ORGANISATION EUROPÉENNE ET MÉDITERRANÉENNE POUR LA PROTECTION DES PLANTES
EUROPEAN AND MEDITERRANEAN PLANT PROTECTION ORGANIZATION

EPPO

Reporting Service

Paris, 1993-05-01 **Reporting Service 1993, No. 5**

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93/080 EPPO...INFOEPPO again in operation

From the 1st of May 1993, INFOEPPO, EPPO's online information service, has been reopened after restructuring the software and some technical adjustment. The EPPO Secretariat, user-ID: EPPOHQ, is now providing information on all areas of plant quarantine and plant protection in form of newsflashes. Newsflashes entered during the first week of May 1993 include:

#199 11-MAY-93 Sysop: **EPPO News Flashes**
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#237 13-MAY-93 Eppohq: **IOBC/WPRS general assembly in PT**
#238 13-MAY-93 Eppohq: **EPPO - non-European potato viruses**
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#247 13-MAY-93 Eppohq: **EPPO - Environmental Risk Assessment**
#248 13-MAY-93 Eppohq: **FUSAAL - supposed record in IT**
#254 13-MAY-93 Eppohq: **BURSXY - Survival of Pine Wood Nematode**

Newsflashes stay in the system for a limited time only and are than deleted from the network. Some will later appear in fuller form in the Reporting Service. Please note the detailed log-on instructions for INFOEPPO (Reporting Service 521/01), and the following special instructions for newsflashes.

If you are **not** a registered user, enter as a **new** user, giving your details as the system requests and entering your USER-ID and password. EPPO wil then, within a day or two, register you as a user (phone if you want it more quickly).

If you **are** a registered user, follow the instructions for accessing Subjects (SIGs). On first access to the system, you will find yourself in SIG **/Intro**. Select a new SIG, entering **/News**. The system will remember the SIG you were in last when you contact it for the next time and you will then go directly into /News (unless you select otherwise).

To consult Newsflashes, there are two simple approaches:

1. Type **RLB** at the message "Select a letter....", then twice **RETURN**. You will obtain a list of all newsflash titles. Note the **numbers** of the ones you want to read. At the next message, type **RS** followed by the number.

2. Type **RK** at the message "Select a letter....", then **RETURN**. The system will ask you for a keyword to search for. Enter word you are interested in: e.g. Germany; thrips; control. The system will find all the messages containing the word specified, somewhere in the title or text. You may also enter several keywords separated by spaces. You will then find the messages which contain all the words in the title or text. Note that upper and lower case are not distinguished, and that any strings of characters can be specified, whether a whole word or not. Thus entering "**IT**" (ISO code for Italy) will also find messages with the word Mediterranean, or Cucurbitaceae, or Smith. More help is available from the system by typing "**?**".

At any point in INFOEPPO, typing **X** in return to a question takes you back a step. In this way, you can always step backwards to a point you recognize. Note that the two short-cut approaches specified above are special cases of a more extensive set of possible replies, explained by the on-screen messages. Explore them as you wish.

Source: EPPO Secretariat, Paris **(1993-05)**

93/081 NEW PESTS....Eastern Filbert blight caused by *Anisogramma anomala* on European hazelnuts

Eastern Filbert blight is caused by the ascomycete *Anisogramma anomala*, an indigenous pathogen of *Corylus americana* in eastern North America. The disease was not reported west of the Rocky Mountains until 1973, when it was found in an orchard of European hazelnut (*C. avellana*) in Washington State (US). By 1979, the disease had spread through the hazelnut-growing areas of Washington and in 1986 it was found in the Willamette Valley in Oregon where 98% of the US hazelnut production is located. Further surveys showed that the disease is now established in this valley.

The disease cycle of this disease is initiated in the spring when ascospores of *A. anomala* infect breaking vegetative buds and young vegetative shoots. The fungus systematically colonizes the cambial tissue of branches, usually producing a canker 13-15 months after the infection. Canker expansion eventually girdles branches and limbs, resulting in canopy dieback and death of trees in 4-10 years.

Experiments were carried out in Oregon to test the susceptibility of European hazelnut clones to eastern filbert blight. Several cultivars obtained from Europe were tested as well as cultivars of European hazelnut from the USA. It was found that several cultivars from Europe showed a very high susceptibility to this disease.

