

Pest risk assessment made by France on *Citrus exocortis viroid* (CEVd) considered by France as harmful in French overseas department of Réunion¹

Scientific Opinion of the Panel on Plant Health

(Question No EFSA-Q-2006-093)

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SUMMARY

Following a request from the European Commission, the Panel on Plant Health was asked to deliver a scientific opinion on 30 pest risk assessments made by France on organisms, which are considered by France as harmful in four French overseas departments, i.e. Guadeloupe, French Guiana, Martinique and Réunion. In particular, the Panel was asked whether these organisms can be considered as harmful organisms for the endangered area of the above departments, in the meaning of the definition mentioned in Article 2.1.(e) of Directive 2000/29/EC and thus potentially eligible for addition to the list of harmful organisms in Directive 2000/29/EC.

This document presents the opinion of the Panel on Plant Health on the full² pest risk assessment conducted by France on *Citrus exocortis viroid* (CEVd) with Réunion considered as endangered area.

CEVd is a well-characterised viroid of the family *Pospiviroidae*, which infects citrus, grapevines and several herbaceous species of economic importance belonging to different families. CEVd is considered as widespread all over the citrus-growing areas of the world.

The Panel examined in detail the risk assessment provided, and considered the accuracy and quality of the information provided and methods applied for pest risk assessment purposes. The review was based on the principles and terminology of the International Standard on Phytosanitary Measures ISPM No. 11³ [Pest risk analysis for quarantine pests including

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² The full pest risk assessments have been made according to the Guidelines for the European and Mediterranean Plant Protection Organisation (EPPO) pest risk assessment scheme in EPPO Standard PM 5/3 (1) (EPPO Bulletin 27, 281-305).

³ ISPM: International Standard for Phytosanitary Measures. ISPM No. 11: Pest risk analysis for quarantine pests, including analysis of environmental risks and living modified organisms.

analysis of environmental risks and living modified organisms (2004)] and the terminology of ISPM No. 5 [Glossary of Phytosanitary Terms (2007)] by the International Plant Protection Convention (FAO, 2007).

The French document is unclear in its conclusion, stating that CEVd could feature as a pest in Réunion, yet acknowledging that CEVd is already present in the PRA area⁴. The document suggests that although preventative measures are limiting its further spread, its impact is minimal. The Panel found that many other statements, for example, those relating to economic impact, appear contradictory to the ratings given, or to statements made earlier in the assessment. In addition, many statements are neither substantiated by references nor supported by verifiable data, for example, relating to the extent of the occurrence of CEVd, the control measures undertaken and the impact of citrus exocortis disease in the PRA area.

CEVd is present in citrus producing countries worldwide and it can be spread by graft-propagation of infected planting material. Therefore, the Panel agrees that the introduction of infected propagation material is the most important entry pathway. The volume of imported material into Réunion, however, is acknowledged in the French assessment to be low, due to the small area of citrus under production.

CEVd is a well-characterised viroid in terms of its molecular and biological properties and suitable methods are available to identify and detect it in plant material. As a result, the Panel considers that viroid-indexing can reduce the probability of entry via propagation material to a negligible level. The probability of entry was rated as moderate in the French document. However, in the absence of viroid-indexing, the probability of entry is considered by the Panel to be moderate to high.

The probability of establishment was rated as moderate in the French document but the Panel considers this to be high, as CEVd would be established following the planting of any infected material. CEVd is also acknowledged as present in old plantings in the PRA area where the original plants have not been subjected to viroid-testing procedures. The Panel, however, considers these represent a low risk in terms of being a source of contamination of newly established CEVd-free orchards. Although CEVd can be spread by vegetative propagation of infected material, efficiency of mechanical transmission under field conditions is low and transmission can be avoided by disinfecting cutting and pruning tools.

CEVd is not spread by seed-transmission and has no known natural vectors. As a consequence, the probability of spread is considered by the Panel to be low.

