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2023/221 New data on quarantine pests and pests of the EPPO Alert List

By searching through the literature, the EPPO Secretariat has extracted the following new data concerning quarantine pests and pests included (or formerly included) on the EPPO Alert List, and indicated in bold the situation of the pest concerned using the terms of ISPM 8.

- **New records**

Citrus leaf blotch virus 2 (*Citrivirus*, CLBV-2) is a newly described virus, first reported in China in 2018 (EPPO RS 2020/184). It was first reported from Jeju Island (Republic of Korea) in July 2021 on symptomatic mandarin (*Citrus reticulata*) (Kwak & Kil, 2023). The other species in the genus *Citrivirus*, Citrus leaf blotch virus (CLBV) is a Regulated Non-Quarantine Pest for a number of EPPO member countries.

Fusarium wilt of banana caused by *Fusarium oxysporum* f. sp. *cubense* Tropical race 4 (EPPO Alert list) is first reported from Comoros. Symptoms were observed on Cavendish banana plants in Grande Comoros (Ngazidja) in early 2023. Surveys will be conducted to assess the presence and impact of the pathogen in all three Comoros islands (Mmadi *et al.*, 2023).

In Switzerland, tomato fruit blotch virus (*Blunervirus solani*, ToFBV) was first reported in a tomato (*Solanum lycopersicum*) fruit production site in Ticino region (Blouin *et al.*, 2023).

In Slovenia, tomato fruit blotch virus (*Blunervirus solani*, ToFBV) was first reported based on high throughput sequencing analysis of the tomato (*Solanum lycopersicum*) virome (Rivarez *et al.*, 2023).

Xylosandrus compactus (Coleoptera: Curculionidae: Scolytinae – formerly EPPO Alert List) is reported for the first time from Mexico. In November 2021, it was found in coffee plantations in the municipality of Zoquitlán (state of Puebla). In 2022, it was also observed in Veracruz (municipality of Tezonapa) and Oaxaca (municipality of Santa María Chilchotla), close to the infested area in Puebla. The pest was mainly found on Robusta coffee plants (*Coffea canephora*) and to a lesser extent on Arabica coffee plants (*C. arabica*) (Equihua-Martínez *et al.*, 2023).

- **Detailed records**

Dendroctonus frontalis (Coleoptera: Curculionidae: Scolytinae – EPPO A1 List) is extending its range northwards in the USA. It was first recorded in 2021 in the north of New York state, and has been caught in traps in New Hampshire and Maine (Kanaskie *et al.*, 2023).

In Brazil, *Xylosandrus compactus* (Coleoptera: Curculionidae: Scolytinae – formerly EPPO Alert List) occurs in the states of Amazonas, Bahia, Espírito Santo, Rondônia and Tocantins. Its presence is also reported from Minas Gerais and Pará (Torrez *et al.*, 2022).

Sources:
Blouin AG, Dubuis N, Brodard J, Apothéloz-Perret-Gentil L, Altenbach D, Schumpp O (2023) Symptomatic, widespread, and inconspicuous: new detection of tomato fruit blotch virus. *Phytopathologia Mediterranea* **62**(3), 349-354. https://doi.org/10.36253/phyto-14463
Equihua-Martínez A, Robledo-Martínez JD, Barrera JF (2023) The presence of *Xylosandrus compactus* (Coleoptera: Curculionidae: Scolytinae) in the Sierra Negra of Puebla, Veracruz and Oaxaca, Mexico. *Florida Entomologist* **106**(3), 192-194. https://doi.org/10.1653/024.106.0307

Kanaskie CR, Schmeelk TC, Cancelliere JA, Garnas JR (2023) New records of Southern Pine Beetle (*Dendroctonus frontalis* Zimmermann; Coleoptera: Curculionidae) in New York, New Hampshire, and Maine, USA indicate Northward range expansion. *The Coleopterists Bulletin* **77**(2), 248-251.

Kwak M, Kil EJ (2023) First report of citrus leaf blotch virus 2 in mandarin (*Citrus reticulata*) in Jeju Island, Korea. *Plant Disease* **107**(5), 1639.

Mmadi M, Azali HA, Mostert D, Robène I, Viljoen A (2023) First report of Fusarium wilt of Cavendish bananas caused by *Fusarium oxysporum* f. sp. *cubense* Tropical Race 4 in the Grande Comoros Island. *Plant Disease* (early view). https://doi.org/10.1094/PDIS-07-23-1288-PDN

Rivarez MP, Pecman A, Bačnik K, Maksimović O, Vučurović A, Seljak G, Mehle N, Gutiérrez-Aguirre I, Ravnikar M, Kutnjak D (2023) In-depth study of tomato and weed viromes reveals undiscovered plant virus diversity in an agroecosystem. *Microbiome* **11**, 60. https://doi.org/10.1186/s40168-023-01500-6

Torrez AA, Imakawa AM, Barbosa ML, Souza LA, Sampaio PD (2022) [Traps efficiency in the capture of *Xylosandrus compactus* (Eichhoff, 1875)(Coleoptera: Curculionidae: Scolytinae) during the early development of *Aniba rosaeodora* Ducke]. *Research Society and Development* **11**(1), e48911125186. http://dx.doi.org/10.33448/rsd-v11i1.25186 (in Portuguese).

Additional key words: detailed record, new record

Computer codes: CLBV20, DENCFR, FUSAC4, FUSACB, TOFBV0, XYLSCO, BR, CH, CH, KM, KR, MX, SI, US

2023/222 New and revised dynamic EPPO datasheets are available in the EPPO Global Database

The EPPO Secretariat is in the process of revising the EPPO datasheets on pests recommended for regulation and creating new datasheets. This project is also supported by an EU grant agreement. This revision provides the opportunity to create dynamic datasheets in the EPPO Global Database in which the sections on pest identity, host range and geographical distribution are automatically generated by the database. It is planned that these dynamic datasheets will progressively replace the PDF documents that are currently stored in the database. Since the previous report (EPPO RS 2023/195), the following new and revised EPPO datasheets have been published in the EPPO Global Database:

- *Andean potato latent virus**. https://gd.eppo.int/taxon/APLV00/datasheet
- *Andean potato mild mosaic virus***. https://gd.eppo.int/taxon/APMMV0/datasheet
- *Ditylenchus dipsaci*. https://gd.eppo.int/taxon/DITYDI/datasheet
- *Fusarium foetens*. https://gd.eppo.int/taxon/FUSAFO/datasheet
- *Nacobbus aberrans sensu lato*. https://gd.eppo.int/taxon/NACOBA/datasheet
- *Phialophora cinerescens*. https://gd.eppo.int/taxon/PHIACI/datasheet
- *Xiphinema americanum sensu lato*. https://gd.eppo.int/taxon/XIPHAM/datasheet
- *Xiphinema americanum sensu stricto*. https://gd.eppo.int/taxon/XIPHAA/datasheet
- *Xiphinema bricolense*. https://gd.eppo.int/taxon/XIPHBC/datasheet
- *Xiphinema californicum*. https://gd.eppo.int/taxon/XIPHCA/datasheet
- *Xiphinema rivesi*. https://gd.eppo.int/taxon/XIPHRI/datasheet

* Now *Tymovirus latandigenum* according to the new binomial nomenclature.
** Now *Tymovirus mosandigenum* according to the new binomial nomenclature.

