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Pest risk assessment made by France on *Citrus yellow mosaic virus* or *Citrus mosaic badnavirus* considered by France as harmful in the French overseas departments of French Guiana, Guadeloupe, Martinique and Réunion[1]

Scientific Opinion of the Panel on Plant Health

(Question No EFSA-Q-2006-095)

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PANEL MEMBERS

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SUMMARY

Following a request from the European Commission, the EFSA 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. French Guiana, Guadeloupe, 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 simplified[2] pest risk assessment conducted by France on *Citrus yellow mosaic virus* or *Citrus mosaic badnavirus*, with French Guiana, Guadeloupe, Martinique and Réunion considered as endangered area. The Panel will use the internationally accepted name of *Citrus mosaic virus* (CMBV) in the following text.

CMBV is a member of the family *Caulimoviridae*, genus *Badnavirus*, which causes a mosaic disease in citrus that has been termed citrus mosaic disease or citrus yellow mosaic disease. This virus is currently restricted to India. The causal agent is transmitted by grafting and experimentally, by mechanical inoculation and by the citrus mealybug *Planococcus citri* (Risso). CMBV causes mosaic and yellow flecking along the veins of the leaves. Trees affected

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[2] A simplified pest risk assessment contains in a "synthetic fiche" the information available allowing according to the risk assessor the assessment of the risk associated with the relevant organism (see the Terms of reference).

by the disease not only show significant yield reduction, but also a decrease in the quality of fruits (less juice and ascorbic acid). The virus can infect and cause symptoms in almost all citrus species and cultivars.

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. 11[3] [Pest risk analysis for quarantine pests including 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, 2007b).

The French document concludes that the phytosanitary risk associated with CMBV and citrus mosaic disease is low to moderate. The Panel notes that the main concern highlighted in the French document relates to the uncertainty in the regulatory status of CMBV, caused by past confusion in taxonomy.

An analysis of the French document, the references cited in it and additional literature consulted by the Panel, has allowed the Panel to reach to following conclusions:

- *Citrus mosaic virus* (CMBV) is the causal agent of a mosaic disease in citrus that has been termed citrus mosaic disease or citrus yellow mosaic disease. It is listed (Annex IIAI) in Directive 2000/29/EC as *Citrus mosaic virus* but has been previously known as *Citrus yellow mosaic virus* or *Citrus mosaic badnavirus*.
- CMBV is a well characterised *Badnavirus* and there are reliable molecular methods available to distinguish it from another virus causing mosaic symptoms in citrus, *Satsuma dwarf virus* (SDV), a *Sadwavirus* which was previously referred to as *Citrus mosaic virus* (CiMV) and is also listed in Directive 2000/29/EC.
- CMBV occurs in India, but not in the PRA area[4] nor in other citrus-growing regions worldwide.
- The known host range of the CMBV is limited to *Citrus* spp.
- The main pathway of entry in the PRA area is through the import from India of citrus plants or budwood for multiplication.
- There is no demonstration that CMBV is spread in nature by its experimental vector *P. citri*. Mealybugs are generally considered to be inefficient vectors and spread of CMBV in the PRA area by *P. citri* is therefore estimated to be of limited potential impact. Substantial uncertainty is however attached to this evaluation.
- If CMBV is introduced in the PRA area in infected citrus material, it will remain for at least as long as the infected material is cultivated and propagated.
- Citrus mosaic disease can cause severe losses in sweet orange, mandarins, pummelo and grapefruit orchards and in ornamental citrus plants, but not in lime. It therefore has the potential to cause significant damage to the citrus growing industry of the various French overseas departments under consideration.

The overall conclusion of the Panel is that CMBV could pose a risk to citrus production in the French overseas departments and that this pathogen is listed (in Annex IIAI) of Directive 2000/29/EC as *Citrus mosaic virus*.

[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.