Source: Pinkerton, J.N.; Johnson, K.B.; Mehlenbacher, S.A.; Pscheidt, J.W. (1993) Susceptibility of European hazelnut clones to eastern Filbert blight.
Plant Disease 77, 261-266.

93/082 **NEW PESTS...**New pest of cucumber reported from Switzerland

A new pest of cucumber has been reported from the western part of Switzerland. In 1992, one establishment in the canton of Genève growing cucumbers was heavily attacked by *Tyrophagus neiswanderi*, a mite which has not been previously reported to attack cucumbers in Europe. The mite had been found, with hardly any significance, on ornamentals. The heavy infestation of the establishment in Switzerland was attributed to the growing medium which consisted of 60% wood chips, which seemed to have introduced the pest into the glasshouses. The mite attacks only the leaves of the cucumbers, feeding on the parenchymatic cells and perforating the leaves with a multitude of small (max. 5 mm) holes. Symptoms on fruits and flowers were not observed.

Source: Fischer, S. (1993) Observation d'un nouveau ravageur du concombre en Suisse occidentale, *Tyrophagus neiswanderi* Johnston & Bruce (Acari; Acaridae).
Revue Suisse de Viticulture Arboriculture Horticulture 25, 103-104.

93/083 NEW PESTS/E.C...Muskmelon collapse - a new disease in the EC (Spain)

A new disease of muskmelon (*Cucumis melo*) has been reported from Spain which causes very severe economic losses in some Spanish regions. The most obvious symptom of the disease is a sudden collapse of the whole plant at the time when the first fruit is ripening. First disease symptoms appear, however, very early, directly after sowing or after transplanting and are characterized by a yellow discoloration and corking of the upper root. Death of secondary roots occurs afterwards. Aerial symptoms appear when the first fruit begins to ripe, by wilting of young leaves and the consequent death of the plant within a few days.

Studies to identify the causal agent showed that a fungus of the genus *Acremonium* is responsible. Means of controlling the disease are currently beeing investigated. None of 89 melon cultivars tested were resistant to the fungus. Chemical control by using prochloraz in drip irrigation has shown some effects, but total control has not been achieved. The use of resistant rootstocks is, according to the authors, the most promising method of controlling the disease.

Source: Garcia-Jimenez, J.; Martinez-Ferrer, G.; Armengol, J.; Jorda, C.; Alfaro-Garcia, A. (1993) Symptomatology, etiology and possibilities in the control of a Spanish muskmelon collapse.
Presentation at the "Premier Colloque Italo-Français De Phytopathologie sur: Maladies nouvelles ou d'introduction récente en France, en Italie et dans le bassin méditerranéen", Alghero, IT, 1993-04-14/18.

93/084 **BTNYVX/BTSBXX...**Comparison of damage caused by beet necrotic yellow vein virus and beet soilborne virus 2

A comparative study to investigate the yield loss of sugarbeet due to infection by *Polymyxa betae*, beet necrotic yellow vein virus (EPPO A2 quarantine pest) and beet soilborne virus serotype 2 were carried out at the University of Giessen, Germany.

Pot and field experiments were conducted and it was found that there were significant differences between BNYVV and BSBV-2. BNYVV induced a quantity loss of 40% while BSBV caused only 26% yield loss. The quality of the sugarbeet was reduced by 55% through the BNYVV infection while the BSBV infection accounted for 35% quality loss.

Source: Prillwitz, H.; Schlösser, E. (1993) Comparative investigations on the damage of sugar beet by *Polymyxa betae* Keskin, beet soilborne virus and beet necrotic yellow vein virus.
Presentation at the "45th International Symposium on Crop Protection", Gent, 1993-05-04.

93/085 PLPXXX...Unsuccessful eradication of plum pox potyvirus in Italy

An account on an attempt to eradicate plum pox potyvirus (EPPO A2 quarantine pest) from the Trento province of Italy was given at the first French-Italian phytopathological colloquium.

The eradication programme was initiated in 1984 and included systematic surveys, the testing of trees showing symptoms of the sharka disease and the uprooting of infected trees. During the seven years 1985-92 total eradication of the disease was obtained only in three of the 12 zones into which the area had been subdivided. Those three zones were separated by natural barriers. In the other zones only a containment of the disease and a progressive reduction in the percentage of affected trees (from 4,98% to 2,03%) was achieved.

