pagavė, 15 07 2015, 1♀, 19 09 2015, 1♂ (A.N.); Paluobiai (2), 02 09 2015, 1 spec. (R.F.); Paluobiai (1), 04 08 2013, 2♀3♂ (R.F.); Pavyžupys, 15 06 2015, ~10 spec. (R.F.); Pilaitė, 27 07 2014, 1♀ (A.B.); Puvočiai, 02 08 2013, 1♂ (E.V.), 08 08 2013, 4♀ (D.S., K.S. & E.Ž.), 03 08 2015, 1♀1♂ (E.B.); Puvočiai, 1.4 km S, 02 07 2013, 1♂ (P.K.); Pravieniškių miškas f., 31 08 2015, 1 spec. (V.B.); Rūdninkai military area, 06 08 2015, 1 spec. (T.Ū.); Suktiškės, 12 08 2012, 1♀ (Ž.P.); Šakiai, Molėtai distr., 11 08 2014, 1 spec. (R.E.); Šilutė, 26 07 2015, 1♂ (O.V.); Šukėtai (1), 21 08 2015, 4♀4♂ (R.F.); Šukėtai (2), 23 08 2015, 1 spec. (R.F.); Tarvydžiai, 29 08 2015, 2 spec. (D.R.); Tendžiogala, 0.8 km S, 20 09 2015, 2 spec. (B.G.); Tendžiogala, 1 km SE, 20 09 2015, 2 spec. (B.G.); Tervydoniai (1), 11 08 2014, 1♀ (R.F.); Vaidučiai, 14 08 2015, ~50 spec. (V.P.); Vaiguvos miškas f., 28 08 2013, 1 spec. (R.F.); Vaišvydava (1), 19 09 2015, 1♀1♂ (V.P.); Vaišvydava (2), 19 09 2015, 1♀1♂ (V.P.); Vaišvydava (3), 19 09 2015, 1♀1♂ (V.P.); Verkiai, 25 08 2015, 2 spec. (D.V.); Vilijampolė, 15 08 2015, 5 spec. (M.R.); Visoriai, 17 08 2015, 1♀ (A.B.); Zapyškis, 21 08 2015, 1 spec. (V.P.).

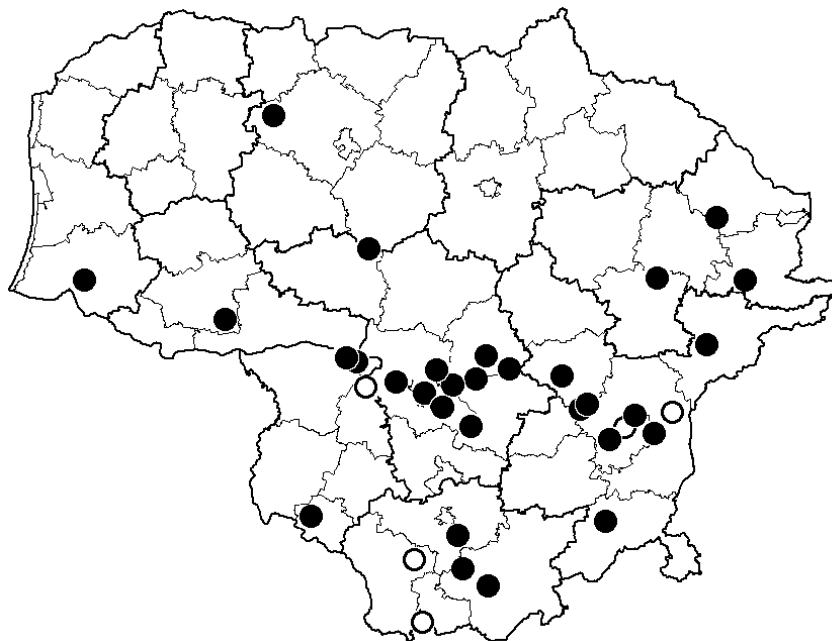


Figure 1. Expansion of *Phaneroptera falcata* in Lithuania in 2008-2015. Open circles: records of 2008-2012; solid circles: records of 2013-2015.

## Discussion

*P. falcata* was observed in the southern Lithuania in 2008; in 2011, the species was recorded in the south-eastern Latvia, 300 km to North-East from the first Lithuanian record, meaning that the species was spreading approximately 100 km per year. Apparently, immediately after the first wave of range expansion the distribution of the species remained fragmented and local: we know only 5 records of the species before 2013. However, afterwards the populations of *P. falcata* were growing and spreading rather fast. E.g. in Puvočiai, a site with high and regular insect collecting efforts due to the presence of Vilnius University field station, there were no records until 2012; the species was recorded for the first time in 2013; it was abundant in all suitable habitats in 2015. The results of the survey of 2015 revealed that *P. falcata* became one of common and abundant orthopteran species in all suitable habitats of the southern, eastern and central Lithuania; it presumably remained scarce or lacking in most parts of northern and western Lithuania (Fig. 1).

