ORGANISATION EUROPEENNE
ET MEDITERRANEENNE
POUR LA PROTECTION DES PLANTES

EUROPEAN AND MEDITERRANEAN
PLANT PROTECTION
ORGANIZATION

EPPO Reporting Service

NO. 5 PARIS, 2023-05

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2023/103 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**

Pepino mosaic virus (*Potexvirus*, PepMV – EPPO A2 List) is reported for the first time from the Republic of Korea. PepMV was detected in 2020 in tomato (*Solanum lycopersicum*) plants growing in a greenhouse in Jeolla province (Cho *et al.*, 2023). **Present.**

Tomato leaf curl New Delhi virus (*Begomovirus*, ToLCNDV – EPPO A2 List) was first recorded causing significant damage in tomato plants (*Solanum lycopersicum*) in Nepal (Gandaki and Bagmati provinces) in 2021 (Khadka *et al.*, 2023). **Present**.

Tomato mild mottle virus (TomMMoV – EU Annexes) is reported for the first time from Iraq. During surveys conducted from September to October 2020, TomMMoV was detected in field and glasshouse aubergine (*Solanum melongena*) crops near Baghdad (Khaffajah *et al.*, 2022).

Tomato mild mottle virus (TomMMoV – EU Annexes) is reported for the first time from Kenya. TomMMoV was detected in symptomatic leaf samples of tree tomato (*Solanum betaceum*) collected from the Eastern and Rift Valley regions. Phylogenetic analysis showed that Kenyan isolates were highly similar to an Ethiopian isolate (Kinoga *et al.*, 2023).

- **Detailed records**

In China, *Cryphonectria parasitica* (EPPO A2 List) is first reported from Gansu province on symptomatic *Castanea seguinii*. Gansu province was one of the few areas in China thought to be free of the disease. The specimens were found in the westernmost part of the natural distribution of chestnut trees in China (Ni *et al.*, 2023).

In Mozambique, Fusarium wilt of banana caused by *Fusarium oxysporum* f. sp. *cubense* Tropical race 4 (EPPO Alert list) was first recorded in 2013. Tests of symptomatic banana plants in 2020 and 2021 from smallholder plantations and along roadsides showed that the pathogen was present in 13 locations, both close to, and up to 210 km away from the initial outbreaks (van Westerhoven *et al.*, 2023).

In Finland, outbreaks of *Leptinotarsa decemlineata* (Coleoptera: Chrysomelidae) have been reported by the NPPO during summer 2021. The pest has been found in 3 potato fields in the communes of Parikkala. Eradication measures have been taken. Surveys will be carried out during the next two potato-growing seasons to verify the absence of the pest.
The pest status of *Leptinotarsa decemlineata* in Finland is officially declared as: **Present, under eradication**.

Tomato leaf curl New Delhi virus (*Begomovirus*, ToLCNDV – EPPO A2 List) was first reported in China on tomato in August 2021 (EPPO RS 2022/243). It was recently reported on cucurbits. Zeng *et al*. (2023) reported the detection of ToLCNDV in August 2022, in melon (*Cucumis melo*), cucumber (*Cucumis sativus*) and luffa (*Luffa aegyptiaca*) in greenhouses in Shanghai. Gu *et al*. (2023) reported high damage caused by ToLCNDV in autumn 2022 in the provinces of Jiangsu, Shanghai, and Zhejiang, on muskmelon (*Cucumis melo* subsp. *melo*), oriental melon (*Cucumis melo* subsp. *agrestis*), pumpkin (*Cucurbita moschata*), luffa (*Luffa acutangula*), and squash *(Cucurbita pepo*).

Tomato yellow leaf curl virus (*Begomovirus*, TYLCV - EPPO A2 List) is first reported from Oklahoma (US). It was detected in 2021 on tomato and *Capsicum* (Paslay *et al.*, 2023).

- **Host plants**

The root-knot nematode *Meloidogyne enterolobii* (EPPO A2 List) is recorded for the first time on plantain (*Musa* spp. AAB), on which it was found in Nigeria (Olajide *et al.*, 2023).

Sources:

Cho IS, Chung BN, Yoon JY, Hammond J, Lim HS (2023) First report of pepino mosaic virus infecting tomato in South Korea. *Plant Disease* **107**(3), 971. https://doi.org/10.1094/PDIS-02-22-0380-PDN

Gu Q, Yan L, Liu L, Bao W, Fang H, Xu J, Li J, Kang B, Wu H, Wang K, Tao X (2023) First report of tomato leaf curl New Delhi virus infecting several cucurbit plants in China. *Plant Disease* (early view). https://doi.org/10.1094/PDIS-01-23-0059-PDN

Khadka RB, Dabargainya B, Pokhrel S, Parajuli A, Paudel B, Upadhyaya S, Poudel R, Baidya S (2023) First report of tomato leaf curl New Delhi virus in tomato in Nepal. *New Disease Reports* **47**(2), e12170. https://doi.org/10.1002/ndr2.12170.

Khaffajah B, Alisawi O, Al Fadhl F (2022) Genome sequencing of eggplant reveals Eggplant mild leaf mottle virus existence with associated two endogenous viruses in diseased eggplant in Iraq. *Archives of Phytopathology and Plant Protection* **55**(16), 1930-1943.

Kinoga MN, Kuria PK, Miano DW, Kiambi RG, Mollov DS, Grindstead, Wasilwa LA (2023) Genome characterisation of two complete coding sequences of tomato mild mottle virus from tree tomato and their distribution in Kenya. *Journal of Plant Pathology* **105**, 15–19.

Ni C, Liu Y, Liu Y, Li H, Shi M, Zhang M, Han B (2023) First report of chestnut blight caused by *Cryphonectria parasitica* on chestnut (*Castanea seguinii*) in Gansu Province, China. *Plant Disease* **107**(3), 942. https://doi.org/10.1094/PDIS-03-22-0556-PDN

NPPO of Finland (2023-05).

