

Recent expansion of bush-cricket *Phaneroptera falcata* (Orthoptera: Tettigoniidae) in northern Moravia and Silesia (Czech Republic)

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Abstract: In the Czech Republic, *Phaneroptera falcata* was known to be widespread only in southern and central Moravia till 2000. During the last 5 years we have observed quick expansion to the northern Moravia and Silesia (Moravian-Silesian district) and recently we have recorded many occurrences in 10 squares (Central European grid mapping) there. Based on the sequence of findings, we suppose consecutive spreading through Moravian Gate. Climatic changes associated with warming of the weather in last decades is the probably reason of the expansion. As this species requires tall herb vegetation, the spreading could be escalated by the local ruderalization of abandoned fields, meadows and pastures associated with declining of large-scale farming after 1989.

Keywords: *Phaneroptera falcata*, distribution, expansion, hypsometric distribution, Moravia, Silesia, Czech Republic

Phaneroptera falcata (Poda, 1761) is a long-winged thermophilous bush cricket which is able to colonise new sites quickly (Nagy 1992). This species occupies a wide variety of open habitats, from xerothermic (esp. forest steppes) to wetlands (esp. lowland meadows and floodplain forest edges) including ruderal habitats; but it demands tall herb or lower shrubby vegetation everywhere.

P. falcata is a Euro-Siberian species, distributed from France and Belgium to Japan (Kočárek et al. 2005). In the Czech Republic, this species is historically widespread within southern and central Moravia, which is documented by many published records (survey see Chládek 1993). Only single specimen in Horní Radíkov (6857) has been published from Bohemia (Čejchan 1981). From northern part of Moravia and Silesia (Moravian-Silesian district) the only occasional occurrence of single specimen has been found in Háj ve Slezsku (6074) (Dobšík & Chládek 1975). Both records have not been verified during last 30 years.

The expansion of *P. falcata* to the north has been noticed in some other countries of Western Europe (e.g. Germany, Belgium) (Decler et al. 2000, Kleukers et al. 1996, Landeck et al. 2005). In the Czech Republic we have been observing expansion to the north in northern Moravia and Silesia for last 10 years. The data about the spreading are published in this contribution.

Material and methods

Material of *Phaneroptera falcata* presented in this contribution is based mainly on authors collecting activity in the period 1995-2005. All material is deposited in own authors collections. Unpublished data preserved in collection of O. Ginther in Museum of Zlín, Czech Republic have been processed. Hypsometrical data were obtained from all known records summarized by Chládek (1993) to 1993 and Kočárek (1998), Kočárek & Němečková (2000), Vlk et al. (2002), Holuša (2003) and Kočárek (2003) and from new unpublished records presented in this contribution.

All data are also included into the following analysis of expansion.

Data are arranged as follow:

Kravaře¹-Zábřežské louky² (6074)³, 240⁴, 16.8.2004⁵, 1/0⁶, coll. PK⁷;

- 1) village
- 2) specification of locality

- 3) the grid mapping square code used for faunistic research in the Czech Republic (Pruner & Míka 1996)
- 4) altitude in m a.s.l
- 5) date of collection
- 6) number of males and females collected
- 7) leg., det. et coll.

Abbreviations: PK – Petr Kočárek, JH – Jaroslav Holuša, OG – Ondřej Ginter, MZM – Museum of Southern-eastern Moravia in Zlín; p.a. – protected area

Results and discussion

Published faunistic data:

Faunistic records published till 1990 were summarised by Chládek (1993). Later, only several records from already known areas as Natural park Podují (Holuša 2003: Popice (7162), Lukov, Hnanice, Čížov, Zadní Hamry (7161)) and Budkovice (6964) (Vlk et al. 2002) were published but even other localities are known and are placed more northerly (Střeň (6368) (Kočárek 1998), Kunín (6373), Bartošovice-Hukovice (6374), Bartošovice na Moravě (6374) (Kočárek & Němečková 2000, Kočárek 2003).

Unpublished faunistic data:

