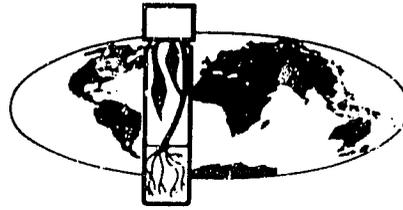


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Proceedings

of the

# Second Annual Conference of the International Plant Biotechnology Network (IPBNet)

**Biotechnology in the Development of Stress-Tolerant Tropical Food Crops**

Bangkok, Thailand  
January 11-16, 1987

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Tissue Culture for Crops Project  
Department of Biology/Botany  
Colorado State University

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July 15, 1987

Part II - Post Conference Update

The Tissue Culture for Crops Project is a program of the United States Agency for International Development, implemented by Colorado State University under Cooperative Agreement No. DAN-4137-A-00-4053-00.

SECOND ANNUAL CONFERENCE OF THE INTERNATIONAL PLANT BIOTECHNOLOGY NETWORK

January 11-16, 1987, Bangkok, Thailand

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## CONFERENCE AGENDA

January 11, 1987

15:00 - 17:00 Registration (Jamjuree Room #4 and #5)  
17:00 - 20:00 Cocktail Reception hosted by Chulalongkorn University  
(Lumpini Room)

January 12

Session I (Ploenchit Room)

08:30 - 09:20 Keynote Address--Anther Culture and Somatic  
Embryogenesis, Dr. Colette Nitsch

09:20 - 11:40 Oral Presentations--Chairwoman: Dr. Pimchai  
Apavatjirut

09:20 - 09:40 Dr. S.B. Babbar

09:40 - 10:00 Dr. Harvinder Cheema

10:00 - 10:20 Dr. Gary Hanning

10:20 - 12:00 Break

12:00 - 13:20 Lunch (Garden Room)

13:20 Oral Presentations--Chairman: Dr. David Isenhour

13:20 - 13:40 Dr. Satish Raina

13:40 - 14:00 Dr. M.C. Rush

14:00 - 15:00 Film: History Micropropagation, Breeding and  
Mutation Induction of Plantain and Banana

15:00 - 16:00 Break

16:00 - 16:20 Dr. Nguyen Thanh-Tuyen

16:20 - 16:40 Dr. Dirk Vuylsteke

16:40 - 17:00 Dr. Ludwig Muller

17:00 - 18:00 Break

18:00 - 19:30 Cocktail Reception hosted by the Imperial Hotel  
(Chompunute Room)

January 13  
Session II (Ploenchit Room)  
09:20 Oral Presentations--Chairwoman: Dr. Nguyen Thanh-Tuyen  
09:20 - 09:40 Dr. Azra Quraishi  
09:40 - 10:00 Dr. M. Salim Mirza  
10:00 - 10:20 Mr. Mohamed Aaouine  
10:20 - 10:40 Break  
10:40 - 11:00 Dr. Oradee Sahavacharin  
11:00 - 11:20 Mr. Rachmat Kartapradja  
11:20 - 11:40 Dr. Thavorn Vajrabhaya  
11:40 - 12:00 Break  
12:00 - 13:20 Lunch (Garden Room)  
13:20 - 14:20 TCCP/IPBNet Overview--Dr. Oluf Gamborg  
14:20 - 16:20 Poster Session

January 14 Excursions

January 15

Session III	(Ploenchit Room)
08:30 - 09:20	Keynote Address--Gene Movement and Protoplast Technologies, Dr. Roger Beachy
09:20	Oral Presentations--Chairman: Dr. M.C. Rush
09:20 - 09:40	Dr. Joel Cohen
09:40 - 10:00	Dr. Krishnamurthi
10:00 - 10:20	Dr. Frantisek Novak
10:20 - 10:40	Break
10:40 - 11:00	Dr. Shao Qiquan
11:00 - 11:20	Dr. B.B. Singh
11:20 - 11:40	Dr. Sumarno
11:40 - 11:50	Group Photo
12:00 - 13:20	Lunch (Garden Room)
13:20 - 14:00	Film: <u>In Vitro</u> Techniques for Crop Improvement