CEVd is a pathogenic agent for citrus grown on sensitive rootstocks, causing stunting and reduced yield. The Panel confirmed that sensitive rootstocks such as Carrizo citrange are used for new plantings in Réunion.

Existing risk management measures prevent the importation of citrus planting material from Third (non-EU) countries (Annex III A of Directive 2000/29/EC). Virus indexing procedures can be applied as part of existing certification schemes for citrus propagation material in the EU. Furthermore, in the absence of virus indexing, the Panel considers the impact of CEVd to be limited, due to the absence of a natural vector, which limits the potential for further dissemination of the viroid.

Therefore, the Panel concludes that CEVd is not appropriate for evaluation of further risk management measures and thus is not considered by the Panel to be eligible for addition to the list of harmful organisms in Directive 2000/29/EC.

⁴ PRA area is the area in relation to which a Pest Risk Analysis is conducted [FAO, 2007a].

Key words: *Citrus exocortis viroid*, French overseas departments, pest risk assessment

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BACKGROUND AS PROVIDED BY THE EUROPEAN COMMISSION⁵

The current Community plant health regime is established by Council Directive 2000/29/EC on protective measures against the introduction into the Community of organisms harmful to plants or plant products and against their spread within the Community (OJ L169, 10.7.2000, p. 1), as last amended by Commission Directive 2006/35/EC (OJ L88, 25.3.2006, p. 9).

The Directive lays down, amongst others, the technical phytosanitary provisions to be met by plants and plant products and the control checks to be carried out at the place of origin on plants and plant products destined for the EC or moved within the EC, the list of harmful organisms whose introduction into or spread within the EC is prohibited and the control measures to be carried out at the outer border of the EC on arrival of plants and plant products. A harmful organism is defined in its Article 2.1.(e) as: any species, strain or biotype of plant, animal or pathogenic agent injurious to plants or plant products.

However, the provisions of the Directive are at present not yet applicable to trade in plants and plant products between the French overseas departments and the remainder of the Community. In view of the special nature of the agricultural production of the French overseas departments, additional protective measures justified on grounds of the protection of health and life of plants and plant products therein should be given.

France has therefore prepared for 4 departments (Guadeloupe, Guyana, Martinique and Réunion) 130 pest risk analyses (PRA) on organisms which are considered by France as harmful for the most important crops grown in these departments, such as banana, sugar cane, pine apple, rice, coffee, orchids, Palmae, etc. These PRAs cover a wide range of harmful organisms, such as insects and mites (54), fungi (14), bacteria (20) and virus (42).

In accordance with the discussions on this topic in the meeting of the Standing Committee on Plant Health on 27 and 28 April 2006, it was agreed that in a first phase France would select 30 PRAs among the 130 PRAs initially transmitted. They cover harmful organisms (insects, mites, fungi, bacteria and virus) affecting citrus fruit and bananas grown in the above departments.

Two types of PRA have been made: a full PRA for harmful organisms for which the probability of introduction into the French overseas departments is high with economic important crops and a simplified PRA for organisms for which the probability of introduction is extremely low.

The full PRAs have been made according to the Guidelines for the European and Mediterranean Plant Protection Organisation (EPPO) pest risk assessment scheme in EPPO Standard PM 5/3 (1) (EPPO Bulletin 27, 281-305). This scheme aims at assessing the potential risk of a particular pest (or harmful organism) for a clearly defined area through a quantitative evaluation of that risk based on questions to which replies are given on a 1-9 scale. Expert judgement is used in interpreting the replies. Moreover for each of the 130 harmful organisms a data sheet containing the most important data on the organism has been made according to the EPPO Standard PM 5/1 (1) on Checklist of information required for PRA (EPPO Bulletin 23, 191-198). The guidelines are based on many years experience of EPPO experts in the EPPO Panel on PRA and the EPPO Panel on phytosanitary measures. They conform with the International Standards on Phytosanitary Measures (ISPM) No 11 (Guidelines on PRA for quarantine pests) and use the terms of ISPM No 5 (Glossary of phytosanitary terms).

