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SLU Risk Assessment of Plant Pests

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Is *Epiphyas postvittana* present in Sweden?

1 Background

Epiphyas postvittana (EPPO code: TORTPO), with the Swedish common name "Blek fruktvecklare", is a well known invasive pest of horticultural plants that originates from Australia but has spread around the world with plant material (Suckling & Brockerhoff 2010; CABI 2022). The pest is very polyphagous and *Malus domestica* is a major host (EPPO 2022). The pest is considered present in UK and is not regulated in the EU (EPPO 2022a; EU 2021). *Epiphyas postvittana* may however be of concern for the EU, e.g. in an Express PRA for Poland it was assessed to constitute a medium phytosanitary risk (Kubasik et al. 2019). EFSA is currently working on a commodity risk assessment of a host species of *E. postvittana* from the UK, i.e., *Ligustrum delavayanum* grafted on *L. japonicum*. EFSA refer to CABI (2022) and Svensson (2009) for the presence of *Epiphyas postvittana* in Sweden and now request information about the pest status[1] of *E. postvittana* in Sweden (pers. comm. Swedish Board of Agriculture 2022). They also request information about measures applied, or that are planned to be applied, to limit its spread.

SLU Risk Assessment of Plant Pests was requested by the Swedish Board of Agriculture to evaluate whether *E. postvittana* should be regarded to be present or absent in Sweden. In addition, information should be provided whether any measures are applied against the spread of this pest in Sweden.

2 Methodology

A broad approach was used to find information about observations of *E. postvittana* in Sweden. Searches were performed in: Web of Science (2022) (filtering for "Sweden"), the search engine Google (restricting the search to Swedish wepages), Google Scholar (including "Sweden" in the

[1] The pest status of a pest within a country refers to the "Presence or absence, at the present time, of a pest in an area, including where appropriate its distribution, as officially determined using expert judgement on the basis of current and historical pest records and other information" (IPPC 2021c; see also the newly published guideline provided by IPPC (2021a)). It is determined by the National Plant Protection Organisation (NPPO), which in Sweden is the Swedish Board of Agriculture (IPPC 2021b).

search string and restricting the review to the top 100 hits), and in different specific databases, i.e., CABI Crop Protection Compendium (CABI 2022), EPPO Global Database (EPPO 2022a), EPPO Platform on PRAs (EPPO 2022b), EUROPHYT (2020), Pest Information Wiki (2022), Fauna Europeaea (2022), HOSTS - A Database of the World's Lepidopteran Hostplants (Robinson et al. 2022), SLU Artfakta (SLU Artdatabanken 2022), the Nordic-Baltic checklist of Lepidoptera (Aarvik et al. 2017; 2021), Catalogus Lepidopterorum Sueciae (2022), iNaturalist (2022) and GBIF (2022). The searches included, in addition to the preferred name "*Epiphyas postvittana*", also two other scientific names, i.e. *Austrotortrix postvittana* and *Tortrix postvittana* (EPPO 2022a), as well as two Swedish names, i.e. "blek fruktvecklare" and "australienvecklare" (SLU Artdatabanken 2022). Information about the pest was also requested from several Swedish experts on Microlepidoptera (see Acknowledgement).

3 Presence of *Epiphyas postvittana* in Sweden

CABI (2022) include Sweden in the distribution map of *E. postvittana* with a reference to Svensson (2009). However, Svensson (2009) describes a finding of the species on imported citrus plants in a greenhouse and most likely did not represent an established Swedish population. Two years later, *E. postvittana* was captured using pheromones[2] at the same location, but this time outside the greenhouse in a park, which may suggest that *E. postvittana* had spread to the wider environment (Svensson 2011). However, the maximum dispersal distance recorded for *E. postvittana* is rather long, i.e. 600 m (Suckling 1994), and since this observation was in close vicinity to the likely place of introduction, it may have been the result of an escape from the greenhouse and the presence of *E. postvittana* may thus just have been temporary. No further verified observations of *E. postvittana* have been made during the last 10 years, not in this particular location nor elsewhere in Sweden[3].

Epiphyas postvittana is not listed in the Nordic-Baltic checklist of Lepidoptera which aims to lists all Lepidoptera species recorded in this region including introduced species that have become established (Aarvik et al. 2017; 2021). Neither EPPO (2022a) nor Fauna Europeaea (2022) list *E. postvittana* as present in Sweden.