January 16

Session IV	(Ploenchit Room)
08:30 - 09:20	Keynote Address--Rapid Propagation, Dr. Paiboolya Gavinlertvatana
09:20	Oral Presentations--Chairman: Dr. Frantisek Novak
09:20 - 09:40	Mr. Paul Arulpragasam
09:40 - 10:00	Dr. A.R. Mehta
10:00 - 10:20	Dr. Yigal Cohen
10:20 - 10:40	Break
10:40 - 11:00	Dr. S.C. Gupta
11:00 - 11:20	Dr. Pranee Hamelink
11:20 - 11:40	Ms. Seema Kapur
11:40 - 12:00	Break

12:00 - 13:20	Lunch (Garden Room)
13:20	Oral Presentations--Chairman: Dr. Gary Hanning
13:20 - 13:40	Dr. Fathan Muhadjir
13:40 - 14:00	Dr. Ponpimon Suriyajantratong
14:00 - 14:20	Dr. Colette Nitsch
14:20 - 14:40	Dr. Livy Winata Gunawan
14:40 - 15:00	Break
15:00 - 16:00	Group Discussions
16:00 - 18:30	Break
18:30 - 20:00	Farewell Dinner hosted by the Tissue Culture for Crops Project (Nualchand Room)

## IPBNet DISCUSSION GROUP SUMMARY

### I. Resources

Feedback covered the following topics:

#### 1. Information retrieval

Participants requested a comprehensive listing of IPBNet members and their research interests. They also requested an updated list of recent research techniques, literature, and publications on tissue culture be made available (see Newsletter).

#### 2. Collaborative exchanges

Personnel exchanges on the level of graduate students, technical staff and visiting scientists would be established between member labs. The period of six months to one year was agreed upon as significant time for productive exchange (depending on topic of research). Requests were made that TCCP assist in organizing workshops and seminars according to regional interests and needs.

#### 3. Funding

Several groups expressed interest in receiving a list of funding agencies (grants, scholarships, stipends) available for training, foreign graduate studies, research exchange programs (see Newsletter).

### II. IPBNet Newsletter

Several groups felt the Newsletter should have an increased global/IPBNet focus. Sections devoted to IPBNet collaborations, information, etc. would feature:

1. Special interest articles covering various IPBNet scientists and their work.
2. A published researched list of funding organizations. Also feature updated literature available for new technical methods, research findings, etc.
3. Compile a synopsis of members' research to be featured on rotational basis—divided by region, crops or scientific specialties (protoplasts, stressing techniques, etc).

4. Use the newsletter as means of mass information dissemination; not a TCCP update exclusively.

### III. Training

The issues of funding and regional/TCCP training programs were the main focus. Suggestions included:

1. Initiate joint training programs between FAO/IAEA/TCCP. These could be either short term (six weeks) or longer (six months). Molecular biology, breeding and in vitro techniques were mentioned as areas of interest.
2. The consensus was in favor of regional training centers. Members would like TCCP's assistance in course design, lecture outline, and technical assistance. Courses would vary according to specialized interests and regional crops. Participants would include a variety of people, ranging from agriculturists or forestry personnel to molecular biologists.
3. Inquiries were made concerning the financial role TCCP could play in initial funding (seed money) of regional training courses.
4. Assist interested trainees in locating funding from existing programs (established International Centers, etc.).

## ABSTRACTS

### PLANT REGENERATION FROM COTYLEDONS OF Stylosanthes guyanensis cv. Cook IN THE PRESENCE OF SODIUM CHLORIDE

Livy W. Gunawan, Fajar Sugiartono, and Agus Purwito.

Department of Agronomy, Bogor Agricultural University, Bogor

Indonesia

The effect of sodium chloride on regeneration of Stylosanthes guyanensis cv. Cook was studied. Cotyledons were excised from 7-day-old and 30-day-old seedlings. Explants were grown in MS medium supplemented with 1 mg/l BAP. Sodium chloride at the rates of 0, 50, 100, 200, 400, and 800 mg/l were added to the growth media.

