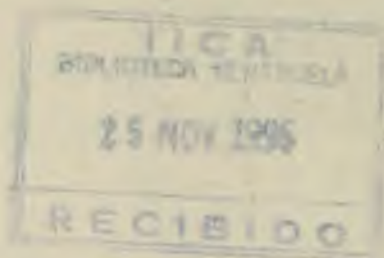


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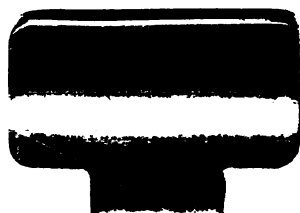


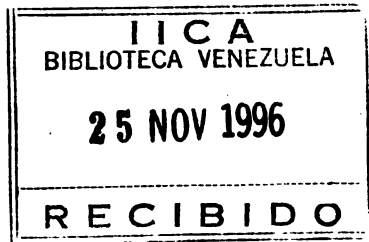
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Consultant Final Report
IICA/EMBRAPA-PROCENSUL II

GENETIC RESOURCES IN POMOLOGY

ESCRITÓRIO NO BRASIL





✓ Consultant Final Report
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GENETIC RESOURCES IN POMOLOGY

Consultant Final Report
IICA/EMBRAPA-PROCENSUL II



Leon Fredric Hough

Brasília, março de 1988

INSTITUTO INTERAMERICANO DE COOPERAÇÃO PARA A AGRICULTURA
EMPRESA BRASILEIRA DE PESQUISA AGROPECUÁRIA

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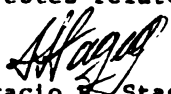
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A reprodução e difusão dos Relatórios de Consultores, no âmbito restrito das Diretorias das Unidades do Sistema Nacional de Pesquisa Agropecuária, vinculado à EMBRAPA, tem como objetivo principal o de divulgar as atividades desenvolvidas pelos consultores e as opiniões e recomendações geradas sobre os problemas de interesse para a pesquisa agropecuária.

As atividades de consultoria são realizadas no âmbito do Projeto de Desenvolvimento da Pesquisa Agropecuária e Difusão de Tecnologia na Região Centro-Sul do Brasil-PROCENSUL II, financiado parcialmente pelo Banco Interamericano de Desenvolvimento-BID e a EMBRAPA conforme os contratos de Empréstimo 139/IC-BR e 760/SF-BR, assinados em 14 de março de 1985 entre o Governo brasileiro e o BID.

As opiniões dos consultores são inteiramente pessoais e não refletem, necessariamente, o ponto de vista do IICA ou da EMBRAPA.

A coordenação dos Contratos IICA/EMBRAPA agradecerá receber comentários sobre estes relatórios.



Horacio R. Stagno
Coordenador Contratos IICA/EMBRAPA



INTER-AMERICAN INSTITUTE FOR COOPERATION ON AGRICULTURE
IICA/ENBRAPA CONTRACT

CONSULTANT FINAL REPORT

1. Consultant's full name: Leon Fredric HOUGH
2. Specialist in: GENETIC RESOURCES _POMOLOGIST
3. Title of IICA Project: 2.SB.3

4. ENBRAPA Program for which consultancy is provided:

PROGRAM : PROCENSUL II,
SUBPROGRAM : IV RECURSOS GENETICOS, BIOTECNOLOGIA E CONTROL BIOLÓGICO

IICA Project Activity Code: 2.SB.3.05		Administrative Code: R4874B1B03105
Title of Activity of IICA Project corresponding to this consultancy	Cooperation with EMBRAPA on research and applications of genetic resources, biotechnology and biologic control of pests diseases and weeds.	

CONSULTANT CONTRACT PERIOD	DUTY LOCATION (Center)
September 19th to October 18th, 1987	CNP FRUTEIRAS DE CLIMA TEMPERADO, PELOTAS
CONTRACT EXTENTION PERIOD (If any)	DUTY LOCATION (Center)

5. Financial support: PROCENSUL II

6. ACTIVITIES UNDERTAKEN BY THE CONSULTANT AND RESULTS

6.1 RESEARCH DONE UNDER DIRECT RESPONSIBILITY OF THE CONSULTANT

Research activities developed	Results Achieved
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Research activities reviewed

Apple breeding with Dra. Maria do Carmo Raseira.