Olajide EO, Kolombia Y, Amah D, Couvreur M, Swennen R, Coyne DL, Cortada L, Bert W (2023) First report of the root-knot nematode *Meloidogyne enterolobii* parasitizing plantain (*Musa* spp., AAB) in Nigeria. *Plant Disease* **107**(3), 970. https://doi.org/10.1094/PDIS-06-22-1350-SC

Paslay C, Ali A (2023) First report of tomato yellow leaf curl virus infecting pepper and tomato in Oklahoma. *Plant Disease* **107**(3), 973. https://doi.org/10.1094/PDIS-04-22-0927-PDN

van Westerhoven AC, Meijer HJ, Houdijk J, Martínez de la Parte E, Matabuana EL, Seidl MF, Kema GH (2023) Dissemination of Fusarium wilt of banana in Mozambique caused by *Fusarium odoratissimum* Tropical Race 4. *Plant Disease* **107**(3), 628-632. https://doi.org/10.1094/PDIS-07-22-1576-SC

Zeng R, Gu H, Fan J, Zhu P, Xu L, Gao SG, Gao P, Song Z, Zhang K, Zhang C, Dai F (2023) Occurrence of tomato leaf curl New Delhi virus in cucurbit plants in China. *Plant Disease* (early view). https://doi.org/10.1094/PDIS-01-23-0059-PDN

Additional key words: detailed record, host plant, new record

Computer codes: ENDOPA, FUSAC4, LPTNDE, MELGMY, PEPMV0, TOLCND, TOMMOV, TYLCV0, CN, FI, IQ, KE, KR, MZ, NG, NP, US

2023/104 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 2023/080), the following new and revised EPPO datasheets have been published in the EPPO Global Database:

- *Beet curly top virus*. https://gd.eppo.int/taxon/BCTV00/datasheet
- *Entoleuca mammata*. https://gd.eppo.int/taxon/HYPOMA/datasheet
- *Gilpinia hercyniae*. https://gd.eppo.int/taxon/GILPPO/datasheet
- *Lettuce infectious yellows virus*. https://gd.eppo.int/taxon/LIYV00/datasheet
- *Lopholeucaspis japonica*. https://gd.eppo.int/taxon/LOPLJA/datasheet

Source: EPPO Secretariat (2023-05).

Additional key words: publication **Computer codes:** BCTV00, GILPPO, HYPOMA, LIYV00, LOPLJA

2023/105 Call for applications to the EPPO Jens-Georg Unger Plant Health Fellowship for international co-operation in plant health

EPPO is happy to announce the 2023 call for applications to the EPPO Jens Georg Unger Plant Health Fellowship for international co-operation in plant. This fellowship started in 2021 in the context of the International Year of Plant Health (IYPH) and is dedicated to Dr Jens-Georg Unger, a reputed professional in Plant Health.

The aim of this fellowship is to enable plant health professionals from the EPPO region to gain international working experience in plant health in another country or organization through a secondment. This fellowship is meant for plant health professionals working in plant health in the early or middle stage of their careers.

All necessary information, and link to an online form to submit applications can be found on the EPPO website:
https://www.eppo.int/ABOUT_EPPO/special_events/plant_health_fellowship

Deadline: 5th of September 2023.

Source: EPPO Secretariat (2023-05).

2023/106 Eradication of *Eotetranychus lewisi* in Switzerland

In Switzerland the mite *Eotetranychus lewisi* (Acari: Tetranychidae - EU Annexes) was found infesting *Euphorbia pulcherrima* in a greenhouse of a producer of poinsettia plants in the canton of Zürich at the end of October 2021 (EPPO RS 2021/241), and in another location in December 2021. In both cases, the infested plants were incinerated, and official phytosanitary measures were taken to eradicate the pest. These two outbreaks are now considered eradicated.

The pest status of *Eotetranychus lewisi* in Switzerland is officially declared as: **Absent, pest eradicated.**

Source: NPPO of Switzerland (2023-05).

Picture *Eotetranychus lewisi*. https://gd.eppo.int/taxon/EOTELE/photos

Additional key words: eradication, absence **Computer codes:** EOTELE, CH

2023/107 Eradication of *Ripersiella hibisci* in Switzerland

In Switzerland, the root mealybug *Ripersiella hibisci* (Hemiptera: Pseudococcidae – EPPO A1 List) was first reported in May 2021 (EPPO RS 2021/127) in relation to imported plants. The plants still at the retailers were destroyed. Since most of the plants had been already sold to private customers, a recall action was conducted in June 2021. About 100 *Callistemon* plants from the same lot were found thanks to the recall action. Half of them tested positive for *R. hibisci*. All the located plants have been destroyed. In 2022, a surveillance programme was conducted in nurseries and garden centres that have been in contact with infested plants, and no further cases of infestation were detected.

The pest status of *Ripersiella hibisci* in Switzerland is officially declared as: **Absent, pest eradicated.**

Source: NPPO of Switzerland (2023-05).

Picture *Ripersiella hibisci*. https://gd.eppo.int/taxon/RHIOHI/photos

Additional key words: eradication, absence **Computer codes:** RHIOHI, CH

2023/108 Eradication of *Ripersiella hibisci* in Germany

In Germany, the root mealybug *Ripersiella hibisci* (Hemiptera: Pseudococcidae – EPPO A1 List) was first reported in June 2021 in a garden centre in Hesse (EPPO RS 2021/126) in relation to imported plants. It was later found in two garden centres in Baden-Württemberg and 2 garden centres in Bayern. In all cases, plants were destroyed. Further surveys were carried out and the pest was no longer observed. All outbreaks are considered eradicated.

The pest status of *Ripersiella hibisci* in Germany is officially declared as: **Absent, pest eradicated.**

Source: NPPO of Germany (2023-04).

Picture *Ripersiella hibisci*. https://gd.eppo.int/taxon/RHIOHI/photos

Additional key words: eradication, absence **Computer codes:** RHIOHI, DE

2023/109 First record of *Platypus quercivorus* and *Platypus koryoensis* in China

Platypus quercivorus and *P. koryoensis* (Coleoptera: Curculionidae: Platypodinae) are ambrosia beetles which, together with their symbiotic fungi, have been responsible for extensive mortality of oak trees in Japan and the Republic of Korea, respectively. In China, considering the risks both *P. quercivorus* and *P. koryoensis* may pose to forest trees, both species are regulated as quarantine pests. Extensive surveys on ambrosia beetles have been carried out in China from 2012 to 2022. During these surveys, numerous specimens of both *P. quercivorus* and *P. koryoensis* were trapped or collected by hand in several Chinese provinces and their identity was confirmed by morphological methods, and by molecular methods for some specimens.

- *P. quercivorus* was found in Guangdong and Yunnan provinces, at 6 locations in natural forests.
- *P. koryoensis* was found in the following provinces: Fujian, Shaanxi and Jiangxi, at 3 locations in natural forests.

This is the first time that *P. quercivorus* and *P. koryoensis* are reported from in China. Both insects were collected from Fagaceae trees which were already dying from other causes, however it is noted that further studies are needed to better understand their distribution in China and their potential risks.

