Express PRA[1] for *Aproceros leucopoda* – Occurrence –

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Revision highlighted in red and italics.

Initiation: Occurrence on elms in the Federal State Bavaria on 28 November 2011 and in the Federal State Brandenburg on 7 August 2013

Initiation for the revision: Change of status since the sawfly is now widespread in the EU and there is a lack of control measures

Express PRA	***Aproceros leucopoda* Takeuchi, 1939**		
Phytosanitary risk for Germany **Phytosanitary risk for EU-Member States**	Aproceros leucopoda *is already widespread in the EU. The zigzag elm sawfly has also spread further in Germany. Effective phytosanitary measures are not available. Therefore, the classification as a potential quarantine pest is no longer given.*		
Certainty of the assessment	**high** ☒	**medium** ☐	**low** ☐
Conclusion	*The zigzag elm sawfly,* Aproceros leucopoda *is endemic to East Asia and does already occur in Germany and the EU. It is not listed in the Annexes of Regulation (EU) 2019/2072 or by EPPO but was listed in the EPPO Alert List from 2011 to 2015.* Aproceros leucopoda *infests elms.* *Due to suitable climatic conditions, it is assumed that* A. leucopoda *can establish further outdoors in Germany, further establishment in other EU-Member States has to be expected, too.* Aproceros leucopoda *can cause significant damage on elms, but since it is widespread now in the EU and there is a lack of control measures, no phytosanitary regulations apply.* *Thus,* Aproceros leucopoda *is not classified as a potential quarantine pest and Article 29 of the Regulation (EU) 2016/2031 does not apply.*		
Taxonomy[2], common name, synonyms	Hymenoptera, Argidae, *Aproceros*, *Aproceros leucopoda* Takeuchi, 1939 Japanische Ulmenblattwespe, Zick-Zack-Ulmenblattwespe, zigzag elm sawfly		
EPPO Code	APRCLE		

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Does a relevant earlier PRA exist?	*Not at the time of preparation of the previous version of this Express-PRA (14-08-2013). In October 2016, the Department for Environment, Food and Rural Affairs (Defra, Great Britain) prepared a PRA for Great Britain and Northern Ireland that cited the first version of this Express-PRA (Defra, 2016). The British PRA concludes that there is no prospect to exclude this pest from Great Britain. In the meanwhile, the wasp also occurs in Great Britain (EPPO, 2021).*
Biology	Parthenogenetic propagation, so far, no males were found. Very fast development; several generations per year (up to 4 in Hungary). Adults found from mid of April to the beginning of September in Hungary. Under laboratory conditions, up to 49 eggs per female are laid at leaf edges. 6 larval stages until the stage of the eunymphs. Cocoons of the eunymphs in which the pupation takes place are spun loosely, net-like, sometimes also sturdier. Cocoons with sturdy walls were also found in leaf litter and presumably serve for overwintering (Blank et al. 2010; including an identification key).
Is the pest a vector?[3]	No.
Is a vector needed?[4]	No.
Host plants	In the literature *U. glabra*, *U. japonica*, *U. laevis*, *U. minor*, *U. minor* x *glabra*, *U. pumila* and *U. pumila* var. *arborea* are listed (Blank et al. 2010, Zandigiacomo et al. 2011, Kraus et al. 2011, *CABI, 2019*). *It cannot be ruled out that the complete genus Ulmus can act as host plants (EPPO, 2015).*
Symptoms[5]	Typical zigzag design in the leaf blade, which reminds of a meandering river, blurring with further voracity and growth of the larvae. Later only the mid vein of the leaf remains. Complete defoliation of the infested trees is possible.
Presence of the host plants in Germany[6]	Widespread.
Presence of the host plants in the Member States[7]	Widespread (e. g. see EUFORGEN 2009)
Known infested areas[8]	*Canada (Québec), China (Peking, Gansu, Yunnan), Japan (Hokkaido, Honshu), Kazakhstan, Bosnia-Herzegovina, Russia (Central Russia, Far East, Southern Russia), Great Britain, Switzerland, Serbia, Ukraine, (EPPO 2021).* *As of 25-03-2021 (EPPO, 2021),* A. leucopoda *is present in the* EU *in Belgium, Bulgaria, Germany, Estonia, France, Italy,*

