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Current range of the ash seed weevil *Lignyodes bischoffi* BLATCHLEY, 1916 (Coleoptera: Curculionidae) in Poland

MAREK WANAT [*], ZBIGNIEW MOCARSKI [**]

* Museum of Natural History, University of Wrocław,
Sienkiewicza 21, PL 50-335 Wrocław, Poland
** Zagajnikowa 14/16 m. 7, PL 97-200 Tomaszów Mazowiecki

ABSTRACT. Sixteen new localities of the Nearctic weevil *Lignyodes bischoffi* BLATCHLEY are provided and its current distribution in Poland is mapped and discussed. The adult, larva and egg-laying scars on seeds of *Fraxinus penssylvanica* H. MARSH. are illustrated, to help in monitoring of the range of this invasive weevil species.

KEY WORDS: Coleoptera, Curculionidae, *Lignyodes bischoffi*, identification, new records, distribution in Poland, invasive species, larval image, *Fraxinus pennsylvanica*.

The ash seed weevil, *Lignyodes bischoffi* is a North American species introduced to Europe probably in about mid 20th c., together with American ash trees planted from seeds by European foresters. Development of the larvae of this weevil in seeds of *Fraxinus americana* L. was studied in laboratory by BARGER and DAVIDSON (1967), but the weevil was observed in the U.S.A. also on *F. nigra* H. MARSH and *F. pennsylvanica* H. MARSH. In Europe the weevil was found in 1960 in Slovakia and first recorded under the new name *L. slovacicus* (DIECKMANN 1970), soon synonymized with *L. bischoffi* by DIECKMANN (1974). Since then the species has been recorded also from Austria, Switzerland, Hungary, Bulgaria, Moldova, and Eastern Ukraine (DIECKMANN 1988, PODLUSSÁNY 1996, POIRAS 1991, 1998, KAŁMUK & PAWŁOWSKI 2008). The record from the province of Burgenland in Austria (DIECKMANN 1988) was considered by BÖHME (2005) as based on the specimens collected before 1950, thus being the oldest European finding of this weevil species. It was

found in Austria again in 1980 (biodiversity occurrence data provided by Biologiezentrum Linz - accessed through GBIF Data Portal, www.gbif.org, 2008-06-03).

In Poland *L. bischoffi* was first found in 1998 in Białowieża, and a year later in Lublin (GOSIK et al. 2001). Further several localities in SE part of Poland were published soon, the westernmost in Cracow (STANIEC 2003, WANAT 2003, WANAT & GOSIK 2003, GOSIK 2006). All these records confirm that in Poland basic, if not the only host plant of *L. bischoffi* is *Fraxinus pennsylvanica* H. MARSH. It is almost the only American ash species commonly planted along roads in the whole area of Poland. Contrary to records from Moldova and Southern Slovakia, where *L. bischoffi* was found on several European ash species, including *F. excelsior* L., *F. lanceolata* BORKH., *F. ornus* L., and *F. oxycarpa* WILL. (DIECKMANN 1970, 1974, POIRAS 1991), in Poland the weevil has never been observed on native *F. excelsior* (STANIEC 2003; WANAT, own observations). Considering its biological preferences, commonness of the host tree, lack of any barriers and high migration ability of *L. bischoffi*, the weevil was expected to spread rapidly to the west in Poland (STANIEC 2003, WANAT 2003). The species was placed on the lists of invasive alien species in Europe (NOBANIS, KAŁMUK & PAWŁOWSKI 2008).

The adults of *L. bischoffi* (Figs 2, 6) appear on trees of *F. pennsylvanica* not earlier than in July, but they stay on leaves and fruits until September-October and at least by the end of August they are usually very abundant and easy to collect. It is even easier to control this weevil by examination of the seeds of *F. pennsylvanica*. The female makes distinct egg-laying scar in the basal, thickened part of the seed (usually single per seed), which soon becomes dark violet to black (Fig.3). This point-like dark scar is maintained, though less distinct, on mature, brown and dried seeds (either falling on the ground or remaining on branches in the end of the season). Since the percentage of attacked seeds is usually very high, it allows for easy and fast control of each fruiting tree in regard of the presence of the weevil. Edible part of the seed of *F. pennsylvanica* is very narrow compared to seeds of *F. excelsior*, and even of *F. americana*. Therefore, the mature larva (Figs 4, 5) is enormously squeezed inside the seed and literally pours out when the hole is made in the seed skin. There is always single larva per seed, and it utilizes the whole food material available in the seed, including even the cast skins remained after its molts.

Our examination of *F. pennsylvanica* in north-east, central and south-west Poland revealed much wider range of *L. bischoffi* than it had resulted before from the first published records. The new localities are listed below and shown in Fig. 1 (the respective 10 × 10 km squares of the UTM grid). The division into major regions of Poland follows that adopted for the Catalogus Faunae Poloniae (BURAKOWSKI et al. 1973); the species is new for the regions marked with asterisk. All the listed adult specimens are preserved in the senior author's collection, unless otherwise stated. The larvae from controlled seeds of *F. pennsylvanica* have not been counted nor preserved.

