

# GLOBAL NEWSLETTER ON *UNDERUTILIZED* CROPS



December 1999

## Editorial

*'The second issue of your newsletter is a treasure house of very useful and practical information. I've been interested in the general area of conserving bio-diversity and recognizing the value of native crops for many years and I must say this is the single best "resource" list that I have come across. Congrats and keep it up.'*

Dr Julian F. Gonsalves, Vice President for Program International Institute of Rural Reconstruction (IIRR), Philippines. Dr Gonsalves' comment says it all!

Welcome to the third Global Newsletter of Underutilized Crops. We are pleased to say that FAO's funding facilitated the production of this issue. This newsletter has been published regularly to meet the requirement of Agenda 12 of Global Plan of Action agreed at the Leipzig meeting in 1996. We find this useful to promote and commercialise the underutilized crops.

There are several activities taken place this year which gives us hope that resource-poor farmers, who want to diversify their farming systems and products to alleviate poverty, will be benefited for food and nutrition security. FAO has organised several meetings in Rome and other regions to prioritise activities to promote underutilised commodity crops. The CGIAR organised a meeting in February in Chennai (India) to discuss the need for improvement and use of underutilized crops. The meeting emphasised the role that underutilized crops play in food and nutrition security and in sustainable agriculture systems in developing countries. ICUC has actively participated in these meetings. The Global Forum for Agricultural Research has also indicated the role of underutilized crops for research and development, which will enhance poverty eradication at the beginning of the next millennium. ICUC has taken the initiative to work on commodity groups through the regional fora. The news on the activities of these organisations has been reported in the newsletter. We have also highlighted some of the news of NGOs who are also involved in the domestication and development of underutilized crops. We hope you find these useful to promote your national indigenous underutilized crops.

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The next issue of this newsletter will be published in June 2000. WE LOOK FORWARD TO RECEIVING YOUR NEWS, ARTICLES, COMMENTS, and SUGGESTIONS AS SOON AS POSSIBLE. Many thanks for your co-operation.

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### Mission Statement

**Food Security, improved nutrition and economic welfare of human beings raised through sustainable and increased economic production of food and industrial raw materials. This to be achieved by developing and utilising the untapped biological diversity of underutilized crops.**

## **ICUC**

***announces an  
International  
Conference:***

***‘New Crops: a  
decade of  
achievements  
and the way  
forward’***

***to be held in April  
2001. Please contact  
ICUC for further  
information.***

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### **A Millennium Message from the Chairman**

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As time marches on and we move from the 20<sup>th</sup> into the 21<sup>st</sup> century, who knows what the future holds for planet Earth and its inhabitants? The balance of bio-diversity is rapidly changing. The population of *Homo sapiens* continues its rapid expansion, ousting many other species through competition for space and as a result of the side effects of human activities. These activities are changing our climate and degrading and causing the loss of fertile soils. However, in the latter decades of the 20<sup>th</sup> century, humankind in its wisdom has rapidly come to

recognise the need for action to be taken to reverse these trends if life on the planet is to be sustained through the coming millennium. Human populations must be stabilised if they are to be sustainable and their welfare enhanced, and if they are to be fed by the renewable and non-renewable resources that will remain available as time marches on. We are already seeing a considerable slowing down of population growth in many economies, thanks to the availability of technologies that reduce the need for human energy in the production of food, consumer goods, medicines and the other necessities of modern lifestyles. The inequities that exist between the poor, the less poor and the wealthy, although unacceptable today, will become intolerable in the years soon to come. Equal opportunities for education and equal access to resources through fair pricing and fair trade are pre-requisites for the achievement of equity for all.

The evolution of today's human societies has been governed by the natural laws of evolution - competition and the survival of the fittest. We who survive in our societies, are those who are able to secure roofs over our heads, places to rear our offspring, and provide the food with which to feed them. We need to rear our young in such ways that they too might be taught to compete and survive in a changing world. Competition for the essential requirements of homes, food and consumer goods has, during the past millennium, resulted in violent conflicts through which the well resourced have defeated the resource poor, often decimating the populations of the latter. Populations living in resource-poor environments, unable to provide their food needs, have been reduced through starvation, malnutrition and the resulting

diseases, in spite of the many attempts to save them by providing the needed resources through humanitarian aid schemes, which only provide temporary emergency relief without addressing the root causes of the disasters.

Our knowledge of ecology, and our access to technology, is however such that we should be able to organise our societies in such a way that we all can be fed, poverty can be eliminated and human health assured. We all must strive to achieve these goals before our renewable resources are irretrievably lost. But we need to elect good leaders for our societies, by fair democratic processes, leaders who through their good governance will provide the enabling environments within which civil society can work to realise our aspirations.

The ICUC can play its part in these endeavours, as it helps establish a new and strong International Network on Under-utilised Crops which will explore the un-utilised and under-utilised biodiversity and use it to raise productivity within our changing environments, especially those which are fragile, degraded and which are currently unproductive. We must recognise and use the indigenous knowledge of our forebears, much of which has been irretrievably lost in the so-called developed economies, but much of which still survives in the ethnic cultures of many so-called developing countries.

I wish all our readers a peaceful and thoughtful journey into the next millennium.

Roger W. Smith  
Chairman, ICUC

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### Friends of New Crops

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#### DONATIONS

The ICUC have recently received generous donations from:

**Jean Bezard**, Professor Emerite de l'Universite de Bourgogne, France

**Senora M J Pascual-Villulobos**, Centro de Investigacion, y Desarrollo Agroalimentario, Spain

We thank you and have included your names in the list of Friends of New Crops and on the mailing list.

#### NEW INTEREST

**S A Adesanya, Department of Pharmacognosy, Faculty of Pharmacy, Obafemi Awolowo University, Ile-Ife, Nigeria** wrote that as the use of African herbal materials has not been maximised yet, medicinal plants fall under the title 'Underutilized Crops' and he will be submitting an article in the near future.

Mr T J Glover, South Africa kindly offered space in his organic fruit orchard for the planting of ICUC research saplings. ICUC are able to supply the technology free of charge, but due to legal complications, are unable to supply him with saplings.

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### Organisations Concerned with Underutilized Crops

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#### ICUC News

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The year 1999 has been very successful for ICUC. We have

finished several projects during the year but also we have been successful in bids for several projects.

K. P. Paudyal and A Azad have projects on genetic diversity of pummelo and jackfruit development of propagation methods. They submitted their Ph.D theses. They were both recommended by the examiners for Ph.D degree. They have returned to their countries. Two papers on pummelo have been submitted to peer reviewed journals. Two papers on jackfruit are being prepared now for submission. The project was funded by DFID (R6389)

Peter Lovett has finished his practicals on the Diversity and management of sheanut, *Vitellaria paradoxa* in June. He has been writing up his thesis for Ph.D and will submit by the end of 1999. Two papers from his work have been accepted for publication by journals: *Agroforestry Systems and Genetic Resources and Crop Evolution of Kluwer Publications*. The project was partly funded the Leverhulme Trust.

The project on indigenous vegetables in collaboration with the University of Fort Hare (UFH) has been completed in April 1999. The project was funded by the Office of Science & Technology, UK and the final report was submitted to OST last July.

Improvement of Safflower in Pakistan: The project ended officially in May 1999 because of non-availability of funds from CSC but the Director of BARANI Research Institute agreed to continue the project until May 2000 so that multilocation trials are completed and valid selection of genotypes have been made for the rainfed conditions.

Diversity of homestead farms in Bangladesh- this is the second

year of the project. Initially the project was funded by CSC but now the project has been carried out by a student of Agricultural University in Bangladesh. The field survey has been completed from 5 different agroecosystems and the data have been compiled and I am awaiting for the annual report. Since it is going to be part of the Ph.D thesis (to be submitted at the Agricultural University, Bangladesh) more work is needed.

Research and Development in Homestead Farming funded by DFID through CARE UK & Bangladesh. A contract has been sent by CARE and it is in the process of final discussion.

The Improvement of Indigenous Vegetables in South Africa and Tanzania. The project is funded by the National Lottery Charities Board, UK. Project initiation meeting was held in Pretoria and developed work plan according to the rules and regulation of NLCB. The project has started from January 1998 and is on target. A new project coordinator will be appointed soon who will also work and coordinate "Pulses, vegetables, roots and tubers" programme for ICUC.

DFID-FRP project: The project is a collaborative programme with IPGRI and ICRAF and started from November. Dr. Mark Atkinson was initially appointed but Angela Hughes took over in April when Mark left.

The major constraint to the effective use of many underutilized crops is access to information. Fruits for the Future aims to overcome this with the production of monographs, extension materials and annotated bibliographies for 4 species and 1 genus of tropical fruit tree (*Tamarindus indica*, *Ziziphus mauritiana*, *Dacryodes edulis*, *Adansonia digitata* and *Annona* spp.). The first of the monographs and its

accompanying extension manual will be published early in the new year with the second close behind. The annotated bibliographies for the above species can be accessed via the ICUC web site

<http://www.soton.ac.uk/~icuc>

Lottery 2 project: The NLCB has awarded a further grant of £241.5K for UTFANET programmes for 3 years (see Networks for details).

UTVAPNET: A new network has been established in collaboration with FAO for vegetables in Asia and the Pacific. However, ICUC's involvement has to be determined (See Networks for details).

ICUC has been expanding during the last two years and this has been due to hard work for the Board of Trustees and the generosity of sponsors to carry forward the objectives of ICUC.

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### Food and Agriculture Organisation (FAO)

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#### Plantinfo: A Component of FAO's Global Plant and Pest Information System at

<http://pppis.fao.org>

(Abstract from a paper presented at Oregon State University, August 1999.)

FAO has collaboratively established a global, shared knowledge resource for information on plants and pests. GPPIS is Internet-based and its design allows for implementation in a variety of cross-platform environments, including an equivalent CD-ROM system that runs on both Windows and Macintosh. Procedures are being developed to enable individuals to submit interest profiles that would filter data and information according to specific needs. **Plantinfo** aims at developing and maintaining a

platform for access to reliable information on plants and crop management within different ecologies and production systems. This paper presents a short overview of the current development of GPPIS and Plantinfo with current guidelines for editors. Individuals are invited to participate in the GPPIS community by "adopting" a species, a discrete "layer" (topic) of information about plants, or simply by serving as public referees. Each record has a primary editor who receives a password to edit or add data by a set of protocols. The information in GPPIS is in the public domain and under the name and logo of the contributing author or institution, resulting in a public, transparent assumption of responsibility and insuring appropriate recognition. ICUC, for example, has adopted the record on Shea nut. This dynamic framework for continuous knowledge processing and sharing within the community is possible as the Internet allows the distribution of tasks to create a global resource, while concentrating and multiplying the benefits of collaboration. You are invited to comment on and join this community by contributing information - no matter how modest.

Should you wish a copy of the full presentation, kindly email [Plantinfo@fao.org](mailto:Plantinfo@fao.org). In order to see how some of the plant "shells" are being filled in, please go to <http://pppis.fao.org>, click on Plant Info in the top left menu, then enter some examples such as abaca, azolla, coffee, bambara, barley, cassava, cactus pear, cat's whiskers, cowpea, dragon fruit, grapple, guar (*Cyamopsis tetragonoloba*), oil palm, peach palm, peppermint (*Mentha piperita*), rice, safflower, sesame, shea, tef,

ylang etc. and browse the bottom left fields.

Under "Resources" in the top left menu of the home page you will find over 491000 entries under Bibliographic references, over 27500 terms in the Glossary, over 4000 Pictures in the Databank, 100 Methodologies and 37 GPPIS-related Methodologies. A new feature is the illustrated glossary developed by Per Diemer. Go to the Picture databank and enter Diemer under Author, you will find over 40 of these. Many of these resource entries are hyperlinked to the species text. You will see the links in the resource window.

If your 'favourite' plant species does not have an editor assigned (very likely - as we have over 17500 'orphan' plant identity records), perhaps you would like to adopt it? If so E-mail [Plantinfo@fao.org](mailto:Plantinfo@fao.org) - perhaps you also have a colleague who would like to participate? If you wish to contribute as a public referee by adding to or commenting on existing information, just click on the yellow envelope icons under the fields and send your contribution. It will be fully acknowledged. This is how the public knowledge 'sponge' collects otherwise fragmented information, referees it, adds it and builds an ever more complete record for the reader.

In January 2000 GPPIS will move to <http://www.ecport.org> - to browse through this now - enter the user name ecosystem and password fynbos.

Peter Griffie, Senior Officer, Industrial Crops & Plantinfo Supervisor, Crop and Grassland Service, Plant Production and Protection Division, FAO, Rome, Italy.

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## Networks

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### *Africa*

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#### **WAFNET**

A WAFNET Newsletter has now been published and a Co-ordinator's Meeting was held in May 1999, at Bunso, Ghana. The Committee drafted a project proposal and sent it to ICUC for further development and funding.

### *Asia*

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#### **UTFANET**

**The Fifth Steering Committee Meeting of the Underutilized Tropical Fruits for Asia Network (UTFANET) was held on 12-14 August 1999 at Philippine Council for Agriculture, Forestry and Natural resources Research and Development (PCARRD).**

Attendees:

Dr. C Escano (Philippines)  
Dr. S.P. Ghosh (India)  
Dr. N.I. Bhuyian (Bangladesh)  
Dr. M. Winarno (Indonesia)  
Prof. Dr. V. Lai (Vietnam)  
Mr. H. Samaratunga (Sri Lanka)  
Dr. S. Somsri (Thailand)  
Dr. M.B. Raja (Pakistan)  
Mr. Ghale (Nepal)

The following representatives also attended:

Dr. N. Haq (ICUC)  
Dr. Bhag Mal (IPGRI)  
Dr. N. Urquia (FAO)

ICUC has been successful to secure funds from the National Lottery Charities Board,

UK(NLCB) for part of the project developed by the members at the last steering Committee meeting. ICUC and its partners have agreed with NLCB that the project will include only activities 1, 2 and 3 and HRD related to number 2 of the activity list, as established by the members at the last Steering Committee meeting.

