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CONTENTS ***Pests & Diseases***

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2006/049 First report of *Monilinia fructicola* in Spain

In Hungary in October 2005, symptoms of brown rot were observed on imported peaches from Italy and Spain. The infected fruits had been bought at a market and several supermarkets in Budapest and Gödöllö. Based on morphological characteristics and PCR (according to EPPO diagnostic protocol PM7/18), the pathogen was identified as *Monilinia fructicola* (Petroćzy & Palkovics, 2006). In 2006, the NPPO of Spain confirmed the occurrence of *M. fructicola* (EPPO A2 list) on its territory. *M. fructicola* was found in peach trees (*Prunus persica*) in two adjacent localities: Ivars de Noguera (Provincia de Lleida, Cataluña) and Castillonroy (Provincia de Huesca, Aragón). A focus zone was delimited within a radius of 5 km around the initial finding, and intensive surveys will be carried out in spring 2006 to delimit the extent of the infestation. Another zone of 10 km radius was also delimited and phytosanitary measures will be applied in orchards, packing stations and nurseries to prevent any further spread of the disease.
The situation of *Monilinia fructicola* in Spain can be described as follows: **Present, first reported in 2006, isolated outbreak found in *Prunus persica* in 2 adjacent localities (Cataluña, Aragón), under official control.**

Source: NPPO of Spain, 2006-03.
Petroćzy M, Palkovics L (2006) First report of brown rot caused by *Monilinia fructicola* on imported peach in Hungary. *Plant Disease* **90**(3), p 375.

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

2006/050 Further details on the situation of *Gibberella circinata* in Spain

As reported in EPPO RS 2005/097, *Gibberella circinata* (anamorph *Fusarium circinatum* - EPPO A1 list) was found in Northern Spain in 2004. Further details have recently been provided by the NPPO of Spain. *G. circinata* has been detected in 12 nurseries in the 4 following 'Comunidades Autónomas': Asturias, Cantabria, Castilla y León, and Galicia. During follow-up studies to locate plants which had been produced by these nurseries, several plantations were also found to be infested. As a result, trees were lifted and destroyed over a total surface of 38.8 ha (18.8 ha in Asturias, 18 ha in Cantabria and 2 ha in Castilla y León, respectively). In affected nurseries a total of 3,125,540 plants were destroyed. *G. circinata* was identified on the following *Pinus* species: *P. nigra, P. pinaster, P. radiata* and *P. sylvestris*. Without affecting the initial phytosanitary measures which had been adopted to eradicate *G. circinata*, national legislation is being elaborated to regulate control and eradication of this fungus throughout Spanish territory.

The situation of *Gibberella circinata* in Spain can be described as follows: **Present, isolated outbreaks found in Asturias, Cantabria, Castilla y León, and Galicia, under eradication.**

Source: NPPO of Spain, 2006-03.

Additional key words: detailed record **Computer codes:** GIBBCI, ES

2006/051 Detailed situation of *Plum pox potyvirus* in Argentina

As reported in EPPO RS 2005/019, *Plum pox potyvirus* (PPV – EPPO A2 list) has recently been found in Argentina for the first time. In November 2004, symptoms resembling those of PPV were observed in a plum and apricot orchard (comprising 5000 trees in total) in Pocito, San Juan Province. Samples were collected from 70 symptomatic trees and tested (DAS-ELISA, ISEM, RT-PCR). PPV was detected in 80% of the samples, and studies showed that only PPV-D was present.
The situation of *Plum pox potyvirus* in Argentina can be described as follows: **Present, first found in 2004 in one orchard (San Juan Province), under eradication.**

Source: Dal Zotto A, Ortego JM, Raigon JM, Caloggero S, Rossini M, Ducasse DA (2006) First report in Argentina of *Plum pox virus* causing sharka disease in *Prunus*. *Plant Disease* **90**(5), p 523.

Additional key words: detailed record **Computer codes:** PPV000, AR

2006/052 *Plum pox potyvirus* found again in Switzerland

In Switzerland, *Plum pox potyvirus* (EPPO A2 list) had first been detected in 1967 but was successfully eradicated at the end of the 1970s. Later outbreaks sporadically occurred, but these were all contained. Despite all these efforts, new outbreaks of PPV were discovered in 2004 in a few newly planted orchards of plums (*Prunus domestica*), mainly located in the German-speaking part and to a lesser extent in the French-speaking part (Valais). So far, only PPV-D has been detected in infected orchards. Eradication measures are being taken.

The situation of *Plum pox potyvirus* in Switzerland can be described as follows: **Present, first reported in 1967 but successfully eradicated in the 1970s; found again in 2004 in a few plum orchards, now under eradication.**

Source: Web site Agroscope Changins-Wädenswil. Communiqué de presse du 20 janvier 2006. Le virus de la sharka est de retour sur les Prunus en Suisse. http://www.racchangins.ch/media/presse/2006/cp04-06.pdf

Additional key words: detailed record **Computer codes:** PPV000, CH

2006/053 First report of *Citrus tristeza closterovirus* in Sudan

So far, no studies other than visual inspections had been done on citrus viruses occurring in Sudan. In Sudan, most citrus are grafted on sour orange rootstocks which are susceptible to *Citrus tristeza closterovirus* (CTV - EPPO A2 list). A survey on citrus viruses was initiated in 2003 and 2004. Symptomatic leaves were collected and tested by immunoprinting and nested RT-PCR. CTV was detected in 13 leaf samples using a mixture of specific monoclonal antibodies. 10 samples had been collected from orchards of orange trees (*Citrus sinensis*), 2 samples came from a mandarin (*C. reticulata*) and 1 from a lime tree (*C. aurantifolia*). The presence of CTV was confirmed by nested RT-PCR in 4 citrus trees (3 orange and 1 lime tree) which had previously given positive results with immunoprinting. Further molecular tests will be carried out to verify the presence of CTV in other citrus orchards in Sudan. According to the EPPO Secretariat, this is the first report of CTV in Sudan.
The situation of *Citrus tristeza closterovirus* in Sudan can be described as follows: **Present, detected for the first time in 2003/2004 on few samples, further studies are underway to confirm its occurrence.**

Source: Abubaker M, von Bargen S, Bandte M, Elhassan S, Büttner C (2005) Investigation on *Citrus tristeza virus* (CTV) and its occurrence in citrus orchards in arid and semi arid zones of Sudan. *Phytomedizin*. Mitteilungen der Deutschen Phytomedizinischen Gesellschaft, Braunschweig no. 3, 29-30.

