Report on 2022 Plant Pest Survey activities

Prepared by Marina Elena Martino

At the request of the European Commission, EFSA was asked to support the EU Member States in the preparation and planning of the surveys of the EU quarantine pests (EFSA mandates on Plant Pest Surveillance M-2020-0114 and M-2022-00069).

In response, EFSA developed a toolkit that consists of pest survey cards on regulated pests, as well as general survey guidelines, three pest-specific guidelines and statistical tools (i.e. RiBESS+). The aim of the pest survey cards is to guide the EU Member States in the preparation of plant pest surveys by providing relevant information on the pests for this activity. The aim of the guidelines is to assist the EU Member States in the design of statistically sound and risk-based surveys for quarantine pests.

The purpose of the current document is to facilitate the access to the outputs delivered in 2022 in the context of both mentioned mandates. The listed outputs are delivered in different formats and platforms: as PDF files in the EFSA Journal, as ESRI ArcGIS StoryMaps in EFSA Plant Pest Survey Cards Gallery, and shared presentations at different conferences, panels and working groups.

In the context of mandate M-2020-0014, the activities of 2022-2027 are focused on the delivery of (i) pest survey cards for all the Union quarantine pests, protected zone pests and provisional quarantine pests; (ii) an expert system, RiPEST (Risk-based Pest Survey Tool), tailored to plant health for guiding the users through the survey design (replacement of RiBESS+), and, (iii) developing of the multi-pest surveys tool to optimize survey activities at crop level.

In the context of mandate M-2022-00069, which purpose is to train the EU Member states on the EFSA toolkit for preparing and designing statistically sound surveys, the EFSA Scientific Network on plant pest surveillance was established and it is planned to start operating during the first semester of 2023. Its main objective is capacity building to train the trainers in the MSs ensuring the outreach and application of the EFSA methodological framework for surveillance, whereby robust and harmonized surveys can be carried out in the EU.

Within the PLANTS Unit, Plant Health Monitoring team, the following persons contributed to the preparation and delivery of the outputs: Melanie Camilleri, Alice Delbianco, Ignazio Graziosi, Tomasz Kaluski, Marina Elena Martino, Luka Mustapic and Sybren Vos.

Through outsourcing procedures, individual collaborators and competent organisations contributed to the preparation and delivery of outputs: Michela Chiumenti, Giulia Mattion, Gabriele Rondoni (collaborators under procedure EOI/EFSA/SCIENCE/2020/01), Instituto Valenciano de Investigaciones Agrarias (IVIA) (in the context of grant GP/EFSA/ALPHA/2021/08-Lot 1), Institute for Sustainable Plant Protection of the National Research Council of Italy (IPSP-CNR) and DAFNAE (Dipartimento di Agronomia, Animali, Alimenti, Risorse naturali e Ambiente, Università di Padova) (in the context of grant GP/EFSA/ALPHA/2021/08–Lot 2). The scientific review of the pest survey cards published in 2022 was performed by the following professionals: Gian Paolo Accotto, Antonio Biondi, Thierry Candresse, Cecile Robin and Irene Vloutoglou.

In order to deliver the outputs of the workplan, a series of Grants with EFSA Article 36 competent organisations funded by EFSA were launched and awarded in 2022 and are expected to start delivering their respective outputs in the first semester of 2023:

- Fruit trees (pome fruits and stone fruits): lot awarded to CSIC (Spanish National Research Council) and ILVO (Flanders Research Institute for Agriculture, Fisheries and Food);
- Coniferous trees: lot awarded to DAFNAE (Dipartimento di Agronomia, Animali, Alimenti, Risorse naturali e Ambiente, Università di Padova) and IPSP (Institute for Sustainable Pant Protection of the National Research Council of Italy (CNR)).

All the outputs can be accessed through the Index of the EFSA Plant Pest Survey Toolkit[1]. The pest survey cards in the StoryMap format are available in the Gallery[2]. EFSA Plant Pest Surveillance outputs were promoted through the EFSA Plant Health Twitter account (@Plants_EFSA[3], 3.932 followers on April 21, 2023), gaining an average of about 4000 visualizations per Tweet.