Regeneration through shoot bud formation in young cotyledons occurred within 2 weeks, whereas in older cotyledons, after 3 weeks. Percentage of culture regenerated was lower in older cotyledon. Young cotyledons cultured in medium with 50 mg/l sodium chloride showed the highest number of shoot, while in older cotyledons, in medium with 200 mg/l sodium chloride.

At all levels of sodium chloride, the average length of shoots was reduced. However, occasionally vigorous shoots were observed.

### TISSUE CULTURE, RAPID MULTIPLICATION AND POTATO MINITUBERS FOR CERTIFIED SEED POTATO PROGRAMME IN THAILAND.

P. Hamelink and Y. Mongkolsook\* Department of Plant Pathology, Faculty of Agriculture, Kasetsart University, Bangkok 10900, Thailand. \*The Central Scientific Equipment, Laboratory (KURDI), Kasetsart University, Bangkok 10900, Thailand.

Plantlets of potato variety Spunta and Russet Burbank were produced by tissue culture. Immunoelectromicroscopy (IEM) was used to select plantlets free from viruses. A rapid multiplication of plantlets was performed by growing single node cuttings on modified Murashige and Skoog (MS) medium, to produce healthy plantlets in 2-3 weeks with well-developed root systems and rapid growth. The plants were prepropagated 5 times per 3 weeks. Stem cutting growing in the glasshouse, produced plantlets with a well-developed root system in 2-3 weeks, and grew more rapidly than single node cutting plantlets grown on MS medium. Transportation of large numbers of single node cutting plantlets grown on MS medium was easier than by cutting and survival rates after growing for 2 weeks were higher than 80%. Plantlets in spacing trials under field plot conditions (10 m<sup>2</sup>) produced 3-12 tubers ranging in weight from 0.2 to 70 gm. for 20x20 cm. or three row/plots and 2-7 tubers ranging in weight from 0.1-60 gm. at 10x10 cm. or five rows/plot. The soil was treated before planting with Basamid-G and insects were controlled by a cheese-cloth screenhouse. The tubers harvested from stemculture plantlets all showed a normal shape, whereas, a high percentage of those from stem cuttings were malformed and borne areally. These field trials revealed that the production of minituber seed potatoes is very promising for commercial scale production.

## TISSUE CULTURE FOR VIRUS FREE POTATO PRODUCTION

Iteu Hidayat and Rachmat Kartapradja

Lembang Horticulture Research Institute, Jl. Tangkuban Perahu  
517 Lembang, West Java, Indonesia

The project of tissue culture for virus free potato production was established in October 1982 involving laboratory set-up, staffing and training, meristem culture and rapid multiplication technique.

Laboratory set-up and aphid proof screen house was completed November 10, 1984.

Laboratory staff were sent to the Philippines and Vietnam for training and workshops in 1984.

The preliminary results in meristem culture media experiments showed that MS basal medium (1962) completed with 3% sucrose, 100 mg/l inositol, 0.20 mg/l GA, and 0.5 mg/l BAP solidified with 6 gm/l agar was the best media among 10 basal media tested for Cipanas, Cateella, Desiree and Cosima cultivars. This media completed with 2 mg/l Ca phantotenat and also MS basal media + 0.25 mg/l GA + 2 mg/l Ca phantotenat + 100 mg/l inositol shaken for 100 rpm for 2 hr /day were good for multishoot culture.

The technique of rapid multiplication of plant materials produced in vitro is under study.

The plantlets obtained from 45 clones virus free plant materials from Peru which were resistant to late blight (Phytophthora palmiora) and pseudomonas solanacearum were maintained in solid MS media completed with 0.25 mg/l GA, 2 mg/l Ca phantotenat solidified with 8 gm/l agar.

Lembang Horticulture Research Institute should be able to produce at least 60,000 tuberlets of desired variety every year in order to provide clean seed for the national seed production program.