Participated in planning the cross pollinations for 1987 at Vacaria and also at Pelotas.

Participated in collecting pollen and performing emasculations.

Suggested plans for 1988 hybridizations, including sources of pollen from foreign experiment stations. Suggested cross pollinations that could be made at Purdue University, W. Lafayette, Indiana, USA.

Appropriate disease resistant parents have been identified. The volume of seeds to be screened annually for scab resistance should be increased. Some crosses with one low chilling parent should be included each year in order to extend the areas where apples may be grown profitably.

Pear Breeding with Dr. Bonifacio H. Nakasu

Reviewed evaluations of pear cultivars for resistance to leaf spot, Fabraea maculata, productivity, adaptation and extent of flower bud drop. The death and abscission of flower buds at the time of bud break of the vegetative buds was very serious on most cultivars. Consequently it was impossible to undertake an extensive cross pollination program this year. The death of the buds was probably a consequence of the hot weather in midwinter which blocked the normal metabolic processes of the flower buds during middle, or deep, dormancy. This phenomenon has been observed in peaches and apricots, but it has never been reported for pears. Bud drop was also observed in the pear cultivar collection at Caçador and São Joaquim, SC.

Since a few of the cultivars had a relatively small percentage of bud drop, it should be possible to select hybrid seedlings that could avoid this problem, even though it may not occur frequently. An appropriate screening procedure should be developed. Dr. Mauget, INRA, France, has expressed an interest in dormancy problems of temperate zone fruit trees in the south of Brazil. He should be asked to collaborate in developing methodology for this screening.

European plum collection with Dr. Bonifacio H. Nakasu

European plums seem adapted in the Vacaria area. Most selections have very little problem with bacterial leaf spot or other diseases. It would be desirable to test many more selections at the C.E. Vacaria in order to select for an extended period of ripening and good fruit characteristics for eating fresh as well as for drying and for canning. Dr. Cociu at ICCP, Pitesti, Romania has many promising selections of European plums. They should be imported and tested. Of course all plants from eastern Europe should be subjected to post entry quarantine at a station with mild temperate climate.

Japanese plums, Prunus salicina, are not recommended for either region, neither the alto plano nor the warmer region in the south of RS, because of their susceptibility to bacteriosis, Xanthomonas pruni.

Peach breeding and peach culture with

Dra. Maria do Carmo Raseira

Dr. Joel Figueiredo Fortes

Dr. Sergio Sachs - ISAGRO, Pelotas

Much progress has been made in extending the harvest period for peaches for processing and for peaches and nectarines for eating fresh, especially at the early ripening end of the harvest spectrum. With the peaches and nectarines for fresh market much variability has been developed in flavor and flesh texture (firmness) both with white flesh and yellow flesh. New cultivars have been named and there are still more promising selections being tested, this program has been continuing for 20 years. There is a need for still more genetic variability, especially for different and better sources of disease resistance. The most promising area would be mainland China. Peach breeders in other regions are also being suggested.

There is a need for still earlier ripening - both for processing and for fresh market. This will require in-ovule culture of hybrid seeds. Guidance in the development of this technique can be obtained from Dr. David Romming, USDA, Fresno, California - USA, and Dr. Daniele Bassi, University of Bologna Italy. Control of diseases, is the major concern of peach growers, especially those with large orchards of peaches grown for processing. The problems most frequently mentioned are: Anthracnosis - Glomerella cingulata

Bacteriosis - Xanthomonas pruni

Leafcurl - Taphrina deformans

Peach tree decline

Anthracnosis is developing in spots in many orchards. Apparently a grower introduced it to this region on infected apples from Vacaria. It is frightening because it is very difficult to control on apples, and there is no satisfactory control for peaches at this time. The fruit of some commercial cultivars has been 100% infected in some

orchards.

Bacteriosis has always been a problem on peaches in this region, but seldom serious on most of the commercial cultivars. It seems that more virulent races of the bacteria are developing. In some cases a virulent race may be cultivar specific.

Leaf curl appears more destructive this season. Apparently because of the extreme fluctuation in winter temperature, the dormant sprays were not fully effective.

