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EPPO Reporting Service

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2020/001 Beastie the Bug and the International Year of Plant Health

Beastie the Bug is an invasive pest which seriously damages wild and cultivated plants. Several specimens have started to spread from the EPPO headquarters where the first outbreak was detected at the end of 2019. Since the beginning of 2020, the International Year of Plant Health, Beastie has started to spread across the world. If you see it, capture Beastie, and share your finding with everyone!

It is hoped that this communication campaign will provide a unique opportunity to share opinions, experiences, feelings, as well as nice photos about the importance of plant health, not only among experts of the EPPO region but with everyone around the world. The objective is to raise public awareness about plant health issues during the International Year of Plant Health.

Beastie the Bug has a dedicated website and a Twitter account, where participants can post pictures and write short stories about plant health.

Website: https://beastiebug.eppo.int/
Twitter: @bug_beastie

Have fun with Beastie the Bug!

Source: EPPO Secretariat (2020-01).

Pictures: Beastie the Bug. https://gd.eppo.int/taxon/BEASTY/photos

Additional key words: communication **Computer codes:** BEASTY

2020/002 Recommendations to policy makers from Euphresco projects

The following research project has recently been carried out in the framework of Euphresco (network for phytosanitary research coordination and funding, hosted by EPPO). A report presenting the main objectives and results of this project, as well as recommendations made to policy makers can be viewed on the Internet.

Project title: Assessment of *Dickeya* and *Pectobacterium* spp. on vegetables and ornamentals (Soft rot)

This project contributed to a rapid and extensive information exchange on the characterization of (new) pathogens causing soft rot and blackleg diseases. It has been observed that the population structure of soft rot Pectobacteriaceae (SRP) changes rapidly, in particular in potato. The finding and characterization of several new variants of SRP indicates that there is a risk of introducing new aggressive pathogens causing soft rots from the environment. It stresses the importance of conducting regular surveys. Given the high risks of infections from environmental sources, management practices (in particular hygiene) are essential to reduce the risk of spread. Attempts to select cultivars with a high level of resistance against SRP have failed. To limit damage, treatment of planting material is highly desirable. A combination of physical treatments to reduce inoculum levels of planting material followed by the application of biological control agents (antagonists) that are able to control the pathogen is a strategy that is expected to reduce inoculum load and symptom development.

Authors: van der Wolf, Jan; Bergsma-Vlami, M; Saddler, Gerry; Hélias, Valérie; Tsror, Leah; Yedida, Iris; Pirhonen, Minna; Degefu, Yeshtila; Tuomisto, Jussi; Lojkowska, Ewa; Li, Sean.

Duration of the project: 2015-01-01 to 2018-12-31.

Link: https://zenodo.org/record/3603096#.XhcnsMhKjcs

Source: Euphresco (2020-01). https://www.euphresco.net/projects/

Additional key words: research **Computer codes:** 1DICKG, 1PECBG

2020/003 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 no. 8.

- **New records**

Halyomorpha halys (Hemiptera: Pentatomidae – formerly EPPO Alert List) has recently been reported from Kazakhstan (Zhunisbai *et al.*, 2019). **Present, no details.**

Ips sexdentatus (EU Annexes) occurs in Kazakhstan (Linch *et al.*,2019). **Present, no details.**

Leptoglosus occidentalis (Hemiptera: Coreidae) is reported for the first time from Cyprus. One adult specimen was found in April 2019 in the Paphos forest. This forest is mainly composed of Mediterranean pine species, and located in the Western part of the Troodos Mountains (van der Heyden & Zettel, 2019). **Present, few occurrences**.

Leptoglosus occidentalis (Hemiptera: Coreidae) is reported for the first time from Argentina. The first specimens were found in December 2017 in El Bolson (Rio Negro province). Other detections were then made in other localities (Bariloche and Dina Huapi) (Kun & Masciocchi, 2019). **Present, few occurrences**.

Phoracantha recurva (Coleoptera: Cerambycidae – formerly EPPO Alert List) is reported for the first time from Mexico (Cortés-Aguilar *et al.*, 2019). **Present, no details.**

- **Detailed records**

In Germany, *Synchytrium endobioticum* (EPPO A2 List) was found in ware potatoes in Niedersachsen during a phytosanitary inspection. The source of the infestation is not known so far but eradication measures have been taken.
The pest status of *Synchytrium endobioticum* in Germany is officially declared as: **Present few occurrences, at low prevalence**.

In Italy, *Xylosandrus crassiusculus* (Coleoptera: Scolytidae - EPPO Alert List) was first found in Toscana (EPPO RS 2009/054) and then in other regions (Liguria, Veneto). It was first recorded in Cuneo Province (Piemonte) in April 2018 in recently planted Japanese hybrids of chestnut trees (Dutto *et al.*, 2018).

- **Eradication**

During research studies carried out in Spain, *Tomato chlorotic dwarf viroid* (*Pospiviroid*, TCDVd) was detected on *Solanum melongena* (EPPO RS 2019/154). The NPPO of Spain recently informed the EPPO Secretariat that this finding was made only in the framework of an experiment conducted at the Universitat Politècnica de València. All infested plants, as well as all other plants present in the greenhouse were destroyed, and the facilities were disinfected. Surveys were carried out in the adjacent greenhouses and in all outdoors plots of the university campus. Seed lots which had been used and seed beds were tested for TCDVd and all results were negative. Therefore, it is considered that TCDVd has been eradicated.
The pest status of *Tomato chlorotic dwarf viroid* in Spain is officially declared as: **Absent, pest eradicated**.

- **Host plants**

Cordia myxa (Boraginaceae) is first recorded as a host plant of Asian citrus psyllid, *Diaphorina citri* (Hemiptera: Liviidae – EPPO A1 List - vector of '*Candidatus* Liberibacter asiaticus') in the southern region of the state of Punjab, Pakistan.

Sources:

Arshad M, Irfan Ullah M, Sena Çağatay N, Dikmen F, Abdullah A, Afzal M (2019) *Cordia myxa* L., a new host plant record for Asian citrus psyllid, *Diaphorina citri* Kuwayama. *Southwestern Entomologist* **44**(1), 331-334. https://doi.org/10.3958/059.044.0137

Cortés-Aguilar J, Bello-Bedoy R, Navarrete-Heredia JL, Velázquez A (2019) Primer captura de *Phoracantha recurva* Newman, 1840 en condiciones naturales en México e informacion sobre su distribucion en México. *Southwestern Entomologist* **44**(4), 973-978. https://doi.org/10.3958/059.044.0410

Dutto M, Ferracini C, Faccoli M (2018) Prima segnalazione di *Xylosandrus crassiusculus* (Motschulsky, 1866) (Coleoptera Curculionidae Scolytinae) in Piemonte. *Bollettino Della Società Entomologica Italiana* **150**(3), 123-125. https://doi.org/10.4081/BollettinoSEI.2018.123

Kun ME, Maschiocchi M (2019) First detection of the cosmopolitan invader *Leptoglossus occidentalis* Heidemann (Heteroptera: Coreidae) in Argentina. *Anais da Academia Brasileira de Ciências* **91**(3), e20180493. http://www.scielo.br/pdf/aabc/v91n3/0001-3765-aabc-91-03-e20180493.pdf

Lynch AM, Mukhamadiev NS, O'Connor CD, Panyushkina IP, Ashikbaev NA, Sagitov AO (2019) Tree-ring reconstruction of bark beetle disturbances in the *Picea schrenkiana* Fisch. et Mey. forests of Southeast Kazakhstan. *Forests* **10**, 912. https://doi.org/10.3390/f10100912

NPPO of Germany (2019-09).

