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

Prepared by: Julius Kühn-Institut, Institute for Plant Health, 14 August, 2013
Dr. Gritta Schrader, Dr. Thomas Schröder; translated by Elke Vogt-Arndt
Initiation: Notification on occurrence in Germany, Bavaria on 28 November 2011 and in Brandenburg on 7 August 2013 according to § 16.2 of Directive 2000/29/EC

Express - PRA	*Aproceros leucopoda*		
Phytosanitary Risk for Germany	**high** ☒	**medium** ☐	**low** ☐
Phytosanitary Risk for EU-MS	**high** ☐	**medium** ☒	**low** ☐
Certainty of Assessment	**High phytosanitary risk for the genus *Ulmus* ; uncertainty whether the complete genus *Ulmus* is endangered. Rapid natural spread is expected.**		
Taxonomy [1)]	Hymenoptera, Argidae		
Common name	Japanische Ulmenblattwespe, Zick-Zack-Ulmenblattwespe, zigzag elm sawfly		
Synonyms	--		
Biology	Parthenogenetic propagation, until now no males were found. Very fast development (24-29 days from egg to imago, Fig. 1); several generations per year (up to 4 in Hungary). Imagines found from mid April to the beginning of September in Hungary. Under laboratory conditions up to 49 eggs per female are laid at leaf edges (Fig. 2). 6 larval stages until the stage of the eunymph is developed. Cocoons of the eunymphs, within which the pupation takes place, are spun net-like, loosely, 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 cited (Blank *et al.* 2010, Zandigiacomo *et al.* 2011, Kraus *et al.* 2011, Crop Protection Compendium, 2012). It cannot be excluded that the complete genus *Ulmus* is suitable as host plants.		
Symptoms[5)]	Typical zigzag design in the leaf blade which reminds of a meander (Fig. 3), blurring with further voracity and growth of the larvae (Fig. 4). Later only the mid leaf rib remains. Complete defoliation of the infested trees is possible.		
Presence of host plants in Germany[6)]	Widespread (see distribution maps of different *Ulmus* species: *Ulmus minor*, Fig. 5, *U. glabra*, Fig. 6, *U. laevis,* Fig. 7)		
Presence of host plants in the MS[7)]	Widespread (see f. e. EUFORGEN 2009)		
Known infested areas[8)]	China, Japan, Russia (Far East), Austria (Vienna, Lower Austria), Germany (Bavaria), Hungary (Bàcs-Kiskun, Békés, Budapest, Csongràd, Heves, Nògràd), Italy (Friuli-Venezia-Giulia, Veneto), Poland (Sandomierz, Warschau), Romania (Banat), Moldova,		

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	Slovenia, Slovakia, Serbia, Ukraine (Luhans'ka, Kharkiv oblast).
Pathways[9)]	Most likely: plants for planting, but also infested branches and shootings. Growing season: larvae, eggs, cocoons. Outside of growing season: 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 „blind passenger" is an important factor.
Natural spread[10)]	From the end of April to the beginning of September when the females are mature; deemed to be good flyers.
Expected establishment and spread in Germany[11)]	Yes, since host plants are present and the pest already occurs in areas with comparable climate. A first infestation outdoors with propagation of *A. leucopoda* was already described in Germany (Kraus et al. 2011).
Expected establishment and spread in the MS[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 the beginning of July in Hungary. Defoliation up to 98 %, in single cases 100%, after leaf regeneration a new complete defoliation was observed in the same year. Dieback of single branches. Massive losses of the assimilation activity and subsequently the production of reserve material. No age preference. No location preference. Esthetical problem (Blank *et al.* 2010).
Limitation of the endangered area in Germany	Throughout Germany (see distribution maps of different *Ulmus* species).
Expected damage in the endangered area in Germany[14)]	Comparable with 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 & Gibbs, 1973) up to now. Depending on the host preference of *A. Leucopoda* further spread could have a considerable impact on the breeding activities in the genus *Ulmus* aimed to control the Dutch Elm Disease.
Expected damage in the endangered area in MS[15)]	See Germany. In all MS where *Ulmus* occurs. (f. e. distribution *Ulmus laevis*: EUFORGEN, 2009).
Control feasibility and measures[16)]	In Hungary, insecticides (deltamethrine and teflubenzuron) were used against larvae. These were effective against the larvae of the first generation. In China pesticides were used which killed more than 95% from the first and the second larval stage (Blank *et al*. 2010). Despite this achievement it must be considered that the zigzag elm sawfly is already widespread in Europe and that adults are capable to re-colonize a treated area – therefore no sufficient result is expected from treatment with insecticides. Furthermore the realization of use of insecticides in big trees is difficult and would require the use of aircrafts. At the moment this does not seem indicated. Insecticides would have to be used in the frame of exemptions or „danger ahead". Since no crop endangering damage was described up to now this measure seems not suitable.