Prof. Dr. Lai from Vietnam has been nominated to be the Vice-Chairperson.

It was agreed at the meeting that ICUC is the executing agency, while all nine parties are the national partners. The executing agency is responsible for overall control of the project, while the national partners are responsible for the physical work.

Work plans were set up both quarterly and annually. These workplans included the activities, responsibilities, costs and the responsible person.

The Committee recommended the following Workplan:

#### *First year*

The committee agreed to start the project from January 1, 2000 and suggested the following changes in the activities of the project document, if approved by NBLCB.

#### Farmer's participatory survey (Activity 1):

The survey should include marketing also. It was agreed to prepare a standardised questionnaire according to the need of the project. ICUC will provide samples of Jackfruit and Pummelo and Indonesia will provide Mangosteen to country coordinators who would return to ICUC with their comments. If any country decided to include relatives of the species selected for the survey, characterisation and selection have to be done within the allowed budget. It

was agreed by the coordinators that they would provide schedules to ICUC in two weeks time. The number of sites to be surveyed will depend on the budget available.

#### Characterisation of Pummelo (Activity 2):

Vietnam, Sri Lanka and Thailand to be added in addition to countries already included. Similarly, Bangladesh, Pakistan, Philippines and Sri Lanka are to be added for Jackfruit. "Potential colonel lines" should replace "Elite lines". It was agreed that expenses of procurement of germplasm material should be included in the budget.

#### Vegetative propagation (Activity 3):

Nepal wished to be included for Jackfruit propagation.

#### For water and nutrient requirements:

Although Indonesia intended to carry out Experiments, the coordinator agreed to opt out from nutrient requirement activities. Nepal would like to be included for nutrient requirements for Pummelo. Thailand agreed to explore new techniques (fertilisation) for Jackfruit and Pummelo.

Training: Sri Lanka and India would prefer to have training in propagation of Mangosteen in Thailand. Philippines would prefer to use the training budget (Philippines share) to train Philippino Scientists and would bring a Thai Expert to organise a training course on Mangosteen in the Philippines. It was then suggested that Sri Lanka and India would send their trainees to the Philippines

Sri Lanka and India would like to be opted out from micro-propagation activities. Nepal and the Philippines would like to be included for training in Jackfruit and Pummelo respectively. The

training would use techniques developed by ICUC and also those available locally. ICUC has agreed to provide protocols for propagation of Jackfruit and Pummelo which it has developed to all member countries. Tentative starting dates of training activities were fixed for January or February 2000.

Review and annual reports: The committee agreed on an Annual Review meeting to assess the progress, the meeting could be arranged along with the Annual Steering Committee meeting.

### *Second year*

#### Propagation and distribution of planting materials

(Activity 1):

It was suggested that the word “saplings” should be replaced by “vegetatively propagated plants”, and the number of 200 to be changed to 50 for each species in each country. Materials would be supplied to 10 farmers in each of the 8 countries.

#### Selection of farmers

(Activity 2):

The number of farmers for training would depend on the willingness of farmers in each country and the training dates would be around 20<sup>th</sup> month of the project (approximately September/October in year 2). Annual review will take place thereafter.

### *Third year*

#### Propagation and distribution of planting materials

(Activity 1):

The number of vegetatively propagated plants for Mangosteen by farmers should be reduced to 100. India and Pakistan did not want to be involved in Mangosteen activities. Each nursery would be able to deliver 500

propagated plants of Jackfruit and Pummelo.

#### Multiplication by farmers/nurseries (Activity 2):

The number of plants would be 150 for Jackfruit and Pummelo instead of 250 and 50 for Mangosteen. India and Pakistan did not want to take part for Mangosteen

The members agreed to make these changes within the approved budget agreed by NLCB

A second project on the development of economically viable and socially acceptable marketing strategies for underutilised fruits in Asia was discussed and agreed for further development for funding.

The FAO representative produced an outline of FAO activities and support for UTFANET.

The MOU between IPGRI and UTFANET was signed during the meeting. The Chairman and the members of the Steering Committee welcomed IPGRI as an Associate member of UTFANET. Dr. Haq, on behalf of ICUC also welcomed IPGRI for its associate membership of UTFANET.

The Steering Committee discussed the location of the Regional coordination office for UTFANET. Dr. Haq informed the members that the Coordinator for UTFANET would be appointed from the NLCB fund and the coordinator would be responsible to ICUC, being the executing agency of the project. India, Pakistan and the Philippines offered to host the Regional Coordination Office.

The bid from PCARRD has been successful and the UTFANET Co-ordinating Office will be

based at PCARRD from January 2000.

## UTVAPNET

UTVAPNET (Underutilized Traditional Vegetables for Asia and the Pacific Network) was formed at the regional workshop on Conservation and Use of Traditional Vegetables, held on 10-12 August 1999 at Los Banos, the Philippines.

### NETWORK CO-ORDINATION STRATEGY

**National Coordinators:** The meeting agreed that scientists representing each country would be the focal point until the coordination responsibilities are officially endorsed by the respective authority of the country.

**Steering Committee:** As soon as the national coordinators are confirmed, a steering committee consisting of one member from each participating country will be appointed. The regional co-ordination will be provided by the Indian Council of Agricultural Research (ICAR), New Delhi. Dr. S.P. Ghosh of ICAR was elected as the chairperson of the Steering Committee.

The steering Committee will meet at least once per year in order to harmonise activities and to define a common workplan and assess achievement and results. The first general meeting of the network will be convened according to the needs of the network, and in any case communication will be maintained between the regional coordinator and members to decide a convenient date. The steering committee will be encouraged to organise meetings on specific technical topics. The meeting will preferably be

convened in association with other national and international workshops symposia or conferences related to traditional vegetables in Asia and the Pacific, as a means of facilitating participation.

### Role and functions of the regional coordinator

They were defined as follows:

- to ensure dissemination of information among network members
- to ensure regular publication of a newsletter and/or other instruments (e.g. website/web-pages) for enhancing information dissemination and exchange.
- to promote co-ordinating meetings of working groups if needed for particular technical issues or activities
- to promote efforts to obtain financial assistance from donors and financing agencies for strengthening network activities.

The role and appointment of the regional co-ordinator will be assessed and renewed every two years and on the occasion of the general meeting of the regional network.

All scientists designated to carry out coordination responsibilities should officially confirm endorsement of their role vis-à-vis the network by their respective institutions within three months.

In dealing with conservation and utilisation of traditional vegetables, the participants felt that little systematic work had been done on underutilised traditional vegetables, mainly due to lack of available germplasm, limited use, less economic value, lack of information on use and nutritional value and lack of information on production systems.

### Recommendations

The meeting discussed in detail the potential of underutilized vegetable species in the region and identified potentially valuable species as a tool to increase diversification of agricultural systems. These species are of common interest for which a conservation and utilisation program would be developed on the basis of the following criteria:

- They should be underutilised vegetable species

- they should be primary used as vegetables
- they will need to have wide adaptability to farming systems under low input conditions
- they will be of interest to at least 4 to 5 countries
- they will be of potential nutritional value

Other criteria such as cultivation in high wet season or seed producing species to facilitate exchange of material would also be taken into account if too many species would be selected in the first place.

Following this criteria, five crop species were identified:

1. Taro
2. Amaranth
3. Momordica
4. Lablab bean
5. *Ipomea aquatica*

### Specific activities

The meeting agreed that PGR collection, evaluation, characterisation and conservation activities, together with standardisation of production technologies for each crops, would be carried out by interested countries as indicated in the table below and that final results would be shared by all members.

Table 1

Country	Bangl.	China	India	Indonesia	Nepal	Pakistan	Philipp.	PapuaNG	Thailand	Sri Lanka	Vietnam
Activity											
<b>PGR Conservation</b>	2, 3, 4, 5	2, 3, 4	1, 2, 3, 4	1, 2, 3, 5	1, 2, 3, 4	1, 2, 3	1, 2, 3, 4, 5	2, 4, 5	1, 2, 3, 5	2, 3, 4	1, 2, 3, 4, 5
<b>Evaluation</b>	2, 3, 4, 5	2, 3, 4	1, 2, 3, 4	1, 2, 3, 5	1, 2, 3, 4	1, 2, 3	1, 2, 3, 4, 5	1, 2, 4, 5	1, 2, 3, 5	2, 3, 4	1, 2, 3, 4, 5
<b>Characterisation</b>	2, 3, 4, 5	2, 3, 4	1, 2, 3, 4	1, 2, 3, 5	1, 2, 3, 4	1, 2, 3	1, 2, 3, 4, 5	1, 2, 4, 5	1, 2, 3, 5	2, 3, 4	1, 2, 3, 4, 5
<b>Ex-situ conservation</b>	2, 3, 4, 5	2, 3, 4, 5	1, 3, 4	2, 3, 5	1, 2, 3, 4	2, 3, 4	1, 2, 3, 4, 5	2, 4, 5	2, 3, 5	2, 3, 4	1, 3, 4, 5
<b>Pre-breeding Selection Purification</b>			1			4	3		5		
<b>Seed Production technologies</b>	4	2	3, 4	2, 5		4	3, 5	1	3, 5	2, 3	3, 4

The meeting recommended that characterisation and evaluation of materials, selected for collection, will be done by each country and that results will be compiled and shared among participating countries. The meeting also recommended that standard seed production technologies to be developed by selected countries that will then be shared with participating countries.

The meeting agreed that on-farm trials were needed. However, in view of the time frame, it was felt that this activity could be started in the second stage. The meeting took note that ongoing similar activities are being carried out with *Amaranthus* and *Ipomea aquatica* by AVRDC. However, since half of the countries present are not participating in AVRDC programs for these crops, the meeting decided to maintain its decision and eventually establish contact with this organisation to mutually share final results.

The meeting also decided that evaluation of materials would be carried out on the basis of the data obtained from characterization of materials, thus greatly reducing the number of accessions to be evaluated.

It took note that for conservation purposes, multiplication and regeneration of materials is needed.

## Europe

### ACTIN

Manufacturing industry worldwide recognizes the potential benefits of using crop-derived products as renewable raw materials. In the long term, they are more sustainable than oil-based products, they are generally non-toxic and can be biodegradable.

ACTIN is now recognized as the authority in alternative crops in the UK and has strategic links into Europe and beyond. ACTIN is the representative in ERRMA (European Renewable Resources and materials Association) and IENICA (Interactive European Network for Industrial Crops and their Applications).

### SPONSERS

Since its launch in 1995, ACTIN has received significant support from an increasing number of companies and organisations in the private sector. This support has been matched by the Government in the form of funding and through the active participation of BBSRC, DTI and MAFF. ACTIN's current Industrial Sponsors (which represent all stages of the supply chain, but not all relevant industries) are:

British Sugar  
Cargill  
DuPont  
HGCA  
ICI  
NFU  
Sustainable Industries  
Zeneca

There are significant benefits to be gained through a strategic involvement in ACTIN and we are still actively seeking input in sectors not currently represented.

### ACTIN<sup>2020</sup> - benefits of membership include:

- Internet access to ACTIN's unique database of people and organisations - providing valuable contacts in industry and the research community
- Participation in Seminars and Conferences at special delegate rates
- Involvement in workshops designed to explore specific opportunities for collaboration between industry and the science base.

- The quarterly newsletter, ACTIN News - keeping members abreast of developments in industry and academia
- The Members Bulletin - listing specific business opportunities and the latest news on developments in regulations and funding opportunities
- The ACTIN Help Desk and extensive ACTIN Databank - providing an information service to all enquirers.

ACTIN Help Desk contact details:

Tel: +44 (0) 1372 802054

Email: [info@actin.co.uk](mailto:info@actin.co.uk)

Web: <http://www.actin.co.uk>

### MEDUSA

A Network on the 'Identification, Conservation and Use of Wild Plants in the Mediterranean region' called MEDUSA, was formally established in June 1996, by CIHEAM (Centre International des Hautes Etudes Agronomiques Mediterraneennes) and its constituent organ MAICh (Mediterranean Agronomic Institute of Chania). The Network is financially supported partly by the Directorate General I of the European Union and partly by CIHEAM.

### MAJOR ACTIVITIES

#### The First Regional Workshop

The first workshop, organised at the Mediterranean Agronomic Institute of Chania, Crete, Greece, was entitled 'Identification of Wild Food and Non-Food plants of the Mediterranean Region' on 28-29 June, 1996. The proceedings of this Workshop have been published in the Cahiers Options Mediterraneennes.

#### The Second Regional Workshop

The second MEDUSA Workshop was held in Port El Kantaoui,

Tunisia on 1-3 May 1997. General and Country Reports on the Governmental and Non-Governmental Organisations involved in any aspects of the study, cultivation, sustainable use, conservation of plant genetic resources used or of potential use in agriculture, and habitat conservation and restoration, were presented. The Proceedings were published in November 1998.