P. quercivorus is a vector of *Dryadomyces quercivora* (formerly *Raffaelea quercivora*) which causes Japanese oak wilt (formerly EPPO Alert List). It has a strong preference for Fagaceae, and extensive tree mortality has been observed on Japanese oak species (*Q. serrata* and *Q. crispula*). *P. quercivorus* occurs in several Asian countries (India, Indonesia, Japan, Laos, Taiwan, Thailand, Vietnam).
Platypus koryoensis is a vector of *Dryadomyces quercus-mongolicae* (formerly *Raffaelea quercus-mongolicae*). In the Republic of Korea, tree mortality has mainly been observed on *Q. mongolica* (Mongolian oak). *P. koryoensis* occurs in the Republic of Korea, the Russian Far-East and Taiwan.
For more information on *P. quercivorus* and *P. koryoensis*, see the EPPO Study on the risk of bark and ambrosia beetles associated with imported non-coniferous wood. EPPO Technical Document no. 1081.

- *P. quercivorus*: https://www.eppo.int/media/uploaded_images/RESOURCES/eppo_publications/TD1081_EPPO_Study_bark_ambrosia.pdf
- *P. koryoensis*: https://www.eppo.int/media/uploaded_images/RESOURCES/eppo_publications/TD1081_EPPO_Study_bark_ambrosia.pdf

Source: Lai S, Wang J, Wang Y, Li Y, Lin W, Meng L, Hao D (2023) First record of two ambrosia beetle, *Platypus quercivorus* (Murayama) and *Platypus koryoensis* (Murayama)(Coleoptera: Curculionidae, Platypodinae) in mainland China. *Zootaxa*, **5284**(2), 397-400.

Additional key words: new record **Computer codes:** PLTPKO, PLTPQU, RAFFQM, RAFFQU, CN

2023/110 Update on the situation of *Aromia bungii* in Germany

Aromia bungii (Coleoptera: Cerambycidae – EPPO A1 List) was first found in Germany in July 2011 in an old damson plum tree (*Prunus domestica* subsp. *insititia*), in a private garden in Rosenheim in the southern part of Bayern (EPPO RS 2012/090), and later in another garden in Rosenheim (RS 2017/056). Official measures have been applied since then in the two demarcated areas (RS 2020/192).
In 2022, further infestations were found at one location and the infested area has been extended accordingly. However, the total demarcated area could be decreased because since 2016 no *A. bungii* were found in the city of Rosenheim itself. The findings (14 larvae) were all located in another part of the demarcated area. The official survey is ongoing. 20 pheromone traps were installed in the infested zone, but no beetles were caught during the flying period.

The pest status of *Aromia bungii* in Germany is officially declared as: **Present at one location, under containment, in case eradication is impossible.**

Source: NPPO of Germany (2023-05).

Commission Implementing Decision (EU) 2018/1503 of 8 October 2018 establishing measures to prevent the introduction into and the spread within the Union of Aromia bungii (Faldermann) OJL 254, 9-18
http://data.europa.eu/eli/dec_impl/2018/1503/oj

A map of the regulated area is available at:
https://www.lfl.bayern.de/ips/pflanzengesundheit/142278/index.php

Picture *Aromia bungii*. https://gd.eppo.int/taxon/AROMBU/photos

Additional key words: detailed record **Computer codes:** ARUMBU, DE

2023/111 Update on the situation of *Saperda candida* in Germany

In Germany, *Saperda candida* (Coleoptera: Cerambycidae - EPPO A1 list) was first detected on the Island of Fehmarn (Island in the Baltic Sea, part of Schleswig-Holstein) in 2008 (EPPO RS 2008/139) and eradication measures are applied (RS 2021/036). In July 2021, an infested *Sorbus* tree was found within the infested area. It was located next to a road. In November 2021, exit holes and a total of 74 larvae were found in several *Crataegus* plants in a hedge about 1000 m south of the first outbreak site. This finding resulted in an expansion of the infested and the buffer zones. The infested hedge was felled and destroyed.
During the survey conducted in 2022, exit holes and larvae were found at 7 locations within the demarcated area. 7 infested zones were established. All infested trees have been felled and incinerated. Eradication measures were carried out in all infested zones in February and March 2023. These measures include preventive destruction of all host plants within a radius of 100 m around the infested plants. In 2023, the official survey will continue.

The pest status of *Saperda candida* in Germany is officially declared as: **Present only in one location, under eradication.**

Source: NPPO of Germany (2023-05).

A map of the regulated area is available at
https://www.lksh.de/presse/pressemitteilungen/news/artikel/show/presseinformat

ion-zur-bekaempfung-des-rundkoepfigen-apfelbaumbohrers-saperda-candida-auf-fehmarn/

Picture *Saperda candida*. https://gd.eppo.int/taxon/SAPECN/photos

Additional key words: detailed record **Computer codes:** SAPECN, DE

2023/112 First report of *Xanthomonas citri* pv. *citri* in Peru

Citrus canker caused by *Xanthomonas citri* pv. *citri* (EPPO A1 List) is first reported from Peru. In March 2023 as a result of official surveillance, the bacterium was detected in a commercial orchard of 3 ha in the district of Manantay (province of Coronel Portillo, department of Ucayali, a region bordering Brazil). The NPPO of Peru noted that this isolated finding is very distant from the citrus exporting areas, which are free from this pathogen. Immediate control and eradication measures were taken, and surveillance will be intensified in the eastern part of the country.

The pest status of *Xanthomonas citri* pv. *citri* in Peru is officially declared as: **Present: not widely distributed and under official control.**

Source: IPPC website. Official Pest Reports. Peru (PER-02/4 of 2023-03-30). Detección de *Xanthomonas citri* subsp. *citri*. https://www.ippc.int/en/countries/peru/pestreports/2023/03/deteccion-de-xanthomonas-citri-subspcitri/

Pictures: *Xanthomonas citri pv. citri*. https://gd.eppo.int/taxon/XANTCI/photos

Additional key words: new record **Computer codes:** XANTCI, PE

2023/113 First report of *Xylella fastidiosa* in Lebanon

In 2015, a paper suggesting the presence of *Xylella fastidiosa* (EPPO A2 List) in Lebanon was published. However, later studies confirmed that the ELISA-positive samples initially obtained were false-positive (EPPO RS 2016/037). Inspections carried out in Lebanon in late summer 2020, identified almond (*Prunus dulcis*) trees with symptoms such as leaf scorch, resembling those caused by *X. fastidiosa*, in some orchards in Bint Jbeil district (Nabatiyeh governorate). Leaves sampled from 3 symptomatic trees tested positive for *X. fastidiosa* (ELISA, conventional PCR, quantitative PCR, real-time LAMP). Sequencing identified the subspecies *fastidiosa*. Infected almond trees were located in the southern part of Lebanon, a few kilometres from the Hula Valley in Israel, where *X. fastidiosa* subsp. *fastidiosa* had been reported in 2017 (EPPO RS 2019/121). Further surveys will be conducted to delimit the infested area.