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

Key words: ***Badnavirus*, citrus mosaic disease, *Citrus mosaic virus*, Citrus yellow mosaic virus, CMBV, India, pest risk assessment, *Planococcus citri***

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BACKGROUND AS PROVIDED BY THE EUROPEAN COMMISSION[5]

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, l0.7.2000, p. l), 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 yellow mosaic virus* or *Citrus mosaic badnavirus* with French Guiana, Guadeloupe, Martinique and Réunion considered as endangered area.

1.1. General introduction to *Citrus yellow mosaic virus* (CMBV)

CMBV is a member of the family *Caulimoviridae*, genus *Badnavirus* (Baranwal *et al.*, 2005; Huang and Hartung, 2001; Pringle, 1999) that causes a graft-transmissible mosaic disease in citrus species and cultivars which has been named citrus yellow mosaic disease or sometimes citrus mosaic disease and results in reductions in yield and fruit quality (Ahlawat, 2000).

The citrus yellow mosaic disease was first described by Dakshinamurti and Reddy (1975) in South India (Anantpur district of Andhra Pradesh) and was later detected in Northeast India in 1985 (Ahlawat *et al.*, 1985; Reddy and Murti, 1985). The disease was later studied in detail by Ahlawat *et al.* (1993, 1996a and b), Reddy (1997) and Baranwal *et al.* (2005). Citrus yellow mosaic disease occurs in India, especially in *Citrus sinensis* (L.) Osbeck (sweet orange) cultivars (Ahlawat *et al.*, 1996b; Ahlawat, 2000; Reddy and Murti, 1985).

CMBV can infect nearly all citrus species and cultivars. Those species particularly sensitive include: sweet orange, *C. grandis* (L.) Osbeck (pummelo), *C. limonia* (Rangpur lime), *C. volkameriana* Ten. and Pasq. (Volkamer lemon), *C. jambhiri* Lush (rough lemon), *C. paradisi* Macf. (grapefruit), *C. deliciosa* Ten. (common mandarin), *C aurantium* (L.) (sour orange), *C. mitis* (calamondine, calamondin) and *C. decumana* L. (shaddock) (Ahlawat *et al.*, 1993, 1996b; Ahlawat, 2000). The species *C. aurantifolia* (Mexican or acid lime) appears to be tolerant (Alhawat *et al.*, 1996b; Sai Gopal *et al.*, 1999).

CMBV symptoms in leaves of infected field trees are bright yellow mottling and yellow flecking and vein banding. The infected trees are slightly stunted and leaf size is smaller than in healthy trees. Trees affected by the disease not only produce a significant yield reduction, but also fruits with reduced quality (yellow depressed and green elevated areas symptoms), juice and ascorbic acid content (Ahlawat *et al.*, 1996b; Ahlawat, 2000).

Citrus mosaic disease is currently only known to occur in India where it is considered a serious disease of citrus, with losses ranging from 10 to 70% in citrus orchards and nurseries. Yield reduction is up to 77% in 10 year-old trees, and fruit quality is also affected (Ahlawat, 2000). The losses caused by the disease in some sweet orange orchards, four to six year-old, are significant and the orchards were abandoned since they were no longer productive (Ahlawat *et al.*, 1996b). Yield of affected trees can be substantially reduced in sensitive cultivars, but an accurate evaluation of losses has not yet been performed.

CMBV is readily transmitted by grafting (Ahlawat, 2000). The virus is also mechanically transmitted by dodder (*Cuscuta reflexa* L.) under experimental conditions (Ahlawat *et al.*, 1996b) and by the citrus mealybug *Planococcus citri* (Risso) (Garnsey *et al.*, 1998).

1.2. The document under scrutiny

The assessment of risks of the CMBV disease is presented by the French risk assessors in a so-called simplified version (AGR-v4) PRA 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 an 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 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 assessment of risks of the organism is presented by the French risk assessors in a "simplified format". This follows the principal sections of ISPM No. 11 but also contains descriptive sections, e.g. geographical distribution, host plants and description of damage, which would normally form part of a datasheet. Although described as a pest risk analysis, only the pest risk assessment stage has been undertaken.

