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98/001 Present situation of *Diabrotica virgifera* in Central Europe

The situation of *Diabrotica virgifera* in Central Europe was reviewed during the joint meeting of the 2nd EPPO *ad hoc* Panel and 4th International IWGO Workshop which took place in Gödöllo (HU) on 1997-10-29/30. In short, the spread of *Diabrotica virgifera* (EPPO A2 quarantine pest) continues in Central Europe at a rather rapid pace, adults being trapped over a wider and wider area. However, except in the parts of Serbia where the pest was first found, no economic damage has yet been seen on maize. Because the adults can fly considerable distances, it is difficult to decide which parts of the 'potentially infested' areas where adults are trapped in fact contain breeding populations.
An FAO project has been set up to monitor the spread of *D. virgifera* by placing traps in several countries (including some permanent trapping points), and also to try to control and contain the pest by intense trapping and area-wide management (aerial treatments with SLAM® : bait + insecticide (carbaryl).

Bosnia-Herzegovina
A survey on *D. virgifera* was initiated in July 1997 using pheromone traps in the cantons of Tuzla-Posavina and Zenica-Doboj which are situated in the region near the borders of Croatia and Serbia (Yugoslavia). *D. virgifera* was trapped in the region around Tuzla (but the situation towards the west where the pest is progressing, or toward the south, is not exactly known). This report confirms earlier records of *D. virgifera* in Bosnia-Herzegovina.

Croatia
D. virgifera was first found in the east part of Croatia in 1995 (EPPO RS 95/005). One adult was caught in a cucurbitacin trap, but now it is considered that the pest was probably already present on an area extending about 30 km from the Yugoslav border and situated to the south of the river Bosut. In 1996, the pest spread westwards (80 km from the Yugoslav border) and adults were trapped in approximately 6000 km² (EPPO RS 97/033). In 1997, many traps (both yellow sticky traps and pheromone traps) were placed in this area, along its border line and at the west of it. Approximately 3500 beetles were trapped from July to October 1997 (mainly in pheromone traps). The area where adults are trapped has now reached 9000 km² and the front line of the outbreak is situated 100 km from the Yugoslav border. Larval damage to maize roots was seen in an insecticide trial (root damage was rated at 5 on a scale from 1 to 9), but no yield reduction on maize was noted.

Hungary
D. virgifera was first found in Hungary in 1995 (EPPO RS 95/157) in the south of the country. As in previous years, the monitoring programme continued in 1997. The results showed that *D. virgifera* continues to spread towards the north (up to 100-120 km from the Yugoslav border). In 1996-1997, it is estimated that the pest has moved 40 km to the north. More than 4000 beetles were caught in pheromone traps. The pest is now present in the

following counties: Baranya (Villány-Boly), Bács-Kiskun (Kecskemét), Csongrád (Szeged, Csanádpalota, Maroslele-Makó) and Békes (Mezökovacsháza, Mezöhegyes, Battonya, Csnádapáca). The highest population numbers were found in Békes and Czongrád counties. Larvae were seen for the first time, slightly damaging maize roots near Szeged (Czongrád county), but without any impact on maize yield. In general, populations are more abundant in places where maize is grown as a monoculture. It is estimated that approximately 10 000 km² are now potentially infested by *D. virgifera* in Hungary, and it is expected that the pest will continue its progression towards the north of the country. In southern Hungary, aerial treatments on wide areas have been initiated using Slam®(a commercial product which contains a bait and carbaryl in a special formulation).

Romania

The first find of *D. virgifera* was made in 1996 (EPPO RS 96/165) in Nadlac (district of Arad – west of the country near Hungary) on yellow sticky traps. In 1997, a monitoring programme started in July with 240 pheromone traps located in the western part of the country (Arad, Timis, Caras-Severin, Bihor). In August, more traps (pheromone and yellow sticky traps) were placed in four other districts (Mehedinti, Alba, Hunedoara and Dolj). Approximately, 40000 adults have been trapped in Romania. *D. virgifera* was caught mostly in Arad, Timis and Caras-Severin districts. In August and September, adults started to be caught in Mehedinti district which is situated near Bulgaria. The present situation in Bulgaria is not known. In Romania, it is estimated that approximately 10000 km² are now potentially infested, but no root damage was seen. No insects were trapped in the other districts studied (Alba, Bihor, Dolj, and Hunedoara).

Yugoslavia

It must be recalled that *D. virgifera* was reported for the first time in Europe in Surcin, near Belgrade airport in 1992-1993 (EPPO RS 94/001 and 94/062). A monitoring programme was done in 1997 and showed that the pest continues to spread towards the south of Serbia, as it can now be found in places near Kragujevac. It is estimated that in Serbia the infested area was respectively: 0.5 ha in 1992, 6 ha in 1993, 60 ha in 1994, 275 ha in 1995, and 10 787 ha in 1996. It is felt that the total potentially infested area in 1997 has been multiplied by 2 compared to 1996. However, damage was only reported near Belgrade, Pozarevac and Vrsac (an area of 50 km from south to north and 130 km from west to east around Belgrade). Damage in 1997 was not as severe as in 1996, as with abundant rains in summer, maize plants were able to recover. The pest has not been found in Montenegro.

