

NOTES ON DISTRIBUTION OF *XYLOMOIA STRIX* MIKKOLA, 1980 IN LITHUANIA

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Introduction

The genus *Xylomoia* Staudinger, 1892 is represented in Europe by 4 species: *X. graminea* (Graeser, 1888), *X. retinax* Mikkola 1998, *X. stangelmaieri* Mikkola, 1998, and *X. strix* Mikkola, 1980 (Karsholt & Nieukerken, 2013). Two species - *X. graminea* (Aarvik *et al.*, 2017; Ivinskis & Rimšaitė, 2015; Ivinskis & Rimšaitė, 2016; Ivinskis & Rimšaitė, 2017; Ivinskis *et al.*, 2018; Švitra *et al.*, 2011; Švitra *et al.*, 2013; Švitra *et al.*, 2014; Švitra *et al.*, 2015; Švitra *et al.*, 2016; Švitra *et al.*, 2018; Ūsaitis *et al.*, 2019) and *X. strix* (Aarvik *et al.*, 2017; Ivinskis & Rimšaitė, 2013; Ūsaitis *et al.*, 2019) - are known from Lithuania.

Xylomoia strix is known from Poland, Latvia, Estonia, Finland, NW Russia, Ukraine (Aarvik *et al.*, 2017; Karsholt & Nieukerken, 2013; Nowacki & Palka, 2016; Zilli, 2005). Recently it was reported from Belarus (Derzhinsky, 2017; Derzhinsky *et al.*, 2018; Pisanenko *et al.*, 2019). The larval host plant of *X. strix* was identified to be *Equisetum hyemale* L. (Ahola & Silvonen, 2008).

Material and Methods

The survey was carried out by the authors of this paper V. Bačianskas (V.B.), D. Mikalauskas (D.Mk.), T. Ūsaitis (T.Ū.), G. Sasnauskas (G.S.), G. Švitra (G.Š.) and D. Dapkus (D.D.), D. Makavičius (D.Ma.), Ž. Putys (Ž.P.), M. Sasnauskas (M.S.) during field trips.

The information on distribution of *Equisetum hyemale* was collected from various sources: records of *E. hyemale* from www.inaturalist.org (iNaturalist, 2020); personal references of M. Lapelė, D. Makavičius, D. Matulevičiūtė, S. Obelevičius, S. Pupininkas, V. Stukonis, D. Uogintas, and K. Valavičiūtė. Selected locations were visited in April–May, 2020, checked for *Equisetum hyemale* presence (Fig.1–6) and possible signs of feeding by caterpillars of *X. strix* inside the stems of *E. hyemale* (Fig.7–9). In June 2018, 2019, 2020 few locations were visited and checked for *X. strix* imagoes using light source of mercury lamps. Habitats with *X. strix* found were photodocumented. Few larvae were taken for rearing to imagoes (Fig.10–11). Collected specimens are stored in private collections of the authors and in the collection of Tadas Ivanauskas Zoological Museum in Kaunas. All data from the inventory is stored in the LepiBASE – a private database of G. Švitra.



Fig. 1. Žygmantiškių Miškas f., Šalčia river valley Fig. 2. Gudeliai, Nemunas river valley



Fig. 3. Kibyšių Miškas f., Nemunas river valley Fig. 4. Merkys river valley



Fig. 5. Kulokiškės, Vokė river valley Fig. 6. Kadriškės, Vokė river valley



Fig. 7. Signs of feeding by caterpillars of *X. strix* inside the stems of *E. hyemale*



Fig. 8. Signs of feeding by caterpillars of *X. strix* inside the stems of *E. hyemale* (photo Ž. Putys)

