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Pest survey card on *Euwallacea fornicatus sensu lato*, *Fusarium ambrosium* and *F. euwallaceae*

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Abstract

This document provides the conclusions of the pest survey card that was prepared in the context of the EFSA mandate on plant pest surveillance (M-2020-0114) at the request of the European Commission. The full pest survey card for *Euwallacea fornicatus sensu lato* (s.l.), *Fusarium ambrosium* and *F. euwallaceae* surveys is published and available online in the EFSA Pest Survey Card gallery at the following link and will be updated whenever new information becomes available:

<https://efsa.europa.eu/plants/planthealth/monitoring/surveillance/euwallacea-fornicatus-fusarium-ambrosium-euwallaceae>

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Keywords: detection survey, delimiting survey, FUSAAM, FUSAEW, risk-based surveillance, Union quarantine pest, XYLBFO

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1 Introduction

This pest survey card was prepared in the context of the EFSA mandate on plant pest surveillance (M-2020-0114), at the request of the European Commission. Its purpose is to guide the Member States in preparing data and information for *Euwallacea fornicatus sensu lato* (s.l.), *Fusarium ambrosium* and *Fusarium euwallaceae* surveys. These are required to design statistically sound and risk-based pest surveys, in line with current international standards. *Euwallacea fornicatus* s.l. (Coleoptera: Curculionidae) reproduces by feeding on *F. ambrosium* and *F. euwallaceae* fungi (Hypocreales: Nectriaceae). The females of *E. fornicatus* s.l. bore galleries in the twigs and branches of host trees, thereby contaminating them with fungal spores. The mycelium colonises the vascular tissues of the plant, resulting in branch dieback and, sometimes, the death of the tree. *Euwallacea fornicatus* s.l. is multivoltine, with several agricultural, forest and ornamental host species, mainly belonging to Fabaceae, Fagaceae, Magnoliaceae, Malvaceae, Rosaceae, Salicaceae, Sapindaceae and Theaceae. To avoid overlooking the pests, detection and delimiting surveys should target all available host species. *Euwallacea fornicatus* s.l., *F. ambrosium* and *F. euwallaceae* could potentially become established in protected environments, such as greenhouses, throughout the EU. However, suitable outdoor conditions for their establishment are likely to be limited to the Mediterranean coastal areas of the EU and inland nearshore regions. The recommended method for surveys is based on visual examination of symptoms on infested plants (e.g. the presence of frass pellets, bore holes on the trunk and branch wilting), followed by dissection and laboratory testing of the affected plant parts, in combination with the use of semiochemical-baited traps. Identification can be conducted morphologically for *E. fornicatus* s.l. (females), possibly with the support of molecular diagnostics. Molecular identification is necessary for males, the immature stages of the beetle, *F. ambrosium* and *F. euwallaceae*. The best timing for surveys is during spring and summer (for the observation of plant symptoms and insect trapping), although galleries can be observed all year round.

2 The survey preparation

Table 1 addresses the key questions that are relevant for preparing a pest survey. First, the plant pest needs to be characterised in terms of its life cycle and biology. Then, the structure and size of the target population needs to be characterised and these analyses should be tailored to the situation in each Member State. Figure 1 gives examples of the components of a target population for *E. fornicatus* s.l., *F. ambrosium* and *F. euwallaceae* and is not necessarily exhaustive. Finally, the detection process needs to be characterised in terms of the sequence of detection and identification methods required for the survey.



Table 1: Preparation of surveys for *Euwallacea fornicatus s.l.*, *Fusarium ambrosium* and *Fusarium euwallaceae*

SURVEY QUESTION	SECTIONS	KEY INFORMATION
WHAT?	1. The pest and its biology	<i>Euwallacea fornicatus sensu lato (s.l.)</i> feeds and reproduces on colonies of <i>Fusarium ambrosium</i> and <i>F. euwallaceae</i> , which grow inside galleries excavated by the beetle in a tree’s twigs, branches or trunk.
WHERE?	2. Target population	Host species mainly belong to Fabaceae, Fagaceae, Magnoliaceae, Malvaceae, Rosaceae, Salicaceae, Sapindaceae and Theaceae. Epidemiological units: agricultural, forest, and urban areas (either outdoor or indoor) with at least one host plant.
		Risk areas: areas surrounding risk locations (e.g. harbours, wood storage and trade facilities, green waste facilities, nurseries) where host plants are present.
		Inspection unit: individual host plant and/or a trap.
HOW?	3. Detection and identification	Recommended method: visual examination of plants for symptoms, followed by dissection of attacked plant parts, in combination with semiochemical-baited traps. <i>Euwallacea fornicatus s.l.</i> females can be identified morphologically, with the support of molecular methods. Molecular identification is necessary for males, the immature stages, <i>F. ambrosium</i> and <i>F. euwallaceae</i> .
WHEN?		The best timing for surveys is during spring and summer (insect trapping, presence of frass pellets, symptoms around bore holes, branch and tree dieback). Galleries can be observed all year round.