The situation of *X. fastidiosa* subsp. *fastidiosa* in Lebanon can be described as: **Present, not widely distributed**.

Source: Choueiri E, Abou Kubaa R, Valentini F, Yaseen T, El Sakka H, Gerges S, La Notte F, Saponari M, Elbeaino T, El Moujabber M (2023) First report of *Xylella fastidiosa* on almond (*Prunus dulcis*) in Lebanon. *Journal of Plant Pathology* (early view). https://doi.org/10.1007/s42161-023-01361-w

Picture *Xylella fastidiosa*. https://gd.eppo.int/taxon/XYLEFA/photos

Additional key words: new record **Computer codes:** XYLEFA, XYLEFF, LB

2023/114 New findings of *Xylella fastidiosa* in Occitanie region (France)

In France, *Xylella fastidiosa* (EPPO A2 List) was first reported in 2015, in Corse (EPPO RS 2015/144). It currently occurs in Corse, as well as in Provence-Alpes-Côte d'Azur (RS 2016/193, 2019/187) and Occitanie regions (RS 2020/197). *X. fastidiosa* is under containment in Corse, and eradication measures are conducted in Provence-Alpes-Côte d'Azur and Occitanie regions in accordance with Regulation (EU) 2020/1201.

In Occitanie region, *X. fastidiosa* had been detected for the first time in 2020 in Aude and Gard departments. As a result of the nation-wide surveillance programme, new outbreaks were reported in this region in 2022:

- In Ariège department, 2 infested zones were defined.
- In Haute-Garonne department, *X. fastidiosa* was first detected at the end of November 2022 in the urban area of Toulouse. The determination of the subspecies was unsuccessful.
- In Tarn department the presence of *X. fastidiosa* subsp. *multiplex* was confirmed in November 2022. Following a delimiting survey at the end of 2022, 6 new infested zones were defined in addition to the 2 first ones.

In Aude department, surveys carried out since the first discovery have led to the establishment of 264 infected zones in 2022.
In Gard department, no new detections were made in 2022.

The pest status of *X. fastidiosa* subsp. *multiplex* in France is officially declared as: **Present, only in some parts of the Member State concerned, under eradication, under containment, in case eradication is impossible.**

Source: NPPO of France (2023-03).

EU (2020) Commission Implementing Regulation (EU) 2020/1201 of 14 August 2020 as regards measures to prevent the introduction into and the spread within the Union of *Xylella fastidiosa* (Wells *et al.*) http://data.europa.eu/eli/reg_impl/2020/1201/2021-12-23 (consolidated text)
Maps of demarcated areas in France are available at: https://shiny-public.anses.fr/Xylella_fastidiosa/
Préfet de la Région Occitanie. Direction Régionale, de l'Alimentation de l'Agriculture et de la forêt. https://draaf.occitanie.agriculture.gouv.fr/xylella-fastidiosa-point-de-situation-en-occitanie-cropsav-du-12-12-2022-a7660.html

Picture *Xylella fastidiosa*. https://gd.eppo.int/taxon/XYLEFA/photos

Additional key words: new record **Computer codes:** XYLEFA, XYLEFF, FR

2023/115 First report of citrus bark cracking viroid and hop latent viroid in Brazil

In Brazil, cultivation of hop (*Humulus lupulus*) has been increasing during the past decades due to a large demand for craft beers. Studies on viroids were carried out in commercial hop gardens. From May 2020 to October 2021, samples were collected from several varieties of hop plants (cvs. Cascade, Comet, Saaz, Triple, Zeus) showing symptoms of dwarfism and yellowing in three Brazilian states (Minas Gerais, São Paulo and Paraná). Molecular tests (RT-PCR, sequencing, hybridization) confirmed the presence of viroids in some samples. 80% of the tested plants (all regions and varieties) were infected by hop latent viroid (HLVd –

Cocadviroid). In samples of *H. lupulus* cv. Cascade and Comet from São Paulo, a co-infection by HLVd and citrus bark cracking viroid (CBCVd, *Cocadviroid* - EPPO A2 List) was detected. The Brazilian isolate of CBCVd shared 98% sequence identity with an isolate from China. The authors noted that this is the first time that both CBCVd and HLVd are detected in commercial hop gardens in Brazil, and that further studies are needed to better understand their incidence and impact.

The situation of citrus bark cracking viroid in Brazil can be described as follows: **Present, not widely distributed.**

Source: Eiras M, de Oliveira AM, de Fátima Ramos A, Harakava R, Daròs JA (2023) First report of citrus bark cracking viroid and hop latent viroid infecting hop in commercial yards in Brazil. *Journal of Plant Pathology* **105**, 603. https://doi.org/10.1007/s42161-023-01313-4

Pictures: *Citrus bark cracking viroid*. https://gd.eppo.int/taxon/CBCVD0/photos

Additional key words: new record **Computer codes:** CBCVD0, BR

2023/116 Watermelon crinkle leaf-associated virus 1 (WCLaV-1) and WCLaV-2: addition to the EPPO Alert List

Why: Watermelon crinkle leaf-associated virus 1 (*Coguvirus*, WCLaV-1) and Watermelon crinkle leaf-associated virus 2 (*Coguvirus*, WCLaV-2) are newly described viruses affecting watermelon and other cucurbits. Little is known about their biology, but considering their recent reports in different parts of the world and the potential damage that they may cause on cucurbits, the EPPO Secretariat decided to add WCLaV-1 and WCLaV-2 to the EPPO Alert List.

Where: WCLaV-1 and WCLaV-2 were first described in China in 2017.

WCLaV-1
Asia: China (Henan).
North America: USA (Florida, Georgia, Texas).
South America: Brazil (Bahia, Piaui, Rio Grande do Norte).
Oceania: Australia (New South Wales).

WCLaV-2
Asia: China (Henan).
North America: USA (Florida, Oklahoma, Texas).
South America: Brazil (Bahia, Rio Grande do Norte).

