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CONTENTS ***Pests & Diseases***

Invasive Plants

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EPPO *Reporting Service*

2006/224 New data on quarantine pests and pests of the EPPO Alert List

By browsing through the literature, the EPPO Secretariat has extracted the following new data concerning quarantine pests and pests included on the EPPO Alert List. The situation of the pest concerned is indicated in bold, using the terms of ISPM no. 8.

- **New records**

Xanthomonas axonopodis pv. *vesicatoria* (EPPO A2 list) was detected in the Republic of Macedonia during surveys done in pepper crops (*Capsicum annuum*). Bacterial strains were characterized as belonging to type A, and were identified to races P0 and P2 (Mitrev and Kovačević, 2006). The EPPO Secretariat had previously no data on the occurrence of this bacterium in Macedonia. **Present, no detail.**

- **Detailed records**

Surveys were done in autumn 2005 in Kosovo (RS) for the presence of fruit tree phytoplasmas. Symptoms resembling those of apple proliferation, pear decline and European stone fruit yellows were observed in all orchards studied. Samples were collected and tested. The presence of '*Candidatus* Phytoplasma mali' (EPPO A2 list), '*Candidatus* Phytoplasma pyri' (EPPO A2 list) was detected in 6 apple trees and 3 pear trees, respectively. '*Candidatus* Phytoplasma prunorum' was not detected. This is the first record of apple proliferation and pear decline in Kosovo (Myrta *et al.*, 2006).

During extensive surveys carried out in Bosnia and Herzegovina for stone fruit viruses in 2003, 16 isolates of *Plum pox virus* (*Potyvirus* – EPPO A2 list) were typed. Isolates were collected from peach and plum, and from various parts of the country. 4 isolates were identified as PPV-M, 8 as PPV-D, and 4 as natural D/M recombinants. This high variability of PPV isolates fits with the presence of this virus over a long period of time in Bosnia and Herzegovina (Matic *et al.*, 2006).

An outbreak of *Ralstonia solanacearum* (EPPO A2 list) was observed on tomato crops (*Lycopersicon esculentum*) in Nigeria. In June 1996, 80% of tomato fields in the production area of Ogun state presented wilt symptoms. Later surveys done in 1998 in Edo, Delta, Lagos, Oyo and Osun states showed that 60-80% of the tomato fields were infected. Laboratory studies showed that all collected isolates belonged to *R. solanacearum* biovar 3. According to the authors, this is the first report of *R. solanacearum* biovar 3 in Nigeria (Adebayo and Epko, 2005).

Tomato yellow leaf curl virus (*Begomovirus*, TYLCV – EPPO A2 list) is reported for the first time in Sardegna, Italy. In addition to *Tomato yellow leaf curl Sardinia virus* (TYLCSV), TYLCV was detected during recent surveys conducted in tomato glasshouses in the province of Cagliari (Nannini *et al*., 2005).

Venturia nashicola (EU Annexes) is an economically important disease on pears (*Pyrus bretschneideri*) in China. It occurs at least in the Shandong and Shanxi provinces (Lian *et al*., 2006).

Xylella fastidiosa (EPPO A1 list) is reported for the first time from Oklahoma (US). An elm tree (*Ulmus americana*) located in a botanical garden showed symptoms of leaf scorch in summer 2004, and molecular studies confirmed the presence of the bacterium (Olson *et al*., 2006).

- **New host plants**

Rhamnus purshiana (Rhamnaceae), *Crataegus douglasii* and *Prunus laurocerasus* (both Rosaceae) have been identified as new hosts of *Rhagoletis indifferens* (Diptera: Tephritidae – EPPO A1 list) in Washington state, USA (Yee and Goughnour, 2005).

In Poland, *Tomato black ring virus* (*Nepovirus* – EU Annexes) was identified in courgettes (*Cucurbita pepo* var. *giromantiina*). Affected plants showed leaf mosaic and fruit deformation (Pospieszny and Borodynko, 2005).

Source:

Adebayo OS, Ekpo JA (2005) Biovar of *Ralstonia solanacearum* causing bacterial wilt of tomato in Nigeria. *Plant Disease* **89**(10), p1129.

Lian S, Li BH, Xu XM (2006) Formation and development of pseudothecia of *Venturia nashicola. Journal of Phytopathology* **154**(2), 119-124.

Matic S, Al-Rwahnih M, Myrta A (2006) Diversity of *Plum pox virus* isolates in Bosnia and Herzegovina. *Plant Pathology* **55**(1), 11-17.

Mitrev S, Kovačević B (2006) Characterization of *Xanthomonas axonopodis* pv. *vesicatoria* isolated from peppers in Macedonia. *Journal of Plant Pathology* **88**(3), 321-324.

Myrta A, Martini M, Susuri L, Susuri HS, Carraro L (2006) First report of apple proliferation and pear decline phytoplasmas in Kosovo. *Journal of Plant Pathology* **88**(1), 121-125.

Nannini M, Testa M, Napoli C, Accotto GP (2005) [First report of *Tomato yellow leaf curl virus* (TYLCV) in Sardinia.] *Informatore Fitopatologico* **6**, 53-56 (in Italian).

Olson BR, Dominiak J, von Broembsen S, Berg M, Bextine BR (2006) First report of *Xylella fastidiosa* in Oklahoma. *Plant Disease* **90**(1), p 108.

Pospieszny H, Borodynko N (2005) First report of *Tomato black ring virus* (TBRV) in the natural infection of zucchini (*Cucurbita pepo* L. convar *giromantiina*) in Poland. *Journal of Plant Protection Research* **45**(4), 321-325.

Yee WL, Goughnour RB (2005) New hosts of western cherry fruit fly, *Rhagoletis indifferens* (Diptera: Tephritidae), and their relationship to life history characteristics of this fly. *Annals of the Entomological Society of America* **98**(5), 703-710.

Additional key words: new records, detailed records, new host plants

Computer codes: ACIZJA, PHYPMA, PHYPPY, PPV000, PSDMSO, RHAGIN, TBRV00, TYLCV0, VENTNA, XANTAV, XYLEFA, BA, CN, IT, IT, MK, NG, PL, US, YU

EPPO *Reporting Service*

2006/225 First record of *Rhynchophorus ferrugineus* in France

The NPPO of France recently informed the EPPO Secretariat of the first finding of *Rhynchophorus ferrugineus* (Coleoptera: Curculionidae - EPPO A2 list) on its territory. On 2006-09-12, 4 larvae collected from a *Phoenix canariensis* were identified and confirmed as being *R. ferrugineus*. The infested palm trees (10 m tall) were located in a private garden at Porto-Vecchio, in the south of Corsica.

A surveillance programme using traps had been initiated earlier in 2006 in several volunteer nurseries located in the departments of Var and Alpes-Maritimes (region Provence-Alpes-Côte d'Azur). In the deparment of Var, an adult beetle was caught on 2006-10-20 in 1 nursery at Grimaud on different palm species which had been imported from Italy, Spain, Brazil and Egypt. However, as of 2006-11-17, no infested palm could be identified despite all inspections made. Three other cases were then reported from Var:

- 2 females were identified on 2006-10-24 on a *P. canariensis*, which had been planted in 1996 in a private garden at Sanary-sur-Mer. The tree was growing in urban environment but in the vicinity of a nursery.
- 1 outbreak was identified on 2006-11-15 in a nursery at Sainte-Maxime, on an imported lot of *P. canariensis* (arrived in September 2006 from Italy).
- 1 outbreak was found on 2006-11-16 at a public park of La Croix Valmer, in 1 *P. canariensis* which had been planted in 1980.