**The Third Regional Workshop**

This workshop was held at the University of Coimbra, 27-28 April 1998. In addition to general papers and progress reports on activities of the Network, a series of case studies on particular medicinal and/or aromatic species was presented. The Proceedings will be published.

**Newsletter**

To facilitate operation of the Network, a newsletter is published, with the financial support of FAO. The first was issued in the summer of 1997 and the second in the autumn of 1998.

**Priority species list and database**

A specific questionnaire aimed at establishing a list of the priority species in the region, following the use categories as defined in the objectives, has been distributed and completed by most of the current Country Focal Point Coordinators of the Network. The results of the questionnaires have been entered in a database held at MAICh with a view to compiling a database of the most widely used species. This is currently being revised and expanded. So far, 1335 records have been received and correspond to 684 taxa and 361 genera that belong to 104 families. Half of the records as well as half of the taxa and 40% of the genera refer only to seven plant families which are in order of importance: *Labiatae*, *Leguminosae*, *Compositae*, *Gramineae*, *Umbelliferae*, *Rosaceae* and *Solanaceae*.

**REMUFRUT**

REMUFRUT (Red Mundial de Frutales Tropicales) is a Global network on Tropical and Subtropical Fruit (TSTF) genetic resource conversation, evaluation and utilisation. The acronym

REMUFRUT derives from the Spanish “Red Mundial de Frutales Tropicales” (Red=Network; Mundial=World; Frutales=Fruit Trees).

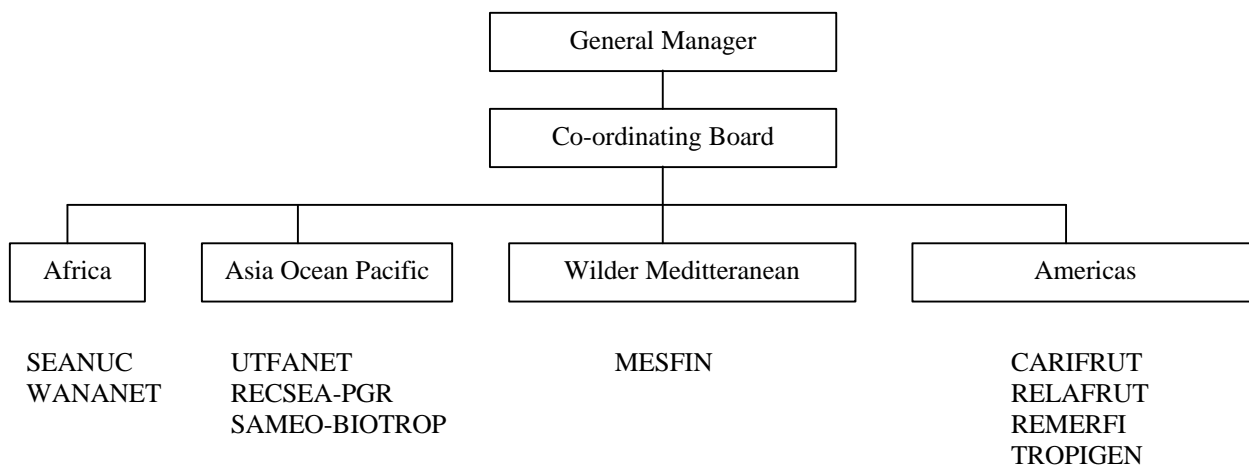
It was established in Madeira on August 1998 under the auspices of FAO on an international meeting organised by MESFIN (Mediterranean Selected Fruit Inter-Country Network).

REMUFRUT is organising the Coordinators' meeting in February 2000 to determine the action and training for the future. It is hoped that all Regional Coordinators will participate in this meeting.

**OBJECTIVES**

The major goal of the network is to link different initiatives in different parts of the world dealing with TSFT, - including underutilised fruits -, genetic resource exploration, conversation and utilisation. It aims also to play a major role in harmonising on-going networking initiatives in different regions of the world.

**Figure 1. Network On Tropical And Subtropical Fruit Genetic Resource Conservation And Utilisation**



## Identification of genetic variability

- Identification of primary and secondary centres of diversity for selected TSTF
- Facilitate co-operative efforts in genetic resource exploration.
- Facilitate Cupertino between PGR research work at the basic level and at field level.
- Organise and develop documentation (e.g. Catalogues).

## Evaluation and characterisation

- Facilitate co-operative studies on characterisation of TSTF through biotechnological or traditional means.
- Revise criteria for existing descriptors, specifically to include utilisation criteria, as well as developing new ones.

## Conservation

- To facilitate co-operative studies on appropriate and efficient conservation strategies for germplasm of selected tropical and subtropical fruits and their wild relatives.

## Documentation and information

- Facilitate the exchange of information among regional networks.
- Disseminate information on collections, accessions, conservation technologies, catalogues, utilisation and plant genetic erosion concerning TSTF.
- Facilitate development of a global database on TSTFGR.

## Germplasm exchange

- Help member networks and institutions on exchange of TSTF germplasm in full respect of all international agreements.

## Utilisation

- Encourage regional collaboration to facilitate co-operative studies in TSTF genetic improvement.
- Encourage the development of appropriate production technologies.

## Transfer of technology

- Identify the needs for technology dissemination in TSTF and promote the establishment of appropriate mechanisms to address them.

## Public Awareness

- Promote efforts to increase public and institutional awareness about the establishment of appropriate mechanisms to address them.

## STRUCTURE OF REMUFRUT

The structure of the global network is represented in Figure 1.

## GENERAL CO-ORDINATOR

### Role and functions

- Guarantee divulgence of information among members.
- Guarantee regular publication of a newsletter.
- Promote co-ordinating board meetings as well as specific meetings on species or subjects.
- Guarantee that the database will be accessible for world benefit. Facilitate exchange of PGR.
- Promote efforts to obtain funding assistance from donors and financing agencies for strengthening network activities.

Dr. Victor Galan from the Instituto Canario de Investigaciones Agrarias (I.C.I.A.) was designated as General Co-ordinator. I.N.I.A. of Spain is the co-ordinating institution. The mandate will be reviewed every three years.

## CO-ORDINATING BOARD

### Role and functions

- Facilitate communication among different regions.
- To help the General Co-ordinator in promoting activities both at the regional or species level.
- Facilitate adaptation of the working arrangements of the network to meet member requirements.
- Cooperate to identify and obtain funding assistance from donors and financing agencies for strengthening network activities.

The co-ordinating board will include representatives of the different regional and inter-regional networks participating in the global network as well as interested countries/institutions not involved in regional networks.

### MEMBERSHIP

The network functions on a voluntary basis involving the participation of interested national institutions as well as regional and inter-regional networks dealing with TSTF genetic resource conservation and utilisation. Besides the previously mentioned networks (see structure of the network) REMUFRUT members include representative of 15 countries from all the Continents.

### ACTIVITIES

After the constitution REMUFRUT has developed the following activities:

- Preparation of REMUFRUT logo
- Technical meeting for the establishment of a database for REMUFRUT (Madrid 02/04/98).
- Preparation of a multi-crop descriptor list for tropical fruits compatible with the FAO World Information and Early Warning System (VIEWS) on Plant Genetic Resources (PGR).
- First Co-ordinating Board Meeting (Rome 16/06/98)

- Publication/distribution of the Proceedings of the Madeira meeting.
- Attendance to the Accra meeting (Oct. 14-16) to help the establishment of under the auspices of FAO.

### PLANNED ACTIVITIES

- Gathering of information about the situation of plant genetic resources of TSTF.
- Preparation of the first REMUFRUT Newsletter (April 1999).
- Compilation and edition of a directory of people and institutions working on tropical and subtropical fruits.
- Identification of needs for training courses on TSTFGR and related topics in different parts of the world.
- Revision of technical information existing for TSTFGR management to existing gaps and identify people and funding to complement these items.
- Organisation of 1999 Co-ordinating Board meeting.

The General Co-ordinator of REMUFRUT, Dr Victor Galan Saucó, has been recently appointed as Chairperson of the Commission of Tropical and Subtropical Horticulture of the International Society of Horticulture (ISHS). This will serve as an excellent link between ISHS and REMUFRUT.

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## Crops News

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### AMARANTH

Worldwide amaranth is successfully cultivated as either a grain crop or vegetable crop. Because it is essentially a weed, the plant grows under practically any conditions, showing a high tolerance with water requirements equal to 42% - 47% that of maize and 52% - 62% that of

corn. It is also a photosynthetic effective C4 plant that grows very rapidly, providing a high yield of fresh material that can be repeatedly harvested in a short time span (e.g. in India 11 tons/hectare after 10 harvests over 3 months has been recorded). The crop also has a high nutritional value with high concentrations of proteins, vitamins, minerals and trace elements, all in all fulfilling the entire essential dietary spectrum required to qualify as a staple food resource. In South Africa *Amaranthus hybridus* has been developed as a vegetable crop since 1995. Positive negotiations are currently underway with a major food canning company for its release on the food market.

Taken from SANCRA News, Volume 2 No 1. Editor: Prof Schalk Louw, Department of Zoology & Entomology, University of the OFS, P O Box 339, Bloemfontein 9300

### BITTERGOURD PUSA Hybrid 1

Pusa Hybrid 1 is the first F<sub>1</sub> hybrid of bittergourd (karela) for commercial cultivation in northern plains of the country. It is superior to commercial cultivars, Pusa Vishesh and Pusa Do Mausami, in yield (42% and 58% heterosis), quality and nutritive value (28% and 57.6% higher in vitamin C, 48.2% and 1.9% higher in iron and 44.8% and 3.5% higher in calcium over Pusa Do Mausami and Pusa Vishesh). Its fruit is medium long, medium thick, with smoothly broken ridges on the surface. And it of dark glossy green colour, which gives it a high market appeal. It is suitable for cooking as vegetable, making pickle, for de-hydration purpose and also for export. It matures in 50-55 days, its average fruit weight is 100g, and its average yield is 21.8 tonnes/ha.

Taken from ICAR News, Volume 5 No 2 April-June 1999. P S Sirohi, Scientist -in-Charge, Unit of Vegetable Research and Demonstration, IARI, New Delhi 110 012

### BOTTLE & NEWSPAPER MAKE YOUNG TREE HAPPY

If you have experience with planting young trees, you will know that the best time for planting is a few weeks before the rainy season starts. Young trees usually develop deeper root systems if the soil is relatively dry and the water table is low. Growth is then sturdier; in addition, trees with deep root systems are more drought-resistant than trees planted in damp soil. The problem is to keep your trees alive in the dry period preceding the rains. According to Dee Raymer from Machakos, Kenya, there are many possible solutions: however, none is ideal. One of the better known is the method of the inverted bottle in the soil, close to the roots. It is a tedious job and sometimes the bottlenecks get clogged with soil. In *Ecoforum 22-1*, Daymer presents a method, which is a combination of different techniques.

Dig a planting hole about half a metre deep and wide and line it with a single layer of newspaper. Fill it with alternate layers of organic matter and soil. Organic matter is made by mixing manure, organic kitchen wastes, some compost, and a handful of bonemeal. Bonemeal is a good slow release fertiliser, which stimulates root development. Each layer should be damped. Make four small holes with a hot needle in the bottom of the plastic bottle. The bottle is placed next to the tree, slightly off the centre of the hole. The neck of the bottle - with a screw cap! - should rise just above ground level. Place the root ball - remove planting bags - in the centre of the hole in a layer of organic matter. Fill the rest of the hole and apply 1 litre of water across the hole. Cover the hole with a double layer of newspaper. On top of that, apply dry soil covered with a thick layer of organic mulch. That layer is overlaid by stones to shade the soil and reduce daytime soil temperatures. The amount of water released by the bottle is regulated by the tightness of the cap. Unscrewing the cap for ten seconds every day makes a little water go a very long way.

Taken from Spore, Number 83. Dee Raymer P O Box 2356, Machakos, Kenya.

### **ENTEROLOBIUM CYCLOCARPUM**

This is an interesting fodder tree because it is leguminous but does not appear to have the tannins that make it difficult for animals to digest many other leguminous trees. The crude protein content of its foliage ranges from 17-25% and *in vitro* digestibility is a high 69%. An *E. cyclocarpum* fact sheet is available from the Forest, Farm & Community Tree Network (FACT Net), c/o Winrock International, Rt. 3, Box 376, Morrilton, Arkansas 72110, USA.

Taken from Agroforestry Today Vol 11 Nos 1-2. International Centre for Research in Agroforestry, ICRAF House, United Nations House, United Nations Avenue, Gigiri, P O Box 30677, Nairobi, Kenya.

### **HENNA stages comeback in Senegal**

The virtues of Henna (*Lawsonia inermis*) are well known as a beauty product (colouring for hair, hands and feet) and as a curative (treating cuts and grazes, and skin diseases). It is also used as a colorant in cloth and some traditional food recipes. The dried and powdered leaves of the henna plant are widely used in Africa. But its cultivation has been shrinking of late, for example, in the Thies region of Senegal. Ndane Sylla's women's group decided to take up production as a way to finance their small trading and market gardening. Good thinking, since the first year's two harvests could not satisfy demand. Profits were used as credit for the group's activities. All this is thanks to the judicious preparations made by the women of Ndane Sylla, who successfully submitted a business plan to the Africa 2000 network for funding. They held a training session in a neighbouring village

where people have long grown henna. They now have so many clients that their business can now flourish without external support.

Taken from Spore, Number 83. Ms Adja Sagar Gningue, President UGAPS/K BP 6 Khombole Thiès, Senegal.