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	Until now no effective parasitoids or other beneficial organisms are known to be suitable for biological control (Blank *et al.* 2010).
Detection and diagnosis[17)]	Body of the wasp app.6 mm, dark brown to black with pale legs. Larvae (Fig. 8, adult app. 1 cm) green with 3 sternum pairs (with T-like design) and brown, striate colouring of the head-capsule. Identification key acc. to Blank *et al.* 2010. Net-like or also sturdier cocoons, eggs on the leaf edge of elms. Characteristic feeding design (zigzag design).
Remarks	A further quick natural spread of the zigzag elm sawfly is expected, mainly because of the parthenogenetic propagation and the rapid development based on a short pupae rest, a fast and light woven summer cocoon and the lack of natural enemies. Spread mainly via transport routes and through 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. Crop Protection Compendium, 2012 EPPO 2011: *Aproceros leucopoda*: Addition to the Eppo Alert List. EPPO Reporting Service 2011/198: 8-9. EPPO 2012: *Aproceros leucopoda* (Hymenoptera: Argidae), Alert List; http://www.eppo.org/QUARANTINE/Alert_List/insects/aproceros_leucopoda.htm EUFORGEN 2009: Distribution map of European white elm (*Ulmus laevis*), http://www.euforgen.org/fileadmin/www.euforgen.org/Documents/Maps/PDF/Ulmus_laevis.pdf 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): 117-119. 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.

Fig. 1: *Aproceros leucopoda*, adult wasp (Photo: Csoka, Forestry Images)

Fig. 2: *Aproceros leucopoda*, egg (Photo: Csoka, Forestry Images)

Fig. 3: *Aproceros leucopoda*, damage pattern of the young larvae (Photo: Csoka, Forestry Images)

Fig. 4: *Aproceros leucopoda*: damage pattern of older larval stage (Photo: Csoka, Forestry Images)

