**UNION DES COMORES**

**Unité-Solidarité-Développement**

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VICE PRESIDENCE EN CHARGE DU MINISTERE DE L'AGRICULTURE, DE LA PECHE

DE L'ENVIRONNEMENT, DE L'ENERGIE ET DE L'ARTISANAT

# STATE OF THE SEED SECTOR IN THE COMOROS


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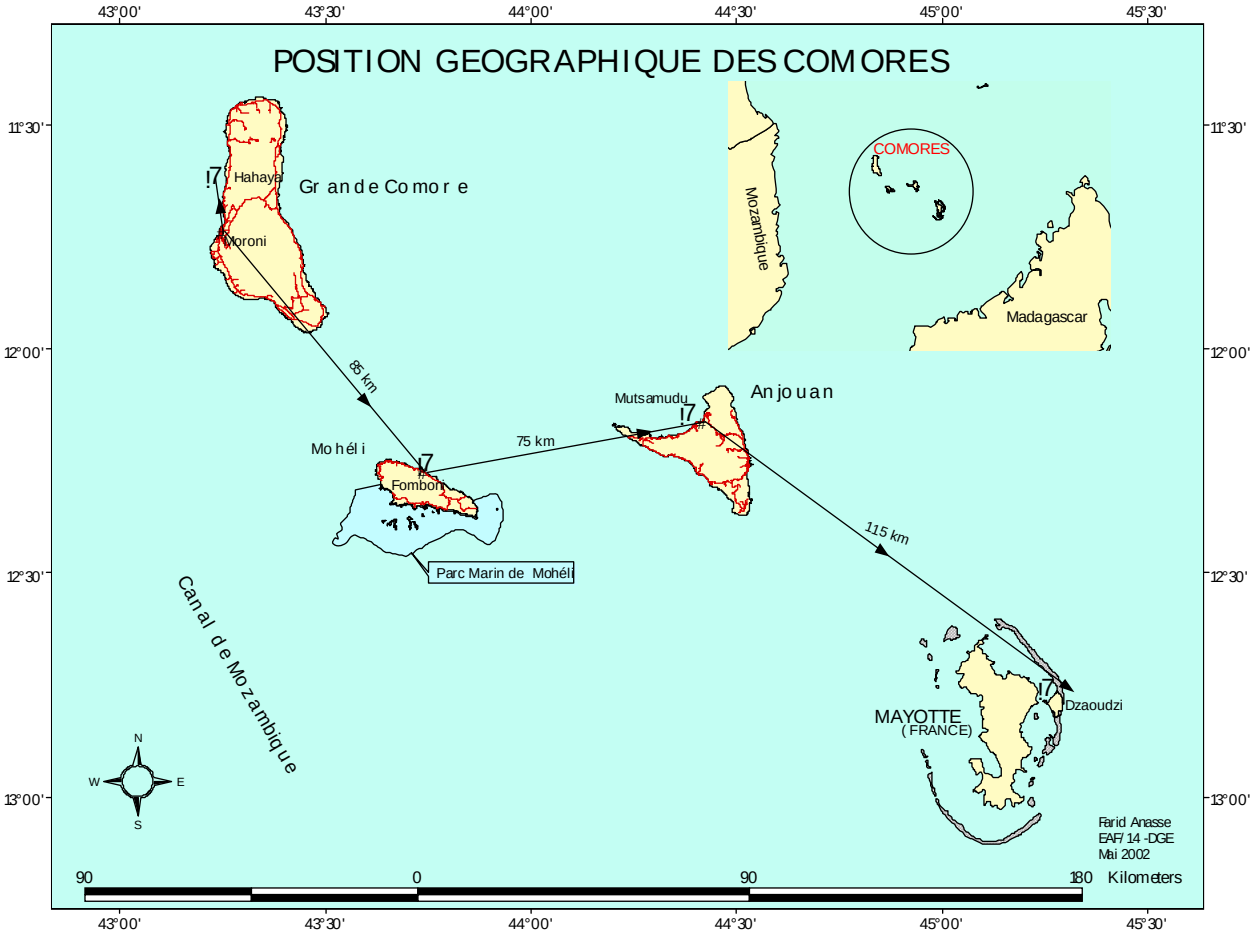
# GEOGRAPHICAL POSITION OF THE COMOROS



## 1. INTRODUCTION

The Common Market for Eastern and Southern Africa (COMESA) following the Meeting of Ministers of Agriculture held in Seychelles in 2008 mandated AFSTA (African Association on seeds) to deal with harmonization on seed in the 19 member countries of COMESA including Comoros.