### **JACKFRUIT**

IPGRI has been finalising the Descriptors for Jackfruit. It is hoped that it will be published early in the New Year.

### **KIWI - adapted on Indian Hills**

In India, kiwi-fruit was introduced in 1963. Presently, the crop is under cultivation in Himachal Pradesh, Uttar Pradesh hills, Sikkim, Meghalaya, Darjeeling, Jammu and Kashmir, Arunachal Pradesh and Nilgiri hills. The farmers of Kullu district of Himachal Pradesh have taken this as one of the important substitutes, and are slowly replacing stone-fruits through kiwi-plantation. Kiwi-fruit (*Actinidia deliciosa Planch*) is a native of China. The fruits are rusty brown with a hairy surface and are oblong in shape. The brown hairs disappear by rubbing in muslin-cloth or in gunny bags after harvesting. The flesh in cross-section is very beautiful, attractive and light green in colour. The ripe fruit is refreshing, with delicate flavour and pleasing aroma. It is highly nutritive, and is mostly eaten as fresh or combined with other fruits in salad and dessert. Out of the following cultivars, Allison, Bruno, Monty, Abbott, Hayward (female) and Tomuri (male), the first 2 are considered best for sweetness and early maturity. Kiwi can be successfully propagated both by sexual and asexual means. To raise large number of plants, propagation through softwood cutting with treatment of 5,000 ppm IBA as a quick-sip method under intermittent mist is advocated.

Rooted kiwi-plant can be planted during February-March at a distance of 5-6m apart. It is a dioecious plant and growing of male and female plants in 1:8 ratio is essential in field for effective pollination and fruit-set. For optimum yield, kiwi needs to be trained either on T-bar system or pergola. Both summer and winter prunings are essential to maintain balance between the vegetative growth and fruiting of vine. Kiwi-plant bears fruits on the current season growths, which emerge from one-year-old shoots; so pruning needs a special expertise for obtaining economic yields. At present, the yield potential of this is 70-100 kg fruits/plant, after 7 years onwards.

There are several pest and diseases reported in literature but fortunately in our country no serious attack has been reported so far, except some *spidermites* and *rodentso* damage to fruits.

### **Required Thrusts**

- The genetic base of the kiwi-fruit may be widened by introducing germplasm which are suitable to higher altitudes and are drought tolerant; besides hermaphrodite cultivars from China
- Large-scale multiplication of plants through vegetative means
- Field demonstration to highlight its importance among hill-farmers
- Agro-industrial potential of kiwi-fruit may also be developed along with agro-techniques
- To popularize kiwi-fruit in local market so that common people develop a taste for its sweet-and-sour blend.

Taken from ICAR News, Volume 5 No 2 April-June 1999. G Pandey, Senior Scientist (Horticulture), Central Institute of Temperate Horticulture, P O Sanatnagar, Srinagar (Jammu & Kashmir) 190 005

### MULBERRY LEAVES

The crude protein content of mulberry leaves ranges from 15-19% on a dry matter basis. This is slightly lower than the crude protein content of other leguminous fodder trees, but *in vitro* digestibility of its organic matter is very high: 85%. Mulberry is very palatable to cattle. In a feeding trial conducted in Embu, Kenya, dairy heifers consumed more of mulberry than of other fodder trees (calliandra, *Leucaena diversifolia* and cassava tree - *Manihot glaziovii*). Therefore, palatability of mulberry for cattle is very good. Mulberry can easily be planted as a hedge and can be pruned frequently. It is a popular fodder tree among trial farmers in central Kenya because of its ease of establishment through cuttings and because it simultaneously produces fodder and fruits.

Taken from Agroforestry Today Vol 11 Nos 1-2. Ralph Roothaert, International Centre for Research in Agroforestry, ICRAF House, United Nations House, United Nations Avenue, Gigiri, P O Box 30677, Nairobi, Kenya.

### NEW LIFE FOR LOCAL PRODUCTS

Thanks to processing techniques, new products can be developed from familiar local primary products. And so it has come to pass that many businesses and cooperatives have launched whole product lines based on a narrow range of farm produce. Take the case of Moliège, a small processing company in Cameroon which produces jams and fruit juices. By using a variety of packaging from 35 grams to 7 kg it can serve clients ranging from household level, through hotels, to airlines. Similarly women's groups have processed products on offer. Often they breathe new life into surplus materials: biscuits based on groundnuts, natural drinks made from cereals and wild fruits and wine from sorghum, sorrel and guava. Such processed products do

not yet have a firm foothold in local markets, however, due to the combination of local consumers' weak purchasing power and strong competition from traditional and imported goods. More success can be found in the wholesale markets of Europe where there are some runaway winners such as the Cote d'Ivoire cooperative Proxema, which sells its atieke (cassava couscous) as far afield as Europe. These leaders have met the pre-conditions of overcoming not a few obstacles in transport and conservation, and of fulfilling the veritable arsenal of very strict hygiene and quality standards.

Taken from Spore, Number 83 October 1999.

### RICE BEAN

The rice bean (*Vigna umbellata*) is one of the underutilised crops in the Philippines. The rice bean is a multipurpose crop. It is used both for consumption and as a product for the market. It was used to open new areas for agriculture through weed suffocation method. It is used as a cover crop during both dry and rainy seasons to conserve soil moisture in hilly land and to prevent soil erosion. It is also used as a source of protein and nutrients. The agronomic characteristics of this leguminous crop is superior because it is a pest and is disease resistant, acid soil tolerant, high yielding and it can grow in altitudes of 2000 metres.

The rice bean has the potential for more widespread use, and its promotion could contribute to food security, agriculture diversification, and income generation, particularly in areas where the cultivation of major crops is economically marginal. However, there are factors affecting the underutilisation of the rice bean and study establishes the reason why rice bean is underutilised.

Worldwide predicaments today are the world's growing food requirements and maintaining the

balance between food supply and demand without endangering the ecosystems that are the primary source of answering food needs. In most developing countries, particularly in the Philippines, awareness of how to maintain this balance is limited and coupled with the inclination to follow adverse agricultural trends. The problem goes back to the soil, which continuously undergoes erosion and nutrient depletion. This results in insufficient quality food production and protein malnutrition. Among various research works done on legumes, the rice bean (*Vigna umbellata* syn. *Phaseolus calcaratus*) has diverse agronomic characteristics, which render it suitable to many ecological zones and adaptable to a wide range of soil types. Its multiple uses are beneficial to humans, animals, crop plants, and the soil.

Yet, with all these characteristics, it remains an indigenous crop generally unknown to the world and is slowly being driven to extinction because of the adoption of new farming practices that hinders its growth and continuous usage. This study uncovers the factors leading to the rice bean's underutilisation.

The main purpose of this study is to emphasize that the rice bean is only one of the many traditional plant species that should be utilised instead of exclusively using genetically enhanced species, which may cost the farmers and consumers millions of dollars.

The government's wrong solutions have caused the underutilisation of the rice bean that could answer not only human needs, but which could improve environments and contribute to more sustainable development.

Abstract submitted by Rustico 'Rusty' Binas, Project Manager, Integrated Conservation and Development, International Institute of Rural Reconstruction, Silang, Cavite, Philippines 4118.

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**TITHONIA**

There have been encouraging results from large applications of rock phosphate in combination with the use of *Tithonia diversifolia* in the first two seasons of cropping. Tithonia is a common shrubby weed in western Kenya. It produces a lot of biomass, and contains high amounts of nitrogen and considerable amounts of other nutrients. Farmers have tested tithonia in biomass transfer trials in various locations. Where trials or demonstrations were carried out, the technique of using these additions has been widely adopted as an inexpensive soil fertility improvement measure, particularly for vegetables such as tomatoes and kale.

Taken from Agroforestry Today Vol 11 Nos 1-2. A Niang, ICRAF, P O Box 30677, Nairobi, Kenya.  
Email: [icraf-maseno@x1.cgiar.org](mailto:icraf-maseno@x1.cgiar.org)

**THE LETTUCE THAT CLEANS WATER!**

Jean-Pierre Bayala, in Burkna Faso, has found a simple, effective and beneficial way to clean waste-water from local handicraft workshops using the water lettuce (*Pistia stratiotes*). Simple, because it only needs four tanks. Effective, because the cleansed water can be used for irrigation after three weeks. And beneficial, because the fast-growing water lettuce can be used for feeding domestic animals and for compost. First pour the wastewater, from which fats and oils have been removed, into a tank. After three days, switch the water to a second tank and cover it with water lettuces. A week later, switch it to a third tank and cover with new water lettuces, and after a week, put it in the fourth tank. Then the water can be used in nurseries and for aquaculture, but not for drinking or kitchen gardens.

Taken from Spore, Number 83. Jean-Pierre Ballet, Rue Langeveld, 113A, 1180 Brussels, Belgium.

**COMFREY**

*Naida N.M. St Petersburg State Agrarian University, St Petersburg, Russia. Vishnuakova M A All-Union research institute of plant breeding, named after Vavilov, St Petersburg, Russia*

There are at least 15 species of comfrey (*Symphytum*) in Russia and many of these are used for forage, as a nectar source for honey bees and as decorative plants. Some species are also used for medicinal purposes. The introduction of these species into cultivation is hampered for a number of reasons, the main one being low seed productivity. The authors reported on the pollination conditions of the species *Symphytum L. (Boraginaceae)* of the Russia North-West Region and

**Table 2 Dynamic of nectar extraction in the flowers of some types *Symphytum L.* (1986)**

Phase of flower development	Length of the phase	Absolute quantity of nectar in a flower (mg)	Intensiveness of nectar extraction (mg/hr)	Energy of nectar extraction (mg/hr)	Sugar content in nectar (%)	Sugar amount in the flower (mg)
<i>S. officinale L.</i>						
Bud	2-8	0.92+0.02	0.92	0.12+0.005	20-23	0.19
Opened flower	5-6	2.21+0.11	1.29	0.21+0.011	23-28	0.33
Pollination of pollinium	6-8	5.81+0.20	3.60	0.45+0.022	28-30	1.04
Perception of pollen	30-34	13.38+0.60	7.57	0.22+0.011	30-32	2.35
Corolla falling	20-24	17.01+0.93	3.63	0.15+0.007	32-34	1.11
<i>S. x uplandicum Nym.</i>						
Bud	2-8	0.57+0.01	0.57	0.07+0.003	23-24	0.13
Opened flower	3-4	1.38+0.07	0.81	0.20+0.009	24-25	0.19
Pollination of pollinium	8-10	4.51+0.24	3.13	0.31+0.013	25-28	0.83
Perception of pollen	22-26	5.57+0.27	1.06	0.04+0.002	28-30	0.31
Corolla falling	10-16	6.22+0.30	0.65	0.04+0.002	30-34	0.21
<i>S. tanaicense Stev</i>						
Bud	2-8	0.81+0.01	0.81	0.10+0.004	23-25	0.19
Opened flower	3-4	1.33+0.07	0.52	0.13+0.006	25-29	0.14
Pollination of pollinium	8-10	4.82+0.21	3.49	0.35+0.016	29-30	1.03
Perception of pollen	30-32	7.07+0.32	2.25	0.07+0.003	30-33	0.71
Corolla falling	20-24	7.66+0.037	0.59	0.02+0.011	33-35	0.20
<i>S. asperum Lepech</i>						
Bud	2-8	0.71+0.01	0.71	0.09+0.004	23-25	0.17
Opened flower	3-4	1.29+0.02	0.58	0.14+0.006	25-29	0.14
Pollination of pollinium	8-10	4.48+0.22	3.19	0.32+0.015	29-30	0.94
Perception of pollen	22-26	6.04+0.28	1.56	0.06+0.003	30-36	0.51
Corolla falling	8-12	6.70+0.27	0.66	0.06+0.003	36-38	0.66

considered a number of flower characteristics to determine low seed set (Table 2). The workers found that five species *Symphytum*, *S. asperum* Lepech, *S. carpativum* Frolov, *S. officinale* L.S. *tanaecense* Stev. *S. x uplandicum* Nym. In North-West Russia had sufficient primary insect attractants (pollen and nectar) and bright flower colour. However, the flowers were all found to contain a long corolla tube that prevented access to the pollen and nectar by many insects. A small group of bumblebees were able to access the flowers and included *Bombus hortorum* and *Bombus lucorum* that are the normal comfrey pollinators. Two related bumblebees (*B. lapidarius* and *B. derhamellus*) and a number of honey bees are unable to penetrate the flower and steal nectar from the flowers by biting into the base of the corolla tube. These bees do not take part in the pollination process. Comfrey was also found to have a number of mechanisms that prevented self-pollination and self-fertilisation.

The specificity of comfrey pollination by two species of bumblebee explain why low seed set is prevalent and why comfrey is typically propagated vegetatively.

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### Recent Meetings

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#### **BAMNET International Bambara Groundnut Network - 2<sup>nd</sup> International Workshop, September 1998, Accra, Ghana**

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Hosted by the Council for Scientific and Industrial Research (CSIR), the meeting reviewed how the network had stimulated research in key areas such as pollination techniques, soil requirements, conservation of genetic resources, nutritional content and economics and marketing. Production levels of the bambara species were reported as

encouraging in Nigeria (est 100,000 tonnes), Zimbabwe (20,000 tonnes), and Namibia (750 tonnes), despite falling harvests and consumption in other countries. A demonstration of a new groundnut thresher from South Africa was held for the 36 participants from 12 countries, and reports made on new research on crop improvement. The network chose processing and marketing as one of its three priority topics, along with breeding, and information and communication.