On which plants: WCLaV-1 and WCLaV-2 have been described causing damage on watermelon (*Citrullus lanatus*) and more recently on squash and zucchini (*Cucurbita pepo*). As little is known about these viruses, their host range may be wider.

Damage: Symptoms on leaves include mild leaf crinkling and yellow mosaic patterns, yellow mottling and chlorosis, and wrinkling with thickened, bunchy, and upward curling. Symptoms on fruit include circular lesions, and deformations. Symptoms may be severe and disease incidence up to 50% has been reported in commercial fields.

Transmission: More research is needed to assess the modes of transmission of these viruses. In experiments, WCLaV-1 and WCLaV-2 were shown to be transmissible mechanically. Both viruses may be found in mixed infections. No vectors have been identified so far but many viruses of the order Bunyavirales, to which *Coguvirus* belongs, are vectored by arthropods. The recent reports in different parts of the world suggest that WCLaV-1 and WCLaV-2 may be associated with seeds.

Pathways: Plants for planting. Seed? Fruits?

Possible risks: Watermelons and zucchini are widely grown in Southern Europe and around the Mediterranean Basin. WCLaV-1 and WCLaV-2 have been reported in different parts of the world and could probably also be introduced and establish into the EPPO region.

Sources:

Hendricks KE, Hernandez RN, Roberts PD, Isakeit T, Alabi OJ (2022) First report of watermelon crinkle leaf-associated virus 1 (WCLaV-1) and WCLaV-2 in watermelon (*Citrullus lanatus*) plants coinfected with cucurbit chlorotic yellows virus in Florida. *Plant Disease* **106**(1), 339. https://doi.org/10.1094/PDIS-06-21-1141-PDN

Hernandez RN, Isakeit T, Al Rwahnih M, Villegas C, Alabi OJ (2021) First report of watermelon crinkle leaf-associated virus 1 (WCLaV-1) and WCLaV-2 infecting watermelon (*Citrullus lanatus*) in the United States. *Plant Disease* **105**(7), 2025. https://doi.org/10.1094/PDIS-02-21-0249-PDN

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EPPO RS 2013/116

Panel review date –

Entry date 2023-05

Additional key words: Alert List

Computer codes: WCLAV1, WCLAV2

2023/117 First report and eradication of tomato leaf curl New Delhi virus in Türkiye

In Türkiye, symptoms of a leaf curl disease had been frequently observed since 2019 in greenhouses where cucumber (*Cucumis sativus*), melon (*Cucumis melo*) and squash (*Cucurbita pepo*) are produced in Antalya (Mediterranean region). In 2019, samples were collected from eight adjoined greenhouses in Antalya, four growing cucumber, two melon and two squash. Tests (PCR, sequencing) identified tomato leaf curl New Delhi virus (*Begomovirus*, ToLCNDV – EPPO A2 List). This was the first report of ToLCNDV in Türkiye. Measures were applied, they included the destruction of infected plants, and the sanitation of the greenhouses by solarization and use of disinfectants. Further surveys conducted in 2020 and 2021 in the affected and neighbouring greenhouses did not detect ToLCNDV. The virus is considered eradicated.

The situation of tomato leaf curl New Delhi virus in Türkiye can be described as: **Absent, pest eradicated**.

Source: Fidan H, Yildiz K, Sarikaya P, Calis O (2023) First report of Tomato leaf curl New Delhi virus in Türkiye. *New Disease Reports* **47**, e12180. https://doi.org/10.1002/ndr2.12180

Picture Tomato leaf curl New Delhi virus. https://gd.eppo.int/taxon/TOLCND/photos

Additional key words: new record, eradication, absence **Computer codes:** TOLCND, TR

2023/118 First report of the white rust of spinach *Wilsoniana occidentalis* in Germany

The white rust of spinach *Wilsoniana occidentalis* is reported for the first time from Germany. It was identified in an open field of spinach (*Spinacia oleracea*) in Baden-Wurttemberg. This oomycete probably originates from North America but has been also recorded in China, India, Iran, Pakistan. In the EPPO region, it was first reported in Greece in 2013, Türkiye in 2018 and Italy in 2021. The host plants of *W. occidentalis* hosts belong to the Amaranthaceae and spinach is the only species grown commercially.

W. occidentalis is an important disease of spinach in the USA. The pathogen causes chlorotic spots on the leaf surface that develop and often coalesce. Damage reduces both spinach quality and yield and may reach total crop failure as heavily infested leaves are not marketable. The disease is usually controlled by fungicides and the use of less susceptible varieties.

W. occidentalis is not known to be seed-borne, but in the USA it has been recorded as a surface contaminant of seed produced in infested areas. Appropriate disinfection or hot water treatment of the seed will prevent such contamination.

An express PRA conducted by JKI concluded that this pathogen was presenting a high risk for Germany and the other EU countries and recommended measures to limit the spread of *W. occidentalis* in Germany.

Source: JKI (2022) Express-PRA zu *Wilsoniana occidentalis* – Auftreten https://pra.eppo.int/pra/4cad026c-7144-4516-a59f-da44a1ab8fb9

Additional key words: new record **Computer codes:** ALBUOC, DE,

2023/119 The potential global distribution of *Tamarixia radiata* based on climate change

Tamarixia radiata (Hymenoptera: Eulophidae) is an ectoparasitoid biological control agent that has been used extensively throughout the world to supress field populations of *Diaphorina citri* (Hemiptera: Psyllidae - EPPO A1 List, a vector of '*Candidatus* Liberibacter asiaticus'). Studies have shown that temperature and relative humidity influence variation in the performance of *T. radiata* against *D. citri* where the most favourable temperature for optimum parasitism range from 25-30ºC and the optimum temperature for *T. radiata* growth is 25ºC. Using 317 native and non-native global occurrence records, the potential global distribution was modelled based on two climate change projections (SSPs 4.5: moderate estimate of climate warming and SSPs 8.5 high estimate of climate warming) and two time periods (2030 and 2050). The model estimates that habitat suitability for *T. radiata* occurs in all continents except Antarctica. Over the two time periods (2030 and 2050), *T. radiata* is projected to expand its known distribution into new climatic regions mainly due to an increase in those regions in the mean temperature of the coldest quarter.