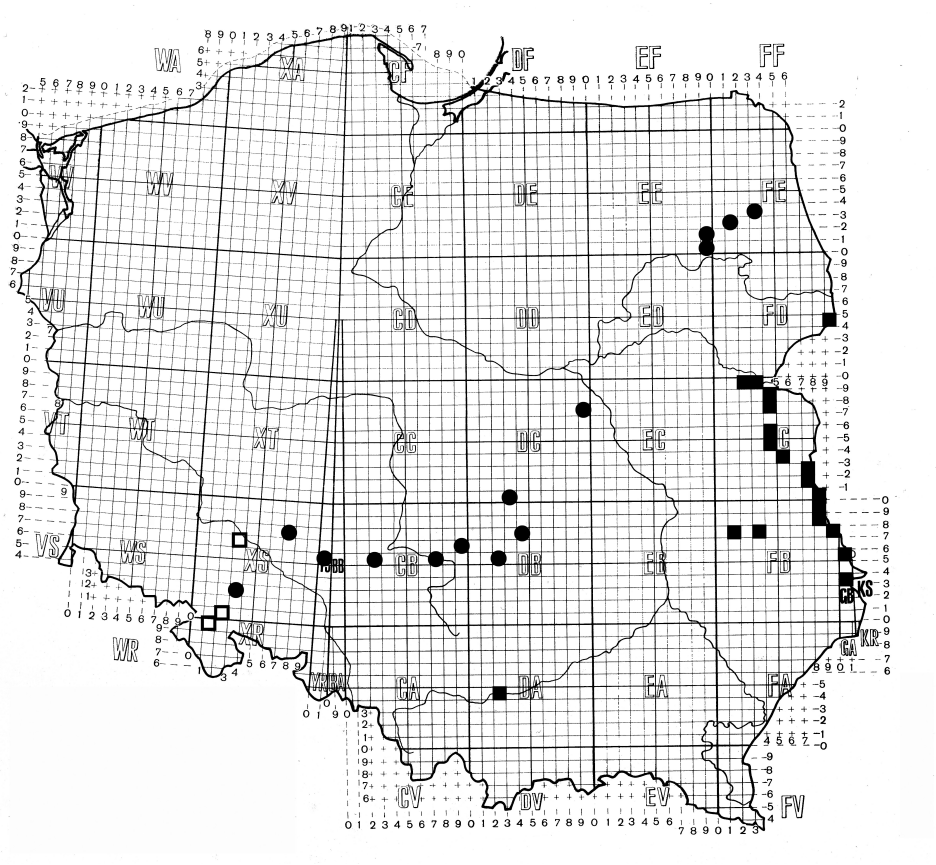

Fig. 1. Localities (UTM grid squares) of *Lignyodes bischoffi* in Poland: ■ – literature records since 2001; ● – new records; □ – negative controls in 2007.

- *Masurian Lake Region: Jatwież Mała near Suchowola (FE33), 11 VIII 2005, 2 exs; Dawidowizna near Goniądz (FE12), 11 VIII 2005, 1 ex., Goniądz (FE12), 11 VIII 2005, 1 ex. – all leg. M. WANAT.
- Podlasie: Brychy near Radziłów (EE91), 11 VIII 2005, 14 exs, leg. M. WANAT; along the road from Brzostowo to Mocarze (EE90), 20 VII 2004, 7 exs, leg. J. SAWONIEWICZ; along the road from Mocarze to Szostaki (EE90), 11 VIII 2005, 1 ex., leg. M. WANAT.
All the above sites lay in the buffer zone of the Biebrza National Park.
- *Mazowiecka Lowland: Janki near Warszawa (DC97), 15 X 2007, larvae observed, M. WANAT.

- *Małopolska Upland: Tomaszów Mazowiecki (DC30), 19 VIII 2005, 1 ex., leg. et coll. Z. MOCARSKI; Bronów near Żarnów (DB47), 19 VIII 2007, 2 exs; along the road from Dobromierz to Mrowina (DB25), 30 IX 2007, larvae observed; Kietlin near Radomsko (CB96), 1 X 2007, larvae observed; Nowa Brzeźnica (CB75), 1 X 2007, larvae observed – all by M. WANAT.
- Krakowsko-Częstochowska Upland: Strojec near Praszka (CB25), 1 X 2007, larvae observed, M. WANAT.
- *Upper Silesia: Domaszowice near Namysłów (YS05), 1 X 2007, larvae observed, M. WANAT.
- *Lower Silesia: Solniki Wielkie near Oleśnica (XS77), 1 X 2007, larvae observed, M. WANAT; along the road from Łagiewniki to Radzików (XS32), 7 X 2007, a few larvae observed, J. SZYPUŁA and M. WANAT.

Lower Silesian localities listed above are probably close to the current western range frontier of *L. bischoffi* in Western Poland. The site near Łagiewniki, although with numerous fruiting trees of *F. pennsylvanica*, revealed low percentage of parasited ash seeds (estimated <5%), while in all other sampled localities 30-80% of seeds contained larvae of the weevil. Moreover, the following Lower Silesian localities were controlled in Sept-Oct 2007 by the senior author for the presence of the larvae of *L. bischoffi* with negative result: Wrocław, Klecińska street (XS36), Lotnicza street (XS36); Kłodzko (XR19); Ząbkowice Śląskie (XS20) (Fig. 1). The controls in the Czech Republic, between Prague and Hradec Krälove brought negative results as well (J. KRÄTKÝ, pers. comm.).