Van der Heyden T, Zettel H (2019) First record of *Leptoglossus occidentalis* Heidemann, 1910 (Heteroptera: Coreidae) from Cyprus. *Zeitschrift der Arbeitsgemeinschaft Österreichischer Entomologen* **71**, 177-178.

Zhunisbai RT, Dinasilov AS, Islamova RA (2019) [Brown marmorated stink bug (*Halyomorpha halys*) - a new invader in the territory of the Republic of Kazakhstan]. *Zashchita i Karantin Rasteniĭ* no. 10, 38-40 (in Russian).

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

Computer codes: CRHMY, DIAACI, HALYHA, IPSXSE, IPSXTY, LEPLOC, PHOARE, SYNCEN, XYLBCR, AR, CY, DE, IT, KZ, MX

2020/004 Eradication of *Anoplophora chinensis* from Switzerland

The NPPO of Switzerland informed the EPPO Secretariat that the outbreak of *Anoplophora chinensis* (Coleoptera: Cerambycidae – EPPO A2 List) detected in the Canton of Thurgau in 2014 (EPPO RS 2014/182, 2017/007) was officially declared eradicated in December 2019. Following the first discovery in 2014, intensive monitoring with sniffer dogs and visual inspections was carried out during four consecutive years in the delimited area. Since this finding, no signs of activity of *A. chinensis* were detected (i.e. no beetles, larvae, eggs, exit holes, frass, oviposition pits, signs of maturation feeding). Restrictions on the movement of plants and plant material as well as intensive monitoring measures were lifted.
The pest status of *Anoplophora chinensis* in Switzerland is officially declared as: **Absent, pest eradicated.**

Source: NPPO of Switzerland (2019-12).

Pictures: *Anoplophora chinensis*. https://gd.eppo.int/taxon/ANOLCN/photos

Additional key words: detailed report, eradication **Computer codes:** ANOLCN, CH

2020/005 Eradication of *Anoplophora glabripennis* from Switzerland

The NPPO of Switzerland informed the EPPO Secretariat that the outbreak of *Anoplophora glabripennis* (Coleoptera: Cerambycidae – EPPO A1 List) detected in Berikon (Canton of Aargau) in 2015 (EPPO RS 2015/185) was officially declared eradicated in December 2019. Following the first discovery in September 2015, 183 host trees were felled and intensive monitoring with sniffer dogs, tree climbers and visual inspections was carried out during four consecutive years in the delimited area. Since 2015-09-21, no signs of activity of *A. glabripennis* were detected (i.e. no beetles, larvae, eggs, exit holes, frass, oviposition pits, signs of maturation feeding). Restrictions on the movement of plants and plant material as well as intensive monitoring measures were lifted.
The pest status of *Anoplophora glabripennis* in Switzerland is officially declared as: **Absent, pest eradicated.**

Source: NPPO of Switzerland (2019-12).

Internet: https://www.bafu.admin.ch/alb

Pictures: *Anoplophora glabripennis*. https://gd.eppo.int/taxon/ANOLGL/photos

Additional key words: detailed report, eradication **Computer codes:** ANOLGL, CH

2020/006 First report of *Arboridia kakogawana*, the Japanese grape leafhopper, in Romania

Arboridia kakogawana (Hemiptera: Cicadellidae) was first described in Japan (Honshu) and then found in the Republic of Korea and the Russian Far East. In 1999, it was discovered in Southern Russia. In the 2000s, *A. kakogawana* was recorded as a pest of grapevine (*Vitis vinifera*) in vineyards of Russia and the Republic of Korea (EPPO RS 2016/097), as well as in Crimea and in North-western China.

In 2018 *A. kakogawana* was first identified from a vineyard (*Vitis vinifera*) in Northern Bucharest in Romania. Very high numbers were caught in yellow sticky traps during a monitoring for *Scaphoideus titanus*. Strong discoloration of the upper surface of the leaves (due to adult and nymph feeding) was also observed in this plot. Traps used in prior monitoring in 2016 and 2017 were re-examined and specimens of *A. kakogawana* were already present in 2016 and 2017, although in lower numbers. Adults and nymphs of *A. kakogawana* were also observed feeding on Virginia creeper (*Parthenocissus quinquefolia*). Considering the major impact of this pest on grapevine production in Southern Russia and Crimea, this pest could present a threat for grapevine production in Romania.

Source: Chirecean C, Daniel N, Seljak G (2019) First record of the Japanese grape leafhopper *Arboridia kakogawana* (Matsumura, 1932) (Hemiptera: Cicadellidae) from Romania. *EPPO Bulletin* **49**, 391–397. https://doi.org/10.1111/epp.12585

Pictures: *Arboridia kakogawana* https://gd.eppo.int/taxon/ARBOKA/photos

Additional key words: new record **Computer codes:** ARBOKA, RO

2020/007 *Arboridia kakogawana*: addition to the EPPO Alert List

Why: *Arboridia kakogawana* (Hemiptera: Cicadellidae – Japanese grape leafhopper) is a pest of Asian origin, has spread within Russia and was recently found in Romania (EPPO RS 2020/006). Considering the importance of grapevine (*Vitis vinifera*) cultivation in the EPPO region, and the potential damage caused by this new pest, the EPPO Secretariat decided to add *A. kakogawana* to the EPPO Alert List.

Where: *A. kakogawana* was first described in Japan and then found in the Republic of Korea and the Russian Far East. It was discovered in 1999 in Southern Russia, and later in Ukraine, China, and in 2016 in Romania.
EPPO region: Romania, Russia (Southern Russia), Ukraine (Crimea)
Asia: China (Xinjiang); Japan (Kyushu), Korea (Republic of), Russia (Far East)

On which plants: In its native range, *A. kakogawana* lives in broadleaved and mixed forests and feeds on *Vitis amurensis*. In Southern Russia, Crimea, the Republic of Korea and Romania, it is reported as a pest of grapevine (*Vitis vinifera*). In Romania, it was also recorded on *Parthenocissus quinquefolia*.