Source: Aidoo OF, Souza PGC, Silva RS, Júnior PAS, Picanço MC, Heve WK, Duker RQ, Ablormeti FK, Sétamou M, Borgemeister C (2023) Modeling climate change impacts on potential global distribution of *Tamarixia radiata* Waterston (Hymenoptera: Eulophidae). *Science of the Total Environment* 864. https://doi.org/10.1016/j.scitotenv.2022.160962

Additional key words: biological control **Computer codes:** DIAACI, TAMRRA

2023/120 Prioritization of invasive alien plants for biological control

Classical biological control (CBC) of invasive alien plants is receiving increased attention in the EPPO region, with a number of biocontrol programmes being implemented against species which have detrimental impacts on native biodiversity and ecosystem services. Prioritizing species for control using this management method can act to identify those invasive alien plant species which may be amenable. Invasive alien plants from the List of Invasive Alien Species of Union Concern (Regulation 1143/2014) were prioritized using a scheme which focuses on (a) the suitability of the weed as a target for biological control, (b) the effort required to evaluate the safety of a biocontrol agent, and (c) the potential impact of the biocontrol agent on the target species. Sixteen invasive alien plant species were identified (Table 1) with a high potential for CBC in Europe.

Species	Family	EPPO Status	Main or potential biocontrol agents
Acacia saligna	Fabaceae	List IAP	*Melanterius castaneus* (Coleoptera), *Uromycladium morrisii* (Pucciniales)
Ailanthus altissima	Simaroubaceae	List IAP	*Eucryptorrhynchus brandti* (Coleoptera), *Aculus taihangensis* (Acari)
Alternanthera philoxeroides	Amaranthaceae	A2 List	*Agasicles hygrophila* (Coleoptera)
Baccharis halimifolia	Asteraceae	A2 List	*Hellensia balanotes* (Lepidoptera), *Megacyllene mellyi* (Coleoptera), *Rhopalomyia californica* (Diptera), *Trirhabda baccharidis* (Coleoptera)
Cabomba caroliniana	Cabombaceae	List IAP	*Hydrotimetes natans* (Coleoptera)
Cardiospermum grandiflorum	Sapindaceae	A2 List	*Cissoanthonomus tuberculipennis* (Coleoptera), *Contarinia* sp. (Diptera), *Puccinia arechavaletae* (Pucciniales)

Species	Family	EPPO Status	Main or potential biocontrol agents
Hakea sericea	Proteaceae	A2 List	*Erytenna consputa* (Coleoptera), *Carposina autologa* (Lepidoptera), *Aphanasium australe* (Coleoptera), *Dicomada rufa* (Coleoptera), *Cydmaea binotata* (Coleoptera)
Hydrocotyle ranunculoides	Araliaceae	A2 List	*Listronotus elongatus* (Coleoptera)
Lagarosiphon major	Hydrocharitaceae	List IAP	*Hydrellia lagarosiphon* (Diptera)
Ludwigia grandiflora	Onagraceae	A2 List	*Liothrips ludwigi* (Thysanoptera), *Merocnemus binotatus* (Coleoptera), *Tyloderma* spp. (Coleoptera)
Ludwigia peploides	Onagraceae	A2 List	*Liothrips ludwigi* (Thysanoptera), *Merocnemus binotatus* (Coleoptera), *Tyloderma* spp. (Coleoptera)
Myriophyllum aquaticum	Haloragaceae	List IAP	*Lysathia* sp. (Coleoptera)
Parthenium hysterophorus	Asteraceae	A2 List	*Epiblema strenuana* (Lepidoptera), *Zygogramma bicolorata* (Coleoptera), *Listronotus setosipennis* (Coleoptera), *Smicronyx lutulentus* (Coleoptera), *Puccinia xanthii* var. *parthenii hysterophorae* (Pucciniales)
Pistia stratiotes	Araceae	A2 List	*Neohydronomus affinis* (Coleoptera)
Pontederia crassipes	Pontederiaceae	A2 List	*Neochetina* spp. (Coleoptera), *Niphograpta albiguttalis* (Lepidoptera)
Salvinia molesta	Salviniaceae	A2 List	*Cyrtobagous salviniae* (Coleoptera)

Source: Lesieur V, Sforza RFH, Sheppard AW, Shaw RH (2023) Prioritising environmental invasive weeds of European concern for classical biological control: A reanalysis. *Weed Research* (early view). https://doi.org/10.1111/wre.12582

Additional key words: biological control

Computer codes: ACASA, AILAL, ALRPH, BACHA, CABCA, CRIGR, HKASE, HYDRA, LGAMA, LUDUR, LUDPE, MYPBR, PTNHY, PIIST, EICCR, SAVMO

2023/121 Biological control of *Ceratitis capitata* with entomopathogenic nematodes

Ceratitis capitata (Diptera: Tephritidae – EPPO A2 List) is a highly polyphagous pest which has been recorded from more than 350 different confirmed hosts worldwide. Entomopathogenic nematodes have the potential to kill soil dwelling life stages of *C. capitata*. In a laboratory experiment, a culture of *C. capitata* was established from field collected flies from *Citrus aurantium* from Attica (Greece). Four nematode species, *Heterorhabditis bacteriophora*, *H. downesi*, *Steinernema carpocapsae* and *S. feltiae*, were used in the experiment with varying dose levels. Each nematode species was applied to a soil substrate where 100 late instar larvae of *C. capitata* were added and allowed to burrow into the soil and pupate. In addition, field trials (applying the nematode solution to soil) were carried out early in the season (March – May) and late in the season (October - November) in a citrus grove at the Koniario Intitute, Corinthos Greece. In the laboratory experiment all treatments (dose and different species) led to significant reductions in the emergence of *C. capitata*. Field trials in early and off-season showed that a single application of *S. feltiae* at a moderate dose regime can provide approximately 62–65 % suppression of adult *C. capitata*. Nematode application in the field, in combination with other management methods could potentially provide significant suppression of *C. capitata* populations.

Source: Kapranas A, Chronopoulou A, Peters A, Antonatos S, Lytra I, Milonas P, Papachristos D (2023) Early and off-season biological control of medfly with entomopathogenic nematodes: from laboratory experiments to successful field trials. *Biological Control 179*, https://doi.org/10.1016/j.biocontrol.2023.105173

Pictures: *Ceratitis capitata*. https://gd.eppo.int/taxon/CERTCA/photos

Additional key words: biological control

Computer codes: CERTCA, HETOBA, HETODO, NEAPCA, NEAPGL, GR

2023/122 5th Meeting of the Working Group: Benefits and Risks of Exotic Biological Control Agents (Aveiro, PT, 2023-09-11/14)

The International Organisation for Biological Control is organising the 5th meeting of the Working Group "Benefits and Risks of Exotic Biological Control Agents" combined with the IOBC-Global Working Group - BREBCA 2023, which will take place from 11-14 September 2023, at the University of Aveiro, in Aveiro, Portugal. This meeting is targeted at scientists and professionals working with benefits and risks of exotic biological control agents, and addresses the following areas: benefits and risks of exotic biological control agents in forest production systems; benefits and risks of biological control of invasive exotic plants; interactions between exotic biological control agents and native species; benefits and risks of exotic biological control agents of emerging pests and pathogens; novel tools to access the benefits and risks of exotic biological control agents and synergies between organizations and networks dealing with exotic biological control agents. Early registration has been extended to the 15th June, 2023. The meeting will be followed by a kick-off meeting of the European Weed Research Society Working Group (EWRS WG) on Biological Control on the 15th September.