Čejč (7067), 183, 16.8.1947, 2/4, 28.7.1970, 1/0; Dolní Dunajovice (7165), 183, 4.9.1961, 0/1; Kloboučky, p.a. Baračka (6868), 12.8.1957, 2/0; Skalka u Kyjova, p.a. Hošťálka (6969), 1.8.1958, 1/0, Kurdějov, p.a. Kamenný vrch (7066), 28.8.1962, 3/0; Prasklice, p.a. Křeny (6769); Lhotka u Přerova, p.a. Lhotka u Přerova (6470/6570), 20.8.1952, 3/0, Želetice u Kyjova, p.a. Na Adamcích (6968), 7.8.1961, 3/0; Pouzdřany, p.a. Pouzdřanská step-Kolby (7065), 29.10.1923, 1/1; 14.8.1973, 1/0; Letonice, p.a. Větrníky (6867), 9.9.1969, 1/0; 11.9.1970, 1/0; Kunkovice, p.a. Strabišov-Oulehla (6869), 26.8.1960, 2/1; Javorník, 312 (7171), 17.8.1967, 1/0; Komořany (6767), 244; Krumvíř (7067), 184, 2.8.1963, 1/1; Mikulov (7165), 242, 5.8.1969, 2/0; Mohelno (6863), 345, 24.8.1959, 1/0; Moravský Krumlov (6963), 255, 7.8.1970, 2/0; Mutěnice (7068-7168), 183, 8.8.1958, 1/2; Přerov II-Předmostí, Na Žernové (6570), 216, 14.9.1936, 1/0; Radějov (7170), 236, 26.8.1963, 1/0; hill Kobyly hlava 358 m asl (7071); Špidlák hill 214 m asl (7067), 19.8.1946, 3/3, all leg. OG, det. JH, coll. MZM; Kravaře, p.a. Zábřežské louky (6074), 240, 16.8.2004, 1/0; Zábřeh (6074), 235, 7.2004, 0/1; Závada – sand pit (6075), 262, 30.7.2005, 1/0; Ostrava-Koblov (6075), 235, 22.7.2005, 3 nymphs; Ostrava-Heřmanice, Heřmanský stav pond (6175), 230, 8.6.2004, 0/1 ex nymph; Prostřední Suchá (6176), 270, 2.8.2005, 1/0; Litovel, p.a. Hvězda and Malá Voda (6268), 13.9.2000, 1/1; Staříč (6275), 327, 12.8.2003, 1/0; Karviná – Karvinský potok (6276), 268, 30.8.2004, 1/0; Vyšní Lhoty (6376), 375, 1.8.2005, 0/1; Čelechovice na Hané (6468), 234, 21.8.1996, 1/1; Štramberk, hill Kotouč (6474), 330, 30.8.2005, 1/1, all leg., det. et coll. PK; Tulešice (6963), 9.8.1996, 0/1; Vlárský průsmyk, valley of Vlárka (6974), 300, 13.10.1991, 0/1; Choryně, Choryňská stráž hill (6373), 2.9.1997, (observ. many specimen) all leg., det. et coll. JH.

Altitudinal distribution in the Czech Republic

Altogether, 118 records have been compiled to this analysis (Fig. 1). Majority of records (95%) comes from altitudes up to 350 m a.s.l. According to this data we can conclude that the species prefers lowlands and occurs only occasionally in higher altitudes in the Czech Republic. Our results follow published study from Thuringia, Germany (Köhler 2001), but we

also know records from 900 m a.s.l. (Mařan 1956, Chládek 1993) and 1150 m (Rabia Skala, Bukovské vrchy hills, unpublished own observation) from Slovakia.

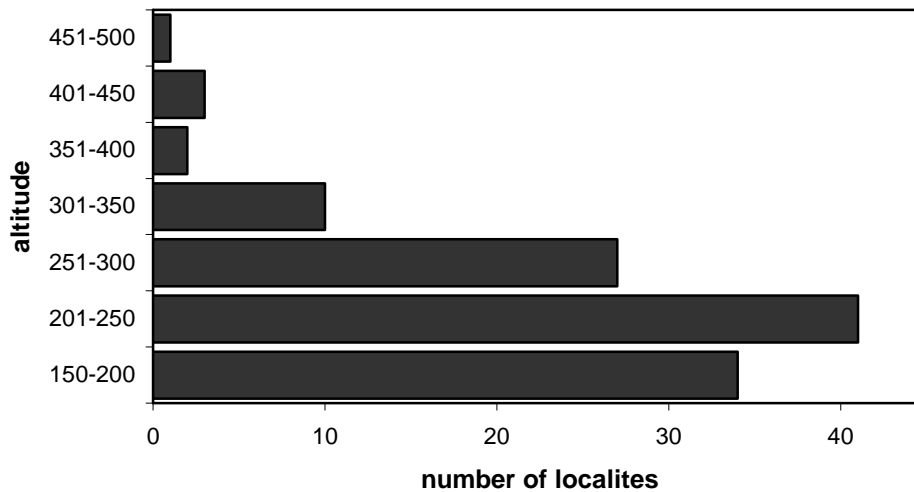


Fig. 1: Vertical distribution of *Phaneroptera falcata* in the Czech Republic.

Recent expansion in the Czech Republic

In the Czech Republic, *Phaneroptera falcata* is known to be widespread in southern and central Moravia. From Bohemia, only single specimen from Horní Radíkov (6857) has been known (Čejchan 1981) as well as from northern part of Moravia and Silesia (Moravian-Silesian district) the only occasional occurrence of one specimen from Háj ve Slezsku (6074) has been recorded (Dobšík & Chládek 1975). Both findings have not been verified during last decades there and also nowhere in the surroundings. That is why we can consider it as accidental occurrence out of the range.