## PRE-BASIC SEED POTATO PRODUCTION IN PUNJAB THROUGH TISSUE CULTURE

M. Salim Mirza and M. Salim Shaheen. Plant Virology Section, Ayub Agricultural Research Institute, Faisalabad, Pakistan.

Studies were initiated to standardize technology for virus tested disease free seed potato production through tissue culture to stop the import of seed potatoes in the country. Plants obtained through meristem culture or sprouts of potatoes tested for freedom from viruses were multiplied in vitro. Multiplication rate of 8-10 nodes per node per month was recorded in culture vessels. Test tube plantlets were transferred to pots/soil in the greenhouse/field for tuber formation. Number of tubers in pot ranged from 3-9 per plant with an average of 4, whereas in the field number ranged from 6-15 per plant. Best composition of pot mixture was of 2:1 ratio of well rotten farm-yard-manure and soil. Rate of multiplication was further enhanced by plantlet cutting, stem cutting and tuberlet formation in the greenhouse. These studies resulted in production of 8000 tubers in first year and 9000 in the next year with a workable technology for an enlarged programme.

THE PROBLEM OF SOMACLONAL VARIATION IN Musa spp.

Ludwig E. Müller and Jorge Sandoval. Centro Agronómico Tropical de Investigación y Enseñanza (CATIE) 7170 Turrialba, Costa Rica.

In bananas and plantains traditional methods of plant breeding have not yielded, in many decades of research, any new commercial varieties. This is due to the sterility, a condition essential for eating quality. During the last decade much work has been done on Musa tissue culture. Thus, in several cases commercial applications of rapid clonal propagation of banana has been carried out. In each case it was noted that somaclonal variation could be detected. In Jamaica, where some 2 million tissue culture-grown plants were planted, an unusual high rate of somaclonal variation was prevalent, exceeding 30% (visual symptoms only), with most off-types of no commercial value, and needed to be replaced. Considering that the plantlets were obtained from adventitious buds, arising from the corm tissue of the explant, in a similar way as in field-grown plants, and being genetically stable, no explanation can be given. There exists a good probability that this high variation rate could yield some new varieties, which may perhaps be resistant to the severe diseases attacking commercial plantations all over the world. On the other hand, when trying to preserve germplasm in vitro, somaclonal variation needs to be eliminated. This can be done by cultivating only the apical bud or, with addition of ABA to the medium, which induces elongation of all internodes of the explant, by excision of the lateral axillary buds, which represent primary meristem only. Thus, somaclonal variation in Musa may be beneficial and selection could yield new materials, and on the other hand detrimental if rapid clonal multiplication and germ plasm preservation in vitro are being considered.

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Primary Research Areas: Improvement for high yield and quality of corn.

Collaboration Interests: Selection for drought tolerance.

---

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Phone: 03-9486101 to ...109 ext. 3731 Telex: MA 37454

Primary Research Interests: Propagation, stress tolerance germplasm collection and storage of sago palm.

Collaboration Interests: Hydroponic testing for stress tolerance (salt, drought, acidity).

---

Dr. Pimchai Apavatjirut  
Department of Horticulture  
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Primary Research Areas: Flower, fruit and forest crops.

Collaboration Projects: Micropropagation of forest and fruit crops; stress tolerance of forest and fruit crops; mutation breeding in flower crops.

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Dr. Paul V. Arulpragasam  
Tissue Culture Project  
Tea Research Institute  
Talawakele, Sri Lanka  
Telex: 21304 TBOARD CE

Primary Research Areas: Micropropagation of tea; selection for drought and disease resistance; anther culture—haploid plant.

Collaboration Interests: Selection for drought and disease resistance.

Dr. Shashi B. Babbar  
Department of Botany  
University of Delhi  
Delhi - 110007, India  
Phone: 236263 (work); 566794 (home)

Primary Research Areas: Anther culture of Brassica nigra; regeneration of Psidium guajava.

