WAGENINGEN UR
For quality of life

HORTIN Annual report 2003

Horticultural Research Cooperation between Indonesia and the Netherlands

W.J. van der Burg & A.P. Everaarts (Editors)

Wageningen
May 2004

If you think you could contribute to the goals of HORTIN in any way, please contact the Programme management.

Indonesia
Dr Ahmad Dimyati, Director, ICHRD
Telephone: +62 21 7890990,
fax +62 21 7805135
E-mail: DIMYATIA@INDO.NET.ID

Netherlands
Joost van der Burg, Plant Research International, programme leader
Telephone +31 317 476984,
fax +31 317 423110
E-mail: JOOST.VANDERBURG@WUR.NL

or Arij Everaarts, APR, programme secretary
Telephone +31 320 291671,
fax +31 320 230479
E-mail: ARIJ.EVERAARTS@WUR.NL

Table of contents

I. General

1. Programme number: 424

2. Title: Horticultural research cooperation between Indonesia and the Netherlands

3. Working title: HORTIN

4. Programme leader and leading institute: W.J. van der Burg, Plant Research International (PRI).
   Programme secretary: A.P. Everaarts, Applied Plant Research (APR).

5. Participating institutions:
   Indonesia: IVEGRI, IOPRI, IFRURI, CISTROPHRES, DINAS Pertanian (Riau).
   Netherlands: APR Lelystad, APR Naaldwijk, APR Horst, Agrotechnology & Food Innovations (A&F) , Plant Research International (PRI), Centre for Genetic Resources (CGN).
   Participating companies: PT East West Seed Indonesia, AGRIOM, Plasthill, Rovero Systems.
   Input by: DLV Agriconsult, Wavin Overseas, Asian Perlite Industries, Fungi 2000, PT Joro.

6. Duration: 1 January 2003 – 31 December 2006

7. Budget 2003 (k€)

Institute	LNV	Matching other LNV programmes	Matching SENTER
APR	240.0		
PRI	238.9	47	100
A&F	50.0 (NAP)		13.5
WUR communication	1.1		
Total	530	47	113.5

   This year the A&F-led PROCULT project has received a subsidy of 50 k€ from the NAP funds, and the activities will be reported in this annual report.
   APR furnished an additional 3.5 k€ for building a prototype greenhouse at Lelystad.
   Ewindo and Koppert provided funds, personnel input and facilities for organising an insect scouting course.
   Asian Perlite invested several days facilitating a study tour in Malaysia.
   Wavin Overseas provided plastic tubing for an experimental greenhouse at Lelystad.

8. Character of the programme: policy support programme (BO)

9. (Potential) users of the results: Respective Ministries of agriculture, Indonesian and Dutch agribusiness (breeders, producers of plant starting materials, agricultural supply companies, traders, exporters), Indonesian and Dutch knowledge institutions, Indonesian primary producers.

10. Composition of the Programme Board (BC):
    Chairman: W.J.C. Huisman (IH-LNV)
    Secretary: C.G.J. van Leijen (EC-LNV)
    Members: C.M.M. van Winden (DL-LNV)
    R.A. van Raalte (IZ-LNV)
    The successor to Mr van Raalte will be Mr B. Vrolijk (IZ-LNV)

II. Report on 2003

Introduction

With the kick-off of HORTIN, Jakarta, February, a new programme has started as a successor to BIOBREES. The new programme is entirely new in several ways: all projects are new and were selected jointly to ensure conformity with Indonesian and Dutch horticultural policy; most project leaders on both sides are new to international collaboration and/or each other, and new institutes were included on both sides, *viz.* IFRURI and CISTROPHRES in Indonesia and APR in the Netherlands. Emphasis of the project is on generating knowledge and transfer of knowledge to facilitate the establishment of business-to-business relationships. The projects are therefore more of practical nature than during its predecessor.
The DG Horticultural Production, the DG AARD in consultation with the Dutch agricultural counsellor have been instrumental in its establishment.

Policy issues

The programme contributes to three important elements of Dutch foreign policy.

Promotion of trade

It is the intention of HORTIN to assist Indonesian and Dutch companies in establishing working relationships. In this first year of the programme, this is done with several approaches. Firstly, a number of projects have reached a stage at which collaboration with the private sector becomes a prerequisite for progress. These are MUSHROOM, PROTFLOW, PROTVEG1, PROTVEG2, QUALITY, and many contacts have been established. All project leaders of these projects have visited Indonesia at least twice to establish contacts and to negotiate conditions for joint activities. Also for HAPLIN and SEEDS, the input of the private sector is essential, and these projects benefited from their close links to the industry, which they had from the start. The other projects, FRUITFLY, GARLIC are at a stage in which first some results are needed, before the industry can be interested. It has been agreed that the GENEBANK project is not suitable for close business links. Secondly, it is important to organise and participate in events in which companies are invited to exchange knowledge and to learn about the possibilities of collaboration. HORTIN organised a kick-off meeting in collaboration with the Dutch Agricultural counsellor, in which quite a number of companies attended. The HORTIN coordinator participated actively in the IAARD-organised Ekpose at Lembang this year, which included a seminar and a trade fair. The link with the public-private Senter project PROCULT has been reinforced through additional financing under this programme. This is important for all protected cultivation projects.

Figure 1. The Dutch programme leader took part in the Business meeting at the Ekspose 2003 in Lembang.

Knowledge dissemination

GENEBANK, PROTFLOW, PROTVEG1, PROTVEG2, QUALITY, SEEDS, all organised workshops and training courses with participation of private companies and farmers. GARLIC, FRUITFLY, MUSHROOM gave presentations or provided on-the-job training. The character of some of the workshops held so far was of an inventory and orientating nature, including basic training. When the programme progresses, many more of such events will be organised gradually shifting to transfer of knowledge gained in the projects.

Institute building

Under the GARLIC project, one scientist was trained at IPB in marker technology, a course that for a large part originated from the HORTIN's predecessor, BIOBREES, and the BIOTRAIN project, and is now being given without external support.
The aim of training most counterparts in the Netherlands has largely failed due to the too short notice for several of the funding sources, and because of the very late release of funds from the Indonesian side. On the other hand, almost all project leaders visited the counterpart institutes and had ample time to discuss problems and possible solutions. Inventories of essential equipment lacking were made. Many small supplies have been bought with Indonesian and Dutch money, but for the more expensive pieces of equipment, solutions still have to be found.
Institute staff benefited largely from the training activities at their institutes, in which they took actively part. Not only the participation, but also the preparation of such events has many learning elements.

Figure 2. Excellently organised fields for the Ekspose 2003 at IVEGRI.

Results

Much progress has been made, these are presented in the individual project reports in the annex. Despite a number of constraints encountered during the year, most projects are now well underway. Hereunder a short summary per project in alphabetical order.

FRUITFLY

Main aim this year was to identify the kinds of fruitflies present in the two research areas on Sumatra, and to identify traps, attractants and bioactive compounds for their possible control.
The Dutch project leader visited the project twice, and during these visits a number of problems and possible solutions were identified. A choice of traps has been made, and several models are now being tested under field

condition. The identification of fruit fly species is underway. A nice result is also the participation of Dinas Pertanian (Riau), who will assist in the field work and will perform much of the knowledge transfer to farmers.
Involvement of the private sector: contacts have been made with a large Dutch fruit importer. They pointed out that the problems are mostly at the level of production. New contacts will be made with for instance large producers as soon the as the first results become available.
Highlight: **Traps are working and the most important fruit fly species have been identified**.
Conclusion: Project is running well.

GARLIC

Aim of this project is to revitalise Indonesian garlic agriculture. At present competition from China is overwhelming, endangering the garlic genetic resources of Indonesia. This project had a slow start, because of uncertainty in relation to the Indonesian priority. By 1 March the project took of and will be a collaboration between CISTROPHRES, IVEGRI and PRI. Collections of indigenous and foreign garlic varieties have been made and planted under various conditions in Indonesia and at PRI the Netherlands. During a field visit farms on Java and Lombok were visited. At present the characterisation of the material is on going, including virus detection. A staff member of CISTROPHRES could be financially supported to follow a training course in Genetic Marker Technology at IPB, Bogor.
Involvement of the private sector: an inventory of possible interested private companies was made on the Indonesian and Dutch side and based on this list discussions will take place in 2004 with these companies concerning collaboration.
Highlight: **The identification of garlic accessions that have good flowering potential and virus resistance.**
Conclusion: Project runs satisfactorily now.

Figure 3. Festive start of the garlic harvest on Lombok.

GENEBANK

Aim of this project is to assist IOPRI with the development of a management system for the genetic resources collection of tropical ornamentals. The Indonesian project leader visited the Netherlands in February and studied the Dutch system at PRI. At that occasion also the Plan of Action was discussed and the genebank facilities of CGN visited. The Dutch project leader went to Indonesia twice. The second time for a longer period to intensively discuss and work with IOPRI staff, to unveil all ins and outs of their system and possibilities for support. Orchids were chosen for the development of protocols and databases. The training of an Indonesian scientist was cancelled at the last moment due to SARS; she will now come in 2004. A mission report was prepared which included several recommendations for the improvement of the IOPRI genetic resources management system.
Involvement of the private sector: Not applicable.
Highlight: **A collecting form was developed and tried out in practice.**
Conclusion: Project runs according schedule.

HAPLIN

Aim of the project is to implement haploid technologies at IOPRI and IVEGRI. The technology for cabbage and pepper is available and can be transferred immediately. The lab at IVEGRI is developing and most of the equipment and facilities is present. A growth room facility, a major investment, is still lacking however. Unfortunately a disagreement on the involvement of IPB resulted in a discussion that halted this part of the project. The Dutch project leader will go to Indonesia early 2004, and together with the Indonesian HAPLIN-coordinator will try to resolve this issue. For *Anthurium* the methods still have to be developed, and are currently facing problems with bacterial contamination. COGEM permission has been obtained for the import of transgenic plant material with bacterial resistance from the University of Hawaii; the material is expected February 2004.
Involvement of the private sector: The *Anthurium* research is carried out in collaboration with AGRIOM breeding company. Contacts with private vegetable breeding companies in Indonesia will be made during 2004.
Highlight: **A very efficient routine method based on shed microspore culture was developed for Indonesian hot pepper varieties.**
Conclusion: Despite major difficulties this year, the outlook for 2004 is positive.

MUSHROOM

Aim of the project is to introduce mushroom research into Indonesia. IVEGRI intends to establish a centre for mushroom research and the project supports this by providing training, introduce methods of collecting, characterisation and storage of cultures, and by performing collaborate research on spawn production, development of growing media, etc. The Dutch project leader visited IVEGRI twice, visited many farmers with the Indonesian project leader and identified the missing facilities and equipment. A start has been made with the collection of available commercial strains during the trip in Indonesia and with collecting edible mushrooms from nature. Many collections have been genotyped, the production of a selection of these commercial strains has started at APR in collaboration with a Dutch company.
Involvement of the private sector: Contacts have been established with local mushroom producing companies, there is some reluctance due to secrecy.
Highlight: **The first trials for oyster mushroom testing have started at IVEGRI.**
Conclusion: The project is running well.