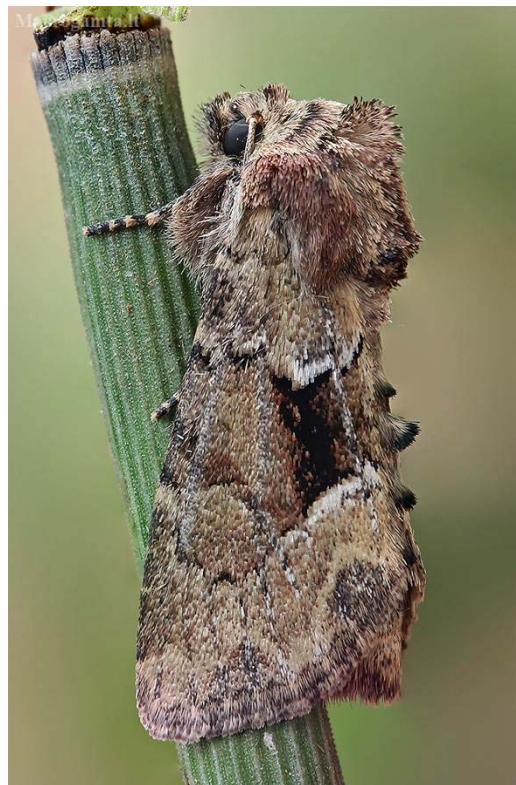


Fig. 11. Imago of *X. strix* (photo G. Steiblys)

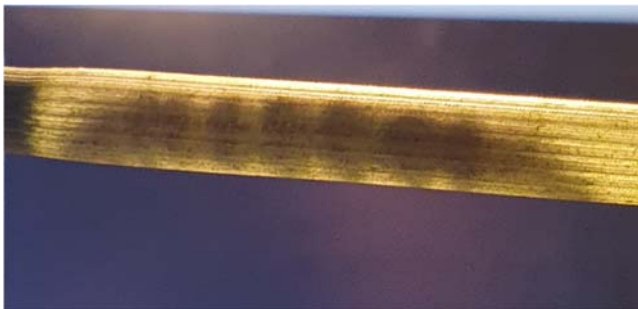


Fig. 9. Signs of feeding by caterpillars of *X. strix* inside the stems of *E. hyemale*



Fig. 12. Parasitized caterpillar of *X. strix*



Fig. 10. Caterpillar of *X. strix* from the stem of *E. hyemale* (photo Ž. Putys)

List of visited localities with *Equisetum hyemale* with short comments on the results

Anykščiai distr., Kavarskas, bank of dam (55.43605, 24.94740), 01 06 2018, ~0,5 ha overgrowth of *E. hyemale*, no signs of *X. strix* presence (G.Š.).

Anykščiai distr., Ragaišiai, Šventoji river valley (55.64413, 25.27323), 29 04 2020, overgrowth of *E. hyemale*, no signs of *X. strix* presence (D.D.).

Joniškis distr., Bariūnai, Satkūnų Miškas f. (56.27075, 23.64909), 07 10 2015, numerous larvae in stems of *E. hyemale* (Ivinskis & Rimšaitė, 2015).

Kaišiadorys distr., Žiežmariai, Triliškės (54.81883, 24.45819), 27 04 2020, few ares overgrowth of *E. hyemale*, no signs of *X. strix* presence (V.B.).

Kėdainiai distr., Šventybrastis, Nevėžis river valley (55.41793, 24.04197), 25 04 2020, ~3 ha overgrowth of *E. hyemale* in alluvial forest with *Alnus glutinosa* and *Fraxinus excelsior* (EU Habitats Directive Annex I habitat code 91E0), 1 larva in the stem of *E. hyemale*, other signs of *X. strix* presence; 26 06 2020, 9 imagoes attracted to the light source (V.B.).

Mažeikiai distr., Reivyčiai, Falsbergo Miškas f. (56.35815, 22.30185), 06 05 2020, overgrowth of *E. hyemale*, no signs of *X. strix* presence (D.Ma.).

Mažeikiai distr., Renavas park (56.22423, 22.05781), 06 10 2015, in Fennoscandian hemiboreal natural old broad-leaved deciduous forest (EU Habitats Directive Annex I habitat code 9020), few larvae in stems of *Equisetum hyemale* (Ivinskis & Rimšaitė, 2015).