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	Croatia, Latvia, the Netherlands, Austria, Poland, Romania, Czech Republic, Hungary, Slovakia and Slovenia.
Pathways[9]	Most likely: plants for planting, but also infested branches and shoots. Growing season: larvae, eggs, cocoons. Outside the vegetation period: overwintering cocoons in surface near substrate (therefore spread also via soil). In the literature, the spread alongside traffic lines was described; therefore, possibly also transport over long distances as “hitchhiker” is an important factor.
Natural spread[10]	From the end of April to the end of September when the females are mature, deemed to be good flyers.
Establishment and spread to be expected in Germany[11]	Yes, since host plants are present and the pest already occurs in areas with comparable climate. A first outdoor infestation with reproduction of *A. leucopoda* was already described in Germany in 2011 (Kraus et al. 2011), *after which further occurrences were reported*.
Establishment and spread to be expected in the Member States[12]	Yes, see above; moderate climate and Mediterranean region
Known damage in infested areas[13]	Leaf feeding. Massive defoliation of infested trees was already observed in Hungary in the beginning of July. Defoliation of up to 98%, in individual cases 100%, after leaf regeneration a new complete defoliation was observed in the same year. Dieback of single branches. Massive loss of the assimilation activity and subsequently the production of reserve material. No age preference. No location preference. Esthetical problem (Blank et al. 2010). *Also in Romania, observations on individual trees have shown that severe defoliation of 74% to 98% can occur by early July. Infested trees often have secondary bud break later in the season, but since these new leaves are also consumed, twig and branch dieback can occur (EPPO, 2015).*
Limitation of the endangered area in Germany	Throughout Germany, (see distribution maps of different elm species).
Damage to be expected in endangered area in Germany[14]	Comparable to damage in infested areas. There is a risk that an infestation with *A. leucopoda* could have a negative effect on elms that are not infested by the Dutch elm disease (Brasier und Gibbs, 1973), so far. Depending on the host preference of *A. leucopoda,* further spread could have a considerable impact

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	on the breeding activities in the genus *Ulmus* aimed to control the Dutch elm disease.
Damage to be expected in endangered area in Member States[15]	See Germany. In all Member States where elms are present (e.g. distribution *Ulmus laevis*: EUFORGEN, 2009). *The British PRA classifies potential economic damage as medium since no infestation can be observed on dormant elms without leaves so that the majority of the trees is marketable and marketability is not reduced (Defra, 2016).*
Control feasibility and measures[16]	In Hungary, insecticides (deltamethrin and teflubenzuron) were used against larvae. These were effective against larvae of the first generation. In China, pesticides were used which killed more than 95 % of the first and the second larval stage (Blank et al. 2010). Despite this achievement, it must be considered that the zigzag sawfly is already widespread in parts of Europe and that adults are capable to re-colonize a treated area – therefore no sufficient result is expected from treatment with insecticides, in addition, extensive application of insecticides is difficult on large trees and requires aerial application. Currently, there is no indication available for the necessary application. Thus, application of insecticides would have to be made under exemption permits or „imminent danger“. Since no stock threatening damage was described so far, this measure does not seem useful. So far, no effective parasitoids or other beneficial organisms are known that could be used for biological control (Blank et al. 2010). *Given the rapid spread of the pest throughout Europe and its introduction and spread as a "hitchhiker", there are few effective measures to prevent its introduction. In the event of an infestation, the rapid spread of parthenogenetically reproducing females makes eradication or containment highly unlikely (Defra, 2016).*
Detection and diagnosis[17]	Body of the wasp approx. 6 mm, dark brown to black with pale legs. Larvae green with 3 sternum pairs (with T-like design) and brown striate colouring of the head-capsule. Identification key at Blank et al. 2010. Net-like or also sturdier cocoons, eggs at the leaf edge of elms. Characteristic feed pattern (zigzag design).
Remarks	Further rapid natural spread of the zigzag elm sawfly is expected, mainly because of the parthenogenetic propagation and the rapid development due to a short pupae rest and a fast and light woven summer cocoon as well as the lack of natural