Additional key words: new record **Computer codes:** CTV000, SD

2006/054 *Citrus tristeza closterovirus* occurs in Jordan

In Jordan, citrus are mainly grown in the Jordan Valley. The most important species are sweet orange (*Citrus sinensis*), mandarin (*C. reticulata*), lemon (*C. limon*) and grapefruit (*C. paradisi*). Approximately 98% of these species are grafted onto sour orange rootstocks (*C. aurantium*) which are susceptible to tristeza. In the last few years, symptoms resembling those caused by CTV, including severe tree decline, yellowing and stunting have been observed in various orchards of the Jordan Valley. A survey was conducted in 2002 and 2003 on the possible presence of *Citrus tristeza closterovirus* (CTV - EPPO A2 list). More than 3000 trees in 62 orchards distributed in the central and northern parts of the Jordan Valley were individually inspected for symptoms. Leaf samples (in total 844) were collected in autumn and winter from symptomatic trees and tested (serological and molecular tests). Results showed that 12.7% and 15.2% of the samples from the central and Northern Jordan Valley, respectively, were infected by CTV. In addition, 100 leaf samples were collected from an orchard in the Dir Alla area (Central Jordan Valley) where severe symptoms were observed, and 49% of them tested positive for CTV. This study confirms the presence of CTV in the major citrus-growing regions of Jordan. It is stressed that this represents a serious risk to the Jordanian citrus industry. It is considered that epidemiological studies are urgently needed to determine which CTV strains and insect vectors are occurring in Jordan. It is also stressed that certification schemes and appropriate phytosanitary measures should be implemented.
The situation of *Citrus tristeza closterovirus* in Jordan can be described as follows: **Present, a survey done in 2002/2003 has confirmed its presence in the Jordan Valley.**

Source: Anfoka GH, Abhary MK, Fattash I, Nakhla MK (2005) Occurrence and distribution of *Citrus tristeza virus* (CTV) in the Jordan Valley. *Phytopathologia Mediterranea* **44**(1), 17-23.

Additional key words: detailed record **Computer codes:** CTV000, JO

2006/055 First record of Grapevine flavescence dorée phytoplasma in Switzerland

In Ticino (Switzerland), symptoms of grapevine yellows were observed in autumn 2004 in 3 localities of the Mendrisiotto vineyards. Analysis revealed the presence of Grapevine flavescence dorée phytoplasma (EPPO A2 list). This is the first time flavescence dorée has been reported in Switzerland. The insect vector, *Scaphoideus titanus*, had been reported for several years in Ticino and in a few vineyards of the Geneva canton, but it has not been caught in other grapevine-producing regions. In Ticino, official control measures against *S. titanus* have been implemented since 2001, and now all plants found infected by flavescence dorée are being destroyed.

The situation of Grapevine flavescence dorée in Switzerland can be described as follows: **Present, first reported in few vineyards (Mendrisiotto) in Ticino in 2004, under official control.**

Source: Stäubli A. (2005) Faits marquants dans la recherche 2004. La flavescence dorée de la vigne est apparue pour la première fois en Suisse. *Revue suisse de Viticulture, Arboriculture, Horticulture* **37**(3), p 149.

INTERNET
Servizio fitosanotario cantonale, Ticino, Bolletino fitosanitario no. 31 (2004-12-13). http://www.ti.ch/DFE/DE/SezA/temi_02/pubblicazioni/fito/2004/bof3104.pdf

Additional key words: new record **Computer codes:** PHYP64, CH

2006/056 First record of *Pepino mosaic potexvirus* in Switzerland

In Switzerland, the presence of *Pepino mosaic potexvirus* (EPPO Alert List) has been reported for the first time in 2004 on tomato crops in the French-speaking part of the country.
The situation of *Pepino mosaic potexvirus* in Switzerland can be described as follows: **Present, first reported in 2004 in the French-speaking part.**

Source: Stäubli A. (2005) Faits marquants dans la recherche 2004. Nouvelle virose sur tomate. *Revue suisse de Viticulture, Arboriculture, Horticulture* **37**(3), p 150.

Additional key words: new record **Computer codes:** PEPMV0, CH

2006/057 First record of *Tomato spotted wilt tospovirus* in Lebanon

In Lebanon, during spring and summer 2004, symptoms of *Tomato spotted wilt tospovirus* (TSWV – EPPO A2 list) were observed in an isolated tomato field in a mountainous area (1000 m altitude). Seedlings had been produced in a nursery in the coastal area of Byblos. In spring 2005, similar symptoms appeared on tomato in the same mountainous area, as well as on tomato, capsicum and lettuce crops near Byblos (37 km north of Beirut). Analysis (serological and molecular tests) confirmed the presence of TSWV in tomato and lettuce samples. This is the first record of TSWV in Lebanon.
The situation of *Tomato spotted wilt tospovirus* in Lebanon can be described as follows: **Present, first observed in 2004 in a few areas.**

Source: Abou-Jawdah Y, El Mohtar C, Sobh H, Nakhla MK (2006) First report of *Tomato spotted wilt tospovirus* on tomatoes in Lebanon. *Plant Disease* **90**(3), p 376.

Additional key words: new record **Computer codes:** TSWV00, LB

2006/058 First record of *Tomato chlorosis crinivirus* in Lebanon

In Lebanon, during studies done to evaluate the possible resistance of local tomato accessions to *Tomato yellow leaf curl begomovirus* (EPPO A2 list), the presence of another virus *Tomato chlorosis crinivirus* (ToCV - EPPO A2 list) was detected. 22 samples were then collected from tomato plants showing yellowing symptoms on lower leaves. Samples were taken from 2 commercial greenhouses in the Damour coastal area (south of Beirut), where the first finding had been made. 6 samples tested positive for ToCV using RT-PCR. This is the first report of ToCV in Lebanon. The incidence and distribution of ToCV has not yet been investigated. However, on the basis of symptoms and preliminary RT-PCR results, the disease does not appear to be widespread.
The situation of *Tomato chlorosis crinivirus* in Lebanon can be described as follows: **Present, first reported in 2006, preliminary results suggest limited distribution and low incidence.**

Source: Abou-Jawdah Y, El Mohtar C, Atamian H, Sobh H (2006) First report of *Tomato chlorosis virus* in Lebanon. *Plant Disease* **90**(3), p 378.