Source: EPPO Secretariat (2023-10).

Computer codes: APLV00, APMMV0, DITYDI, FUSAFO, NACOBA, PHIACI, XIPHAA, XIPHAM, XIPHBC, XIPHCA, XIPHRI

Additional key words: publication

2023/223 New additions to the EPPO A1 and A2 Lists

In September 2023, the EPPO Council approved the following changes made to the EPPO A1 and A2 Lists of pests recommended for regulation as quarantine pests.

Additions to the A1 List (pests absent from the EPPO region)
- *Meloidogyne ethiopica* (Nematoda: Meloidogynidae)
- *Spodoptera ornithogalli* (Lepidoptera: Noctuidae)
- *Spodoptera praefica* (Lepidoptera: Noctuidae)
- *Tetranychus mexicanus* (Acari: Tetranychidae)

Additions to the A2 List (pests locally present in the EPPO region)
- *Ageratina adenophora* (Asteraceae)
- *Crisicoccus pini* (Hemiptera: Pseudococcidae)
- *Meloidogyne luci* (Nematoda: Meloidogynidae)
- *Meloidogyne graminicola* (Nematoda: Meloidogynidae)

Transfer from the A1 to the A2 List
- *Scirtothrips citri* (Thysanoptera: Thripidae)

For each individual pest, PRA documents and datasheets have been prepared (or are under development) and will be available in due course in the EPPO Global Database (https://gd.eppo.int) and the EPPO Platform on PRAs (https://pra.eppo.int/).

Source: EPPO Secretariat (2023-09).

Pictures:
Ageratina adenophora. https://gd.eppo.int/taxon/EUPAD/photos
Crisicoccus pini. https://gd.eppo.int/taxon/DACLPI/photos
Meloidogyne enterolobii. https://gd.eppo.int/taxon/MELGMY/photos
Meloidogyne graminicola. https://gd.eppo.int/taxon/MELGGC/photos
Meloidogyne luci. https://gd.eppo.int/taxon/MELGLC/photos
Scirtothrips citri. https://gd.eppo.int/taxon/SCITCI/photos
Spodoptera ornithogalli. https://gd.eppo.int/taxon/PRODOR/photos
Tetranychus mexicanus. https://gd.eppo.int/taxon/TETRME/photos

Additional key words: EPPO lists

Computer codes: DACLPI, EUPAD, MELGGC, MELGLC, MELGMY, PRODOR, PRODPR, SCITCI, TETRME

2023/224 New IPPC guides on e-commerce and management of Fusarium Tropical Race 4

The IPPC Secretariat has recently published two new guides.

- **E-commerce. A guide to managing the pest risk posed by goods ordered online and distributed through postal and courier pathways.**
  This guide provides practical guidance for improving cooperation and collaboration with key stakeholders involved in e-commerce supply chains, including national customs administrations, postal operators, courier services, e-commerce platforms and marketplaces, and the general public.
  This guide can be downloaded from the FAO website: https://www.fao.org/documents/card/en/c/cc8209en

- **Prevention, preparedness and response guidelines for Fusarium Tropical Race 4 (TR4) of banana.**
  Fusarium wilt of banana caused by *Fusarium oxysporum* f. sp. *cubense* Tropical race 4 (EPPO Alert list) is a major threat to worldwide banana production. This guide highlights actions to prevent the TR4 spread, critical operational actions to prepare the governments' capacities to respond to TR4 outbreaks, and mentions the technical and operational actions to approach TR4 containment when detected in a new territory.
  This guide can be downloaded from the FAO website: https://www.fao.org/documents/card/en/c/cc4865en

Source: IPPC Secretariat (2023-10).

Additional key words: publication, IPPC Computer codes: FUSAC4

2023/225 First report of *Spodoptera frugiperda* in Greece

The NPPO of Greece recently informed the EPPO Secretariat of the first record of *Spodoptera frugiperda* (Lepidoptera: Noctuidae – EPPO A2 List) on its territory. As part of the official survey programme conducted since 2019, pheromone funnel traps were placed in fields of maize (*Zea mays*), rice (*Oryza sativa*) and solanaceous plants in 40 regional units of Greece. Adults were caught at the end of September and in October 2023, first in the mainland in the regions of Laconia and Eastern Attica, and then in the region of Evvoia and the island of Kriti (in the region of Heraklion and Lassithi).
The pest was identified as *S. frugiperda* by the Benaki Phytopathological Institute following EPPO Standard PM 7/124(1) and confirmed by the relevant EU Reference Laboratory for Insects and Mites. Eradication measures are being taken according to Commission Implementing Regulation (EU) 2023/1134. Surveys will be intensified, and actions to inform stakeholders and the general public have been taken.

The pest status of *Spodoptera frugiperda* in Greece is officially declared as: **Present, under eradication.**

Source: NPPO of Greece (2023-10).

Commission Implementing Regulation (EU) 2023/1134 of 8 June 2023 as regards measures to prevent the introduction into, establishment and spread within the Union territory of *Spodoptera frugiperda* (Smith) and repealing Commission Implementing Decision (EU) 2018/638. OJ L 149.
http://data.europa.eu/eli/reg_impl/2023/1134/oj

Pictures: *Spodoptera frugiperda*. https://gd.eppo.int/taxon/LAPHFR/photos

Additional key words: new record **Computer codes:** LAPHFR, GR

2023/226 First report of *Spodoptera frugiperda* in Portugal (Madeira)

The NPPO of Portugal recently informed the EPPO Secretariat of the first record of *Spodoptera frugiperda* (Lepidoptera: Noctuidae – EPPO A2 List) on its territory. As part of the official survey programme, one specimen (male adult) was caught in a pheromone trap located in a sugarcane (*Saccharum officinarum*) field, in the municipality of Câmara de Lobos on Madeira Island.
The specimen was identified as *S. frugiperda* by the Madeira Regional Laboratory (Laboratório de Qualidade Agrícola - LQA) and confirmed by the EU Reference Laboratory for Insects and Mites. Measures are being taken according to Commission Implementing Regulation (EU) 2023/1134, including the immediate intensification of the official survey programme across the whole island. Several host plants could be found in the vicinity of the trapping site, but no other specimens nor symptoms of the pest were found. There are no producers of host propagating material in the vicinity of this detection site.