Damage: Nymphs and adults feed on the lower leaf surface, causing discoloration and necrosis which can then have negative impacts on the maturation of grapes.
A. kakogawana is a leafhopper with body length of 2.6-3.1 mm. Adults are light yellow with brown or orange spots of the forewings. Nymphs are green-yellow.

In Romania, adults were trapped from early June to the middle of November. *A. kakogawana* has two to three generation per year in Russia and four in Xinjiang (China) and in Romania. In the Republic of Korea, observations have shown that, in October, adults move from vineyards to nearby forests in search of trees to overwinter under the bark.
Control is possible with insecticides, and biocontrol is also under study. However, in Romania, the normal insecticide treatments against *Lobesia botrana* could not control *A. kakogawana*. In addition the proportion of organic vineyards is increasing in Europe and this pest may be difficult to control in such cases.

Dissemination: Data is missing on its natural spread but adults can fly. Over long distances, host plants can transport the pest. Wood with bark can possibly transport *A. kakogawana*, as the insect overwinters under the bark of broad-leaved trees. Grapes are not considered a pathway by Biosecurity Australia (2011) as the pest is only associated with leaves.

Pathway: Plants for planting of host plant species, wood with bark (as contaminant)?

Possible risks: Grapevine (*Vitis vinifera*) is an economically important crop in the EPPO region. In the Republic of Korea and Russia, *A. kakogawana* is considered as a pest of grapevine and has been spreading since the years 2000s. It is desirable to avoid its spread within the EPPO region. The fact that this pest was found in an EU country poses a new risk as import of *Vitis* plants for planting is prohibited from third countries into the EU.

Ahn KS, Kim HY, Lee KY, Hwang JT & Kim GH (2005) Ecological characteristics of *Arboridia kakogawana* and *Arboridia maculifrons* (Auchenorrhyncha: Cicadellidae) in vineyards. *Korean Journal of Applied Entomology* **44**, 251–255.

Lee SJ, Lee CM, Song JS, Lim TH, Han SS, Lee SM, Kim HH, Cho MR, Lee DW (2014) Seasonal occurrence of *Arboridia* spp. in grapevine export complexes in Korea. *Journal of Agriculture & Life Science* **48**, 79–88. (in Korean with English summary)

Biosecurity Australia (2011) Final non-regulated risk analysis report for table grapes from the Republic of Korea. https://www.agriculture.gov.au/biosecurity/risk-analysis/plant/grapes-korea

Cao WQ, Lin SY, Wang YQ, Fan WL & Hu HY (2017) A survey of population dynamics of leafhopper, *Arboridia kakogawana* (Matsumura) and parasitoids of vineyard in Turpan. *Journal of Environmental Entomology* (2), 019

Chirecean C, Daniel N, Seljak G (2019) First record of the Japanese grape leafhopper *Arboridia kakogawana* (Matsumura, 1932) (Hemiptera: Cicadellidae) from Romania. *EPPO Bulletin* 49(2), 391– 397. https://doi.org/10.1111/epp.12585

Matsumura, S. (1932) A revision of the Palaearctic and Oriental Typhlocybid-genera with descriptions of new species and new genera. Insecta Matsumurana 6(3): 93-120. http://hdl.handle.net/2115/9233

Radionovskaya YE & Didenko LV (2014) Invasion of grapes by *Arboridia kakogawana* Mats. and its bioecological peculiarities in the Crimea. *Karantin i zakhyst roslin* **8**, 5–7.

Radionovskaya YE & Didenko LV (2015) A study of the leafhopper (Auchenorrhyncha) species composition on grapes in The Crimea. Научные труды **8**, 205–215.

EPPO RS 2020/007

Panel review date – Entry date 2020-01

Additional key words: Alert List **Computer codes:** ARBOKA

2020/008 First report of *Opogona sacchari* in Cyprus

The NPPO of Cyprus recently informed the EPPO Secretariat of the presence of *Opogona sacchari* (Lepidoptera: Tineidae – EPPO A2 List) on its territory. The insect was caught in traps in garden centres in Nicosia district in August 2019, as part of national official surveys. *O. sacchari* was identified at the National Reference Laboratory by sequencing of the COI (Cytochrome c oxidase subunit I) barcode gene. Official surveys are ongoing to demonstrate the extent of the infestation. No official phytosanitary measures were implemented but the operators applied appropriate plant protection products. It can be noted that *O. sacchari* had been first detected in 2011 on ornamental plants in the warehouses of two traders but had been eradicated.

The pest status of *Opogona sacchari* in Cyprus is officially declared as: **Present, seasonally, only in some parts of the Member State concerned, at low prevalence.**

Source: NPPO of Cyprus (2019-10).

EU (2011) Summary report of the meeting of the Standing Committee on Plant Health held on 29-30 September 2011. https://ec.europa.eu/food/sites/food/files/plant/docs/sc_plant-health_20110929_sum.pdf

Pictures: *Opogona sacchari*. https://gd.eppo.int/taxon/OPOGSC/photos

Additional key words: new record, detailed record **Computer codes:** OPOGSC, CY

2020/009 First report of *Drosophila suzukii* in Israel

The NPPO of Israel recently informed the EPPO Secretariat of the first record of *Drosophila suzukii* (Diptera: Tephritidae – EPPO A2 List) on its territory. In August 2019, the pest was incidentally found by a member of the public in a private garden. Specimens were reared from raspberry (*Rubus idaeus*) and identified with classical methods using the EPPO diagnostic protocol (EPPO Standard PM 7/115). The identification was verified using molecular methods (PCR and sequencing). The NPPO of Israel (PPIS) is currently carrying out surveys to determine the distribution of *D. suzukii*. Until now, the pest has been found on *Rubus* spp. in Jerusalem hills and Sha'al. Infested plots and gardens have been treated.
The pest status of *Drosophila suzukii* in Israel is officially declared as: **Present, limited distribution.**

Source: NPPO of Israel (2020-01).

Pictures: *Drosophila suzukii*. https://gd.eppo.int/taxon/DROSSU/photos

Additional key words: new record **Computer codes:** DROSSU, IL

2020/010 First report of *Xylosandrus compactus* in Mallorca (Baleares, ES)

The NPPO of Spain recently informed the EPPO Secretariat of the first finding of *Xylosandrus compactus* (Coleoptera: Scolytidae – EPPO Alert List) in Mallorca, Islas Baleares. Symptoms were first observed by gardeners in a carob tree (*Ceratonia siliqua*) in a private garden located in the municipality of Calvià, Mallorca Island. The identification of *Xylosandrus compactus* was confirmed by the Official Plant Health Laboratory of Islas Baleares in December 2019. The infested tree was drastically pruned and two endotherapy treatments with abamectin were carried out in August 2019. A survey was carried out in the area consisting of visual inspections and sampling. Samples (mainly branches) were taken from the affected tree and other nearby carob trees in December 2019 and no *X. compactus* was detected. Symptoms produced by the insect do not seem to cause the death of the tree. Surveillance will continue within a radius of 200 m around the affected tree.
The pest status of *Xylosandrus compactus* in Spain is officially declared as: **Transient, actionable, under surveillance**.