Additional key words: new record **Computer codes:** TOCV00, LB

2006/059 First report of *Xanthomonas arboricola* pv. *pruni* in Iran

In Iran, studies were carried out in stone fruit tree orchards in different parts of the province of Guilan (north of the country, along Caspian Sea) to detect the possible presence of *Xanthomonas arboricola* pv. *pruni* (EPPO A2 list). Cherry, plum and peach orchards were visually inspected and samples showing symptoms of bacterial leaf spot were collected from buds, leaves and shoots and then tested (bacterial isolation followed by biochemical and pathogenicity tests). The presence of *X. arboricola* pv. *pruni* was detected in samples of sweet and sour cherry (*Prunus avium, P. cerasus*) and plum (*P. domestica*). This is the first report of *X. arboricola* pv. *pruni* in Iran.
The situation of *Xanthomonas arboricola* pv. *pruni* in Iran can be described as follows: **Present, first reported in 2005 in several *Prunus* orchards of Guilan province.**

Source: Jami F, Kazempour MN, Elahinia SA, Khodakaramian G (2005) First report of *Xanthomonas arboricola* pv. *pruni* on stone fruit trees in Iran. *Journal of Phytopathology* **153**(6), 371-372.

Additional key words: new record **Computer codes:** XANTPR, IR

2006/060 First report of *Phytophthora kernoviae* in New Zealand

In March 2006, the presence of *Phytophthora kernoviae* (EPPO Alert List) was reported for the first time in New Zealand. The pathogen was found during studies determining which species of *Phytophthora* were present in New Zealand. *P. kernoviae* was found at 2 sites in Northland (North Island). It was isolated from a cherimoya sample (*Annona cherimola*) in one orchard, and from a soil sample collected from Trounson Kauri Park. The origin of these findings remains unknown at the moment. Further investigations are being made into the distribution of *P. kernoviae* in New Zealand.
The situation of *Phytophthora kernoviae* in New Zealand can be described as follows: **Present, first reported in 2006; found in 2 samples in Northland (North Island), under official control.**

Source: INTERNET
New Zealand - Ministry of Agriculture and Forestry. Biosecurity New Zealand investigates new fungus in Northland (Press Release 2006-03-24). http://www.maf.govt.nz/mafnet/press/240306fungus.htm
NAPPO Pest Alert System. *Phytophthora kernoviae* found for the first time in New Zealand. http://www.pestalert.org/viewNewsAlert.cfm?naid=16

Additional key words: new record **Computer codes:** PHYTKE, NZ

2006/061 First record of *Globodera pallida* in Ukraine

In Ukraine, *Globodera rostochiensis* (EPPO A2 list) was first identified in 1963 in the Western part of the country, in the province (oblast) of Chernivtsi, in the fields of a Research Station. Despite phytosanitary measures, *G. rostochiensis* spread to other potato-growing regions. At present, *G. rostochiensis* is recorded in the following 13 provinces, infesting approximately 5500 ha: Cherkasy (181.5 ha), Chernihiv (1323.7 ha), Ivano-Frankivs'k (5.7 ha), Khmel'nyts'kyi (34.6 ha), Kiev (61.5 ha), Lviv (896 ha), Rivne (638.3 ha), Sumy (780.22 ha), Ternopil (22.5 ha), Vinnytsia (17.7 ha), Luts'k (Volyns'ka oblast) (1173.3 ha), Uzhhorod (Zakarpats'ka oblast) (21.3 ha), Zhytomyr (372.6 ha).
A survey using molecular techniques (Multiplex PCR) was conducted in these 13 Ukrainian provinces. Results revealed the occurrence of *Globodera pallida* in the region of Uzhhorod (Zakarpats'ka oblast). This is the first report of *G. pallida* in Ukraine. *G. pallida* was found in mixed populations with *G. rostochiensis* but was less prevalent. The origin of the introduction of *G. pallida* into Ukraine is unknown. Phyllogenetic studies showed that the Ukrainian population was very closely related to other *G. pallida* pa2/3 isolates found in Europe.
The situation of *G. rostochiensis* in Ukraine can be described as follows: **Present, first found in 1963; occurring in 13 provinces (approximately 5500 ha), under official control.**
The situation of *G. pallida* in Ukraine can be described as follows: **Present, first reported in 2005 near Uzhhorod (Zakarpats'ka Oblast), under official control**.

Source: Pylypenko LA, Uehara T, Phillips MS, Sigareva DD, Blok VC (2005) Identification of *Globodera rostochiensis* and *G. pallida* in the Ukraine by PCR. *European Journal of Plant Pathology* **111**(1), 39-46.

Additional key words: new record, detailed record **Computer codes:** HETDPA, HETDRO, UA

2006/062 Details on the situation of *Lissorhoptrus oryzophilus* in China

The rice water weevil, *Lissorhoptrus oryzophilus* (Coleoptera: Curculionidae – EPPO Alert List) originates from the Southern USA where it reproduces sexually and feeds on gramineous and cyperaceous weeds as its native hosts. Damage to introduced rice was reported in Georgia as early as the 1880s, and *L. oryzophilus* is now considered as the most destructive pest of rice in North America. Invasions of parthenogenic populations were then reported in Asia. *L. oryzophilus* was first reported in Japan in 1976 (Aichi Prefecture) and within 10 years it spread to the whole of the Japanese Archipelago. It was found in China and the Korean Peninsula in 1988, and in Taiwan in 1990.
In China, *L. oryzophilus* was first detected in Tanghai county in Hebei Province (1988). Since then, it has become one of the major rice pests in the region with yield losses ranging from 10 to 80%. It poses a challenge for rice production, particularly in areas where integrated pest