The search in databases where species observations from the public can be found only resulted in one observation from Sweden (GBIF 2022; iNaturalist 2022; SLU Artdatabanken 2022). It was an observation recorded in iNaturalist from 2021 in Troentorp, approximately 100 km north of the previous findings (iNaturalist 2022). The observation is currently categorised in the quality grade "Needs ID". Based solely on the picture provided in iNaturlist it was judged likely to be *E. postvittana* based on the wing shape and length of the labial palps of the specimen (B. Å. Bengtsson pers. comm). However, genital preparation is necessary to obtain a certain

[2] Commercial pheromones are available for *Epiphyas postvittana*.
[3] *Epiphyas postvittana* is listed in a table with the title "Common pest arthropod species in Sweden" with the comment "Not a pest in Sweden" in a report by Nilsson et al. (2016). However, it is not clear how the information should be interpreted and no reference is provided to support the statement.

identification[4] (B. Å. Bengtsson & P. Witzgall pers. comm) or it could be done by molecular diagnostics (Venette et al. 2003). Thus, the identity of the observation remains inconclusive.

There is of course a possibility that *E. postvittana* has an established population in Sweden but that it has remained undetected. The fact that *E. postvittana* is very difficult to distinguish from native Swedish species without genital preparation (P. Witzgall, pers. comm.) and that the pest has been found outdoors (Svensson 2011), increase the likelihood for that. However, *E. postvittana* belongs to a group of organisms, i.e. Lepidopteran species, for which the geographical distributions of the species generally are well known. This decrease the likelihood that there are established but undetected populations of this pest in Sweden. In addition, there does not appear to be any support for that *E. postvittana* is established in any of the countries with borders to Sweden (Aarvik et al. 2017; 2021; Artsdatabanken 2022; CABI 2022; EPPO 2022; Fauna Europaea 2022; Finnish Biodiversity Information Facility 2022; GBIF 2022; iNaturalist 2022). Still, an observation, similar to those made in Sweden, has been done in Norway, i.e., one specimen of *E. postvittana* was trapped indoors at an import location with horticultural plants (Westergaard et al. 2018). Finally, it is uncertain if the conditions are suitable for establishment of *E. postvittana* in Sweden. Hosts are widely distributed outdoors (CABI 2022; SLU Artdatabanken 2022) but it should be noted that although *E. postvittana* occurs in temperate areas it appears to be relatively sensitive to cold stress. CLIMEX models indicate that the climate in Sweden may not be suitable for its establishment whereas a Maxent model indicate that establishment in the most southern part of Sweden may be possible (Lozier & Mills 2011; He et al. 2012; see also Mills (2021) for models including abundance–suitability relationships).

The SLU Swedish Species Information Center currently[5] classify the Swedish occurrence of *E. postvittana* as “Occasional occurrence (or remaining)” (SLU Artdatabanken 2022b).

Conclusion

No verified records of *E. postvittana* were found except from inside, or close to, a greenhouse which contained imported plants infested with the pest. Mainly based on this information it was assessed that *E. postvittana* is likely absent from Sweden. The main cause of uncertainty is the lack of species specific survey data from Sweden.

4 Measures against the pest in Sweden

No information was found that measures have been taken, or is planned to be applied, against *E. postvittana* in Sweden. It may, however, be expected that measures were taken in the greenhouse in Alnarp where *E. postvittana* was found in 2008 (Svensson 2009).

[4] It should be noticed that genital preparation was used for the determination of the specimen described in Svensson (2009).
[5] The species was recently reclassifed based on the currently available information (SLU Artdatabanken 2022a, b)

5 Acknowledgement

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7 References

Aarvik, L., Bengtsson, B. Å., Elven, H., Ivinskis, P., Jürivete, U., Karshol, O., ... & Savenkov, N. (2017). Nordic-baltic checklist of Lepidoptera. Norwegian Journal of Entomology, Supplement 3. 1–236. https://www.duo.uio.no/bitstream/handle/10852/64154/Aarvik%2Bet%2Bal.2017.Nordic-Baltic%2BLepidiptera%2Bchecklist.pdf?sequence=2

Aarvik, L., Bengtsson, B. Å., Elven, H., Ivinskis, P., Jürivete, U., Karsholt, O., ... & Savenkov, N. (2021). Additions and corrections to the Nordic-Baltic checklist of Lepidoptera. Norwegian Journal of Entomology, 68(1), 1-14. https://www.duo.uio.no/bitstream/handle/10852/90922/1/Aarvik%2Bet%2Bal.2021.Additions%2Band%2Bcorrections%2BNordic-Baltic%2BLepidoptera%2Bchecklist.pdf

Artsdatabanken (2022) Artsdatabanken [Norwegian Biodiversity Information Centre] https://www.artsdatabanken.no/taxon/Epiphyas%20postvittana/216127 [Accessed 2022-04-22]