Source: NPPO of Spain (2019-12).

Pictures: *Xylosandrus compactus*. https://gd.eppo.int/taxon/XYLSCO/photos

Additional key words: new record **Computer codes: XYLSCO, ES**

2020/011 First report of *Tetranychus evansi* in China

Tetranychus evansi (Acari: Tetranychidae - EPPO A2 List) is reported for the first time from China. The pest was detected in three provinces (Guangdong, Guangxi and Sichuan) during studies conducted in 2016/2017. *T. evansi* was found on tomato (*Solanum lycopersicum*) in Ya'an (Sichuan); on aubergine (*S. melongena*) in Baise, Guangzhou and Ya'an (Guangxi, Guangdong and Sichuan, respectively); and in cucumber (*Cucumis sativus*) in Chengdu (Sichuan). The identity of the pest was confirmed by morphological and molecular methods. It is concluded that *T. evansi* may represent a new threat to tomato production in China and that further studies on its geographical distribution and incidence are needed.
The situation of *Tetranychus evansi* in China can be described as: **Present, only in some areas (Guangdong, Guangxi and Sichuan provinces).**

Source: Tian L, Jin PY, Sun CP, Hong XY (2019) First distribution record of the tomato red spider mite *Tetranychus evansi* (Acari: Tetranychidae) in mainland China. *Systematic & Applied Acarology* **24**(6), 965–970.

Pictures: *Tetranychus evansi*. https://gd.eppo.int/taxon/TETREV/photos

Additional key words: new record **Computer codes:** TETREV, CN

2020/012 First report of *Meloidogyne mali* in Belgium

The NPPO of Belgium recently informed the EPPO Secretariat of the first record of *Meloidogyne mali* (EPPO A2 List) on its territory. In the EPPO region, *M. mali* has been detected in several sites in France, Italy, the Netherlands, and the United Kingdom (EPPO RS 2014/102, 2017/043 and 2019/081), where elm (*Ulmus* spp.) trees had been planted as part of a breeding programme against Dutch elm disease. In Belgium, potentially infested elm trees had been planted at one experimental site of the Research Institute for Nature and Forest in the province of East Flanders. During a research project (Suwanngam & Wesemael, 2019), root samples collected from these elm trees were found to be infested with *M. mali* in April 2018. Infested plants showed typical root galls, and the identity of the nematode was confirmed by morphological and molecular (PCR, sequencing) methods. Nucleotide sequences were compared with those from other related *Meloidogyne* species and shared the closest identity with an accession of *M. mali* from Japan.
The pest status of *Meloidogyne mali* in Belgium is officially declared as: **Present, few occurrences: found in one experimental site related to the Dutch elm disease [resistance] breeding program.**

Source: NPPO of Belgium (2020-01).

Suwanngam A, Wesemael WML (2019) First report of the root-knot nematode *Meloidogyne mali* infecting elm trees in Belgium. *New Disease Reports* **40**, 16. http://dx.doi.org/10.5197/j.2044-0588.2019.040.016

Pictures: *Meloidogyne mali*. https://gd.eppo.int/taxon/MELGMA/photos

Additional key words: new record **Computer codes:** MELGMA, BE

2020/013 New outbreaks of *Meloidogyne chitwoodi* and *Meloidogyne fallax* in France

In France, *Meloidogyne chitwoodi* and *M. fallax* (both EPPO A2 List) were first detected in 2008 in Picardie region (EPPO RS 2011/030) and several other regions (EPPO RS 2012/235). Eradication measures were applied. The NPPO of France recently informed the EPPO Secretariat of two new findings of *Meloidogyne chitwoodi* and *Meloidogyne fallax* (both EPPO A2 List) on its territory.

- ***Meloidogyne chitwoodi***

In September 2019, *M. chitwoodi* was detected in the municipality of Marzan in Bretagne region on lettuce (*Lactuca sativa*) grown in a greenhouse of 2000 m^2. Eradication measures are being applied, including crop destruction and disinfection of agricultural equipment. Traceability studies are being conducted.
The pest status of *Meloidogyne chitwoodi* in France is officially declared as: **Present, under eradication.**

- ***Meloidogyne fallax***

In September 2019, *M. fallax* was detected in the municipality of Bricqueville-sur-Mer in Basse-Normandie region on ware potato tubers (*Solanum tuberosum*) grown outdoors. Eradication measures are applied and include the prohibition of moving plant material and soil out of the infested plot, the destruction of infested potato lots. Additional surveys in the infested farm and traceability studies are being conducted. It is noted that *M. fallax* had been previously found in Basse-Normandie but had been eradicated.
The pest status of *Meloidogyne fallax* in France is officially declared as: **Present, under eradication.**

Source: NPPO of France (2019-10, 2019-11).

Pictures: *Meloidogyne fallax*. https://gd.eppo.int/taxon/MELGFA/photos
Meloidogyne chitwoodi. https://gd.eppo.int/taxon/MELGCH/photos

Additional key words: detailed report **Computer codes:** MELGFA, MELGCH, FR

2020/014 Update on the situation of *Globodera pallida* in Cyprus

Globodera pallida and *Globodera rostochiensis* (both A2 List) have been detected in Cyprus since 1970. Both nematodes are widespread in Famagusta District, they occur at a lesser extent in Larnaca district and in one area in Paphos district. So far, no detections were made in the Nicosia district during official surveys. The NPPO of Cyprus recently informed the EPPO Secretariat of the first report of the presence of *Globodera pallida* in Nicosia district in May 2019. The identity of the nematode was confirmed by PCR by the National Reference Laboratory. The first confirmed occurrence of *G. pallida* (19 viable cysts) in Nicosia district was made in a field of 1.3 ha. An extensive survey was conducted and 12 other fields were found to be infested. Among these fields, 11 fields belonged to the same producer and one field to another producer. The total infested area is around 10 ha. The fields which were recorded as infested have been placed under official phytosanitary measures.
The pest status of *Globodera pallida* in Cyprus is officially declared as: **Present, in specific parts of the Member State where host crop(s) are grown.**

Source: NPPO of Cyprus (2019-10).

Pictures: *Globodera pallida*. https://gd.eppo.int/taxon/HETDPA/photos

Additional key words: detailed report **Computer codes:** HETDPA, CY

2020/015 First report of *Fusarium oxysporum* f. sp. *cubense* tropical race 4 in Turkey

Fusarium oxysporum f. sp. *cubense* tropical race 4 is continuing to spread through the Middle East. In Turkey, during a survey of banana greenhouses in Alanya, Anamur and Gazipasa cities along the Mediterranean coast, plants showing severe wilt symptoms and collapse were detected in March 2018. Yellowing of the oldest leaves that split at their base, brownish streaks of the vascular tissue of pseudostems, and root necrosis were observed on Cavendish 'Grand Naine'. Disease incidence in the greenhouses in Alanya, Anamur and Gazipasa cities were calculated as 17.8%, 86.2% and 10%, respectively. The identity of the pathogen was confirmed by morphological and molecular analyses. Pathogenicity tests were also conducted.