Figure 4. Spawn production at the Institute of Horticultural Seed development and Agribusiness promotion in Yogyakarta.

PROCULT

Aim of this project is to develop possibilities for protected cultivation in the lowland. Six greenhouse have been built, with three different plastic foils in two replications. Internal climate, crop development, and insect incidence is observed and recorded to investigate the effect of the different plastic filters employed. After a crop failure due to a bacterial disease in the first crop, now a second crop performed excellently. Data are used for a PhD-study of an Indonesian student, working at the company that hosts the greenhouses. The company invests much money and

labour in the crop management and insect scouting activities. The project is run in close collaboration with PROTVEG2.
Involvement of the private sector: It is basically a B2B project, sponsored by Senter, Rovero, Plasthill and Ewindo and with the involvement of Dutch and Indonesian knowledge institutions. Senter subsidy ends by December 2004. This issue is under discussion with the agency.
Highlight: **The first crop cycle has been completed with a healthy tomato crop.**
Conclusion: The project is running well.

Figure 5. Experimental greenhouses for the lowland.

PROTFLOW

The project aims at developing an improved low-cost greenhouse for commercial flower production at mid- and high elevation. This project is run in close collaboration with PROTVEG1. The Indonesian and Dutch project leaders of both projects went to Malaysia for a study tour on the more advanced low-costs greenhouses that exist there. A well-attended workshop was held at IOPRI, in which the conclusions from the study tour, the outcome of the survey by IOPRI and the plans for the next period were discussed. Three different experimental greenhouses will be built at IOPRI early 2004.
Involvement of the private sector: Several contacts have been made.
Highlight: **The design of 2 experimental low-cost greenhouses for vegetable and flower production.**
Conclusion: The project is running well.

PROTVEG1

The project aims at developing an improved low-cost greenhouse for commercial vegetable production at mid- and high elevation. This project is run in close collaboration with PROTFLOW. The study tour to Malaysia mentioned above, provided a better insight into the possibilities for alternative constructions and resulted in collaboration with a Malaysian supplier. Apart from that, an entirely new concept was developed and is now being tested at APR. A participatory workshop was held at IVEGRI with a large group of farmers and suppliers to discuss the outcome of the survey and the economic analysis. Three experimental greenhouses will be built at IVEGRI early 2004.
Involvement of the private sector: A Dutch plastic producer has supplied the piping materials for the first experimental greenhouse at APR. Asian Perlite International has very actively supported the study tour and agreed to be instrumental in the transfer of suitable Malaysian technology to Indonesia. DLV-Agriconsult has given considerable input during the field visits in Indonesia and during the workshop, and will continue to do so.
Highlight: **The design of 2 experimental low-cost greenhouses for vegetable and flower production.**
Conclusion: The project is running well.

Figure 6. Protected cultivation in the highlands.

PROTVEG2

This fourth project dealing with protected cultivation provides the input on crop and pest management aspects in tropical lowland of Indonesia. At present it focuses on the greenhouse experiments of PROCULT with emphasis on climate and crop growth. Several visits were made, and an insect scouting course has been organised together with Koppert and with input and support from Ewindo. The second crop grown in these greenhouses had low levels of infestation with spider mite and leaf miners, indicating the effectiveness of the closed greenhouses. Only two sprayings were necessary in contrast to the twice-weekly ordinary routine in outdoor tomato production during the dry season. IVEGRI performed a survey on the incidence of harmful and beneficial insects as well as pesticide use in several highland and lowland crops.

Involvement of IVEGRI was delayed due to budget difficulties and lack of mandate of the project leader. These problems have recently been resolved during the last visit.
Involvement of the private sector: With these first results in hand, it is expected that companies and farmers will start to see the possibilities of insect-tight greenhouses in combination with intelligent spraying or even IPM. The main actors in this sector will be approached this year (greenhouse constructors, various types of agricultural suppliers, growers).
Highlight: **Design of a greenhouse construction tight for insects has resulted in a drastic reduction of insecticide application.**
Conclusion: The project is running well now.

Figure 7. Insect scouting course at East West Seed Company.

QUALITY

The project aims at the development and testing of a certifiable protocol for the safe production and product quality of vegetables in Indonesia. It was the intention that an Indonesian researcher would first come to the Netherlands, and follow an IAC-course and a special training at APR. Due to family circumstances this could not materialise. A similar visit is now planned for 2004. In order to safeguard the knowledge transfer at an early stage, the Dutch project leader decided to give a training course at IVEGRI. 15 Researchers attended, including the whole Indonesian project team. The course was intensive and included theories, practice, and company visits.
A questionnaire was developed and interviews were made with chain participants in Indonesia about quality and food safety demands. Desk research and interviews in the Netherlands were performed for a report about control of food safety and product quality
Involvement of the private sector: Participation of several companies in interviews and the training course. No financial Involvement yet. Planned is to involve the private sector further during a workshop in October 2004 and during the testing phase of the protocol (2005).
Highlight: **First ever quality training course at IVEGRI**
Conclusion: The project is running well.

SEEDS

Aim of this project is to provide a basis for managing the most important seed-borne diseases of vegetables (tomato, pepper, and shallot) in Indonesia. The project started with a survey of disease incidence on Java and parts of Sumatra, which includes the determination and characterisation of the species and strains found. The first new detection techniques for seed-borne fungi, bacteria and viruses have now been introduced in Indonesia. Facilities still have to be developed to be able to carry out some of the tests in a good way. Methods will be studied to control the diseases in the field during seed production, and by processing. Ultimately all that is known about the diseases will be laid down in a practical disease compendium in Bahasa Indonesian. A standard format for that has now been developed.
During the survey the first records of bacterial canker were made. This could be confirmed in the PRI-lab. The companies can now take measures to control the disease and include it in their breeding programmes. This demonstrates that it is very important that Indonesia develops its own capacity in seed heath testing.
Involvement of the private sector: The project is carried out in close collaboration with a seed company, PT Ewindo (Senter-subsidised project INDOSEED). Other companies have been invited to join the training course that had to be deferred to January 2004. PT Selektani and IPB (which also produces seed) are actively collaborating. Other companies will be approached during 2004.
Highlight: **The identification of some important seed-borne pathogens important for improved seed quality management.**
Conclusion: The project is running well.

For more detailed project information, please refer to the annexes.

Remarks concerning the programme in general

Agribusiness contacts, B2B promotion & matching

The Dutch Programme Board (BC) for HORTIN emphasises the importance of trade relations between the two countries. That type of collaboration lies at the heart of the programme. Some projects started in HORTIN with good business contacts and contracts, but most projects are entirely new, with new subjects, new approaches and new institutional partners on both sides. At all occasions, during meetings in the Netherlands as well as in Indonesia, the programme management emphasises this issue and acts as an intermediate whenever possible. The success of making good business contacts is the responsibility of the individual project leaders, who with their counterparts should give this high priority. At this stage, most projects have already established good relations with business partners, and these contacts are still usually limited to good relations, getting to know each other, contributions from the business partner to workshops and excursions, etc. It is in the coming year that these contacts must

become formalised. This depends on the outcome of the research, which in most cases is just starting up. Nevertheless, the outlook for 2004 to achieve the target of 50% matching is challenging, but possible.
Apart from that the excursions and workshop activities in this first year have already resulted in many business encounters and matching of institutes with companies. We intend to develop this function as broker in the coming years.

Welcoming PROCULT

Thanks to an extra grant from the Ministry of Agriculture, the input of A&F in PROCULT could be supported financially. This ensured the continuation of the programme, of which several protected cultivation projects are dependent, most notably PROTVEG2. Financing of a possible continuation of PROCULT is not certain yet, and it will be very difficult to generate it from the regular HORTIN programme.

Major constraints

The limited mobility of Indonesian researchers due to budgetary constraints remains one of the main issues for the programme management on both sides. Several efforts will be made to alleviate this problem.
Some equipment is missing that is essential for the application of the new technologies. Here also the budget is the main constraint. In early 2004 the Programme management will again discuss this, in part through the mediation of the agricultural counsellor, take this up with IAARD management.
Both issues deserve attention during the next Agricultural Working Party (LWG) meeting in spring in the Hague.

New project descriptions

Many visits have been made by the Dutch researchers, to bring the project expectations in line with everyone's wishes and to make adequate descriptions accordingly. Thanks to this extra effort by all, the programme management can be optimistic about the coming year. 2004 will be the year of many practical activities, like the establishment of 3 greenhouses both at IOPRI and IVEGRI, training in the Netherlands of a number of Indonesian scientists, further furbishing of the laboratories, completion of important parts of field work, and stronger matching with the private sector.
Uniform new project descriptions will be distributed separate from this report.