Despite of fast expansion and occupation of wide range of habitats, *P. falcata* cannot be considered as an invasive species in the Lithuanian fauna, because it is native to Europe and naturally spreading, possibly along with climate warming. The species is not harmful to the humans; its effects on the natural ecosystems where it was lacking earlier need to be explored.

## Acknowledgements

The authors are grateful to all amateur entomologists, nature photographers and other volunteers who have participated in the action of the Lithuanian entomological society "The Insect of the Year 2015". A part of this study was carried out using the Open Access to research infrastructure of the Nature Research Centre under Lithuanian open access network initiative.

## References

- Bazyluk W., Liana A. 2000. *Prostoskrzydłe. Orthoptera. Katalog fauny Polski XVII, 2*. Warszawa: Muzeum i Instytut zoologii PAN.
- Beckmann B., Sutton P. 2015. Tree Cricket and Sickle-bearing Bush-cricket – here to stay? *Grasshoppers and related species Recording Scheme of Britain and Ireland* 32: 8–10.
- Böhme W., Geissler, P., Wagner P. 2011. A remarkable record of *Phaneroptera falcata* (Poda, 1761) (Saltatoria: Phaneropteridae) from north-eastern Poland. *Bonn zoological Bulletin* 60 (1): 109–111.
- Budrys E., Budrienė A. 2012. New records of three rare Orthoptera species from Lithuania. *New and rare for Lithuania insect species* 24: 49–51.
- Budrys E., Pakalniškis S. 2007. Orthoptera of Lithuania. *Acta Zoologica Lituonica* 17 (2): 105–115.
- GBIF backbone taxonomy. 2015. *Phaneroptera falcata* (Poda, 1761). Available from <http://www.gbif.org/species/1686243#>. Accessed 05 11 2015.
- Ivinskis P., Rimšaitė J. 2008. *Phaneroptera falcata* (Poda, 1761) (Orthoptera, Phaneropteridae) in Lithuania. *Acta Zoologica Lituonica* 18 (4): 270–272.

Kočárek P., Holuša J., Vlk R., Marhoul P., Zuna-Kratky T. 2008. Recent expansions of the bush-crickets *Phaneroptera falcata* and *Phaneroptera nana* (Orthoptera: Tettigoniidae) in the Czech Republic. *Articulata* 23(1): 67–75.

Lietuvos entomologų draugija. 2015 metų vabzdys - lakštasparnis pjūklis *Phaneroptera falcata*. (in Lithuanian) Available from <http://www.entomologai.lt/akcija-metu-vabzdys/2015-metu-vabzdys-lakstasparnis-pjuklius-phaneroptera-falcata>. Accessed 05 11 2015.

Sokolovskis K., Suveizda J. 2012. First record of *Phaneroptera falcata* (Poda, 1761) (Orthoptera, Phaneropteridae) in Latvia. *Latvijas Entomologs* 51: 155–157.

### **Lakštasparnio pjūklio (*Phaneroptera falcata*) išplitimas Lietuvoje (Orthoptera: Phaneropteridae)**

*E. BUDRYS, V. BAČIANSKAS, A. BUDRIENĖ, R. FERENCA, B. GLIWA, T. ŪSAITIS*

#### **Santrauka**

Straipsnyje apibendrinami Lietuvos entomologų draugijos akcijos "Metų vabzdys - lakštasparnis pjūklis" rezultatai. Ši žiogų rūšis pirmą kartą pietinėje Lietuvoje, netoli Seirijų, aptikta 2008 metais; 2011 metais ji buvo aptikta Latvijoje, Daugpilio apylinkėse, už 300 km į šiaurės rytus nuo pirmosios radvietės Lietuvoje, tad jos arealas plėtėsi apytikriai 100 km per metus. 2012 m. lakštasparnis pjūklis Lietuvoje stebėtas dar 4 vietovėse, o 2013-2015 m. jis jau žinomas beveik keturiasdešimtyje vietovių, daugiausia pietinėje, vidurio ir rytinėje Lietuvoje, daugumoje stebėjimo vietų jis tinkamose buveinėse gausus. Nepaisant greito išplitimo ir pasiekto didelio gausumo lakštasparnis pjūklis nėra invazinė rūšis Lietuvoje, nes tai Europos faunos rūšis, šiltėjant klimatui plintanti natūraliu keliu. Šis žiogas nekenksmingas žmogui; jo poveikis natūralioms ekosistemoms, kuriose anksčiau šios rūšies nebuvo, turėtų būti toliau tiriamas.

*Received: 20 October, 2015*