Slovenia

A monitoring programme has been in place in Slovenia since 1995 in the north-east and south-east of the country, which are two intensive maize-growing areas near Hungary and Croatia. So far, *D. virgifera* has **not** been found in Slovenia.

Surveys will continue in countries where the pest is present and in neighbouring countries. During the meeting, it was pointed out that pheromone traps are probably the best available tool to follow the progression of the pest, whereas yellow sticky traps are to be used in places where the pest has been present for a sufficient time to reach a certain population level. Many studies are being done on the efficacy on plant protection products applied as soil treatments against larvae or aerial treatments against the adults, and the establishment of control strategies. Finally, pest risk analysis studies on *D. virgifera* are being carried out, and as an oversimplification it may be suggested that wherever maize can be grown in Europe, the pest is likely to survive and develop.

Source: Abstracts of papers presented at the 2nd Meeting of the EPPO ad hoc Panel and 4th International IWGO Workshop on *Diabrotica virgifera virgifera* LeConte, Gödöllo¨(HU), 1997-10-28/30

Additional key words: detailed records **Computer codes:** DIABVI, BA, HR, HU, RO, SI, YU

98/002 *Tilletia indica* and *Diabrotica virgifera* are absent from the Netherlands

The Plant Protection Service of the Netherlands has recently informed the EPPO Secretariat that surveys have been carried out on *Tilletia indica* (EPPO A1 quarantine pest) and *Diabrotica virgifera* (EPPO A2 quarantine pest).
In 1997, a national survey was conducted on wheat diseases. In total, 125 fields were visually inspected for bunt and smut symptoms, including those caused by *T. indica*. No symptoms of Karnal bunt were found. It is concluded that *T. indica* is absent from the Netherlands. This survey will continue in summer 1998.

As soil attached to military vehicles returning from Bosnia-Herzegovina can be considered as a potential way of introducing *D. virgifera* into the Netherlands, a survey was carried out using 50 Hungarian pheromone traps, placed at 25 different sites, mainly near airports and in maize-growing areas. From the end of June until the beginning of September 1997, these traps were inspected every two weeks. No *D. virgifera* was caught. This survey will continue in 1998, as more military vehicles will return from Bosnia-Herzegovina.

Source: **Plant Protection Service of the Netherlands, 1997-12.**

Additional key words: absence **Computer codes:** NEOVIN, DIABVI, NL

98/003 Transmission of squash mosaic comovirus by *Diabrotica barberi*

During studies carried out in South Dakota on *Cucurbita pepo* plants affected by squash mosaic comovirus, the presence of *Diabrotica barberi* (EPPO A1 quarantine pest) and *D. undecimpunctata howardii* was noted. In transmission tests, it was found that *D. barberi* could act as an efficient vector for the transmission of squash mosaic comovirus in the field, as transmission percentages could reach up to 16.7 %.

Source: Langham, M.A.C.; Gallenberg, D.J.; Gergerich, R.C. (1997) Occurrence of squash mosaic comovirus infecting summer squash (*Cucurbita pepo*) in South Dakota and transmission by *Diabrotica barberi*.
Plant Disease, 81(6), p 696.

Additional key words: biology **Computer codes:** DIABLO

98/004 Further details on the first outbreak of fireblight in Bulgaria (1989-90)

The first signs of the occurrence of fireblight (*Erwinia amylovora* – EPPO A2 quarantine pest) were seen in Bulgaria in 1989. Essentially two foci were found in the region of Plovdiv, on quince (Tzaratzovo village) and pear orchards (Plovdiv). It was then found that some quince orchards and single trees in private gardens in the region of Plovdiv and seven surrounding villages were affected by the same disease. Studies carried out in 1990, showed that the Bulgarian isolates found on quince and pear in the region of Plovdiv belonged to *E. amylovora*. This was the first report of fireblight in Bulgaria. These foci were then considered as eradicated, as the affected trees had been destroyed and the disease was no longer observed.
However, in 1995, *E. amylovora* was found again in the region of Kiustendil, near Macedonia (see EPPO RS 95/199) and an eradication programme was put into place. The EPPO Secretariat will make enquiries about the present situation of fireblight in Bulgaria.

Source: Bobev, S. (1989) [Bacteriosis of quince].
Higher Institute of Agriculture-Plovdiv, Scientific Works. Vol. XXXIV, book 4. Third scientific conference with international participation on intensification and ecologization of agriculture, p 99-101.
Bobev, S. (1990) [Fire blight of tree fruits in Bulgaria - Characterization of its pathogen].
Higher Institute of Agriculture-Plovdiv, Scientific Works. Vol. XXXV, book 4, 227-231.

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

98/005 Survey on *Erwinia amylovora* in Australia gave negative results

In Australia, after the first report of *Erwinia amylovora* (EPPO A2 quarantine pest) in Melbourne and Adelaide Botanical gardens in May 1997 (see EPPO RS 97/145), suspect trees were destroyed and a survey was carried out in all States and the Australian Capital Territory (around Canberra). This intensive survey covered approximately six million trees, more than 1,600 apple and pear orchards, 203 nurseries in major growing areas, and host trees in parks and gardens of 82 cities around Australia. As a result, no evidence of fireblight could be found in the country.