Early tree decline is serious in the germ plasm collection of CNPFT, and it is prevalent in some commercial orchards. The symptoms seem to vary somewhat from orchard to orchard. There may be more than a single cause. In general, the problem appears similar to apoplexy of apricots in southern Europe.

Certainly additional work by pathology is urgently needed. An experienced person with international perspective would be very helpful in the fuller diagnosis of these problems and also in the development of effective control treatments.

Bud drop of one year grafted trees of apple

Visited the orchard and cold storage of RASIP near Vacaria, RS with Liberaci Pedro de Couto.

Dessication of cut tips and lateral bud drop was serious last year - many thousands of trees died. After the trees were dug from the nursery in May they were placed in a cold storage room at 5°C and 95% relative humidity for more than 3 months before planting. There were some apples in the same room for part of the storage period. This year there were no apples in the storage room and temperature was 2°C and relative humidity was 70%. However the door to the storage room was often open and the door of an adjacent room with apples was open part of each day in late winter when fruit was being removed. Probably the damage to the buds was due to ethylene gas from the respiring apples. Fernando Flores will test this diagnosis in controlled gas chambers at CNPFT at Pelotas.

Strawberry breeding and production of healthy true-to-name nursery plants with Alverides M. dos Santos

There are good cultivars of strawberries and good production in this region. The commercial processing in this region is by freezing. Selections from the northeast of the US are not well adapted. Most of the cultivars in production are from California.

Anthracnosis, Colletotrichum fragariae is a problem in the propagation of nursery plants during midsummer. Bordeaux 8-8-100 has been recommended. It seems more feasible to move the nurseries to areas with cooler weather during the entire growing season, for example, at

elevations of 1000 - 1200 m in São Paulo or Minas Gerais.

This solution is practiced in California

Mildew, Microsphaera spp. is a problem with most of the commercial varieties being used. Good resistance exists in a few commercially unsatisfactory cultivars. A breeding program for resistance is limited by unsatisfactory screening technics.

Rapid increase of virus free clones by meristem culture sometimes gives plants that produce malformed fruits.

Dr. Gene Galletta, USDA, Maryland, USA may be able to suggest help for these problems.

Persons interviewed

CNPFT/EMBRAPA, Pelotas, RS

José Francisco Martins Pereira	-	Chefe
Dra. Maria do Carmo Raseira	-	Chefe Adjunto Técnico, fruit breeding
Dr. Bonifacio Nakasu	-	Fruit breeding
Daniela Lopes Leite	-	Pear breeding
Flavia Machado Homrich	-	Thesis research - apple scab
Dr. Joel Figueiredo Fortes	-	Pathology
Dr. Nelson Luiz Finardi	-	Root stocks
Dr. Paulo Junqueira de Araujo	-	Growth physiology
Rufino Fernando Flores Cantillano	-	Post harvest
Alverides Machado dos Santos	-	Strawberries

Campo Experimental CNPFT, Vacaria, RS

Dra. Rosa Maria Valdebenito-Sanhueza	-	Pathology
Liberaci Pedro de Couto	-	Administrative Assistant

Others

Dr. Sergio Sachs	-	Fruit grower
Isagro, Pelotas		
Marcos Palombini	-	Prefeito Vacaria, RS
Joaquim Goulart Junior	-	Lages, SC
President		
Associação Brasileira de Produtores de Maçã		

6.5 ACTIVITIES IN SUPPORT OF RESEARCH STRATEGY AND PLANNING

Research subject matter	Research program to which subject matter is concerned
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6.6 ACTIVITIES IN SUPPORT OF OTHER CENTERS AND UNIVERSITIES IMPROVING THE RESEARCH CENTERS LINKS WITH ABROAD

Subject matter on which links were recommended	Persons, centers and universities recommended for contact
<p>Develop Cooperative research Projects between CNPQ and EMBRAPA</p>	<p>EMBRAPA, BR João Afonso Zambal Neto Diretor Técnico Florianópolis Dr. José Luis Petri Chefe, E.E. Caçador João Bernardi Pear cultivars, E. E. Caçador Frederico Denardi Apple breeding, E.E. Caçador Enílio Brighenti Pear cultivars, E.E. São Joaquim</p>
<p>Develop cooperative research - on dormancy and - blocking dormancy - in pears</p>	<p>Dr. Jean Claude Mauget INRA Laboratoire de Bioclimatologie Domaine de Crozeille 63039, Clermont-Ferrand Cedex - FRANCE Tel: 7362 4000</p>