Prienai distr., Norkūnai, Nemunas river valley (1) (54.50057, 23.94596); 03 05 2020 Norkūnai, Nemunas river valley (2) (54.50037, 23.94643), 05 05 2020, overgrowth of *E. hyemale*, no signs of *X. strix* presence (V.B.).

Šalčininkai distr., Žygantiškių Miškas f., Šalčia river valley (1) (54.33819, 24.99666), 22 04 2020, few ares overgrowth of *E. hyemale*, 2 larvae, numerous signs of *X. strix* presence (D.Mk.).

Šalčininkai distr., Žygantiškių Miškas f., Šalčia river valley (2) (54.33681, 24.99895), 02 05 2020, few ares overgrowth of *E. hyemale*, >10 larvae, numerous signs of *X. strix* presence (T.Ū.).

Širvintos distr., Čiobiškio Miškas f., Neris river valley (54.97520, 24.61766), 19 04 2020, overgrowth of *E. hyemale*, >5 larvae and numerous signs of *X. strix* presence; 06 06 2020, 7 pupae of *X. strix*, unsuccessful attempt to attract imagoes to the light source (T.Ū.).

Švenčionys distr., Bielkiškė, roadside (54.99478, 26.00975), 30 04 2020, few ares overgrowth of *E. hyemale*, no signs of *X. strix* presence (T.Ū.).

Švenčionys distr., Gelednės Miškas f. (54.98494, 26.06559), 31 05 2019, ~1 ha overgrowth of *E. hyemale*, signs of *X. strix* presence (G.Š.); 21 06 2019, 2 imagoes attracted to the light source (D.Mk.) (Ūsaitis *et al.*, 2019).

Švenčionys distr., Melagėnų Miškas f., Žeimena river valley (55.07396, 25.90504), 19 05 2020, overgrowth of *E. hyemale*, no signs of *X. strix* presence (T.Ū.).

Švenčionys distr., Mera river valley, roadside (55.02026, 25.86795), 21 04 2020, few ares overgrowth of *E. hyemale*, no signs of *X. strix* presence (T.Ū.).

Švenčionys distr., Meškerinė (55.03078, 25.82383), 19 05 2020, ~0,05 ha overgrowth of *E. hyemale*, few damaged by *X. strix* stems of *E. hyemale* (T.Ū.).

Trakai distr., Lake Spindis (54.57186, 24.69296), 23 04 2018, ~0,4 ha overgrowth of *E. hyemale*, no signs of *X. strix* presence (G.Š.).

Ukmergė distr., Dukstynos Miškas f., Šventoji river valley (55.25803, 24.82705), 26 04 2018, ~6 ha overgrowth of *E. hyemale*, no signs of *X. strix* presence; 05 06 2018 and 14 06 2018 - unsuccessful attempts to attract imagoes to the light source (G.Š.).

Ukmergė distr., Žemieji Svirnai, Šventoji river valley (55.35529, 24.89611), 26 04 2020, overgrowth of *E. hyemale*, no signs of *X. strix* presence (T.Ū.).

Varėna distr., Gelovinė, Subartonių Miškas f. (54.23076, 24.16021), 10 05 2020, only few tussocks of *E. hyemale*, no signs of *X. strix* presence (T.Ū.).

Varėna distr., Gudeliai, Nemunas river valley (54.09856, 24.15362), 10 05 2020, ~0,2 ha overgrowth of *E. hyemale*, >20 larvae and numerous signs of *X. strix* presence. Most of larvae were parasitized (Fig. 12) (T.Ū.).

Varėna distr., Kibyšių Miškas f., Nemunas river valley (54.18221, 24.07976), 10 05 2020, ~2,5 ha overgrowth of *E. hyemale*, >30 larvae and numerous signs of *X. strix* presence; 13 06 2020, 2 pupae in the stems of *E. hyemale*; 18 06 2020, 1 imago attracted to the light source (T.Ū.).