Finally, in the Alpes-Maritimes department, an adult was caught on the 2006-11-21 at Saint-Martin-du-Var, in a nursery growing different palm species.

For all 6 outbreaks, surveys are being carried out and traps have been installed to determine the extent of the infestation. All palms trees identified as being infested by *R. ferrugineus* will be destroyed.

The situation of *Rhynchophorus ferrugineus* in France can be described as follows: **Present, first recorded in 2006, few outbreaks found in the departments of Corse du Sud (1), Var (4) and Alpes-Maritimes (1), under eradication.**

Source: NPPO of France, 2006-11.

Additional key words: new record **Computer codes:** RHYCFE, FR

2006/226 First report of *Rhynchophorus ferrugineus* in Greece

The NPPO of Greece recently informed the EPPO Secretariat about the presence of *Rhynchophorus ferrugineus* (Coleoptera: Curculionidae - EPPO A2 list) on its territory. The pest was found on the islands of Kriti (Iraklio prefecture) and Rhodos. Phytosanitary measures are being taken to prevent any further spread.
The situation of *Rhynchophorus ferrugineus* in Greece can be described as follows: **Present, reported in 2006 on the islands of Kriti and Rhodos, under official control.**

Source: NPPO of Greece, 2006-12.

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

2006/227 *Rhynchophorus ferrugineus* found in Lazio region, Italy

The NPPO of Italy recently informed the EPPO Secretariat of the presence of *Rhynchophorus ferrugineus* (Coleoptera: Curculionidae – EPPO A2 list) in the Lazio region, Italy. The pest was found on ornamental palms in several municipalities in the province of Latina, as well as in a few private gardens in Roma. Eradication measures are being taken in the Lazio region.
The situation of *Rhynchophorus ferrugineus* in Italy can be described as follows: **Present, few outbreaks found in Campania, Lazio, Toscana and Sicilia, under official control.**

Source: NPPO of Italy, 2006-11.

Additional key words: detailed record **Computer codes:** RHYCFE, IT

2006/228 First report of *Bactrocera latifrons* in Tanzania

The presence of *Bactrocera latifrons* (Diptera: Tephritidae – EU Annexes) is reported for the first time in Tanzania. This is also the first record for Africa. In May 2006, 2 female specimens were caught in a protein bait trap at Morogoro, Tanzania. The trap had been placed in a citrus tree but aubergines (*Solanum aethiopica*) were grown in the near vicinity. *B. latifrons* is a fruit fly species of Asian origin which mainly attacks solanaceous crops (e.g. aubergines and tomatoes). Its currently known distribution is as follows:
Asia: Brunei Darussalam, China, India, Laos, Malaysia, Pakistan, Singapore, Sri Lanka, Taiwan, Thailand, Vietnam.
Africa: Tanzania.
America: USA (Hawaii only).

Source: Tephritid Workers Database
Alert! New invasive *Bactrocera* species in Africa : *Bactrocera latifrons* (dated 2006-10-13). http://www.tephritid.org/twd/srv/en/home

Additional key words: new record **Computer codes:** DACULA, TZ

2006/229 Further finding of *Potato spindle tuber viroid* on ornamental Solanaceae in the Netherlands

An isolated finding of *Potato spindle tuber viroid* (*Pospiviroid*, PSTVd – EPPO A2 list) had previously been reported in the Netherlands on the ornamental *Solanum jasminoides* (EPPO RS 2006/142) and followed by a similar report in Germany (EPPO RS 2006/159). The NPPO of the Netherlands recently informed the EPPO Secretariat of further findings of PSTVd infections on the premises of several companies growing ornamental Solanaceae. These infections were discovered as part of a specific monitoring survey for viroids on symptomless ornamental plants. This survey was triggered by earlier outbreaks of PSTVd and other pospiviroids detected in Europe (the later mainly found on tomato crops) for which no source of infestation could be identified. Specific surveys have confirmed that PSTVd did not occur in the Netherlands on potato or tomato crops. The first PSTVd finding which was made in July 2006 on *Solanum jasminoides* (EPPO RS 2006/142) is now considered eradicated. Another outbreak was found in November 2006 on symptomless ornamental plants of *Solanum jasminoides* and several *Brugmansia* species (*B. suavolens, B. x candida*, *B. cordata* and *B. variegata*). Infections were detected on the premises of several companies producing potted plants for final consumers and in one propagation company producing *Brugmansia* plants. So far, no impact of PSTVd has been observed on these ornamental species which all remained symptomless. During trace-back studies, eight consignees located in other EU member states and which may have received possibly contaminated plants in 2005/2006 were informed. In the Netherlands, eradication measures are being applied. The origin of these PSTVd infections remains unclear.
The pest status of *Potato spindle tuber viroid* in the Netherlands is officially declared as follows: **Transient, only on ornamental plants of *Solanum jasminoides* and *Brugmansia* spp., under eradication.**

Source: NPPO of the Netherlands, 2006-11.

Additional key words: detailed record **Computer codes:** PSTVD0, NL

2006/230 New records of *Phakopsora pachyrhizi* in North America

Soybean rust caused by *Phakopsora pachyrhizi* (EPPO Alert List) has continued to spread in North America.

Mexico
At the end of October 2005, soybean leaves (*Glycine max* cv. 'Huasteca 400') showing rust symptoms were collected in Tamuin (State of San Luis Potosi) and in Altamira (Tamaulipas). The presence of *Phakopsora pachyrhizi* was then confirmed by laboratory tests. This was the first report of *P. pachyrhizi* in Mexico. In 2006, another outbreak of soybean rust was reported near the city of Tampico (Tamaulipas).

USA
In 2006, *P. pachyrhizi* was recorded in the 15 following states: Alabama, Arkansas, Florida, Georgia, Illinois*, Indiana*, Kentucky*, Louisiana, Mississippi, Missouri, North Carolina, South Carolina*, Tennessee, Texas*, Virginia*.

* New detailed records

Source: NAPPO Pest Alert System - Official Pest Reports. Detection of soybean rust (*Phakopsora pachyrhizi*) in the states of Tamaulipas and San Luis Potosi, Mexico. http://www.pestalert.org/oprDetail_print.cfm?oprid=192

ProMed posting of 2006-05-25. Soybean rust – Mexico (02). http://www.promedmail.org

USDA website – Soybean rust information site. http://www.sbrusa.net/

Additional key words: new record, detailed records **Computer codes:** PHAKPA, MX, US

2006/231 *Liriomyza huidobrensis* found in Japan

In Japan, *Liriomyza huidobrensis* (Diptera: Agromyzidae – EPPO A2 list) was found for the first time in Aomori Prefecture (north of Honshu) in July 2004, on various glasshouse crops. Studies done on specimens collected from Hokkaido and Honshu (Aomori, Miyagi and Yamaguchi Prefectures) showed that the Japanese specimens (as those obtained from China, Korea and Taiwan) belonged to the South American clade. The EPPO Secretariat had previously no data on

the occurrence of *L. huidobrensis* in Japan. *L. huidobrensis* had been intercepted on consignments imported into Japan but not reported on Japanese crops, so far.
The situation of *Liriomyza huidobrensis* in Japan can be described as follows: **Present, first reported in 2004, found in protected crops in Honshu (north) and Hokkaido.**

Source: Shindo J, Kinota M, Inokuchi S, Kimura Y, Fujimura T (2005) Occurrence of pea leafminer, *Liriomyza huidobrensis* (Blanchard) (Diptera: Agromyzidae), in Aomori Prefecture. *Annual Report of the Society of Plant Protection of North Japan* **55**, 236-239 (abst.).
Available on-line: http://njp.ac.affrc.go.jp/abstract/html/56/56-145.html

Takano SI, Iwaizumi R, Nakanishi Y, Someya H, Iwasaki A (2005) [Genetic differentiation and morphological comparison between two clades of *Liriomyza huidobrensis* (Blanchard) (Diptera: Agromyzidae).]. *Research Bulletin of the Plant Protection Service, Japan* **41**, 43-46 (in Japanese).