Insect resistant apple
selections. Scions
for testing at Vacaria.
Pollen for hybridization

Disease resistant apple
selections. Scions
for testing at Vacaria.
Pollen for hybridization

Pollen of low chilling
apple selections
for hybridization

Pears, disease resistant
selections and F₁ hybrids
of Japanese x European
Scions, pollen, seeds from
controlled crosses

Peaches sources of additional
germplasm: Pollen and/or scions

Dr. Hilary F. Goenewaldene
USDA
Room 106 Entomology Hall
Department of Entomology
Purdue University
W. Lafayette, IN 47907 USA
Tel: 317-494-4607

Dr. Jules Janick
Department of Horticulture
Purdue University
W. Lafayette, IN 47909 USA
Tel: 317-494-1329

Dr. Robert Lamb
Department of Pomology
New York Agricultural Experiment Station
Cornell University
Geneva, NY 14456 USA
Tel: 315-787-2235
Telex (230) 937478
Cornell ITCA

Dr. Y. Lespinasse
INRA
Station d'Arboriculture Fruitiere
Domaine du Bois-Labbe
Beaucouze 49000
Angers, FRANCE
Tel: 4148 5123

Dr. Amnon Erez, Head
Department of Pomology
Institute of Horticulture
Volcani Center
PO Box 6
Bet Dagan
50250 ISRAEL
Tel: 03-980392

Dr. Daniel Diaz-Montenegro
Campo Agricola Experimental
Costade Hermosillo
A P 1031
Hermosillo
Sonora, MEXICO

Dr. Richard Bell
USDA/SER - AR
Appalachian Fruit Research Station
Kearneysville, WV 25430 USA
Tel: 304-725-3451

Wang, Yu-Lin, Professor
Director Cheng-chow, Fruit Research Institute
National Academy of Agricultural Sciences
Cheng-chow, Hunan Province
Peoples Republic of China

One of the national gene banks for peaches at
this station

Professor Zhuang, En-ji
Chief, Fruit Department
Horticultural Research Institute
Shang-hai Academy of Agricultural Sciences
Shang-hai
Peoples Republic of China
Early ripening, in ovule culture

Dr. Salvador Pérez
Prol. Zaragoza 408
Jardines de la Hacienda
Querétaro
Querétaro 76180 - MEXICO
Tel: 463-6428 (home)

Dr. Daniele Bassi
Istituto Cultivazioni Arboree
Universita di Bologna
Via Filippo Re 6
40126 Bologna - ITALIA
Tel: 051-239256 + 229610
Very early ripening; in ovule embryo culture

Dr. David Raming
Fruit Products Research Lab.
USDA/SEA - AR
P.O. Box 8143
Fresno, CA 93747 - USA
Tel: 209-487-5334
In ovule embryo culture techniques, very early
ripening

(No project leader at present)
Rutgers Fruit Research and Development Center
RD2, Box 38
Cream Ridge, NJ 08514 - USA
Tel: 609-758-7311
Non-melting freestone

Strawberries:

Methods of screening for disease
resistance, stage of development,
spore concentration.
Genetic stability of clones
during and after multiplication
in tissue culture.

European plums:

Source of new selections
Virus free scions

Dr. Gene Galletta
USDA/ARS Fruit Lab.
Plant Genetics and Germplasm Institute
Beltsville, MD 20705 - USA

Dr. Vasile Cociu
ICCP
0300 Pitesti, Romania
Tel: 976-34292

Dr. Nicolae Minou
SCCP
4400 Bistrita, Romania
Tel: 17895

Author(s)*	Title of publication or Report and other bibliographic identification
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* Personal, institutional, etc.

6.8 SUPPORT PROVIDED TO ENBRAPA RESEARCHERS IN THESES AND DISSERTATION WORK

Name of the student	Thesis subject matter and synthesis of advice
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Flavia Machado Homrich	Evaluation of apple selections as parents for breeding for scab (<u>Venturia inaequalis</u>) resistance and adaptation in Rio Grande do Sul, Brazil
------------------------	---

Research director: Dr. Bonifacio Nakasu

This is a very satisfactory M.S. thesis. The techniques of preparing inoculum and maintaining all the details for effective controlled inoculation are exacting. The proportion of uninfected seedlings is more than expected. This has happened at every experiment station in the world the first time this type of screening has been attempted.