Collaboration Interest: Selection of stress (salinity, cold) tolerant and disease resistant plants of some oil yield Brassicaceae, employing tissue culture methods; screening plants for desired levels of euracic acid and glucosinate among the regenerants in cell and anther culture of other explants.

---

Dr. Aht Boonitee  
Botany Department  
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Bangkok 10900, Thailand

Primary Research Areas: Joining with Agronomy Dept., Kasetsart Univ., to work on corn tissue culture, cell line propagation and screening for corn breeding project.

Collaboration Projects: Biotechnology in the protoplast technologies of corn.

---

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Primary Research Areas: Morphogenetic studies on soybean, Brassica, and ferns; somatic embryogenesis in economically important crop plants.

Collaboration Interest: Morphogenetic studies on herbaceous crop plants.

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Primary Research Areas: Genetics and breeding for the improvement of yield and quality of corn.

Collaboration Interests: Prevention and control of aflatoxin problem in corn through research and development of tissue culture; plant regeneration and long-term culture (corn) with yield and quality: protein, oil, sweet corn; drought tolerance.

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Dr. Yigal Cohen  
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Primary Research Areas: Potato, cucurbits, sweet corn, avocado, tobacco.

Collaboration Interests: Breeding for disease resistance; gene transformation; intergeneric crosses in cucurbits; chemical control of foliar fungal pathogens.

---

Dr. L. D'Souza  
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Primary Research Areas: Clonal propagation and somatic embryogenesis of coconut, cashew, and breadfruit.

Collaboration Projects: Somatic embryogenesis in coconut and cashew or other palms.

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Primary Research Areas: Potato, rubber, coconut, stura and oil palm, rattan ebony, teak, sandalwood.

Collaboration Interests: Tissue culture technique for selection of Al-tolerant cell line in peanut.

Dr. Shrish C. Gupta  
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Primary Research Areas: Micropropagation of leguminous trees through tissue culture; physiology of androgenesis; physiology of fertilization with reference to biology of sexual reproduction.

Collaboration Interests: Physiology and biochemistry of induction of organogenesis/somatic embryogenesis; developing wide hybrids through hybrid embryo rescue operations by embryo culture; protoplast culture technology and genetic engineering.

---

Dr. Pranee Hamelink  
Dept. of Plant Pathology  
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Primary Research Areas: Production of virus-free seed potato; production of disease-free seed potato for commercial scale; quality control of plants from tissue culture; production of virus-free cotton and orchid.

Collaboration Interests: Improve the diagnosis techniques for plantlets produced by bioculture; disease resistant cultivar produced by high technology.

---

Dr. David J. Isenhour  
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Coastal Plain Exp. Station  
University of Georgia  
Tifton, GA 31793 USA

Primary Research Areas: Evaluation of maize and alfalfa genotypes for resistance to insect feeding; incorporation of resistant genotypes and beneficial insects for developing pest control strategies; application of tissue culture to insect host plant resistance work.

Collaboration Projects: Regeneration of maize genotypes with resistance to insect feeding.

Mr. Mopadon Kailapanont  
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Phone: 4210020-4 Telex: 82734 MADAME TH

Primary Research Areas: Orchid tissue culture.

Collaboration Interests: Clonal propagation of palms (coconut, date palm, and oil palm) through tissue culture.

---

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Primary Research Areas: Oil palm and rubber.

Collaboration Interests: Oil palm and rubber plants regeneration, field testing and selection.

---

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Primary Research Areas: Tissue culture, anther culture, and protoplast culture of Sesbania bispinosa (leguminous shrub).

---

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Hessaraghatta Lake  
Bangalore 560 089, India

Primary Research Areas: Genetic improvement and cultural practices of tropical horticultural fruits, vegetables, ornamentals; biotechnology project on tomatoes and capsicums.

Collaboration Interest: Introduction of drought tolerance genes in tomatoes and capsicums from wild sources.