Additional key words: new record **Computer codes:** LIRIHU, JP

2006/232 First record of *Xanthomonas arboricola* pv. *corylina* in Iran

In Iran, a severe disease of hazelnut (*Corylus avellana*) was observed in 2004 in several orchards of the Gilan province (north-west, along the Caspian Sea). Water-soaked spots were observed on leaves which then desiccated. Shoots also presented dark-brown to black necrotic lesions. Analysis of extracts from symptomatic tissues revealed the presence of *Xanthomonas arboricola* pv. *corylina* (EPPO A2 list). This pathogen could then be inoculated to healthy hazelnut plants and re-isolated from lesions which appeared on these inoculated plants. This is the first report of *X. arboricola* pv. *corylina* in Iran.
The situation of *Xanthomonas arboricola* pv. *corylina* in Iran can be described as follows: **Present, first observed in 2004, in the Gilan province (north-west).**

Source: Kazempour MN, Ali B, Elahinia SA (2006) First report of bacterial blight of hazelnut caused by *Xanthomonas arboricola* pv. *corylina* in Iran. *Journal of Plant Pathology* **88**(3), p 341.

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

2006/233 First record of *Xanthomonas arboricola* pv. *corylina* in Sardegna and Sicilia (IT)

In Italy, during surveys done in hazelnut (*Corylus avellana*) orchards in Sardegna (near Nuoro), and Sicilia (near Messina and Catania), symptoms resembling those of *Xanthomonas arboricola* pv. *corylina* (EPPO A2 list) were observed. Water-soaked necrotic spots were observed on fruit husks and twigs sometimes showed partial die-back. Laboratory and pathogenicity tests confirmed that *Xanthomonas arboricola* pv. *corylina* was the causal agent of the disease observed. This is the first record of *X. arboricola* pv. *corylina* on both islands. In Italy, *X. arboricola* pv. *corylina* had been reported previously in Lazio (EPPO RS 519/12, 1992).
The situation of *Xanthomonas arboricola* pv. *corylina* in Italy can be described as follows: **Present, occurs in Lazio and reported in 2006 in Sardegna and Sicilia.**

Source: Cirvilleri G, Fiori M, Bonaccorsi A, Scuderi G, Virdis S, Scortichini M (2006) Occurrence of *Xanthomonas arboricola* pv. *corylina* in hazelnut orchards in Sardinia and Sicily. *Journal of Plant Pathology* **88**(3), p 340.

Additional key words: detailed record **Computer codes:** XANTCY, IT

2006/234 Details on the situation of *Erwinia amylovora* in Iran

In Iran, *Erwinia amylovora* (EPPO A2 list) was reported for the first time in 1991 on pear trees in Karaj (Tehran province), and then found in many orchards in the provinces of Azarbaijan, Ghazvin and Mazandaran. During a survey of pear orchards in different areas of the province of Gilan, symptoms of necrotic shoots and bacterial exudates were observed in pear trees. Based on morphological, biochemical and physiological characters, as well as PCR, most bacterial isolates were identified as *E. amylovora*.
The situation of *Erwinia amylovora* in Iran can be described as follows: **Present, first reported in 1991, found in the north (provinces of Azarbaijan, Ghazvin, Gilan, Mazandaran, Tehran)**.

Source: Kazempour MN, Kamran E, Ali B (2006) *Erwinia amylovora* causing fireblight or pear in the Guilan province of Iran. *Journal of Plant Pathology* **88**(1), 113-116.

Additional key words: detailed record **Computer codes:** ERWIAM, IR

2006/235 Structure and origin of *Xanthomonas arboricola* pv. *pruni* populations in western Europe

Xanthomonas arboricola pv. *pruni* (EPPO A2 list) was first described in North America in 1903. In Europe, it was first recorded in Italy in 1920. In France, the disease was observed in the 1990s in the southeast departments of Drôme and Gard (see EPPO RS 97/112). The disease was severe in 2000 and has continued to expand to new stone fruit orchards. Studies were done in France on the population genetics of *X. arboricola* pv. *pruni* to analyse its variability and better understand its origin. Strains from the USA, Italy, France (as well as a limited number of strains from Australia, Brazil, New Zealand and Uruguay) were studied using 3 complementary genomic tools (ITS region, 4 genes, FAFLP analysis). Results showed that population diversity was higher in the USA than in Italy and France. The same bacterial genotype was detected from 5 countries and 3 continents, a geographic distribution that can be explained by a human-aided migration of the pathogen. All data obtained supported the hypothesis that the pathogen originates from the USA and has subsequently been disseminated to Europe. In addition, it seemed more likely that *X. arboricola* pv. *pruni* was introduced to France via Italy.

Source: Boudon S, Manceau C, Nottéghem JL (2006) Structure and origin of *Xanthomonas arboricola* pv. *pruni* causing bacterial spot of stone fruit trees in western Europe. *Phytopathology* **95**(9), 1081-1088.

Additional key words: genetics **Computer codes:** XANTPR

2006/236 First report of *Eggplant mottled dwarf virus* in Slovenia

The NPPO of Slovenia informed the EPPO Secretariat that *Eggplant mottled dwarf virus* (*Nucleorhabdovirus* - EMDV) was found for the first time in 2003. EMDV was detected on tomato plants (*Lycopersicon esculentum* cv. Belle) showing unusual symptoms of chlorotic spots and wrinkles on Fruit, narrow and necrotic leaves. In June 2004, EMDV was also detected in potato crops (*Solanum tuberosum* cvs. Bistra, Désirée, Discovery, KIS94-1/5-14, Pšata). Infected plants showed severe dwarfing, leaf curling, reduced leaf size, small tubers produced in low numbers. Brown spots were clearly visible in cross sections of tubers. All infected plants were destroyed to prevent any further spread of the virus. In 2005, no further findings were made, and the NPPO of Slovenia now considers that EMDV is no longer present on its territory.

EPPO note: EMDV was first described in Italy on aubergine (*S. melongena*) in 1969 and occurs in many countries around the Mediterranean Basin. It has been recorded on vegetable crops, ornamental plants (*Hibiscus rosa-sinensis, Lonicera, Pittosporum*) and weeds (*Solanum nigrum*). On vegetable crops, EMDV has mainly been found on Solanaceae such as: *Capsicum annuum*

(pepper), *Nicotiana tabacum* (tobacco), *Lycopersicon esculentum* (tomato), *Solanum melongena* (aubergine), *Solanum tuberosum* (potato); and on Curcurbitaceae such as: *Cucumis sativus* (cucumber) and *Cucumis melo* (melon). The economic impact of EMDV is considered to be minor because the incidence of field infection is usually very low. In vegetatively propagated crops, EMDV can be disseminated through infected propagating material. In the field, the distribution pattern of infected plants suggests transmission by aerial vectors of low efficiency. So far, one leafhopper species *Agallia vorobjevi* (Homoptera: Cicadellidae) has been shown to transmit the virus.