The objective is to harmonize seed regulations at COMESA level to promote across-boarder seed trade for a better supply for farmers in the COMESA region.

Agriculture accounts for 40 to 50% of GDP in Comoros
Importation of most food staples (rice, flour)
Self-sufficiency in tubers
Import seed through cooperatives and informal sector
Local production of seeds in the field
Annual seed demand: 30 tons.

The Purchasing Center for Comorian Farmers (CAPAC) orders and distributes certified seed to the farmers' grouping.

The Law No. 95-09/AF related to the creation, the organization and the operation of INRAPE (National Research Institute for Agriculture, Fisheries and Environment) states that one of the missions of this institute is to make respect the standards, to analyze the products and to issue plant and animal import permit and authorization.

## 2. BACKGROUND

In 1981, the World Bank funded coconut project was launched. One component of this project is the rehabilitation of the coconut.
From 1982 to 1985, the project infrastructure was created with the plantation of seed field and the field for testing the behaviour.

In 1985, the exploitation of seed field started. The first seed lot was produced in 1986 and the first seedling was planted in 1987.

The exploitation stopped in the beginning of 1988 because 200,000 seedlings were produced of which 35,000 were exported. These seedlings covered from 1987 to 1991 nearly 550 ha. The technique used was that of assisted pollination for hybrid seed production like the hybrid PB121 (intersection of Grand Comoros and Malayan Yellow Dwarf).

From 1988 to 1989 the maize development project

After several trials of some varieties, it appears that the best variety is HK.241D (red grains) with a better yield for the lowland. These varieties are from Burkina Faso.

From 1980 to 1990 seeds were ordered by the Federal Centre for Rural Development Support. (CEFADER).

In 1994, there was a problem of structural adjustment and the number of the staff of CEFADER decreased from 1100 to 130.

A new structure was set up in 1995, which was the INRAPE (National Institute of Research for Agriculture, Fisheries and Environment) by law 95-09/AF.

From 1996 to 2000, the project PAFIA: Project for reinforcement of Agricultural Inputs funded by the AFD (French Development Agency). The PAFIA had three components:

Component 1: Creation of an autonomous network near the zones where there is a high demand in seed

Component 2: importation

Identify private operators with financial and technical capacity to import agricultural inputs. Unfortunately, these operators were not cooperative. Therefore, there was a creation of a network of users of agricultural inputs called ZANA ZEMA in July 2000 (these are groupings of villagers).

Component 3: Institutional Support

It was to support the Ministry of Agriculture on the management of public donations of agricultural inputs. To do so, a joint committee of management of agricultural donations was created and composed of:

- One representative of the Ministry of Production
- One representative of the Ministry of Economy and Finance
- Representatives of private sector(ZANA, ZEMA, VOUNA DJEMA)

The role of this committee is:

- Study the donation request for agricultural inputs
- Set up the prices of the reimbursements
- Entrust the physical management of donations to a private operator

Following the formation of this committee, a bid was launched to call for any persons who would like to sell these agricultural inputs based on the conditions set up by the committee.

Under the third component of the project PAFIA, a stock-taking of the inputs, equipment and tools in the three islands was conducted.

In 1996 the Project DECVAS (Food crop Development and reinforcement of the Seed) funded by the European Union had two components:

- A component “seed”
- A component “extension”

For the component “seed”, the expected result is the establishment of a network of seed producers. The project helped them to become independent and worked on their own nursery.

The project had two approaches:

- Local production of seedlings by local nursery
- Group that buys and sells seeds from abroad

For food component of the DECVAS Project (Jan – Feb - March 2003)

Introduction of vitro plant 32,000 in late January and distributed in the three islands.

There was no list of released varieties but rather performing varieties to be vulgarized.

INRAPE controls the germination rate and issue the seed import permit seed

One of the failures found is storage

In 1998 the draft law on the protection of plants is developed (Gilbert Theissen Consultant)

As there was no time for National Assembly, the bill remained dormant until 2006. This bill through its component 2 (Legislation) PRPV program funded by the European Union is presented to the National Assembly in the beginning of December 2006
This law is promulgated by the President of the Comoros Ahmed Abdallah Mohamed Sambi on 21st December 2006. Decree No. 06-220/PR promulgating the Law No. 06-010/AU on 2nd December 2006.

Since 2002, CAPAC imported potato seeds from France. They are supplied by the Desmazières à ARRAS and produced by the Trade-Union Artois Bapaume in the North of France.