Dr. Sman Keoboonrueng  
Plant Pathology & Microbiology Division  
Dept. of Agriculture  
Bangkhen, Bangkok 10900, Thailand  
Phone: 5799584

Primary Research Areas: Mutation breeding for disease resistance of roselle, kenaf; screening of roselle hybrids derived from conventional breeding for collar rot disease resistance; chemical control of roselle, kenaf leaf blight.

Collaboration Interests: Roselle and cotton improvement for disease resistance through in vitro culture.

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Dr. Boonyuen Kijiwan  
Biology Department  
Faculty of Science  
KhonKaen University  
Khon Kaen, Thailand  
Phone: 236199

Primary Research Areas: Plant regeneration of sugarcane tissue culture.

Collaboration Interests: Corn.

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Dr. Apichart Koasa-ard  
Ms. Suchitra Changtragoon  
Biotechnology and Biochemistry  
Central Forest Research Laboratory  
and Training Centre  
Royal Forest Department  
Bangkok, Thailand  
Phone: 5790230-4 ext. 49

Primary Research Areas: Application of tissue culture in forest tree species including Tectona grandis, Pinus spp., Dipterocarpus spp. and fast growing tree, for mass propagation.

Collaboration Projects: Protoplast technology and molecular biology: genetic manipulation in woody plants.

Dr. Krishnamurthi  
Sugarcane Research Centre  
Fiji Sugar Corporation Ltd.  
PO Box 3560  
Lautoka, Fiji  
Phone: 61839 Telex: FJ 5175

Primary Research Areas: Sugarcane, mint.

Collaboration Interests: Breeding for resistance to diseases, salt tolerance, and other variations in sugarcane.

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Ms. Siripong Kumphai  
Vegetable Disease Branch  
Plant Pathology & Microbiology Division  
Department of Agriculture, Bangkok  
Bangkok 10900, Thailand  
Phone: 579-9585, 579-8558

Primary Research Areas: Mutation breeding for diseases resistance in Pisum and Vigna; breeding for resistance of important disease of Pisum and Vigna.

Collaboration Interests: Pisum and Vigna improvement for disease resistance and stress tolerance through in vitro culture.

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Dr. Siranut Lamseejan  
Dept. of Applied Radiation and Isotopes  
Kasetsart University  
Bangkok, Thailand  
Phone: 5795530

Primary Research Areas: Mungbean and soybean mutation breeding for major disease resistances; in vitro culture technique in soybean and mungbean.

Collaboration Interests: Improvement of mungbean and soybean for stress resistance such as salt and acids through in vitro culture.

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Ms. Razia Latiff  
Tea Research Institute  
Talawakelle, Sri Lanka  
Telex: 21304 TBOARD CE

Primary Research Areas: Tea

Collaboration Interests: Selection of drought and disease tolerance in tea.

Dr. Atul Mehta  
Department of Botany  
Faculty of Science  
The M.S. University of Baroda  
Baroda 390 002, India  
Phone: 64779 (work); 67189 (home)

Primary Research Areas: Clonal multiplication of forest and fruit trees; somatic embryogenesis in tree spp; isolation of wilt-resistant cell lines and regeneration of tobacco plants; isolation and selection of low BOAA containing cell lines of Lathyrus sativus L.; physiological/biochemical aspects of morphogenesis in vitro.

Collaboration Interests: Selection of stress (salinity, drought and disease) resistant plants (tobacco and grain legumes); transfer of desirable genes from the wild to cultivated crop plants by embryo rescue, parasexual hybridization, recombinant DNA technology and electroporation methods.

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Dr. Muhammad Salim Mirza  
Ayub Agricultural Research Institute  
Faisalabad, Pakistan  
Phone: 34915

Primary Research Areas: Disease-free seed potato production through tissue culture; virus eradication from sugarcane varieties through meristem culture.

Collaboration Interests: Virus eradication from vegetatively propagated crops/plants for healthy seed/plant production; rapid multiplication through tissue culture.