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	enemies. Spread particularly via transportation routes and river valleys is expected.
Literature	BLANK, S.M., HARA, H., MIKULÁS, J., CSÓKA, G., CIORNEI, C., CONSTANTINEANU, R., CONSTANTINEAU, C., ROLLER, L., ALTENHOFER, E., HUFLEJT, T., VÉTEK, G. (2010): *Aproceros leucopoda* (Hymenoptera: Argidae): An East Asian pest of elms (*Ulmus* spp.) invading Europe. Eur. J. Entomol. 107: 357-367. BRASIER, C.M.; GIBBS, J.N. (1973): Origin of the Dutch elm disease epidemic in Britain. Nature 242: 607-609. *CABI (2019): Datasheet* Aproceros leucopoda *(elm zigzag sawfly) Online available: https://www.cabi.org/cpc/datasheet/118020. accessed on 12-07-2021* *Defra (2016): Rapid Pest Risk Analysis (PRA) for: Aproceros leucopoda. Department for Environment, Food and Rural Affairs, Großbritannien. Online available:* https://planthealthportal.defra.gov.uk/assets/pras/Aproceros-leucopoda-PRA-v4.pdf *accessed on 12-07-2021.* *EPPO (2015): Mini data sheet on* Aproceros leucopoda*. Online verfügbar: https://gd.eppo.int/taxon/APRCLE/documents accessed on 12-07-2021.* *EPPO (2021):* Aproceros leucopoda *(APRCLE) EPPO Global Database. Online availabler: https://gd.eppo.int/taxon/APRCLE accessed on 12-07-2021.* EUFORGEN (2009): Distribution map of European white elm (Ulmus laevis) Online available: http://www.euforgen.org/fileadmin/www.euforgen.org/Documents/Maps/PDF/Ulmus_laevis.pdf *accessed on 12-07-2021.* KRAUS,M., LISTON, A.D., TAEGER, A. (2011): Die invasive Zick-Zack-Ulmenblattwespe *Aproceros leucopoda* Takeuchi, 1939) (Hymenoptera: Argidae) in Deutschland. Deutsche Gesellschaft für allgemeine und angewandte Entomologie – Nachrichten 25 (3): 117-1191-3. ZANDIGIACOMO, P., CARGNUS, E., VILLANA, A., 2011: First record of the invasive sawfly Aproceros leucopoda infesting elms in Italy. Bulletin of Insectology 64 (1): 145-149.

Photos: Gyorgy Csoka, Hungary Forest Research Institute, Bugwood.org, No. 5410982 and 5410983.

Remarks

Erläuterungen

[1] Compilation of the most important and directly available information that renders possible a first preliminary evaluation of the phytosanitary risk. This short evaluation is necessary for the decision on a notification to EU and EPPO as well as the preparation of a complete risk analysis, to inform the countries and as the basis for the possible initiation of eradication measures. In the case of phytosanitary risk especially the possibility of the introduction and spread in Germany and in the Member States as well as possible damage are taken into account

[2] Taxonomic classification - also subspecies - as the case may be; in the case that the taxonomic classification is uncertain, the JKI-scientist initiates the taxonomic classification as far as possible.

[3] If so, which organism (organisms) is (are) transmitted and does it (do they) occur in Germany / the Member States?

[4] If so, which organism serves as a vector and does it occur in Germany/ the MS?

[5] Description of the pattern of damage and the strength of the symptoms/damage on the different host plants.

[6] Presence of the host plants in protected cultivation, open field, public gardens, forest,....;
Where, in which regions are the host plants present and to which extent?
How important are the host plants (economic, ecological, ...)?,

[7] Presence of the host plants in protected cultivation, open field, public gardens, forest,....;
Where, in which regions are the host plants present and to which extent?
How important are the host plants (economic, ecological, ...)?, possible origin.

[8] E.g. according to CABI, EPPO, PQR, EPPO Datasheets.

[9] Which pathways are known for the pest and how important are they for the probability of introduction. Primarily the transport of the pest over long distances is meant, normally with infested traded plants, plants products or other contaminated articles. This does not comprise the natural spread resulting from introduction.

[10] Which pathways are known for the pest and of which relevance are they in respect of the probability of the spread? In this case, the natural spread resulting from introduction is meant.

[11] Under the given/prevalent environmental conditions.

[12] Under the given/prevalent environmental conditions (domestic areas and areas of introduction).

[13] Description of the economic, ecological /environmental relevant and social damage in the area of origin resp. areas of previous occurrence

[14] Description of the economic, ecological /environmental relevant and social damage to be expected in Germany, as far as possible and required, differentiated between regions..

[15] Description of economic, ecological/ environmental relevant and social damage to be expected in the EU / other Member States, as far as possible and required, differentiated between regions.

[16] Can the pest be controlled? Which possibilities of control are given? Are plant health measures conducted in respect to this pest (in the areas of previous occurrence resp. by third countries)?

[17] Description of possibilities and methods of detection. Detection by visual inspections? Latency? Uneven distribution in the plant (sampling)?