In 2007, two containers of 15 tons of seeds were ordered and delivered. These were basic seed Elite Class and the diameter is about 35/45 mm. The seeds are excellent for meeting the most stringent production conditions especially compared to the percentage of diseases allowed that seed certified as Class A or B. Indeed, the European regulations and the annex of technical regulations of seed production of potato of the SOC allow from 0.5 to 1% of observation of infected plants by Erwinia carotovora var. atroseptica in seed production plots of basic class Elite. Only seeds of class Super Elite have a zero tolerance to Erwinia carotovora.

In 2007 The National Farmers Union Comorians (SNAC), which includes the majority of producers, wanted to start the export of potato for consumption on the island of Mayotte. To achieve this objective, the production in 2007 was doubled. Thirty tonnes of certified seed of the variety Désiré were imported and cultivate on the two islands (Anjouan and Grande Comoros) with the same quantity for each island.

While production was low in Anjouan, it was practically zero in Grand Comoros where on many plots, almost all plants were destroyed by unknown disease in early stage of the cycle.

## A. SEED CERTIFICATION STANDARDS

### a) Responsible for the seed certification

The Head of the certification is INRAPE (National Research Institute for Agriculture, Fisheries and Environment)
Email: inrape@yahoo.fr
Tel: (00269) 7633068
Address: B.1406 Moroni Comoros

### b) The existing seeds

The Main crops are:

- Plants with root and tuber crops (potatoes, yams, cassava, sweet potato, and arrow root)
- Pulses (pigeon pea, bean, peanut, mung bean, lentil, and cowpea)
- Cereals (maize, rice)
- Vegetables (tomato, onion, pepper, carrot, cabbage, cucumber, and melon)

### c) For the harvest (moisture content, germination, diseases, etc.)

The phytosanitary is the main barrier. The problems encountered on the Seeds are:

- Storage problem and sorting of agricultural products;
- No seed selection;
- No respect of criteria of quality
- No specific purity for seed (example maize)
- No varietal purity (one year after planting)
- Low germination rate
- Low yield
- Increased variety degeneration (cases of maize and potato)

### d) Future plan for seed certification

There is no national plan for seed certification. There is neither law nor draft law for seed in Comoros. Whereas Comoros has a phytosanitary law and only the application decree is missing.

## B. VARIETY EVALUATION AND RELEASE

### a) Responsible for variety evaluation and release

Currently, the Comoros does not produce seeds from released varieties. The INRAPE issues seed permit.

### b) Existing Varieties

- Three varieties of open pollinated maize imported from Nigeria with production potential of 30 to 35 quintaux/ha: TZ-W, SR-1, TZ-PB-Suakoko.

- One variety of potato (variétéPB-1)

- Two varieties for French bean (variety contades and Albert)

The unavailability of seeds of the variety Noflaye, which yielded good results in Grande Comore and Anjouan, the NDMS and CAPAC decided to import seed of the variety Red of Tana in 2008. The SEMOI (Seed of Indian Ocean) was able to supply 25 to 30 kg of seeds of the variety Veronique Noflaye identical to the variety and already tested in the Comoros.

### c) For the harvest (moisture content, germination, diseases, etc.)

At harvest the first problem is the storage and marketing. The INRAPE prepared the necessary documents.
Different techniques of seed production:

- Genetic improvement of seed
- Conservation of Plant Genetic Resources
- Micro propagation of seedlings

The main problems encountered in the potato seed production were related to nematodes, mildew and in conservation, Mealybugs of pineapple.

### d) Futur plan for variety evaluation and release

There is no plan for variety evaluation and release

## C. PHYTOSANITARY MESURES

### a) Responsible for phytosanitary measures

INRAPE is in charge of the phytosanitary measures

**b) Crops subject to phytosanitary measures**

- Vegetables (zucchini, cabbage, lettuce, tomato, cucumber, carrots, pets)
- Potato
- Cereals (maize)
- Legumes (French bean)

**c) For the harvest (moisture content, germination, diseases, etc.)**

The plant protection service of the INRAPE is the organization designated by the competent authority for the enforcement of legislation. The regulation is based on the Comoros publication (ministerial and prefectural Bylwas)
The regulations stipulates:

- The detailed procedures and all technical requirements
- The roles and missions of each partner concerned by the law
- Guidelines for surveillance of pests and preparation for regulatory measures as directed by the application decree

The PRPV project has a life span of 5 years and one of the results was the elaboration of phytosanitary legislation that was promulgated by the President. The regional harmonization of phytosanitary legislation, PRPV was also an outcome of this project (see Annex6)

## D. PLANT VARIETY PROTECTION (INTELLECTUAL PROPERTY RIGHTS)

INRAPE being a Research Institution has the intellectual property rights but there is no law for the protection of new plant variety.