Source: Media Release of 1997-12-17. John Anderson. Minister for Primary Industries and Energy.
Web site of the Department of Primary Industries and Energy on INTERNET
http://www.dpie.gov.au/dpie/pr/media_releases/anderson/97_179a.html

Additional key words: absence **Computer codes:** ERWIAM, AU

98/006 Review on *Xylella fastidiosa*: reference to a possible presence in Europe on grapevine

Xylella fastidiosa (EPPO A1 quarantine pest) infects many plant species, mostly woody perennials. In a recent paper, Purcell (1997) has established a list of these diseases (see below), for some of them the implication of *X. fastidiosa* has still to be confirmed. It can also be noted that a disease caused by *X. fastidiosa* on coffee has been recently found in Brazil (EPPO RS 96/169). Although the strains of *X. fastidiosa* are grouped as a single species, they differ in host range, pathogenicity, nutritional fastidiousness and DNA homology. It is felt that *X. fastidiosa* probably consists of more than one pathovar or subspecies (Purcell & Hopkins, 1996).

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Plant diseases	**Reported occurrence**
Grapevine Pierce's disease	Costa Rica, Mexico, Peru, USA (southern)
Alfalfa dwarf	USA (California)
Almond leaf scorch	Argentina, India (doubtful), USA (California)
Peach phony	USA (south-eastern)
Plum leaf scald	Brazil, Paraguay, USA (south-eastern)
Maple leaf scald	USA (eastern)
Oak leaf scorch	USA (eastern)
Elm leaf scorch	USA (eastern)
Sycamore leaf scorch	USA (eastern)
Mulberry leaf scorch	USA (eastern)
Periwinkle wilt	USA (Florida)
Ragweed stunt	USA (Florida)
Citrus variegated chlorosis	Argentina (symptoms observed), Brazil
Pear leaf scorch (unconfirmed)	Taiwan
Oleander leaf scorch	USA (California)
Stunting diseases of nutgrass, poison hemlock, blackberry, Dallis grass	USA (California)

(from Purcell, 1997)

From a quarantine point of view, the author felt that due to the broad host range of this bacterium, and the fact that new strains probably remain to be recognized or discovered (as shown by the recent findings of *X. fastidiosa* on oleander (EPPO RS 97/049) and coffee), phytosanitary measures should prevent the introduction of the bacterium by monitoring the movement of live plants from regions where *X. fastidiosa* occurs

The possible presence of *X. fastidiosa* in Europe is mentioned by Purcell, and is based on an abstract published in *Phytopathology* (Berisha *et al*., 1996). In this abstract, it is said that *X. fastidiosa*, the causal agent of Pierce's disease, has been isolated from diseased grapevines grown in Kosovo (Yugoslavia). The EPPO Secretariat wrote to the authors of this abstract to try to obtain more information on this record. Unfortunately, it was not possible for them to provide more details on the origin of the affected plants, the possible extent of the disease in Kosovo vineyards, the origin of the disease, etc. This issue will have to be followed closely but the report must for the moment be regarded as 'unconfirmed'.

Source: Purcell, A.H.; Hopkins, D.L. (1996) Fastidious xylem-limited bacterial plant pathogens.
Annual Review of Phytopathology, 34, 131-151.

Purcell, A.H. (1997) *Xylella fastidiosa*, a regional problem or global threat?
Journal of Plant Pathology, 79(2), 99-105.

Berisha, B.; Chen, Y.D.; Xu, Y.; Chen, T.A. (1996) Isolation of Pierce's disease bacteria from grapevines in Europe (abstract).
Phytopathology, 86(11) Supplement, p S119.

Additional key words: publications, new record? **Computer codes:** XYLEFA, YU

98/007 Survey on citrus variegated chlorosis and citrus blight in Brazil

Citrus variegated chlorosis, a disease caused by *Xylella fastidiosa* (EPPO A1 quarantine pest) was first observed in Brazil in 1987. The disease was then spread by propagation material and sharpshooter vectors, and is now widely distributed in the citrus-growing areas of Brazil (see also EPPO RS 96/196). It is felt that citrus variegated chlorosis is potentially more devastating than citrus blight disease (EPPO A1 quarantine pest). It is observed that in Brazil, citrus blight (also called 'declinio') affects approximately 10 million trees a year. In Florida (US), it is estimated that 1 million trees are lost each year because of citrus blight. There have been controversial reports suggesting that citrus blight in Florida could be due to the Pierce's disease strain of *X. fastidiosa* (it must be noted that Pierce's disease has never been observed on grapevine in Brazil).
A survey was carried out in Brazil by using PCR techniques, on strains of *X. fastidiosa* present in citrus trees affected by citrus variegated chlorosis and citrus blight disease. Result showed that the *X. fastidiosa* strain identified as being the cause of citrus variegated chlorosis was consistently found with symptomatic citrus trees. In some cases, trees without symptoms were found infected with this strain. It can be noted that no other strain of *X. fastidiosa* was found on citrus. Finally during this survey, *X. fastidiosa* was never found associated with trees showing citrus blight symptoms.

Source: Beretta, M.J.G.; Barthe, G.A.; Ceccardi, T.L.; Lee, R.F.; Derrick, K.S (1997) A survey for strains of *Xylella fastidiosa* in citrus affected by citrus variegated chlorosis and citrus blight in Brazil.
Plant Disease, 81(10), 1196-1198.