Economic, social and environmental considerations

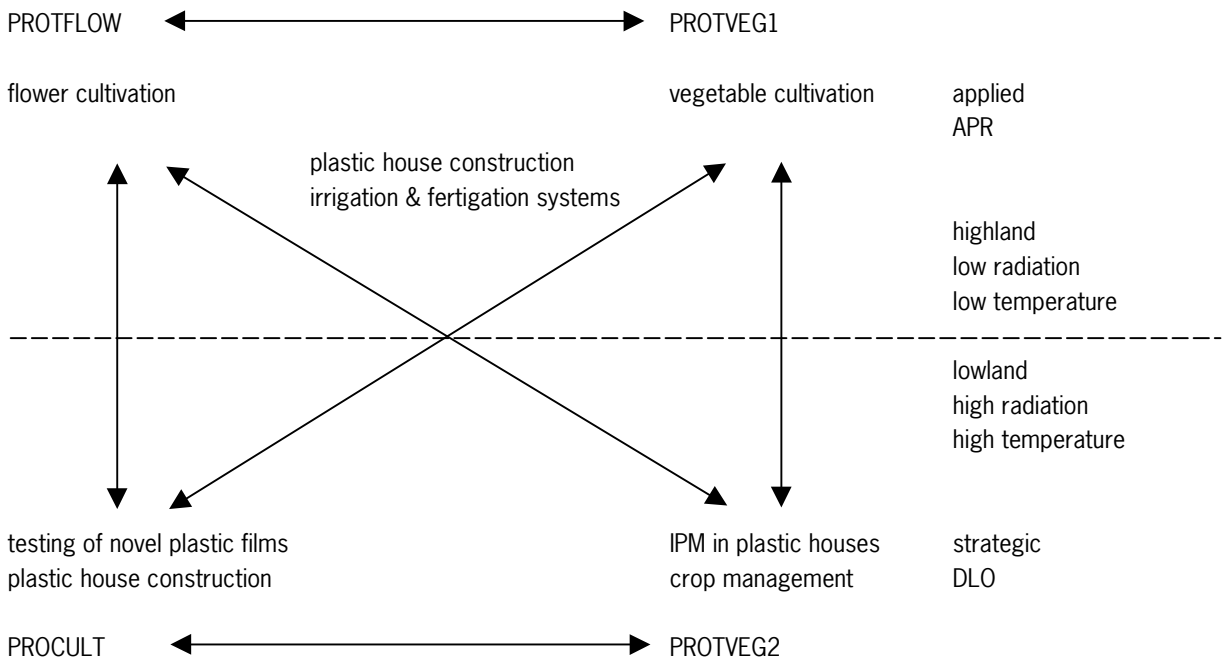
The Netherlands is a member of the Organisation for Economic Co-operation and Development (OECD). The OECD has guidelines for multinational enterprises, regarding for instance labour, environment and human rights. The HORTIN programme, carried out under the responsibility of the Dutch Ministry of Agriculture, Nature and Food Quality, aims to operate according to the General Policies of the OECD guidelines.
HORTIN tries to contribute to economic, social and environmental progress by developing sustainable horticulture. The development of protected vegetable cultivation serves the purpose of more continuity in production throughout the year, resulting in a more evenly spread labour demand and higher farmer's income. Biological control of insects aims to reduce pesticide use, contributing to environmental protection. Science and technology development takes place in a way that addresses local market needs. Local capacity building is encouraged by transfer of knowledge and training. Transparency in financial matters and organisational principles has been encouraged and documented. Information on the programme is regularly updated and readily accessible. Awareness of and adhering to the general principles of the Guidelines will be promoted within the programme.

Task division and synergy between the PROTVEG1, PROTVEG2, PROTFLOW and PROCULT projects

(Clarification on request of the Programme Board)

Crops under field conditions are exposed to adverse climatic and biotic conditions. The aim of protected cultivation is to reduce the damage and to manage these influences, resulting in a reduced pesticide use and an increased product quality.
The main distinguishing factor between the PROTVEG1 and PROTFLOW projects on the one hand and the PROTVEG2 and PROCULT projects on the other hand, is the environment in which they are situated. The PROTVEG1 and PROTFLOW projects are operating in the highlands. In the highlands, because of the high degree of cloudiness throughout the year, maximum interception of available radiation is essential for good crop production. Given the comparatively low temperatures in the highlands, control of temperature in highland plastic houses, is less important as compared to achieving maximum interception of available radiation by the crop. Because of the advantage of low temperatures, protected cultivation is already applied to quite some extent in the highlands. The PROTVEG1 and PROTFLOW projects focus on the development of plastic houses with maximum radiation interception, combined with low costs of construction and crop cultivation, and that are suitable for both vegetables and flowers. Attention is also given to crop and nutrient management.

The PROTVEG2 and PROCULT projects have their working field in the lowlands, where until now protected cultivation is limited. Because of the high temperatures, temperature control, i.e. temperature reduction, in lowland plastic houses is desirable. PROCULT and PROTVEG2 focus on the development of a total greenhouse system for the lowlands, in which PROCULT concentrates on the construction, the covering material and the physical climate, and PROTVEG2 complements this with an adapted cropping system and integrated pest management.



Task division and synergy between the PROTVEG1, PROTVEG2, PROTFLOW and PROCULT projects. Arrows indicate cooperation and knowledge transfer.

Acronyms and abbreviations.

English acronym	Indonesian acronym	Full English name
A&F		Agrotechnology & Food Innovations
AIAT	BPTP	Assessment Institute for Agricultural Technology
APR		Applied Plant Research
B2B		Business-to-Business
BC		HORTIN Programme Board, Netherlands
CGN		Centre for Genetic Resources, Netherlands
CISTROPHRES (formerly Tlekung Research station)	Lolittan Jehortis	Citrus & Subtropical Horticultural Crops Research Station
COGEM		Commission on Genetic Modification, Netherlands
DINAS	Dinas Pertanian	Extension Service
EWINDO		East West Seed Company, Indonesia
GWT		Germplasm Working Team (of IOPRI)
IAARD (formerly AARD)	(Badan) 'Litbang'	Indonesian Agency for Agricultural Research and Development
ICHRD (formerly CRIH)	'Pushor'	Indonesian Center for Horticultural Research and Development
IFRURI (formerly RIF)	Balitbu	Indonesian Fruit Research Institute
IOPRI (formerly RIOP)	Balithi	Indonesian Ornamental Plants Research Institute
IPB	Institut Pertanian, Bogor	Agricultural University, Bogor
IPM		Integrated Pest Management
IVEGRI (formerly RIV, Lehri)	Balitsa	Indonesian Vegetable Research Institute
LWG		Agricultural Working Party (Landbouwwerkgroep)
PGR		Plant genetic resources
PRI		Plant Research International
WUR		Wageningen University and Research Institutes

Annexes: Annual reports per project

Programme DWK 424 – Horticultural research cooperation between Indonesia and the Netherlands (HORTIN)

1. Project title : Fruit fly control in Indonesia (FRUITFLY).

2. Project number : PRI: 7400020500

3. Project leader : W.J. de Kogel, Plant Research International, the Netherlands
E-mail: willemjan.dekogel@wur.nl

4. Executing agency : Plant Research International (PRI)
P.O. Box 16
6700 AA Wageningen
The Netherlands
Tel.: + 31 317 476225
Fax: + 31 317 418094

5. Participating organisations

- Plant Research International (PRI)
- Indonesian Fruits Research Institute (IFRURI), Solok, West Sumatra, Indonesia
- DINAS Pertanian, Karimun, Riau, Indonesia

6. Objectives and short project description

One of the constraints in fruit farming in Indonesia is the decrease of fruit quality and quantity as a result of attack by fruit flies. The FRUITFLY project has the objective to develop and implement trapping devices to control fruit flies. These traps are based on attractants that are strongly attractive for male fruit flies. By mass trapping of the male flies the population growth of the fruit flies can be strongly reduced. This technique is referred to as male annihilation. Aim is to develop this control method in the Indonesian situation, leading to increased yield and (export)quality of the fruits and thus a better income for the farmers. Secondly the use of traps and lures will contribute to a reduction in the use of pesticides.

7. Results

7.1 Output and impact

1. Identify the problem: what are the most important fruit fly species in which crops?

In 2003 fruit flies have been collected at several locations in West Sumatra and Riau by using traps and collecting damaged fruits. Identification of the collected flies has started at the end of 2003. Results up to now indicate that several species can be found (depending on the crop), but the majority of the flies belong to 3 species: *Bactrocera dorsalis*, *B. umbrosa*, *B cucurbitae*. Citrus on the island Kundur in the Riau archipel has been selected as main test location.

2. Identify effective attractants and bioactive compounds

A literature survey on fruit flies with focus on attractants, trapping devices and bioactive compounds has been done. Traps and attractants were selected, purchased and sent to Indonesia to be used for field work. The results of the literature survey have been transferred to IFRURI.

3. Possibilities and potential for post-harvest fruit fly control

The literature survey indicated that there are several methods for post harvest control. Discussions with the company BakkerBarendracht (imports tropical fruits to the Netherlands), indicated that the focus should be on the primary process i.e. pre-harvest in the orchards during the growing season. Therefore we will focus on that aspect.

4. Contacts between Indonesia and Netherlands

In February and in December WJ de Kogel visited Indonesia. The first visit was used to get to know each other personally and discuss the workplan 2003. During the visit in December the progress in 2003 was discussed as well as the workplan 2004. In addition we visited DINAS on Kundur island (Riau) to discuss cooperation. DINAS will cooperate in two ways: 1) assisting with field work, 2) cooperate on knowledge transfer to farmers. It was decided that DINAS staff will be trained by IFRURI staff for the field work.

7.2 Training, technology transfer and knowledge exchange

1. Selected fruit fly traps and lures were sent to Indonesia
2. Transfer of literature survey on fruit flies to IFRURI including a collection of reprints from relevant literature
3. Information by DINAS to IFRURI and PRI on fruit growing and farmer organisation on Kundur, Riau, December 2003
4. Appointment made that DINAS staff will be trained in Solok by IFRURI

7.3 Reports, publications

No publications yet.

7.4 Presentations

1. Lecture on semiochemicals for pest control by WJ de Kogel at IFRURI, 10-12-03
2. Lecture on Hortin program, FRUITFLY project and semiochemicals by WJ de Kogel at DINAS, 13-12-03

Figure 8. Fly trap in citrus orchard on Kundur Island.

Programme DWK 424 – Horticultural research cooperation between Indonesia and the Netherlands (HORTIN)

1. Project title : Revitalising Indonesian garlic agriculture (GARLIC)

2. Project number : 760 00 164 00

3. Project leader : C. Kik, Plant Research International, Wageningen, the Netherlands
E-mail: chris.kik@wur.nl

4. Executing agency : Plant Research International (PRI)
P.O. Box 16
6700 AA Wageningen
The Netherlands
Tel.: + 31 317 477001
Fax: + 31 317 418094

5. Participating organisations

Research Station for Citrus and Subtropical Horticulture (CISTROPHRES)
Raya Tlekung, P.O. Box 22, Batu, East Java, Indonesia
Tel: + 62 341 592683
Fax: + 62 341 593047

Indonesian Vegetable Research Institute (IVEGRI)
Jalan Tangkuban Perahu 517,
Lembang, Bandung 40391
Indonesia
Tel.: + 62 22 2786245
Fax: + 62 22 2786416

6. Objectives and short project description

Objectives

Long-term objectives:

The project will contribute to:

- To contribute to the revitalisation of the Indonesian garlic agriculture by means of socio-economic and agronomic methods.

Short-term objectives:

In order to achieve the long-term objectives the project will initially focus on the following aspects:

Socio-economics

- Updating garlic agro-economic data base

Agronomy/breeding

- Collection and evaluation of garlic germplasm

Short project description

The market in Indonesia for indigenous garlic has drastically decreased in the last decade due to large garlic imports from China. Currently it is hard to find large garlic cultivation areas in Java, the former centre of production of garlic in Indonesia. At the moment the indigenous Indonesian garlic production can only be found in more remote places on the Indonesian archipelago (for example on Lombok). If no counter measures are taken the indigenous Indonesian garlic will be soon extinct. To contribute to the recovery of Indonesian garlic agriculture, the project will focus on socio-economic and agronomic/breeding topics. The socio-economical part of this study will consist of a consumer preference test and the updating and maintenance of a large garlic agro-economic data base and the agronomy/breeding part will encompass collection & evaluation of garlic strains and quality increase. The socio-economic study will be carried out by the group from Lembang and the agronomy study by the research groups from Batu and Wageningen.