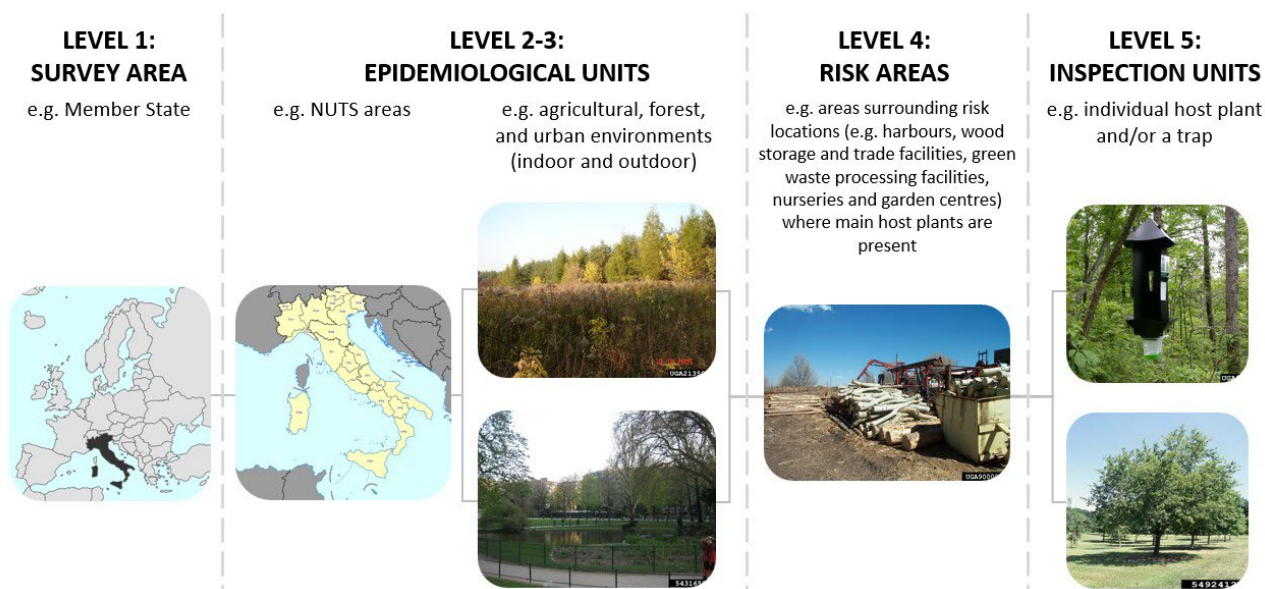


Figure 1: Example of the hierarchical structure of the target population for *Euwallacea fornicatus s.l.*, *Fusarium ambrosium* and *F. euwallaceae* (Sources: Eurostat, 2022 (levels 1–2); Barbara Tokarska-Guzik, University of Silesia, Bugwood.org (level 3, top); Luana Vargas, International Society of Arboriculture, Bugwood.org (level 3, bottom); Doug Page, USFS / BLM, Bugwood.org (level 4); University of Arkansas Forest Entomology Lab, University of Arkansas, Bugwood.org (level 5, top); T. Davis Sydnor, The Ohio State University, Bugwood.org (level 5, bottom))

3 From survey preparation to survey design

Figure 2 shows the next steps after the survey preparation for designing statistically sound and risk-based detection and delimiting surveys of *E. fornicatus* s.l., *F. ambrosium* and *F. euwallaceae*. Guidance on the selection of type of survey, related survey preparation and design, is provided in the EFSA general guidelines for pest surveys¹.