The simplified PRAs contain in a “synthetic fiche” the information available allowing the assessment of the risk associated with the relevant organism.

⁵ Submitted by the European Commission, ref. SANCO E/1/VE/svi D(2006)510488

TERMS OF REFERENCE AS PROVIDED BY THE EUROPEAN COMMISSION

EFSA is requested, pursuant to Article 29(1) and Article 22(5) of Regulation (EC) No 178/2002, to provide a scientific opinion on 30 PRAs made by France on organisms which are considered by France as harmful in 4 French overseas departments, i.e. Guadeloupe, French Guiana, Martinique and Réunion, and in particular whether these organisms can be considered as harmful organisms for the endangered area of the above departments in the meaning of the definition mentioned in Article 2.1.(e) of Directive 2000/29/EC and thus potentially eligible for addition to the list of harmful organisms in Directive 2000/29/EC.

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ASSESSMENT

1. Introduction

This document presents the opinion of the Panel on Plant Health on the pest risk assessment conducted by France on *Citrus exocortis viroid* (CEVd) with Réunion considered as endangered area.

1.1. General introduction to *Citrus exocortis viroid*

The exocortis disease was described in California in 1948, as a bark shelling or scaling disorder on trifoliolate orange (*Poncirus trifoliata*). Similar disorders were also reported as “scaly butt” of trifoliolate orange in Australia in 1949 and as “Rangpur lime disease” in Brazil in 1955.

Citrus exocortis viroid (CEVd) is a well-known pathogen described first in 1972 (Semancik and Weathers, 1972a and b) and which is present worldwide in citrus growing areas (Randles *et al.*, 2003). It is the causal agent of the exocortis disease which causes stunting and bark scaling symptoms in trifoliolate orange (*Poncirus trifoliata*), the citrange hybrids (*Poncirus trifoliata* × *Citrus sinensis*) and Rangpur lime (*Citrus limonia*), all of them widely used as rootstocks in commercial citrus orchards. Scaling symptoms begin at the soil level or even below the soil level and develop only 4-5 years after infection. Therefore, symptoms of CEVd may be overlooked. CEVd also infects other tolerant citrus species used as scion or rootstock, without causing any symptoms. This is in particular the case in areas where commercial citrus species are grown grafted on sour orange or on other CEVd-tolerant rootstocks, which act as symptomless hosts. Biological interactions between CEVd and other citrus viroids co-infecting the same plant may also interfere with symptom expression (Vernière *et al.*, 2006).

1.2. The document under scrutiny

The assessment of risks of the organism is presented by the French risk assessors in a so-called “full” pest risk assessment made according to the Guidelines for the European and Mediterranean Plant Protection Organisation (EPPO) pest risk assessment scheme [EPPO Standard PM 5/3 (1) of the EPPO Bulletin 27, 281-305].

1.3. Evaluation procedure

The Panel examined in detail the documents provided, and considered the accuracy and quality of the information and methods applied for pest risk assessment purposes.

The evaluation of the French document was conducted on the basis of an English translation from the original submission in French, which remains the reference language.

Detailed comments have been made only for the questions where it was considered that the French assessment is incorrect or could be improved. Where the Panel has uncovered new information that supports the pest risk assessment, this has been noted. While the literature has been checked and additional data has been sought, no new risk analysis has been undertaken. The Panel has noted where it considers the risk scores provided by France were too low or too high but has not suggested an exact score.

1.4. General comments on the document

The document comprises 23 pages and is divided into two parts:

- Part I provides background information required for the assessment.
- Part II contains the assessment of the risks of the organism in subject.

Although entitled a “Pest risk analysis” the French document contains only the pest risk assessment part of the analysis (despite the fact that “Pest risk analysis” is mentioned in the title of the French document).