7. Results

7.1 Output and impact

Expected

Year	Output	Impact
2003	1. Agronomy/breeding Identification of problems associated with garlic cultivation in Indonesia Building up garlic collection in Indonesia and the Netherlands collection of local Indonesian garlic strains and other tropical countries. garlic accessions of core collection PRI from Central Asia. Cultivation and partial characterisation of garlic accessions in Indonesia and the Netherlands 2. Socio-economics Updating garlic agro-economic data base	The project is carried out in the context of the revitalisation of the garlic agro-industry in Indonesia. This project will contribute via Increase of knowledge in the area of garlic socio-economics Increase of knowledge which garlic strains can be used for an improved garlic cultivation in Indonesia Increase of knowledge concerning the impact of mycorrhizas on garlic yield Increase of knowledge concerning the impact of meristem culture on garlic yield

Realised

Agronomy/breeding

Identification of problems associated with garlic cultivation in Indonesia

During the September visit of the Dutch partners to Indonesia in depth discussions took place between the project partners on the problems associated with garlic cultivation in Indonesia. Furthermore the Shangdong area in PR China was visited as this is the major garlic producing area of Chinese garlic. The visit was carried out to analyse why Chinese garlic can be sold for such low prices on the Indonesian market and to identify future developments. The impression was obtained that the price/quality ratio seems to be the major factor for the declining sales of Indonesian garlic. The proposed socio-economic study could corroborate and substantiate this. Both visits led to a reformulation of the GARLIC project: the focus has shifted from sexual hybridisation & phytopharma to mycorrhiza, *in vitro* culture & phytopharma. This approach will have a more direct impact on garlic quality; sexual hybridisation will remain an item of study through the evaluation of the PRI core collection.

Building up garlic collections in Indonesia and the Netherlands

- collection of local Indonesian garlic strains and other tropical countries
- garlic accessions of core collection PRI from Central Asia

The collection in the Netherlands consisted at the start of the project of approximately 90 garlic accessions from non-tropical origin. In September 3 local Indonesian accessions were added to this collection and in November 17 accessions from Nigerian origin were added to the collection.
The collection in Indonesia consisted at the start of the project of approximately 10 accessions and in September and November 10 and 19 accessions respectively from the Dutch collection were added to this collection. Furthermore in November the 17 accessions from Nigerian origin, mentioned earlier, were added to the collection. Currently the building up of the collections on both sides is more or less finished.

Cultivation and partial characterisation of garlic accessions in Indonesia and the Netherlands

The garlic material in two collections is growing well and already some assessments have been carried out. On the Indonesian side material has been grown on a number of elevations to get insight into the performance of the same genetic material under several growing conditions. Furthermore in the Netherlands general plant performance, flowering & seed set, and virus symptoms (field and ELISA testing) was analysed.

Socio-economics

Updating garlic agro-economic data base

No info has been received from Dr. Witono Adiyoga from IVEGRI Lembang on this aspect of the GARLIC project. Furthermore requests for additional funding were up until present negative. Therefore it is foreseeable that this part of the study will, unfortunately, not be carried out.

7.2 Training, technology transfer and knowledge exchange:

- A. Hardiyanto has followed a two week course on Molecular Markers in Bogor.
- A. Hardiyanto, A. Suprianto, C. Kik & K. Burger-Meijer visited several garlic cultivation areas in East-Java and Lombok in September 2004 and discussed with local farmers the problems related to garlic cultivation, especially in Lombok intensive discussions took place.

7.3 Reports, publications

No reports (other than the quarterly progress reports) and publications have been written.

7.4 Presentations

Kik, C (2003). *Allium* research at PRI with special reference to the BIOBREES/HORTIN programmes. Batu and Lembang, Indonesia, September 2003.

Programme DWK 424 – Horticultural research cooperation between Indonesia and the Netherlands (HORTIN)

1. Project title : Management of field collection of tropical ornamentals (GENEBANK)

2. Project number : 7500004500

3. Project leader : Loek J. M. van Soest, Centre for Genetic Resources, the Netherlands
E-mail: loek.vansoest@wur.nl
INTERNET: www.cgn.wur.nl

4. Executing agency : Centre for Genetic Resources, the Netherlands (CGN),
Wageningen University and Research Centre,
P.O. Box 16, 6700 AA Wageningen, The Netherlands
Tel.: + 31 317 477011: Fax: + 31 317 418094

5. Participating organisations

– Centre for Genetic Resources, the Netherlands (CGN), Wageningen University and Research Centre, P.O. Box 16, 6700 AA Wageningen.
– Indonesian Ornamental Plants Research Institute (IOPRI), Segunung/ Cipanas, Indonesia

6. Objectives and short project description

The overall objective is to optimise the conservation of the collections of tropical ornamentals of IOPRI by conducting the following activities:

- To improve collection management, a range of activities with the final goal to optimise the conservation and utilisation of the material (e.g. inventory of existing collections, acquisition of new sources, optimal maintenance of accessions, using established methods to characterise and/or evaluate the material, and conservation techniques).
- Documentation of the available information to improve utilisation of to the collection. Standardisation of descriptors needs to be realised. It also may need to be investigated what type of data base information system is required for the available data (passport, characterisation/evaluation, and storage data)
- Contribution in the training of young scientists of IOPRI in the field of PGR

7. Results

7.1 Output and impact

Output

During the kick-off meeting of HORTIN Program in Indonesia in February 2003 only a short visit could be made to the headquarters of the Indonesian Ornamental Plants Research Institute (IOPRI) at Segunung. Dr Kusumah Effendie, the director of IOPRI, visited Wageningen on 25 February 2003 and a plan of action for the GENEBANK project was discussed and agreed upon.

A familiarisation and advisory mission to IOPRI was conducted from 13-27 October 2003 with the following objectives:

- Familiarisation with the activities of IOPRI at its three stations, particularly concentrating on the collections of tropical ornamental plants maintained by the institute
- To discuss and advise the members of the Germplasm Working Team (GWT) on the PGR program
- Participation in a one day workshop on PGR management of tropical ornamentals and presenting a paper on 'Collection Management of Genebanks'
- Discussion on the training opportunities in the Netherlands in 2004 and 2005 (see also 7.2)

- Visits to private growers and breeders of ornamentals to get acquainted with the possibilities of IOPRI collections for potential use by these stakeholders.

General discussions with all members of GWT focuses on the following subjects:

- Maintenance of the collections on three locations, the strength and weaknesses of the locations and need for more centralisation
- Inventory of all available collections of ornamental crop collections and mode of conservation
- Differentiation between base and working collections of IOPRI and were to locate these two type of collections.
- Planning of the Germplasm program 2004-2007 (see GENEBANK Mission report 2003).
- Documentation of collections

Detail discussions with selected persons of Germplasm Working Team

1. Inventory of the collections, only a few collections are inventoried, this work needs to be completed
2. Acquisition of material and collecting forms to describe passport data
3. Management of the field genebank, labelling of accessions, layout of field genebank, facilities required, etc.
4. Characterisation/evaluation, development of minimal descriptor lists, priority crops for characterisation, etc.
5. Documentation, so far three collections of ornamental crops have been computerised

Some important achievements of the mission (details in Mission Report 2003)

1) The FAO/IPGRI multi-crop passport descriptors (2001) was introduced and will be used in orchids.
2) A Collecting Form for exploration (acquisition) of new material based on the FAO/IPGRI multi-crop passport descriptors was developed with Miss Suskandari Kartikaningrum
3) An acquisition mission to collect germplasm from the orchid grower Hans and Maryanti Orchid Nursery was organised and the developed Collecting Form was used to describe the collected accessions
4) A number recommendations, divided in four major PGR activities (acquisition, collection management, characterisation and evaluation and documentation) are included in the Mission Report, 2003.
5) Plans for training were discussed and elaborated for 2004

Impact

The visits to growers showed that the production of tropical ornamentals is an important economical activity in West Java. The growers produce for the local market of West Java (including Jakarta), for different islands of Indonesia and for export abroad. The ornamental growers indicated that a good income could be achieved and the large-scale growers employ many persons. The visits also showed that the growers use and need different sources of ornamental diversity. This implicates that a well-organised acquisition and germplasm maintenance program of IOPRI can have impact on the economy of this region in West Java.

Figure 9. Orchids are among the first to get a collection protocol.

7.2 Training, technology transfer and knowledge exchange

On 6 February and 15 October papers were presented at the headquarters of IOPRI, Segunung.(see 7.4). The latter paper was presented at a workshop on collection management of genebanks and during this workshop several aspects of PGR activities were discussed with the staff of IOPRI. During the recent mission from 12-27 October, 2003 to IOPRI several discussions on PGR management were held with members of the 'Germplasm Working Team' of the institute (see 7.1 and Mission report 2003). Arrangements have been made for the training in the Netherlands of a member of the Germ Plasm Working Team' (Miss Suskandari Kartikaningrum) in the Netherlands in 2004. Two short IAC courses on Agrodiversity and Plant breeding design and a practical training in PGR management organised by CGN are planned.

7.3 Reports, publications

Soest van, L. J. M. Report of a mission (12-27 October, 2003) to IOPRI-Genebank, Segunung, Indonesia. HORTIN/CGN, Wageningen. 23 pp.

7.4 Presentations

Soest van, L.J.M. HORTIN Genebank; management of field collection s of ornamental crops. Project meeting Wageningen. 16 January, 2003.

Soest van, L.J.M. Centre for Genetic Resources, the Netherlands. An overview of the activities of CGN. Presentation for IOPRI staff, Segunung, Indonesia. 6 February, 2003.

Soest van, L.J.M. Collection management of genebanks. Workshop on Management and Enhancement of the Field Genebank and the future planning of the HORTIN programme. IOPRI, Segunung, Indonesia, 15 October, 2003.

Programme DWK 424 – Horticultural research cooperation between Indonesia and the Netherlands (HORTIN)

1. Project title : Introduction of haploid technology in breeding programs in Indonesia; hot pepper, cabbage, and *Anthurium* (HAPLIN)

2. Project number : HORTIN internal project number 007700017100

3. Project leader : J.B.M. Custers, Plant Research International, the Netherlands
E-mail: jan.custers@wur.nl

4. Executing agency : Plant Research International (PRI)
P.O. Box 16
6700 AA Wageningen
The Netherlands
Tel.: + 31 317 477001
Fax: + 31 317 418094

5. Participating organisations

- Indonesian Vegetable Research Institute (IVEGRI),
- Indonesian Ornamental Plant Research Institute (IOPRI),
- Research Center for Biotechnology, IPB, Bogor,
- Plant Research International (PRI),
- University of Hawaii,
- Agriom BV, Aalsmeer, through the matching Senter-financed InDuAnthurium project.