It can be estimated from the current data, that *L. bischoffi* already inhabits more or less two-thirds of the area of Poland. We expect that the gap in NW Poland (see Fig. 1) is an artifact resulting from the complete lack of sampling, rather than a real picture of the weevil distribution. We have now in Poland a rare opportunity for direct monitoring of expansion of this invasive species. Hopefully our indications and provided illustrations will help coleopterists in Poland to identify localities of *L. bischofii*, and thus to draft and date its expansion more precisely.

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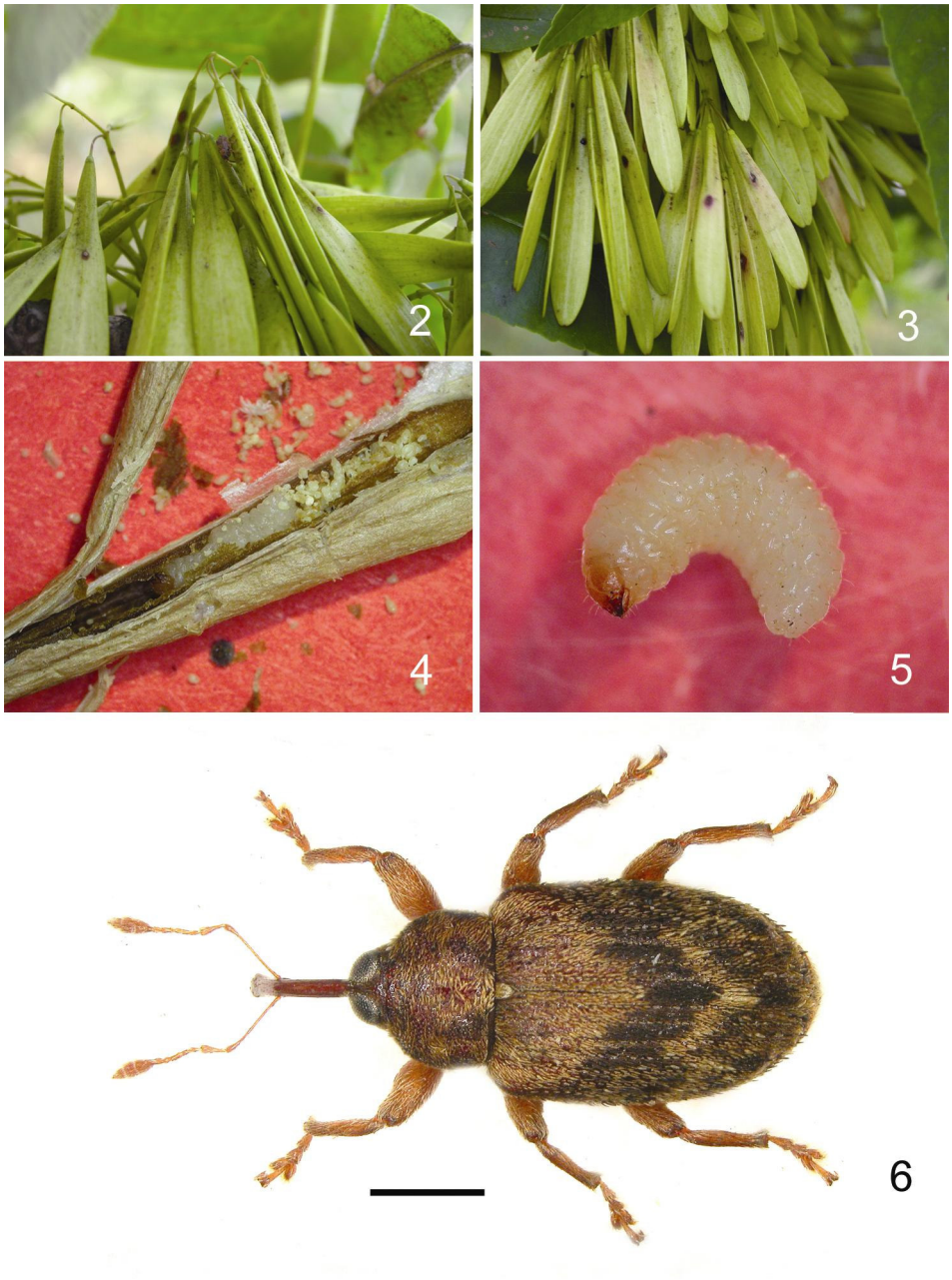

Figs 2-6. *Lignyodes bischoffi*. 2 – adult on seeds of *Fraxinus pennsylvanica*; 3 – darkened egg-laying scars on the ash seeds; 4 – larva inside the seed; 5 – mature larva removed from the seed; 6 – adult, dorsal view (scale bar = 1.0 mm).

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