It is important to realize the possible deficiencies in the procedure which could have caused this excessive amount of apparently resistant seedlings;

1. There was an inadequate number of races of the pathogen in the inoculum to infect all the genotypes for multigene resistance in the seedling populations. It may be that the full range of genetic potential for pathogenicity in Venturia inaequalis does not exist in Brazil at this time.

2. The inoculation conditions may not have been wholly adequate: Temperature too high and/or the humidity was too low during part of the infection period. Seedlings were not growing vigorously. Leaves that are about 1/2 developed and are growing vigorously are the most susceptible.

Consequently, it is certain that some of the apparently resistant seedlings from these populations are not resistant. Therefore it will be essential to retest subsequent selections before they can be considered to be worthy of commercial trials because of disease resistance together with good fruit quality.

For the retest, there must be:

1. maximum genetic variability of the pathogen, in adequate amount, in the inoculum
2. there must be optimum conditions for infection in the inoculation chamber
3. the potted trees of the selections to be retested must be in good vegetative condition with new leaves unfolding

If the inoculation conditions are appropriate there should be 3 categories of infection:

1. Escapes from the first seedling inoculation that are fully susceptible to some of the Brazilian races of scab. These will have freely sporulating lesions(class 4).
2. Selections that have multigene (horizontal) resistance to all of the races of scab used in the inoculation, but lack the V_f (vertical) gene for resistance. There will show no evidence of infection (class 0).
3. Selections that have the V_f (vertical) gene for resistance, actually hypersensitivity. These should show one of the 3 hypersensitivity reactions: pit = class 1, fleck = class 2 or extensive fleck and limited sporulation = class 3.

If the selection has a considerable amount of genes that give horizontal resistance together with the V_f gene, the hypersensitivity will be reinforced. This will give the fleck or the pit reaction.

The V_f gene is unique among vertical genes for resistance: first because the hypersensitive reaction (resistance) can be reinforced by multigenes that give some degree of horizontal resistance, and second because the phenotype (presence or absence of V_f as well as the degree of multigene or horizontal resistance) can be observed at an early seedling stage following controlled infection. This means that a seedling that is very hypersensitive (pit or fleck) to infection by scab is protected by many loci, not just one locus for vertical resistance.

Since apple cultivars are long lived perennial clones, that must

be maintained for many years to be profitable, permanent resistance is necessary. Breeding for horizontal resistance alone, which could break down after a few years of sexual reproduction in the pathogen, would be futile.

8. CONSULTANT'S SUGGESTIONS AND TECHNICAL OR INSTITUTIONAL RECOMMENDATIONS FOR THE IMPROVEMENT OF THE RESEARCH SERVICE

There is a great potential for further expansion of profitable production of temperate zone fruit crops, especially apples, pears and European plums, in the alto-plano of northern Rio Grande do Sul and similar areas in central Santa Catarina. More research in the development of adapted, disease resistant new cultivars, and in the development of improved cultural practices is needed.

Research facilities and activities should be expanded at the Campo Experimental of CNPFT at Vacaria, RS.

The need is urgent. At this time the biologically necessary basis for increasing the research activity exists at Vacaria. There are uniform plantings of bearing trees of the present standard cultivars of apples that are suitable for cultural research plots. And there are fruiting trees of much of the germplasm necessary for disease resistance breeding for apples and pears at Vacaria and at Pelotas.

Lower costs of production are necessary before there will be much more new production. A less sophisticated and less expensive plant protection program would make fruit production more attractive for growers to establish small orchards on small diversified farms. With better adapted, disease resistant new cultivars, the cost of production of apples could be reduced 40%!

Suggestions for intensifying the apple and pear breeding projects and for introducing european plums are appended to this report. Ten years of vigorous research on these projects should produce new cultivars with superior fruit quality, both for fresh market and for processing: The cost of production should be equal to, or less than, the cost of production in other major fruit growing areas of the world.

The increased production that would follow should be sufficient to stimulate the development of another fruit and vegetable processing center, probably in the vicinity of Lagoa Vermelha, similar to the peach and vegetable processing industry at Pelotas.