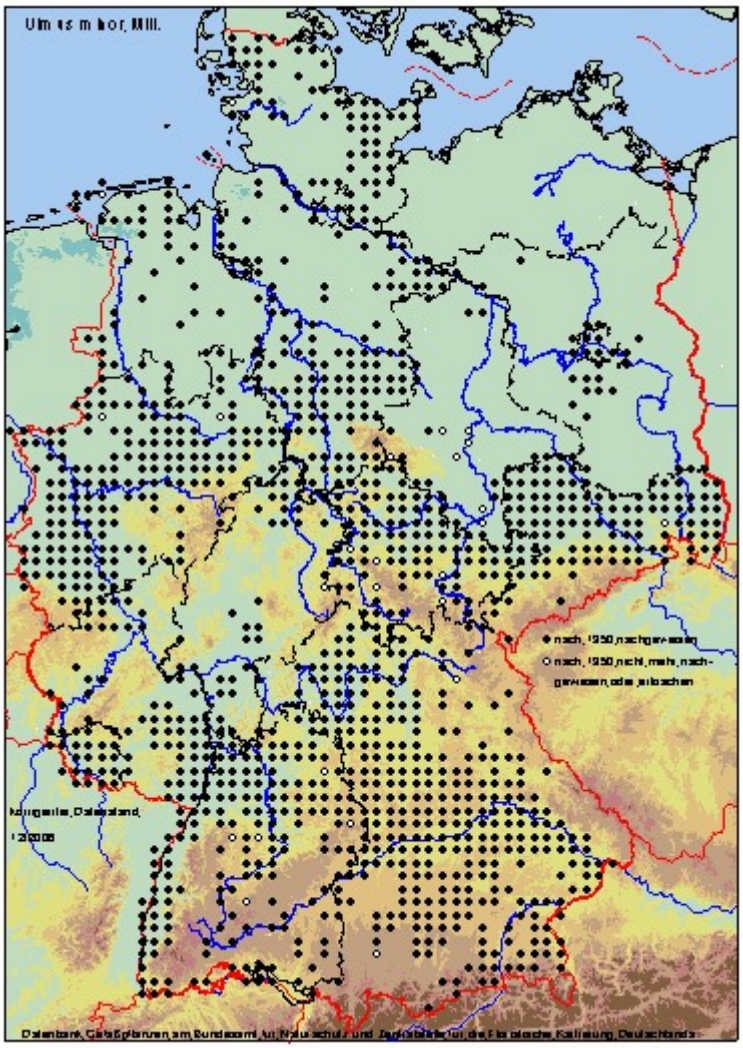

Fig. 5: Distribution of *Ulmus minor* in Germany (source: floraweb.de)

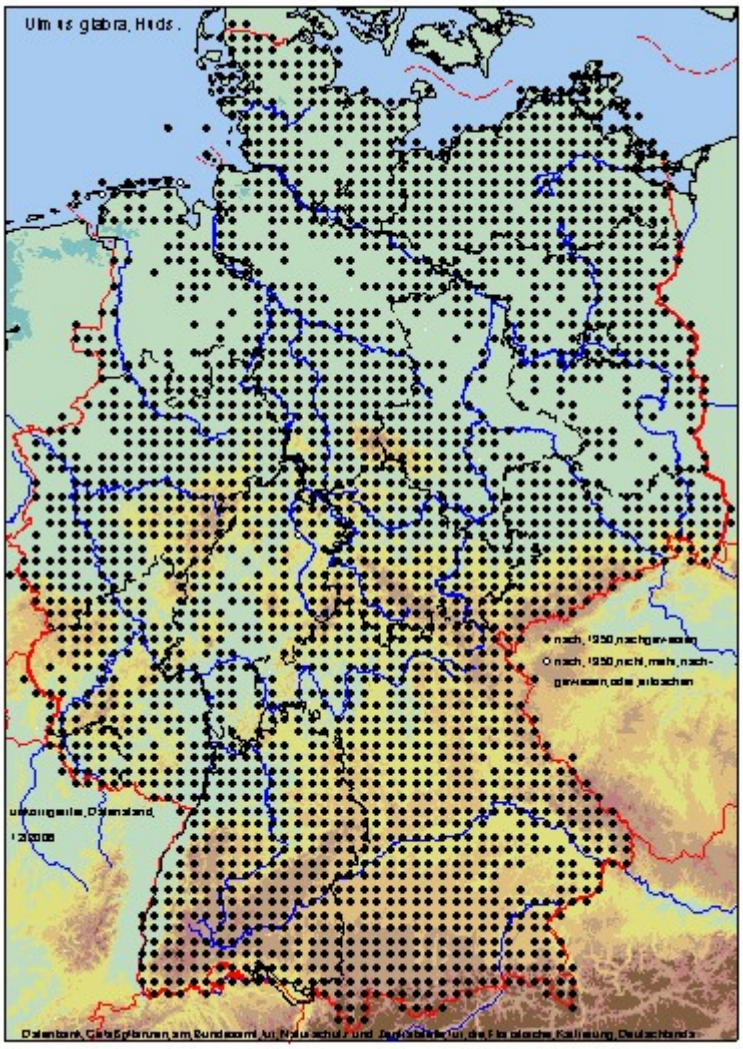

Fig. 6: Distribution of *Ulmus glabra* in Germany (source: floraweb.de)