Contact: F Beremann, BAMNET Information & Communication, c/o Information Centre for Genetic Resources, P O Box 201415, D-53144 Bonn, Germany.  
Fax: +49 228 954 8220  
Email: [igr@zadi.de](mailto:igr@zadi.de)

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#### **Enlarging the Basis of Food Security: role of Underutilized Species, 17-19 February 1999, Chennai, India**

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The International Consultation was organised by the Genetic Resources Policy Committee (GPRC) of the CGIAR at the M S Swaminathan Research Foundation, Chennai, India. It was convened to examine priority issues in the conservation and use of underutilized species and the potential contributions of the CGIAR in this important area. The workshop built on the decision by the GRPC to explore opportunities for increased attention to underutilized species, as well as on the recommendation of the CGIAR System Review that such species be considered in development of an Integrated Gene Management initiative. Proceedings available from: M S Swaminathan Research Foundation, 3<sup>rd</sup> Cross Street, Taramani Institutional Area, Taramani, Chennai 600 113, India  
Tel: 91-44-2351698  
Fax: 91-44-2351319  
Email: [mssrf.madras@sm8.sprintrpg.ems.vsnl.net.in](mailto:mssrf.madras@sm8.sprintrpg.ems.vsnl.net.in)

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#### **Group Meeting of AICRP (Underutilized Crops), 16-17 March 1999, NBPGR, New Delhi**

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The meeting was inaugurated by Dt Mangal Rai, Deputy Director General (Crop Sciences), ICAR and attended by 57 participants. The objective of the meeting was to review the progress made during 1998 and formulate the technical programme for 1999. The programme was structured in six technical sessions:

- Research highlights
- Programme formulation for plant breeding trials
- Programme formulation for agronomic trials
- Programme formulation for quality aspects
- Programme formulation on PGR
- Variety release.

The important PGR related issues discussed were germplasm collecting, conservation, assigning national identification number and registration of germplasm.

Contact: G D Sharma, Project Coordinator, AICRP (Underutilized Crops), NBRGR, Pusa Campus, New Delhi,  
Tel: 91-11-5784845  
Fax: 91-11-5784835  
Email: [nbpgr@400nicgw.nic.in](mailto:nbpgr@400nicgw.nic.in)

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#### **Coconut Embryo Culture Training Course, 17-20 March 1999, Albay, Philippines**

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The course is part of the ADB-funded project entitled 'Coconut Genetic Resources Network and Human Resources Strengthening in Asia and the Pacific Region'. It was conducted by Albay Research Centre under the leadership of Erlinda Rillo of the Philippine Coconut Authority (PCA). COGENT funded two researchers,

each from Indonesia and Papua New Guinea for the training.

Contact: Dr Pons Batugal, COGENT Coordinator, IPGRI-APO, Serdang, Malaysia

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### **International Workshop on Bamboo & Rattan: Biodiversity Conservation, Utilization & Technology Exchange, 11-23 April 1999, Beijing**

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This meeting was organised by INBAR, in collaboration with the Chinese Academy of Forestry and the Ministry of Science and Technology. Participants from INBAR member countries, 4 countries that are planning to become members and international organisations such as FAO, CIFOR, IITO and IPGRI participated in the deliberations. The draft INBAR strategy for 2000-2005 was presented, discussed and suggestions for improvement made. The status reports on the work in bamboo and rattan in China were presented.

Contact: V Ramanatha Rao, IPGRI-APO, Serdang, Malaysia

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### **6<sup>th</sup> World Neem Conference, May 1999, Canada**

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Scientists have developed an exciting and potentially valuable new use for neem. They have found that there are anti-fungal properties in the oil and leaves of neem. This discovery could mean the commercialisation of a new generation of botanical fungicides for agricultural use.

Another important development, says IPMnet News in their report of the 6<sup>th</sup> World Neem Conference held in Canada during May, is the use of neem insecticides to protect high-value forest trees from insect-caused defoliation through ULV aerial application or via systemic action following stem injection.

Delegates to the conference heard how the use of Neem insecticides in food production should increase in the USA due to implementation of new, strict food quality regulations. Several conference co-sponsors are either already marketing neem insecticides in the USA, or expect to do so in the near future. Elsewhere, several small companies in the UK, Scandinavia, Africa, and the Caribbean have developed neem-based insecticides for regional use. The neem tree itself continues to be widely propagated outside of its native India, with large plantations being established in Australia, Hawaii, Mexico, and Africa.

Vector and disease control is another potential important use of neem. Neem insecticides are potent insect growth regulators against mosquito larvae; neem oil and other derivatives can be effective personal repellents against biting adult mosquitoes; and certain neem fractions have anti-malarial action.

Contact: M B Isman, Faculty of Agri, Sci., University of British Columbia, 2357 Main Mall, Suite 248, Vancouver, BC V6T 1Z4  
Email: [murray.isman@ubc.ca](mailto:murray.isman@ubc.ca)  
Fax: 1-6040822-8640

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### **Conservation and Use of Traditional Vegetables for Asia and the Pacific 10-12 August 1999, Los Banos, Philippines**

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The importance of traditional leafy vegetables in Asia and the Pacific cannot be underestimated as these can meet the need for micro-nutrient deficiency for humans. Yet these commodity groups are neglected. As a result, cultivation, utilization and knowledge associated with production are becoming limited.

Over 1000 vegetable species are estimated in South East Asia but only 20 species are grown in intensive systems. The situation in South Asia, East Asia and the Pacific are also similar. The rest of the species are grown, often by women in traditional systems,

mostly in home gardens or in inter-cropping or mixed cropping systems. These species usually require low inputs, are adapted to the environment and are tolerant to biotic and abiotic stresses. The genetic resources of the species face rapid destruction owing to erosion of traditional farming cultures and change of traditional feeding habits because of the introduction and adoption of high-yielding crop varieties. In addition, changes in land-use systems and the loss of natural habitats and ecosystems have further threatened the loss of genetic resources which traditional farmers have relied on for their livelihood.

A regional workshop for the conservation and sustainable use of traditional vegetables in Asia and the Pacific organised by the International Centre for Underutilized Crops (ICUC) in collaboration with the Philippine Council for Agriculture, Forestry and Natural Resources Research and Development and FAO-Plant genetic resources and Seed service (AGPS) was held at PCARRD HQ in Los Banos, Philippines, 10-12 August 1999. Sixteen senior experts from eleven countries of Asia and the Pacific participated at this meeting. The meeting was also attended by the Network Coordinator of FAO Plant Genetic Resources, Director of Programme III of AVRDC, coordinator for South Asia, IPGRI and the Director of ICUC.

The objectives of this workshop were

1. to assess the present status of genetic resources of indigenous vegetables (including aquatic) and their use in the region
2. to identify gaps and needs for conservation and utilization of PGR
3. to evaluate the potential production and use of vegetables in the region
4. to assess the need for training in collection, evaluation, documentation and utilization of traditional vegetables and
5. To obtain a consensus and

appropriate programme strategy for promotion of indigenous vegetables through the establishment of a regional network on traditional indigenous vegetable crop genetic resources.

During the meeting representatives from each of the countries: Bangladesh, China, India, Indonesia, Nepal, Pakistan, Papua New Guinea, the Philippines, Sri Lanka, Thailand and Vietnam requested such a network be placed under the aegis of FAO. The meeting also requested that the network be addressed to all countries in the region that are interested in indigenous traditional vegetables. The network will function on a voluntary basis and it will involve national institutions, as well as associations and Non-Governmental Organisations (NGOs) dealing with underutilised traditional vegetables conservation and utilisation. It was also agreed that ICUC would act as the agency responsible to provide secretarial support on agreed activities and assist in the implementation of the network including the mobilisation of funds in close consultation with FAO.

The meeting identified the priority programmes and these would include collection, characterisation, documentation, conservation and utilization of genetic resources to improve traditional indigenous vegetables. The participants felt that standardised DESCRIPTORS of each indigenous vegetable species were needed and for this purpose, existing national descriptors will be shared among countries as provisional regional descriptors before standardisation is completed. FAO to be approached for technical assistance for development of such DESCRIPTORS.

The network will link with different initiatives of the region and of the world dealing with indigenous vegetables genetic resources exploration, conservation and utilization and will encourage participation of any country of the

region, institutions, NGOs and organisations that are interested to collaborate in this area. The meeting recommended that FAO should explore the possibility to assist in strengthening the capacity of this new regional network.

The Network was given the acronym UTVAPNET, Underutilized Traditional Vegetables for Asia and the Pacific Network. Details concerning the Network Co-ordination Strategy is given under 'UTVAPNET' in the Network section towards the front of this Newsletter.

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### Forthcoming events

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#### Conferences on the Conservation and Cultivation of Native Medicinal Plants of North America

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28 Dec 1999 - 2 Jan 2000. Hawaii.

This conference will focus on the sustainable cultivation of medicinal plants, identification of wild medicinal plants, ecological herbalism, plant conservation principles and techniques and bioregional herbalism as a healthy way of living.

Contact: United Plant Savers, P O Box 98, East Barre, VT 05649 Tel: 802.479.9825

Email: [info@plantsavers.org](mailto:info@plantsavers.org)

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#### IIRR International training courses for year 2000

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The International Institute of Rural Reconstruction (IIRR) offers regular, international training courses on a range of topics. These courses are designed for development managers and leaders and focus on field experience and participatory approaches. They draw on IIRR's 35 years of work in

development and on the experience of participants and collaborating organizations. More than 9,000 trainees from over 90 nations and around 2,500 organizations have attended training programs at IIRR.

IIRR courses are typically 2-4 weeks long. They combine interactive presentations, discussions, hands-on exercises and field visits. Many feature action planning, during which participants formulate plans to put into practice on their return home.

Contact: Education and Training Department, International Institute of Rural Reconstruction  
Y.C. James Yen Center  
Silang 4118, Cavite, Philippines  
Telefax: (63-46) 4142423  
Tel: (63-46) 4142417  
Fax: (63-46) 4142420  
Email: [etd-iirr@cav.pworld.net.ph](mailto:etd-iirr@cav.pworld.net.ph)

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#### Geospatial Information in Agriculture and Forestry

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10-12 January 2000. Florida, USA

Contact: EI Conferences, PO Box 134008, Ann Arbor, MI, 48113-4008, USA  
Fax: 1-734-994 5123

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#### International Conference on Managing Natural Resources for Sustainable Agricultural Production in the 21<sup>st</sup> Century

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14-18 February 2000. ICAR, New Delhi

The major themes of the conference include:

- Agro-biodiversity
- Agro-forestry
- Soil Management
- Water Management
- Weather and Climate Management Socio-Economics
- Integrated Resource Management Energy Management.

Contact: Dr A K Singh, Secretary General, International Conference on Managing Natural Resources, Indian Society of Soil Sciences, Indian Agricultural Research Institute, New Delhi 110 012, India  
Fax: +91 11 575 5529  
Email: [icmar@bic-iari.ren.nic.in](mailto:icmar@bic-iari.ren.nic.in)

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### SANCRA Congress 2000

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18-20 January 2000. University of the Orange Free State.

This congress will be held jointly with the South African Weed Science Society and the South African Crop Production Society.

Contact: Prof Schalk Louw, Department of Zoology & Entomology, University of the OFS, P O Box 339, Bloemfontein 9300  
Tel: (051) 401 2578  
Email: [LouwSvdM@dre.nw.uovs.ac.za](mailto:LouwSvdM@dre.nw.uovs.ac.za)

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### World Congress of Young Farmers

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20-24 February 2000. Coronada Springs Resort, Orlando, FL.

Contact: [bhmgmt@aol.com](mailto:bhmgmt@aol.com)

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### International Symposium on Iron Nutrition and Interactions in Plants

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14-19 May 2000. Texas Medical Center, Houston.

Contact: [mgrusak@bcm.tmc.edu](mailto:mgrusak@bcm.tmc.edu)

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### XXI IUFRO World Congress

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7-12 August 2000. Kuala Lumpur, Malaysia

Contact: XXI IUFRO World Congress Organising Committee, Forest Research Institute Malaysia,

Kepong, 52109 Kuala Lumpur, Malaysia  
Fax: 60-3-6367753  
Email: [iufroxxi@frim.gov.my](mailto:iufroxxi@frim.gov.my)

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### International Crop Science Congress

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17-22 August 2000. Hamburg, Germany.

Contact: [www.cch.de/CROPSCIENCE/](http://www.cch.de/CROPSCIENCE/)

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### International Symposium on Animal, Agricultural, and Food Processing Waste

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7-11 October 2000. Marriott Hotel, Des Moines, IA.

Contact: [moore@asae.org](mailto:moore@asae.org)

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### 10th ASOMPS (Asian Symposium on Medicinal Plants, Spices and other Natural products): Research and Development of Natural Products for Human Survival in the 21<sup>st</sup> century

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19-23 November 2000. Dhaka, Bangladesh.

Contact: Prof. Nilufar Nahar, Secretary Organising Committee ASOMPS X, Room 305, Khundkar Biggan Bhavan, Dept of Chemistry, University of Dhaka, Dhaka-1000, Bangladesh

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### International Symposium on Tropical and Subtropical Fruits

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27 November -1 December 2000. Cairns, Queensland, Australia

The major theme of the symposium will be the conservation of genetic resources and the facilitation of regional and global networks for the conservation of tropical and subtropical fruit germplasm.