The pest status of *Spodoptera frugiperda* in Portugal is officially declared as: **Present, only in some parts of the Member State concerned.**

Source: NPPO of Portugal (2023-09).

Commission Implementing Regulation (EU) 2023/1134 of 8 June 2023 as regards measures to prevent the introduction into, establishment and spread within the Union territory of *Spodoptera frugiperda* (Smith) and repealing Commission

Implementing Decision (EU) 2018/638. OJ L 149
http://data.europa.eu/eli/reg_impl/2023/1134/oj

Pictures: *Spodoptera frugiperda*. https://gd.eppo.int/taxon/LAPHFR/photos

Additional key words: new record **Computer codes:** LAPHFR, PT

2023/227 Non-native beetles trapped at entry points in Spain

Two recent articles report on surveillance programme on beetles in Spain. A multiannual surveillance programme was carried out from 2017 to 2021 with baited traps at five Spanish ports (Alicante, Castellon de la Plana, Gandia, Sagunto, and Valencia), targeting non-native bark and ambrosia beetles, as well as longhorn beetles. In another study carried out from 2013 to 2022, traps were placed in all the international ports and wood processing sites of the Valencia region, as well as in the nearby forested areas. The following non-native beetles were caught:

Species	Family/subfamily	Specimen numbers	Comments
Coccotrypes dactyliperda	Scolytinae	432	Trapped in Alicante, Castellon de la Plana, Gandia, Sagunto, and Valencia (port and surrounding area)
Dactylotrypes longicollis	Scolytinae	2	Trapped in Valencia (port)
Gnathotrichus materiarius	Scolytinae	1	Trapped in Sagunto (port)
Hypothenemus eruditus	Scolytinae	3	Trapped in Castellon de la Plana and Gandia (surrounding area)
Ips calligraphus (EPPO A1 List)	Scolytinae	4	Trapped in Valencia (port) in 2019 First record in Europe
Ips grandicollis (EPPO A1 List)	Scolytinae	1	Trapped in the forest near Valencia in 2014 First record in Europe
Xyleborus bispinatus	Scolytinae	29	Trapped in Castellon de la Plana and Gandia (surrounding area) First record in Spain
Xylosandrus germanus	Scolytinae	16	Trapped in Gandia (surrounding area)
Xylotrechus stebbingi	Cerambycidae	8	Trapped in Gandia, Sagunto, and Valencia (port) and Castellon de la Plana (surrounding area)

After the capture of *Ips calligraphus* in August 2019, several field surveys were carried out in 2021 to search for signs of establishment of the species. Additional traps were installed, but no further specimens were detected. Similarly, no other specimens of *I. grandicollis* were trapped after 2014. The authors noted that these species had probably been transported through international trade from their native range, but consider that they are not established in Spain.

The pest situation of *Ips calligraphus* and *Ips grandicollis* in Spain can be described as: **Absent, intercepted only.**

Source: Mas H, Santoiemma G, Lencina JL, Gallego D, Pérez-Laorga E, Ruzzier E, Rassati D (2023) Investigating beetle communities in and around entry points can improve surveillance at national and international scale. *NeoBiota* **85**, 145-165. https://doi.org/10.3897/neobiota.85.103904

Mas H, Johnson AJ (2023) First reported detection of *Ips calligraphus* Germar (Coleoptera: Curculionidae) and *Ips grandicollis* Eichhoff (Coleoptera: Curculionidae) in a port of entry and its surrounding forest in Spain. *Coleopterists Bulletin* (in press).

Pictures: *Ips calligraphus*. https://gd.eppo.int/taxon/IPSXCA/photos

Additional key words: new record, interception

Computer codes: COCODA, GNAHMA, HYOTEU, IPSXCA, IPSXGR, XYLBBI, XYLOST, ES

2023/228 *Anoplophora horsfieldii* (Coleoptera: Cerambycidae): addition to the EPPO Alert List

Why
Anoplophora horsfieldii (Coleoptera: Cerambycidae - chinaberry yellow-banded longhorn beetle) originates from South-East Asia. Its establishment on the island of Jeju (Republic of Korea) has recently been reported, thus indicating that this insect has the potential to expand its distribution range. On Jeju Island, the first specimens of *A. horsfieldii* were photographed in September 2019 in urban environments by members of the public. In July 2022, scientists observed adult beetles and exit holes in *Celtis sinensis* (Cannabaceae) trees. They confirmed the establishment of *A. horsfieldii* and estimated that the insect had been introduced around 2015. For the moment, the pest is restricted to a small area located between the island's largest port and airport. Because of its possible similarities with other damaging and invasive *Anoplophora* species (i.e. *Anoplophora chinensis* and *A. glabripennis*), the EPPO Secretariat considered that *A. horsfieldii* could usefully be added to the EPPO Alert List.

Where
Its known distribution is restricted to South-East Asia, and it has been proposed that *A. horsfieldii* could be separated into three subspecies occupying different geographical areas: *A. horsfieldii horsfieldii* (China), *A. horsfieldii tonkinensis* (Indochina) and *A. horsfieldii taiwanensis* (Taiwan). As explained above, *A. horsfieldii* has recently been introduced on Jeju Island in the Republic of Korea (absent from the mainland). An old record of the species in Assam (India) is considered doubtful.
EPPO region: Absent.
Asia: China (Anhui, Chongqing, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Shanghai, Sichuan, Yunnan, Zhejiang), Korea (Republic of), Laos, Taiwan, Thailand, Vietnam.

On which plants: According to the literature, the known host range includes the following tree species: *Azadirachta indica* (chinaberry), *Camellia oleifera* (oil-seed camellia), *Camellia sinensis* (tea), *Celtis sinensis* (Chinese hackberry), *Citrus* sp., *Quercus glauca*, *Ulmus pumila*.