The local seed producers shared among themselves seeds. Farmers sow the grains of the previous harvest. This is the case for onions, potato, cassava, yams, peanut and pulses. Farmers used vegetative propagation (banana, cassava, arrowroot, coconut, breadfruit, paddy) and the propagation by grafting, cuttings and assisted pollination.

## E. SEED IMPORT/EXPORT DOCUMENTATION AND PROCEDURES

**a) INRAPE (inrape@yahoo.fr)**
The service of plant protection of INRAPE is the organization designated to establish the seed certification, to determine the germination rate and the moisture content. The Comoros is mainly potato and vegetable seed importer.
The Comoros only export cash crops such as vanilla, cloves and ylang-ylang.

CAPAC[1] and FNAC[2] order seeds

[1] Central d'Achat Pour les Agriculteurs Comoriens

SNAC[3] and FNAC are the two Institutions distributing seeds to farmers
CAPAC is the cooperative of SNAC in charge of the seed supply among others.

**b) Existing seeds**

Mainly vegetable seeds.
The majority of tuber seeds are locally produced.

**c) For the harvest (moisture content, germination, diseases, etc.)**

On the health of onion bacterial blight (Xanthomonas axonopodis pv. Allii) of IYSV (Iris Yellow Spot Virus) or Botritys (Botrytis squamosa).
Bacterial Wilt (Bacterial wilt, Ralstonia solanacearum)
Different strains of TYLCV in more common diseases of tomato (Fusarium, TMV ...).
The main variety used for tomato Comoros Floradade (Technisem). The main problem for the production of tomato is the fruit fly

## F. MEMBERSHIP OF INTERNATIONAL ORGANIZATIONS

The Comoros has ratified the Cartagena Protocol in 2009.

## 3. CONCLUSION AND PERSPECTIVES

It is very important:

- Update existing decrees and implement them
- Standardize Phytosanitary certificates
- Develop synergy between the laboratories in the Region to exchange experience
- Have a file on the regional experts
- Set up control structure and seed certification
- Train farmers and extension workers on seed multiplication and conservation

**a) Perspective**

- Well defined for the seed sector
- Intensification of seed production under the system of quality declared seed
- Promulgation of seed law
- Promulgation of the law on Intellectual Property Rights
- Consolidation of regional cooperation

**b) Constraints**

- Lack of qualified personnel

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[2] Fédération Nationale des Agriculteurs Comoriens

[3] Syndicat National des Agriculteurs Comoriens

- Lack of a unit of plant breeding
- Lack of a comprehensive policy for seed
- Lack of a seed laws
- No seed quality control for seed locally produced by growers and those imported
- No Intellectual Property Laws

## ANNEXES

Annex 1: Annual Seed Importation

Annex 2: Type of seed imported

Annex 3: Quantity of seeds imported by CAPAC

Annex 4: Seed actors

Annex 5: Documentary Resources and Internet links

Annex 6: Objective and expected results from PRPV

**Annex 1: Annual Seed Importation**

| **Annual seed importation** | | |
|---|---|---|
| **Crops** | **Package** | **Average quantity per year** |
| Potato | Cold Container | 45 tons |
| Zucchini | Tin of 100g | 6kg |
| cabbage | Tin of 100g | 15kg |
| Lettuce | Tin of 100g | 15kg |
| Tomato | Tin of 100g | 40 kg |
| Cucumber | Tin of 100g | 10 kg |
| Carrot | Tin of 100g | 30 kg |
| Petsaï | Tin of 100g | 40kg |
| Green pepper | Tin of 100g | 02kg |
| Egg plant | Tin of 100g | 0,5kg |

| | | |
|---|---|---|
| Leek | Tin of 100g | 05kg |
| Melon | Tin of 100g | 02kg |
| Pepper | | 30kg |
| Onion | | 300kg |

**Annex 2: Types of imported seeds**

| Imported seeds | Country of origin | Companies and variety |
|---|---|---|
| Tomato, pepper, cabbage, cucumber, bean, melon, zucchini | France | Gauttier<br>technissem |
| Maize | Reunion<br>Burkina Faso | Revolution,<br>HK.241.D(red grain and best results for lowland)<br>TS.321<br>Variety:RMP.91( for the highland) and variety RMP.12<br>Variety TS.321 (22qx/ha) |
| Potato | Thailand, France and south Africa | |
| Cassava Vitro plants | Nigeria | |
| Banana Vitro plants | Israel and Cameroon | |
| Maize seed revolution | Reunion island | |
| Yam vitro plant | Cameroon | |
| Sweet potato | South Africa | |
| Coconut seedling | Ivory Coast | Big West African, Yellow dwarf of Malaysia, Red dwarf of Cameroon |