6. Objectives and short project description

Three major objectives of the project are:

- with hot pepper and cabbage, to transfer existing microspore culture technology to Indonesia, to implement procedures at IVEGRI, and to exploit doubled haploid plants (DHs) produced for the benefit of F1 hybrid variety breeding in Indonesia. In earlier joined research PRI and IPB, Bogor University, successfully developed a new procedure of microspore culture in Indonesian hot pepper genotypes. It would be obvious that IPB can be of great help to IVEGRI in implementing the new developed procedure, and therefore both institutes are asked to conclude an agreement on co-operation in hot pepper.
- with *Anthurium*, to develop a protocol for haploid plant production from gametes in cooperation with IOPRI, and to produce DHs for future facilitating breeding and production of F1 hybrid varieties, allowing to replace expensive in vitro propagation by cheap seed propagation methods.
- to contribute to the development of a team of Indonesian researchers who are highly trained in haploid technology. The proposed project will train one researcher from IVEGRI and one from IOPRI. We would suggest that Ir Ence Darmo Jaya Supena, IPB Bogor, would also join in the expert team. In 2004 he will get his PhD at Wageningen-UR on his topic haploid technology in Indonesian hot peppers. This team of three researchers will be challenged to further diffuse haploid technology in other important crops in Indonesia.

Figure 10. Cabbage and hot pepper for pollen and seed production.

7. Results

In retrospect, the 2003 work plan for hot pepper and cabbage included:

- Training of IVEGRI staff in the basics of microspore culture methods at PRI
- Joined experiments on establishing a microspore culture protocol for cabbage accessions from Java, as part of the training at PRI
- Equipping the laboratory at IVEGRI

The 2003 work plan for *Anthurium* mainly concerned research at PRI to establish a haploid production protocol. Experiments on the same topic would be performed at IOPRI, especially also to check the laboratory equipment needed.

7.1 Output and impact

Hot pepper and cabbage:

- In ongoing research PRI made crossings between interesting Indonesian hot pepper accessions and produced haploid plants from F1's.
- Indonesian cabbage types started to flower at PRI. In microspore cultures some rare embryos developed, showing at least that the crop is responsive.
- IVEGRI started equipping the laboratory, and this job is almost finished. Bottleneck is the lack of a plant growth room facility at low temperatures (12°-18°C), which is durable equipment for which no money is available from the project budget. So far, a collection of Indonesian cabbages for providing flower buds for microspore culture have been grown in the glasshouses at IVEGRI.
- PRI exchanged protocols with IVEGRI, where first cultures were incubated with cabbage.
- IVEGRI principal scientist in hot pepper objected to co-operation with IPB, which complicated IPB assistance in technology transfer with hot pepper. On the advice of PRI, negotiations have been started on this matter between directors of both institutes, but these have not finished yet.

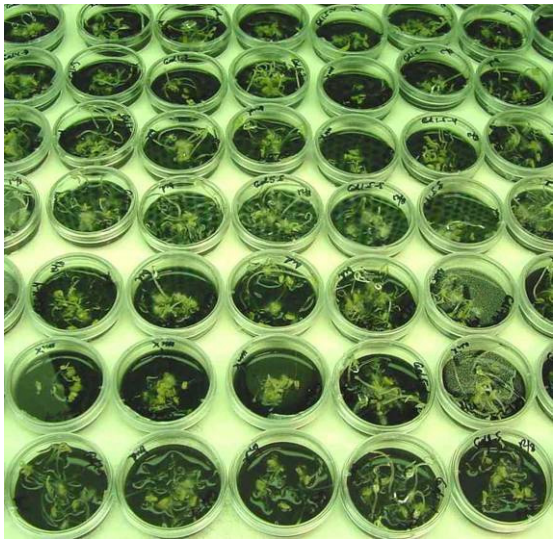


Figure.11 Haploid hot pepper embryos.

Anthurium:
- PRI performed extensive experiments on protocol development for haploid production. As severe problem we encountered the presence of endogenous bacteria in the donor plant material. Microspore culture, anther culture as well as ovule and ovary cultures were tried, but without success so far.
- IOPRI experienced similar problems of bacterium-contaminated cultures.
- Collaboration with the University of Hawaii has been established, Prof, Kuehnle, who will send transgenic material with bacterial resistance. Recently COGEM granted permission for the importation.

In the parallel running Senter project PRI has intensive contacts with Agriom, Aalsmeer, while IOPRI performs an inventory of its Anthurium collection for ornamental traits of interest for the breeder.

7.2 Training, technology transfer and knowledge exchange:
- Training of IVEGRI staff at PRI in 2003 was impossible, as it appeared that no money for long-term training was available in the Indonesian budget. We sent in an application for an IAC-fellowship grant for Mr Joko Pinilih, IVEGRI, and fortunately this was granted at November 12.
- PRI offered the IVEGRI principal scientist for cabbage to assist in applying for a short-term mission grant for coming to Wageningen in order to learn techniques. At that time travelling money was available from KNAW as well as IAARD, but due to circumstances chances were not utilised.
- Detailed protocol information was provided to IVEGRI and IOPRI
- A visit by Jan Custers for giving a seminar and training at location in Indonesia has been prepared for early 2004 and is planned in week 8.
- Communications on project affairs with Indonesia have improved a lot during the last three months.

7.3 Reports, publications

No reports so far.

7.4 Presentations

Presentations were given at the biannual HORTIN programme team meeting, May 10 and November 6, 2003.

Programme DWK 424 – Horticultural research cooperation between Indonesia and the Netherlands (HORTIN)

1. Project title : Improving musroom production

2. Project number : 620154

3. Project leader : Anton S.M. Sonnenberg, Applied Plant Research (APR), the Netherlands
E-mail: Anton.Sonnenberg@wur.nl

4. Executing agency : Applied Plant Research (APR)
P.O. Box 6042
5260 AA Horst
The Netherlands
Tel.: + 31 77 4647575
Fax: + 31 77 4641567

5. Participating organisations

- Applied Plant Research (APR)
- Fungi 2000
- Indonesian Vegetable Research Institute (IVEGRI)

6. Objectives and short project description

The project aims at establishing a research group at IVEGRI, Lembang, skilled in applied research for edible mushrooms. The group will build up a collection of commercial and indigenous strains that will serve to improve source materials. This group will then support growers to improve mushroom production.
The activities of the MUSHROOM project are:

- Exploration, isolation, collection, and conservation of germplasm of edible mushrooms both for indigenous and cultivated/exotic species/strains, as germ sources for research activities.
- To find out superior edible mushroom strains for a limited number of species by carrying out growing trials of strains of different origins under defined conditions.
- To increase productivity of edible mushrooms by varying substrate formulations and supplements for the best selected strains of a limited number of cultivated species
- Improvement of preservation of edible mushrooms

In the first year of the project a large number of mushroom farms have been visited to obtain a good impression of the needs of mushroom growers and to find commitment and cooperation of Indonesian companies with the project. A number of days have been spent by the Dutch project leader to teach the project leader at IVEGRI how to collect and maintain source materials (strains).

7. Results

7.1 Output and impact

Indonesia

- A large number of farms have been visited and a clear impression has been obtained of the main problems in cultivating mushrooms. Among these are the low quality of the source material (strains and spawn) and infections in the substrate.
- At IVEGRI a spawn run room has been built to inoculated and colonise substrate for the production of mushroom. In addition, a growing house has been built to produce mushrooms. These facilities will be used to test strains and spawn/substrate formulas. The first trials for Oyster mushroom testing have started at the end of 2003.
- IVEGRI has started to build a collection of strains. Strains are collected from Indonesian mushroom farms, the APR collection and from the woods (tissue cultures made from mushrooms eaten by locals).

The Netherlands

- The Dutch project leader has visited Indonesia twice this year and has obtained a good impression how mushrooms that are being grown, what the main problems are and what will be feasible in the project.
- Knowledge on how to make pure cultures of wild isolates and spawn was transferred and how to maintain cultures in an optimal way.
- APR has expanded its collection of strains for those species that are relevant for the project (shiitake, oyster mushrooms, ear mushrooms and paddy straw mushroom). Most strains were obtained from China that has a long tradition in cultivating these strains.
- Most of the oyster mushroom strains and shiitake strains were genotyped to get an impression of the genetic variety. A selection of genetically different shiitake strains (18) has been made and testing at APR has begun. The latter in cooperation with Fungi 2000, a Dutch company that produces colonised substrate of different varieties of edible mushrooms.

The Dutch project leader has contact with a governmental extension officer and a spawn supplier (George Surya Adinata) in the region of Karawang (West Java). Dr Surya Adinata has written a provisional business plan to develop mushroom production in that region (IMPC: Integrated Mushroom Development Project, Karawang, West Java). Karawang is a large region of rice production. The rice straw is used to cultivate the paddy straw mushroom. There are already some initiatives, and a group of farmers now cooperate in the production and marketing of mushrooms. This small project is very successful and can be used to expand mushroom production in this region. The income of local farmers has been doubled when member of the project. The local market can easily absorb the increase of mushroom production. There is a large need for an inexpensive source for proteins. The paddy straw mushroom can fill this need perfectly.

Figure 12. The Indonesian project leader Etty Sumiati besides her "borrowed" autoclave. There is a need for extra funding for indispensable lab equipment.

7.2 Training, technology transfer and knowledge exchange

The Dutch project leader has visited IVEGRI and trained people basic skills for building up a collection, maintaining strains and making tissue cultures of collected mushrooms.

7.3 Reports, publications

No publications have been made so far.

7.4 Presentations

No presentation has been held.

Programme DWK 424 – Horticultural research cooperation between Indonesia and the Netherlands (HORTIN)

1. Project title : Protected cultivation in tropical lowland (PROCULT) – greenhouse construction and greenhouse climate

2. Project number : 53.780.01

3. Project leader : S. Hemming, Agrotechnology and Food Innovations, The Netherlands
E-mail: silke.hemming@wur.nl

4. Executing agency : Agrotechnology and Food Innovations B.V. (A&F)
P.O. Box 43
6700 AA Wageningen
The Netherlands
Tel.: + 31 317 476556
Fax: + 31 317 425670

5. Participating organisations

- Agrotechnology and Food Innovations, Plant Research International, Rovero Systems, Plasthill
- partners in Indonesia: Ewindo, Indonesian Vegetable Research Institute (IVEGRI), University of Bogor (IPB)

6. Objectives and short project description

In tropical lowland of Indonesia crops are conventionally grown in the open field. However, heavy rainfalls, wind and various plant pests and diseases often damage the open field grown vegetables. The use of pesticides, which often leads to unacceptably high levels of residues in the products, heavy pollution of the environment, and high levels of resistance of insects to these pesticides, needs to be restricted. In Indonesia the farmers use simple protected structures for the production of vegetables. In these protected structures they often have problems with the greenhouse inside temperature and humidity and with plant pests and diseases, especially trips and caterpillar, because the structure is not particularly suited for the local conditions. A new greenhouse design with an advanced covering material will be developed during this project including an integrated pest management system, also considering economical aspects. Besides an optimally adapted design of the greenhouse construction with natural ventilation, the covering material has to contribute to an improvement of the greenhouse inside climatic conditions and must lead to a cooling effect making plant production with a better quality and quantity possible. The new greenhouse has also to be tight for several insects using special nets. On the other hand these nets must not limit the natural ventilation of the greenhouse. Protected cultivation provides the conditions where integrated pest management can be employed. The introduction of natural enemies or biologicals against trips has to be investigated for the Indonesian conditions and insect types.
Due to participation of several industrial partners the project results are practically oriented. By involving local research partners such as IVEGRI in Lembang it is guaranteed that the project results will be made available for the Indonesian farmers.