management programmes had been put in place before its arrival. As of 2003, *L. oryzophilus* was found in the following 12 provinces (Anhui, Fujian, Guangdong, Guangxi, Hebei, Hunan, Jiangsu, Jilin, Liaoning, Shandong, Shanxi, Zhejiang) and municipalities (Beijing, Tianjin), infesting over 400,000 ha of rice. A dispersal rate of 10-30 km/year was observed in China. CLIMEX studies have shown that *L. oryzophilus* has the potential to continue its spread towards the North and West, but that its progression would probably be stopped by winter stress in Helongjiang and Jilin Provinces, by high elevations in Sichuan and Yunnan Provinces, and by dry summers and cold winters in Inner Mongolia and Gansu Provinces. Field and laboratory studies have shown that adults of *L. oryzophilus* could feed on a wide range of plants (64 species in 10 families).
Significant efforts had been made in China to try to prevent the spread of the pest. As soon as it was detected, surveys were initiated to delimit the extent of the outbreak. As *L. oryzophilus* can survive in stored rice grain, straw or plant for more than a month, the transport of rice seeds, seedlings and plants was forbidden from infested areas. Fumigation of potential host material was required, as well as disinfection of vehicles leaving quarantined areas. Despite all these efforts, the pest could not be contained in China, probably because of the following factors: adults can fly (dispersal by natural flight is estimated at 10-20 km/year), irrigation systems and rivers spread the pest, and occasional hitchhiking on human transportation can most probably take place.

Source: Chen H, Chen Z, Zhou Y (2005) Rice water weevil (Coleoptera: Curculionidae) in mainland China: invasion, spread and control. *Crop Protection* **24**(8), 695-702.

Additional key words: detailed record **Computer codes:** LISSOR, CN

2006/063 Detection and eradication of *Anoplophora glabripennis* in Yokohama, Japan

In July 2002, *Anoplophora glabripennis* (Coleoptera: Cerambycidae – EPPO Action List) was detected on *Ulmus parvifolia* trees planted along a street in Yokohama city, Japan. All other trees situated in the vicinity were inspected and only a few were found infested. Chemical treatments were applied in September 2002 and heavily damaged trees were destroyed. The origin of this infestation remained unknown. Investigations have been carried out since March 2003, and no beetles have been captured or observed. It is now considered that *A. glabripennis* has been eradicated in Yokohama.

Source: Takahashi N, Ito M (2005) [Detection and eradication of the Asian longhorned beetle in Yokohama, Japan.] *Research Bulletin of the Plant Protection Service* no. **41**, 83-85 (abstract).

Additional key words: phytosanitary incident **Computer codes:** ANOLGL, JP

2006/064 Real-time PCR tests for flavescence dorée, bois noir and apple proliferation phytoplasmas

Real-time PCR assays were developed in Italy for the specific diagnosis of flavescence dorée (EPPO A2 list), bois noir and apple proliferation (EPPO A2 list) phytoplasmas, as well as for the universal detection of phytoplasmas belonging to 16Sr-V, 16Sr-X and 16Sr-XII groups. These methods could be used successfully to detect phytoplasmas in field samples of grapevine and apple, as well as in insect vectors (*Scaphoideus titanus* for flavescence dorée, *Hyalestes obsoletus* for bois noir and *Cacopsylla melanoneura* for apple proliferation). It was considered that real-time PCR assays are rapid and sensitive tools to detect phytoplasmas at the universal or group-specific level, which could be used both for fundamental studies (e.g. host-pathogen relationships, epidemiology) and routine testing.

Source: Galetto L, Bosco D, Marzachi C (2005) Universal and group-specific real-time PCR diagnosis of flavescence dorée (16Sr-V), bois noir (16Sr-XII) and apple proliferation (16Sr-X) phytoplasmas from field-collected plant hosts and insect vectors. *Annals of Applied Biology* **147**(2), 191-201.

Additional key words: diagnostics **Computer codes:** PHYPMA, PHYPPY, PHYP64

2006/065 Multiplex RT-PCR to detect eight stone fruit viruses

A one step RT-PCR assay was developed to detect and differentiate the following 8 viruses of stone fruit trees: *Apple mosaic ilarvirus* (EU Annexes), *Prunus necrotic ringspot ilarvirus, Prune dwarf ilarvirus, American plum line pattern ilarvirus* (EPPO A1 list), *Plum pox potyvirus* (EPPO A2 list), *Apple chlorotic leaf spot trichovirus,* Apricot latent foveavirus, Plum bark necrosis stem pitting associated ampelovirus. This multiplex RT-PCR was considered an efficient, sensitive and rapid tool, which can allow routine detection of a large number of viruses either alone or in combination.

Source: Sánchez-Navarro JA, Aparicio F, Herranz MC, Minafra A, Myrta A, Pallás V (2005) Simultaneous detection and identification of eight stone fruit viruses by one-step RT-PCR. *European Journal of Plant Pathology* **111**(1), 39-46.

Additional key words: diagnostics **Computer codes:** APMV00, APLPV0, PPV000

EPPO *Reporting Service*

2006/066 Real-time PCR to detect *Bursaphelenchus xylophilus*

A real-time PCR method was developed in China to identify *Bursaphelenchus xylophilus* (EPPO A1 list). A set of primers and probe specific for *B. xylophilus* was designed to target the ITS region of ribosomal DNA. This assay was found to be highly specific and sensitive. It also gave satisfactory results when used on samples of wood collected from trunks of symptomatic pine trees in several provinces of China. Nematodes had first to be recovered using a Baermann funnel (2 h) before being tested (singly or in bulk). As real-time PCR is largely automated, it enables a rapid and simultaneous analysis of several samples (up to 96 samples). It was concluded that this real-time PCR could be particularly useful for quarantine purposes.

Source: Cao AX, Liu XZ, Zhu SF, Lu BS (2005) Detection of the pinewood nematode, *Bursaphelenchus xylophilus*, using a real-time polymerase chain reaction assay. *Phytopathology* **95**(5), 566-571.

Additional key words: diagnostics **Computer codes:** BURSXY

2006/067 Proceedings of the International Workshop "Invasive Plants in the Mediterranean Type Regions of the World", 2005-05-25/27, Mèze (France)

The Proceedings of the International Workshop "Invasive Plants in the Mediterranean Type Regions of the World" held last May in Mèze (France) have now been edited and sent to all participants and Heads of National Plant Protection Organizations of the 47 EPPO Member Countries. All presentations, posters and conclusions of the working groups are included in the Proceedings.