CABI (2022) Crop Protectioin Compendium, Datasheet, *Epiphyas postvittana* (light brown apple moth). DOI:10.1079/CPC.54204.20210104830 https://www.cabi.org/cpc/datasheet/54204 [Accessed 2022-04-20]

Catalogus Lepidopterorum Sueciae (2022) Svenska fjärilskatalogen Catalogus Lepidopterorum Sueciae är en sammanställning över alla i Sverige funna fjärilsarter, Naturhistoriska riksmuseet (The Swedish Museum of Natural History) https://www.nrm.se/forskningochsamlingar/zoologi/samlingar/katalogerochartlistor/catalogusle pidopterorum.9003426.html [Accessed 2022-04-25]

EPPO (2022a) EPPO Global Database (available online). https://gd.eppo.int/taxon/TORTPO/distribution/GB [Accessed 2022-04-20]

EPPO (2022b) EPPO Platform on PRAs, the complete version that requires login, https://pra.eppo.int/ [Accessed 2022-04-20]

EU (2021) Commission Implementing Regulation (EU) 2019/2072 of 28 November 2019 establishing uniform conditions for the implementation of Regulation (EU) 2016/2031 of the European Parliament and the Council, as regards protective measures against pests of plants, and repealing Commission Regulation (EC) No 690/2008 and amending Commission Implementing Regulation (EU) 2018/2019. Official Journal of the European Union L 319, 10.12.2019, 1–279. consolidated version: 16/12/2021 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02019R2072-20211216

EUROPHYT (2020) Circa EUROPHYT (European Union Notification System for Plant Health Interceptions) notifcations, provides information about interceptions within EU until June 2020, access requires authorisation https://webgate.ec.europa.eu/SANTE_PLANT_HEALTH/BOE/BI/logonNoSso.jsp [Accessed 2022-04-25]

Fauna Europaea (2022) Fauna Europaea - all European animal species on the web, https://fauna-eu.org/cdm_dataportal/taxon/7027e200-13ef-4ecd-80a4-d63d488443ab [Accessed 2022-04-21]

Finnish Biodiversity Information Facility (2022) https://laji.fi/en [Accessed 2022-04-21]

GBIF (2022) *Epiphyas postvittana* (Walker, 1863) in GBIF Secretariat (2021). GBIF Backbone Taxonomy. Checklist dataset https://doi.org/10.15468/39omei accessed via GBIF.org on 2022-04-21.

He, S., Worner, S. P., & Ikeda, T. (2012). Modeling the potential global distribution of light brown apple moth *Epiphyas postvittana* (Lepidoptera: Tortricidae) using CLIMEX. Journal of Asia-Pacific Entomology, 15(3), 479-485. https://doi.org/10.1016/j.aspen.2012.01.004

iNaturalist (2021) Inaturalist, California Academy of Sciences och National Geographic Society, database available from https://www.inaturalist.org [Accessed 2022-04-21]

IPPC (2021a) Food and Agriculture Organization of the United Nations, IPPC (International Plant Protection Convention) Secretariat. 2021. Pest status guide: Understanding the principal requirements for pest status determination. Rome. FAO on behalf of the Secretariat of the International Plant Protection Convention. https://doi.org/10.4060/cb6103en

IPPC (2021b) Food and Agriculture Organization of the United Nations, IPPC (International Plant Protection Convention) Secretariat. 2021. Determination of pest status in an area. International Standard for Phytosanitary Measures No. 8. Rome. https://www.ippc.int/en/core-activities/standards-setting/ispms/

IPPC (2021c) Food and Agriculture Organization of the United Nations, IPPC (International Plant Protection Convention) Secretariat. 2021. Glossary of phytosanitary terms. International Standard for Phytosanitary Measures No. 5. Rome. FAO on behalf of the Secretariat of the International Plant Protection Convention. https://www.ippc.int/en/core-activities/standards-setting/ispms/

Kubasik, W., Klejdysz, T., Strażyński, P., Gawlak, M., Rzepecka, D., & Kałuski, T. (2019) Analizy Zagrożenia Agrofagiem (Ekspres PRA) dla *Epiphyas postvittana*, EPPO Platform on PRAs https://www.eppo.int/RESOURCES/eppo_databases/pra_platform

Lozier, J. D., & Mills, N. J. (2011). Predicting the potential invasive range of light brown apple moth (*Epiphyas postvittana*) using biologically informed and correlative species distribution models. Biological invasions, 13(10), 2409-2421. https://link.springer.com/article/10.1007/s10530-011-0052-5