Please note that this reporting only covers the work done with respect to the greenhouse construction and greenhouse climate. This is a multidisciplinary project covering the above mentioned project objectives. However, the crop aspects and integrated pest management aspects are covered by PROTVEG2. For any results see the report of PROTVEG2.

7. Results

7.1 Output and impact

Production greenhouse construction:

In January the six greenhouse constructions were produced by Rovero. On February 1st, the material was shipped to Indonesia where it arrived 4 weeks later. Another 4 weeks were needed for custom clearance. During April and May the six greenhouses were built on the site of Ewindo in Purwarkarta.

Producing greenhouse covering materials

In January the greenhouse films were produced by Plasthill: one reference film and two different NIR-absorbing films, all having diffusing properties. The films were shipped to Indonesia together with the greenhouse construction. In May the three films were installed on the greenhouses, with one repetition (3 different films on 6 greenhouses).

Building of greenhouses and installation of greenhouse inside equipment

The greenhouses were built by Ewindo under supervision of PT Joro on the site of Ewindo in Purwakarta, and based on the mounting drawings of Rovero. The mounting of the greenhouses including films and nets lasted about 6 weeks. The greenhouse inside equipment was installed in June. Also the watersystem and electricity etc. was installed. Every greenhouse contains 5 beds with each 2 rows of tomato plants.

Figure 13. Second tomato crop with measuring equipment.

Measuring greenhouse climate

In July the second mission of A&F to Ewindo took place. During this mission the measurement equipment for measuring greenhouse inside climate was installed and tested. In every greenhouse inside air temperature, humidity, global radiation and PAR radiation is measured continuously. Also outside climate is recorded including wind speed and wind direction.
During the first two months of climate measurements we had some problems with the measuring equipment. One of the data loggers broke down and to be repaired by the local dealer. This problem is now corrected and did not occur again. Also the maintenance of the temperature and humidity sensors was very intensive at the beginning. The wet bulb became dry very fast. By choosing different wicks this problem has now been corrected.
The following preliminary results can be mentioned:

– the mean temperature in the greenhouses with tomatoes inside are roughly comparable and on the same level as outside temperature => ventilation seems to be high enough, good effect of the construction, ventilation and nets => construction seems to be very suitable for tropical lowland of Indonesia

- the maximum temperature is about 0.5 degree lower under the NIR-absorbing film than under the control
- global radiation is lowered by the NIR-absorbing films, the transmission of the control greenhouses for global radiation is about 70%, the transmission of the NIR-absorbing greenhouses is about 65%, mainly due to the NIR-absorbing effect
- total PAR radiation is only limited to 77% in the control greenhouses and about 71% in the NIR-absorbing greenhouses => the films limit energy transfer into the greenhouse, but do not limit light transmission to the greenhouse up to the same amount

However, further measurements have to be carried out also during the dry and wet season of the coming months. At the moment we are busy linking the results of the crop reaction with the results of the climate measurements. This was not possible until now since the first crop experiment failed due to problems with the soil-borne pathogen bacterial wilt. The second crop experiment will be finished in February 2004.
The target group is the Indonesian farmer. Since the greenhouse construction seems to meet the requirements of a new system for protected cultivation in tropical lowland, the system can be introduced into the Indonesian horticultural practice after finishing the project.
The co-operation with the national partners is very good, the co-operation with Ewindo and Bogor University is also good, only the co-operation with IVEGRI goes very slowly. We hope to be able to improve that in the future.

7.2 Training, technology transfer and knowledge exchange:
Since we are still in the phase of constructing and testing the new greenhouse system until now, no training or technology transfer took place. The first results will be presented during the ISHS symposium in Malaysia in June 2004.
Knowledge transfer takes place continuously with the Indonesian project partners by e-mail correspondence and visits.

7.3 Reports, publications
Hemming, S. & D. Waaijenberg, 2003. Development of a greenhouse system for tropical lowland of Indonesia. Abstract for ISHS “International symposium on greenhouses Environmental Controls and in-house mechanisation for crop production in tropics and sub-tropics” in Malaysia.

7.4 Presentations
None so far.

Programme DWK 424 – Horticultural research cooperation between Indonesia and the Netherlands (HORTIN)

1. Project title : Sustainable tropical plastic house flower production systems (PROTFLOW)

2. Project number : 41616001

3. Project leader : Ruud Maaswinkel, Applied Plant Research (APR)
The Netherlands
E-mail: ruud.maaswinkel@wur.nl

Yoyo Sulyo, Indonesian Ornamental Plants Research Institute (IOPRI), Indonesia
E-mail: segunung@indoway.net or yoyo.sultyo@plasa.com

4. Executing agency : Applied Plant Research (APR)
P.O. Box 8
2670 AA Naaldwijk
The Netherlands
Tel.: + 31 17 46 36 700
Fax: + 31 17 46 36 835

5. Participating organisations

- Indonesian Vegetable Research Institute (IVEGRI), Lembang, Indonesia
- Applied Plant Research (APR), Naaldwijk, Netherlands
- first contacts have been made with Peval Indonesia (coco peat producer).
- Asian Perlite Industries, Malaysia

6. Objectives and short project description

Long-term objectives:

The project will contribute to:

- The development of plastic house structures and growing techniques for protected flower production under plastic in the tropical climate conditions of Indonesia. The structures and techniques have to match the needs of the local farmers.
- An increase in the productivity and quality of growing flowers in plastic houses in Indonesia.

Short-term objectives:

In order to achieve the long-term objectives the project will initially focus on the following aspects:

- An identification of the problems and the potential of existing flower production under plastic in Indonesia.
- The development of simple structures of plastic houses for flower production, which are suitable for the farmer and the climatological conditions in Indonesia.
- A study of the feasibility of available technology for flower production in plastic houses under tropical highland conditions.
- The development of technological components for flower production under plastic. This includes simple drip irrigation and integrated nutrient management systems for flower production in plastic houses.

7. Results

7.1 Output and impact

Survey

From 4 September till 9 September nine different chrysanthemum-growers were visited by Yoyo Sulyo (RIOP) , Mrs Nurmalinda (Agro economic department) and Ruud Maaswinkel (APR). One grower had a plastic house of bamboo, five of wood, two of steel and one of wood and steel. The questionnaire provided the basis of the interviews.
The following important main lines came from the survey:

- There are big differences in using lighting to create the long-day photoperiod. For instance during four hours: cycles of 10 minutes on and 20 minutes off and all kinds of different combinations up to 4 hours continuous lighting. There are also big differences in the lamps used. From 40 - 150 W/lamp.
- The plant propagation and uniformity of the cuttings need more attention.
- There are big differences in water management and fertilisation
- The uniformity of the plants by the harvest should be better
- The main problems of insects are: trips and leaf miner
- The main problem of fungus is Japanese White Rust

Figure 14. Plastic house of a small flower grower.

Visit to Malaysia

From 11 - 14 September the project team of PROTVEG1 and PROTFLOW visited different growers in the Cameron Highlands. In Malaysia there is about 650 ha of plastic houses, and the area is still growing. The average area of a nursery is about 7.000m^2. Most important flowers are chrysanthemum, and lily. Most growers do not pay royalties.
The following important main lines came from the excursion:

- The flowers are growing in the soil. Water is mostly given by sprinkler- and drip systems.
- The main problems in chrysanthemums are trips, leaf miner and Japanese White Rust.
- Most of the flowers are sold to Singapore.
- Biological disease control is not allowed in Malaysia.
- In Malaysia different types of plastic houses are used. During the last years a plastic house with a bow construction is becoming more and more common. The bow construction is used with and without ventilation.

The plastic houses with a bow construction are used for flower and vegetable cultivation. This type of plastic house seems very suitable for Indonesia and will be used in both PROTFLOW and PROTVEG1.

With the colleagues of PROTVEG1 an agreement was made about the type of plastic houses that will be built in Lembang and Segunung. In both locations the same plastic houses will be built, with the following specifications:

1. A typical Indonesian bamboo plastic house (which will serve as control)
2. House of wood. A plastic house with substructure of wood and the typical Malaysian bow structure without ventilation. Column length 3m; bow width: 3,20m. In the roof there will be no ventilation. At the outside at a height of 2 meter a net for ventilation will be constructed.
3. Plastic house of 100% plastic. The whole greenhouse will be one bow construction, without columns. In the roof there will be no ventilation. At the outside at a height of 2 meter a net for ventilation will be constructed.

7.2 Training, technology transfer and knowledge exchange:

At the workshop on September 19, details of the survey were given, and the possibilities and problems of chrysanthemums cultivation were discussed.

7.3 Reports, publications

Maaswinkel, Ruud, 2003. PROTFLOW Mission report 2003-1 (February, number: M2)
Maaswinkel, Ruud, 2003. PROTFLOW Mission report 2003-2 (September, number: M9)

7.4 Presentations

Workshop PROTFLOW, September 19, 2003. More than 65 persons (chrysanthemum growers and researchers)
R. Maaswinkel gave lectures about:

- Developing a cheap greenhouse construction
- The experience of the survey September 2003
- Research activities 2004
- The training program in 2004

Programme DWK 424 – Horticultural research cooperation between Indonesia and the Netherlands (HORTIN)

1. Project title : Sustainable tropical plastic house vegetable production systems (PROTVEG1)

2. Project number : APR 51.0310

3. Project leader : A.P. Everaarts
E-mail: arij.everaarts@wur.nl

4. Executing agency : Applied Plant Research (APR)
P.O. Box 430
8200 AK Lelystad
The Netherlands
Tel.: + 31 320 291671
Fax: + 31 320 230479

5. Participating organisations

- Indonesian Vegetable Research Institute (IVEGRI), Lembang, Indonesia
- Applied Plant Research (APR), Lelystad, The Netherlands
- Wavin Overseas, Dedemsvaart, The Netherlands
- DLV-Agriconsult, Horst, The Netherlands
- Asian Perlite Industries, Tanah Rata, Malaysia

6. Objectives and short project description

Long-term objectives:

The project will contribute to:

- The development of plastic house structures and growing techniques for protected vegetable production under plastic in the tropical climate conditions of Indonesia. The structures and techniques have to match the needs of the local farmers.
- An increase in the productivity of growing vegetables in plastic houses in Indonesia.