Varėna distr., Marcinkonys (54.04470, 24.39490), 17 05 2020, overgrowth of *E. hyemale* along the railroad embankment, no signs of *X. strix* presence (D.Mk., T.Ū.).

Varėna distr., Merkinė, roadside (54.17003, 24.17367), 09 05 2020, overgrowth of *E. hyemale*, no signs of *X. strix* presence (D.Mk.).

Varėna distr., Merkinė, Merkys river valley (1) (54.15301, 24.19239), 17 05 2020, ~0,01 ha overgrowth of *E. hyemale* in coniferous forest on glaciofluvial eskers (EU Habitats Directive Annex I habitat code 9060), 3 damaged by *X. strix* stems of *E. hyemale* (D.Mk., T.Ū.).

Varėna distr., Merkinė, Merkys river valley (2) (54.15368, 24.19173), 17 05 2020, overgrowth of *E. hyemale* in coniferous forest on glaciofluvial eskers (EU Habitats Directive Annex I habitat code 9060), no signs of *X. strix* presence (D.Mk., T.Ū.).

Varėna distr., Merkys river valley at the bridge of the road Vilnius- Gardinas (54.14502, 24.20605), 17 05 2020, ~0,05 ha overgrowth of *E. hyemale* in coniferous forest on glaciofluvial eskers (EU Habitats Directive Annex I habitat code 9060), >10 damaged by *X. strix* stems of *E. hyemale* (D.Mk., T.Ū.).

Varėna distr., Merkinė, Pelekiškė, forest (54.18561, 24.15763), 09 05 2020, overgrowth of *E. hyemale* in western taiga (EU Habitats Directive Annex I habitat code 9010), no signs of *X. strix* presence (T.Ū.).

Varėna distr., Puvočiai (54.11890, 24.30453), 02 05 2020, ~0,1 ha overgrowth of *E. hyemale*, no signs of *X. strix* presence (T.Ū.).

Vilnius mun., Belmontas, Vilnia river valley (54.69070, 25.35340), 18 03 2020, ~0,8 ha overgrowth of *E. hyemale* in alluvial forest with *Alnus glutinosa* and *Fraxinus excelsior* (EU Habitats Directive Annex I habitat code 91E0), no signs of *X. strix* presence (G.Š.).

Vilnius distr., Čekoniškės (54.73496, 25.06295), 26 04 2020, overgrowth of *E. hyemale*, 1 larva and numerous signs of *X. strix* presence (D.Mk.).

Vilnius mun., Kadriškės, Vokė river valley (54.65671, 25.11329), 20 05 2020, ~0,15 ha overgrowth of *E. hyemale* in alluvial forest with *Alnus glutinosa* and *Fraxinus excelsior* (EU Habitats Directive Annex I habitat code 91E0), 1 larva and 5 damaged by *X. strix* stems of *E. hyemale* (T.Ū.).

Vilnius mun., Kulokiškės, Vokė river valley (54.65600, 25.11704), 20 05 2020, ~0,05 ha overgrowth of *E. hyemale* in alluvial forest with *Alnus glutinosa* and *Fraxinus excelsior* (EU Habitats Directive Annex I habitat code 91E0), no signs of *X. strix* presence (T.Ū.).

Vilnius mun., Lake Balsys (1) (54.78714, 25.33730), 18 04 2020, 21 04 2020, Lake Balsys (2) (54.78808, 25.33795), Lake Balsys (3) (54.78978, 25.33667), Lake Balsys (4) (54.78824, 25.33773), ~1,5 ha overgrowth of *E. hyemale* in Fennoscandian deciduous swamp wood (EU Habitats Directive Annex I habitat code 9080), >9 larvae and numerous signs of *X. strix* presence (G.Š., T.Ū., D.MK., G.S., M.S.); Lake Balsys (5) (54.78343, 25.33431), 25 04 2020, ~0,08 ha overgrowth of *E. hyemale*, 2 larvae and signs of *X. strix* presence (G.S., M.S.); Lake Balsys (6) (54.78919, 25.33071), Lake Balsys (7) (54.78998, 25.32983), 28 04 2020, ~0,2 ha overgrowth of *E. hyemale* in Tilio-Acerion forest of slopes, screes and ravines (EU Habitats Directive Annex I habitat code 9180), few damaged by *X. strix* stems of *E. hyemale* (G.Š.).