The authors conclude that the failure of eradication was due to the late start of the intervention, the first outbreak of the disease in the province was reported in 1977, as well as to some deficiencies in uprooting the affected trees. The root residues of uprooted trees gave rise to young, tender, but infected sprouts which provided an inoculum source. In future, systemic herbicides will be used on infected trees by applying the herbicide to wounds made on the trunk, in order to kill the entire wood system.

Source: Refatti, E.; Osler, R. (1993) Attempts to eradicate plum pox virus in an infected area.
Presentation at the "Premier Colloque Italo-Français De Phytopathologie sur: Maladies nouvelles ou d'introduction récente en France, en Italie et dans le bassin méditerranéen", Alghero, IT, 1993-04-14/18.

93/086 **PLPXXX...Non-transmission of plum pox potyvirus through seeds**

Further evidence on the non-transmission of plum pox potyvirus (EPPO A2 quarantine pest) through seeds has been reported from Italy. Experiments carried out at the University of Pisa showed that the virus could be detected in seeds of apricots; transmission from seed to seedling, however, could not be achieved. The authors assume that a possible virus-breakdown process is taking place in the seeds since the virus could not be detected 15 d after the start of the pre-chilling treatment. Furthermore, the dropping of immature infected fruits may lead to the exclusion of seed transmission of plum pox potyvirus.

Source: Triolo, E.; Ginanni, M.; Materazzi, A. (1993) Further evidence on the non-transmission through seed of plum pox virus in apricot.
Presentation at the "Premier Colloque Italo-Français De Phytopathologie sur: Maladies nouvelles ou d'introduction récente en France, en Italie et dans le bassin méditerranéen", Alghero, IT, 1993-04-14/18.

93/087 **PLPXXX...Distribution of plum pox potyvirus in Piemonte, IT.**

A short report has been given on the distribution of plum pox potyvirus (EPPO A2 quarantine pest) in Piemonte, Italy in 1992. Currently there is an area of 219 ha infected by the virus in the province. The virus could be found in approximately 60% of all the orchards checked, having an infection range up to 80% with a mean value of 2,9%. All in all, 557 orchards were inspected and 128 695 plants tested of which 3 703 were infected.

Source: Conti, M. (1993) Further studies on aphid transmission of plum pox potyvirus.
Presentation at the "Premier Colloque Italo-Français De Phytopathologie sur: Maladies nouvelles ou d'introduction récente en France, en Italie et dans le bassin méditerranéen", Alghero, IT, 1993-04-14/18.

93/088 **PLPXXX...**Strains of plum pox potyvirus in France

Since the outbreak of plum pox potyvirus (EPPO A2 quarantine pest) in France in 1970 prophylactic measures have been applied to limit the spread of the disease. At the end of the 1980s, however, a new epidemiological development of the disease could be observed which was characterized by a faster development of the disease. Serological studies conducted showed that two serotypes of the virus could be distinguished. One, which was designated as the M serotype, could be detected on peaches and apricots and the designated D serotype was found only on apricots. In inoculation experiments the D serotype virtually infected only the apricots while the M serotype infected peaches and apricots. Infections of hosts by both serotypes could not be found.

The faster development of the disease has been attributed to the D serotype which multiplies faster and produces more severe symptoms than the serotype from peaches. It was reported that the virus can infect a host tree up to 100% within 4-5 years.

Source: Bousalem, M.; Adamolle, C.; Boeglin, M.; Labonne, G.; Pecheur, P.; Quiot-Douine, L.; Quiot, J.B. (1993) La détection de deux types de Plum Pox Virus peut expliquer des différences épidémiologiques observées en France.
Presentation at the "Premier Colloque Italo-Français De Phytopathologie sur: Maladies nouvelles ou d'introduction récente en France, en Italie et dans le bassin méditerranéen", Alghero, IT, 1993-04-14/18.