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Dr. Aouine Mohamed  
I.A.V. Hassan II - Complexe Horticole  
B.P. 121 Ait Melloul  
Agadir, Morocco  
Phone: (08) 301-51 Telex: AGROVEH 81960M

Primary Research Areas: Salinity tolerance in banana; elimination of strawberry virus and potato virus; micropropagation of ornamentals and fruit crops; virus elimination in fruit crops.

Collaboration Interest: Development of salt tolerant bananas (and other vegetable crops); germplasm exchange (pineapple).

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Dr. Ludwig Müller  
CATIE  
Turrialba 7170, Costa Rica

Phone: 566431 Telex: 8005 CATIE CR

Primary Research Areas: Somaclonal variation in Musa spp.; clonal in vitro propagation of Coffea arabica L.; clonal propagation of some Zingiberaceae and Erythrina spp.

Collaboration Interests: Computerization of reference collection; tissue culture training; funding.

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Dr. Colette Nitsch  
CNRS  
Bat 13 Allée de la Terrasse  
91190 Gif sur Yvette, France  
Phone: (1) 69077828 ext. 387

Primary Research Areas: Adapt androgenesis by pollen suspension culture for interspecific crosses in tomato (selection disease resistant) and in lupin (selection for sweetness, cold resistant); androgenesis in screening selection of resistant lines from wide sexual cross between millet and corn; embryo rescue in sunflower; cold resistant selection for Gerbera; vegetative multiplication and somatic embryogenesis in Pinus pinaster.

Collaboration Interests: Speed up the project on millet x corn, for example, to analyze the change in storage protein quality of millet grain after backcrossing with corn.

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Dr. Frantisek Novak  
Plant Breeding Unit  
Joint FAO/IAEA Programme  
Wagramerstrasse 5, PO Box 100  
Vienna A-1400, Austria  
Phone: (0) 2254/2251 ext. 279 Telex: 1-12645

Primary Research Areas: In vitro mutation breeding technology in plantains and bananas; somatic embryogenesis in cocoa; assessment of somaclonal and mutagen induced genetic variability in maize; in vitro breeding system of Allium.

Collaboration Interests: Somatic embryogenesis in maize.

Dr. Thipmani Paratasilpin  
Biology Department, Faculty of Science  
Chiang Mai University  
Chiang Mai 50002, Thailand

Primary Research Areas: Tissue culture of teak; mutagenetic effects of fast neutrons on tissue culture of broad bean (Vicia faba) and onion (Allium cepa); tissue culture of tea and coffee.

Collaboration Interests: Tissue culture of tea; regeneration of plants from callus in order to get uniformity as observed in the donor plants; mass propagation of such uniformity is needed.

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Ms. Valailak Phadvibulya  
Office of Atomic Energy for Peace  
Vibhavadeerangsit Road, Bangkok  
Bangkok 10900, Thailand  
Phone: 5795230-4

Primary Research Areas: Mutation breeding of mulberry for bacterial blight disease resistance; mutation breeding on peaches and nectarine.

Collaboration Interests: Mutation breeding of mulberry for bacterial blight disease resistance, specific on in vitro culture of the irradiated buds and then screen for disease resistance.

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Dr. Shao Qiquan  
Genetics Institute  
Academia Sinica  
Beijing, P.R. of China  
Phone: 28-3564

Primary Research Areas: Gene transfer with soybean, ginseng, Chinese wolfberry, rice, barley, wheat.

Collaboration Interests: Isolation of salt-tolerant genes and its transformation; artificial seeds with cereals.

Dr. S.K. Raina  
Rice Tissue Culture Lab.  
Biotechnology Centre  
I.A.R.I.  
New Delhi 110012, India

Primary Research Areas: Induction, evaluation and utilization of pollen plants and somaclones in rice improvement.

Collaboration Interests: Development of stable, alien addition, substitution lines in indica rices through tissue culture techniques involving embryo culture, somatic culture and/or anther culture.

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Dr. A. Ian Robertson  
Department of Crop Science  
University of Zimbabwe  
PO Bag 167 MP  
Harare, Zimbabwe  
Phone: 303211 ext. 341

Primary Research Areas: Propagation of cassava; virus elimination of strawberry, potato, carnation, and chrysanthemum; propagation of coffee; development of drought and heavy metal tolerance in maize.