**Annex 3: Quantity of seeds imported by CAPAC**

| **Exercices** | **2005-2006** | **2006-2007** | **2007-2008** | **2008-2009** | **Variation** |
|---|---|---|---|---|---|
| **Products** | Total | Total | Total | Total | Price in Euro |
| Tomato | 59,2kg | 138 kg | 32,75 kg | 56,3kg | 94-99 |
| Carot | 24,5 kg | 99,3 kg | 32 kg | 75 kg | 39,1 -39 ,1 |
| Cucumber | | 15,3 kg | 10,2 kg | 10 kg | 38,5 |
| Lettuce | 10,2 kg | 65 kg | 18 kg | 12 kg | 49,2-49,2 |
| Cabbage | 11 kg | 43 kg | 8 kg | 18,5 kg | 49,2-49,2 |
| Bean | 15 kg | 80 kg | 40 kg | 15 kg | 36-36 |
| Sugar beat | 1 kg | 0,5 kg | | 0 | 29,7-29,7 |
| Egg plant | 0,5 kg | 1,5 kg | 2,5 kg | 0,2 kg | 53-53 |
| Green pepper | 0,5 kg | 3,5 kg | 2 kg | 1,5 kg | 85-85 |
| Melon | | | | 0,5 kg | |
| Leek | 0,5 kg | 2,35 kg | 1,5 kg | 0,5 kg | 57,8-57,8 |
| Petsaï | 5,5 kg | 11 kg | 2,5 kg | 5,5 kg | 49,2-49,2 |
| Zucchini | 1,5 kg | 2 kg | 2,1 kg | 5,0kg | 39,9-39,9 |
| Onion | 145kg | 131 kg | 305,5kg | 133kg | 51,46-50,4 |
| Total Small seeds | 274,4 kg | 529 ?4 kg | 474,05 kg | 346,5 kg | |
| Potato | 27,65T | 29,7T | 29,600T | 30T | 385-450 |

**Annex 4: Seed actors**

Grande Comores :

a) Ahmed Abdou Elkader : Executive Director of CAPAC (Central d'Achat des Professionnels Agricoles des Comores) B.P 1473

Tél : Cell : +239 3330234

Bureau : +239 7730101

Email : capac@comorestelecom.km

b) Mr. Youssoufa Mohamed Ali, National Focal Point du Plant Proection Program
Email : youssoufa63@yaoo.fr

Tel : +269 3339176

c) Mr. Issimaila Mohamed : chef du département protection des végétaux INRAPE

Email : issimaila63@yahoo.fr

d) CHADHOULIATI Abdou Chakour : Head of Plant pathology and entomology Laboratory of INRAPE and Deputy Director of INRAPE

Email : chadhouliati5@yahoo.fr ou chadhouliati@comorestelecom.km

Tel : +269 3339176
INRAPE

Email : inrape@yahoo.fr

Tel : +2697633068

Address : B.P 1406 Moroni Union Des Comores

e) Mr. Issa Mhadji Président du SNAC (Syndicat National des Agriculteurs Comoriens)
f) Mr. Ahmed Naussoib : technician GIE ZANAZEMA
Mohéli
Mr. Loutoufi mohamed Responsible for Cendre d'Encadrement agricole de Fomboni
Mr. Abdou Soimadou Ali Director of Plant Protection Service of Anjouan
Mr. Ibrahim abdallah charif : Director of Plant Protection
Mr. Saindou kassim : Head of Phytosanitary Inspection

**Annex 5: Documentary Resources and Internet links**

Report Cuvellier 2008

http://www.plantdepommedeterre.org/pages/plan.htm

http://www.cipotato.org/ : CIP website particulraly downloadable file: http://www.cipotato.org/publications/

http://www.avrdc.org/ : website of AVRDC

For seeds of tomatos: http://www.avrdc.org/ Contact for tomato: Dr. Peter Hanson: hansp@netra.avrdc.org.tw

http://www.prpv.org/ : website for PRPV (Regional Program of Plant Protection)

**Annex 6: Objective and expected results from PRPV**

The pest control is not efficient whereas the crops are subject to quasi permanent parasite pressure. The objective of PRPV is to promote and develop operational, scientific and technical cooperation between the countries members of Indian Ocean Commission about the Plant Protection.