The document includes 29 references. Some statements made in the document are neither substantiated by references nor supported by verifiable data.

The document was compiled in 2003 and therefore new information was reviewed and updated where relevant to the risk assessment.

The Panel reviewed a translation of the original French document. Some errors were noted in relation to specific risk assessment terminology. For example, the terms probability and risk are incorrectly used as synonyms in the translated text, and the same is true of the use of the terms “average” and “moderate” when describing specific ratings in Part 2 of the risk assessment. The translation of “plant” as “seedling” in the English translation also caused confusion in the assessment of entry pathways. In cases of doubt, the Panel has referred to the original French text.

1.5. Methodology applied for the risk assessment

The Panel considered the methodology used in the risk assessment provided in Part 2 of the document and concluded that:

- The document does not take into account the new situation that would apply in the pest risk assessment area in case the current regulations were to be eliminated.
- Probabilities of entry and establishment, introduction, impacts and an overall risk rating are expressed in qualitative terms such as “low” “moderate” “high” etc. A quantitative scale (1-9) is also used. Numeric and descriptive ratings used in the document are not explained, and thus do not allow for accurate interpretation.
- In some cases, the ratings given in the pest risk assessment do not seem to be justified or substantiated by the information provided in Part 1 of the document.
- The method of combining risk ratings and ascribing an overall risk rating is not defined and seem to assume equal weighting to the questions.

2. Evaluation of the pest risk assessment

2.1. Pest categorization

2.1.1. Identity of pest

The French document clearly identifies the pest as *Citrus exocortis viroid* (CEVd). Since then, the International Committee on the Taxonomy of Viruses has omitted the subfamily taxon for viroids. Therefore, the taxonomic position of CEVd is: Family *Pospiviroidae*, genus *Pospiviroid* (Flores *et al.*, 2005). This viroid is a single stranded covalently closed RNA molecule of 370-375 nucleotides which, like other members of the genus *Pospiviroid*, contains a Central Conserved Region (CCR) and a Terminal Conserved Region (TCR) located in the left terminal domain, which are presently used for taxonomical classification of viroids.

CEVd is taxonomically related to other pospiviroids, like the *Potato spindle tuber viroid* (PSTVd) and *Chrysanthemum stunt viroid* (CSVd), both included in Directive 2000/29/EC.

As indicated in the document, graft-transmission to Etrog citron (*C. medica*) provides a biological amplification system that coupled with sequential polyacrylamide gel electrophoresis (sPAGE), allows the separation and isolation of CEVd and other viroids (Duran-Vila *et al.*, 1993). Although the French document lists several other viroids in citrus (Duran-Vila and Semancik, 2003) that may interfere with the identification of CEVd, molecular methods i.e. molecular hybridization using CEVd specific probes (Palacio *et al.*, 2000) and RT-PCR based methods using CEVd specific primers (Ito *et al.*, 2002; Nakajara *et al.*, 1999; Yang *et al.*, 1992) are also available. Recent improvements of RT-PCR technology (Bernad and Duran-Vila, 2006; Ragozzino *et al.*, 2004; Tessitori *et al.*, 2005) allow the unequivocal identification of CEVd.

The Panel concludes that CEVd is a well characterised pathogen for which reliable detection methods are available. However, the Panel notes that the use of at least two methods, based on different strategies, is recommended for reliable identification of CEVd.

2.1.2. Presence or absence in PRA area

The presence of CEVd in the PRA area of Réunion is not clearly described in the French document, which imprecisely indicates in its introduction that CEVd can exist in the PRA area, but then states in other parts of the document that CEVd is present. Even though this statement is not supported by written evidence, the Panel agrees that the presence of CEVd in Réunion is very likely, as it is commonly found in all citrus growing areas of the world, especially in old orchards that were not established with viroid-indexed plant material.