Source: Özarslandan M, Azkgul DS (2019) First report of *Fusarium oxysporum* f. sp. *cubense* race 4 causing Fusarium wilt disease of banana in Turkey. *Plant Disease*. https://doi.org/10.1094/PDIS-09-19-1881-PDN

Additional key words: new record **Computer codes:** FUSAC4, FUSACB, TR

2020/016 First report of *Fusarium oxysporum* f. sp. *cubense* Tropical race 4 in Mayotte

The NPPO of France recently informed the Secretariat of the first finding of *Fusarium oxysporum* f. sp. *cubense* Tropical race 4 in Mayotte (overseas territory). The pathogen was detected in one plot of banana (*Musa* sp.), varieties Baraboufaka (ABB, sub-group Bluggoe) and Kissoukari (AAB, sub-group of Silk) in Poroani, south west of Mayotte. Symptoms (yellowing and wilting associated with the presence of necrotic vascular bundles) were observed in October 2019. The fungus was identified by PCR, isolation in pure culture and determination of its vegetative compatibility group.
The pest status of *Fusarium oxysporum* f. sp. *cubense* Tropical race 4 in Mayotte is officially declared as: **Present, only in some parts of the Member State concerned**.

Source: NPPO of France (2020-01).

Additional key words: new record **Computer codes:** FUSAC4, FUSACB, YT

2020/017 First report of *Stenocarpella maydis* in Spain

Stenocarpella maydis (EPPO A2 List) is first reported from Spain. Scattered maize (*Zea mays*) plants with symptoms of premature wilting and leaf senescence were observed in one commercial field in Torres de Alcanadre (province of Huesca, Aragon) during the summer of 2012. Similar symptoms including disintegrated stalk pith tissues, and lodged plants following rain and strong wind were observed again in two commercial fields in Almacelles (province of Lleida, Catalonia) in 2016 and in two commercial fields in Biota (province of Zaragoza, Aragon) in 2017. Estimated disease incidence ranged from 15 to 30% depending on the field. Symptomatic plants were collected from the fields in Almacelles and in Biota, and *Stenocarpella maydis* was identified based on morphology and sequencing.
The situation of *Stenocarpella maydis* can be described as: **Present, few occurrences.**

Source: de la Riva A, García-Carneros AB, Molinero-Ruiz L (2019) First report of stalk rot of maize caused by *Stenocarpella maydis* in Spain. *Plant disease* **103**(7), 1789. https://doi.org/10.1094/PDIS-02-19-0278-PDN

Pictures: *Stenocarpella maydis*. https://gd.eppo.int/taxon/DIPDMA/photos

Additional key words: new record **Computer codes:** DIPDMA, ES

2020/018 First report of *Lecanosticta acicola* in Spain

The NPPO of Spain informed the EPPO Secretariat of the first official record of *Lecanosticta acicola* (EPPO A2 List) on its territory. In November 2018, in the framework of an official inspection for the detection of *Fusarium circinatum,* symptoms of *Lecanosticta acicola* were observed on *Pinus radiata* in a nursery of forestry plants located in the municipality of Munitibar (Vizcaya province, Autonomous Region of País Vasco). The identity of the pathogen was confirmed by the regional laboratory. The infested plot has an area of 800 m^2. All the 14 500 plants of the plot were destroyed by burning. It is suspected that the source of the outbreak is the pine trees of the surrounding area. Containment measures are applied against *Lecanosticta acicola* in the area, and eradication measures have been applied in the infested nursery.
The pest status of *Lecanosticta acicola* in Spain is officially declared as: **Present, only in some parts of the Member State concerned.**

Source: NPPO of Spain (2019-03).

Ortíz de Urbina E, Mesanza N, Aragonés A, Raposo R, Elvira-Recuenco M, Boqué R, Patten C, Aitken J, Iturritxa E (2017) Emerging needle blight diseases in Atlantic Pinus ecosystems of Spain. *Forests* **8**, 1–18. https://doi.org/10.3390/f8010018

Pictures: *Lecanosticta acicola*. https://gd.eppo.int/taxon/SCIRAC/photos

Additional key words: new record **Computer codes:** SCIRAC, ES

2020/019 Update on the situation of *Lecanosticta acicola* in Latvia

Lecanosticta acicola (EPPO A2 List) was first reported in Latvia in 2012 in Salaspils (EPPO RS 2012/168) and again in 2016 (RS 2019/040). In August 2018, it was detected during an official survey on 6 *Pinus* trees in a nursery in the municipality of Ilūkstes. In May 2019, the fungus was found in 20 symptomatic *Pinus mugo* trees in green areas of the municipality of Daugavpils. A further survey was conducted and in total 51 *Pinus* trees were found to be positive for *L. acicola* in this area. In August 2019, it was also found on one *Pinus* tree in a green area near a nursery in the same municipality. In all cases, eradication measures haven been applied.
The pest status of *Lecanosticta acicola* in Latvia is officially declared as: **Present, under eradication, only in some parts of the Member State concerned.**

Source: NPPO of Latvia (2018-09, 2019-07, 2019-08).

Pictures: *Lecanosticta acicola*. https://gd.eppo.int/taxon/SCIRAC/photos

Additional key words: detailed record **Computer codes: SCIRAC, LV**

2020/020 First report of *Plum pox virus* in the Republic of North Macedonia

Plum pox virus (*Potyvirus*, PPV – EPPO A2 List) is reported for the first time from the Republic of North Macedonia. A specific survey was carried out in June 2018 across the country, targeting commercial orchards and private gardens, as well as wild *Prunus* trees. Leaf samples were collected from 173 *Prunus* trees (including *P. persica, P. armeniaca, P. domestica,* and *P. cerasifera*) exhibiting typical sharka symptoms (chlorotic rings and vein yellowing; 115 samples), atypical symptoms (necrotic spots; 29), or no symptoms (29). Samples were tested (ELISA, PCR tests, sequencing) and PPV was detected in 69% of the samples (110, 8, and 1 sample(s) with typical, atypical, and no symptoms, respectively). In addition, 88 isolates were characterized as PPV-M (74%), 10 as PPV-D (8%), and 21 as PPV-Rec (18%). A mixed infection with PPV-M and PPV-D was detected in 1 sample. During this survey, it is noted that all sampled peach (*P. persica)* and plum *(P. domestica*) orchards were found to be infected by PPV; and up to 100% yield loss has been observed in the most susceptible local plum cultivars (e.g. Požegača).
The situation of plum pox virus in the Republic of North Macedonia can be described as follows: **Present, widespread**.