**Partners of the program**

- INRAPE Comoros;
- Plant Protection Services of the Ministry of Agriculture of Madagascar;
- Quarantine and Plant Pathology Division and Entomology Division of the Ministry of Agriculture of Mauritius (AREU and MSIRI)
- Plant Protection Services of the Ministry of Agriculture and CIRAD of Reunion island;
- Plant Protection Services and Plant research and Evaluation of The Ministry of Environment of Seychelles

PRPV had 5 components:

**Developed Activities**

- Creation of a network of plant proection in Indian Ocean;
- Regional harmonization of phytosanitary legislations;
- Setting up the quality control (planting materials and pesticides);
- Applied research to pesticide experimentation and to alternative methods of control;
- Technical and training support.

***Annex 6 :***

***List 1 A. Quarantine pests of which importation are prohibited when found isolated or in the plants or in plant products:***

***Bacteria and Phytoplasms***

Acidovorax anthurii

Agrobacterium tumefasciens

*Candidatus liberobacter africanum*
*Candidatus liberobacter asiaticum*
*Cassava witches broom*
*Clavibacter michiganensis ssp michiganensis*
*Clavibacter michiganensis ssp sepedonicus*

*Coconut Lethal yellowing*

*Curtobacterium flaccumfasciens pv flaccumfasciens*
*Erwinia amylovora*
*Pseudomonas syringae pv pisi*
*Pseudomonas syringae pv tabaci*
*Pseudomonas syringae pv glycinea*
*Pseudomonas syringae pv morsprunorum*
*Pseudomonas fuscovaginae*

Xanthomonas campestris pv oryzae

*Xanthomonas campestris pv oryzicola*
*Erwinia stewartii*
*Erwinia tracheiphila*
*Phytomonas sp ( pourriture du Coeur de palmiste)*
*Pseudomonas syringae pv lacrymans*
*Ralstonia solanacearum race 2 (Moko)*
*Ralstonia solanacearum Race 3( biovar 2 )*
*Spiroplasma citri*
*Strawberry lethal decline phytoplasma*
*Sugarcane grassy shoot phytoplasma*
*Sugarcane white leaf phytoplasma*
*Sweet potato little leaf phytoplasma*
*Xanthomonas axonopodis pv citri*
*Xanthomonas axonopodis pv diffenbachiae*
*Xanthomonas axonopodis pv passiflorae*
*Xanthomonas campestris pv fragariae*
*Xanthomonas campestris pv musacearum*

**Fungi**

Cronartium spp

Deuterophoma tracheiphila

*Exobasidium vexans*
*Fusarium oxysporum f.sp cubense*
*Mycosphaerella fijiensis*
*Peronosclespora virus litchii*
*Peronosclerospora maydis*
*Peronosclerospora phillipinensis*
*Peronosclerospora sacchari*
*Peronosclerospora sorghi*
*Peronospora hyoscyami fsp tabacina*
*Phytophthora fragariae pv fragariae*
*Phytophthora infestans A2*
*Synchytrium endobioticum*
*Urocystis cepulae*
*Sphaceloma arachidis*

*Phytophthora megasperma f.sp. glycinea*

***Insects and Mites***

*Acalymma trivittata*
*Acyrthosiphon pelargonii*
*Acyrthosiphon pisum*
*Aleurocanthus woglumi*
*Aleurocanthus zizyphi*
*Aleurodicus destructor*
*Aleurodicus dugesii*
*Aleyrodes protella*
*Anacridium melanorhodon*
*Anastrepha fraterculus*
*Anastrepha grandis*
*Anastrepha interrupta*
*Anastrepha ludens*
*Anastrepha mombinpraeoptans*
*Anastrepha obliqua*
*Anastrepha serpentina*
*Anastrepha striata*
*Anastrepha suspensa*
*Anoplophora chinensis*
*Anoplophora glabripennis*
*Aonidiella orientalis*
*Aphis coreopsidis*
*Aphis glycines*
*Aphis idaei*
*Aphis rubifolii*
*Aphis rumicis*
*Aphis sesbaniae*
*Aspidiotus nerii*
*Atranchya sp*
*Aulacaspis madiunensis*
*Aulacaspis yasumatsui*
*Aulacophora foveicollis*
*Aulacophora indica*
*Aulacophora lewisii*
*Bactrocera correcta*
*Bactrocera cucumis*
*Bactrocera dorsalis*
*Bactrocera dorsalis species complex*
*Bactrocera invadens*
*Bactrocera neohumeralis*
*Bactrocera tau*
*Bactrocera tryoni*
*Bemisia tabaci biotype Q*
*Brevipalpus californicus*