2.1.3. Regulatory status in PRA area

CEVd is not listed in the EU as a quarantine pathogen. The Panel notes that CEVd is listed in the EU Directive 92/34/EEC on the marketing of fruit trees propagation material and fruit trees intended for fruit production as one of the organisms that must be absent from certified plant material (Barba *et al.*, 2003).

The introduction of citrus plant material into Réunion is prohibited under current French regulations, although introduction of seeds and of some other propagation material is permitted through a derogation that specifically lists and controls CEVd. Unfortunately, the current French legislation specifically relating to Réunion is not clearly presented, particularly in relation to the official controls in effect in areas of the island where CEVd is present.

2.1.4. Potential for establishment and spread in PRA area

Réunion Island is a volcanic island in the South-East Indian Ocean (55°30 East longitude, 21°05 South latitude) about 700 km from Madagascar. The climate is tropical, with temperatures affected by elevation. The average coastal temperature is between 18-31°C, with temperatures dropping in the interior. Humidity is high.

Réunion has eco-climatic conditions favourable for the establishment of the citrus plants and therefore also for the establishment and survival of CEVd. With regard to the potential for spread, the Panel confirms that no CEVd vectors have been identified and that CEVd is not seed-transmitted. The main means of spread is therefore by the propagation of infected budwood and, to a lesser extent, by mechanical transmission through contamination of pruning and cutting tools (Barbosa *et al.*, 2005; Garnsey and Whidden, 1973).

2.1.5. Potential for economic consequences in PRA area

The citrus growing area is reported as 301 ha mainly in the East and Southeast regions of the island with an annual production of about 8000 tons for local consumption (Agreste, 2007). The Panel found that the major citrus rootstock is Carrizo citrange (*Poncirus trifoliata* × *Citrus sinensis*) which is sensitive to CEVd and accounts for 95% of the new plantings (Vernière, personal communication).

In specific assays, yield losses have been reported to be as high as 50% (Caruso *et al.*, 2005; Vernière *et al.*, 2004) or even higher when the trees are co-infected with other viroids (Davino *et al.*, 2005; Vernière *et al.*, 2006). Unfortunately no information is available regarding losses caused by CEVd under the specific agronomic and environmental conditions of the PRA area.

2.1.6. Conclusion of pest categorization

CEVd can be clearly identified. The presence of susceptible hosts in the PRA area indicates a potential for economic consequences. The document states that CEVd is present, but limited in distribution to old plantings in which the original plants have not been subject to certification or monitoring. Thus the potential for establishment is confirmed, although due to the use of tolerant rootstocks, there is uncertainty on the extent of the occurrence of CEVd in the PRA area.

2.2. Assessment of the probability of introduction and spread

2.2.1. Probability of entry of the pest

2.2.1.1. Identification of pathways

The French document identifies two pathways: the commercial import of citrus propagation material and the introduction by private individuals.

The Panel agrees with the French document that commercial introduction of infected plants and budwood for propagation is the most important pathway.

Although CEVd may be present in non-citrus hosts, no natural vectors are known to be involved in CEVd transmission and dispersal and therefore the probability of transfer of CEVd from alternative hosts to citrus is considered to be extremely low.

2.2.1.2. Probability of the pest being associated with the pathway at origin

The French document suggests that CEVd is fairly unlikely to be associated with the pathway at origin. However, this is probably because the document considers only the importation of pathogen-tested material as required by the current French regulations. In the absence of such regulations, and given the distribution of CEVd in many parts of the world, the Panel considers the probability of CEVd being associated with the pathways at origin to be variable to high.

2.2.1.3. Probability of survival during transport or storage

The Panel agrees with the statement of the French document that CEVd is very likely to survive in plant propagation materials (budwood) during transport and storage. Probability of pest surviving existing pest management procedures

The French assessment is unclear in its presentation and ratings relating to existing pest management information. This relates particularly to consideration of the propagation material

pathway, both with and without the presence of management measures (pathogen-testing and/or certification of propagation material). No information is provided concerning the pest management measures currently taken against CEVd and other citrus pathogens in Réunion.