Many of the research objectives at the Campo Experimental, Vacaria, RS, will be similar to the research objectives of the EMPASC stations at Caçador and São Joaquim, SC. There should be close collaboration between these research stations in research for the temperate climate fruits. For some objectives, it would be helpful to have cooperative projects.

Projects leaders from the two states would benefit from the early

exchange of experience, and data from comparable experiments could be combined to give added confidence in each years results. Such cooperation would multiply the effectiveness of the research at each station. It should not be considered duplication of effort.

Additional Personnel Needed at C.E. Vacaria

Pomology - Physiology - Ph.D.

An experienced research scientist for field cultural practices

Pomology - preferably at M.S. level

field research supervisor, with experience

to coordinate all field research at the C.E. Vacaria

This is especially important for proper application of treatments, and taking field data for projects directed by the research staff stationed at CNPFT Pelotas.

3 technicians: 1 Fruit pathology
 1 Physiology
 1 Fruit breeding and cultivar testing

Additional Personnel - CNPFT at Pelotas

Plant Pathology - Ph.D;

An experienced senior fruit pathologist to help in the diagnosis and the development of appropriate control measures for peach diseases, especially: Anthracnosis, Glomerella cingulata

Bacteriosis, Xanthomonas pruni

Early tree decline

Dr: Joeseoph M. Ogawa - Phone 916-752-0301

Department of Plant Pathology

University of California

Davis, CA 95616 USA

Dr. Ogawa should be invited for a short term consultancy as soon as possible, while a search is initiated for an experienced fruit pathologist who could help for one, or preferably two years.

The disease problems have become more serious the past two years, especially in the case of early tree decline. There seems to be more than one cause for the early decline. It is similar to apoplexy of apricots in Europe. There is urgent need for help in diagnosis, as well as in the development of feasible control measures.

Appendix 1, Apple breeding.

Objectives:

Disease resistance

Field immunity to scab, Venturia inaequalis

Good field resistance to mildew, Podospaera leucotricha

Low level of susceptibility to bitter rot, Glomerella leucotricha. (Good resistance can come only after suitable parents for resistance are identified).

Early to very late ripening

Emphasis on late and midseason ripening

Attractive red color

Good shelf life, good shipping, good keeping in cold storage

Good flavour for eating fresh

Good flavour and texture for processing

Low rate of oxidative browning

Adaptation to intermediate winter chilling requirement

Procedure:

Controlled crosses to produce 20,000 to 30,000 seeds per year for the next 3 to 5 years

Screening for susceptibility to scab in the greenhouse at Pelotas during July and August, so that cool temperature can be maintained throughout the inoculation and evaluation periods. If practical, there should be 2 inoculations.

As soon as the scab evaluation has been completed the seedlings should be sprayed to protect them from mildew, and this treatment should be repeated after they have been transplanted to the nursery.

As soon as practical in the same spring, the resistant seedlings should be transplanted to a nursery in Vacaria.

After midsummer, natural mildew infection should be allowed to develop in the nursery until the end of the first growing season, and throughout the second growing season. Susceptible seedlings can be identified and eliminated at the end of the first growing season, and again at the beginning and the end of the second growing season in the nursery.

Adaptation, the time of terminal bud break, and lateral bud break (when this is significantly different) can be evaluated at the beginning (spring) of the second growing season.

Screening for vigor and for desirable growth characteristics can be done in the fall of the first growing season and again in the summer of the second growing season. Vigor is an important criterion for seedling selection. High seedling vigor has a good positive correlation with early bearing (not early ripening).

A scion of each selected seedling should be cut and labeled in July of the second winter. These should be stored at $\pm 2^{\circ}\text{C}$ in an atmosphere free of ethylene (stored fruits) for ± 2 months and then top worked on pre established M.9 rootstocks.

The selected seedlings from which the scions were taken should be maintained in the nursery, or transplanted to a closely spaced orchard as insurance in case the first graft failed. If the planting of the original selected seedling is maintained without spray protection, it will provide an additional opportunity to evaluate for resistance to disease and insect pests. These trees will also be a source of additional scions for the seedlings that are selected for commercial trials.