Complete Proceedings and PowerPoint presentations are also available on-line on the EPPO Website: http://www.eppo.org/MEETINGS/2005_meetings/workshop_invasive/workshop.htm

Moreover, following the recommendations of this workshop, UICN – Centre for Mediterranean Cooperation created an internet platform on invasive plants in the Mediterranean area. This platform is a place of exchange of experiences about the management of invasive plants: http://iucn.org/places/medoffice/invasive_species/index_en.html

The EPPO Secretariat has extracted from these proceedings useful information (e.g. reviews on invasive plants, new geographical records) which is presented in the articles below.

Source: EPPO Secretariat, 2006-03

Additional key words: conference

2006/068 Invasive plant species in Portugal: an overview

Portuguese native flora is threatened by invasions of exotic plants. During the last two centuries, and especially in recent decades, the number of introduced plant species has increased extensively. Alien species now represent more than 15% of the total Portuguese vascular flora, which comprises approximately 3200 taxa. Their presence has increased probably by more than 1000% during the last two centuries, reaching nowadays around 500 species. Almost 40% of the listed species are actually or potentially invasive, including agricultural weeds and invaders of natural habitats, and around 7% are considered as dangerous invaders. Fabacae and Asteraceae provide the largest numbers of problematic species. Australia seems to have supplied the most dangerous and aggressive invaders to Portugal, including several *Acacia* and *Hakea* species.

In 1999, specific legislation (Decreto - Lei 565/99) was prepared in Portugal to address this problem. A list of introduced invasive alien plants has been established and it is prohibited to introduce any new plant species unless it has been shown to be not harmful (with a few exceptions granted for forestry and agricultural purposes). Penalties will be applied to those using any listed invasive species. It is planned that the list will be regularly updated. The

implementation of these new regulations will imply inspections of the horticultural sector (e.g. nurserymen, landscape designers, gardeners) and adequate training of technicians.

The species listed as invasive by this law are: *Acacia dealbata, Acacia karroo, Acacia melanoxylon, Acacia mearnsii, Acacia longifolia, Acacia pycnantha, Acacia retinodes, Acacia saligna, Ailanthus altissima* (EPPO List of Invasive Alien plants), *Arctotheca calendula, Azolla filiculoides* (EPPO List of Invasive Alien plants), *Carpobrotus edulis, Cortaderia selloana, Eichhornia crassipes, Elodea canadensis, Hakea sericea, Hakea salicifolia, Ipomoea indica, Myriophyllum aquaticum* (EPPO List of Invasive Alien plants),, *Oxalis pes-caprae, Pittosporum undulatum, Robinia pseudoacacia, Spartina densiflora, Tradescantia fluminensis*.
Potentially invasive plants are also listed: *Agave americana, Acacia baileyana, Acacia cyclops, Acacia decurrens, Arundo donax, Cortaderia selloana, Lantana camara, Opuntia ficus-indica, Ricinus communis*.

Concerning aquatic ecosystems, Aguiar *et al*. (2006) state that several plants only invade rice fields and their vicinity (e.g. *Ammannia x coccinea, Echinochloa oryzicola*), while others such as the water-hyacinth (*Eicchornia crassipes*) and the parrot-feather (*Myriophyllum aquaticum*, EPPO List of Invasive Alien plants) affect multiple ecosystems including watercourses, drainage and irrigation channels, reservoirs, swamps and marshes, and can be very detrimental both as environmental weeds and to human activities. Some species are widely distributed in Portugal, such as the giant-reed (*Arundo donax*) and the knotgrass (*Paspalum distichum*), whereas others have a restricted distribution (e.g. *Eryngium pandanifolium*) or develop plant outbreaks under specific environmental conditions (e.g. *Azolla filiculoides*).

Sources: Aguiar FC, Ferrerra MT, Moreira L, Duarte MC (2006) Are invasive plant species a problem in aquatic ecosystems of Portugal? In: *Invasive plants in Mediterranean Type Regions of the World* (Ed. by S Brunel). Council of Europe publishing. Strasbourg. p. 358.

Marchante H (2006) Invasive plant species in Portugal: an overview. In: *Invasive plants in Mediterranean Type Regions of the World* (Ed. by S Brunel). Council of Europe publishing. Strasbourg. p. 147-155.

Decreto Lei 565/99 (Invasive plants in Portugal). Diário da República – I Série A, no. 295, 1999-12-21. http://www.uc.pt/invasoras/dec_lei_invasoras.pdf

Additional key words: legislation, records of invasive plants **Computer codes:** AILAL, MYPBR, PT

2006/069 Present knowledge on invasive plants in Morocco

A survey of the adventive flora in Morocco shows that 2/3 of its exotic species were introduced between 1970 and 1997. Solanaceae and Poaceae are the main families represented (50% of the total number of adventive species):

Latin name	Family	Bayer Code (EPPT Database)	Probable year of introduction
Nicotiana glauca	*Solanaceae*	NIOGL	Before 1931
Ricinus communis	*Euphorbiaceae*	RIICO	Before 1931
Oxalis pes-caprae	*Oxalidaceae*	OXAPC	Before 1931
Kochia scoparia	*Chenopodiaceae*	KCHSC	1948
Salpichroa origanifolia	*Solanaceae*	SAPOR	1949
Solanum elaeagnifolium (EPPO List of Invasive Alien plants)	*Solanaceae*	SOLEL	1949
Abutilon theophrasti	*Malvaceae*	ABUTH	1980
Ammannia coccinea	*Lythraceae*	AMMCO	1980
Echinochloa phyllopogon	*Poaceae*	ECHPH	1980
Cyperus difformis	*Poaceae*	CYPDI	1980
Dactyloctenium aegyptiacum	*Poaceae*	DTTAE	1980
Euphorbia heterophylla	*Euphorbiaceae*	EPHHL	1980
Solanum cornuuim	*Solanaceae*	SOLCU	1986
Brachiaria eruciformis	*Poaceae*	BRAER	1970
Corchorus olitorius	*Tiliaceae*	CRGOL	1990
Panicum capillare	*Poaceae*	PANCA	1990
Verbesina encelioides	*Asteraceae*	VEEEN	1997

Since 1984, only *Solanum elaeagnifolium, Oxalis pes-caprae* and *Verbesina encelioides* have been studied and monitored.