93/089 **TMSWXX/IMNSXX...Hosts of tomato spotted wilt tospovirus and impatiens necrotic spot tospovirus in France**

It has been reported at the first French-Italian Phytopathological Colloquium in Alghero, IT, that tomato spotted wilt tospovirus (potential EPPO A2 quarantine organism) and impatiens necrotic spot tospovirus* (potential EPPO A2 quarantine organism) have been found on the following host plants in France:

Ornamentals

Aconitum carmichaeli
Alstroemeria sp.
Anemone sp.
Antirrhinum majus
Begonia x *hiemalis*
Calceolaria sp.
Calendula officinalis
Callistephus chinensis
Celosia sp.
Chrysanthemum morifolium
Cineraria cruenta
Cyclamen persicum
Dahlia variablis
Eustoma russellianum
Fatsia japonica
Freesia x *hybrida*
Fuchsia sp.
Gazania sp.
Gerbera sp.
Gladiolus sp.
Gloxinia sp.
Hippeastrum x *hybrida*
Hydrangea macrophylla
Impatiens balsamina
I. x *novae-guinea*
Limonium sp.
Nicotiana sp.
Primula acaulis
Ranunculus asiaticus
Tagetes erecta
T. patula
Vinca rosea
Zinnia elegans

Vegetables

Brassica oleracea
Capsicum annuum
Cichorium endivia
Cucumis sativus
Cucurbita pepo
Lactuca sativa
Lycopersicum esculentum
Ocimum basilicum
Phaseolus vulgaris
Salvia sp.
Solanum melongena
Solanum tuberosum
Valerianella olitoria
Verbena officinalis
Vicia faba

* Plant species which are underlined are equaly infected by impatiens necrotic spot tospovirus which has been previously known as tomato spotted wilt virus - impatiens strain (see EPPO Reporting Service 529/05).

Source: Llamas-Bousquet, Allex, D.; Berling, A. (1993) Importance of tomato spotted wilt virus on vegetable and ornamental crops in France.
Presentation at the "Premier Colloque Italo-Français De Phytopathologie sur: Maladies nouvelles ou d'introduction récente en France, en Italie et dans le bassin méditerranéen", Alghero, IT, 1993-04-14/18.

93/090 TMSWXX/FRANOC...Grapevine is not susceptible to tomato spotted wilt tospovirus

Experiments were carried out in Ontario, Canada, to test if grapevine cultivars are susceptible to tomato spotted wilt tospovirus (potential EPPO A2 quarantine pest). Eight *Vitis vinifera* cultivars, 34 *Vitis* hybrids, 7 *V. labrusca* cultivars and 3 *V. rupestris* cultivars were exposed to viruliferous *Frankliniella occidentalis* (EPPO A2 quarantine pest) and after one year additionally inoculated with the virus. The foliage of the plants was assayed by ELISA and bioassayed on *Petunia* X *hybrida*, but no infection of tomato spotted wilt virus occurred on grapevine. Feeding and reproduction of *F. occidentalis* occurred on the foliage of over 90% of the cultivars tested.

Source: Stobbs, L.W.; Broadbent, B.A. (1993) Susceptibility of grapevine cultivars to tomato spotted wilt virus in southern Ontario, Canada. **Plant Disease 77, 318.**

93/091 TMSWXX/FRANOC...Tomato spotted wilt tospovirus in La Réunion

La Réunion is a French island located in the Indian Ocean. Tomato spotted wilt tospovirus (potential EPPO A2 quarantine pest) was first detected in July 1991 during customs examinations of chrysanthemum cuttings. Few months later it was observed in tomato fields quite distant from each others. At the end of January 1992 the virus was present in numerous places where horticultural crops are important. During the warm season 1992/3 severe epidemics occurred in tomato, pepper and ornamental crops. Different strains of the virus have been collected and characterized by ELISA using polyclonal and monoclonal antibodies.

Three vectors, *Frankliniella occidentalis* (EPPO A2 quarantine pest), *F. shultzei* and *Thrips tabaci*, have been observed on the island of which only *F. occidentalis* has an epidemiological significance.

Source: Boissot, N.; Reynaud, B.; Nabeneza, S. (1993) Epidemiology of TSWV in La Réunion Island. **Presentation at the "Premier Colloque Italo-Français De Phytopathologie sur: Maladies nouvelles ou d'introduction récente en France, en Italie et dans le bassin méditerranéen", Alghero, IT, 1993-04-14/18.**

93/092 TMYLCX...Screening method for tomato lines tolerant to tomato yellow leaf curl geminivirus

Experiments were carried out in Israel to determine the accumulation of tomato yellow leaf curl geminivirus DNA in tomato plants tolerant and susceptible to tomato yellow leaf curl geminivirus (potential EPPO A2 pest).