In 2000, we found the first breeding population in northern Moravia in Kunín (6373) (Kočárek & Němečková 2000). Next populations were found during the two successive years in other sites of Poodří Protected Landscape Area - Kunín (6373), Bartošovice-Hukovice (6374), Bartošovice na Moravě (6374) and consecutively we found many populations in the surroundings of the towns of Ostrava, Opava, Karviná and Frýdek-Místek (see above) in 2004-2005. Recently we have known records in 10 faunistic grid of Moravian-Silesian district.

Based on the sequence of findings, we suppose consecutive spreading through Moravian Gate, which form the hypothetical bridge between the two large moravian-silesian warmer areas – southern Moravia and Ostravian Basin. The species probably penetrated this little cooler area and it has been followed by the quick expansion and establishment of many new populations in Ostravian Basin. There are two main reasons, which can allow the penetration through the gate. (i) Climatic changes associated with warming of weather in last decades are the generally used as explanation of the recent expansion of this species in Western Europe (e.g. Kleukers et al. 1996, Decler et al. 2000, Bah et al. 2003, Landeck et al. 2005). (ii) The declining of large-scale farming after 1989 in the Czech Republic (and also in Moravian Gate) has been followed by the escalation of local ruderalization of abandoned fields, meadows and pastures. As *P. falcata* requires taller herb vegetation, this factor could play an important role during the penetration through Moravian Gate and could escalate the expansion.

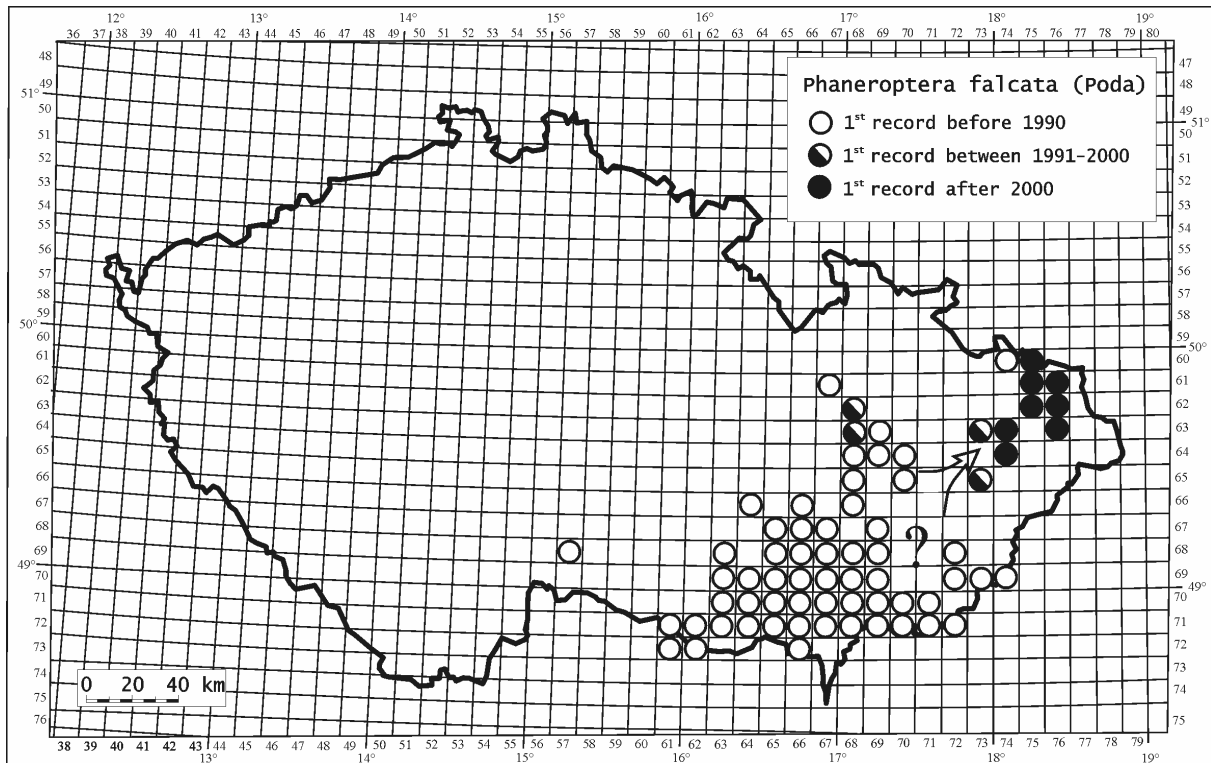


Fig. 2: Distributive map of *Phaneroptera falcata* in the Czech Republic. Arrow marks the probable direction of spreading through Moravian Gate; question mark labels the area of missing data.

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