Table 1 shows the 2022 ongoing Grants in Plant Pest Surveillance.

Table 2 shows the outputs published in 2022.

Table 3 shows Plant Pest Surveillance new mandate M-2022-00069.

Table 4 shows the events which the Plant Health Monitoring team has organized or collaborated with in 2022.

Suggested citation: Martino ME, Camilleri M, Delbianco A, Graziosi I, Kaluski T and Vos S, 2023. Report on 2022 Plant Pest Survey activities. Environment, Plants and Ecotoxicology (PLANTS) Unit, Plant Health Monitoring team. European Food Safety Authority. 5 pp. doi: 10.5281/zenodo.7875069

Correspondence: any enquires related to this output should be addressed to PLANTS@efsa.europa.eu

---

[1] https://efsa.europa.eu/plants/planthealth/monitoring/surveillance/index

[2] https://efsa.europa.eu/plants/planthealth/monitoring/surveillance/gallery

[3] https://twitter.com/Plants_EFSA?s=20

Table 1: 2022 ongoing Plant Pest Surveillance outsourced activities under mandate M-2020-0114[4]

Outsourcing	Pest species	Expected deliverables by the end of the project
GP/EFSA/ALPHA/2021/08 LOT 1 Citrus pests – Awarded to IVIA	*Citrus leprosis viruses, Elsinoë australis, Elsinoë citricola, Elsinoë fawcettii, Eotetranychus lewisi, Lopholeucaspis japonica, Pseudocercospora angolensis, Oemona hirta*	**Pest survey cards:** production of an initial draft and a final draft with EFSA review comments included for each pest
	Aleurocanthus citriperdus, Aleurocanthus spiniferus, Aleurocanthus woglumi, Anastrepha ludens, Anoplophora chinensis, Bactrocera dorsalis, Candidatus Phytoplasma aurantifolia-reference strain, 'Candidatus Liberibacter africanus', 'Candidatus Liberibacter americanus', 'Candidatus Liberibacter asiaticus', Citrus leprosis viruses, Citrus tristeza virus (EU and non-EU isolates), *Diaphorina citri, Elsinoë australis, Elsinoë citricola, Elsinoë fawcettii, Eotetranychus lewisi, Hishimonus phycitis, Lopholeucaspis japonica, Oemona hirta, Phyllosticta citricarpa, Pseudocercospora angolensis, Satsuma dwarf virus, Scirtothrips aurantii, Scirtothrips citri, Scirtothrips dorsalis, Thaumatotibia leucotreta, Toxoptera citricida, Trioza erytreae, Unaspis citri, Xanthomonas citri* pv. *aurantifolii* and pv. *citri, Xylella fastidiosa*	**Development of the crop-based surveillance methodology:** draft guidelines for preparing and designing multi-pest surveys in citrus
	Anastrepha ludens, Anoplophora chinensis, Bactrocera dorsalis, 'Candidatus Liberibacter africanus', 'americanus' and 'asiaticus', Phyllosticta citricarpa, Thaumatotibia leucotreta, Xylella fastidiosa	**Adjustment of survey preparation and design of the citrus priority pests:** pilot the new the expert system for survey preparation and design of surveys for the priority pests threatening the citrus crops in the EU, provide feedback on tool performance and report the adjustments to be made
	-	**Promotion of the crop-based survey methodology with the MSs:** co-organize a workshop with stakeholders and potential users and plan a webinar on the statistically sound and crop-based surveys for a broader audience
	-	**Test the entire pest survey toolkit for the implementation in citrus orchards:** coordinate the practical implementation of the tools in surveys of citrus pests in citrus orchards