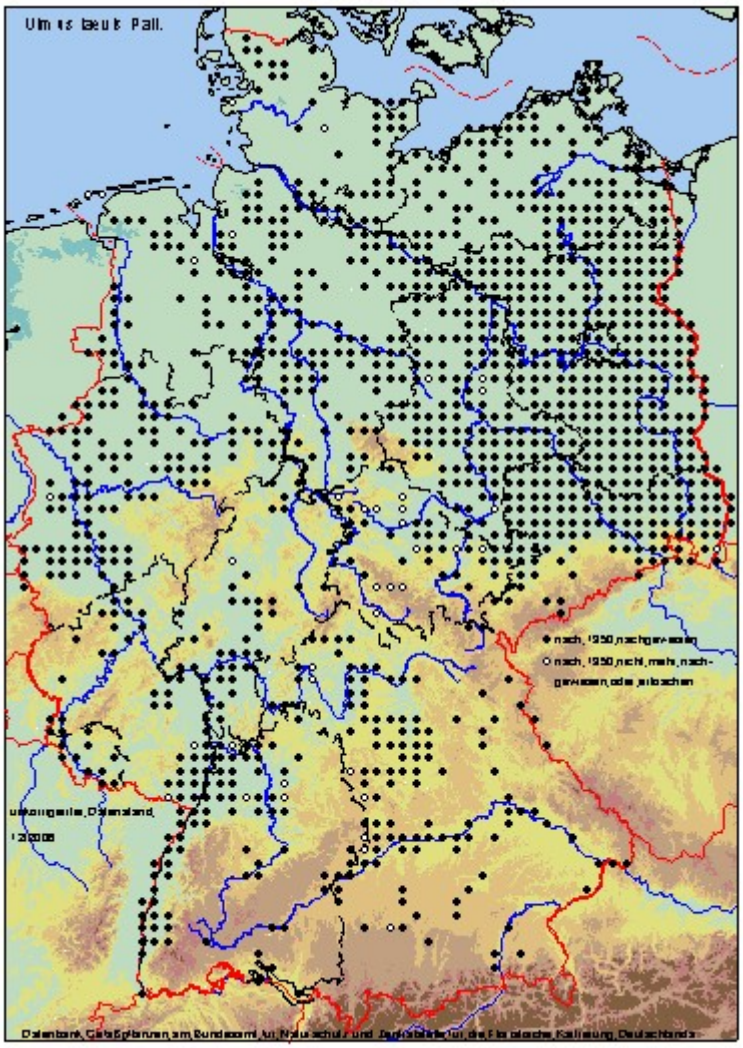

Fig. 7: Distribution of *Ulmus laevis* in Germany (source: floraweb.de)

Fig. 8: *Aproceros leucopoda*, larva (Photo: Csoka, Forestry Images)

Explanations

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

2) Taxonomic classification – also subspecies; in case that the taxonomical classification is uncertain the JKI-scientist initiates the taxonomic classification, as far as possible.

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

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 severity of the symptoms/damage on the different host plants

6) Presence of the host plants in protected cultivation, open field, amenity plantings, forest.
Where, in which regions are the host plants present and to which extent?
How important are the host plants (economical, ecological,..)? Possible origin

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Where, in which regions are the host plants present and to which extent?
How important are the host plants (economical, ecological,..)? Possible origin

8) f. e. acc. to CABI, EPPO, PQR, EPPO Datasheets

9) Which pathways are known for the pest and how important are they for the possibility of introduction? Primarily the transport of the pest over long distances is meant, normally with infested traded plants, plant 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 possibility of 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 (native areas and areas of introduction)

13) Description of the economic, ecological/environmental relevant and social damage in the area of origin resp. areas of occurrence up to now

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 the 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 current distribution resp. by third countries)?

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