*Brevipalpus chilensis*
*Tragoderma granarium*
*Mononychellus tanajoa*
*Cacoecimorpha pronubana*
*Cerataphis orchidearum*
*Ceratitis cosyra*
*Ceratitis malgassa*
*Ceratovacuna lanigera*
*Ceroplastes ceriferus*
*Ceroplastes destructor*
*Ceroplastes rubens*
*Ceroplastes rusci*
*Chaetanaphothrips signipennis*
*Chaetosiphon fragaefolii*
*Chaetosiphon fragariae*
*Chaetosiphon tetrarhodum*
*Chaetosiphon thomasi*
*Chromatomyia horticola*
*Chrysodeixis eriosoma*
*Cochliothis melolonthoides*
*Dialeurodes citri*
*Dialeurodes citrifolii*
*Danothrips trifasciatus*
*Eldana saccharina*
*Eutetranychus orientalis*
*Epilachna varivestis*
*Epitrix cucumeris*
*Frankliniella bispinosa*
*Frankliniella intonsa*
*Frankliniella fusca*
*Frankliniella occidentalis*
*Frankliniella schultzei*
*Gynaikothrips ficorum*
*Hayhurstia atriplicis*
*Helicoverpa assulta*
*Hercinothrips femoralis*
*Heteronychus arator*
*Heteronychus plebejus*
*Hoplochelus marginalis*
*Hylurgus ligniperda*
*Hysteroneura setariae*
*Icerya aegyptiaca*
*Leptinotarsa decemlineata*
*Leucinodes orbonalis*
*Liriomyza brassicae*
*Liriomyza bryoniae*
*Liriomyza sativae*
*Lopholeucaspis japonica*
*Maconellicoccus hirsutus*
*Macrosiphum pelargonii*

*Mamestra brassicae*
*Megalurothrips distalis*
*Megalurothrips usitatus*
*Melanoplus differentialis*
*Myzus ascalonicus*
*Myzus ornatus*
*Neoaliturus opacipennis*
*Neoaliturus tenellus*
*Nipaecoccus nipae*
*Parlatoria oleae*
*Parlatoria pergandii*
*Paysandisia archon*
*Perkinsiella vastatrix*
*Perkinsiella vitiensis*
*Petrobia latens*
*Pezothrips kellyanus*
*Phoracantha recurva*
*Phthorimaea operculella*
*Planococcus minor*
*Planococcus musae*
*Pseudococcus calceolariae*
*Pseudococcus comstocki*
*Pseudococcus jackbeardsleyi*
*Quadraspidiotus perniciosus*
*Rastrococcus iceryoides*
*Rastrococcus invadens*
*Rhopalosiphon padi*
*Rhagoletis cerasi*
*Rhagoletis pomonella*
*Rhynchophorus ferrugineus*
*Rhynchophorus phoenicis*
*Scirtothrips dorsalis*
*Sesamia cretica*
*Sitobion fragariae*
*Symmetrischema tangolias*
*Tetranychus cinnabarinus*
*Thrips flavus*
*Thrips hawaiiensis*
*Thrips imaginis*
*Thrips parvispinus*
*Toxoptera odinae*
*Trialeurodes ricini*
*Trialeurodes vaporariorum*
*Trichoplusia ni*
*Unaspis yanonensis*
*Uroleucon ambrosiae*
*Xylotrupes bajulis*
*Haplothrips tenuipennis*

*Rhyncophorus palmarum*

***Nematods***

*Anguina tritici*
*Aphelenchoides besseyi*
*Aphelenchoides fragariae*
*Aphelenchoides ritzemabosi*
*Bursaphelenchus xylophilus*
*Ditylenchus angustus*
*Ditylenchus dipsaci*
*Ditylenchus destructor*
*Globodera pallida*
*Globodera rostochiensis*
*Heterodera schactii*
*Nacobbus aberrans*
*Pratylenchus goodeyi*
*Radopholus citri*
*Radopholus similis*
*Rhadinaphelenchus cocophilus*
*Tylenchulus semipenetrans*