Source: Dallot S, Kuzmanovska B, Brevet M, Rusevski R, Thébaud G (2020) First report of plum pox virus strains M, D, and Rec infecting *Prunus* spp. in the Republic of North Macedonia. *Plant Disease* **104**(1), p 296. https://doi.org/10.1094/PDIS-03-19-0475-PDN

Pictures: *Plum pox virus*. https://gd.eppo.int/taxon/PPV000/photos

Additional key words: new record **Computer codes:** PPV000, MK

2020/021 Phytoplasma classification

Phytoplasmas are a large group of bacteria lacking cell walls, associated with numerous plant diseases of economic importance. As attempts to routinely culture phytoplasmas in artificial growing media have failed, their study and classification is difficult. The current phytoplasma classification is largely based on the 16S rRNA gene sequence. The possible use of additional genes to better identify and classify phytoplasmas is being studied, as some closely related strains are currently difficult to separate using the 16S rRNA-encoding gene alone.

For the moment, phytoplasmas are classified either into '*Candidatus* Phytoplasma' species based on percent sequence identity of a unique 16S rRNA gene (>1200 bp) with any previously described species (i.e. the threshold being less than 97.5% similarity), or into 33 ribosomal groups, each comprising a number of subgroups (obtained by RFLP and/or virtual RFLP analyses of the 16S ribosomal gene amplicon or sequence with a number of restriction enzymes).

The number of new '*Candidatus* Phytoplasma' species and ribosomal groups and subgroups is constantly growing, and it has not yet been possible to attribute a '*Candidatus* Phytoplasma' name to all studied phytoplasmas. In particular, for some diseases of quarantine importance, such as grapevine flavescence dorée (16SrV group, subgroups V-C and V-D) or some of the palm lethal yellowing diseases (16SrIV group), the grouping and

subgrouping is still the accepted taxonomy (because no '*Candidatus* Phytoplasma' species descriptions have been officially proposed).

The table below (from Bertaccini, 2019) shows the currently proposed '*Candidatus* Phytoplasma species' and their 16Sr groups - subgroups. As explained above, many phytoplasmas have not been attributed a '*Candidatus* Phytoplasma' species name but are classified only on the basis of their 16Sr group and subgroup only (these are not shown in the table).

16Sr group-subgroup	'*Candidatus* Phytoplasma species'	Associated disease
I-B	'*Ca*. Phytoplasma asteris'	Aster yellows
I-Y	'*Ca*. Phytoplasma lycopersici'	Tomato 'brote grande'
II-B	'*Ca*. Phytoplasma aurantifolia'	Lime witches' broom
II-D	'*Ca*. Phytoplasma australasia'	Papaya mosaic
III-A	'*Ca*. Phytoplasma pruni'	Peach X-disease
V-A	'*Ca*. Phytoplasma ulmi'	Elm yellows
V-B	'*Ca*. Phytoplasma ziziphi'	Jujube witches' broom
V-E	'*Ca*. Phytoplasma rubi'	Rubus stunt
V-F	'*Ca*. Phytoplasma balanitae'	Balanites witches' broom
VI-A	'*Ca*. Phytoplasma trifolii'	Clover proliferation
VI-I	'*Ca*. Phytoplasma sudamericanum'	Passionfruit witches' broom
VII-A	'*Ca*. Phytoplasma fraxini'	Ash yellows
VIII-A	'*Ca*. Phytoplasma luffae'	Loofah witches' broom
IX-B	'*Ca*. Phytoplasma phoenicium'	Almond witches' broom
X-A	'*Ca*. Phytoplasma mali'	Apple proliferation
X-B	'*Ca*. Phytoplasma prunorum'	European stone fruit yellows
X-C	'*Ca*. Phytoplasma pyri'	Pear decline
X-D	'*Ca*. Phytoplasma spartii'	Spartium witches' broom
XI-A	'*Ca*. Phytoplasma oryzae'	Rice yellow dwarf
XI-E	'*Ca*. Phytoplasma cirsii'	Cirsium phytoplasma
XII-A	'*Ca*. Phytoplasma solani'	Stolbur
XII-B	'*Ca*. Phytoplasma australiense'	Australian grapevine yellows
XII-D	'*Ca*. Phytoplasma japonicum'	Japanese hydrangea phyllody
XII-E	'*Ca*. Phytoplasma fragariae'	Strawberry yellows
XII-H	'*Ca*. Phytoplasma convolvuli'	Bindweed yellows
XIII-A	'*Ca*. Phytoplasma hispanicum'	Mexican periwinkle virescence
XIII-G	'*Ca*. Phytoplasma meliae'	Chinaberry yellowing
XIV-A	'*Ca*. Phytoplasma cynodontis'	Bermuda grass white leaf
XV-A	'*Ca*. Phytoplasma brasiliense'	Hibiscus witches' broom
XVI-A	'*Ca*. Phytoplasma graminis'	Sugarcane yellow leaf
XVII-A	'*Ca*. Phytoplasma caricae'	Papaya bunchy top
XVIII-A	'Ca. Phytoplasma americanum'	American potato purple top wilt
XIX-A	'*Ca*. Phytoplasma castaneae'	Chestnut witches' broom
XX-A	'*Ca*. Phytoplasma rhamni'	Rhamnus witches' broom
XXI-A	'*Ca*. Phytoplasma pini'	Pinus phytoplasma
XXII-A	'*Ca*. Phytoplasma palmicola'	Lethal yellowing

16Sr group-subgroup	'*Candidatus* Phytoplasma species'	Associated disease
XXIX-A	'*Ca*. Phytoplasma omanense'	Cassia witches' broom
XXX-A	'*Ca*. Phytoplasma tamaricis'	Salt cedar witches' broom
XXXI-A	'*Ca*. Phytoplasma costaricanum'	Soybean stunt
XXXII-A	'*Ca*. Phytoplasma malaysianum'	Malaysian periwinkle virescence
XXXIII-A	'*Ca*. Phytoplasma allocasuarinae'	Allocasuarina phytoplasma
XXXVI-A	'*Ca*. Phytoplasma wodyetiae'	Foxtail palm phytoplasma
-	'*Ca*. Phytoplasma noviguineense'	Bogia coconut syndrome

Source: Bertaccini A (2019) The phytoplasma classification between '*Candidatus* species' provisional status and ribosomal grouping system. *Phytopathogenic Mollicutes* **9**(1), 1-2.

Bertaccini A, Lee IM (2018) Phytoplasmas: an update. In: Phytoplasmas: plant pathogenic bacteria – I. Springer, pp 1-29.

Perez-Lopez E, Olivier CY, Luna-Rodriguez, Dumonceaux TJ (2016) Phytoplasma classification and phylogeny based on in silico and in vitro RFLP analysis of cpn60 universal target sequences. International *Journal of Systematic and Evolutionary Microbiology* **66**, 5600–5613.