The Panel concludes that pathogen-testing as part of certification procedures currently available for citrus viroids including CEVd has the potential to reduce the probability of entry through the commercial import pathway to a negligible level.

2.2.1.4. Probability of transfer to a suitable host

The French document states that the probability of transfer of CEVd to a suitable host is very likely. The Panel confirms that CEVd can be transferred to a suitable host by graft-propagation of infected budwood. CEVd can also be mechanically transmitted by cutting and pruning tools but the efficiency is low (Barbosa *et al.*, 2005).

The probability of natural transfer is negligible, as no natural vectors are known and CEVd is not seed-transmissible.

2.2.1.5. Conclusion on the probability of entry

The French document concludes that there is a medium probability of entry but the semi-quantitative assessment methodology used in the French document and combination of ratings does not adequately explain how this conclusion is reached. It also includes a qualifying comment stating that the rating was reduced due to the small volume likely to be imported. The small volume of material imported is not discussed in detail earlier in the assessment and the level of reduction in the rating ascribed to this factor is not stated.

The Panel generally agrees with the probability rating of medium given in the French document but considers that in the absence of the existing management measures which only allow the importation of pathogen-tested materials, the probability of entry would be medium to high.

2.2.2. Probability of establishment

2.2.2.1. Availability of suitable hosts, alternate hosts and vectors in the PRA area

As reported in the French document *Rutaceae* hosts of CEVd are present in the PRA area. Additional non *Rutaceae* hosts include grapevine and a range of vegetable crops e.g. tomato and eggplant, also present in the PRA area.

The main citrus species grown in the PRA area are mandarins and mandarin hybrids (Ortanique tangor, Common clementine and Beauty and Dancy mandarins) accounting for about 50% of the acreage, limes (Tahiti lime and Mexican lime) and lemons accounting for about 34%, and sweet orange (mainly Washington navel) for 16% (FAOSTAT, 2008). In addition, combava (*Citrus histryx*), lime and lemon trees are commonly grown in small holdings and backyards, essentially for home consumption. The citrus relative *Murraya paniculata* is widely used as an ornamental plant as well as in hedges. The major citrus rootstock is Carrizo citrange (*Poncirus trifoliata* × *Citrus sinensis*) which accounts for 95% of the new plantings (Vernière, personal communication).

No natural vectors are known to be involved in CEVd transmission and dispersal and therefore the probability of transfer of CEVd from the alternative hosts to citrus or, conversely, from alternative hosts to citrus, is seen by the Panel as very remote.

2.2.2.2. Suitability of environment

The Panel agrees with the French document that CEVd replicates and spreads in all areas where eco-climatic conditions are favourable for the establishment of the host plant. High temperatures favour viroid replication and therefore increase its titre within plant tissues.

Once a plant has become infected with CEVd, it will remain infected. The Panel agrees with the statement of the French document that CEVd survives in infected plant materials even at low temperatures and persists in dried plant tissues and on contaminated tools (Garnsey and Whidden, 1973; Roistacher *et al.*, 1969). However, while this might theoretically and experimentally be feasible, it is very unlikely that in nature this will provide a source of inoculum (Barbosa *et al.*, 2005).

2.2.2.3. Cultural practices and control measures

The use of tolerant cultivars grafted onto tolerant rootstocks, while providing a means of disease control results in reservoirs of the pathogen from which CEVd can potentially be mechanically transmitted from infected symptomless plants to sensitive rootstock/scion combinations.

2.2.2.4. Other characteristics of the pest affecting the probability of establishment

The Panel agrees that, as stated in the French document, CEVd exists in infected hosts as populations of closely related sequence variants. However, while the French document states no difference in adaptability, recent results have shown that distinct sequence variants of CEVd present differences in their ability to infect different hosts (Gandía *et al.*, 2005; 2007).