Short-term objectives:

In order to achieve the long-term objectives the project will initially focus on the following aspects:

- An identification of the problems and the potential of existing vegetable production under plastic in Indonesia.
- The development of simple structures of plastic houses for vegetable production, which are suitable for the farmer and the climatological conditions in Indonesia.
- A study of the feasibility of available technology for vegetable production in plastic houses under tropical highland conditions.
- The development of technological components for vegetable production under plastic. This includes simple drip irrigation and integrated nutrient management systems for vegetable production in plastic houses.

The project aims to contribute to an increase in protected vegetable production under the tropical climate conditions in Indonesia. New technologies will be introduced and developed with regards to construction and type of plastic used for plastic houses. Improved systems for drip irrigation will contribute to integrated nutrient management and efficient use of water under protected cultivation. Suitable and sustainable ways of protected vegetable cultivation increase crop productivity and quality, thereby contributing to higher farmer's income.
The projects aims to be instrumental to the development of activities of Dutch agricultural firms in Indonesian vegetable horticulture and seeks complementary financing to realise this goal.

7. Results

Figure 15. Various types of plastic houses in the Cameron Highlands, Malaysia.

7.1 Output and impact

Three activities were to be carried out in 2003:

1. Identification of the potential and problems of the existing vegetable production under tropical plastic house conditions in Indonesia.
2. Developing simple structures of plastic houses for vegetable production under the tropical climate conditions in Indonesia.
3. Developing simple techniques of drip irrigation as an integrated nutrient management tool for vegetable production in plastic houses in Indonesia.

For the first activity, a survey was carried out in Indonesia on the existing vegetable production in plastic houses in West Java. Details on crops and cultivation methods were collected. Furthermore a financial analysis was made of the local vegetable production in plastic houses.
An extensive preliminary report describing the results of the survey and the financial analysis was published (Gunadi *et al.,* 2003).

For the second and third activity detailed discussion were made between the project partners in Indonesia and The Netherlands and together a study tour was made to the Cameron Highlands, Malaysia, to identify more advanced but suitable technology for the Indonesian conditions. This mission was carried out with the Indonesian and Dutch project leader of the PROTFLOW project. Suitable technology was identified and an order to procure equipment from a Malaysian company was prepared.
A plan was made to build three different types of plastic houses for vegetable production at the research station in Lembang. Similar plastic houses will be constructed at Segunung for comparison and experimentation with flower cultivation in the PROTFLOW project.
At the end of the year a proposal for division of costs of equipment and construction between Indonesia and The Netherlands was formulated and submitted to the directors of the Indonesian institutes.

Proposals, agreements and actions that were formulated, are mentioned in the reports of the two missions to Indonesia that were made in 2003 (Everaarts, 2003a,b).

7.2 Training, technology transfer and knowledge exchange:

Two activities were to be carried out in 2003:

1. A participatory workshop on the existing vegetable production in plastic houses.
2. A study tour on advanced existing vegetable production under protected cultivation.

A workshop was held at IVEGRI in September, to present and discuss the results of the survey and the financial analysis carried out of the vegetable production under plastic in West Java. This workshop was attended by about forty persons, including the Indonesian growers and companies that participated in the survey. The results of the survey were presented and discussed. Furthermore other presentations were given on a number of subjects dealing with vegetable cultivation under plastic. Research needs were identified. A report on the workshop is given by Gunadi *et al*. (2003).

The workshop for the Indonesian growers and companies met the goal for exchange of knowledge in the PROTVEG1 project.
The study tour to Malaysia served as for training, technology transfer and exchange of knowledge in the project for the project leaders of PROTVEG1 and PROTFLOW (see Everaarts, 2003b).

7.3 Involvement of companies

Contacts have been established with Wavin Overseas and DLV- Agriconsult to design and produce a 'full plastic' plastic house. A 'full plastic' plastic house means that also the construction material of the plastic house is made of plastic. WAVIN was interested to develop this concept together with Applied Plant Research and DLV- Agriconsult in the PROTVEG1 project. DLV-Agriconsult provided back-stopping from an extensive knowledge concerning the world-wide market for tropical plastic houses.
APR-AGV provided additional funds to the PROTVEG1 project for the testing of a 'full plastic' plastic house at the Lelystad site. Unfortunately the plastic pipe material provided by Wavin appeared unsuitable for construction. The use of other types of plastic pipes is explored.

In Malaysia contacts were established with Asian Perlite Industries in Tanah Rata, Cameron Highlands. Much of the advanced technology for protected vegetable cultivation in the Cameron Highlands is provided for by Asian Perlite. Luuk Runia, API representative in the Cameron Highlands, invested one-and-a-half day to introduce us to farms, protected cultivation technology and research concerning both vegetables and flowers in the Cameron Highlands. Runia agreed to be instrumental with the transfer of suitable Malaysian technology to Indonesia in the framework of the PROTVEG1 and PROTFLOW projects.

Applied Plant Research Lelystad made 3.5 k€ available for prototype construction and testing of an experimental 'full plastic' plastic house in Lelystad. Company partners contributed in kind to the PROTVEG1 project: DLV-Agriconsult: 10 days, Wavin Overseas: 9 days, Asian Perlite: 1.5 days.

7.4 Reports, publications

- Gunadi, N., A.P. Everaarts, Witono Adiyoga, Tony K. Moekasan, Subhan, Rini Rosliani, Rachman Suherman, 2003. Sustainable vegetable production systems under tropical plastic house conditions. Research Report PROTVEG1 Project. [file: PROTVEG1 Workshop report IVEGRI.doc]
- Everaarts, A.P., 2003a. Sustainable tropical plastic house vegetable production systems. Mission Report 01, HORTIN Programme. [file: PROTVEG1 Mission report 2003-1.doc]
- Everaarts, A.P., 2003b. Sustainable tropical plastic house vegetable production systems. Mission Report 08, HORTIN Programme. [file: PROTVEG1 Mission report 2003-2.doc]

7.5 Presentations

- Report on results of survey on critical factors and research needs in plastic house cultivation, Workshop on Protected Vegetable Cultivation, September 10, IVEGRI, Lembang, by N. Gunadi.
- Sustainable tropical plastic house vegetable production systems, HORTIN Programme meeting, November 6, Wageningen, by A.P. Everaarts

Programme DWK 424 – Horticultural research cooperation between Indonesia and the Netherlands (HORTIN)

1. Project title : Protected cultivation of vegetables and Integrated Pest Management in tropical condition (PROTVEG2)

2. Project number :

3. Project leader : E. den Belder, Plant Research International, the Netherlands
E-mail: e.denbelder @wur.nl

4. Executing agency : Plant Research International
P.O Box 16
6700 AA Wageningen the Netherlands
Building 122
Bornse Steeg 65
6708 PD Wageningen

5. Participating organisations

National partners: Plant Research International (PRI), Agrotechnology & Food Innovations (A&F), Rovero Systems bv, Plasthill bv
Partners in Indonesia: Balai Penelitian Tanaman Sayuran BALITSA (Indonesian Research Institute for Vegetables IVEGRI), PT East West Seed Indonesia EWINDO, SEAMEO BIOTROP (South East Asian Regional Centre for Tropical Biology).

6. Objectives and short project description

In tropical lowland of Indonesia conventional crops are grown in the open field. Heavy wind and rainfall and various plant diseases often damage the open field vegetables. The use of pesticides often leads to unacceptable high levels of residues in the products, pollution of the environment (air, water, and soil) and danger for employees.
The development of a new greenhouse design is crucial to enhance the opportunities in the production of high quality products. In order to support this development, it is necessary that the construction of a greenhouse developed for the regional circumstances, goes hand in hand with the optimisation of the indoor abiotic conditions and an environmentally friendly growing system including integrated pest management.

7. Results

7.1 Output and impact

The development of a new greenhouse design for the regional circumstances to improve the possibilities for the production of high quality products (starting point calculations of loads and strength of the construction and simulation of greenhouse climate including ventilation and covering material. The construction of 6 greenhouses at Purwakarta. Equipment to measure greenhouse climate has been installed (sensors for temperature, humidity and light). A PhD student Impron from SEAMEO BIOTROP South East Asian Regional Centre for Tropical Biology, collects the climatic and crop data. Two crops have been tested so far. The first crop failed totally due to bacterial wilt infection. The second crop, a lowland tomato variety of EWINDO developed very well.
Crop monitoring is the foundation of an IPM programme. Crop monitoring provides heightened awareness of pest presence, activity and control. It addresses the real needs of the crop, reduces pesticide use by eliminating unnecessary, routine applications and assures pesticides applied at the proper life-cycle stage to insure effectiveness.
Vegetable farmers depend on pesticides to control pests and diseases. Detection of pesticide residues on e.g. hot pepper grown along the North East of Central Java showed that residues of organic phosphates were 20 -200 times the FAO/ WTO maximum residue limits. For this reason IPM which deals with non-chemical control becomes very important.

Up to now very little experience has been built up in Indonesia in scouting of tomato pests and diseases. Therefore a first scouting course was given in September 2003 at EWINDO by Nancy van der Heden (Koppert) and Wim van den Brink (PRI). IVEGRI was invited but no one showed up. Impron and Anne have evaluated the running experiments, which will be terminated mid-February 2004. The tomato variety used in the first experiment, during the second half of 2003, suffered from high levels of bacterial wilt infection, while towards the end of the season some infestation by spider mite and mealy but was observed. Therefore, a bacterial-wilt resistant variety with determinate growth habit was selected for the second experiment (Permata type). The crop was much healthier this time, with only low levels of infestation by spider mite and leafminers. This variety will be used in the coming two seasons. Growth of the crop appeared good, with normal levels of leaf area and production.
Results of scouting activities by IVEGRI in 5 districts in West-Java were presented. The main objectives of the scouting were to identify harmful and beneficial insects as well the pesticide use Data were collected partly in highland, and partly in lowland environments, at the end of the dry season. The focus host plants were chillies, sweet pepper and eggplant.

Figure 16. Mrs Nancy van der Heden of Koppert BV gives instruction.

7.2 Training, technology transfer and knowledge exchange:

Scouting/monitoring course given by Plant Science Group and Koppert at Purwakarta for farm managers of EWIDO and the company Saung Mirwan.
Training of PhD student in Wageningen on measurement and analysis of climatic and crop data.
Open days at EWINDO for local farmers.