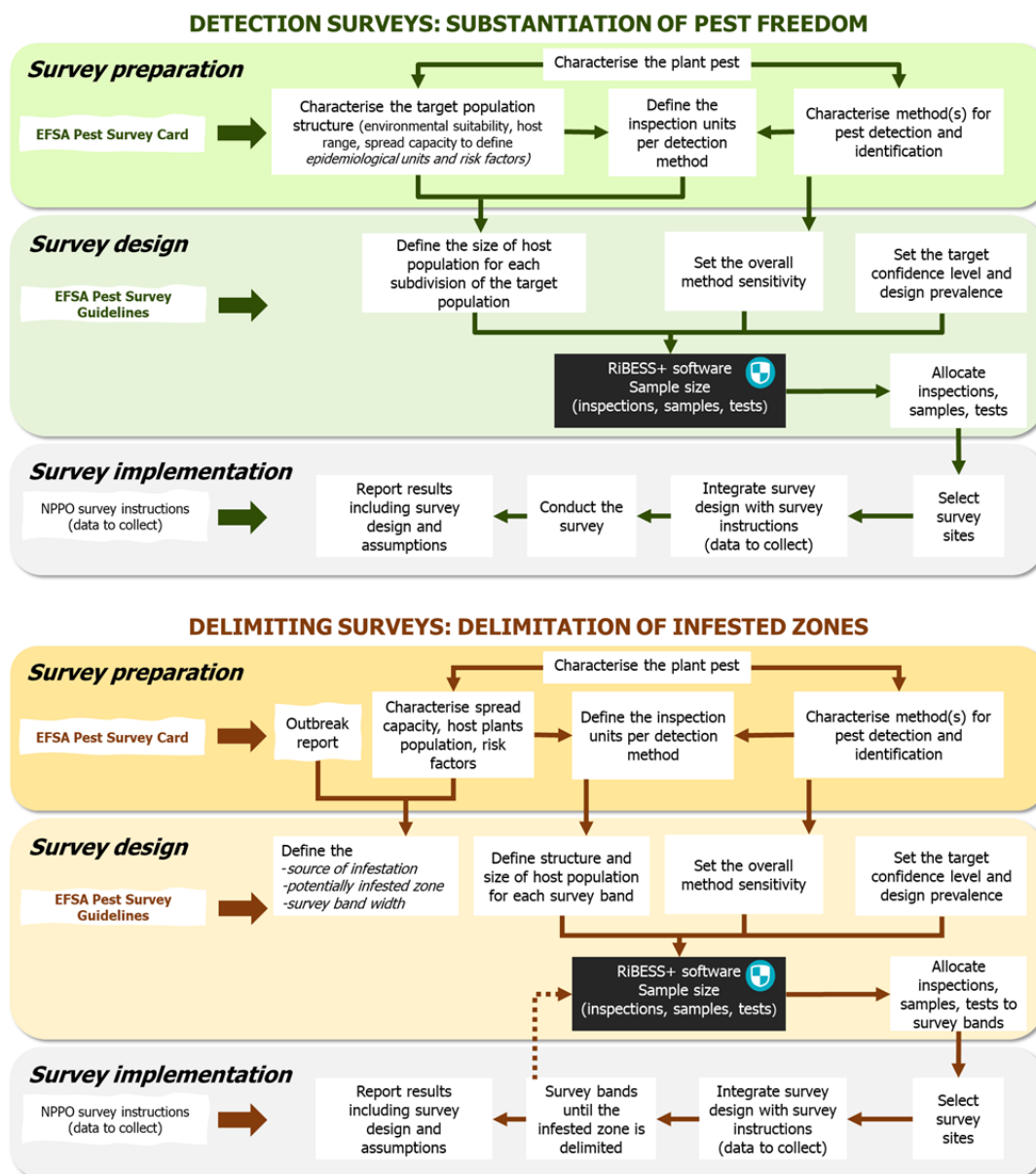


Figure 2: Steps required for the preparation, design and implementation of detection and delimiting surveys, in accordance with the methodology for statistically sound and risk-based surveillance¹

¹ EFSA (European Food Safety Authority), Lázaro E, Parnell S, Vicent Civera A, Schans J, Schenk M, Cortiñas Abrahantes J, Zancanaro G and Vos S, 2020. General guidelines for statistically sound and risk-based surveys of plant pests. EFSA supporting publication 2020:EN-1919. 65 pp. doi:10.2903/sp.efsa.2020.EN-1919 <https://efsa.onlinelibrary.wiley.com/doi/10.2903/sp.efsa.2020.EN-1919>

Relevant EFSA outputs

- General guidelines for statistically sound and risk-based surveys of plant pests: <https://efsa.onlinelibrary.wiley.com/doi/10.2903/sp.efsa.2020.EN-1919>
- Pest survey card on *Euwallacea fornicatus sensu lato*, *Fusarium ambrosium* and *F. euwallaceae*: <https://efsa.europa.eu/plants/planthealth/monitoring/surveillance/euwallacea-fornicatus-fusarium-ambrosium-euwallaceae>
- Commodity risk assessment of *Acer palmatum* plants grafted on *Acer davidii* from China: <https://efsa.onlinelibrary.wiley.com/doi/full/10.2903/j.efsa.2022.7298>
- Pest categorisation of non-EU Scolytinae on non-coniferous hosts: <https://efsa.onlinelibrary.wiley.com/doi/10.2903/j.efsa.2024.8889>
- Index of the EFSA Plant Pest Survey Toolkit: <https://efsa.europa.eu/plants/planthealth/monitoring/surveillance/index>
- EFSA Pest Survey Card gallery: <https://efsa.europa.eu/plants/planthealth/monitoring/surveillance/gallery>
- Pest survey cards: what, when, where and how to survey? <https://efsa.europa.eu/plants/planthealth/monitoring/surveillance/video-pest-survey-card>
- The statistical tool RiPEST: <https://r4eu.efsa.europa.eu/app/surveillance>
- The RiPEST manual: <https://zenodo.org/doi/10.5281/zenodo.8335472>
- The statistical tool RiBESS+: <https://r4eu.efsa.europa.eu/app/ribess>
- The RiBESS+ manual: <https://zenodo.org/doi/10.5281/zenodo.664465>
- The RiBESS+ video tutorial: <https://youtu.be/qYHqrCiMxDY>