---

[4] https://open.efsa.europa.eu/

GP/EFSA/ALPHA/2021/08 LOT 2 Broadleaved trees – Awarded to DAFNAE – IPSP	*Bretziella fagacearum, Chrysomyxa arctostaphyli, Davidsoniella virescens, Melampsora medusae f. sp. tremuloidis, Sphaerulina musiva, Stegophora ulmea, Anisogramma anomala, Cryphonectria parasitica, Entoleuca mammata, Arrhenodes minutus, Pseudopityophthorus minutissimus, Pseudopityophthorus pruinosus, Thaumatopoea processionea*	**Pest survey cards:** production of an initial draft and a final draft with EFSA review comments included for each pest
	Anoplophora glabripennis, Stegophora ulmea, Agrilus anxius, Anisogramma anomala, Agrilus auroguttatus, Cryphonectria parasitica, Agrilus planipennis, Entoleuca mammata, Bretziella fagacearum, Arrhenodes minutus, Ceratocystis platani, Pseudopityophthorus minutissimus, Chrysomyxa arctostaphyli, Pseudopityophthorus pruinosus, Davidsoniella virescens, Melampsora medusae f. sp. tremuloidis, Thaumatopoea processionea, Sphaerulina musiva, Gonipterus scutellatus, Xylosandrus crassiusculus, Dryocosmus kuriphilus	**Development of the crop-based surveillance methodology:** draft guidelines for preparing and designing multi-pest surveys in broadleaved trees
	Anoplophora glabripennis, Agrilus planipennis, Agrilus anxius	**Adjustment of survey preparation and design of the broadleaved trees priority pests:** pilot the new the expert system for survey preparation and design of surveys for the priority pests threatening the broadleaved trees in the EU, provide feedback on tool performance and report the adjustments to be made
	-	**Promotion of the crop-based survey methodology with the MSs:** co-organize a workshop with stakeholders and potential users and plan a webinar on the statistically sound and crop-based surveys for a broader audience
	-	**Test the entire pest survey toolkit for the implementation in citrus orchards:** coordinate the practical implementation of the tools in surveys of citrus pests in citrus orchards
GP/EFSA/ALPHA/2017/02 – Lot 3 GA 1 – Awarded to University of Thessaly (UTH)	non-European Tephritidae (75 taxa)	**Pest survey cards:** production of an initial draft and a final draft with EFSA review comments included for each pest **Database for the surveillance of non-EU Tephritidae in the EU:** Excel spreadsheet including relevant information on surveillance of 254 species of non-EU Tephritidae belonging to the 75 taxa **Guide for using pest survey cards:** guide for selecting and using the most appropriate EFSA pest survey card for the preparation of surveillance activities of non-EU Tephritidae