Verbesina encelioides originates from the eastern United States. It is recorded in Australia, India, Argentina, South Africa, Botswana, Namibia, Saudi Arabia, Israel (South-West) and doubtfully in Europe (unconfirmed records in Denmark, Germany, Switzerland and Sweden, Tutin *et al*., 1964-1980). It is described as very invasive where it has established, especially in India. In Morocco, it colonizes wastelands, roadsides, and starts to invade crops. Due to its rapid growth and huge production of seeds, it rapidly outcompetes cultivated or indigenous plants. It is very toxic when ingested by cattle.

Oxalis pes-caprae is a well known invasive plant in the whole Mediterranean Basin. It comes from South Africa and mainly colonizes anthropised sites (e.g. roadsides, in the vicinity of human habitation) and crops (e.g. orchards, vineyards, cereals, vegetables). The plant forms monospecific stands, smothering the rest of the vegetation. An allelopathic effect on cereals has also been identified: it can reduce the germinability of cereal seeds to 63 %.

Moreover, Molero and Montserrat (2006) report that recent field investigations in the middle and low Moulouya Valley (East Morocco) have revealed the presence of new Chenopodiaceae in the flora of Morocco. These species are: *Suaeda aegyptiaca, Atriplex suberecta, Atriplex semibaccata* and *Bassia scoparia*. The latter three are clearly neophytes, escaped from cultivation in many cases, while the former is a native species in all countries eastward from Libya to Pakistan. *Suaeda aegyptiaca* is an invasive therophyte that grows on fields which were damaged after badly planned irrigation practices and is a regular component of wadis and naturally disturbed places. *S. aegyptiaca* is here reported for the first time for the Maghreb countries, but it is not known whether it is native or introduced.
The two species of *Atriplex*, both native from South Australia, are nowadays expanding invasive plants. *A. semibaccata* is widespread in South Australia where it is usually found in heavy soils, sometimes slightly saline, and is frequently an invader of disturbed areas. Many localities with similar conditions exist in North-East Morocco, where this species seems to be quite common, although few records of this plant have been made in recent floras. *Atriplex suberecta* appears to be much rarer and has been reported for Morocco for the first time. *Bassia scoparia* has been included as an invader in almost all recent floras but very few localities could be identified in practice.

Source: Molero J, Montserrat JM (2006) Some new neophytes for the North East of Morocco. In: *Invasive plants in Mediterranean Type Regions of the World* (Ed. by S Brunel). Council of Europe publishing. Strasbourg. p. 333.

Taleb A, Bouhache M (2006) Etat actuel de nos connaissances sur les plantes envahissantes au Maroc. In: *Invasive plants in Mediterranean Type Regions of the World* (Ed. by S Brunel). Council of Europe publishing. Strasbourg. p. 99-107.

Information on *Verbesina encelioides*:
http://www.hear.org/hnis/reports/verbesina_encelioides_hnis.pdf

Tutin *et al*. (1964-1980) Flora Europaea. 5 Vol. Cambridge University Press.

Additional key words: invasive plants **Computer codes:** SOLEL, OXAPC, VEEEN, MA

2006/070 Exotic plant species in Islas Baleares, Spain

A list of exotic vascular plants which have been introduced in to the Islas Baleares (Spain) has been elaborated, identifying the most dangerous species. So far, about 305 introduced species have been identified, representing 15.9 % of the total Balearic flora.
The most frequent origin of alien plants was America (31.8 %), followed by the Mediterranean basin (18.4%) and Africa (16.4%). The most frequent life forms of these exotic species are phanerophytes (34.4%), followed by annual herbaceous species (therophytes) (29.5%). This pattern is disharmonic when compared with the indigenous flora which is characterized by a scarcity of phanerophytes (8.4%), especially trees, and a large proportion of therophytes (41.3%). Trees and other large species were most likely introduced for a specific use (ornamental, medicinal, forestry), while most annual species probably arrived as contaminants of crop seeds.
The document "Els vegetals introduïts a les Illes Balears" gives information about the main invasive plants of the Islands: *Agave americana, Ailanthus altissima* (EPPO List of Invasive Alien plants), *Aloe* spp., *Amaranthus* spp., *Arundo donax, Aster squamatus, Carpobrotus* spp., *Chamaesyce* spp., *Conyza* spp., *Cyperus alternifolius, Disphyma crassifolium, Ipomoea indica, Nicotiana glauca, Opuntia maxima, Oxalis pes-caprae, Paspalum paspalodes, Ricinus communis, Senecio cineraria, Solanum bonariense, Soliva stolonifera, Sorghum halepense, Spartium junceum, Trapeolum majus.*
Potentially invasive plants are also listed: *Abutilon theophrasti, Acacia* spp., *Aeonium arboretum, Anredera cordifolia, Artemisia arborescens, Bromus catharticus, Clematis vitalba, Coronopus didymus, Cortaderia selloana, Cotula coronopifolia, Datura* spp., *Echinochloa colona, Gomphocarpus fruticosus, Helianthus tuberosus, Kalanchoe daigremontiana, Lantana camara, Limoniastrum monopetalum, Lonicera japonica, Melia azedarach, Mesembryanthemum crystalllinum, Mirabilis jalapa, Myoporum tenuifolium, Nothoscordum borbonicum, Parkinsonia aculeate, Pennisteum* spp., *Phytolacca americana, Pittosporum tobira, Retama sphaerocarpa, Robinia pseudoacacia, Senecio angulatus, Setaria parviflora, Solanum linnaenum, Stenotaphrum secundatum, Xanthium* spp.

A study done on Mallorca shows that 15.9% of the total island flora consists of naturalised or sub-spontaneous species, but only 9.5% could be considered as naturalised in a very broad sense. Mediterranean ecosystems are resistant to the invasion of exotic species, but it is also likely that there is a certain under-estimation of these species since many of them, of Mediterranean origin, could have been introduced by humans in very ancient times. The most sensitive environments to invasion of exotic species are, in order of importance: roadsides, dry river beds, crop fields, and to a lesser extent rocky coasts, wetlands and dune systems. On Mediterranean islands, the most mature, stable environments seem to be extremely resistant to invasion, whereas the open and/or permanently disturbed habitats are the most susceptible to invasion by exotic species.