Additional key words: detailed record **Computer codes:** XYLEFA, CSBXXX, BR

98/008 Impatiens necrotic spot tospovirus on ornamentals in USA: general considerations

In the late 1980s, a significant new virus disease problem began to develop in the glasshouse floriculture industry. Two closely related tospoviruses, tomato spotted wilt tospovirus (TSWV - EPPO A2 quarantine pest) and impatiens necrotic spot tospovirus (INSV) have been associated with these outbreaks in North American and European glasshouses. This could also be related with the upsurge of *Frankliniella occidentalis* (EPPO A2 quarantine pest). At least in USA, INSV is currently the more commonly encountered problem in ornamental greenhouses, while TSWV causes more difficulties on outdoor vegetable crops. INSV has a wide host range, and it has caused significant crop losses on many ornamentals, including: cineraria (*Senecio cruentus*, ranunculus (*Ranunculus asiaticus*), impatiens (*Impatiens wallerana*), New Guinea impatiens (*Impatiens* hybrids), cyclamen (*Cyclamen persica*), exacum (*Exacum affine*), begonias, primula (*Primula* spp. and hybrids), gloxinia (*Sinningia speciosa*). TSWV has caused problems on chrysanthemum and tuberous dahlia, but has occasionally been detected on other ornamentals. As an example, in the single State of Pennsylvania (US) in 1989-1990, losses caused by INSV and TSWV were estimated of more than 675.000 USD. In addition, some gloxinia growers have experienced 100 % crop loss with INSV infections. Several detection methods for INSV are available like mechanical transmission to *Nicotiana benthamiana*, and essentially ELISA tests with specific INSV antiserum. Other techniques like direct-tissue blot assay, dot blot immunoassay, direct examination of plant tissue for characteristic viral inclusions are also possible. INSV and TSWV are both transmitted by thrips. *Frankliniella intonsa*, *F. schultzei*, *F. fusca*, *F. occidentalis*, *Thrips palmi*, *T. setosa* and perhaps *T. tabaci* are vectors of TSWV. For INSV, for the moment *F. occidentalis* is the only known vector. Seed transmission appears very doubtful for TSWV and has not been investigated for INSV. Therefore, in practice, TSWV and INSV are introduced into the glasshouses by the movement of infected plants and of viruliferous thrips. For these two tospoviruses on glasshouse ornamentals, control methods can include: use of virus-free planting material; monitoring of thrips populations with coloured sticky traps and quick response with adequate means of control to any increase of thrips populations, use of screens (with mesh size <135 µm) to prevent entry of the thrips into the glasshouse, placing of the new plants in separate compartments of the glasshouse. Research on the production of resistant plants is continuing, and for example transformed chrysanthemum resistant to TSWV are being developed.

Source: Daughtrey, M.; Jones, R.K.; Moyer, J.W.; Daub, M.E.; Baker, J.R. (1997) Tospoviruses strike the greenhouse industry – INSV has become a major pathogen on flower crops.
Plant Disease, 81(11), 1220-1230.

Additional key words: biology, control methods **Computer codes:** IMNSXX, TMSWXX

98/009 Details on tomato spotted wilt tospovirus in Israel

In Israel, tomato spotted wilt tospovirus (EPPO A2 quarantine pest) was found for the first time in 1992 (EPPO RS 94/007), shortly after the first appearance of its vector *Frankliniella occidentalis* in 1991. Studies were carried out to identify the main host plants, in ornamental and vegetable crops and also in weeds. Plants showing symptoms were collected from January 1992 to December 1996. By using inoculation to herbaceous indicators, ELISA, and electron microscopy, the following cultivated species were found to be infected by tomato spotted wilt tospovirus: *Asclepias tuberosa*, *Aster* sp., *Brassica oleracea*, *Capsicum annuum*, *Celosia* sp., *Cestrum* sp., *Cucumis sativus*, *Cucurbita pepo*, *Eustoma rusellianum*, *Gerbera* sp., *Gloxinia* sp., New Guinea impatiens, *Lactuca sativa*, *Lycopersicon esculentum*, *Ocimum* sp., *Solanum melongena*, *Solanum tuberosum*, *Vinca* sp. and *Zinnia* sp. In the major ornamental and vegetable growing regions of Israel, the following weeds were found infected: *Sonchus oleraceus*, *Solanum nigrum*, *Conyza bonariensis*, *Portulaca oleracea*, *Silybum marianum*, *Cichorium pumilum*. It is noted that the outbreak of tomato spotted wilt tospovirus in Israel is associated with large populations of *F. occidentalis*. However, despite the wide distribution of this insect, outbreaks of the disease are sporadic and limited.
Characterization studies were also carried out on the Israeli isolates. It was shown that all Israeli isolates obtained either from vegetable or ornamental crops are serologically identical (and are members of the tospovirus serogroup I, type I (BR-01 strain)).
In addition, seed transmission was investigated on tomato, pepper, Petunia and Celosia. Although the virus could be detected on the surface of seeds harvested from naturally infected plants, transmission of the virus to the progeny plants could not be obtained.

Source: Antignus, Y.; Lapidot, M.; Ganaim, N.; Cohen, J.; Lachman, O.; Pearlsman, M.; Raccah, B.; Gera, A. (1997) Biological and molecular characterization of tomato spotted wilt tospovirus in Israel.
Phytoparasitica, 25(4), 319-330.