Contact: Dr Rod Drew, International Society for the Horticultural Science (ISHS) Fruits Symposium, School of Bimolecular & Biomedical Science, Faculty of Science, Griffith University, Nathan Qld 4111, Australia  
Fax: +617-3875 7656  
Email: [R.Drew@sct.gu.edu.au](mailto:R.Drew@sct.gu.edu.au)

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### New Crops: a Decade of Achievements and The Way Forward

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April 2001.

Contact: Dr Nazmul Haq  
Tel: 01703 594229  
Fax: 01703 677519  
Email: [haq@soton.ac.uk](mailto:haq@soton.ac.uk)

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### Publications of Interest

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#### ICUC Publications

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Azad A K and Haq N **Germplasm Catalogue of Jackfruit in Bangladesh** 1999. ISBN 085342687-1. Bangladesh is rich in genetic diversity of Jackfruit. An attempt has been made to characterize and evaluate this diversity through field survey and laboratory analysis carried out during 1997-98. This catalogue includes information on 70 accessions with their passport data and important morphological characters such as the fruit pulp and seed. The study was carried out with support from the Department of International Development, UK. The germplasm is maintained at the Horticulture Research Centre, BARI, Joydebpur, Bangladesh.

Paudyal, K P and Haq, N. **Germplasm Catalogue of Pummelo in Nepal**. 1999. 44p ISBN 0854 32688-x.

**General Publications**

Ackworth, J and Njombe Ewusi, B

**Prunus africana: Striving for sustainable and equitable resource management in Cameroon.** Medicinal Plant Conservation. Volume 5. 1 March 1999. Uwe Schippmann, Bundesamt für Naturschutz, Konstantinstraße 110, D-53179 Bonn, Germany;  
Tel: ++49/228/8491-136  
Fax: ++49/228/8491-119  
E-mail: [schippmu@bfn.de](mailto:schippmu@bfn.de).

Alvarez I M and Nalvarte V **The Use of Local Plants to Control Parasites.** LEISA - ILEIA Newsletter for Low External Input and Sustainable Agriculture. September 1999 Volume 15 No 1/2 p62. ISSN 0920-8771. Centre for Research and Information on Low-External-Input and Sustainable Agriculture, Kastanjelaan 5, PO Box 64, NL-3830 AB Leusden, Netherlands. ISSN 0920-8771.  
Tel: +31-33-4943086  
Fax: +31-33-4951779  
Email: [ileia@ileia.nl](mailto:ileia@ileia.nl)

Basu M S **Taking Groundnut Production to New Heights through Mulch-film.** ICAR News - A Science and Technology Newsletter. Vol 5 No 1. Contact: M S Basu, Project Co-ordinator (Groundnut), National Research Centre on Groundnut, Junagarh (Gujarat) 362 001.

Bonkougou E G, Djimde M, Ayuk E T, Zoungrana I and Tchoundjeu Z. **The market potential of parkland trees.** Agroforestry Today 1999 Vol 11 Nos 1-2, p11. Contact: Edouard Bonkougou, ICRAF Sahel programme, c/o ICRISAT, BP 320, Bamako, Mali.  
Fax: +223 228683  
Email: [e.bonkougou@cgiar.org](mailto:e.bonkougou@cgiar.org)

Brough S H, Azam-Ali S N and Taylor A J **The potential of**

**bambara groundnut (*Vigna subterranea*) in vegetable milk production and basic protein functionality systems.** Food Chemistry 47 (1993) 277-283. Contact: A J Taylor, School of Biological Sciences, University of Nottingham, Sutton Bonington Campus, Leics LE12 5RD, UK.

Brough S H and Azam-Ali S N **The Effect of Soil Moisture on the Proximate Composition of Bambara Groundnut (*Vigna subterranea* (L) Verdc).** J Sci Food Agric, 1992, 60, 197-203. School of Biological Sciences, University of Nottingham, Sutton Bonington Campus, Leics LE12 5RD, UK.

Canales N and Canto R **Moth Control with Local Plants.** LEISA - ILEIA Newsletter for Low External Input and Sustainable Agriculture. September 1999 Volume 15 No 1/2. 65p. Centre for Research and Information on Low-External-Input and Sustainable Agriculture, Kastanjelaan 5, PO Box 64, NL-3830 AB Leusden, Netherlands. ISSN 0920-8771.  
Tel: +31-33-4943086  
Fax: +31-33-4951779  
Email: [ileia@ileia.nl](mailto:ileia@ileia.nl)

Collinson S T, Shamudzarira Z and Azam-Ali. **The effect of soil moisture on the water uptake and transpiration equivalent for three landraces of bambara groundnut (*Vigna subterranea*)** Accepted by Agricultural and Forest Meteorology (Sept 1999). Division of Agriculture and Horticulture, School of Biological Sciences, University of Nottingham, Sutton Bonington Campus, Leics LE12 5RD, UK.

Collinson S T, Sibuga K P, Tarimo A J P and Azam-Ali S N. **Influence of sowing date on the growth and yield of bambara groundnut landraces in Tanzania.** Expl Agric (2000), volume 36, pp 1-13. Accepted 6 May 1999. Division of Agriculture and Horticulture,

School of Biological Sciences, University of Nottingham, Sutton Bonington Campus, Leics LE12 5RD, UK.

Email: [sarah.collinson@nottingham.ac.uk](mailto:sarah.collinson@nottingham.ac.uk)

Collinson ST, Berchie J and Azam-Ali S N. **The effect of soil moisture on light interception and the conversion coefficient for three landraces of bambara groundnut (*Vigna subterranea*)** Journal of Agriculture Science, Cambridge (1999), 133, 151-157. Division of Agriculture and Horticulture, School of Biological Sciences, University of Nottingham, Sutton Bonington Campus, Leics LE12 5RD, UK.  
Email: [savad.azam-ali@nottingham.ac.uk](mailto:savad.azam-ali@nottingham.ac.uk)

Collinson S T, Azam-Ali S N, Chavula K M and Hodson D A. **Growth, development and yield of bambara groundnut (*Vigna subterranea*) in response to soil moisture.** Journal of Agricultural Science, Cambridge (1996), 126, 307-318. Division of Agriculture and Horticulture, School of Biological Sciences, University of Nottingham, Sutton Bonington Campus, Leics LE12 5RD, UK.

Collinson S T, Clawson E J, Azam-Ali S N and Black C R. **Effects of soil moisture deficits on the water relations of bambara groundnut (*Vigna subterranea* L. Verdc.)** Journal of Experimental Botany, Vol 48, No 309, pp 877-884, April 1997. Division of Agriculture and Horticulture, School of Biological Sciences, University of Nottingham, Sutton Bonington Campus, Leics LE12 5RD, UK.  
Fax: +44 115 951 6060  
Email: [savad.azam-ali@nottingham.ac.uk](mailto:savad.azam-ali@nottingham.ac.uk)

Dambroth Prof Dr M **Interspezifische Hybridisierung in der Gattung Lupinus** Abschlussbericht

Vertrag-Nr 4211 Institut für Pflanzenbau und Pflanzenzüchtung. Bundesforschungsanstalt für Landwirtschaft Braunschweig-Volkenrode (FAL)

Kocabas Z, Craigon J and Azam-Ali. **The germination response of bambara groundnut (*Vigna subterranea* (L.) Verdc.) to temperature.** Seed Science & Technology, 27, 303-313, 1999. Contact: J Craigon, School of Biological Sciences, University of Nottingham, Sutton Bonington Campus, Leics LE12 5RD, UK.

Linnemann A R and Azam-Ali S **Bambara Groundnut (*Vigna subterranea*) Pulses and Vegetables.** ISBN 0 412 466104. School of Biological Sciences, University of Nottingham, Sutton Bonington Campus, Leics LE12 5RD, UK.

Massawe F J, Collinson S T, Roberts J A and Azam-Ali S N. **Effect of pre-sowing hydration on germination, emergence and early seedling growth of bambara groundnut (*Vigna subterranea* L. Verdc.)** Accepted Seed Science and Technology June 1999. School of Biological Sciences, University of Nottingham, Sutton Bonington Campus, Leics LE12 5RD, UK. Fax: 0115 951 6060 Email: [saxfjm@szn1.agric.nottingham.ac.uk](mailto:saxfjm@szn1.agric.nottingham.ac.uk)

Massawe F J, Azam-Ali S N and Roberts J A **Variability of bambara groundnut (*Vigna subterranea* Verdc L.)** Paper presented at the 2<sup>nd</sup> International Workshop of BAMNET, held at the Council for Scientific and Industrial Research (CSIR), Accra, Ghana. 23-25 September 1998. School of Biological Sciences, University of Nottingham, Sutton Bonington Campus, Leics LE12 5RD, UK.

Massawe F J, Azam-Ali S N and Roberts J A **Physiological and genetic diversity in bambara groundnut (*Vigna subterranea* L. Verdc) landraces.** Paper presented at PlantBiology 99, American Society of Plant Physiologists, held at Baltimore, Maryland USA 24-28 July 1999. School of Biological Sciences, University of Nottingham, Sutton Bonington Campus, Leics LE12 5RD, UK. Email: [saxfjm@szn1.agric.nottingham.ac.uk](mailto:saxfjm@szn1.agric.nottingham.ac.uk)

Massawe F J, Roberts J A and Azam-Ali S N. **Molecular Techniques in Plant Improvement Programmes - A Case for Bambara groundnut (*Vigna subterranea* L. Verdc)** Paper presented at the 2<sup>nd</sup> International Workshop of BAMNET, held at the Council for Scientific and Industrial Research (CSIR), Accra, Ghana. 23-25 September 1998. School of Biological Sciences, University of Nottingham, Sutton Bonington Campus, Leics LE12 5RD, UK.

Mathur PN, Ramanatha Rao and Arora RK (eds). 1998. **Lathyrus Genetic Resources Network: Proceedings of IPGRI-ICARDA-ICAR Regional Working Group Meeting, 8010 December 1998. National Bureau of Plant Genetic Resources, New Delhi.** IPGRI Office for South Asia, New Delhi. 85p ISBN 92-9043-394-9

Neubert D and Hagemann J **The outlook for participatory agricultural research: - realistic goals instead of exaggerated expectations.** Agriculture and Rural Development 2/98. Contact: Dr Dieter Neubert, Institute for Ethnology and African Studies, Mainz University, Mainz, Germany.

Ochoa L, Fassaert C, Somarriba E and Schlonvoigt A. **Medicinal**

**and food plants in Nicoya, Costa Rica** Agroforestry Today 1999 Vol 11 Nos 1-2, p11. Contact: Cecile Fassaert, CATIE, Apartado 56-7170, Turrialba, Costa Rica Fax: +506 556 1533 Email: [fassaert@catie.ac.cr](mailto:fassaert@catie.ac.cr)

Prasad K V S, Suresh C and Lanting M **A platform for groundnut improvement.** LEISA - ILEIA Newsletter for Low External Input and Sustainable Agriculture Volume 15 No 1/2. September 1999. ISSN 0920 8771. Centre for Research and Information on Low-External-Input and Sustainable Agriculture, Kastanjelaan 5, PO Box 64, NL-3830 AB Leusden, Netherlands. Tel: +31-33-4943086 Fax: +31-33-4951779 Email: [ileia@ileia.nl](mailto:ileia@ileia.nl)

Riley K **Collaboration on Plant Genetic Resources in the Pacific** IPGRI Newsletter for Asia, the Pacific and Oceania No 28 Jan- Apr 1999 Editorial. ISSN 1561-2473 Contact: Ken Riley, IPGRI-APO, Serdang, Malaysia.

Tiwari S C, Igbokwe P E and Collins J B. October 1988 **Malbar Spinach (*Basella alba* L.)** Information Sheet 1321. MAFES (Mississippi Agricultural & Forestry Experiment Station) Director: Verner G Hurt, MSU (Mississippi State University), MS 39762.

**Experts grow the fruits of the future** International Agricultural Development Volume 19 No 5. Sept/Oct 1999. ISSN 0261-4413. Contact: Dr N Haq, Dept of Civil and Environmental Engineering, University of Southampton, Highfield, Southampton, SO17 3RQ. Fax: +44 23 80 677519 Email: [A.Hughes@soton.ac.uk](mailto:A.Hughes@soton.ac.uk) Web: <http://www.soton.ac.uk/~icuc/frunut.htm>

**Hedgerow shrubs boost soil fertility.**

International Agricultural Development Vol 19 No 5 Sept/Oct 1999 (This article includes information about tithonia) The Tropical Soil Biology & Fertility Programme, P O box 30592, Nairobi, Kenya. Fax: +254 2 622733 Email: [TSBFINF@TSBF.UNON.ORG](mailto:TSBFINF@TSBF.UNON.ORG)

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**Interesting Books & Publications**

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Adesanya S A, Idowu TB and Elujoba A A. (1987) **Antisickling Activity of *Adansonia digitata*.** Nigerian Journal of Natural Products and Medicine. Planta medica 1988. Department of Pharmacognosy, Faculty of Pharmacy, Obafemi Awolowo University, Ile-Ife, Nigeria. Tel: (234) 36 232 595 Fax: (234) 36 231 733 Email: [sadesany@oauife.edu.ng](mailto:sadesany@oauife.edu.ng)

Arora R K and Riley K W (eds) **Proceedings of the Asia-Pacific Consultation on Plant Genetic Resources, 27-29 November 1996, IARI, Pusa Campus, New Delhi. 1998.** This publication deals with the deliberations of the Asia-Pacific Regional Consultation organised by IPGRI in collaboration with ICAR/IARI, New Delhi. The meeting was co-sponsored by IPGRI, FAO, IRRI and ICRISAT. The scientific presentations have been covered in 4 sessions:

- Analysis of recent fora from an Asia-Pacific perspective
- Status of PGR networks
- Key issues on conservation and use of PGR, and farmers rights and benefit sharing
- Mechanisms for regional collaboration

The recommendations have been summarised respectively under different topics covered during

presentations. In all, 22 papers, 3 abstracts, and a key-note address, provide an overall view of the current status of plant genetic resources in this highly diverse region. 139p ISBN 92-9043-397-3 IPGRI Office for South East Asia, New Delhi, India.