Damage
The main damage is caused by larvae which bore into the wood of living trees. External signs of infestation include circular exit holes (> 15 mm diameter), sawdust-like frass ejected from larval galleries, sap oozing from oviposition pits, adult maturation feeding on branches and shoots. On Jeju Island, it has been observed that attacked *Celtis sinensis* trees were totally or partially withered, but that external signs of infestation were far less evident than those of *A. glabripennis* or *A. chinensis*.

Adults of *A. horsfieldii* are large beetles (23-43 mm long), black or dark brown and shiny, with large yellow velvety patches distributed over the whole body. The antennae exceed three-quarters of the body length in males and are slightly longer than body length in females. As it is a large and beautiful insect, dead specimens can easily be found for sale online.
Pictures can be found on the Internet.
http://bezbycids.com/byciddb/wdetails.asp?id=32237&w=o
http://insectforum.no-ip.org/gods/cgi-bin/view.cgi?forum=2&topic=13053
http://museum.ioz.ac.cn/topic_detail.aspx?id=14478

Dissemination
Adults can fly, but no information on their flying abilities could be found. In international trade, *A. horsfieldii* is likely to be moved on plants for planting and wood products of its host plant species. No records of interceptions made in the EPPO region could be found.

Pathways
Plants for planting, wood of host plants from countries where *A. horsfieldii* occurs.

Possible risks
Information on many aspects of the biology, and in particular on the damage caused by *A. horsfieldii* in its native range, is generally missing in the available literature. However, past experience with the introduction of similar species in the EPPO region (i.e. *A. chinensis* and *A. glabripennis*) advises for caution.

Sources
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Barševskis A, Cabras AA, Medina MN, Odango J, Susulan T, Rifqi DM, Hanifuddin AS, Kurnitami GT, Barševska Z, Lecka K (2022) New data on the distribution of the genus *Anoplophora* Hope, 1839 (Coleoptera: Cerambycidae). *Baltic Journal of Coleopterology* **22**(1), 149–173.
Base de données Titan sur les Cerambycidés ou Longicornes. *Anoplophora horsfieldii* (Hope, 1842). http://titan.gbif.fr/sel_genann1.php?numero=16851
Danilevsky ML (ed.) (2020) Catalogue of Palaearctic Coleoptera. 6 (1), Chrysomeloidea I (Vesperidae, Disteniidae, Cerambycidae). http://www.cerambycidae.net/catalog.pdf and notes (2018-06-08). http://www.cerambycidae.net/news/06.08.2018/06.08.2018_palaearctic_catalogue.pdf
Lee S, Choi J, Jang H, Choi W, Kwon W, Kim D, Gim J, Park J, Park S, Kim S, Shin S, Lee S (2023) Establishment of non-native *Anoplophora horsfieldii* (Coleoptera: Cerambycidae) in South Korea, *Journal of Integrated Pest Management* **14**(1) 9. https://doi.org/10.1093/jipm/pmad008
Li L, Wang R, Waterhouse DF (1997) The distribution and importance of arthropod pests and weeds of agriculture and forestry plantations in southern China. Australian Centre for International Agricultural Research (ACIAR), 185 pp.
National Animal Collection Resource Center, China. *Anoplophora horsfieldii* (Hope, 1842). http://museum.ioz.ac.cn/topic_detail.aspx?id=14478

Ohbayashi N (2018) [A new subspecies of *Anoplophora horsfieldii* (Hope, 1842) (Coleoptera: Cerambycidae: Lamiinae)]. *Japanese Journal of Systematic Entomology* **24**(1), 39-42 (abstract).
Thomson J (1868) Physis. Recueil d'Histoire Naturelle, Paris 2(6), 146-200. http://www.biodiversitylibrary.org/item/35775
Zhang BL, Zhang J, Zhang D, Feng Y, Qiu J, Ye XJ, Wang BX (2023) Complete mitochondrial genome of the longicorn *Anoplophora horsfieldi* Hope (Coleoptera: Cerambycidae). *Mitochondrial DNA Part B* **8**(2), 220-221. https://doi.org/10.1080/23802359.2021.1915717

EPPO RS 2023/228

Panel review date – Entry date 2023-10

2023/229 First report of the pepper fruit fly *Atherigona orientalis* in Greece

Atherigona orientalis (Diptera: Muscidae) is a cosmopolitan tropical fly which is primarily associated with decomposing fruits and vegetables, as well as vertebrate and invertebrate carrion and manure. In some countries, it was quite recently reported as a primary pest of some crops, in particular of *Capsicum* spp. *A. orientalis* was first reported in Greece causing damage on capsicum crops in commercial greenhouses in two municipality of Kriti in spring 2022. Larvae feed inside the young pepper fruit, resulting in tissue degradation, followed by an external colour change, tissue softening, detachment of the external epidermis and loss of vigour. Although the presence of *A. orientalis* had been reported in some EPPO member countries on carrion, this is the first report of this species as a plant pest for the EPPO region.

Source: Roditakis E, Kremi K, Mylona K, Georgousis V, Avtzis DN, Simoglou KB (2023) First report of the pepper fruit fly *Atherigona orientalis* (Schiner 1968)(Diptera: Muscidae) infesting commercial pepper crops in Greece. *Insects* **14**(4), 393. https://doi.org/10.3390/insects14040393

Additional key words: new record **Computer codes:** ATHEOR, GR

2023/230 New records of alien spider mites in France

A recent article reports the first presence of three alien mites in France.

Aponychus corpuzae (Acari: Tetranychidae) was first found in 2017 on bamboo plants (*Semiarundinaria yashadake*) in Hérault (Occitanie region) In 2019, it was also found on another genera of bamboo; *Phyllostachys* sp. in Alpes-maritimes department (Provence-Alpes-Côte d'Azur region. Overwintering females were observed in late autumn (November), suggesting that the species is established in Southern France. *A. corpuzae* originates from Asia (China, Japan, Korean peninsula) and had been first recorded in the EPPO region in 2012-2014 in Slovenia and Italy (EPPO RS 2015/171). It was also recorded in Croatia in 2016.

Oligonychus perseae (Acari: Tetranychidae – formerly EPPO Alert List) was first collected in 2016 in Menton (Alpes-maritimes department, Provence-Alpes-Côte d'Azur region) on avocado (*Persea americana*) in a private garden. Similar signs of spider mite infestation (silk nests on the underside of leaves) were also observed on grapevine (*Vitis vinifera*) leaves in a neighbouring garden. In 2019, more specimens were collected from avocado in the botanical garden of Menton. This mite is damaging avocado crops in other European countries

where it has been introduced (e.g. in Spain), and EFSA recently concluded that it satisfied the criteria to be a quarantine pest for the EU.