Additional key words: detailed record, host plants **Computer codes:** TMSWXX, IL

98/010 Epidemiology of tomato spotted wilt tospovirus in tomato fields

At present in Spain, tomato spotted wilt tospovirus (EPPO A2 quarantine pest) is a limiting factor to the production of many vegetable crops, and severe economic losses have been observed in important crops such as tomato, pepper or lettuce. The epidemic outbreaks of tomato spotted wilt tospovirus have been related to the introduction and spread of *Frankliniella occidentalis* (EPPO A2 quarantine pest). A survey was carried out in commercial tomato fields in northeastern Spain (near Barcelona) during two growing seasons (1993-94), to study the incidence of tomato spotted wilt, the densities of *F. occidentalis* populations, and the relative number of viruliferous thrips. Results showed that early thrips abundance could be related with final disease incidence for early transplanted tomato crops. The situation was totally different for late transplanted tomatoes. In this case, low adult numbers were detected throughout the season, whereas disease incidences were comparable to those found in early transplanted tomatoes. For late transplanted tomatoes, it was also observed that significantly more viruliferous thrips were present in the initial growth phases compared with early transplanted crops. The sources for these highly viruliferous populations were probably nearby crops like early transplanted tomatoes, where an increase in the infectious potential of thrips populations was detected during the same period. The authors noted that the initial phase of the crop (0-60 days after transplanting) is the critical one for the development of the disease, and this fact should be taken into account when developing control strategies against tomato spotted wilt tospovirus.

Source: Aramburu, J.; Riudavets, J.; Arnó, J.; Laviña,, A.; Moriones, E. (1997) The proportion of viruliferous individuals in field populations of *Frankliniella occidentalis*: implications for tomato spotted wilt virus epidemics in tomato.
European Journal of Plant Pathology, 103(7), 623-629.

Additional key words: epidemiology **Computer codes:** FRANOC, TMSWXX

98/011 New tomato geminiviruses from Cuba

1) In Cuba, geminiviruses have become the most important viruses in tomato crops, as they are detected in all tomato-producing areas causing serious losses. Recently, tomato yellow leaf curl geminivirus (EPPO A2 quarantine pest) has been detected in Cuba (see EPPO RS 97/059). In 1995-1996, tomato samples were tested by PCR using degenerated primers. In samples from most areas, only tomato yellow leaf curl geminivirus was detected, but in some samples from the Havana area another DNA fragment was also amplified. Further studies have shown that a new geminivirus was also present in these tomato samples, and it presented 87 % similarity with tomato mottle geminivirus. The name Taino tomato mottle geminivirus has been proposed.

2) In Cuba, a survey on geminiviruses has been carried out in tomato plants since 1994 in the province of La Habana. In some plants the Israeli strain of tomato yellow leaf curl geminivirus was detected, but in some cases a viral DNA which could not be detected with primers specific for the Israeli strains of tomato yellow leaf curl geminivirus, was detected by hybridization. Further analysis showed that a new bipartite geminivirus related to tomato mottle virus (78.1% similarity) is present in these tomato samples. The name Havana tomato geminivirus has been proposed.

Note: the EPPO Secretariat has presented these two papers together, because of their similarity. However, nothing can be said now on whether these two new bipartite geminiviruses of tomato are the same or not.

Source: Ramos; P.L.; Guerra, O.; Peral, R.; Oramas, P.; Guevara, R.G.; Rivera-Bustamante, R. (1997) Taino tomato mottle virus, a new bipartite geminivirus from Cuba.
Plant Disease, 81(9), p 1095.

Martinez, Y.; de Blas, C.; Zabalgogeazcoa, I.; Quiñones, M.; Castellanos, E.L.; Peralta, E.L.; Romero; J. (1997) A bipartite geminivirus infecting tomatoes in Cuba.
Plant Disease, 81(10), p1215.

Additional key words: new pest **Computer codes:** TMYLCX, CU

98/012 Cotton leaf crumple and cotton leaf curl are distinct geminiviruses

Two important viral diseases of cotton are caused by cotton leaf crumple and cotton leaf curl geminiviruses. Cotton leaf crumple was first reported in United States from California (1954) and then Arizona (1960). It is also present in Mexico. The disease causes floral distortion, hypertrophy of veinal tissues leading to downward curling of leaves, foliar mosaic, vein clearing, vein distortion. Cotton leaf curl was first reported in Africa (1963). It is present in several countries in Africa and also in Pakistan, India and the Philippines. The disease causes vein distortion, thickening and enations on the underside of the leaves, reduction of flower numbers. Recently, severe epidemics have occurred in Pakistan, where losses reached 100% in early infected cotton fields.
Genetic studies have shown that these two viruses belong to geminivirus subgroup III (transmitted by *Bemisia tabaci*), that they are distantly related and distinct geminiviruses. When compared with other geminiviruses, cotton leaf crumple appears more closely related to New World geminiviruses (such as Abutilon mosaic, sida golden mosaic, bean dwarf mosaic, tomato mottle geminiviruses), whereas cotton leaf curl is more closely related to the Old World geminiviruses (such as ageratum yellow vein, tomato leaf curl, African cassava mosaic, tomato yellow leaf curl geminiviruses).