GP/EFSA/ALPHA/2021/08 LOT 3 Potato pests – Awarded to NVWA	*Leptinotarsa decemlineata, Nacobbus aberrans, Puccinia pittieriana, Ralstonia syzygii* subsp. *indonesiensis, Septoria malagutii, Stagonosporopsis andigena, Thecaphora solani,* Andean potato weevil complex	**Pest survey cards:** production of an initial draft and a final draft with EFSA review comments included for each pest
	Group of Potato viruses; viroids and phytoplasmas	**Pest survey cards:** production of an initial draft and a final draft with EFSA review comments included. The taxa should be grouped for preparing survey cards that include multiple taxa
	Candidatus Liberibacter solanacearum + *Bactericera cockerelli, Clavibacter michiganensis* subsp. *sepedonicus, Epitrix cucumeris, E. papa, E. subcrinita* and *E. tuberis, Globodera rostochiensis* and *G. pallida, Meloidogyne chitwoodi* and *M. fallax*	**Pilot the new expert system:** pilot the new the expert system for survey preparation and design for the pests threatening the potato crops in the EU. Afterwards, adjust the survey preparation and design of the potato pests
	Candidatus Liberibacter solanacearum, *Clavibacter michiganensis* subsp. *sepedonicus, Epitrix cucumeris, E. papa, E. subcrinita* and *E. tuberis, Globodera rostochiensis* and *G. pallida, Meloidogyne chitwoodi* and *M. fallax, Ralstonia solanacearum, Synchytrium endobioticum Tecia solanivora Naupactus leucoloma Leptinotarsa decemlineata Nacobbus aberrans Puccinia pittieriana Ralstonia syzygii* subsp. *indonesiensis Septoria malagutii Stagonosporopsis andigena Thecaphora solani,* Andean potato weevil complex	**Application of Multi-pest crop-based surveillance methodology:** support the development of the crop-based surveillance methodology and apply it to the potato crop as a pilot
	-	**Workshop and webinar on multi-pest surveys in potato:** co-organise with EFSA a 2 days' workshop on statistically sound and crop-based surveys for potato pests
GP/EFSA/PLANTS/2022/05 LOT 1 Fruit trees (pome fruits and stone fruits) – Awarded to CSIC – ILVO	*Acrobasis pirivorella* (Matsumura), *Anthonomus quadrigibbus* Say, *Apiosporina morbosa* (Schwein.) Arx, *Apriona cinerea* Chevrolat, *Botryosphaeria kuwatsukai* (Hara) G.Y. Sun and E. Tanaka, *Carposina sasakii* Matsumara, *Grapholita inopinata* (Heinrich), *Grapholita prunivora* (Walsh), *Grapholita packardi* Zeller, *Gymnosporangium* spp., *Longidorus diadecturus* Eveleigh and Allen, *Phyllosticta solitaria* Ellis & Everhart, *Saperda candida* Fabricius, Tomato ringspot virus, *Venturia nashicola* S. Tanaka & S. Yamamoto, *Xiphinema americanum* Cobb *sensu stricto, Xiphinema bricolense* Ebsary, Vrain & Graham, *Xiphinema inaequale* Khan et Ahmad	**Pest-host-detection database:** Excel spreadsheet with the list of host plant species and the detection and identification methodologies for each pest
		Crop characterization: Excel spreadsheet and short technical report (Word file) for characterizing the fruit trees crop
		Delivery plan of pest survey cards: presentation of the previous deliverables and proposal of pest survey cards delivery plan
		Pest survey cards: production of an initial draft and a final draft with EFSA review comments included for each pest

GP/EFSA/PLANTS/2022/05 LOT 2 Coniferous trees – Awarded to DAFNAE – IPSP	*Aschistonyx eppoi* Inouye, *Oligonychus perditus* Pritchard and Baker, *Choristoneura* spp., *Atropellis* spp., *Coniferiporia sulphurascens* (Pilát) L.W. Zhou & Y.C. Dai, *Coniferiporia weirii* (Murrill) L.W. Zhou & Y.C. Dai, *Cronartium* spp., *Gremmeniella abietina* (Lagerberg) Morelet, *Guignardia laricina* (Sawada) W. Yamam& Kaz. Itô, *Melampsora farlowii* (Arthur) Davis, *Mycodiella laricis-leptolepidis* (Kaz. Itô, K. Satô & M. Ota) Crous, *Phytophthora ramorum* Werres, De Cock & Man in 't Veld, *Pseudocercospora pini-densiflorae* (Hori & Nambu) Deighton, *Arceuthobium* spp.	**Pest-host-detection database:** Excel spreadsheet with the list of host plant species and the detection and identification methodologies for each pest
		Crop characterization: Excel spreadsheet and short technical report (Word file) for characterizing the coniferous trees crop
		Delivery plan of pest survey cards: presentation of the previous deliverables and proposal of pest survey cards delivery plan
		Pest survey cards: production of an initial draft and a final draft with EFSA review comments included for each pest

Table 2: Outputs on Plant Pest Surveillance published in 2022 under mandate M-2020-0114