It was found that in all tested tomato lines the viral DNA concentration peaked 12-15 days after inoculation and that at this time the viral DNA in the tolerant lines was 10-50% lower than in the susceptible ones. After this peak the viral DNA decreased up to 50% in tolerant and susceptible lines. A positive correlation was found between the viral DNA accumulation and the expression and severity of disease symptoms. The authors believe that this technique of measuring the viral DNA accumulation in tomato plants infected by TYLCV might be useful to screen fast and efficiently tomato lines in their susceptibility to TYLCV.

Source: Rom, M.; Antignus, Y.; Gidoni, D.; Pilowsky, M.; Cohen, S. (1993) Accumulation of tomato yellow leaf curl virus DNA in tolerant and susceptible tomato lines.
Plant Disease 77, 253-257.

93/093 **CORBSE...**Serological detection of *Clavibacter michiganensis* subsp. *sepedonicus*

The serological detection of several strains of *Clavibacter michiganensis* subsp. *sepedonicus* (EPPO A2 quarantine pest) was investigated in North Dakota, US. The potential to detect mucoid, intermediate and nonmucoid strains of the bacterial ring rot pathogen by enzyme-linked immunosorbent assay (ELISA) from infected potato stem samples was investigated using six different combinations of *C. m. sepedonicus* antibodies. It was found that the mucoid and intermediate strains of the disease could be easily detected by ELISA, mucoid strains, however, were not detectable by this method.

All strains were detected from infected potato stems using the technique of indirect fluorescent antibody staining.

Source: Baer, D.; Gudmestad, N.C. (1993) Serological detection of nonmucoid strains of *Clavibacter michiganensis* subsp. *sepedonicus* in potato. **Phytopathology 83, 157-163.**

93/094 GVFDXX...Diversity of MLOs infecting grapevine

Experiments were carried out in France to compare grapevine flavescence dorée MLO (EPPO A2 quarantine pest), vectored by *Scaphoideus titanus*, from southern France with similar MLO-induced yellows diseases of grapevine from other parts of the country. Polymerase chain reaction (PCR) was applied to carry out this comparison. It was found that the specific flavescence dorée probes from southern France did not detect MLO in samples with grapevine yellows symptoms from other parts of France. MLOs were detected, however, in these samples when less specific primers were used, thus suggesting that different MLOs cause similar symptoms in grapevine. These other MLOs may be related to other serological groups of MLOs (e.g. elm yellows, aster yellows).

Source: Daire, X.; Clair, D.; Larrue, J.; Boudon-Padieu, E.; Caudwell, A. (1993) Characterization by hybridization and PCR of some mycoplasma-like organisms (MLO) inducing grapevine yellows.
Presentation at the "Premier Colloque Italo-Français De Phytopathologie sur: Maladies nouvelles ou d'introduction récente en France, en Italie et dans le bassin méditerranéen", Alghero, IT, 1993-04-14/18.

93/095 **POSBXX...**Tomato big bud MLO transmitted by *Circulifer tenellus*

It is still not absolutely resolved if tomato big bud MLO is just a synonym of potato stolbur MLO (EPPO A2 quarantine organism) or a distinct disease. Experiments in California, US, were carried out to investigate the causal agent of the disease and its vector.

It was established, by using biological and genetic data, that the causal agent of tomato big bud disease is the beet leafhopper-transmitted virescence agent MLO. The leafhopper *Circulifer tenellus* was able to acquire the MLO from field-collected symptomatic tomato plants and transmit it to healthy tomato plants which consequently developed typical big bud symptoms. The aster leafhopper *Mocrosteles fascifrons* failed to transmit the MLO to healthy tomato plants and tomatoes inoculated with western aster yellows MLO did not develop floral gigantism or virescence.

Source: Shaw, M.E.; Kirkpatrick, B.C.; Golino, D.A. (1993) The beet leafhopper-transmitted virescence agent causes tomato big bud disease in California.
Plant Disease 77; 290-295.

93/096 **XYLLFA...**Medium for the cultivation of *Xylella fastidiosa*

A medium for the cultivation of strains of *Xylella fastidiosa* (EPPO A1 quarantine pest) isolated from grapevine has been developed in Georgia, US. The medium, called XF-26, supported the primary growth of the bacterium.