Source: Nadeem, A.; Weng, Z.; Nelson, M.R.; Xiong, Z. (1997) Cotton leaf crumple and cotton leaf curl virus are two distantly related geminiviruses. **Molecular Plant Pathology on-line. http://www.bspp.org.uk/mppol/1997/0612nadeem.**

Additional key words: genetics **Computer codes:** CTLCRX, CTLCXX

98/013 *Lecanoideus floccissimus*: new whitefly pest in Tenerife (Spain)

The spiralling whitefly, *Aleurodicus dispersus*, was reported for the first time in 1965 in the Canary Islands (Spain). It is now a minor polyphagous pest which can be found on various fruit crops (banana, mangoes, avocados, guavas) and many ornamental species (mainly Arecaceae, Musaceae and Moraceae), on five of the seven Canary islands (Tenerife, Gran Canaria, Lanzarote, Fuerteventura, La Gomera). However, since 1991, in the southern coast of Tenerife, a significant increase of whitefly problems was seen particularly on ornamental plants, and this was at first attributed to *A. dispersus*. As some differences were observed, taxonomic studies were carried out and revealed that a new species *Lecanoideus floccissimus* (Homoptera: Aleyrodidae) was involved. *L. floccissimus* also produces large amounts of white waxy secretions and honeydew (on which sooty moulds can develop) which can affect the vigour of the plant and its commercial value, particularly for ornamentals. It is a polyphagous species which can be found on several species of Arecaceae (including coconut) and Musaceae (including banana, *Strelitzia*), and also various other plants such as: papaya (*Carica papaya*), sour orange (*Citrus aurantium*), *Euphorbia pulcherrima*, *Ficus* spp., *Hibiscus rosa-sinensis*, mango (*Mangifera indica*), guava (*Psidium guajava*), oleander (*Nerium oleander*), etc. The authors felt that this pest may have come from Central or South America, as the species was also described on unidentified plant material from Ecuador, in addition to material from Tenerife.

Source: Hernández-Suarez, E.; Carnero, A.; Hernández, M.; Beitia, F.; Alsonso, C. (1997) *Lecanoideus floccissimus* (Homoptera, Aleyrodidae) Nueva plaga en las Islas Canarias.
Phytoma-España, no. 91, 35-48.

Additional key words: new pest **Computer codes:** ES

98/014 First report of *Scaphoideus titanus* in Western Switzerland

In Switzerland, as two cases of grapevine yellows were found in Valais and Ticino cantons in 1990, regular surveys are being conducted on grapevine flavescence dorée phytoplasma (EPPO A2 quarantine pest) and its vector *Scaphoideus titanus.* So far, grapevine flavescence dorée phytoplasma has never been identified in suspect grapevine material and *Scaphoideus titanus* has only been reported in Ticino (since 1967). During surveys carried out in summer 1996, *S. titanus* was trapped for the first time in the Canton of Geneva. Control measures are being applied to prevent the spread of the vector. The authors felt that this finding is of concern as foci of grapevine flavescence dorée are found in neighbouring countries, and if the disease were to be introduced into Switzerland the vector would be there to ensure its dissemination.

Source: Clerc, L; Linder, C.; Günthart, H. (1997) Première observation en Suisse romande de la cicadelle *Scaphoideus titanus* Ball (Homoptera, Jassidae), vecteur de la flavescence dorée de la vigne.
Revue Suisse de Viticulture, Arboriculture, Horticulture, 29(4), 245-247.

Additional key words: new record **Computer codes:** GFVDXX, SCAPLI, CH

98/015 Studies on interspecific hybridization of *Meloidogyne chitwoodi* and *M. fallax*: they are two different species

Until recently, *Meloidogyne chitwoodi* (EPPO A2 quarantine pest) and *M. fallax* were considered as a single species (*M. fallax* was referred to as *M. chitwoodi* type Baexem). But morphological, biological, molecular differences were observed and suggested that they were two different species (EPPO RS 97/001). Studies were carried out in the Netherlands to verify their reproductive isolation. In *M. chitwoodi* and *M. fallax*, reproduction is characterized by facultative meiotic parthenogenesis (amphimixis and meiotic parthenogenesis can occur). Amphimixis may result when insemination by males occurs. Two types of experiments were done: 1) controlled cross between the two species; 2) bulk mating in a 1:1 mixture of two isolates of the two species. In these studies, all isolates used had the same number of chromosomes (no data is available on crossings between isolates with different numbers of chromosomes). During the first type of experiment, successful hybridization was obtained and hybrid females (F1) were able to produce egg masses. However, the hatched F2 juveniles were small in numbers, with morphological distortions and were non viable. In the bulk mating experiment, the progeny contained parental-type females of the two isolates in equal numbers and 10% of all females were non-viable hybrids. This study supports the separate species status of *M. chitwoodi* and *M. fallax*, as the progeny of their interspecific hybrids is non-viable. The authors also noted that this is the first report of interspecific hybridization in *Meloidogyne*.