Mills, N. J. (2021). Abundance–suitability relationships for invasive species: *Epiphyas postvittana* as a case study. Biological Invasions, 23(7), 2205-2220. https://link.springer.com/article/10.1007/s10530-021-02500-z

NDFF (2015). NDFF Verspreidingsatlas, TINEA Verspreidingsatlas Microvlinders, https://www.verspreidingsatlas.nl/T413225 [Accessed 2022-04-20]

Nilsson, U., Porcel, M., Świergiel, W., & Wivstad, M. (2016). Habitat manipulation–as a pest management tool in vegetable and fruit cropping systems, with the focus on insects and mites. SLU, EPOK – Centre for Organic Food & Farming, Uppsala, Sweden. ISBN 978-91-576-9402-7 https://orgprints.org/30032/1/biokontrollsyntes_web.pdf

Pest Information Wiki (2022) https://wiki.pestinfo.org/wiki/Bibliography:Epiphyas_postvittana_(countries) [Accessed 2022-04-21]

Robinson, G. S., P. R. Ackery, I. J. Kitching, G. W. Beccaloni & L. M. Hernández, 2022. HOSTS - A Database of the World's Lepidopteran Hostplants. Natural History Museum, London. https://www.nhm.ac.uk/our-science/data/hostplants/ [Accessed 2022-04-28].

SLU Artdatabanken (2022a) Artfakta, *Epiphyas postvittana* blek fruktvecklare, ”Bofast och reproducerande” [Resident and reproducing] https://namnochslaktskap.artfakta.se/taxa/6003438/details?lang=sv [Accessed 2022-04-20]

SLU Artdatabanken (2022b) Artfakta, *Epiphyas postvittana* blek fruktvecklare, “Tillfällig förekomst (alt. kvarstående)” [Occasional occurrence (or remaining)] https://namnochslaktskap.artfakta.se/taxa/6003438/details?lang=sv [Accessed 2022-04-25]

Suckling, D. M., Brunner, J. F., Burnip, G. M., & Walker, J. T. S. (1994). Dispersal of *Epiphyas postvittana* (Walker) and *Planotortrix octo* Dugdale (Lepidoptera: Tortricidae) at a Canterbury, New Zealand orchard. New Zealand journal of crop and horticultural science, 22(3), 225-234. https://www.tandfonline.com/doi/pdf/10.1080/01140671.1994.9513831

Suckling, D. M., & Brockerhoff, E. G. (2010). Invasion biology, ecology, and management of the light brown apple moth (Tortricidae). Annual review of entomology, 55, 285-306. https://www.annualreviews.org/doi/pdf/10.1146/annurev-ento-112408-085311

Svensson, I. (2009) Anmärkningsvärda fynd av småfjärilar (Microlepidoptera) i Sverige 2008. [Remarkable records of Microlepidoptera in Sweden during 2008.] Entomologisk Tidskrift 130 (1): 61-72. Uppsala, Sweden 2009. ISSN 0013-886x. In Swedish with Abstract in English https://www.sef.nu/download/entomologisk_tidskrift/et_2009/ET2009%20sid61_722.pdf

Svensson, I. (2011) Anmärkningsvärda fynd av småfjärilar (Microlepidoptera) i Sverige 2010. [Remarkable records of Microlepidoptera in Sweden during 2010.] Entomologisk Tidskrift. 132 (1): 55-68. Uppsala, Sweden 2011. ISSN 0013-886x. In Swedish with Abstract in English http://www.sef.nu/download/entomologisk_tidskrift/et_2011/ET2011%2055-68w.pdf

Venette, R. C., Davis, E. E., DaCosta, M., Heisler, H., & Larson, M. (2003). Mini risk assessment: light brown apple moth, *Epiphyas postvittana* (Walker)[Lepidoptera: Tortricidae]. Department of Entomology, University of Minnesota, MN. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.400.8670&rep=rep1&type=pdf

Web of Science (2022) Clarivate, https://www.webofscience.com (requires subscription), [Accessed 2022-04-21]

Westergaard, K. B., Endrestøl, A., Hanssen, O., Often, A., Åström, J., Fossøy, F., ... & Brandsegg, H. (2018). Fremmede arter–spredningsveien import av planteprodukter. Basisovervåking og metodeutvikling 2017–2018. [Alien stowaway species – the pathway import of horticultural plants. Monitoring and method development 2017–2018]. NINA Report 1557. Norwegian Institute for Nature Research. ISBN: 978-82-426-3296-8. In Norwegian with Abstract in English https://brage.nina.no/nina-xmlui/handle/11250/2575833