The currently known distribution of EMDV is the following:

EPPO region: Algeria, Bulgaria, Croatia, Greece, Israel, Italy, Jordan, Morocco, Portugal, Spain (Islas Canarias, and found in 2005 on the mainland), Tunisia, Turkey.

Africa: Algeria, Libya, Morocco, Tunisia.

Asia: Afghanistan, Israel, Iran, Jordan, Turkey.

Source: NPPO of Slovenia, 2006-05.

Mavrič I, Tušek Žnidarič M, Virščck Marn M, Dolničar P, Mehle N, Lesemann DE, Ravnikar M (2006) First report of *Eggplant mottled dwarf virus* in potato and tomato in Slovenia. *New Disease Reports*. http://www.bspp.org.uk/ndr/july2006/2006-09.asp

Other useful references:

Aramburu J, Galipienso L, Tornos T, Matas M (2006) First report of *Eggplant mottled dwarf virus* in mainland Spain. *New Disease Reports*. http://www.bspp.org.uk/ndr/jan2006/2006-03.asp

Babaie GH, Izadpanah K (2003) Vector transmission of eggplant mottle dwarf virus in Iran. *Journal of Phytopathology* **151**, 679-682.

Chatzivassiliou EK, Efthimiou K, Drossos E, Papadopoulou A, Poimenidis G, Katis NI, (2004) A survey of tobacco viruses in tobacco crops and native flora in Greece. *European Journal of Plant Pathology* **110**, 1011-1023.

Cherif C, Martelli GP (1985) Outbreaks and new records. Tunisia. Mottled dwarf of eggplant. *FAO Plant Protection Bulletin* **33**(4), 166-167.

Ciuffo M, Roggero P, Masenga V, Stravato VM (1999) Natural infection of muskmelon by eggplant mottled dwarf rhabdovirus in Italy. *Plant Disease* **83**(1), p 78.

Katis NI, Chatzivassiliou EK, Clay C, Avgelis I, Manoussopoulos I, Lecoq H (2000) Occurrence of eggplant mottled dwarf nucleorhabdovirus (EMDV) in tobacco and cucumber crops in Greece. *Phytopatologia Mediterranea* **39**(2), p 319

Kostova D, Masenga V, Milne RG, Lisa V (2001) First report of *Eggplant mottled dwarf virus* in cucumber and pepper in Bulgaria. *New Disease Reports*. http://www.bspp.org.uk/ndr/jul2001/2001-30.asp

Martelli GP, Cherif C (1987) Eggplant mottle dwarf virus associated with vein yellowing of honeysuckle. *Journal of Phytopathology* **119**(1), 32-41.

Martelli GP, Hamadi A (1986) Occurrence of eggplant mottle dwarf virus in Algeria. *Plant Pathology* **35**(4), 595-597.

Additional key words: new record **Computer codes:** EMDV00, SI

2006/237 Potato diseases in the Andes

In the Andes, it is considered that the status of fungal and bacterial diseases has not changed much during the last 10 to 15 years but that the situation of viruses has been substantially modified. The following points can be noted:

Phytophthora infestans: outbreaks of mating type A2 of potato late blight have been observed in Bolivia. In the Andes, A2 mating type is reported only in Bolivia (in South America, it is also reported in non-Andean countries such as Brazil and Argentina). It is considered that the emergence of the A2 mating type is the result of seed movements from the Northern hemisphere.

Ralstonia solanacearum (EPPO A2 list): bacterial wilt was the most important bacterial disease spreading in the Andes during the last 10 years. Biovars 1, 2A and 2T occur throughout Peru; only biovars 1 and 2A were found in Bolivia.

Streptomyces scabies: a high incidence of common scab was observed in some localities in Bolivia (incidence of 30 to 40%, with up to 20% yield losses).

PVY^{NTN}: isolates of *Potato virus Y* (*Potyvirus*) causing tuber necrosis have been found in some countries, including Peru. Studies suggest that these isolates have always been present in the Andes and were probably spread with other potato viruses when the crop was introduced into Europe during the XVI century.

Two new uncharacterized potato viruses: SB26/29 and SB41
SB26/29 can cause severe symptoms such as mosaic, foliage deformation, dwarfing and severe growth reduction. Yield reductions varying from 30% to 80% according to the potato cultivar have been observed. This virus is spreading in Peru, and has been shown to be transmitted by a psyllid vector (*Russelliana solanicola*, Homoptera: Psyllidae). Isometric viral particles have been observed, but so far the virus could not be purified.
SB41 can cause severe mosaic on potato. In experiments, it could be transmitted only by grafting and could also infect tomato (severe mosaic and deformation).

Potato yellowing virus (tentative *Alfamovirus*): it is commonly observed in the Andes, causing systemic yellowing of the foliage. It is transmitted in a semi-persistent manner by aphids and potato true seeds (on which it can cause a necrosis).

Pepino mosaic virus (*Potexvirus*, PepMV – EPPO Alert List): PepMV has been found in some potato germplasm accessions growing in the field. So far, PepMV had only been reported from pepino (*Solanum muricatum*) and tomato (*Lycopersicon esculentum*) along the coast in Peru. Due to difficulties in isolating PepMV, the potato isolates could not be characterized.

Papaya mosaic virus (*Potexvirus,* PapMV): this virus was also found in some potato germplasm accessions. This was not found surprising because PapMV occurs in *Ullucus tuberosus* which is a tuber crop widely grown in the Andes in the vicinity of potatoes.

Potato yellow vein virus (tentative *Crinivirus*, PYVV): PYVV has spread during the last 7 to 10 years from Colombia and Ecuador to Venezuela and Peru, respectively. It is transmitted by *Trialeurodes vaporariorum* and can persist in symptomless perennial weeds (mainly Polygonaceae).

Potato mop-top virus (*Pomovirus*): symptoms associated with this virus (crinkle mosaic and yellow aucuba patterns) have increased among the native Andean potato cultivars from Venezuela to Bolivia.

Finally, it is noted that both *Potato yellow dwarf virus* (*Nucleorhabdovirus*) and *Potato aucuba mosaic virus* (*Potexvirus*) have practically disappeared from the Andean potato crops.

Source: Salazar LF (2006) Emerging and re-emerging potato diseases in the Andes. *Potato Research* **49**(1), 43-47.

Additional key words: detailed records

Computer codes: PAMV00, PAPMV0, PEPMV0, PHYTFR, PMTV00, PSDMSO, PVY000, PYV000, PYVV00, PYYDV00, STRESC

2006/238 EPPO report on notifications of non-compliance

The EPPO Secretariat has gathered the notifications of non-compliance for 2006 received via Europhyt since the previous report (EPPO RS 2006/169) from the following EU countries: Austria, Belgium, Cyprus, the Czech Republic, Estonia, France, Finland, Germany, Greece, Hungary, Ireland, Lithuania, the Netherlands, Poland, Portugal, Slovenia, Slovakia, Sweden, the United Kingdom. When a consignment has been re-exported and the country of origin is unknown, the re-exporting country is indicated in brackets. When the occurrence of a pest in a given country is not known to the EPPO Secretariat, this is indicated by an asterisk (*).