Source: BREBCA website: https://brebca2023.web.ua.pt/

Additional key words: conference, biological control

Computer codes: PT

2023/123 *Vallisneria australis* in the EPPO region: addition to the EPPO Alert List

Why
Vallisneria australis (Hydrocharitaceae) has been known from the EPPO region since the 1800s though it has more recently been recorded as a species with invasive behaviour. The EPPO Panel on Invasive Alien Plants are seeking further information on any additional occurrences of *V. australis* in the EPPO region and reports of environmental and economic impacts.

Geographical distribution
Asia: Japan.
EPPO region: Belgium, France, Germany, Hungary, Italy, the Netherlands
North America: USA (California).
Oceania: Australia (Native), New Zealand.

Morphology
Vallisneria australis is a rooted submerged freshwater aquatic perennial species. The long elongate strap-shaped leaves can be up to 3 metres long and 1.5-3.5 cm wide, with fine toothed margins towards the leaf apex. The 5-7 prominent longitudinal leaf veins are parallel and connected by small lateral veins. The species is dioecious. Small male flowers (< 0.5 mm) are clustered in membranous sheaths near the bases of the male plants and are released to float to the water surface. The small 3-parted female flowers are approximately 2-4 mm long, generally borne singly (sometimes up to 4 per inflorescence) in a tubular sheath at the end of a long narrow stalk (peduncle).

Biology and Ecology
Vallisneria australis has been reported to grow in waterbodies up to 6 m in depth. It can grow in still and moderately fast-flowing water bodies. Male and female plants are reported in the EPPO region though they are not currently reported to occur together in the same area.

Habitats
In its native range, *V. australis* is found in rivers, streams and other inland water bodies. In the EPPO region it is present in thermally heated canals in Hungary and is present in modified water bodies (rice fields, canals and gravel pits) in Belgium, the Netherlands, Germany and Italy. In France, it has been present for at least 10 years and occurs in two artificial water bodies located far apart, Lake Salagou (Hérault) and Lake Vaivre, near Vesoul (Haute-Saône).

Pathways for movement
Vallisneria australis has entered the EPPO region as an ornamental aquarium plant, mostly under an incorrect name. Natural spread is via vegetative plant fragmentation and seed (though it is not known if viable seed is produced in the EPPO region), dispersed by the water flow. Spread can also be facilitated via human assistance, e.g. boats or dredging equipment.

Impacts
Observations in Hungary detail that *V. australis* is a strong competitor and can replace other submerged invasive alien plants such as *Hydrilla verticillata* (Hydrocharitaceae: EPPO List of Invasive Alien Plants) and *Cabomba caroliniana* (Cabombaceae: EPPO List of Invasive Alien Plants). The species can form dense populations and in France they have been reported to occur over several thousand square metres. Native plant species and higher trophic levels can be negatively impacted as the long leaves can act to shade out sunlight altering the chemical composition of the waterbody. The species could block drainage ditches.

Control
Controlling *V. australis* is difficult and would likely be similar to other submerged species where physical removal is applied. However, removing all of the biomass of a population would be very problematic due to the habitat.

Sources
Dutartre A (2022) *Vallisneria australis*, une nouvelle espèce aquatique exotique en France. http://especes-exotiques-envahissantes.fr/vallisneria-australis-une-nouvelle-espece-aquatique-exotique-en-france/
EPPO (2023) First record of *Vallisneria australis* in France. EPPO Reporting Service 2023/026. https://gd.eppo.int/reporting/article-7508
Mesterházy A, Somogyi G, Efremov A, Verloove V (2021) Assessing the genuine identity of alien *Vallisneria* (Hydrocharitaceae) species in Europe. *Aquatic Botany* **174**, 103431, 6 pp.

Additional key words: invasive alien plant, alert list **Computer codes:** VAIAU

2023/124 Glyphosate resistance in *Amaranthus palmeri* populations in Europe

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. In the EPPO region, it is established in a few countries and transient in others. In Spain, *A. palmeri* is invasive especially in Catalonia. Herbicide resistance has been reported in populations of *A. palmeri* (see EPPO RS 2021/095 and EPPO RS 2022/158). However, this is the first-time that glyphosate resistant populations have been reported in the EPPO region. In 2021, mature seeds were collected from a suspected glyphosate resistant population near Tarragona harbour in Spain. *A. palmeri* seedlings were grown in controlled, replicated conditions and glyphosate was applied at the standard field dose rate. A population of *A. palmeri* known to be susceptible to glyphosate was treated in the same way. All susceptible plants died whereas 10 out of the 25 treated plants collected from Tarragona harbour survived. The dose experiment and subsequent DNA analysis of the resistant plants indicate that the Tarragona harbour population is glyphosate resistant, and it is likely that the EPSPS gene copy number variation is the main resistance mechanism. It is likely that glyphosate resistance seed has been introduced into the EPPO region via the importation of contaminated seed. Further studies are needed to evaluate how widespread glyphosate resistant populations are in the EPPO region.

Source: Manicardi A, Milani A, Scarabel L, Mora G, Recasens J, Llenes JM, Montull JM, Torra J (2023) First report of glyphosate resistance in an *Amaranthus palmeri* population in Europe. *Weed Research* (early view). https://doi.org/10.1111/wre.12579

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

Additional key words: invasive alien plant **Computer codes:** AMAPA, ES

2023/125 Growth traits and potential invasiveness of *Acer* species

Invasive tree species can have significant detrimental impacts on the habitats they invade including outcompeting native biodiversity and altering the structure and composition of habitats. *Acer* species have been widely introduced throughout the world due to their ornamental or wood production properties. Identifying potentially invasive *Acer* species before they become problematic can prevent expensive management costs and reduce effects on ecosystem services. Eight *Acer* species were studied (Table 1), and performance traits were compared with their invasiveness (expressed as the number of regions and countries invaded). Seeds of eight species were collected from arboreta and parks in Belgium, and from suppliers from the United Kingdom and France. Seeds (between 24 and 42 per species) were planted and grown under controlled conditions. Measured traits were relative growth rate (RGR), specific leaf area (SLA), height, number of leaves of seedlings and shoot-root ratio. Seedlings were harvested and measured after 2, 4 and 8 weeks. Overall, RGR, SLA, height and number of leaves after 8 weeks were positively correlated with the invasiveness of the species. Interestingly, *A. rufinerve* (EPPO List of Invasive Alien Plants) was highlighted in the study as a species with low invasiveness due to the low number of countries it has currently invaded, but it has a high RGR and SLA. This may indicate that *A. rufinerve* has not completed its invasion process yet and the species should be closely monitored in temperate countries to avoid invasions into natural habitats.