Additional key words: taxonomy **Computer codes:** 1PHYPG

2020/022 First report of *Trachycarpus fortunei* in Austria

Casual populations of *Trachycarpus fortunei* (Arecaceae - Chinese windmill palm) are recorded for the first time in Austria. During non-systematic field studies conducted over the last decade, seedlings of *T. fortunei* have been found at several sites in Austria (Vienna). In total, six records are reported where seedlings have been found in urban areas and close to railway tracks and some of the individuals survived one or several winters. All populations were found in habitats typical for urban environments and long-term persistence in these sites is unlikely as these areas being managed for horticulture purposes. In Switzerland, *T. fortunei* is considered an invasive species and has been shown to spread in thermophilic forests in Ticino. It is also reported as a casual alien in urban areas in France. When considering climate warming trends in Europe over the last two decades, it is likely that *T. fortunei* will become more frequent in Austria and there is the potential that natural habitats could become invaded.

Source: Essl F (2019) First records of casual occurrences of Chinese windmill palm *Trachycarpus fortunei* (Hook.) H.Wendl. in Austria. *BioInvasions Records* **8**, 471-744.

Additional key words: new record **Computer codes:** TRRFO, AT

2020/023 Seed as a pathway for non-native plant species in Sardinia (IT)

The accidental introduction of non-native plant species via commercial seed contamination is a known pathway for the movement of invasive plant seed. There are numerous examples of invasive plants arriving via this pathway throughout the world. A study on the non-native flora in Sardinia showed that the majority (791 species) were introduced voluntarily, while 140 species were introduced accidentally. In Sardinia, imports of agricultural seed are essential for the industry. Seed is imported from different Italian regions, from other European countries and from Australia. To evaluate the potential of invasive alien plant seed as contaminants of seed (for planting), 39 seed packages were collected and assessed. These comprised 20 packages of novel forage crop cultigens under experimental testing, 10 packages of pet feed (for birds and rodents), 6 packages of lawn mixtures (including one package of grass to be planted for cats) and 3 wildflower mixtures. For each seed package, a subsample of 350 g was screened for the presence of contaminants. If the weight of the seed package was less than 350 g all seeds were sampled. All seeds (commodities and contaminants) were identified to either the family, genus or species level. Ninety-five percent of the seed packages contained seed contaminants. No contaminants were found in the lawn mixture of grass to be planted for cats. A total of 231 contaminant species were found belonging to 88 genera and 34 families. The most common families of seed contaminant were Amaranthaceae, Brassicaceae, Caryophyllaceae, Cyperaceae, Fabaceae, Lamiaceae, Poaceae and Polygonaceae. Of particular interest were the presence of the agricultural weeds *Amaranthus* sp. and *Echinochloa* sp. The results show that seed imported into Sardinia presents a risk for the entry of non-native invasive plant species.

Source: Cossu TA, Lozano V, Stuppy W, Brundu G (2019) Seed contaminants: an overlooked pathway for the introduction of non-native plants in Sardinia (Italy). *Plant Biosystems* doi.org/10.1080/11263504.2019.1701123

Additional key words: invasive alien plants **Computer codes:** 1AMAF, 1CRUF, 1CAFF, 1CYPF, 1LEGF, 1LAMF, 1GRAF, 1POLF, 1AMAG, 1ECHG, IT

2020/024 New data on alien plants from Sicily (IT)

New data on alien plants from Sicily is reported. New records of *Commelina communis*, *Euphorbia hypericifolia*, *Melia azedarach*, *Nicotiana tabacum* and *Xanthoceras sorbifolium* are reported.

- *Commelina communis* (Commelinaceae) is native to Asia and recorded as a naturalized or casual alien species in Italy and other European regions. The species has also been recorded in eastern North America. In Sicily, the species was observed in Palermo in 2017 on the edge of a road.

- *Euphorbia hypericifolia* (Euphorbiaceae) is native to the Southern USA and Central and South America. The species is recorded as invasive in Singapore, Taiwan and a number of Oceanian islands (e.g. French Polynesia and New Caledonia). Within the EPPO region, it is reported in Belgium, Israel, Italy, Greece and Spain. It is also recorded as invasive in Hawaii (USA). The species is reported as major weed in sugarcane and soybean in Peru. In Sicily, the species is reported to be associated with urban areas particularly in the city of Catania, Trapani and Marinella di Selinunte.

- *Melia azedarach* (Meliaceae) is a species of tree native to Southern Asia. The species has been reported as invasive in a number of regions globally, including North and South America and South Africa. The species is also recorded as naturalizing in Algeria. New records in Sicily are from the northern slopes of Monte Pellegrino where a small population has been observed.

- *Nicotiana tabacum* (Solanaceae) has been widely introduced into many regions of the world for cultivation. It is recorded as invasive in Chile, Japan, the Galapagos Islands, a number of Oceanian islands (e.g. Fiji, New Caledonia), and is reported as invasive in Hungary and naturalized in the Canary Islands (ES) and the United Kingdom. In Sicily the species has been reported from Mazara del Vallo and recently a population was found inside a former geriatric institute in the centre of Trapani.

- *Xanthoceras sorbifolium* (Sapindaceae) is native to China and has been introduced in other regions as a garden ornamental. The species has been recorded in Palermo in the park of Villa Whitaker in Malfitano, where a population occupies a small uncultivated area.

Source: Campisi P, Raimondo FM, Spadaro V (2019) New floristic data of alien vascular plants from Sicily. *Flora Mediterranea* **29**, 263-267.

Additional key words: invasive alien plants **Computer codes:** COMCO, EPHHY, MEIAZ, NIOTA, XACSO, IT

2020/025 *Cortaderia selloana* in industrial sites in Galicia (ES)

Cortaderia selloana (Poaceae: EPPO List of Invasive Alien Plants) is native to South America (Argentina, Brazil and Uruguay) and is a widespread in the EPPO region where it has been planted for ornamental purposes. It is invasive in a number of EPPO countries including Italy, Portugal and Spain. *C. selloana* is also invasive in South Africa, California (USA), Australia and New Zealand. A single female plant can produce more than 800 000 seeds which can be spread over long distance by wind. In the Mediterranean region, *C. selloana* has been shown to invade ruderal habitats such as waste ground, mining areas, roadsides and other artificial habitats. Additionally, the species can invade natural habitats of high

conservation importance such as wetlands. In Galicia (North West Spain), *C. selloana* spread along the main highways during the 1980s where it was used as an ornamental species along the side or central strip of the road. This has led to the species invading many industrial sites which were built in the 1990s and 2000s. Out of 123 industrial sites identified in Galicia, *C. selloana* was recorded in 51.7 % (59 sites).The presence of *C. selloana* populations within industrial sites may not have significant impacts on biodiversity and there may not be any associated socio-economic impacts, however these populations can act as a propagule source to invade wider areas including natural habitats and thus such populations should be managed.