Batugal P A Ramanatha Rao V and Bong C (eds) **Promoting Multipurpose Uses and Competitiveness of the Coconut. Proceedings of a Workshop, 26-29 September 1996, Chumphon, Thailand.** These proceedings are based on the deliberations of a COGENT Workshop held to discuss alternative uses for coconut which can help increase its competitiveness. 190p. 1998. ISBN 92-9093-39205. IPGRI-APO, Serdang, Malaysia.

Batugal P A and Ramanatha Rao V (eds) **Coconut Breeding, Papers presented at a Workshop on Standardisation of Coconut Breeding Research Techniques, 20-25 June 1994, Port Bouet, Cote d'Ivoire.** These proceedings comprising 16 papers, contain the details of the coconut breeding programmes in South, and South East Asia, the Pacific, Africa and Latin America/Caribbean. Most of these papers were updated in 1998 and reflect modifications giving latest research techniques adopted. The publication, thus, will be useful to coconut breeders to produce improved coconut varieties for resource-poor farmers. 150p. ISBN 92-9043-3833. IPGRI-APO, Serdang, Malaysia.

Batugal P A and Engelmann F (eds). **Coconut embryo *In vitro* Culture. Papers presented at a Workshop on Embryo Culture, 27-31 October 1997, Banao, Guinobatan, Albay, Philippines.** The 25 papers deal with the latest findings in this field. The information is covered in two parts:

- The status of research on coconut embryo culture and identifies research gaps
- Coordinated research to address identified research gaps. The collaborative efforts are expected to lead to broad application for *in vitro* methods in collecting and safely exchanging coconut diversity. 164p. ISBN 92-9043-385-x. IPGRI-APO, Serdang, Malaysia.

Blowfield M **Bamboo and Poverty. Working Paper 2. Integrated Rural Bamboo Project.** June 1995. Contact: M Blowfield, NRI, Chatham Marine, Kent ME4 4TB, UK. Email: [MICHAEL.BLOWFIELD@NRI.ORG](mailto:MICHAEL.BLOWFIELD@NRI.ORG) Web: <http://www.nri.org/irb/irbl.htm>

Coates LM, Hoffman P J and Johnson G I (eds) **Disease Control and Storage Life Extension in Fruit.** Proceedings of an International workshop held at Chiang Mai, Thailand, 22-23 May 1997. ACIAR Proceedings No 81 166p. Australian Centre for International Agricultural Research, Canberra.

Craker LE and Simon J E (eds) **Herbs, spices and medicinal plants - Recent advances in botany, horticulture and pharmacology Volume 1.** ISBN 1-56022-043-0. Published by Food Products Press, An Imprint of the Haworth Press, Inc, 10 Alice Street, Binghamton, NY, 13904-1580, USA

Han B H, Suh Y and Chi H-J. **Medicinal Plants in the Republic of Korea.** World Health Organisation - Regional Office for the Western Pacific, Manila.

Harris P J C, Lloyd H D, Hofny-Collins A H, Barrett A R and Browne A W. **Organic agriculture in sub-Saharan Africa: Farmer demand and potential for development.**

1998. ISBN 0-905343-220. The Henry Doubleday Research Association, Coventry, CV8 3LG.

Tel: +44 1203 303517

Fax: +44 1203 639229

Email:

[enquiry@hdra.org.uk](mailto:enquiry@hdra.org.uk)

**Haq N A Regional Research Network on Underutilized Tropical Fruits in Asia.**

Tropical Fruits Newsletter, No 40. March 1999. Contact Hr N Haq, ICUC, Institute of Irrigation and Development Studies, University of Southampton, Highfield, Southampton, SO17 1BJ.

Tel: 023 80 594229

Fax: 023 80 677519

Email: [haq@soton.ac.uk](mailto:haq@soton.ac.uk)

**Heller J Physic nut *Jatropha curcas* L. Promoting the conservation and use of underutilized and neglected crops. 1.** ISBN 92-9043-278-0.

Published by the Institute of Plant Genetics and Crop Plant Research, Gatersleben/International Plant Genetic Resources Institute, Rome. Contact: IPGRI Via delle Sette Chiese 142, 00145 Rome, Italy or IPK, Corrensstrasse 3, 06466 Gatersleben, Germany

**Henderson A and Borchsenius F Evolution, Variation, and Classification of Palms.** 1999. ISBN 0-89327-426-7. Order No MEM 83. The New York Botanical Garden Press, 200<sup>th</sup> Street and Kazimoff Boulevard, Bronx, NY 10458-5126.

**Holley J and Cherla K The Medicinal Plants Sector of India.** Medicinal and Aromatic Plants Program in Asia (MAPPA) IDRC/SARO. Contact: J Holley, c/o IDRC/SARO, 17, Jor Bagh, New Delhi 110 003, India.

**Krishnankutty C N and Blowfield M E. Bamboo Marketing in Southern India. Working Paper 3. Integrated Rural**

**Bamboo Project.** May 1996. Contact: M Blowfield, NRI, Chatham Marine, Kent ME4 4TB, UK.

Email:

[MICHAEL.BLOWFIELD@NRI.ORG](mailto:MICHAEL.BLOWFIELD@NRI.ORG)

Web:

<http://www.nri.org/irb/irbl.htm>

**Leadley E and Greene J (eds) 1998 The Darwin Technical Manual for Botanic Gardens.** ISBN 09520275 6 9. Contact: The Publications Department, Botanic Gardens Conservation International (BGCI), Descano House, 199 Kew Road, Richmond Surrey, TW9 3BW, UK

**Luteyn J Paramos: A Checklist of Plant Diversity, Geographical Distribution, and Botanical Literature.** 1999, ISBN 0-89327-427-5. Order No MEM 84. The New York Botanical Garden Press, 200<sup>th</sup> Street and Kazimoff Boulevard, Bronx, NY 10458-5126.

**Lekasi J K, Tanner J C, Kimani S K and Harris P J C. Manure Management in the Kenya Highlands: Practices and Potential for High Potential Production System Portfolio of the Natural Resources Systems Programme, Renewable Natural Resources Knowledge Strategy, Department for International Development.** 1998. Contact: Kenya Agricultural Research Institute, Kaptagat Road, P O Box 57811, Nairobi, Kenya. ISBN 0-905343-25 5.

**Ohler J G (ed) Modern Coconut Management - Palm Cultivation and Products** 458pp with 72 colour pictures. The book has 4 parts: the Coconut Palm and its Environment, Planting Material and Plantation Management, Coconut-Based Farming Systems and Post-Harvest Treatment, Processing, Research and Development. There is a significant coverage of genetic resources for plant breeding. It

has been prepared by FAO's Crop and Grassland Service, Plant Production and Protection Division and the Ethnosystems and Development Programme of Leiden University, Holland. ISBN 1 35339 467 X. Paperback January 1999. £45. Intermediate Technology Publications, 103-105 Southampton Row, London WC1B 4HH, UK  
Tel: +44 (0) 171 436 9761  
Fax: +44 (0) 171 436 2013  
Email: [orders@itpubs.org.uk](mailto:orders@itpubs.org.uk)  
Email: [Publications-Sales@fao.org](mailto:Publications-Sales@fao.org)

**Pareek O P, Suneel Sharma and Arora R K. Underutilized Edible Fruits and Nuts: An Inventory of Genetic Resources in their Regions of Diversity.** IPGRI Office for South Asia, New Delhi, India. 235p. ISBN 92-9043036701.

**Prebble C, Ella A and Subansenee ITTO: Making the Most of NWFP.** Tropical Forest Update Volume 9, No 1. ISSN 1022-5439. Contact: Publications, ITTO, Pacifico-Yokohama, 1-1-1 Minato-Mirai, Nishi-ku, Yokohama, 220-0012, Japan  
Fax: 81-45 223 1111  
Email: [itto@mail.itto-unet.ocn.ne.jp](mailto:itto@mail.itto-unet.ocn.ne.jp)  
Web: <http://www.itto.or.jp>

**Small E and Catling P M Canadian Medicinal Crops** 1999. Soft-cover. 240p. ISBN 0-660-17534-7. NRC No 42252. \$29.95. Monograph Orders, NRC Research Press, M-55, National Research Council Canada, Ottawa, Ontario, K1A 0R6, Canada.  
Tel: (613) 990-2254  
Fax: (613) 952-7656  
Email: [research.journals@nrc.ca](mailto:research.journals@nrc.ca)  
Web: <http://www.nrc.ca/cisti/journals/mgraphs.html>

**Smith R W Is Tropical Agricultural Research and Development contributing to**

**the Reduction of Poverty, Increased Food Security and the Sustainable Management of Natural Resources?** Tropical Agriculture Association UK Newsletter Volume 19 No 2. June 1999. ISSN 0954-6790. General Secretary: Mr Paul Tuley MBE, 43 Mount Place, The Mount, Guildford, Surrey, GU2 5HU  
Tel/fax: [general\\_secretary@taa.org.uk](mailto:general_secretary@taa.org.uk)  
Web: <http://www.taa.org.uk>

Smith, Olanrewaju B (ed) **Urban Agriculture in West Africa: Contributing to Food Security and Urban Sanitation.** IDRC, P O Box 8500, Ottawa, Canada K1G 3H9. 240p. Bilingual. \$30. ISBN 0-88936-890-2.

Sorensen M **Yam bean *Pachyrrhizus* DC - Promoting the conservation and use of underutilized and neglected crops. 2.** ISBN 92-9043-282-9. Published by the Institute of Plant Genetics and Crop Plant Research, Gatersleben/International Plant Genetic Resources Institute, Rome. Contact: IPGRI Via delle Sette Chiese 142, 00145 Rome, Italy or IPK, Corrensstrasse 3, 06466 Gatersleben, Germany

ten Kate K and Laird S **The Commercial Use of Biodiversity** Contact: Kerry ten Kate (020-8382 5741)

Williams J T and Ahmad Z (1999) **Priorities for Medicinal Plants Research and Development in Pakistan.** Medicinal and Aromatic Plants Program in Asia (MAPPA) IDRC/SARO. Contact: J T Williams, MAPPA Consultant, IDRC/SARO, 17, Jor Bagh, New Delhi 110 003, India.

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and Secretariat: Agro-Industrie Avenir, 8, rue d'Athenes - 75009 Paris France.  
Tel: +33 1 44 53 15 35  
Fax: +33 1 44 53 15 49.

**ARC-Roodeplaat Research Report 1949-1999 50 Years of Research and Technology Transfer.** ARC- Roodeplaat Vegetable and Ornamental Plant Institute - An Institute of the Agricultural Research Council. ISBN 1-86849-124-2. Contact: Dr HJ van Zyl (Director) ARC-Roodeplaat Vegetable and Ornamental Plant Institute, Private Bag X293, Pretoria, 0001, South Africa  
Tel: (012) 841 9611  
Fax: (012) 808 0844

**Biodiversity's Electronic Ally - an invaluable aid for conserving wild plant species.** October 1998. ISSN 0122 8048. Contact: CIAT Communications Unit, A A 6713, Cali, Colombia.  
Tel: (57-2)445-0000  
Fax: (57-2)445-0073  
Web: <http://www.ciat.cgiar.org>

**Defining the Scope for future ODA Bilateral Assistance to the Renewable Natural Resources Sector in Ghana.** February 1995. Overseas Development Administration, 94 Victoria Street, London, SW1E 5JL, UK.