2.2.3. Probability of spread after establishment

The Panel confirms the statement of the French document that the probability of natural spread can be considered as low, due to the fact that no vectors have been identified and that CEVd is not seed-transmitted. Therefore, the Panel consider that the main means of spread is by vegetative propagation of infected material.

Although CEVd can be mechanically transmitted, its spread by contaminated tools has been shown to be less efficient than initially thought (Barbosa *et al.*, 2005). In addition the low efficiency of this process can be further reduced by disinfection of cutting and pruning tools.

2.2.4. Conclusion on probability of introduction and spread

The Panel agrees with the rating for the probability of entry as moderate, as given in the French document, but considers that in the absence of the existing management measures the probability of entry would be medium to high.

The probability of establishment was also rated as moderate in the French document but the Panel considers this probability to be high, because CEVd would be established following the planting of any infected material.

The Panel concludes that the probability of natural spread is low because CEVd is not vector- or seed-transmitted, although the viroid can be further spread from infected plants used as a source of propagation material.

2.3. Assessment of potential economic consequences

2.3.1. Direct pest effects

2.3.1.1. Crop quality and/or yield losses

In addition to the characteristic bark scaling symptoms, the French document indicates that the most important economic damage results from the fact that diseased trees are dwarfed and produce less fruits. The Panel agrees with this analysis which is supported by a more recent publication (Vernière *et al.*, 2004). It should also be taken into consideration that in addition to CEVd, other citrus viroids co-infecting the same plant increase the severity of the dwarfing symptoms (Vernière *et al.*, 2006). In specific assays yield losses have been reported to be as high as 50% (Caruso *et al.*, 2005; Vernière *et al.*, 2004) or even higher when the trees are co-infected with other viroids (Davino *et al.*, 2005; Vernière *et al.*, 2006). The Panel wishes to stress, however, that these results have been obtained with a rootstock more sensitive to CEVd than the widely used Carrizo citrange rootstock and that no information is available regarding losses caused by CEVd under the specific environmental conditions of the PRA area.

Overall, the Panel therefore agrees with the French document that the direct effects of CEVd could be fairly serious but considers that a significant level of uncertainty is attached to this rating. In addition, the Panel stresses that this qualification applies only to sensitive citrus species and not to tolerant ones.

2.3.1.2. Control measures and their efficacy

The Panel agrees that control of CEVd is most effectively achieved through preventative measures and, in particular, by the implementation of existing viroid-indexing procedures as part of certification programs to ensure the CEVd-free status of the citrus propagation material.

In countries that have developed sanitation and certification programs (USA, Australia, Spain, France, Italy), old CEVd-infected plants have been gradually substituted by CEVd-free material, and therefore the inoculum sources have been decreased over time.

The efficacy of these measures depends on the proper implementation of suitable detection tests or on the appropriate selection of the sources from which materials are obtained.

The Panel also agrees that the use of tolerant cultivars grafted on tolerant rootstocks provides a means of disease control.

2.3.2. Indirect pest effects

2.3.2.1. Export markets

Citrus is produced only for local consumption in the PRA area, and therefore there is no effect on export markets

2.3.2.2. Social and Environmental consequences

No environmental consequences have been described as a result of CEVd infection. The Panel agrees with the French document stating that non-commercial and environmental consequences of CEVd in the PRA area would be of low importance.

2.3.3. Conclusion of the assessment of economic consequences

The French document concludes that the economic impact seems to be fairly limited but that, in the absence of precautions, the viroid could damage a citrus industry that receives little economic support, a statement considered as imprecise and unsubstantiated by any evidence to support suggestions that CEVd can be economically damaging in the PRA area.