The EPPO Secretariat has selected notifications of non-compliance made because of the detection of pests. Other notifications of non-compliance due to prohibited commodities, missing or invalid certificates are not indicated. It must be pointed out that the report is only partial, as many EPPO countries have not yet sent their notifications.

EPPO *Reporting Service*

Pest	Consignment	Type of commodity	Country of origin	C. of destination	nb
Aleurocanthus woglumi	*Annona reticulata*	Fruit	India	United Kingdom	1
Bemisia afer	*Laurus nobilis*	Plants for planting	Netherlands	United Kingdom	1
Bemisia tabaci	*Ajuga*	Cuttings	Netherlands	United Kingdom	5
	Ajuga reptans	Cuttings	Israel	United Kingdom	1
	Ajuga reptans	Cuttings	Netherlands	United Kingdom	7
	Ajuga, Salvia	Plants for planting	Netherlands	United Kingdom	1
	Anethum graveolens, Ocimum basilicum	Vegetables	Israel	Ireland	1
	Aster	Cut flowers	Israel	Netherlands	1
	Brachychiton	Plants for planting	Israel	Netherlands	1
	Colocasia	Vegetables	India	United Kingdom	2
	Colocasia esculenta	Leaves	India	United Kingdom	1
	Corchorus olitorius, Ipomoea batatas	Vegetables	Gambia	United Kingdom	1
	Corchorus olitorius, Manihot esculenta	Vegetables	Ghana	United Kingdom	2
	Corchorus olitorius, Manihot esculenta	Vegetables	Sierra Leone	United Kingdom	1
	Dipladenia	Plants for planting	Netherlands	United Kingdom	1
	Eruca	Leaves	Israel	United Kingdom	1
	Euphorbia pulcherrima	Plants for planting	(Denmark)	Finland	4
	Euphorbia pulcherrima	Plants for planting	(Germany)	Finland	1
	Euphorbia pulcherrima	Plants for planting	(Netherlands)	Finland	7
	Euphorbia pulcherrima	Plants for planting	Belgium	United Kingdom	1
	Euphorbia pulcherrima	Cuttings	Brazil	Sweden	1
	Euphorbia pulcherrima	Cuttings	Ethiopia	Sweden	3
	Euphorbia pulcherrima	Cuttings	Italy	Sweden	2
	Euphorbia pulcherrima	Cuttings	Italy	Sweden	1
	Euphorbia pulcherrima	Cuttings	Kenya	Finland	10
	Euphorbia pulcherrima	Cuttings	Kenya	Netherlands	1
	Euphorbia pulcherrima	Cuttings	Kenya	Sweden	10
	Euphorbia pulcherrima	Plants for planting	Kenya	United Kingdom	1
	Euphorbia pulcherrima	Cuttings	Mexico	Sweden	1
	Euphorbia pulcherrima	Cuttings	Netherlands	United Kingdom	3
	Euphorbia pulcherrima	Plants for planting	Netherlands	United Kingdom	2
	Euphorbia pulcherrima	Cuttings	Portugal	Sweden	2
	Euphorbia pulcherrima	Cuttings	Uganda	Sweden	3
	Eustoma	Cut flowers	Israel	Belgium	1
	Eustoma	Cut flowers	Israel	Netherlands	1
	Ficus carica	Plants for planting	Israel	Netherlands	1
Bemisia tabaci	*Globba*	Plants for planting	Israel	Netherlands	1
	Gypsophila	Cut flowers	Israel	United Kingdom	1
	Hibiscus	Plants for planting	Italy	Netherlands	1
	Hibiscus	Plants for planting	Netherlands	United Kingdom	2
	Hibiscus sabdariffa	Cut flowers	Ghana	United Kingdom	1
	Hygrophila	Aquarium plants	Singapore	United Kingdom	1
	Hypericum	Cut flowers	Kenya	Germany	1
	Ipomoea batatas	Leaves	Gambia	United Kingdom	1
	Ipomoea batatas	Leaves	Ghana	United Kingdom	1
	Ipomoea batatas	Leaves	Nigeria	United Kingdom	1
	Ipomoea batatas	Leaves	Sierra Leone	United Kingdom	1
	Malva	Cuttings	Israel	Netherlands	1
	Manihot esculenta	Fruit	Sierra Leone	United Kingdom	1

Pest	Consignment	Type of commodity	Country of origin	C. of destination	nb
B.a tabaci (cont.)	*Mentha*	Leaves	Ghana	United Kingdom	2
	Mentha spicata	Cuttings	Israel	United Kingdom	1
	Corchorus olitorius	Leaves	Cyprus	United Kingdom	1
	Corchorus olitorius	Leaves	Cyprus	United Kingdom	1
	Nerium oleander	Plants for planting	Netherlands	United Kingdom	1
	Ocimum	Vegetables	Thailand	France	1
	Ocimum	Vegetables	Thailand	Netherlands	1
	Ocimum basilicum	Vegetables	Israel	Belgium	1
	Ocimum basilicum	Vegetables	Israel	Ireland	5
	Ocimum basilicum	Vegetables	Israel	Netherlands	5
	Ocimum basilicum	Vegetables	Israel	United Kingdom	5
	Ocimum basilicum	Vegetables	Thailand	France	2
	Ocimum basilicum	Vegetables	Thailand	United Kingdom	1
	Origanum vulgare	Cuttings	Israel	United Kingdom	2
	Rosa	Cut flowers	Israel	Netherlands	2
	Scutellaria	Plants for planting	(Netherlands)	Finland	1
	Solidago	Cut flowers	Israel	France	1
	Solidago	Cut flowers	Israel	Netherlands	8
	Solidago	Cut flowers	Israel	United Kingdom	2
	Solidago	Cut flowers	Zimbabwe	Netherlands	1
	Trachelium	Cut flowers	Israel	Belgium	1
	Trachelium	Cut flowers	Israel	France	1
	Trachelium	Cut flowers	Israel	Netherlands	3
	Unspecified	Fruit	Nigeria	Ireland	1
	Veronica spicata	Plants for planting	Netherlands	United Kingdom	1
Chrysanthemum stunt viroid	*Chrysanthemum*	Plants for planting	Netherlands	United Kingdom	1
Cryptophlebia leucotreta	*Citrus sinensis*	Fruit	South Africa	Spain	1
Diaphania indica	*Momordica*	Vegetables	Dominican Rep.	Germany	1
	Momordica	Vegetables	India	Germany	1
	Momordica	Vegetables	India	United Kingdom	1
	Momordica charantia	Vegetables	India	United Kingdom	1
	Momordica charantia	Vegetables	Kenya	United Kingdom	1
	Momordica charantia	Vegetables	Pakistan	United Kingdom	1
Dolichotetranychus floridanus	*Ananas comosus*	Fruit	South Africa	Greece	1
Globodera rostochiensis	*Solanum tuberosum*	Ware potatoes	Italy	Ireland	4
Guignardia citricarpa	*Citrus*	Fruit	Brazil	Netherlands	3
	Citrus limon	Fruit	South Africa	Netherlands	1
	Citrus reticulata	Fruit	Brazil	Portugal	1
	Citrus reticulata	Fruit	Brazil	United Kingdom	4
	Citrus sinensis	Fruit	Brazil	Netherlands	25
	Citrus sinensis	Fruit	Brazil	United Kingdom	2
	Citrus sinensis	Fruit	South Africa	Netherlands	7
	Citrus sinensis, Psidium guajava	Fruit	Thailand	France	1
Helicoverpa armigera	*Dianthus*	Cut flowers	Israel	Netherlands	2
	Eryngium	Cut flowers	Kenya	Netherlands	1