Stigmaeopsis nanjingensis (Acari: Tetranychidae) has recently been found on bamboo species (*Phyllostachys* sp., *P. viridiglaucescens*, *S. yashadake*) in Alpes-maritimes, Hérault, Gard and Hérault departments. The first specimens had been collected in Gard in 2003 but were misidentified as *S. celarius*. Until recently, *S. nanjingensis* was only known to occur in China, but it has been found in Italy, Hungary and Portugal. The related species *S. longus* was first reported in the EPPO region in 2020 in the Netherlands (RS 2020/247), also introduced with bamboo plants.

Source: Auger P, Navia D, Migeon A (2023) Three new alien spider mites (Prostigmata, Tetranychidae) from south-eastern France. *Acarologia* **63**(3), 826-833. https://doi.org/10.24349/yeys-kf03

EFSA PLH Panel (2022) Pest categorisation of *Oligonychus perseae*. *EFSA Journal* **20**(6), 7336. https://doi.org/10.2903/j.efsa.2022.7336

Šimala M, Seljak G, Pintar M, Masten Milek T (2016) *Aponychus corpuzae* Rimando 1966 (Acari: Tetranychidae) nova neeuropska vrsta grinje na bambusu u Hrvatskoj. *Glasilo biljne zaštite* 16(4), 391-396. https://hrcak.srce.hr/166560

Additional key words: new record **Computer codes:** APONCO, OLIGPA, STIMNA, FR

2023/231 First report of *Meloidogyne graminis* in Türkiye

The root-knot nematode *Meloidogyne graminis* is native to the USA. Over the last 20 years, *M. graminis* has expanded its geographical range and was first reported in golf courses in Venezuela (2006), China (2011), Brazil (2018), and Malaysia (2019). *M. graminis* was recently first reported in the EPPO region, in Türkiye in golf courses in Antalya province in May and June 2021. A possible pathway of introduction may be footwear or other golf equipment with infested soil attached. *M. graminis* is considered to be a pest of turf grass (e.g. *Cynodon* spp., *Stenotaphrum secundatum*) in the USA, but cereal crops such as rice (*Oryza sativa*), sorghum (*Sorghum bicolor*), maize (*Zea mays*), and wheat (*Triticum aestivum*) can also be hosts.

Note of the EPPO Secretariat: There were reports of *M. graminis* from coastal dunes in Germany and the Netherlands in the 1980s, but some authors consider that it is a different species; *M. maritima*.

Source: Crow WT (2019) *Grass root-knot nematode Meloidogyne graminis* Whitehead, *1968* (Nematode: Tylenchida: Meloidogynidae). Department of Entomology and Nematology, UF/IFAS Extension Publication EENY722. http://edis.ifas.ufl.edu/pdffiles/IN/IN123100.pdf

Uysal G, Mıstanoğlu I, Devran Z (2023) Genetic variation and identification of *Meloidogyne graminis* populations from golf fields in Antalya province of Türkiye. *Journal of Phytopathology* **171**(7-8), 291-299.

Additional key words: new record **Computer codes:** HYPPGR, TR

2023/232 *Meloidogyne floridensis* is spreading and extending its host range in the USA

Meloidogyne floridensis is a root knot nematode species described in 2004 which was initially reported from peach trees in Florida (US) only. It was later shown that it has a wider host range in Florida, including a number of important horticultural crops (e.g. aubergine, capsicum, cucumber, tomato, watermelon) and weeds. *M. floridensis* was also reported in 2019 from California in almond orchards in two counties, and from South Carolina on peach rootstock in one county. A recent paper reports its presence in Georgia in 2018 in six fields of the following vegetable crops: cabbage (*Brassica oleracea*), cowpea *(Vigna unguiculata*), cucumber (*Cucumis sativus*), watermelon (*Citrullus lanatus*) and tomato (*Solanum lycopersicum*). Tests showed that these species except cabbage were good hosts of *M. floridensis* and that the nematode could develop on tomatoes which would normally be resistant to root-knot nematodes (Mi-1.2 gene).

Source: Marquez J, Hajihassani A (2023) Identification and virulence of five isolates of root-knot nematode *Meloidogyne floridensis* on vegetables. *Plant Disease* **107**(5), 1522-15888.

Marquez J, Forghani F, Hajihassani A (2021) First report of the root-knot nematode, *Meloidogyne floridensis*, on tomato in Georgia, USA. *Plant Disease* **105**(4), 1228. https://doi.org/10.1094/PDIS-10-20-2286-PDN

Reighard GL, Henderson WG, Scott SO, Subbotin SA (2019) First report of the root-knot nematode, infecting guardian peach rootstock in South Carolina, USA. *Journal of Nematology* **51**(1),1-6. https://doi.org/10.21307/jofnem-2019-061

Westphal A, Maung ZT, Doll DA, Yaghmour MA, Chitambar JJ, Subbotin SA (2019) First report of the peach root-knot nematode, *Meloidogyne floridensis* infecting almond on root-knot nematode resistant 'Hansen 536'and 'Bright's hybrid 5' rootstocks in California, USA. *Journal of Nematology* **51**, 1-3.

Additional key words: detailed record, new host plants **Computer codes**: MELGFL, US

2023/233 Update of the situation of *Pomacea* sp. in Spain

Pomacea maculata (EPPO A2 List), the island apple snail, was first found in Spain in July 2010 in the Ebro delta, in the province of Tarragona (Cataluña) (EPPO RS 2012/039). A demarcated area had been established in the municipalities of Baix Ebre and Montsia. In June 2017, another outbreak (150 eggs of *Pomacea* sp.) was detected in the municipality of Miravet (province of Tarragona, Cataluña), 40 km upstream of the demarcated area. The demarcated area was then extended to cover also the municipalities of Miravet and Ginestar (Ribera d'Ebre county). Official measures were applied following the EU Decision 2012/697/EU. Surveys conducted in 2019-2023 did not detect any *Pomacea* sp. in the municipalities of Miravet and Ginestar and the outbreak in these municipalities is therefore considered eradicated. As of July 2023, the demarcated area has been reduced to the municipalities of Baix Ebre and Montsia.

The pest status of *Pomacea* sp. in Spain is officially declared as: **Present, under eradication, only in some parts of the Member State concerned**.

Source: NPPO of Spain (2023-08).