Vilnius mun., Riešė rivulet valley (1) (54.78589, 25.32155), Riešė rivulet valley (2) (54.78616, 25.31781), 28 04 2020, ~1,5 ha overgrowth of *E. hyemale* alongside of the river in alluvial forest with *Alnus glutinosa* and *Fraxinus excelsior* (EU Habitats Directive Annex I habitat code 91E0), no signs of *X. strix* presence (G.Š.).

Vilnius mun., Riešė rivulet valley (3) (54.78637, 25.31764), Riešė rivulet valley (4) (54.78531, 25.32153), 01 05 2020, overgrowth of *E. hyemale* on the south-facing slopes in Fennoscandian hemiboreal natural old broad-leaved deciduous forest (EU Habitats Directive Annex I habitat code 9020), 10 larvae, few of them parasitized, other signs of *X. strix* presence (Ž.P.).

Vilnius mun., Užupis, Vilnius (54.68493, 25.30264), 28 04 2020, overgrowth of *E. hyemale*, no signs of *X. strix* presence (T.Ū.).

Vilnius mun., Valakupiai (54.73263, 25.29254), 25 04 2020, overgrowth of *E. hyemale*, no signs of *X. strix* presence (G.S., M.S.).

Vilnius mun., Valakupių Miškas f. (54.74501, 25.29311), 22 04 2020, overgrowth of *E. hyemale*, no signs of *X. strix* presence (D.Mk.).

Vilniaus mun., Žemasis Pavilnys (1) (54.68151, 25.35518), Žemasis Pavilnys (2) (54.68195, 25.35556), 04 05 2020, overgrowth of *E. hyemale*, no signs of *X. strix* presence (D.Mk.).

Zarasai distr., Subatiškės, Antalieptė reservoir (55.64969, 26.03921), 26 04 2020, overgrowth of *E. hyemale* in Fennoscandian deciduous swamp wood (EU Habitats Directive Annex I habitat code 9080), no signs of *X. strix* presence (T.Ū.).

Zarasai distr., Sniegiškės, forest (55.65094, 26.03617), 26 04 2020, overgrowth of *E. hyemale* in Fennoscandian deciduous swamp wood (EU Habitats Directive Annex I habitat code 9080), no signs of *X. strix* presence (T.Ū.).

Discussion

Data on distribution of *Xylomoia strix* in Lithuania is of great significance because the species is an EU priority species, listed in Annexes II and IV of the Habitats Directive (Council Directive ..., 1992). Up to 2020, the species was recorded only in three locations (Ivinskis & Rimšaitė, 2015; Ūsaitis *et al.*, 2019). This is the reason why we started searching potential habitats with *Euisetum hyemale* that might be inhabited by *Xylomoia strix*.

Due to our limited knowledge on distribution of *E. hyemale* in the country, most of the checked localities with overgrowths of *E. hyemale* are concentrated in the Eastern and Southeastern Lithuania (Fig. 13). As a rule, *E. hyemale* grows on slopes close to the rivers, in damp forests, in many cases its growth places coincide with habitats of the EU concern

(EU Habitats Directive Annex I habitat codes 9010, 9020, 9060, 9080, 9180, 91E0). The best time to look after the signs of *X. strix* presence in the overgrowths of *E. hyemale* is from the middle of April till the beginning of June, when damaged stems of *E. hyemale* can be easily noticed, frequently with larvae or pupae inside. In suitable habitats *X. strix* is not rare.