The document comprises four pages and includes four references.

The document was compiled in 2003 and the Panel has found further relevant information which has become available since that time.

2. Evaluation of the pest risk assessment

2.1. Pest categorization

2.1.1. Identity of pest

The French document identifies the pathogen as *Citrus yellow mosaic virus* (CYMV), as proposed by Pringle (1999). In the list of viruses of the International Committee on the Taxonomy of Viruses the now accepted name of this virus is *Citrus mosaic virus*, CMBV, and this name will be used by the Panel throughout this document. The abbreviation CMBV is used to avoid confusion with *Cucumber mosaic virus* (CMV).

The French document states that various mosaic-type citrus diseases are caused by different viruses and that the names given in lists of quarantine organisms can be confusing. In particular the name citrus mosaic virus has been applied to two organisms: (a) a "citrus mosaic virus" (CiMV) described in Japan, which is in fact *Satsuma dwarf virus* (SDV) a *Sadwavirus* in the family Sequiviridae*;* and (b) to the *Badnavirus* covered in this analysis. The Panel recognises that confusion existed since both viruses can cause mosaic disease in citrus. However, it considers that this ambiguity should now be easily resolved, since the genomes of both viruses have been fully analysed and methods are available to clearly distinguish between SDV and CMBV. Despite this clarification, uncertainties may remain when trying to interpret regulations which simply list "citrus mosaic virus" as the name for the pathogen.

Citrus mosaic (badna)virus (CMBV) is a member of the family *Caulimoviridae*, genus *Badnavirus* (8th ICTV report). The CMBV genome has been fully analysed. CMBV has all badnavirus characteristics, is a non-enveloped bacilliform virus, measuring approximately 30x130 nm (Ahlawat *et al.*, 1996b) and contains a circular double-stranded DNA genome of 7.1-7.6 kb (Lockhart and Olszewski, 1999).

The phylogenetic analysis based on complete nucleotide sequences, revealed that CMBV is more closely related to *Cacao swollen shoot virus*, CSSV and to *Dioscorea bacilliform virus*-DBV (Baranwal *et al.*, 2005; Huang and Hartung, 2001).

The French document states that the available detection methods are biological indexing using sweet orange or pummelo seedlings as indicator plants, serological ELISA assays and molecular PCR amplification assays based on degenerated oligonucleotide primers based on a conserved badnavirus sequence.

The Panel reviewed the available information and concludes that currently, in addition to biological indexing by grafting, improved molecular PCR-based techniques allowing the specific detection of CMBV are available. However, it considers that ELISA is not an adequate method for detection and identification due to the non commercial availability of specific antibodies. The Panel concludes that the availability of the complete nucleotide sequence of the virus (Huang and Hartung, 2001) and the use of specific primers for virus detection by PCR (Baranwal *et al*., 2005) provide the basis for reliable, sensitive and robust detection and identification of CMBV.

2.1.2. Presence or absence in the pest risk assessment

The Panel confirms that CMBV is not reported to be present in the French overseas departments.

2.1.3. Regulatory status

Citrus mosaic virus (CMBV) is listed (Annex IIAI) in Directive 2000/29/EC. The French document indicates that some confusion exists in the regulatory status of CMBV, due to changes in virus taxonomy and nomenclature and potential confusion with other viruses which cause mosaic symptoms in citrus (e.g. Satsuma dwarf virus (SDV) which is also listed (Annex IIAI) in Directive 2000/29/EC). However, after review of the literature and consideration of viruses causing mosaic symptoms of citrus, the Panel considers CMBV to be the pathogen listed in Directive 2000/29/EC as *citrus mosaic virus.*

2.1.4. Potential for establishment and spread in PRA area

The Panel agrees that CMBV can affect almost all citrus species and cultivars. It agrees with the French document that the main pathway for establishment and spread is the introduction of infected plant material for propagation purposes. The Panel concludes that currently the French overseas departments are CMBV-free areas but that all ecoclimatic factors are met for the establishment of this virus in infected plants in these regions. Spread is most likely by grafting or vegetative propagation of infected plant material.