ORDRE ACC/107/2023, de 2 de maig, per la qual es modifica l'Ordre AAR/404/2010, de 27 de juliol, per la qual es declara oficialment l'existència d'un focus del cargol poma a l'hemidelta esquerre de l'Ebre. *Diari Oficial de la Generalitat de Catalunya* **8910.** https://dogc.gencat.cat/ca/document-del-dogc/?documentId=959366

EU(2012) Commission Implementing Decision 2012/697/EU of 8 November 2012 as regards measures to prevent the introduction into and the spread within the Union of the genus *Pomacea* (Perry) *Official Journal of the European Union* **311**/(55) http://data.europa.eu/eli/dec_impl/2012/697/oj

Pictures: *Pomacea maculata*. https://gd.eppo.int/taxon/POMAIN/photos

Additional key words: detailed record **Computer codes:** POMASP, POMAIN

2023/234 First report of *Ralstonia pseudosolanacearum* in Slovenia

The NPPO of Slovenia recently informed the EPPO Secretariat of the first detection of *Ralstonia pseudosolanacearum* (EPPO A2 List) on its territory. The pest was identified from ginger (*Zingiber officinale*) tubers produced in two small greenhouses located in Savinjska region (Zreče). Official measures were taken and included prohibition of movement of plants (and tubers), equipment and tools out of the greenhouses, limitation of entrance to the greenhouses and a ban on irrigation. The source of infection is under investigation. It may be recalled that several outbreaks have been recently found in the EPPO region on ginger (EPPO RS 2023/092, RS 2023/187).

The pest status of *Ralstonia pseudosolanacearum* in Slovenia is officially declared as: **Present, under eradication.**

Source: NPPO of Slovenia (2023-10).

Pictures: *Ralstonia pseudosolanacearum*. https://gd.eppo.int/taxon/RALSPS/photos

Additional key words: new record **Computer codes:** RALSPS, RALSSO, SI

2023/235 First report of *Tomato brown rugose fruit virus* in Morocco

The NPPO of Morocco recently informed the EPPO Secretariat of the occurrence of tomato brown rugose fruit virus (*Tobamovirus*, ToBRFV – EPPO A2 List) on its territory. ToBRFV was first detected in October 2021 in the region of Souss-Massa and in March 2022 in the region of Dakhla. During the production season 2022-2023, about ten outbreaks have been confirmed on tomato (*Solanum lycopersicum*) grown under greenhouses for fruit production. The sources of the outbreaks are infected imported seed.
ToBRFV has been a priority quarantine pest in Morocco since 2018 and official measures are taken in case of findings. They include the destruction of infected plants, restriction on cultivation of host plants and hygiene measures. In 2023, yield losses were observed, as well as increased management costs.

The pest status of *Tomato brown rugose fruit virus* in Morocco is officially declared as follows: **Present, restricted distribution, under official control.**

Source: AgriMaroc (2023-10-17) ToBRFV : Pertes financières et stratégies de gestion https://www.agrimaroc.ma/tobrfv-pertes-financieres-strategies-lutte/

NPPO of Morocco (2023-10).

Pictures: *Tomato brown rugose fruit virus*. https://gd.eppo.int/taxon/TOBRFV/photos

Additional key words: new record **Computer codes:** TOBRFV, MA

2023/236 New viruses of vegetable crops: Physostegia chlorotic mottle virus, African eggplant-associated virus, and African eggplant yellowing virus

The following new viruses have recently been described in different parts of the world on vegetable crops.

- **Physostegia chlorotic mottle virus (*Alphanucleorhabdovirus*, PhCMoV - Alphanucleorhabdovirus physostegiae)**

PhCMoV was first identified by high throughput sequencing from *Physostegia virginiana* (Lamiaceae) in Austria in 2018, and later in Germany and Serbia on tomatoes (*Solanum lycopersicum*) showing severe fruit mottling and ripening anomalies. Further studies showed that PhCMoV is also present in Belgium, France, the Netherlands, Romania, Russia, and Slovenia. Although most of these detections are recent, re-analysis of samples from 2002 showed that this virus was already present in France. PhCMoV can infect important crops (*S. lycopersicum*, *S. melongena*, and *Cucumis sativus*), as well as emerging crops in Europe (*Ipomoea batatas* and *Stachys affinis*) and weeds. It can cause severe fruit symptoms. Further studies are conducted to better understand the reasons behind the emergence of this virus and identify its potential vectors.

- **African eggplant-associated virus (*Tobamovirus*, AEaV)**

A new *Tobamovirus*, tentatively named African eggplant-associated virus (AEaV) was identified in a symptomatic fruit of *Solanum macrocarpon* imported from Mexico into the Netherlands in 2018. Inoculation studies showed that AEaV can infect a number of solanaceous plants including tomato (*Solanum lycopersicum*) and pepper (*Capsicum* spp.), as well as eggplant (*Solanum melongena*) and petunia (*Petunia hybrida*) and cause symptoms (e.g. chlorosis, rugosity, leaf curling). As AEaV was controlled by resistant genes used in tomato and pepper crops, the risk of infection and subsequent impact on these crops was assessed to be low in Europe. However, assessment of the potential threat to eggplant, petunia, and other susceptible species needs further work.

- **African eggplant yellowing virus (*Polerovirus*, AeYV)**

A new *Polerovirus* tentatively named African eggplant yellowing virus was identified in Benin on symptomatic *Capsicum* spp. as well as in Mali in African eggplants (*Solanum aethiopicum)*. In 2019, AeYV was first reported from tomato (*S. lycopersicum*) in Côte d'Ivoire. Whereas the majority of poleroviruses are vectored by aphids, there are suspicions that whiteflies may also play a role in the transmission of AeYV.