Pest	Consignment	Type of commodity	Country of origin	C. of destination	nb
H. armigera (cont.)	*Eryngium*	Cut flowers	Zimbabwe	Netherlands	1
	Phaseolus vulgaris	Vegetables	Senegal	Netherlands	2
	Pisum sativum	Vegetables	Kenya	Netherlands	1
	Pisum sativum	Vegetables	Zimbabwe	Netherlands	2
	Rosa	Cut flowers	Burundi	Netherlands	1
	Rosa	Cut flowers	Kenya	Netherlands	1
	Rosa	Cut flowers	Tanzania	Netherlands	1
	Rosa	Cut flowers	Zimbabwe	Netherlands	2
	Solanum melongena	Vegetables	Kenya	United Kingdom	1
	Solanum melongena	Vegetables	Thailand	Netherlands	1
	Solidago	Cut flowers	Egypt	Netherlands	1
	Solidago	Cut flowers	Israel	Netherlands	1
Hirschmanniella	*Unspecified*	Aquarium plants	Malaysia	Belgium	2
	Unspecified	Aquarium plants	Singapore	Belgium	2
	Unspecified	Aquarium plants	Singapore	Poland	1
	Unspecified	Aquarium plants	Thailand	Belgium	2
Insecta	*Ocimum basilicum*	Vegetables	Thailand	France	1
	Phoenix roebelenii	Plants for planting	Costa Rica	Netherlands	1
Leucinodes orbonalis	*Solanum melongena*	Vegetables	Ghana	Germany	3
	Solanum melongena	Vegetables	Thailand	Czechia	1
	Solanum melongena	Vegetables	Vietnam	Germany	1
Liriomyza	*Gypsophila*	Cut flowers	Israel	France	3
	Gypsophila	Cut flowers	Israel	Germany	2
	Gypsophila	Cut flowers	Israel	Netherlands	3
	Ocimum basilicum	Vegetables	Colombia	United Kingdom	1
	Ocimum basilicum	Vegetables	Israel	Ireland	1
	Ocimum basilicum	Vegetables	Thailand	France	1
	Ocimum basilicum	Vegetables	Thailand	Sweden	1
Liriomyza huidobrensis	*Eryngium*	Cut flowers	Zimbabwe*	Netherlands	1
	Gypsophila	Cut flowers	Israel	Netherlands	1
	Gypsophila	Cut flowers	Netherlands	United Kingdom	1
	Gypsophila paniculata	Cut flowers	Kenya*	Netherlands	2
	Molucella	Cut flowers	Israel	Ireland	1
	Unspecified	Leaves	Netherlands	United Kingdom	1
Liriomyza sativae	*Gypsophila*	Cut flowers	Israel	Netherlands	1
	Ocimum	Vegetables	(Thailand)	Sweden	1
	Ocimum	Vegetables	Thailand	Belgium	1
	Ocimum americanum	Vegetables	Thailand	Netherlands	1
	Ocimum basilicum	Vegetables	Israel	Czechia	1
	Ocimum basilicum	Vegetables	Thailand	France	2
	Ocimum basilicum	Vegetables	Thailand	Netherlands	1
Liriomyza trifolii	*Eustoma*	Cut flowers	Israel	Netherlands	2
	Gypsophila	Cut flowers	Ethiopia	Netherlands	3
	Gypsophila	Cut flowers	Israel	Netherlands	8
	Gypsophila	Cut flowers	Israel	United Kingdom	1
	Ocimum basilicum	Vegetables	Israel	Netherlands	1
	Solidago	Cut flowers	Israel	Netherlands	1

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Pest	Consignment	Type of commodity	Country of origin	C. of destination	nb
Noctuidae	*Ocimum americanum*	Vegetables	Thailand	Netherlands	1
Opogona sacchari	*Coffea arabica*	Plants for planting	Netherlands	Germany	1
	Pachira aquatica	Plants for planting	Netherlands	France	3
	Ravenea	Plants for planting	Netherlands	Germany	1
	Sanseviera	Plants for planting	Netherlands	Germany	1
Parlatoria	*Unspecified*	Aquarium plants	Singapore	Germany	1
Pepino mosaic virus	*Lycopersicon esculentum*	Vegetables	Netherlands	United Kingdom	7
	Lycopersicon esculentum	Vegetables	Poland	United Kingdom	1
Phytophthora ramorum	*Rhododendron*	Plants for planting	(Denmark)	Finland	1
	Rhododendron	Plants for planting	Germany	Slovenia	1
	Rhododendron catawbiense	Plants for planting	Germany	Sweden	1
	Viburnum tinus	Plants for planting	Netherlands	United Kingdom	1
Puccinia hemerocallidis	*Hemerocallis*	Plants for planting	USA	United Kingdom	1
Puccinia horiana	*Chrysanthemum*	Cut flowers	(Netherlands)	Finland	1
	Chrysanthemum	Cut flowers	Poland	Lithuania	1
Rhynchophorus ferrugineus	*Phoenix dactylifera*	Plants for planting	Egypt	Cyprus	1
Spodoptera	*Rosa*	Cut flowers	Burundi	Netherlands	1
Spodoptera littoralis	*Ocimum*	Vegetables	Spain (Canary Isl.)	United Kingdom	1
	Ornamentals	Cut flowers	India	United Kingdom	1
	Rosa	Cut flowers	Israel	Netherlands	2
	Rosa	Cut flowers	Uganda	Netherlands	1
Spodoptera litura	*Colocasia esculenta*	Leaves	India	United Kingdom	1
Thripidae	*Dendrobium*	Cut flowers	Thailand	Belgium	1
	Momordica charantia	Vegetables	Dominican Rep.	United Kingdom	1
	Ocimum	Vegetables	Thailand	Netherlands	1
	Solanum melongena	Vegetables	Ghana	United Kingdom	7
Thrips	*Eugenia*	Fruit	Thailand	France	1
	Momordica	Vegetables	India	Germany	1
Thrips palmi	*Aranthera*	Cut flowers	Malaysia	Netherlands	1
	Dendrobium	Cut flowers	Malaysia	France	1
	Dendrobium	Cut flowers	Thailand	Belgium	2
	Dendrobium	Cut flowers	Thailand	France	1
	Dendrobium	Cut flowers	Thailand	Netherlands	1
	Momordica	Vegetables	Dominican Rep.	Germany	1
	Momordica	Vegetables	Dominican Rep.	Netherlands	1
	Momordica balsamina	Vegetables	Dominican Rep.	Netherlands	1
	Momordica charantia	Vegetables	Dominican Rep.	United Kingdom	1
	Momordica charantia	Vegetables	Thailand	France	1
	Ocimum basilicum	Vegetables	Thailand	Belgium	1
	Ocimum basilicum	Vegetables	Thailand	France	1
	Orchidaceae	Cut flowers	Thailand	Austria	1