Outputs		Publication date	Link to the output
New Pest Survey Cards	Tomato brown rugose fruit virus	26 July	https://efsa.europa.eu/plants/planthealth/monitoring/surveillance/tomato-brown-rugose-fruit-virus
	Pseudocercospora angolensis	26 September	https://efsa.europa.eu/plants/planthealth/monitoring/surveillance/pseudocercospora-angolensis
	Elsinoë australis, E. citricola and *E. fawcettii*	27 September	https://efsa.europa.eu/plants/planthealth/monitoring/surveillance/elsinoe-australis-citricola-fawcettii
	Bretziella fagacearum	4 November	https://efsa.europa.eu/plants/planthealth/monitoring/surveillance/bretziella-fagacearum
	Spodoptera litura	4 November	https://efsa.europa.eu/plants/planthealth/monitoring/surveillance/spodoptera-litura
	Exomala orientalis	15 November	https://efsa.europa.eu/plants/planthealth/monitoring/surveillance/exomala-orientalis
	Chrysomyxa arctostaphyli	12 December	https://efsa.europa.eu/plants/planthealth/monitoring/surveillance/chrysomyxa-arctostaphyli
Updated Pest Survey Cards	*Anastrepha ludens*	13 April	https://efsa.europa.eu/plants/planthealth/monitoring/surveillance/anastrepha-ludens
	Bactrocera zonata	2 May	https://efsa.europa.eu/plants/planthealth/monitoring/surveillance/bactrocera-zonata
	Conotrachelus nenuphar	31 May	https://efsa.europa.eu/plants/planthealth/monitoring/surveillance/conotrachelus-nenuphar
	Rhagoletis pomonella	31 May	https://efsa.europa.eu/plants/planthealth/monitoring/surveillance/rhagoletis-pomonella
	Anthonomus eugenii	5 July	https://efsa.europa.eu/plants/planthealth/monitoring/surveillance/anthonomus-eugenii
	Agrilus anxius	28 November	https://efsa.europa.eu/plants/planthealth/monitoring/surveillance/agrilus-anxius
	Bactrocera dorsalis	12 December	https://efsa.europa.eu/plants/planthealth/monitoring/surveillance/bactrocera-dorsalis

Table 3: New mandate on Plant Pest Surveillance M-2022-00069[5]

Mandate number	Main objectives	Progress & Available material
M-2022-00069	• **Communication and training**: establishing a MSs network, training of third countries, webinars • **Support to the European Commission**: analysis of statistically sound surveys • **Support to the Member States**: estimation of survey parameters for priority pests • **Pest prevalence estimation surveys**: guidelines, training	EFSA scientific Network on Plant Pest Surveillance established in 2022 Terms of reference https://www.efsa.europa.eu/sites/default/files/2023-01/terms-of-reference-network-plant-pest-surveillance-2022-2025.pdf Member institutions https://www.efsa.europa.eu/sites/default/files/2023-02/plantpestsurveillancenetworklist.pdf

---

[5] https://open.efsa.europa.eu/

Table 4: Events which the Plant Pest Surveillance project has organized or has been involved with in 2022

Event	Topic	Date	Organiser	Participants	Available material
Plant Protection Conference – 62nd Science Session IPP – NRI	EFSA Plant Pest Survey Toolkit	16 February	Institute of Plant Protection - National Research Institute	Sybren Vos	https://doi.org/10.5281/zenodo.7745816
EC Working Group on Plant Health Surveillance	EFSA Plant Pest Survey Toolkit	17 February	European Commission	Ignazio Graziosi, Melanie Camilleri, Luka Mustapic, Sybren Vos	https://doi.org/10.5281/zenodo.7759234
	EFSA activities on Pest Surveillance	17 November	European Commission	Ignazio Graziosi, Tomasz Kaluski, Sybren Vos	https://doi.org/10.5281/zenodo.7759260
EPPO Panels on Diagnostics in Virology, Mycology, Entomology, Bacteriology, Nematology	EFSA activities on Pest Surveillance	3 May, 7 September, 14 September, 11 October, 8 November	European and Mediterranean Plant Protection Organization (EPPO)	Alice Delbianco, Ignazio Graziosi, Sybren Vos	https://doi.org/10.5281/zenodo.7759529
EC Working Group on EUROPHYT-Outbreaks	EFSA activities on Pest Surveillance and Risk Assessment	7 June	European Commission	Alice Delbianco, Ewelina Czwienczek (Plant Health Risk Assessment team)	https://doi.org/10.5281/zenodo.7759603