Source: Giesbers AK, Roenhorst A, Schenk MF, Westenberg M, Botermans M (2023) African eggplant-associated virus: Characterization of a novel tobamovirus identified from *Solanum macrocarpon* and assessment of its potential impact on tomato and pepper crops. *PLos ONE* **18**(4), e0277840. https://doi.org/10.1371/journal.pone.0277840

N'cho AJ, Séka K, Bele L, Diallo H, Martin T, Coulibaly N, Fondio L, Hoareau M, Lefeuvre P, Lett JM (2023) First report of African eggplant yellowing virus on tomato exhibiting necrotic yellowing symptoms in Northern Côte d'Ivoire. *Plant Disease* **107**(2), 590. https://doi.org/10.1094/PDIS-05-22-1016-PDN

Temple C, Blouin AG, De Jonghe K, Foucart Y, Botermans M, Westenberg M, Schoen R, Gentit P, Visage M, Verdin E, Wipf-Scheibel C (2022) Biological and genetic characterization of Physostegia chlorotic mottle virus in Europe based on host range, location, and time. *Plant Disease* **106**(11), 2797-2807. https://doi.org/10.1094/PDIS-12-21-2800-RE

Additional key words: new pest **Computer codes:** AEAV00, AEYV00, PHCMOV, BJ, CI, ML, NL

2023/237 First report of *Fusarium foetens* in China on potatoes

Fusarium foetens (EPPO A2 List) is reported for the first time in China on potatoes (*Solanum tuberosum*). During investigations carried out in field potatoes in Laiyang city (Shandong province) in 2021, many wilted and dead potato plants were observed. It was also noted that the disease had spread rapidly, and that all infected plants had died within 2-3 weeks. Laboratory studies (morphological, molecular methods) confirmed the presence of *F. foetens* in symptomatic potato plants. In addition, pathogenicity tests confirmed that *F. foetens* was the causal agent of the disease observed. This is the first time that this pathogen, initially reported as a wilt of hybrid begonias, is reported on potatoes.

The situation of *Fusarium foetens* is China can be described as follows: **Present, not widely distributed.**

Source: Liu L, Jin X, Lu X, Guo L, Lu P, Yu H, Lv B (2023) Mechanisms of surfactin from *Bacillus subtilis* SF1 against *Fusarium foetens*: A novel pathogen inducing potato wilt. *Journal of Fungi* **9**(3), 367. https://doi.org/10.3390/jof9030367

Pictures: *Fusarium foetens*. https://gd.eppo.int/taxon/FUSAFO/photos

Additional key words: new record, host plant **Computer codes:** FUSAFO, CN

2023/238 First report of *Fusarium foetens* in South Africa on rooibos

Fusarium foetens (EPPO A2 List) is reported for the first time in South Africa on rooibos (*Aspalathus linearis*, Fabaceae). The pathogen was detected during studies conducted from 2007 to 2009 on *Fusarium* species causing damping-off of rooibos in 12 nurseries of the Western Cape province. As a result, 121 isolates were obtained, and all morphologically resembled *Fusarium oxysporum*. Sequence analyses of 58 isolates showed that 25 were *F. foetens* and 33 *F. oxysporum*. Pathogenicity tests confirmed that F. *foetens* was the causal agent of the disease observed on rooibos (Lamprecht and Tewoldemedhin, 2017).

The situation of *Fusarium foetens* is South Africa can be described as follows: **Present, not widely distributed.**

Additional note: Experimental studies conducted in South Africa have also shown that *F. foetens* could infect Solanaceae plants, such as tomatoes (*Solanum lycopersicum*) and pepper (*Capsicum annuum*). These results together with recent findings on potatoes (EPPO RS 2023/237), show that the host range of *F. foetens* is wider than originally thought and goes beyond begonias (Amobonye *et al.*, 2021).

Source: Amobonye A, Bhagwat P, Ranjith D, Mohanlall V, Pillai S (2021) Characterisation, pathogenicity and hydrolytic enzyme profiling of selected *Fusarium* species and their inhibition by novel coumarins. *Archives of Microbiology* **203**, 3495–3508.

Lamprecht SC, Tewoldemedhin YT (2017) *Fusarium* species associated with damping-off of rooibos seedlings and the potential of compost as soil amendment for disease suppression. *South African Journal of Botany* **110**, 110-117. https://doi.org/10.1016/j.sajb.2016.07.009

Pictures: *Fusarium foetens*. https://gd.eppo.int/taxon/FUSAFO/photos

Additional key words: new record, host plant **Computer codes:** FUSAFO, ZA

2023/239 *Solanum carolinense* in Austria

Solanum carolinense (Solanaceae - EPPO A2 List) is a weedy species in its native range (North America) where it can have a negative impact on agriculture and pastureland. It can reproduce by both seed and vegetatively; it can grow rapidly and thrives in a variety of biotic and abiotic conditions. It is also toxic to livestock and is reported as a host to several pest species. In the EPPO region, it has already been recorded in crops such as maize and sugar beet in Germany and Northern Italy. Projections of climatic suitability under current climate conditions reveal considerable scope for further invasion in Central European countries. In South-Eastern Austria, *S. carolinense* is in a phase of range filling and ongoing spread. In total, 72 populations were identified between 2019 and 2022. In Austria, *S. carolinense* infests different crops, such as soybean, maize and oil pumpkin, and grassland, but also non-agricultural habitats are invaded. Widespread invasion clusters were found in almost one fifth of the crop fields surveyed, indicating severe infestations locally. A species distribution model shows that only a relatively small part of Austria (8%) is currently climatically suitable. These areas are in the lowlands of Austria in both the north and south of the country. However, most of this area is under agricultural use. In Austria, there is a need to take effective measures against *S. carolinense* to halt further spread and to prevent yield losses.

A dynamic datasheet on *S. carolinense* is now available in the EPPO Global Database. https://gd.eppo.int/taxon/SOLCA/datasheet

Source: Follak S, Chapman D, Schwarz M, Essl F (2023) An emerging weed: rapid spread of *Solanum carolinense* in Austria. *BioInvasions Records* **12**(3), 649–658.

Pictures: *Solanum carolinense*. https://gd.eppo.int/taxon/SOLCA/photos

Additional key words: invasive alien plants **Computer codes:** SOLCA, AT

2023/240 Internet trade of invasive alien plants in Australia

E-commerce platforms can facilitate long distance dispersal of invasive alien plants. This pathway can be difficult to monitor, and invasive plants can be sold online under their correct name or misidentified. In Australia, invasive alien plants have had numerous and widespread negative impacts on the endemic flora and as a result strict importation measures and risk assessment processes have been established to prevent the arrival of unwanted invasive species. However, there is some evidence that banned species are still being sold on popular Australian E-commerce platforms. To better understand the situation, a study was conducted over a 12-month period to monitor one of these popular websites. The study set out to (1) determine what proportion of plants advertised are prohibited, (2) determine the quantity and taxonomic composition of declared plants traded, (3) determine whether current regulations reduce trade quantity, (4) characterise the most frequently traded declared plants, and (5) determine the uses of advertised plants. Over the 12-month period, 235 162 plant advertisements were reviewed and of these 10 000 detailed a total of 155 plant taxa that are prohibited to trade in at least one Australian State or Territory. There were 1 415 cases of invasive plants advertised, of which 411 breached local jurisdictional (i.e., State or Territory) laws. *Opuntia* cacti and invasive aquatic plants were traded in the greatest quantities with *Opuntia microdasys* having the greatest number of advertisements. The aquatic plants were mainly advertised for water filtering use and as habitats for aquatic animals. The study showed that trade prohibitions had no influence on

the quantity and price of traded invasive plants. Future weed risk assessments should consider online trade as a key pathway for spread.