**Descriptors for Bambara Groundnut (*Vigna subterranea*) 1999.** IPGRI, Via delle Sette Chiese 142, 00145 Rome, Italy. Available to download in a portable document format from URL:  
Web: <http://www.cgiar.org/ipgri/>

**Forests Matter The DFID Approach to Forests** For more information about DFID's work on forests, please contact: Environment Policy Department, Department for International Development, 94 Victoria Street, London, SW1E 5JL, UK

Tel: +44 - (0)171 917 7000  
Fax: +44 - (0)171 917 0679  
Email: [epd@dfid.gtnet.gov.uk](mailto:epd@dfid.gtnet.gov.uk)  
Web: <http://www.oneworld.org/dfid>

**The New York Botanical Garden Press 1999/2000.** 200<sup>th</sup> Street and Kazimiroff Boulevard, Bronx, NY 10458-5126  
Web: <http://www.nybg.org>

**Overseas Agriculture Research,** extension and training for developing countries. 1997. The Henry Doubleday Research Association, Ryton Organic Gardens, Coventry, CV8 3LG.  
Tel: +44 (0) 1203-303517  
Fax: +44 (0) 1203-639229  
Email: [enquiry@hdra.org.uk](mailto:enquiry@hdra.org.uk)  
Web: <http://www.hdra.org.uk>

**Prairie medicinal and aromatic plants conference.** Proceedings, March 3-5, 1996 Olds College, Olds, Alberta, Canada. Contact: Extension Services, Land Sciences Olds College, 4500-50 Street, Olds Alberta, Canada, T4H 1P3.  
Fax: 1 403 556 4713

**Southampton research techniques bear fruit.** 2 February 1999. New Reporter. University of Southampton, Highfield, Southampton, SO17 1BJ.  
Tel: 023 80 595000

**Tropical Agriculture Association - Membership List.** November 1998. 54p. General Secretary: Mr Paul Tuley MBE, 43 Mount Place, The Mount, Guildford, Surrey, GU2 5HU  
Tel/fax: [general\\_secretary@taa.org.uk](mailto:general_secretary@taa.org.uk)  
Web: <http://www.taa.org.uk>

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### **Newsletters & Journals of Interest**

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**Agroforestry Today** - published quarterly by the International Centre for Research in

Agroforestry (ICRAF). ISSN  
10013 3225. Agroforestry  
Today, PO Box 30677, Nairobi,  
Kenya  
Fax: +254 2 521001  
Email:  
[e.mwamunga@cgiar.org](mailto:e.mwamunga@cgiar.org)

**The Agronomist** ISSN 0263-9882  
BASF plc, P O Box 4, Earl Road,  
Cheadle Hume, Cheadle,  
Cheshire, SK8 6QG

**American Fruit Grower  
(Including Eastern Fruit  
Grower)** is published monthly  
by Meister Publishing Company,  
37733 Euclid Avenue,  
Willoughby, Ohio 44094. ISSN  
0002-8568.  
Tel: 216-942-2000  
Fax: 216-942-0662

**COGENT Newsletter** A Newsletter  
of the International Coconut  
Genetic Resources Network is  
published twice a year with Sub-  
network reports, National  
Programme Reports, Feature  
Article and other items of  
interest. Contact: COGENT,  
IPGRI, Regional Office for Asia,  
the Pacific and Oceania, P O Box  
236, UPM Post Office, Serdang,  
43400, Malaysia.  
Tel: (603) 942 3891  
Fax: (603) 948 7655  
Email: [ipgri-apo@cgiar.org](mailto:ipgri-apo@cgiar.org)

**Enlarging the Basis of Food  
Security: role of Underutilized  
Species.** Proceedings of the  
International Consultation  
organised by the Genetic  
Resources Policy Committee  
(GPRC) of the CGIAR at the M  
S Swaminathan Research  
Foundation, Chennai, India from  
17<sup>th</sup>-19<sup>th</sup> February 1999.  
Contact: M S Swaminathan  
Research Foundation, 3<sup>rd</sup> Cross  
Street, Taramani Institutional  
Area, Taramani, Chennai 600  
113, India  
Tel: 91-44-2351698  
Fax: 91-44-2351319  
Email:  
[mssrf.madras@sm8.sprintprg.em.vsnl.net.in](mailto:mssrf.madras@sm8.sprintprg.em.vsnl.net.in)

**Food Chain - The International  
Journal of Small-Scale Food  
Processing.** Food Chain is part  
funded by the UK DFID and the  
National Lottery Charities  
Board(NLCB). Intermediate  
Technology, Schumacher Centre  
for Technology and  
Development, Bourton Hall,  
Bourton on Dunsmore, Rugby,  
CV23 9QZ, UK.  
Tel: +44-(0)1788-661100  
Fax: +44-(0)1788-661101  
Email: [itdg@itdg.org.uk](mailto:itdg@itdg.org.uk)  
Web:  
<http://www.oneworld.org/itdg>

**Genetically Modified Organisms  
(GMOs) and developing  
countries** Background Briefing.  
Information Department, DFID,  
94 Victoria Street, London,  
SW1E 5JL  
Tel: +44 1355 84 3132  
Web:  
<http://www.dfid.gov.uk>

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**ICRTS Newsletter** International  
Centre for Research and Training  
on Seabuckthorn was established  
in 1995 in Beijing with 12  
member countries. The  
Newsletter is produced twice  
yearly and mainly aims at  
promoting overall interest in  
seabuckthorn research and  
development.  
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Fax: +86-10-63204032  
Email:  
[icrts@public.east.cn.net](mailto:icrts@public.east.cn.net)

**International Agricultural  
Development** is edited by David  
Dixon and is published six times  
a year. ISSN 0261-4413  
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Web:  
<http://www.users.globalnet.co.uk/~resinf>

**IPGRI Newsletter for Asia, the  
Pacific and Oceania.** The  
International Plant Genetic  
Resources Institute (IPGRI),  
formerly IBPGR, is one of the 16  
Centres of the Consultative  
Group on International  
Agricultural Research (CGIAR)  
with its Headquarters in Rome.  
IPGRI's mission is to encourage,  
support and engage in activities  
to strengthen the conservation  
and use of plant genetic  
resources worldwide with special  
emphasis on the needs of  
developing countries. IPGRI  
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provides scientific and technical  
advice and information. The  
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thrice yearly and is mainly aimed  
at promoting the overall concern  
on plant genetic resources, with  
emphasis on their conservation  
and use. Coordinator: Dr Bhag  
Mal, c/o NBPGR, Pusa Campus,  
New Delhi 110012, India.  
Tel: (91-11)5731845  
Fax: (91-11)5731845  
Email: [ipgri-delhi@cgiar.org](mailto:ipgri-delhi@cgiar.org)

**IPGRI Newsletter for Europe**  
IPGRI publishes five Regional  
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regions of the world. They are  
intended to serve as an informal  
forum for the exchange of news  
and views, and to create closer  
ties between national programme

scientists, researchers and other genetic resources workers.  
Director and EUFORGEN  
Coordinator: Jozef Turok, IPGRI  
Regional Office for Europe, Via  
delle Sette Chiese 142, 00145  
Rome, Italy.  
Tel: 39-0651892 250  
Fax: +39-065750309  
Email: [j.turok@cgair.org](mailto:j.turok@cgair.org)  
Web: <http://www.cgair.org/ipgri>

### MESFIN Newsletter.

Mediterranean Selected Fruit  
Inter-Country Network.  
Contact Dr Victor Galan  
Email:  
[vgalan@icia.rcanaria.es](mailto:vgalan@icia.rcanaria.es)

### People and Plants Handbook

Sources for applying  
Ethnobotany to Conservation and  
Community Development.  
General Editor: Gary J Martin,  
PPH, B P 262, 40008 Marrakesh-  
Medina, Morocco  
Fax: +212.4.301511  
Email:  
[100427.1260@compuserve.com](mailto:100427.1260@compuserve.com)

### Plant Breeding Newsletter (PNBL)

is supported by the Crop and  
Grassland Service, Plant  
Production and Protection  
Division, FAO, Rome. Editor is  
Professor Don Wallace. Over  
1400 subscribers.

### PROSEA Newsletter Plant

Resources of South-East Asia.  
ISSN 0853-2958. PROSEA  
Network Office, c/o Herbarium  
Bogoriense, RDCB-LIPI, P O  
Box 332, Bogor 16122, West  
Java, Indonesia

### Rachis Barley and Wheat

**Newsletter** is published half-  
yearly by the International  
Center for Agricultural Research  
in the Dry Areas (ICARDA). It  
contains mainly short scientific  
articles, but also includes book  
reviews and news about training,  
conferences and scientists in  
barley and wheat. ISSN 0255  
6421. Rachis/CODIS, ICAR-DA,  
P O Box 5466, Aleppo, Syria.  
Tel: +963-21-2213433  
Fax: +963-21-2213490

Email: [ICARDA@cgair.org](mailto:ICARDA@cgair.org)  
Web:  
<http://www.cgair.org/icarda>

**REMUFRT Newsletter** Global  
Network on Tropical and  
Subtropical Fruits. Victor Galan  
Sauco, Instituto Canario de  
Investigaciones Agrarias,  
Apartado de Correos 60, 38200  
La Laguna, Spain.  
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Fax: +34-922-476303  
Email:  
[vgalan@icia.rcanaria.es](mailto:vgalan@icia.rcanaria.es)

**SAGFRAD Newsletter** (Semi-Arid  
Food Grain Research &  
Development) is a quarterly  
publication of OAU/STRC-  
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Ouagadougou 01, Burkina Faso.  
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(226) 31 15 98  
Fax: (226) 31 15 86

**SANCRA News** - Newsletter of The  
Southern African New Crop  
Research Association. Editor:  
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of Zoology & Entomology,  
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### Tropical Agriculture Association

**UK Newsletter** ISSN 0954-  
6790. General Secretary: Mr  
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<http://www.taa.org.uk>

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## Underutilized Crops and the Internet

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There are a growing number of sites  
for those working on underutilized  
crops, assuming you have access to  
an internet linked computer. The

following is a summary of some  
sites that may be of interest. This is  
not an exhaustive list, but many  
bigger sites have useful links to  
related pages. Some sites also have  
interactive databases. Also offered at  
this site is information on how to  
join the Discussion list for New  
Crops – an email based bulletin  
board.

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**'A 'growth' industry: renewable  
raw materials'**, a 4 page magazine  
article on ACTIN and LINK (Green  
Chemistry, Volume 1, February 99)

<http://www.rsc.org/is/journals/current/green/gc001001.htm>

### ACTIN (Alternative Crops Technology Interaction Network)

They run a private internet-based  
'ACTIN<sup>2020</sup>' The Special Interest  
Group' database which is accessible  
from the 'Search ACTIN<sup>2020</sup>' button  
on the home page:

<http://www.actin.co.uk>

### Center for International Trade Expositions and Missions

<http://www.sequel.net/citermdo/bio-main.htm>

### Centre for Research and Information on Low-External- Input and Sustainable Agriculture

<http://www.oneworld.org/iliea>

### 'Crops for a Green Industry'

Proceedings, including views of the  
European Commission (part of the  
Austrian Presidency, Gmunden,  
October 1998).

<http://www.bmlf.gv.at/ebmlf/epublikat/epubland.htm>

### DFID (Department of International Development)

More than one in four of the world's  
population live in extreme poverty.

Governments worldwide have agreed to work together to halve the proportion of people living in extreme poverty by 2015, and to other targets including universal primary education and improved healthcare. The British Government is strongly committed to these targets.

<http://www.dfid.gov.uk>

**Food and Nutrition Internet Index (FNII).** FNII is a fully searchable web site describing and indexing food and nutrition resources available on the Internet.

<http://www.fnii.ifis.or>

**IENICA database** - the IENICA project is funded by DGXII of the European Commission under the FAIR programme. IENICA currently involves 14 states in the EU.

<http://www.csl.gov.uk/ienica>

**Integrated Rural Bamboo Project** is funded by the Forestry Research Programme of the Oversea Development Administration UK. The project is a collaboration between the Natural Resources Institute and CAB International and Kerala Forest Research Institute in southern India. Information is available on the Web:

<http://www.nri.org/irb/irbl.htm>

or via the NRI homepage:

<http://www.nri.org>

**Intermediate Technology, Schumacher Centre for Technology and Development.** Food Chain, The International Journal of Small-Scale Food Processing is available at this site where the information can be printed out directly. This is a new activity for them and they would welcome readers' comments

<http://www.oneworld.org/itdg>

**The International Agricultural Centre**, at Wageningen, The Netherlands has launched WISARD. This new site is a portal for information exchange on projects and organisations, and is helpful for organisations and networks in developed and developing countries to have updated and quick access to information on activities and potential partners searchable by country, keywords, institution etc.

<http://www.iac-agro.nl/wisard>

**International Center for Agricultural Research in the Dry Areas (ICARDA)**

<http://www.cgiar.org/icarda>

**The International Development Research Centre**

<http://www.idrc.ca/saro>

**International Plant Names Index (IPNI)** is an Internet accessible database of the scientific names of all seed plants. It is a product of collaboration between Kew, Harvard University Herbaria and the Centre for Plant Biodiversity Research, Canberra.

Combining the records of Index Kewensis, the Gray Index and the Australian Plant Names Index, IPNI will become an invaluable resource for all who work with plants. It will allow scientific names to be checked and be a first point of access to the taxonomic literature as well as providing a nomenclatural backbone to which other sorts of data can be added.

<http://www.ipni.org>

**International Tropical Timber Organisation (ITTO) promotes Conservation and Sustainable Development of Tropical Forests.** Details of some of their publications are accessible

<http://www.itto.or.jp>

**Medicinal herbs**

<http://sunsite.unc.edu/herbmed/faqs/mediherb.txt>

**Medicinal Plant Conservation**

<http://elib.cs.berkeley.edu/docs/query.shtml>

**Medicinal plants: pictures, books and resources**

<http://chili.rt66.com/hrbmoore/HOMEPAGE/>

**Natural Resource Perspectives** - present accessible information on current development issues. The series is published by the ODI (Overseas Development Institute) which is an independent non-profit policy research institute, with financial support from DFID (Department for International Development). See the web-site for papers in this series.

<http://www.oneworld.org/odi/>

**New Agriculturist on-line Reporting Agriculture for the 21<sup>st</sup> Century**

<http://www.new-agri.co.uk>

**The New York Botanical Garden Press** One of the principal goals of the botanical science program of the NYBG is to disseminate research results and information to the scientific community and to the general public through the publication of scholarly journals, monographs, and books. The program is unrivalled in quality and productivity in the field of botany. Through its varied scientific publications, the Garden reaches thousands of systematics, conservationists, anthropologists, mycologists, land-use planners, professionals in the pharmaceutical and food sciences, and ethnobotanists throughout the world on a regular basis.

<http://www.nybg.org>

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## Some Useful Addresses

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**Budihardjo**, Ms C U, Centre for  
Scientific Documentation and  
Information PDII/LIPI, Jalan, Gatot  
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