***Virus and Viroids***

*Andean potato latent virus*
*Andean potato mottle virus*
*Avocado sun blotch viroid*
*Banana bunchy top virus*
*Bean golden mosaic virus*
*Banana bract mosaic virus*
*Cassava african mosaic virus*
*Cassava brown streak virus*
*Cassava common mosaic virus*
*Chilli veinal mottle virus*
*Citrus cachexia viroid*
*Citrus exocortis viroid*
*Citrus infectious variegation virus*
*Citrus leaf rugose virus*
*Citrus psorosis*
*Citrus tatter leaf virus*
*Citrus tristeza virus*
*Citrus vein enation virus*
*Citrus yellow mosaic virus*
Citrus witches' broom
*Coconut cadang cadang viroid*
*Coconut foliar decay virus*
*Cowpea aphid borne mosaic virus*
*Cowpea mild mottle virus*

*Cucumber green mottle virus*
*Cymbidium mosaic virus*
*Dasheen mosaic virus*
*Impatiens necrotic spot virus*
*Internal cork virus of sweet potato*
*Lettuce infectious yellows virus*
*Papaya bunchy top*
*Papaya ringspot virus P*
*Pepper mild mottle virus*
*Pea seed borne mosaic virus*
*Peanut stripe virus*
*Peanut rosette virus*
*Peanut clump virus*
*Peanut mottle virus*
*Pelargonium leaf curl virus*
*Pineapple bacilliform virus*
*Pineapple wilt virus*
*Potato spindle tuber viroid*
*Potato virus T*
*Potato stolbur*
*Squash leaf curl virus*
*Strawberry crinkle virus*
*Strawberry latent ringspot virus*
*Strawberry mild mottle virus*
*Strawberry mild yellow edge virus*
*Strawberry vein banding virus*
*Sugarcane fiji disease*
*Sugarcane mosaic virus*
*Sweet potato feathery mottle virus*
*Sweet potato yellow dwarf virus*
*Sweet potato mosaic virus*
*Tobacco ringspot virus*
*Tomato black ring virus*
*Tomato bushy stunt virus*
*Tomato ringspot virus*
*Tomato spotted wilt virus*
*Tomato yellow leaf curl virus*

**LISTE 1. B : Non Quarantine pest list**

**Bacteria and Phytoplasms**

*Agrobacterium tumefasciens*
*Candidatus liberobacter africanum*
*Candidatus liberobacter asiaticum*
*Pseudomonas savastanoi pv phaseolicola*
*Pseudomonas syringae pv tomato*
*X. campestris mangiferae indicae*
*X. campestris pv vesicatoria*
*Xanthomonas axonopodis pv citri*

*Xanthomonas axonopodis pv phaseoli*
*Xanthomonas axonopodis pv vitians*
*Xanthomonas campestris pv campestris*
*Xylella fastidiosa*

***Fungi***

*Alternaria dauci*
*Cercospora kikuchii*
*Colletotrichum acutatum*
*Colletotrichum capsici*
*Mycosphaerella citri*
*Mycosphaerella eumusae*
*Mycosphaerella musicola*
*Phytophthora capsici*
*Phytophthora colocassiae*
*Spongospora subterranea f.sp subterranea*
*Stenocarpella macrospora*
*Stenocarpella maydis*

***Insects and Mites***

*Acyrthosiphon solani*
*Aphis craccivora*
*Aphis gossypii*
*Bemisia argentifolii*
*Bemisia tabaci*
*Diaphorina citri*
*Dysmicoccus brevipes*
*Macrosiphum euphorbiae*
*Melanaphis sacchari*
*Myzus persicae*
*Perkinsiella saccharicida*
*Phthorimaea operculella*
*Rhopalosiphum maidis*
*Saccharicoccus sacchari*
*Toxoptera citricidus*
*Trioza erytreae*

***Nematodes***

Meloidogyne arenaria

*Meloidogyne hapla*
*Pratylenchus brachyurus*
*Scutellonema brachyurum*

**Virus and Viroids**

*Banana streak virus*
*Bean common mosaic virus*
*Bean yellow mosaic virus*
*Beet curly top virus*
*Carnation etch ring virus*
*Carnation necrotic fleck virus*
*Carnation ringspot virus*
*Carnation streak virus*
*Chrysanthemum stunt viroid*
*Citrus greening*
*Citrus tristeza virus*
*Citrus psorosis virus*
*Cowpea mild mottle virus*
*Erwinia chrysanthemi*
*Lettuce mosaic virus*
*Odontoglossum ringspot virus*
*Orchid fleck virus*
*Squash mosaic virus*
*Tobacco necrosis virus*
*Tobacco streak virus*
*Tomato spotted wilt virus*
*Vanilla mosaic potyvirus*