61st annual Southern Forest Insect Work Conference (SFIWC)	Risk-based surveillance of an imminent invader in the EU: The EFSA pest survey toolkit and the emerald ash borer *Agrilus planipennis*	21-23 June	Southern Forest Insect Work Conference (SFIWC)	Ignazio Graziosi	https://doi.org/10.5281/zenodo.7759715
	Poster - Strengthening the firewall against invasive insects: the EFSA Plant Pest Survey Toolkit				https://doi.org/10.5281/zenodo.7759867
XXVI International Congress of Entomology (ICE)	Poster - Strengthening the firewall against invasive insects: the EFSA Plant Pest Survey Toolkit	17-22 July	International Congress of Entomology Council	Ignazio Graziosi	https://doi.org/10.5281/zenodo.7759867
	Symposium - Predicting new pest introductions: tools and strategies				https://doi.org/10.5281/zenodo.7760356
Pest Surveillance Workshop: Information Session on the Tomato brown rugose fruit virus	EFSA Plant Pest Survey Toolkit	12 September	European Food Safety Authority (EFSA), Malta's National Plant Protection Organisation	Melanie Camilleri, Sybren Vos	https://doi.org/10.5281/zenodo.7760558
	Pest survey card on Tomato brown rugose fruit virus				
	Survey Design for ToBRFV				
	Reporting of statistically sound surveys				
	Future steps				
International Plant Health Conference London 2022	EFSA activities on Pest Surveillance and Horizon Scanning	21 - 23 September	Food and Agriculture Organization of the United Nations (FAO), Department for Environment, Food & Rural Affairs (DEFRA), International Plant Protection Convention	Sybren Vos	https://doi.org/10.5281/zenodo.7763108

Annual meeting of International Pest Risk Research Group (IPRRG)	Emerging pests in the European Union: EFSA pest survey toolkit to support EU risk managers	10-13 October	International Pest Risk Research Group (IPRRG), Benaki Phytopathological Institute, European and Mediterranean Plant Protection Organization (EPPO), European Food Safety Authority (EFSA), University of Thessaly	Tomasz Kaluski	https://doi.org/10.5281/zenodo.7760621
	Emerging pests in the European Union: pest survey cards as a surveillance tool				https://doi.org/10.5281/zenodo.7760685
	Emerging pests in the European Union: EFSA IT tools to support EU risk managers				https://doi.org/10.5281/zenodo.7760712
European Union Reference Laboratories (EURL) workshop - Insects and Mites	Importance and use of diagnostic protocols for the design of statistically sound surveys for quarantine pests in the EU	29 November	European Union Reference Laboratory for insects and mites	Alice Delbianco, Ignazio Graziosi, Marina Elena Martino, Sybren Vos	https://doi.org/10.5281/zenodo.7760786
	Preparing for the invasion: Pest survey cards on non-EU tephritids				https://doi.org/10.5281/zenodo.7760797
Free University of Bozen-Bolzano visit to EFSA	Introduction to Plant Health activities in EFSA	12 December	European Food Safety Authority (EFSA)	Ignazio Graziosi, Sybren Vos	https://doi.org/10.5281/zenodo.7760825
Working groups meetings	Pest survey cards review	2022	European Food Safety Authority (EFSA)	EFSA Working group on Pest Survey cards review	https://www.efsa.europa.eu/sites/default/files/wgs/plant-health/wg-plh-Pest-Survey.pdf
	Pest survey methods			EFSA Working group on Pest Survey Methods	https://www.efsa.europa.eu/sites/default/files/wgs/plant-health/wg-pest-survey-methods-m-2020-0114.pdf