Pest	Consignment	Type of commodity	Country of origin	C. of destination	nb
T. palmi (cont.)	*Orchidaceae*	Cut flowers	Thailand	Belgium	1
	Orchidaceae	Cut flowers	Thailand	Hungary	1
	Orchidaceae	Cut flowers	Thailand	Slovakia	1
	Solanum melongena	Vegetables	Ghana*	United Kingdom	6
Thysanoptera	*Solanum aculeatissimum*	Vegetables	Thailand	United Kingdom	1
Tilletia indica	*Triticum aestivum*	Stored products	India	United Kingdom	1
Trialeurodes vaporariorum	*Solidago*	Cut flowers	Zimbabwe	Netherlands	1
Xanthomonas	*Citrus*	Fruit	Bangladesh	United Kingdom	1
	Euphorbia pulcherrima	Cuttings	Netherlands	United Kingdom	1

- **Fruit flies**

Pest	Consignment	Country of origin	C. of destination	nb
Bactrocera	*Mangifera indica*	Gambia	United Kingdom	1
	Mangifera indica	Pakistan	United Kingdom	1
	Mangifera indica	Senegal	United Kingdom	2
Bactrocera cucurbitae	*Coccinia grandis*	India	United Kingdom	1
	Momordica	India	United Kingdom	1
Bactrocera dorsalis	*Mangifera indica*	Pakistan	United Kingdom	3
Bactrocera zonata	*Mangifera indica*	Pakistan	United Kingdom	12
Dacus	*Citrullus lanatus*	Ghana	United Kingdom	3
	Lagenaria siceraria	Ghana	United Kingdom	1
	Lagenaria siceraria, Citrullus lanatus	Ghana	United Kingdom	1
Dacus ciliatus	*Citrullus lanatus*	Ghana	United Kingdom	3
Non-European Tephritidae	*Citrullus lanatus*	Ghana	United Kingdom	3
	Lagenaria siceraria, Citrullus lanatus	Ghana	United Kingdom	1
	Mangifera indica	Dominican Rep.	United Kingdom	7
	Mangifera indica	Pakistan	United Kingdom	2
	Momordica	Thailand	Netherlands	1
	Psidium guajava	Thailand	Netherlands	1
	Solanum melongena	Ghana	United Kingdom	1

- **Wood**

Pest	Consignment	Type of commodity	Country of origin	C. of destination	nb
Bursaphelenchus	Unspecified	Packing wood	Bulgaria	Germany	1
Bursaphelenchus xylophilus	Unspecified	Packing wood	(USA)	Sweden	1
	Unspecified	Packing wood	Canada	Estonia	1
Cerambycidae	*Pinus*	Wood and bark	Russia	Germany	2
Criocephalus rusticus	*Pinus*	Wood and bark	Russia	Germany	2
Ips	*Pinus sylvestris*	Wood and bark	Bulgaria	Greece	1
Monochamus	*Larix sibirica*	Wood and bark	Russia	Czechia	3
Scolytidae	*Picea*	Dunnage	Russia	Cyprus	1
	Populus	Wood and bark	Bulgaria	Cyprus	1
	Unspecified	Packing wood	Turkey	Greece	1
Sinoxylon	Unspecified	Packing wood	Côte d'Ivoire	Poland	1
	Unspecified	Packing wood	India	Austria	1
	Unspecified	Packing wood	India	Poland	8
	Unspecified	Packing wood	India	Austria	1
	Unspecified	Packing wood	Korea Rep.	Austria	1
Sinoxylon anale	Unspecified	Packing wood	India	Germany	1

- **Bonsais**

Pest	Consignment	Country of origin	Destination	nb
Anoplophora chinensis	*Acer buergerianum*	China	United Kingdom	1
	Acer palmatum	(Netherlands)	United Kingdom	1
Oligonychus perditus	*Juniperus chinensis, Juniperus rigida*	Japan	Netherlands	1
Rhizoecus hibisci	*Serissa*	China	Netherlands	1
Xiphinema americanum	*Ficus*	China	Netherlands	1

Source: EPPO Secretariat, 2006-11.

2006/239 Plant dispersal: the role of man

Human activity is an increasing important mechanism of plant dispersal, particularly in densely populated countries such as the United Kingdom. This study investigated which species are commonly dispersed by the following vectors: soil carried on motor vehicles, topsoil, sugar factory topsoil, horticultural stock and garden throw-outs. Ecological traits of the species associated with each vector have been compared with those of a representative sample of the regional flora. Traits examined were: life history, canopy height, lateral spread, flowering start, flowering period, seed persistence in the soil, vegetative reproduction, wind dispersal, log seed weight and specific leaf area.

Two major anthropogenic dispersal pathways were identified, each associated with a clearly defined group of species. Species associated with topsoil, cars and horticulture depend essentially on soil movement, and are often small and fast growing, but their most unifying characteristic is the production of numerous, small, persistent seeds. In contrast, garden throw-outs, which are themselves functionally similar to garden escapees, tend to be tall, spreading perennials with transient seed banks, attributes which are almost the exact opposite of the soil-borne group. These two groups are significantly different from the regional flora in many key respects.

Some recent studies of the British flora have failed to find any dispersal-related differences between those species with increasing or decreasing ranges, or between natives and invasive aliens. Others have found contradictory attributes of aliens: they were more likely to have bigger seeds than native, but also more likely to have a persistent seed bank. These findings are consistent with the suggestion that there exist two contrasting groups of successful alien invaders: tall, spreading competitors and small, short-lived, fast-growing species with high reproductive outputs. The parallel with the two groups of species identified here is remarkable, and is further evidence of the probable importance of anthropogenic dispersal in the modern landscape.

Source: Hodkinson DJ, Thompson K (1997) Plant dispersal: the role of man. *Journal of applied ecology* **34**, 1484-1496

Additional key words: invasive alien plants

2006/240 Climate change and the potential distribution of an invasive alien plant: *Acacia nilotica* in Australia

Acacia nilotica (Fabaceae) is a spinescent woody legume that has become highly invasive in several parts of the world, including Australia where it has been declared a weed of national significance. Understanding the likely potential distribution of this plant under current and future climate scenarios will enable policy makers and land managers to prepare appropriate strategies to manage the invasions.
CLIMEX software was used to identify areas at risk of further invasion in Australia so that appropriate measures could be undertaken in time. A potential distribution of *A. nilotica* in Australia under current climatic conditions was produced by the model. The latter was vast and far greater than the current distribution. Global climate change is likely to increase significantly the area at risk of invasion in Australia. The factors of most importance are the expected increases in water-use efficiency of *A. nilotica* due to increased atmospheric CO_2 concentrations, allowing it to invade more xeric sites further inland, and increased temperatures, allowing it to complete its reproductive life cycle further towards the south. Simple quarantine procedures, such as installing paddocks, may provide a means of limiting the range of *A. nilotica.* The projected increased growth potential of *A. nilotica* throughout its current range suggests that if future management patterns result in seed pods lying unconsumed on the ground, additional vigilance may be required to identify and eradicate new invasion foci arising from flood dispersal. The increased growth potential may also result in a change of the economic balance, in favour of harvesting *A. nilotica* for agroforestery or bioenergy projects. Moreover, raising public awareness and identifying suitable control techniques are also crucial components in containing the invasion.