Source: van der Beek, J.G.; Karssen, G. (1997) Interspecific hybridization of meiotic parthenogenetic *Meloidogyne chitwoodi* and *M. fallax*. **Phytopathology, 87(10), 1061-1066.**

Additional key words: taxonomy **Computer codes:** MELGCH

98/016 Further biochemical evidence showing that *Meloidogyne hapla*, *M. chitwoodi* and *M. fallax* are distinct species

Classical nematode species determination is based upon a relatively small number of morphological characters and does not always allow to differentiate between certain species. This was one of the reasons why no discrimination could be made between *M. chitwoodi* (EPPO A2 quarantine pest) and some populations of *M. hapla* or the recently described *M. fallax*. Despite this morphological similarity between, clear differences can be demonstrated between these three species by certain stable morphological traits, isozyme phenotypes, rDNA patterns of the ITS (internal transcribed spacer) regions, etc.

Two-dimensional gel electrophoresis of total soluble proteins has been used to study the similarity between various isolates of the three species. The results confirmed that *Meloidogyne hapla*, *M. chitwoodi* and *M. fallax* are distinct biological entities, as the intraspecific variation (within the three species) is much less than the interspecific variation. Although variation was limited, *M. hapla* shows more intraspecific variation than *M. chitwoodi* and *M. fallax.* The authors also referred to other studies on intraspecific variations in virulence (tests done on potato cultivars and wild *Solanum* species) which showed that no variation was found in *M. chitwoodi* and *M. fallax* whereas a remarkably large variation in virulence was found in *M. hapla*. They felt that the differences in intraspecific variation within these three *Meloidogyne* species can have important implications for crop protection based on the use of host-resistant plants, as breeding for resistant plants might be more promising for *M. chitwoodi* and *M. fallax* than for *M. hapla*.

Source: van der Beek, J.G.; Folkertsma, R.; Poleij, L.M.; van Koert, P.H.G.; Bakker, J.; (1997) Molecular evidence that *Meloidogyne hapla*, *M. chitwoodi* and *M. fallax* are distinct biological entities.
Fundamental and applied Nematology, 20(5), 513-520.

Additional key words: taxonomy **Computer codes:** MELGCH, MELGHA, MELGFA

98/017 Molecular techniques to identify *Meloidogyne hapla*, *M. chitwoodi*, *M. fallax* and other *Meloidogyne* species

1) A fast PCR-technique has been developed in the Netherlands to identify specifically *M. hapla*, *M. chitwoodi* (EPPO A2 quarantine pest), *M. fallax*. By using a mixture of 4 primers in a single PCR reaction, it is possible to identify single juveniles or isolates of these four species. This technique also allows the detection of species present in mixtures, in proportions as low as 2 to 5 % (Ziljstra, 1997).
Note: In this study, several isolates of the four species from various countries have been used. Among them, an isolate of *M. chitwoodi* from Portugal and an isolate of *M. fallax* from Belgium are mentioned. The EPPO Secretariat had previously no data on the occurrence of these species in Portugal and Belgium.

2) Another molecular technique using PCR with 5 primers (specific and non specific) has been developed and allows to identify *M. chitwoodi* and *M. fallax* specifically, and to differentiate them from *M. hapla*, *M. incognita*, *M. javanica*, *M. arenaria* and *M. mayaguensis* (Petersen *et al*., 1997).

Source: Petersen, D.; Zijlstra, C. Wishart, J.; Blok, V.; Vrain, T. (1997) Specific probes efficiently distinguish root-knot nematodes species using signature sequences in the ribosomal intergenic spacer.
Fundamental and applied Nematology, 20(6), 619-626.

Zijlstra, C. (1997) A fast PCR assay to identify *Meloidogyne hapla*, *M. chitwoodi* and *M. fallax*, and to sensitively differentiate them from each other and from *M. incognita* in mixtures.
Fundamental and applied Nematology, 20(5), 505-511.

Additional key words: identification methods, new records

Computer codes: MELGCH, MELGFA, MELGHA, BE, PT

98/018 Nematodes in Argentina

A review on the nematode species present in Argentina has recently been published and give details on plant-parasitic and entomopathogenic nematodes.

Ditylenchus dipsaci (EPPO A2 quarantine pest)
In the past, this species has mainly created problems on lucerne and garlic. It was first reported in the north-west of the country associated with damage on alfalfa, in 1929. But at present, with the use of resistant cultivars for lucerne and the production of nematode-free seeds for garlic, serious losses are no longer observed. *D. dipsaci* has a wide host range in Argentina, it has been reported in pastures, wheat, ornamentals, cotton, forest trees and weeds.

Globodera rostochiensis (EPPO A2 quarantine pest)
It was first reported in Argentina in the soil of a garlic field in the western part of the country, in 1956. It was later found in the Andes, in the Province of Jujuy on wild potatoes (1960, 1961). In 1967, it was reported again in the soil of a potato field in another mountain region in the west of Argentina. However, since these old records, many analyses carried out by different laboratories on large numbers of soil samples and tubers from many different regions have failed to detect *G. rostochiensis*. **It is currently felt that *G. rostochiensis* is not present in Argentina**.

Nacobbus aberrans (EPPO A1 quarantine pest)
The genus *Nacobbus* was first found in the mountain region of the Province of Tucumán (altitude of 2000 m) associated with potato, *Cucurbita maxima*, *Beta* spp. and some weeds. Analysis of morphological characteristics of various populations of *Nacobbus* from Argentina showed that they all belong to the species *N. aberrans*. However, the observation of important differences between populations suggest the existence of a complex within the species *N. aberrans*. This nematode is widely distributed in the country, and can be associated with a large number of plants such as potatoes, vegetables and weeds. However, the main problem caused by this nematode is on potato.