The citrus mealybug, *Planococcus citri* Risso (Hemiptera; Pseudococcidae albeit only experimentally proven as vector for CMBV is present in the French overseas departments (CABI/EPPO, 1998).

2.1.5. Potential for economic consequences in PRA area

CMBV is reported as damaging in India, its current area of distribution. The disease described in India (Ahlawat *et al.*, 1996a; Ahlawat, 2000) is reported as causing serious disorders and losses with many sweet orange and pummelo orchards being no longer productive. The Panel therefore concludes that the cultivation of susceptible citrus hosts in the PRA area confirms the potential for economic consequences.

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

As stated in the French document, international movement of citrus plant material (budwood for propagation and plants) is the most important pathway by which CMBV may gain entry into the PRA area.

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

CMBV is currently of very limited distribution and only present in India. There is thus a very low probability of CMBV being associated with the pathway, except in the case of importation of plant material from India.

2.2.1.3. Probability of survival during transport or storage

Due to the close association with the host plant, the pathogen can survive during transport of infected plant material.

2.2.1.4. Probability of pest surviving existing pest management procedures

Citrus mosaic virus is included in Annex IIAI of Directive 2000/29/EC which provides for measures to prevent the introduction of Citrus mosaic virus (on *Citrus, Fortunella*, and *Poncirus* plant material). The probability of CMBV surviving these measures is considered low.

2.2.1.5. Probability of transfer to a suitable host

The probability of natural transfer is considered low as field transmission by a vector has not been confirmed and as coccids are usually rather ineffectual vectors in nature. As significant level of uncertainty should however be considered to be attached to this rating. CMBV can be readily transferred by grafting of infected plant material.

2.2.1.6. Conclusion on the probability of entry

In the context of the existing measures, provided by current listing of citrus mosaic virus in Council Directive 2000/29/EC the Panel concludes that the probability of entry is low to negligible.

2.2.2. Probability of establishment

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

The French document states that almost all citrus species and cultivars are sensitive to CMBV. The Panel agrees with the French document. No other hosts than citrus are known for this agent.

Citrus production is presented in the French document as a diversification crop in the PRA area, where 301 ha of citrus hosts are grown in Réunion (Agreste, 2007a) and 1787 ha in French Guiana, Guadeloupe and Martinique (Agreste, 2007b and c; INSEE, 2007). The probability of establishment if citrus are grafted with infected plant material is very high due to the availability and local importance of citrus in the French overseas departments.

The citrus mealybug, *Planococcus citri* Risso (Hemiptera; Pseudococcidae albeit only experimentally proven as vector for CMBV is present in the French overseas departments (CABI/EPPO, 1998).

2.2.2.2. Suitability of environment

The French document indicates that when the virus is present inside the tissues, it is protected from climatic influences. The Panel agrees that ecoclimatic conditions will not be a limiting factor in the establishment of the CMBV due to its close association with the host plant. The Panel therefore concludes that, once virus-infected material enters the PRA region, the disease is likely to become established and exists wherever infected citrus plants are grown.

2.2.2.3. Cultural practices and control measures

The Panel agrees that CMBV is easily transmitted during graft propagation. The French document also indicates that the virus is mechanically transmitted to pummelo, shaddock or Satgudi sweet orange, but not to grapefruit or Rangpur lime (Ahlawat *et al.*, 1996b). Considering experimental evidence and the biology of the pathogen, the Panel disagrees with the French document that mechanical transmission does greatly facilitate the pest's establishment, since this mode of virus transmission might only be possible under experimental conditions.