Source: Pardo-Primoy D, Fagúndez J (2019) Assessment of the distribution and recent spread of the invasive grass *Cortaderia selloana* in industrial sites in Galicia, NW Spain. *Flora* doi.org/10.1016/j.flora.2019.151465

Pictures *Cortaderia selloana*. https://gd.eppo.int/taxon/CDTSE/photos

Additional key words: new record, invasive alien plants **Computer codes:** CDTSE, ES

2020/026 *Heracleum sosnowskyi* in Bulgaria

In 2017, the alien species *Heracleum sosnowskyi* (EPPO A2 List and EU Invasive Alien Species of Union Concern) was reported for the first time in Bulgaria, though additional research proved that this was a misidentification and the plants belonged to *H. mantegazzianum* (EPPO List of Invasive Alien Plants and EU Invasive Alien Species of Union Concern). However, during further field surveys conducted in the summer months in 2018, *H. sosnowskyi* was positively identified in the Western Rhodopi Mountains. Notes on the species include that it flowers in June and July with the fruits ripening in July-August. It is easily distinguishable from native *Heracleum* species (*H. angustisectum*, *H. sibiricum*, *H. ternatum* and *H. verticillatum*) by the larger basal and lower cauline leaves, larger compound umbels and the short ovate or elliptic leaves. In Bulgaria, *H. sosnowskyi* has been found on the edge of agricultural fields, along the side of roads, and in urban environments. In some locations, hundreds of fruiting plants have been observed. Following interviews with local farmers in the Rhodopi Mountains, *H. sosnowskyi* has been present for more than 30 years. *H. sosnowskyi* poses a threat to the native biodiversity and associated ecosystem services in Bulgaria. It also poses a threat to human health as it can cause burning of the skin and blisters. As the species is included in the EU List of species of Union Concern, eradication measures should be taken against the species to prevent further negative impacts and reduce its spread.

Source: Vladimirov V, Petrova A, Barzov Z, Gudžinskas Z (2019) The alien species of *Heracleum* (Apiaceae) in the Bulgarian flora revisited. *Phytologia Balcanica* **25**, 395-405.

Additional key words: new record, invasive alien plants **Computer codes:** HERSO, HERMZ, BG

2020/027 Control methods for *Berberis aquifolium* in coastal dunes in Belgium

The Belgium coastal dunes are a diverse habitat that include many rare and threatened plant species. However, the dunes are highly fragmented habitats and are also threatened by invasive alien plants which have increased in these habitats from 5 to 20 % since the 1970s. Non-native shrubs and trees are major invaders in Belgium coastal dune systems (Table 1).

Table 1. Non-native tree, liana and shrub species established within the Belgian coastal dunes. * Species on the EPPO List of Invasive Alien Plants and ** Species on the EPPO A2 List.

Species	Growth form	Surface area (m²)	% dune areas
Rosa rugosa (Rosaceae)	Shrub	56757	63
Berberis aquifolium (Berberidaceae)	Shrub	34035	50
*Prunus serotina** (Roseaceae)	Tree	5461	52
Syringa vulgaris (Oleaceae)	Shrub	4544	30
Ribes odoratum (Grossulariaceae)	Shrub	2986	11
Symphoricarpos spp. (Caprifoliaceae)	Shrub	2874	26
Robinia pseudoacacia (Fabaceae)	Tree	1458	4
Cotoneaster spp. (Rosaceae)	Shrub	1392	41
Lycium barbarum (Solanaceae)	Shrub	420	15
*Ailanthus altissima** (Simaroubaceae)	Tree	209	9
Tamarix spp. (Tamaricaceae)	Shrub	169	9
Elaeagnus spp. (Elaegnaceae)	Shrub	108	11
Lonicera spp. (Caprifoliaceae)	Liana	106	13
Prunus spp. (Rosaceae)	Tree	88	13
Parthenocissus spp. (Vitaceae)	Liana	83	4
Ligustrum ovalifolium (Oleaceae)	Shrub	72	9
Ribes sanguineum (Grossulariaceae)	Shrub	58	26
Amelanchier spp. (Rosaceae)	Shrub	44	9
Yucca spp. (Asparagaceae)	Tree-like succulent	25	15
Cornus spp. (Cornaceae)	Shrub	15	24
*Baccharis halimifolia*** (Asteraceae)	Shrub	13	11
*Buddleja davidii** (Scrophulariaceae)	Shrub	7	7
Euonymus japonicus (Celastraceae)	Shrub	5	2
Pseudosasa japonica (Poaceae)	Shrub	4	2
Rosa spp. (Rosaceae)	Shrub	4	4
Quercus spp. (Fagaceae)	Tree	3	4
Sorbus spp. (Rosaceae)	Tree	2	4
Viburnum spp. (Adoxaceae)	Shrub	1	2

Berberis aquifolium (Berberidaceae) is native to North America and within the EPPO region the species has been recorded in Belgium, Bulgaria, France, Germany, the Netherlands, Russia, Switzerland, the United Kingdom and Uzbekistan. In Belgium, the species was recorded in the wild in 1906 and naturalised between 1920 and 1950. *B. aquifolium* can invade a variety of habitats, from natural habitats (grassland, forests and coastal dunes), to anthropogenic habitats. In these habitats, the species can outcompete native vegetation and

cause negative impacts on biodiversity. Control options have been evaluated where four treatments were tested (1) manual uprooting using a shovel, (2) foliar herbicide application (5% glyphosate), (3) stem cutting + herbicide (glyphosate) application on the stump (4) same as option 3 with the application of saturated salt (NaCl) instead of herbicide. Effectiveness was measured as the lack of regrowth one year after treatment. In total 118 plants were treated, and the following results were obtained. Spraying the foliage of *B. aquifolium* with herbicide was the most effective method with 26 out of 31 plants killed. Stem treatment with glyphosate had an intermediate effect with 13 out of 20 individuals killed. Manual uprooting killed 12 out of 33 individuals. The species develops a highly branched root system that can be difficult to uproot manually. Salt application post cutting had little effect on individuals with 23 out of 25 plants showing regrowth.

Source: Adriaens T, Verschelde P, Cartuyvels E, D'hondt B, Vercruysse E, van Gompel W, Dewulf E, Provoost S (2019) A preliminary field trial to compare control techniques for invasive *Berberis aquifolium* in Belgium coastal dunes. *NeoBiota* **53**, 41-60.

Additional key words: new record, invasive alien plants

Computer codes: AILAL, BACHA, BUDDA, EUOJA, MAHAQ, LIGOV, LYUHA, PRNSO, PSSJA, RIBOD, RIBSA, ROBPS, ROSRG, SYRVU, 1SYPG, 1CTTG, 1TAAG, 1ELGG, 1LONG, 1PRNG, 1PRTG, 1AMEG, 1UCCG, 1CRWG, 1ROSG, 1QUEG, 1SOUG, 1VIBG, BE