Xiphinema americanum sensu lato (EPPO A2 quarantine pest)
It is the most frequently found *Xiphinema* species in Argentina. It is widespread in the country and can be observed on many crops: tobacco, citrus, sugar cane, grapevine, barley, tomato and several fruit trees. However, it is not known whether the populations present in Argentina can transmit pathogenic viruses.

Other nematodes species reported as present in Argentina are: *Meloidogyne chitwoodi* (EPPO A2 quarantine pest), *Radopholus similis** (EPPO A2 quarantine pest) and *Xiphinema rivesi** (EPPO A2 quarantine pest).

* New geographical records.

Source: Doucet, M.E.; de Doucet, M.M.A. (1997) Nematodes and agriculture in continental Argentina. An overview.
Fundamental and applied Nematology, 20(6), 521-539.

Additional key words: new record, detailed record, denied record

Computer codes: DITYDI, HETDRO, MELGCH, NACOBA, RADOSI, XIPHRI, XIPHAM, AR

98/019 Weed hosts of *Ditylenchus dipsaci* and *D. destructor* in Poland

In Poland, a study has been carried out in the Wielkopolska region to determine the presence and distribution of plant parasitic nematodes on weeds, as these could play an important role in the ecology of the nematodes. In 1993 and 1994, weed samples were collected during the vegetative period from 205 fields cultivated with typical crops of this region (barley, oat, rye, wheat, triticale, potatoes, sugar beet, rape). Approximately, 20 % of the fields were fallow. Among the 32 nematode species found, *Ditylenchus destructor* (EU Annex II/A2) and *D. dipsaci* (EPPO A2 quarantine pest) were observed.

D. destructor was found on dicotyledonous weeds: *Anthemis arvensis*, *Bertoroa incana*, *Lycopsis arvensis*. In this region of Poland, *D. destructor* is known as a potato pest. In addition to the use of nematode-free seed potatoes, and rotation with cereals, it would also be useful to control dicotyledonous weeds for pest management.
D. dipsaci was found in 3 plant samples: *Stellaria media*, *Taraxacum officinale* and *Secale cereale*. The authors noted that despite this low frequency, this nematode could easily infect cultivated plants because of its high reproductive potential and its ability for anabiosis.

Source: Kornobis, S.; Wolny, S. (1997) Occurrence of plant parasitic nematodes on weeds in agrobiocenosis in the Wielkopolska region in Poland. **Fundamental and applied Nematology, 20(6), 627-632.**

Additional key words: ecology **Computer codes:** DITYDE, DITYDI

98/020 Control of *Clavibacter michiganensis* subsp. *michiganensis*

Studies carried out in Greece have demonstrated the efficacy of soil solarization in combination with the use of plastic sheets and low doses of methyl bromide against *Clavibacter michiganensis* subsp. *michiganensis* (EPPO A2 quarantine pest). Satisfactory results were obtained with impermeable plastic sheets (Plastopil Hazorea) and 30 days of solarization (with 35 g/m^2 methyl bromide or even without it) on tomatoes grown under plastic houses. With both approaches, the incidence of the disease on tomato plants could be reduced down to 10 % (disease incidence was 47 % in the untreated control plot) and final yield reached 70 t/ha (instead of 30 t/h in the untreated control plot).

Source: Antoniou, P.A.; Tjamos, E.C.; Panagopoulos, C.G. (1997) Reduced doses of methyl bromide, impermeable plastics and solarization against *Fusarium oxysporum* f. sp. *cucumerinum* of cucumbers and *Clavibacter michiganensis* subsp. *michiganensis* of tomatoes. **Proceedings of the 10th Congress of the Mediterranean Phytopathological Union, 1997-06-01/05, Montpellier (FR), 653-655.**

Additional key words: control methods **Computer codes:** CORBMI

98/021 FAO/IPGRI Technical guidelines for the safe movement of germplasm

FAO and IPGRI (International Plant Genetic Resources Institute, previously IBPGR) are publishing booklets containing technical guidelines for the safe movement of germplasm for several plant species. These guidelines give details on diseases and some insects which are likely to be transported by exchanges of germplasm. Information is given on symptoms, geographical distribution, significance, host range, transmission and treatments to be used in order to ensure safe movement of planting material of these crops. So far, FAO/IPBRI have published guidelines for 16 different crops: cassava (published in 1991), citrus (1991), cocoa (1989), coconut (1993), edible aroids (1989), *Eucalyptus* spp. (1996), grapevine (1991), legumes (1990), *Musa* spp. (2nd edition 1989), small fruit (1994), small-grain temperate cereals (1995), sugarcane (1993), stone fruit (1996), sweet potato (1989), vanilla (1991), yam (1989).

They can be obtained from: Publications Office, IPGRI Headquarters
Via delle Sette Chiese 142
00145 Rome
Italy

A Web site on the Internet, also provides details on all FAO/IPGRI publications concerning germplasm health at the following address: http://www.cgiar.org/ipgri.publicat/quara.htm

Source: **EPPO Secretariat, 1997-12**

Additional key words: publication