Sources: Moragues E, Rita J (2006) Exotic plant species in the Balearic Islands, Spain. In: *Invasive plants in Mediterranean Type Regions of the World* (Ed. by S Brunel). Council of Europe publishing. Strasbourg. p. 324.

Moragues E, Rita J (2006) Habitat distribution of exotic plant species on

Mallorca Island. In: *Invasive plants in Mediterranean Type Regions of the World* (Ed. by S Brunel). Council of Europe publishing. Strasbourg. p. 349.

Moragues Botey E, Rita Larrucea J (2005) Els vegetals introduïts a les Illes Balears. Documents tècnics de conservació. II època, núm.11.Govern de les Illes Balears. 126 p. http://herbarivirtual.uib.es/documents/publicaciones/llibre_exotiques.pdf

Additional key words: invasive plants **Computer codes:** AILAL, ES

2006/071 Competition between the invasive species *Carpobrotus edulis* and the endemic species *Limonium emarginatum* in the Strait of Gibraltar

Carpobrotus edulis has been introduced to the coastline of the Strait of Gibraltar in Algeciras, Tarifa and Gibraltar. This neophyte is invading coastal cliffs and dunes where it competes with various endemic plants, including *Limonium emarginatum*, a protected species with a very restricted geographical distribution. Competitive interactions between *L. emarginatum* and *C. edulis* were studied by analyzing local distributions, abiotic characteristics of habitats, root development, biomass production and solar radiation access for both species. Results show that *C. edulis* is replacing *L. emarginatum* at higher topographical levels in populations settled on both coastal dunes and cliffs. *C. edulis* is becoming a challenge for the conservation of this species.

Sources:

Garzón O, Castillo JM, Figueroa ME (2006) Competition between the invasive species *Carpobrotus edulis* and the endemic species *Limonium emarginatum* in Gibraltar Straight. In: *Invasive plants in Mediterranean Type Regions of the World* (Ed. by S Brunel). Council of Europe publishing. Strasbourg. p. 345.

Additional key words: invasive plants, competition. **Computer codes:** CBSED, ES

2006/072 Invasive species in Serbia and Montenegro: a threat for biodiversity

One of the most alarming examples of an invasive plant in Serbia and Montenegro is *Ailanthus altissima* which has started spreading from urban areas. It conquered the devastated areas along roads, and then spontaneously penetrated into natural canyon vegetation. *Amorpha fruticosa, Asclepias syriaca, Echinocystis lobata* and *Solidago gigantea* spread mostly along river courses, and sometimes completely suppress indigenous species or take over the dominant role. The following plants were also reported as invasive in Serbia and Montenegro by Vasic (pers. com. 2006): *Acer negundo, Ambrosia artemisiifolia* (EPPO List of Alien Invasive plants), *Aster novi-belgii, Commelina communis, Cuscuta campestris, Helianthus tuberosus* (EPPO List of Alien Invasive plants), *Ipomoea purpurea, Medicago sativa, Morus alba, Parthenocissus inserta, Paspalum distichum, Reynoutria japonica* (EPPO List of Invasive Alien plants), *Robinia pseudoacacia, Solanum elaeagnifolium* (EPPO List of Alien Invasive plants), and *Sporobolus indicus*.
According to Stevesic (2006), major weeds in Podgorica and its surroundings are: *Amaranthus retroflexus, Chenopodium album, Conyza canadensis, C. bonariensis, Helianthemum tuberosum, Lepidium draba* and *Bidens subalternans*.

Sources: Stevesic D (2006) Contribution to the knowledge on the invasive species in the flora of Montenegro. In: *Invasive plants in Mediterranean Type Regions of the World* (Ed. by S Brunel). Council of Europe publishing. Strasbourg. p. 322.
Vasic O (2006) Invasive adventive species in Serbia and Montenegro - a threatening factor for the natural diversity of flora and vegetation. In *Invasive plants in Mediterranean Type Regions of the World*. (Ed. by S Brunel).Council of Europe publishing. Strasbourg. p. 350.

Additional key words: invasive plants **Computer codes:** POLCU, SOLEL, CS

2006/073 Control of *Pistia stratiotes* in Andalucía (Spain)

Pistia stratiotes (Araceae), a tropical aquatic-floating weed that invades channels and wetlands, has now been recorded throughout 35000 m² in Andalucía (near Doñana Natural Park). Given the risk this species represents for native wetlands, a control program has been initiated based on the physical removing (by hand and machinery) and specific application of a low-impact herbicide if necessary. The eradication is being undertaken within the Andalusian Program for the Control of Invasive Exotics (Plan Andaluz para el Control de las Especies Exóticas Invasoras) (Ortega *et al.*, 2006).

Sources: Ortega F, Dana ED, García-Murillo P (2006) Control of Pistia stratiotes near Doñana Natural Park (SW Spain). In: *Invasive plants in Mediterranean Type Regions of the World* (Ed. by S Brunel). Council of Europe publishing. Strasbourg. p. 371.

Additional key words: management of invasive plants **Computer codes:** PIIST, ES

2006/074 Eradication of *Carpobrotus* spp. in Minorca (Spain)

In 2001 the "Consell Insular de Menorca" started a project with the objective of protecting threatened plants. Three main threats were identified, of which one was the presence of the exotic invasive plant *Carpobrotus*. As a consequence, eradication was envisaged. Two preparatory actions were initially developed: a detailed GIS cartography of its distribution and the selection of an eradication method using experimental plots. GIS cartography appeared to be useful tool for the planning and coordination of eradication. It provided the exact amount of *Carpobrotus* present on the island (i.e. 27.8 ha), which was not known before the project. Eradication started in August 2002. The first actions were undertaken while the plant was still in isolated patches, but showing clear signs of expansion. The eradication then continued along the southern coast of the island, where the plant was mainly located around urban areas. In November 2003, the last eradication measures were applied in places with high plant density, located mainly in the north coast. As a result of this eradication campaign, the plant has been eradicated from 24 ha and 900 tons of *Carpobrotus* remains have been removed. It is stressed that the transport of eradicated plants had been a major difficulty throughout the project. It is considered that the threat represented by *Carpobrotus* has been much reduced in Minorca, as the plant is now only present in two places.