The Panel considers that the impact of CEVd on individual plants of sensitive citrus species can be high. However, in the absence of efficient natural transmission mechanisms, the Panel considers the potential economic consequences of CEVd to be limited, due to the limited potential for spread to other citrus plants in the PRA area

2.4. Comments on the conclusion of the pest risk assessment

The comments given in the final conclusion of the pest risk assessment are often contradictory to the ratings given earlier in the assessment, particularly in relation to the economic impact which it notes in the final conclusions as minimal. Preventative measures such as the use of propagation material from a citrus certification are acknowledged as an effective means to reduce the probability of introduction to a negligible level. The final conclusion of the assessment is unclear when indicating that it is essential to remain vigilant with regard to imports of plant material and management of local nurseries where CEVd is present.

2.4.1. Degree of uncertainty

CEVd is a well-characterised pathogen, the degree of uncertainty with respect to its molecular and biological properties is low. However, there is uncertainty relating to the extent to which CEVd is present in the PRA area on old plantings of tolerant rootstocks and on its potential economic impact on the susceptible rootstocks used under the specific local agroclimatic conditions.

CONCLUSIONS AND RECOMMENDATIONS

The French document is unclear in its conclusion, stating that CEVd could feature as a pest in Réunion, yet acknowledging that CEVd is already present in the PRA area. The document suggests that although preventative measures are limiting its further spread, its impact is minimal. The Panel found that many other statements, for example, those relating to economic impact, appear contradictory to the ratings given, or to statements made earlier in the assessment. In addition, many statements are neither substantiated by references nor supported by verifiable data, for example, relating to the extent of the occurrence of CEVd, the control measures undertaken and the impact of citrus exocortis disease in the PRA area.

CEVd is present in citrus producing countries worldwide and it can be spread by graft-propagation of infected planting material. Therefore, the Panel agrees that the introduction of infected propagation material is the most important entry pathway. The volume of imported material into Réunion, however, is acknowledged in the French assessment to be low, due to the small area of citrus under production.

CEVd is a well-characterised viroid in terms of its molecular and biological properties and suitable methods are available to identify and detect it in plant material. As a result, the Panel considers that viroid-indexing can reduce the probability of entry via propagation material to a negligible level. The probability of entry was rated as “medium” in the French document.

However, in the absence of viroid-indexing, the probability of entry is considered by the Panel to be medium to high.

The probability of establishment was rated as moderate in the French document but the Panel considers this to be high, as CEVd would be established following the planting of any infected material. CEVd is also acknowledged as present in old plantings in the PRA area in which the original plants have not been subjected to testing procedures. The Panel, however, considers these represent a low risk in terms of being a source of contamination of newly established CEVd-free orchards. Although CEVd can be spread by vegetative propagation of infected material, efficiency of mechanical transmission under field conditions is low and transmission can be avoided by disinfecting cutting and pruning tools.

CEVd is not spread by seed-transmission and has no known natural vectors. As a consequence, the probability of spread is considered by the Panel to be low.

CEVd is a pathogenic agent for citrus grown on sensitive rootstocks, causing stunting and reduced yield. The Panel confirmed that sensitive rootstocks such as Carrizo citrange are used for new plantings in Réunion.

Existing risk management measures prevent the importation of citrus planting material from Third (non-EU) countries (Annex III A of Directive 2000/29/EC). Virus indexing procedures can be applied as part of existing certification schemes for citrus propagation material in the EU. Furthermore, in the absence of virus indexing, the Panel considers the impact of CEVd to be limited, due to the absence of a natural vector, which limits the potential for further dissemination of the viroid.

Therefore, the Panel concludes that CEVd is not appropriate for evaluation of further risk management measures and thus is not considered by the Panel to be eligible for addition to the list of harmful organisms in Directive 2000/29/EC.

DOCUMENTATION PROVIDED TO EFSA

1. Letter, dated 14 July 2006 with ref. SANCO E/1/VE/svi D(2006) 510488 from P. Testori Coggi to C. Geslain-Lanéelle.
2. Analyse du Risque Phytosanitaire AGR- v2 : *Citrus exocortis viroid* (CEVd). Rédaction : C. Vernière / CIRAD – Septembre 2003.

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