7.3 Reports, publications

Belder, E. den Mission Report PROTVEG2. Indonesia 2-10 February. 8 pp. [file: PROTVEG2 Mission report 2003-1.doc]

Brink, van den W. (2003) Report of the trip to Indonesia for Hortin and Procult as far as IPM concerned. 8 pp. [file: PRI internal report PROTVEG2 mission sept 2003.doc]

Elings, A. Visit to Procult/Hortin PhD research of Impron at Purwakarta, Indonesia, September 6-13. 16 pp. [file: PROTVEG2 Mission report 2003-2]

7.4 Presentations

E. den Belder, Presentation “PROTVEG 2: Protected cultivation of vegetables in tropical lowland” kick-of meeting, February 2003.

Impron (PhD student) & Rien Rodenburg (EWINDO) “Konstruksi rumah plastik lokal“ workshop at IVEGRI, 10 September 2003.

Impron & Rien Rodenburg (EWINDO) “Bebih/bibit sayuran untuk budidaya di rumah plastik” 10 September 2003.

Programme DWK 424 – Horticultural research Co-operation between Indonesia and the Netherlands (HORTIN)

1. Project title : Product safety and quality management in Vegetable production systems (Quality)

2. Project number : 530085

3. Project leader : H.B. Schoorlemmer, Applied Plant Research, the Netherlands
E-mail: Herman.Schoorlemmer@wur.nl

4. Executing agency : Praktijkonderzoek Plant en Omgeving (APR)
P.O. Box 430
8200 AK Lelystad
The Netherlands
Tel.: + 31 320 291111
Fax: + 31 320 230479

5. Participating organisations

Indonesia vegetables research institute (IVEGRI)
Jl. Tangkuban Perahu No. 517, Lembang
Bandung 40391
Fax : 62 22 278 6416
Projectleader: Dr. Ir. Azis Azirin Asandhi

6. Objectives and short project description

The production and marketing of vegetables of high quality standards has become an important issue in Indonesia. At the same time production of safe food is of major concern to consumers. The control of product quality and food safety have become basic trade conditions in for example the European Union but also in the emerging economies of south east Asia. With a systematic approach vegetable growers and supply chains can meet the required standards for product quality and safe food production.

The aim of the project is the development and testing of a certifiable protocol for safe food production and product quality, in co-operation with stakeholders. The project is proposed to be restricted to the vegetable production region of West-Java and focused at cabbage, tomatoes and potatoes.

The approach contains four steps:

1. Identification of hazards for consumers and bottlenecks for product quality, with on the one hand an Hazard Analysis and Critical Control Points analysis (HACCP), and at the other hand an analysis of the perception and awareness of stakeholders in the production chain.
2. Development of a protocol to control the bottlenecks and to stimulate transparency. For this, a participative approach with growers and advisers will be organised to guarantee that the protocol is realistic and embedded in the local practical possibilities.
3. Test of the protocol in a pilot project with farmers and other participants in the supply chain.
4. Exploratory research on the possibilities of certification: how to organise independent audits and the needed organisational infrastructure.

Figure 17. Conventional way of vegetable handling.

7. Results

7.1 Output and impact

- Project definition in co-operation with the Indonesian counterpart (IVEGRI)
- Kick-off meeting in Indonesia (February, 2003)
- Development of a questionnaire and interviews of chain participants in Indonesia about quality and food safety demands.
- Desk research and interviews in the Netherlands for a report about control of food safety and product quality.
- Preliminary talks about possibilities for co-financing.
- Preparations for knowledge transfer (course in the Netherlands at IAC for an Indonesian project partner and visit to APR and company visits in the week after the course).
- October 2003 it was made clear, participation of the Indonesian project member into a course in the Netherlands couldn't be realised. To stimulate the knowledge transfer a course 'Introduction to quality assurance and safe food production' was developed and held in Lembang (December 2003) for 15 researchers of IVEGRI, including the whole Indonesian team of the project Quality. Afterwards two company visits were organised to discus and to reflect learned theory on practical circumstances.

7.2 Training, technology transfer and knowledge exchange

December 8 till December 11 a course 'Introduction to quality assurance and safe food production' was organised. The first two and a half day contained theory and exercises the last one and a half day company visits The mix between theory and practice was very successful for all participants. Parts of the course were:

1. introduction focused at the definition of quality from the consumer point of view and food safety;
2. international legislation and changes in the global food system as incentives for assurance of quality and food safety. Practical experience with supply chain management by making use of a chain game. Participants were divided in 4 groups (producer, distributor, wholesaler and supermarket) and tried to keep stocks as low as possible and the customer satisfied;
3. theory and exercises about quality assurance and ISO-9001;
4. theory and exercises about food safety assurance and HACCP;
5. introduction to two actual standards: Eurep-GAP and SQF;
6. evaluation
7. company visits (CV Bimandiri, Lembang and PT Saung Mirwan, Bogor)

Figure 18. Participants of the Quality Assurance and Food Safety Course.

7.3 Reports, publications

Schoorlemmer, H.B. Mission report nr 7. [QUALITY Mission report 2003-1.doc]

Schoorlemmer, H.B. Mission report nr 11. [QUALITY Mission report 2003-2.doc]

Schoorlemmer, H.B. and W.M. te Riele. Introduction to Quality Assurance and Safe Food Production. Course-Training for researchers IVEGRI Lembang, 8-10 December. APR-agv, Lelystad, December 2003.

7.4 Presentations

H.B. Schoorlemmer: Product safety and quality management in vegetable production systems. Project introduction during a programme meeting. Wageningen January 2003..

H.B. Schoorlemmer. Training: Introduction to Quality Assurance and Safe Food Production. for researchers IVEGRI. Lembang, December 8-10, 2003.

Programme DWK 424 – Horticultural research cooperation between Indonesia and the Netherlands (HORTIN)

1. Project title : Managing the most important seed-borne diseases of vegetables in Indonesia (SEEDS)

2. Project number :

3. Project leader : J.M. van der Wolf, Plant Research International, Wageningen, the Netherlands, E-mail: Jan.vanderWolf@wur.nl

4. Executing agency : Plant Research International
P.O. Box 16
6700 AA Wageningen
The Netherlands
Tel.: + 31 317 476024
Fax: + 31 317 423110

5. Participating organisations

- Plant Research International, Wageningen
- IVEGRI, Lembang, Indonesia
- Support by EWINDO, Purwakarta, Indonesia and IPB, Bogor, Indonesia

6. Objectives and short project description

- To survey important seed borne vegetable diseases in Indonesia
- To determine useful and reliable procedures for detection and identification of seed borne pathogens in Indonesia
- To produce a leaflet on seed borne diseases useful for seed producers and seed inspectors
- To describe strategies for seed health management
- to improve skill and knowledge on international standard procedures for seed health management to the Indonesian partners
- To disseminate information on the survey and the other project activities to the Indonesian seed growers, seed companies, seed inspectors and research organisations

These project activities will create insight information on the needs for disease health management and other aspects of seed production in Indonesia. It will create goodwill at counterparts in Indonesia, in particular at quarantine officers and seed industry. It will improve seed health management at an important seed company (EWINDO) in Indonesia with a Dutch seed company (ENZA) as an important shareholder. It stimulates the use of diagnostics (antibodies) produced in The Netherlands (at PRI). Indonesian seed growers will profit from Dutch expertise, know how and innovations.

7. Results

7.1 Output and impact

1. Desk study.

A desk study was executed in which literature data were collected from electronic libraries and internet, and supplemented by interviewing representatives from IPB, IVEGRI and EWINDO. No literature on seed borne diseases Indonesia, written in English, is available. Abstracts from literature in Bahasa are currently translated and results used for the desk study. According to specialists the following diseases are considered as most harmful in Indonesia: *Colletotrichum capsici*, *Xanthomonas axonopodis* pv. *vesicatoria* (Xav) and TMV/CMV on hot pepper, *Alternaria solani*, *Clavibacter michiganensis* subsp. *michiganensis (Cmm)*, ToMV and TMV on tomato, *Alternaria porii, Fusarium oxysporum, Erwinia carotovora*, OYDV, LYSV and SLV for shallot.

2. Format compendium.

After discussion with EWINDO we have decided to produce an information booklet on important seed borne pathogens in pepper, tomato and shallot, specifically meant for seed producers and field inspectors. It will be written in Bahasa. It will contain high-quality pictures and comprehensive information on the disease and disease management.

3. Selection of seed lots

At IVEGRI, 20 seed pepper and tomato seed lots and 20 lots of shallot produced on Java were sampled from farmers and bought from commercial seed companies. Seeds were tested for the presence of target pathogens as listed under 1. Results are currently evaluated and pathogens characterised. In addition, 9 commercial tomato seed were tested for bacterial and fungal pathogens at Plant Research International. In four seed lots Cmm was found. Symptoms caused by Cmm (bacterial canker) were also detected in the field. EWINDO, IPB and Selektani has agreed in providing IVEGRI suspected seed lots and information on the seed lots. EWINDO will also provide strains of Xav with information on the locations were infected seed lots were produced.
The results of the survey will be published on internet (webpage HORTIN-programme).

Figure 19. Bacterial spot on sweet pepper.

7.2 Training, technology transfer and knowledge exchange:

Due to health problems of the project leader the 1st HORTIN SEEDS Workshop on seed-borne diseases of vegetable crops in Indonesia had to be postponed to January 2004. The three-day workshop was held in Lembang and attended by 12 participants (IVEGRI, seed inspection, IPB, Ornamental plant institute, Selektani, and Sukamandi). The first day was used for seminars. In the other two days people were trained in techniques described in international standard procedures for seed health testing (plating, immunofluorescence techniques, bioassays, ELISA). The participants considered the workshop as very interesting and valuable for their work.

7.3 Reports, publications

Van der Wolf, J.M. & P.S. Van der Zouwen. 1st HORTIN SEEDS Workshop on seedborne diseases of vegetable crops in Indonesia: towards improved management practices. Lembang, 19 – 21 January 2004. SEEDS. 46 pages and 7 enclosures. [file: Seeds-Manual 2004.doc]

7.4 Presentations

Hamzah, A. Phytosanitary regulations of imported plants and planting materials into the territory of the Republic of Indonesia.
Van der Wolf, J.M. Strategies for seed health management in vegetable production
Hastiti, S.H. Strategies and supply system of vegetable seed in Indonesia
Duriat, A. Managing the most important seed-borne diseases of vegetables in Indonesia
Van der Wolf, J.M. Target pathogens in the HORTIN project
Muharam, A. Methods for viruses carrying seed
Van der Wolf, J.M. Methods for testing fungi and bacteria in seed
All presentations were held at the 1st HORTIN SEEDS Workshop on seed-borne diseases of vegetable crops in Indonesia: towards improved management practices. Lembang, 19 January 2004.