Collaboration Interests: Training my post-graduate students.

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Dr. M.C. Rush  
Dept. of Plant Pathology & Crop Physiology  
Louisiana State University  
Baton Rouge, LA 70803 USA  
Phone: (504) 388-1399

Primary Research Areas: Disease resistance in rice; pesticides for disease control in rice; rice tissue culture-somaculture.

Collaboration Interests: Somaculture techniques, somaclonal variation, somaclonal variation for disease resistance, transformation through protoplasts, and treated pollen in rice tissue culture.

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Dr. Oradee Sahavacharin  
Department of Horticulture  
Faculty of Agriculture  
Kasetsart University  
Bangkok 10900, Thailand  
Phone: 579-1951

Primary Research Areas: Propagation and improvement of banana, ginger, coconut and other palms, potato, elephant yam, asparagus, chrysanthemum tea, aloe vera.

Collaboration Interests: Banana, coconut.

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Dr. B.B. Singh  
IITA  
Oyo Road, PMB 5320  
Ibadan, Nigeria  
Phone: 413440 Telex: 31417 TROPIC NG

Primary Research Areas: Cowpea, soybean, maize, rice, cassava, sweet potato, yam, plantain.

Collaboration Interests: Interspecific and intergeneric crosses in cowpea and rice; plant regeneration from suspension cultures.

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Dr. Pongpimon Suriyajantratong  
Department of Biology  
Faculty of Science  
KhonKaen University  
KhonKaen 40002, Thailand

Primary Research Areas: Development of methodologies for cowpea tissue culture and Vigna spp.

Collaboration Interests: same as above

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Dr. Nguyen T. Thanh-Tuyen  
Visayas State College of Agriculture  
ViSCA, Leyte 7127-A, Philippines

Primary Research Areas: Tissue culture of corn and upland rice for selection of stress-tolerance; tissue culture of coconut and abaca.

Collaboration Interests: Tissue culture of corn and rice with TCCP.

Ms. Somkid Virigool  
Prathumtani Rice Research Center  
Tanyaburi, Prathumtani  
Thailand 12110  
Phone: 5771689

Primary Research Areas: Anther culture, salt tolerance, acid sulfate soil tolerance, submergence tolerance in rice tissue culture.

Collaboration Interests: Salt and acid sulfate soil tolerance by rice anther culture.

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Dr. D. Vuylsteke  
IITA  
PMB 5320  
Ibadan, Nigeria

Primary Research Areas: Meristem and tissue culture of plantain/banana.

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Dr. Rapepun Wititsuwannakul  
Biochemistry Department  
Faculty of Science  
Prince of Songkla University  
Hat-Yai 90112, Thailand  
Phone: 244-877 ext. 2274, 2284 Telex: 62168 UNISONG TH

Primary Research Areas: Rate-limiting enzyme in rubber biosynthesis; biotechnology application for characterization and selection of better-yielding rubber clones; anther culture of Hevea brasiliensis.

Collaboration Interests: Disease resistance studies at tissue culture level (i.e. phytoalexin); tissue culture of Hevea brasiliensis (i.e. anther and leaf).

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Ms. Girlie Wong  
Applied Agric. Research Sdn. Bhd.  
Locked Bag #212, P.O. Sg. Buloh  
47000 Sg. Buloh  
Selangor, Malaysia  
Phone: 03-6561152 or 6561206

Primary Research Areas: Clonal propagation of oil palm.

Collaboration Interests: Direct somatic embryogenesis of oil palm.



Ms. Arunee Wongpiyasatid  
Dept. of Applied Radiation and Isotopes  
Faculty of Science  
Kasetsart University  
Bangkhen, Bangkok 10900, Thailand  
Phone: 5795530

Primary Research Areas: Induced mutations for rust resistance in soybean.

Collaboration Interests: Induced mutations for salt and drought tolerance in soybean.

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