2.2.3. Probability of spread after establishment

The Panel agrees that CMBV is spread by the movement of citrus infected propagation material (budwood and plants). The French document indicates that the virus has also been transmitted experimentally by the citrus mealybug *P. citri* (Garnsey *et al.*, 1998). The Panel states that, spread of CMBV by mealybugs has not been demonstrated in nature and that mealybug spread of viruses is considered slow due to the restricted mobility of the vector (Lockhart, 1995). The role of *P. citri* in CMBV epidemics, in spite of being present and widely distributed in the PRA area, is therefore considered circumstantial and uncertain. Consequently, the Panel disagrees with the French document which states that mechanical and vector transmission will greatly facilitate virus spread.

2.2.4. Conclusion on probability of introduction and spread

The French document concludes that the probability of entry is low. The Panel considers that the entry pathway for CMBV is controlled by existing measures under Council Directive 2000/29/EC, in which it is listed (in Annex IIAI) as *Citrus mosaic virus* (a harmful organism

for which introduction into, and spread within, all member states shall be banned if they are present on plants of *Citrus* L., *Fortunella* Swingle, *Poncirus* Raf., and their hybrids, other than fruits and seeds).

The French document concludes that the probability of establishment is moderate to high. The Panel agrees that CMBV can be efficiently transmitted through grafting of infected material. In contrast, vector transmission for CMBV has only been proven under experimental conditions. Since vector transmission is not confirmed in the field and may be of limited efficiency and since no hosts other than citrus have been reported for CMBV, virus spread by a means other than propagation of infected material can be considered very limited. A high level of uncertainty should however be considered to be attached to this evaluation.

2.3. Assessment of potential economic consequences

2.3.1. Direct pest effects

2.3.1.1. Crop quality and/or yield losses

The Panel considers CMBV one of the most serious citrus pathogens occurring in India, since it can affect almost all citrus species and cultivars, especially on sweet orange, mandarin, pummelo and grapefruit trees and ornamental citrus plants. Limes are tolerant to the disease (Alhawat *et al.*, 1996b; Sai Gopal *et al.*, 1999).

The French document mentions a potential direct damage caused by CMBV to citrus and ornamental citrus plants but provides no data on the potential economic (yield and/or quality loss, loss of export markets, cost of eradication and control, etc.) consequences of the introduction of the disease into the four French overseas departments.

Although there is limited literature available, reports on yield losses attributed to CMBV in sweet orange trees and orchards are estimated up to 77%, with the prevalence of the virus ranging from 10 to 70% in citrus orchards and citrus nurseries (Ahlawat, 2000). Sweet orange and pummelo orchards are reported as no longer productive due to CMBV infection (Ahlawat *et al.* 1996a; Ahlawat, 2000).

Highly susceptible citrus species are cultivated in all four French overseas departments. In Martinique, the main commercial species is sweet orange which accounts for 82% of the total acreage (FAOSTAT, 2006). The potential economic impact of the citrus mosaic disease is considered to be higher for Martinique than for the other three French overseas departments.

2.3.1.2. Control measures and their efficacy and cost

The French document does not estimate the costs associated with the control of CMBV. In the absence of suitable information, the Panel cannot evaluate precisely the cost of control of CMBV for the French overseas departments.

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 CMBV would have no effect on export markets.

2.3.2.2. Social consequences

The French document does not address any potential social consequences as a result of the CMBV establishment in the pest risk assessment.

2.3.2.3. Environmental consequences

Potential environmental consequences associated with the introduction and establishment of CMBV have not been considered in the French document. The Panel has not identified detrimental environmental consequences.

2.3.3. Conclusion of the assessment of economic consequences

The French document concludes that economic consequences would be low to moderate. The Panel considers however that due to the high proportion of sensitive citrus species and cultivars cultivated, especially in Martinique, the economic consequences could be higher than estimated.