Further investigation should be carried on in the Northern and Western Lithuania to obtain the comprehensive knowledge on the distribution range of *X. strix* in Lithuania. Since in two cases caterpillars were parasitized, more attention should be paid to this aspect of the species ecology.

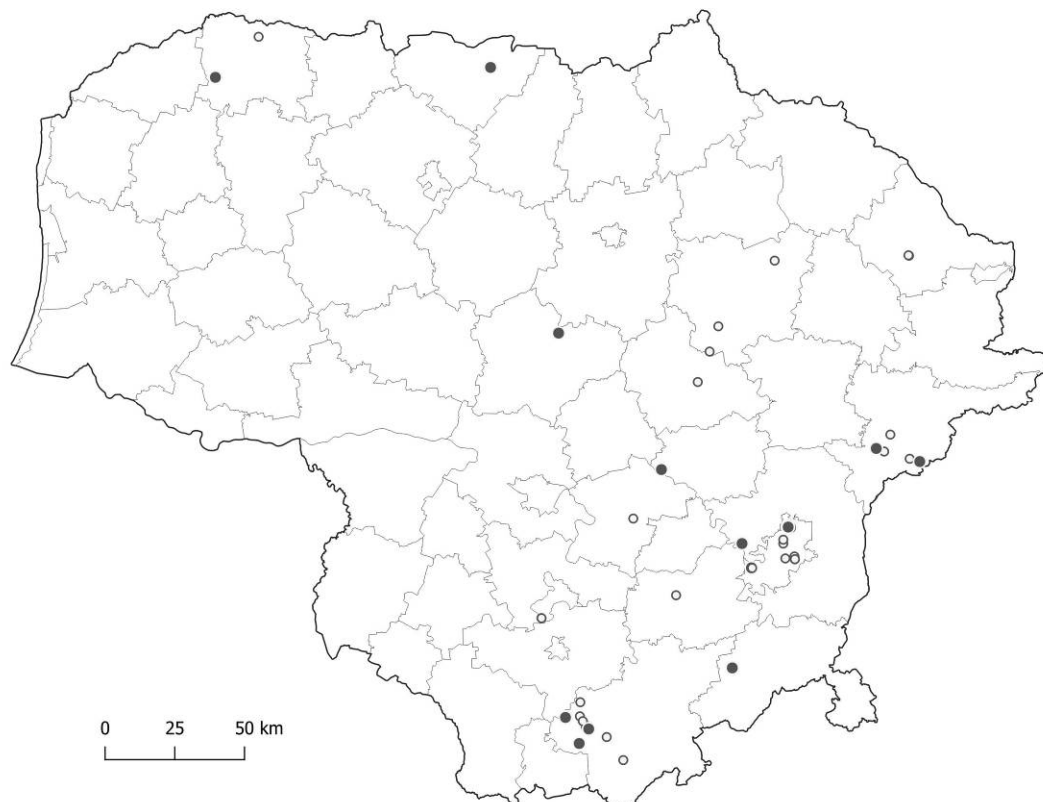


Fig. 13. Distribution of *Xylomoia strix* in Lithuania (solid dots – species found, open dots – potential habitats visited, species not found), status of 2020.

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Pastabos apie *Xylomoia strix* Mikkola, 1980 paplitimą Lietuvoje

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Santrauka

Straipsnyje pateikiami duomenys apie *Xylomoia strix* Mikkola, 1980 paplitimo Lietuvoje tyrimus 2018-2020 m. m. Medžiaga rinkta 13 savivaldybių. Pateiktos visų tirtų potencialių *X. strix* buveinių koordinatės ir paieškos tirtose vietovėse rezultatai. Šiuo metu *X. strix* registruota 17 vietovių. Straipsnyje pateiktos originalios buveinių, *X. strix* vikšrų pažeistų *Equisetum hyemale* stiebų, vikšrų ir imago nuotraukos bei visų šiuo metu žinomų *X. strix* radaviečių žemėlapis.

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