Source: Kriticos DJ, Sutherst RW, Brown JR, Adkins SW, Maywald GF (2003) Climate change and the potential distribution of an invasive alien plant: *Acacia nilotica* in Australia. *Journal of Applied Ecology* **40**, 111-124

Additional key words: invasive alien plants, research, climatic prediction

Computer codes: ACANL, AU

2006/241 What are artificial neural networks?

An artificial neural network (ANN) is an information-processing model inspired by the way the densely interconnected structure of the mammalian brain processes information. Although ANNs have been elaborated since the late 1950s, it was not until the mid-1980s that algorithms became sophisticated enough for general applications. Today ANNs are being applied to an increasing number of real world problems of considerable complexity. They are often good at solving problems that are too complex for conventional technologies (e.g. problems that do not have an algorithmic solution or for which an algorithmic solution is too complex to be found) and are often well suited to problems that people are good at solving but which traditional methods are not.

Source: Sovan Lek's homepage: http://st24-cesac.ups-tlse.fr/slek/

2006/242 The use of artificial neural network in biological invasions: modelling global insect pest species assemblages to determine risk of invasion

Species assemblages are groupings of species that co-occur in the same place and at the same time. Pest species assemblages are non-random species groupings that contain hidden predictive information that can be analysed using ecological community analysis techniques. Currently, there is no objective scientific approach for prioritizing and identifying species that should be subject to more detailed risk assessments. In this study, information available on the geographical distribution of a wide range of insect pest species was meant to assist the identification and prioritization of species that have the potential to pose an invasive threat in regions where they are not normally found. Data comprising the presence and absence of 844 insect pest species recorded over 459 geographical regions world-wide were analysed using self-organizing map (SOM), a well known artificial neural network algorithm.
The SOM analysis allowed each species to be ranked in term of its risk of invasion in each area based on the strength of its association with the assemblage that was characteristic for each geographical region. A risk map for several example species was produced to illustrate how such a map can be compared with the species' actual distribution and used with other information, such as the species' biotic characteristics and interactions with the abiotic environment, to improve pest risk assessment further. For example, in 2002, the melon thrip *Thrips palmi* (EPPO A1 List) attracted attention as a possible invasive species to New Zealand and significant resources were invested in assessing the risk of establishment. However, in the analysis recorded here this species is not strongly associated with the New Zealand assemblage and to date, it has not established in New Zealand. Furthermore, the analysis predicted New Zealand's most recent invasive insect pest *Chrysomphalus aonidum*. Such an analysis can then be used to support additional risk assessment of potential invasive

species, giving invasive species researchers, conservation managers, quarantine and biosecurity scientists a mean for prioritizing species as candidates for further research.

Source: Worner SP, Gevrey M (2006) Modelling global insect pest species assemblages to determine risk of invasion. *Journal of Applied Ecology* **43**, 858-867.

2006/243 *Eichhornia crassipes* in the EPPO region

Eichhornia crassipes (Pontederiaceae) is an aquatic plant originating from South America. It is extensively traded for ornamental and aquarium purposes. It is naturalized and often found to be invasive in tropical and subtropical regions. Its common name is "water hyacinth" in English and "Jacinthe d'eau" in French. In the EPPO region, it is already invasive in Spain and Portugal. Because its distribution is still very limited, this plant can be considered a new emerging invader in Europe.

Geographical distribution
EPPO region: Israel, Portugal, Russia, Spain

Note: In the Paúl do Boquilobo Biosphere Reserve in Central Portugal, it forms dense floating mats over extensive areas of wetlands and is considered the most obvious threat to the ecosystem. The plant is also recorded as invasive in Spain in Caceres, Taragon, Castillon and Alicante.

Africa: Burkina Faso, Burundi, Cameroon, Congo, Côte d'Ivoire, Egypt, Equatorial Guinea, Ethiopia, Gabon, Ghana, Guinea, Guinea-Bissau, Kenya, Liberia, Madagascar, Malawi, Mauritius, Mozambique, Nigeria, Reunion, Rwanda, Senegal, Sierra Leone, South Africa, Sudan, Swaziland, Tanzania, Togo, Uganda, Zambia, Zimbabwe.

Asia: Bangladesh, Cambodia, China, Brunei Darussalam, India, Indonesia, Lebanon, Japan, Jordan, Laos, Malaysia, Maldives, Myanmar, Philippines, Singapore, Sri Lanka, Syria, Taiwan, Thailand, Viet Nam.

Caribbean: Bahamas, Cuba, Dominican Republic, Haiti, Jamaica

Central America: Nicaragua, Panama.

North America: Mexico, USA.

Oceania: American Samoa, Australia, Cook Islands, Fiji, French Polynesia, Guam, Marshall Islands, Federated States of Micronesia, Nauru, New Caledonia, New Zealand, Northern

Mariana Islands, Palau, Papua New Guinea, Samoa, Solomon Islands, United States minor outlying islands, Vanuatu.

South America: Brazil, Chile, Colombia, Costa Rica, Ecuador, Guatemala, Honduras, Peru, Puerto Rico, Venezuela.

Morphology

E. crassipes is a free-floating aquatic macrophyte growing generally to 0.5 m in height, forming dense floating mats. Leaves are ovate to circular, 10-20 cm in diameter, thick and rise above the water surface. The stalk is erect to 50 cm long and carries at the top a single spike of 8-15 purplish blue or lavender to pinkish flowers.

Biology and Ecology

It is considered one of the most serious weeds in many tropical, warm and temperate freshwater habitats worldwide. It has the highest growth rate of any saltwater, freshwater or terrestrial plant. It reproduces both vegetatively and sexually, although vegetative reproduction is more important. Stolon buds are distributed by water currents, winds and boat traffic.

Habitats

E. crassipes grows in shallow temporary ponds, wetlands and marshes, sluggish flowing waters, lakes, reservoirs and rivers.

Environmental requirements

E. crassipes exists in Europe, but does not flourish in some countries as a result of the climatic conditions. It can tolerate extremes of water level fluctuations and seasonal variations in flow velocity, as well as extreme variations in nutrient availability, pH, temperature and toxic substances. This plant is susceptible to frost and salinity can limit or modify its distribution.

Impacts

E. crassipes is one of the world's worst weeds. It forms thick mats that cover rice paddies, clog irrigation channels, impede navigation, halt fishing, favour the destruction of buildings during floods and the development of disease-transmitting mosquitoes.

Control

Control strategies must address both watershed management and direct weed control.
Small infestations can be controlled by pulling and harvesting machines may also be utilised.

Regulatory status in Europe

In Scotland (UK), the Scottish Wildlife and Countryside Act prohibits the release of *E. crassipes* into the wild. In Portugal, trade, transport and possession of the plant are prohibited according to the Decreto Lei 565/99.

Source:

University of Coimbra (PT) – Decreto Lei 565/99
http://www.uc.pt/invasoras/resultados/fichas/especies_perfis.htm

The Wildlife and Countryside Act 1981 (Variation of Schedule) (Scotland) Order 2005
http://www.opsi.gov.uk/legislation/scotland/ssi2005/20050308.htm

United Nations Educational, Scientific and Cultural Organization – Biosphere Reserve Information
http://www2.unesco.org/mab/br/brdir/directory/biores.asp?mode=all&code=POR+01

Global Invasive Species Database
http://www.issg.org/database/species/distribution_detail.asp?si=70&di=36937&sts=sss

Additional key words: invasive alien plants, new record

Computer codes: EICCR, GB, ES, IL, PT, RU