Source: Fraga P, Estaún I, Olives J, Da Cunha G, Alarcón A, Cots R, Juaneda J and Riudavets X (2006) Eradication of *Carpobrotus* (L.) N.E. Br. in Minorca. In: *Invasive plants in Mediterranean Type Regions of the World* (Ed. by S Brunel)**.** Council of Europe publishing. Strasbourg. p. 289-297.

Additional key words: management of invasive plants **Computer codes:** CBSED, ES

2006/075 Geographical distribution of *Solanum elaeagnifolium*: an update

In EPPO RS 2006/018, a preliminary geographical distribution of *Solanum elaeagnifolium* (EPPO List of Invasive Alien plants) was given. The EPPO Secretariat requested more information from its readers who have kindly provided the following new records or detailed information.

Reminder:
An assessment of the situation regarding this species and options for managing it will be presented during the EPPO and FAO/Sub-regional Office for North Africa Workshop on "How to manage Invasive Alien Plants: the case study of *Solanum elaeagnifolium*". This workshop is organized with the cooperation of the NPPO of Tunisia and the Horticulture and Breeding School of Chott Meriem. It will take place in Sousse (Tunisia) on 2006-05-29/31; a field trip will give an opportunity for participants to observe the species discussed. Registration is open until **2006-04-15** at: http://www.eppo.org/MEETINGS/conferences/workshop_solanum.htm

- **EPPO REGION**

North Side of the Mediterranean Sea

Cyprus
The plant has been probably introduced as an ornamental. It then escaped and locally naturalized on waste ground and roadsides around Nicosia, where it was first collected in 1958 (Meikle RD, 1977-1985).

Denmark
According to the Database Nobanis (http://www.nobanis.org/), the plant was first recorded in Denmark in 1960. It is rare and not invasive, Hans Peter (pers. com., 2006) reports that the plant is not even naturalized.

Greece
According to Zahariadi (1973), the first specimen was collected in Greece in 1949 and the species has since spread to several places: Rhodopi, Thessaloniki, Elasson, Tirnavos, between Agrinion and Amfilokhia, Attiki, Leonidion, Kalamata, Ipiroas and Kriti. Yannitsaros and Economidou (1974) report that one of the first localities into which it was introduced, probably directly from America, is the American Agricultural School near Thessaloniki. Its presence in the area between Agrinion and Amfilokhia is probably connected with introduced tobacco seeds. The plant is also supposed to have been introduced in to the "Botanical Garden of Julia and Alexander Diomidis" at Dafni, Attiki, where a forest tree nursery had previously been established. *S. elaeagnifolium* has a particular pattern of spread. From the first point of introduction and establishment, the plant is spreading in all directions. Its spread is not continuous but occurs in leaps.
Davis (1965-1985) records it in Lesvos, the Northern Sporades and the Ionian Islands. It is also recorded in Greece by Boyd *et al.*, (1984), Browicz (1993) and Eleftherohorinos *et al*. (1993).

Italy
S. elaeagnifolium is present in Italy (mainly central to south Italy), including Sicilia and Sardinia. In Sardinia it is locally common in the very south of the island, mainly along roadsides (Brundu, pers. com.). The species is reported in Sicilia as *S. elaeagnifolium* var. *leprosum* (Martino 1956, 1967) and in mainland Italy (Boyd *et al.*, 1984).

Switzerland
In the Herbarium Parisensis, *S. elaeagnifolium* was collected in July 1953 "on a roadside, near the glacier du Rhône (Suisse)" by Henri Bouby.

South Side of the Mediterranean Sea

Israel
The plant is apparently widespread throughout the whole country (Database of the Jerusalem Botanical Garden). Feinbrun-Dothan (1977-1978) states that *S. elaeagnifolium* grows near habitations and is present in the Acco Plain, in the Sharon Plain, in upper and lower Galilee, in Mont Carmel, in the Esdraelon Plain, in Shefela, in the Judean Mounts, in north Negev, in the upper Jordan Valley and in the Beit Shean Valley.

- **ASIA**

Pakistan
The plant is recorded in Karachi (Flora of Pakistan).

Sources:

Boyd JW, Murray DS, Tyrl RJ (1984) Silverleaf nightshade, *Solanum elaeagnifolium*, origin, distribution and relation to man. *Economic Botany*, **38**(2), 210-217.

Browicz K (1993) *Nicotiana glauca* and *Solanum elaeagnifolium* (Solanaceae) - two xenophytes from South America and the history of their spreading in the eastern Mediterranean. *Fragmenta Floristica et Geobotanica*, (Supplement 2, 1), 299-305.

Davis PH (editor) (1965-1985) Flora of Turkey and the east Aegean islands. Vol.1-9, Edinburgh University Press, Edinburgh.

Eleftherohorinos IG, Bell CE, Kotoula-Syka E (1993) Silverleaf nightshade (*Solanum elaeagnifolium*) control with foliar herbicides. *Weed Technology*, **7**(4), 808-811.

Feinbrun-Dothan N. (1977-1978) Flora Palestina. Israel Academy of Science and Humanities, Jerusalem. Several volumes.

Flora of Pakistan, n°100. Department of Botany, University of Karachi, Pakistan and National Herbarium (Stewart Collection), Pakistan Agricultural Research Council, Islamabad, Pakistan.

Martino, A di (1956) Una stazione di "*Solanum elaeagnifolium* Cav. var. *leprosum*" in Sicilia. *Lav. Reale Ist. Bot*. Palermo **15**, 114-120.

Meikle RD (1977-1985) Flora of Cyprus. 2 Volumes. Bentham-Moxon Trust Publishers, Kew, England. Several volumes.

The Jerusalem Botanical Garden Homepage: http://www.botanic.co.il

Yannitsaros A, Economidou E (1974) Studies on the adventive flora of Greece – I. General remarks on some recently introduced taxa. *Candollea* **29**, 111-119.

Zahariadi C (1973) Quelques taxons rares ou nouvellement découverts de la flore de Grèce. *Annales Musei Goulandris* **1**, 165-183.

Additional key words: new records **Computer codes:** SOLEL, CH, CY, DK, GR, IL, IT, PK