Source: Maher J, Stringham OC, Moncayo S, Wood L, Lassaline CR, Virtue J, Cassey P (2023) Weed wide web: characterising illegal online trade of invasive plants in Australia. *NeoBiota* **87**, 45–72. https://doi.org/10.3897/neobiota.87.104472

Additional key words: invasive alien plants **Computer codes:** 1OPUG, AU

2023/241 *Amaranthus palmeri* in the EPPO region

Amaranthus palmeri (Amaranthaceae - EPPO A2 List) is a dioecious summer annual species native to North America. In its native range, it is a weed in agricultural fields and disturbed habitats. It has a high fecundity and a long-lived seed bank, which make management of the species difficult. A new review paper by Matzrafi *et al*. (2023) summarizes the pertinent information on this species including its biology, distribution, habitats invaded and management methods. The paper provides a morphological comparison of *A. palmeri* with other *Amaranthus* species that can be found in the EPPO region.

In 2023/2024 EPPO is developing a PM 9 Standard (National Regulatory Control Systems) which will provide guidance on the control procedures aiming to monitor, contain and eradicate *A. palmeri*.

Source: Matzrafi M, Scarabel L, Milani A, Iamonico D, Torra J, Recasens J, Montull JM, Llenes JM, Gazoulis I, Tataridas A, Rubin B, Pardo G, Cirujeda A, Marí AI, Mennan H, Kanatas P, Dogan MN, Beffa R Travlos I (2023) *Amaranthus palmeri* S. Watson: a new threat to agriculture in Europe and the Mediterranean region. *Weed Research*. https://doi.org/10.1111/wre.12596

Pictures: *Amaranthus palmeri*. https://gd.eppo.int/taxon/AMAPA/photos

Additional key words: invasive alien plants **Computer codes:** AMAPA

2023/242 Identifying areas threatened by aquatic invasive alien plants

Aquatic habitats can be vulnerable to biological invasions due to their use for human activities and their connectivity. Aquatic invasive alien plants can have an array of negative impacts on native biodiversity and ecosystem services. They can degrade a waterbody and can be both difficult and costly to control. The study included 71 non-native aquatic plant species (31 species that are already established in the Iberian Peninsula (Table 1) and 40 non-native species that have invasive potential). The aim of the study was to produce a map of suitable areas to assess the invasion risk of these species in the Iberian Peninsula. Occurrence data was gathered for each species and the 19 bioclimatic variables from WorldClim were used in the model to predict the potential distribution of the species in the Iberian Peninsula. Additional layers were added to the model for the effect of anthropogenic influences, which may influence the occurrence of aquatic plant species. The result showed, out of the 9 039 grid cells in the regional map, that 759 grid cells contained occurrences of non-native aquatic plant species. Most of the grid cells which contain aquatic plant species occur in the western half of the Iberian Peninsula: in the coastal areas of Portugal, around the Tagus River, the Guadiana Basin and the coast of the southwestern Iberian Peninsula.

Cells along the east coast of the Peninsula were also occupied by a large number of non-native aquatic plant species. This map can be used as a reference tool for management regimes and control strategies aimed at the prevention and eradication of non-native aquatic plant species.

Table 1. List of aquatic alien plant species already established in the Iberian Peninsula.

Species	Family	Origin	EPPO status
Alternanthera philoxeroides	Amaranthaceae	South America	EPPO A2
Azolla filiculoides	Salviniaceae	Americas	Observation List
Bacopa monnieri	Plantaginaceae	Widespread	-
Crassula aquatica	Crassulaceae	Widespread	-
Egeria densa	Hydrocharitaceae	South America	List IAP
Pontederia crassipes	Pontederiaceae	South America	EPPO A2
Elodea canadensis	Hydrocharitaceae	North America	-
Heteranthera limosa	Pontederiaceae	Americas	-
Heteranthera reniformis	Pontederiaceae	Americas	-
Heteranthera rotundifolia	Pontederiaceae	Americas	-
Hydrocotyle bonariensis	Araliaceae	Americas	-
Hydrocotyle ranunculoides	Araliaceae	Americas	EPPO A2
Hydrocotyle verticillata	Araliaceae	Americas/Africa	-
Lagarosiphon major	Hydrocharitaceae	Southern Africa	List IAP
Lemna minuta	Araceae	Americas	-
Lemna valdiviana	Araceae	Americas	-
Hydrocharis laevigata	Hydrocharitaceae	Central & South America	-
Ludwigia grandiflora	Onagraceae	Americas	EPPO A2
Ludwigia peploides subsp. *montevidensis*	Onagraceae	South America	-
Ludwigia repens	Onagraceae	Central & North America	-
Myriophyllum aquaticum	Haloragaceae	Central & South America	List IAP
Myriophyllum heterophyllum	Haloragaceae	Central & North America	EPPO A2
Najas gracillima	Hydrocharitaceae	Widespread	-
Najas graminea	Hydrocharitaceae	Widespread	-
Nymphaea mexicana	Nymphaeaceae	Central America	-
Pistia stratiotes	Araceae	Widespread	EPPO A2
Rotala indica	Lythraceae	Asia	-
Salvinia molesta	Salviniaceae	South America	EPPO A2
Spartina alterniflora	Poaceae	Americas	-
Spartina densiflora	Poaceae	South America	-
Spartina patens	Poaceae	Central & North America	-

Source: Rodríguez-Merino A (2023) Identifying and managing areas under threat in the Iberian Peninsula: An invasion risk atlas for non-native aquatic plant species as a potential tool. *Plants* **12**, 3069. https://doi.org/10.3390/plants12173069

Additional key words: invasive alien plants

Computer codes: ALRPH, AZOFI, BAOMO, CSBAQ, ELDDE, EICCR, ELDCA, HETLI, HETRE, HETRO, HYDBO, HYDRA, HYDVE, LGAMA, LEMMT, LEMVA, LIMST, LUDUR, LUDPM, LUDNA, MYPBR, MYPHE, NAIGL, NAIGR, NYMME, PIIST, ROTIN, SAVNA, SAVMO, SPTAL, SPTDE, SPTPA