The formula for the medium is as follows:

Substance	(g/L)
- K_2HPO_4	1,5
- $(NH_4)_2HPO_4$	0,5
- $MgSO_4 \cdot 7H_2O$	2,0
- Trisodium citrate	1,5
- Disodium succinate	1,5
- L-Alanine	0,2
- L-Arginine	0,4
- L-Asparagine	0,4
- L-Cysteine	0,4
- Glycine	0,2
- L-Gutamine	2,0
- L-Histidine	0,4
- L-Isoleucine	0,2
- L-Leucine	0,2
- L-Lysine	0,2
- L-Methionine	0,2
- L-Phenylalanine	0,2
- L-Proline	0,2
- L-Serine	0,2
- L-Threonine	0,2
- L-Tryptophan	0,04
- L-Valine	0,2
- Phenol red	0,02
- Potato starch	0,2
- Difco agar	15,0

K_2HPO_4, $(NH_4)_2HPO_4$, trisodium citrate, disodium succinate, potato starch and agar are dissolved in 800 ml of distilled water followed by adding the stock solutions. The concentrations of $MgSO_4 \cdot 7H_2O$ and phenol red were 10% and 0,2%, respectively. The concentration of the amino acids were 3,3% except those of glutamin and tryptophan which were 16,7 and 0,67%, respectively. All stock solutions were sterilized by autoclaving for 15 minutes. The final volume of the medium was brought up to one litre by adding distilled water and the pH was adjusted to 6,6-6,7 by adding NaOH. The XF-26 broth medium was prepared in the same way without the agar.

Source: Chang, C.J.; Donaldson, R.C. (1993) *Xylella fastidiosa*: Cultivation in chemically defined medium. **Phytopathology 83, 192-194.**

93/097 **FUSAAL/E.C...*Fusarium oxysporum* f. sp. *albedinis* reported from the EC (Italy)**

Bayoud disease of date palms, caused by *Fusarium oxysporum* f.sp. *albedinis* (EPPO A2 quarantine pest), has been reported to occur in southern Italy on *Phoenix canariensis*.. According to Italian scientists from the University of Bari, the fungus was isolated from wilted *P. canariensis* and identified according to its morphological characteristics. Inoculation experiments with the fungus on *P. dactylifera* have not been carried out.

The EPPO Secretariat believes that further experiments are absolutely necessary to confirm this report from Italy. Vascular wilting of P. canariensis on the Canary Islands has been regarded to be caused by a different forma specialis of F. oxysporum than the causal agent of the Bayoud disease of date palms. Cross infection studies with the Italian isolates should clear the question if the vascular wilt of the Italian ornamental palms can be attributed to F. oxysporum f.sp. albedinis or to a different forma specialis.

Source: Luisi, N.; Manicone, R.P. (1993) L'avvizzimento della palma ornamentale in Italia meridionale.
Presentation at the "Premier Colloque Italo-Français De Phytopathologie sur: Maladies nouvelles ou d'introduction récente en France, en Italie et dans le bassin méditerranéen", Alghero, IT, 1993-04-14/18.

93/098 **FRANOC...*Orius minutus* - antagonist to *Frankliniella occidentalis***

In Germany, experiments were carried out to investigate the predation of different developmental stages of *Frankliniella occidentalis* (EPPO A2 quarantine pest) by adults of *Orius minutus*. It was found that the predatory bug preys on all developmental stages of the western flower thrips, but is most efficient on larvae of the pest. About 50-60 *F. occidentalis* larvae were killed by males and females of *O. minutus*. Males of the predatory bug were only slightly less efficient than the females. Females of *O. minutus* were also capable to detect eggs of the pest in plant tissue and feed on them.

Source: Lichtenauer, A.; Sell, P. (1993) Erbeutung verschiedener Entwicklungsstadien des Western Flower Thrips durch Adulte von *Orius minutus* (Heteroptera: Anthocoridae).
Presentation at the "45th International Symposium on Crop Protection", Gent, 1993-05-04.

93/099 MELGCH...Symptom expression of potato cultivars caused by *Meloidogyne chitwoodi*

In The Netherlands, studies have been conducted to compare the symptom expression due to infections by *Meloidogyne chitwoodi* (potential EPPO A2 quarantine pest) of several potato cultivars. It was found that late cultivars, mostly starch potatoes, developed very severe symptoms caused by the nematode infection. Early cultivars were not so severely affected. The cultivars "Hansa" and "Bintje" were among those cultivars were the symptom expression was most severe.

Source: Van Riel, H.R. (1993) Test of potato cultivars for symptom expression on tubers caused by *Meloidogyne chitwoodi*.
Presentation at the "45th International Symposium on Crop Protection", Gent, 1993-05-04.