Table 1. Eight species of *Acer* included in the study.

Species	Native range	Regions invaded
Acer negundo	North America	Africa, Asia, Europe, Oceania, South America
Acer pseudoplatanus	Europe	Africa, Asia, Europe, Oceania, South America
Acer platanoides	Europe	Europe, North America, Oceania
Acer campestre	Europe	Europe, North America
Acer palmatum	East Africa	Asia, Europe, North America
Acer saccharum	North America	Asia, Europe
Acer rufinerve	North America	Europe
Acer lobelii	Europe	Europe

Source: Aurore F, Grégory M, Arnaud M (2022) Can we foresee future maple invasions? A comparative study of performance-related traits and invasiveness of eight *Acer* species. *Plant Ecology* **223**, 1181–1192. https://doi.org/10.1007/s11258-022-01266-1

Additional key words: invasive alien plants

Computer codes: ACRNE, ACRPP, ACRPL, ACRCA, ACRPA, ACRSC, ACRRU, ACRLB, BE

2023/126 Escape of alien species from botanical gardens in Ukraine

Botanical gardens can be sources of invasive alien plants. *Veronica cardiocarpa* (Plantaginaceae) is an annual species native to Central and East Asia. It was recorded in the O.V. Fomin Botanical Garden of the Taras Shevchenko National University of Kyiv (Ukraine) in 1983 as a result of an unintentional introduction. *V. cardiocarpa* can be regarded as a new alien plant species in Ukraine as it has invaded new areas and populations show a high seed production. New populations of *V. cardiocarpa* were found during surveys in adjacent areas to the Botanical Garden before 2016. These populations were situated in urban areas which

were approximately 150 – 250 m from the nearest known locations of the species. The populations consisted of five sites. The largest of them covered an area of about 14 m^2 on a lawn and along pavements. The density of plants was about 280 individuals per m^2. The second-largest site was also a lawn site of approximately 5 m^2 with a density of 60–80 individuals per m^2. The remaining sites were formed of only a few individuals in flower beds. All sites were situated in shaded places. In 2021, *V. cardiocarpa* was still spreading: about 10 individuals were recorded about 30–40 m from the closest site.

Source: Konaikova V, Peregrym M (2023) The escape of alien species from botanical gardens: a new example from Ukraine. *Biologia* **78**, 1415–1423. https://doi.org/10.1007/s11756-023-01384-9

Additional key words: invasive alien plants **Computer codes:** VERCD, UA

2023/127 Non-native species of *Euphorbia* in Tunisia

Surveys conducted since 2015 in Tunisia in areas of salty wetlands and along railways have identified new records of non-native shrubby taxa of the genus *Euphorbia*. Three species *E. cotinifolia* subsp. *cotinoides*, *E. cooperi* var. *cooperi*, and *E. cyathophora* are new casual records for the Mediterranean area. *E. canariensis* is a new record as a casual species for Africa, and *E. trigona* and *E. milii* var. *splendens* are new casual records for North Africa. Moreover, *E. pulcherrima* is first reported as a non-native of continental North Africa and *E. tirucalli* is reported for the second time as an established non-native species in Tunisia.

Table 1. Non-native *Euphorbia* species in Tunisia.

Species	Native range	Notes on occurrence in Tunisia
Euphorbia canariensis	Canary Islands	Edge of an area where many *Opuntia* species are growing, within Tunis region (North-East Tunisia).
Euphorbia cotinifolia subsp. *cotinoides*	Americas	Roadside close to planted ornamentals, Tabarka, Jendouba (North-West Tunisia).
Euphorbia cooperi	Southern Africa	Edges of the metro railway in Monastir (Central East Tunisia).
Euphorbia heterophylla var. *cyathophora*	Americas	Few individuals growing with native species in oasis Douz, Kebili (South-West Tunisia).
Euphorbia milii var. *splendens*	Madagascar	Coastal slopes in the Monastir region, escape from ornamental plantings (Central East Tunisia).
Euphorbia pulcherrima	Americas	Roadside populations and waste ground in Monastir (Central East Tunisia).
Euphorbia tirucalli	Africa	Edge of railway growing with ruderal plants also near plantations of *Opuntia ficus-indica* (Central West Tunisia).
Euphorbia trigona	Africa	Roadside in the region of Monastir (Central East Tunisia).

Source: El Mokni R (2023) Non-native shrubby species of *Euphorbia* (Euphorbiaceae) in Tunisia. *Flora Mediterranea* **33**, 17-29.

Additional key words: invasive alien plants **Computer codes:** EPHKN, EPHKO, EPHCT, EPHMN, EPHPU, EPHTI, EPHTG, TN

2023/128 First record of *Amaranthus crassipes* subsp. *warnockii* in Tunisia

The genus *Amaranthus* is comprised of approximately 65-70 species of which half are native to the Americas. *Amaranthus crassipes* subsp. *warnockii* is an annual species, native to the Southern United States of America and to Mexico. It is reported for the first time in Tunisia and is the first report of the taxa outside of its native range. It is recorded in on clay and sandy substrates within ruderal vegetation. *A. crassipes* subsp. *warnockii* is restricted in Tunisia to one locality of Monastir city. The population covers an area of about 100 m^2. In this location, it flowers from October to November and sets seed from November to December. The taxon can be considered as casual to Tunisia.

Source: Iamonico D, El Mokni R (2022) First record of *Amaranthus crassipes* subsp. *warnockii* (I.M.Johnst.) N.Bayón (Amaranthaceae) outside of the Americas, with nomenclatural notes'. *Bothalia* **53**(1), a2. https://www.abcjournal.org/index.php/BothaliaABC/article/view/350

Additional key words: invasive alien plants **Computer codes:** AMACW, TN