2.4. Comments on the conclusion of the pest risk assessment

The French document concluded that the probability of entry of CMBV is low and the probability of establishment is moderate to high and the Panel agrees with this. The Panel however, considers the risk of spread upon establishment as low since the efficiency of the mealybug vector is probably limited and since there is no alternative host known for the virus.

The Panel considers the economic impact of the disease moderate for Réunion, the French Guiana and Guadeloupe, but higher for Martinique, where more sensitive citrus species are grown.

2.4.1. Degree of uncertainty

The French document highlights the uncertainty of the regulatory status of "citrus mosaic virus" as this name has been applied to two organisms: (a) a *Sadwavirus* in the family *Sequiviridae* described in Japan, which is in fact Satsuma dwarf virus (SDV)*;* and (b) to the *Badnavirus* covered in this analysis. The Panel confirms that the genomes of both viruses have been fully analysed and methods are available to clearly distinguish between SDV and CMBV. Uncertainties exist regarding the potential for transmission of CMBV both mechanically and in nature by the citrus mealybug, *Planococcus citri*, as these have only been confirmed under experimental conditions.

CONCLUSIONS AND RECOMMENDATIONS

The French document concludes that the phytosanitary risk associated with CMBV and citrus mosaic disease is low to moderate. The Panel notes that the main concern highlighted in the French document relates to the uncertainty in the regulatory status of CMBV, caused by past confusion in taxonomy.

An analysis of the French document, the references cited in it and additional literature consulted by the Panel, has allowed the Panel to reach to following conclusions:

- *Citrus mosaic virus* (CMBV) is the causal agent of a mosaic disease in citrus that has been termed citrus mosaic disease or citrus yellow mosaic disease. It is listed (Annex IIAI) in

Directive 2000/29/EC as *Citrus mosaic virus* but has been previously known as *Citrus yellow mosaic virus* or *Citrus mosaic badnavirus*.

- CMBV is a well characterised *Badnavirus* and there are reliable molecular methods available to distinguish it from another virus causing mosaic symptoms in citrus, *Satsuma dwarf virus* (SDV), a *Sadwavirus* which was previously referred to as *Citrus mosaic virus* (CiMV) and is also listed in Directive 2000/29/EC.
- CMBV occurs in India, but not in the PRA area[6] nor in other citrus-growing regions worldwide.
- The known host range of the CMBV is limited to *Citrus* spp.
- The main pathway of entry in the PRA area is through the import from India of citrus plants or budwood for multiplication.
- There is no demonstration that CMBV is spread in nature by its experimental vector *P. citri*. Mealybugs are generally considered to be inefficient vectors and spread of CMBV in the PRA area by *P. citri* is therefore estimated to be of limited potential impact. Substantial uncertainty is however attached to this evaluation.
- If CMBV is introduced in the PRA area in infected citrus material, it will remain for at least as long as the infected material is cultivated and propagated.
- Citrus mosaic disease can cause severe losses in sweet orange, mandarins, pummelo and grapefruit orchards and in ornamental citrus plants, but not in lime. It therefore has the potential to cause significant damage to the citrus growing industry of the various French overseas departments under consideration.

The overall conclusion of the Panel is that CMBV could pose a risk to citrus production in the French overseas departments and that this pathogen is listed (in Annex IIAI) of Directive 2000/29/EC as *Citrus mosaic virus*.

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- v4 on *Citrus yellow mosaic virus* or *Citrus mosaic badnavirus*. Rédaction : C. Vernière / CIRAD-Flhor – Septembre 2003 (Simplified version of Pest Risk Analysis).

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Agreste 2007b. Mémento agricole 2007 (résultats 2006). Agreste Martinique – La statistique agricole, Novembre 2007, 2 pp. Available from: http://agreste.agriculture.gouv.fr/IMG/pdf/D97208C01_.pdf

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

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