Objectives:

Disease resistance

Good field resistance to entomosporia, Fabraea maculata

Good field resistance to pear scab, Venturia pirina

Midseason to late ripening

Late ripening cultivars should keep well in cold storage

Japanese type fruits, Pyrus pyrifolia

European type fruits, Pyrus communis

Good shelf life, good shipping, without internal breakdown

Good flavor for eating fresh

Good flavor and texture for processing

Adaptation to intermediate winter chilling requirements

Adaptation to low winter chilling suitable for the Pelotas region

Dormancy metabolism not subject to blocking by extended periods of warm weather in midwinter

Procedure:

Controlled crosses to produce more than 20,000 seeds per year for the next 5 years

After the seeds have started to germinate they should be planted in the nursery at Pelotas

They seedlings must be protected to avoid any infection from entomosporia (Fabraea maculata) leaf spot during the first growing season in the nursery. Screening for resistance to leaf spot can be done during the summer and autumn of the second growing season

Screening for susceptibility to pear scab will be done on the basis of natural infection in the nursery both summers. In progenies where susceptible seedlings are observed in the nursery, the apparently resistant selections that are planted for fruiting trials should still be observed carefully for scab infection. Many of the parents used will transmit satisfactory resistance. Since the screening of apple seedlings for apple scab resistance will require a major effort in the greenhouse, it is not feasible to attempt a full scale greenhouse screening of pear seedlings for pear scab resistance.

Screening for vigor and for desirable growth characteristics can be done in the fall of the first growing season, and again in summer of the second growing season. Vigor is an important criterion for seedling selection, especially in the

progenies of European type pears. High seedling vigor has a good positive correlation with early bearing (not early ripening).

Adaptation, or chilling requirement can be evaluated in the spring at the beginning of the second growing season, time of terminal bud break, and time and extent of lateral bud break should be noted.

After 2 growing seasons in the nursery at Pelotas, the selected seedlings should be planted for fruiting evaluation at the C.E. Vacaria, RS

Dwarfing rootstocks for pears should be multiplied as soon as they are available and established at the C.E. Vacaria, RS. When the dwarfing rootstocks become available, the selected pear seedlings should be grafted on dwarfing rootstocks in the same manner described for apples, in order to accelerate early fruiting.

If the supply of rootstocks is limited, the European type seedlings should have preference, since the Japanese type seedlings usually are more precocious in coming in to fruiting.

New research needed

The metabolism of dormant flower buds must be studied, in order to develop a method of identifying seedlings (genotypes) which will produce normal flowers in the spring following extreme fluctuation of the temperature during the winter. Dr. Jean Claude Mauget, INRA, France, has expressed a interest in this problem. A cooperative research project should be developed with Dr. Mauget.

Dr. Jean Claude Mauget - Phone 7362 4000

INRA

Laboratoire de Bioclimatologie

Domaine de Crouelle

63039 Clermont-Ferrand Cedex, FRANCE

Appendix 3, Importation of European plums

Dr. V. Cociu, ICCP, Romania has had a plum breeding program for more than 25 years. He has more than 100 promising selections. Most are suitable for drying and/or canning as well as for fresh market. The season of ripening varies from early to late. These should be introduced and tested at Vacaria for adaptation, productivity and fruit quality. There is a very capable virologist, Dr. Nicolae Minoiu, cooperating with Dr. Cociu. Selections that Dr. Minoiu certifies as virus free, will be healthy. Never the less, since plum pox virus is endemic in all of south eastern Europe, a careful post entry quarantine of the plum selections will be essential.

Of course some restriction agreement which allows the propagation of the plum selections for testing only, will be required. As desirable selections are identified a single payment royalty should be negotiated.

Dr. Vasile Cociu
ICCP
0300 Pitesti, Romania

Dr. Nicolae Minoiu
SCCP
4400 Bistrita, Romania

9. AGREEMENTS OR COMMITMENTS ESTABLISHED WITH EMBRAPA RESEARCHERS IN-SERVICE OF
THE FUTURE DEVELOPMENT OF RESEARCH IN THE CONSULTANT'S FIELD OF SPECIALIZATION

10. CONSULTANT'S COMMENTS ON CIRCUMSTANCES WHICH AFFECTED THE CONSULTANCY WORK

Date:

30 October 1987

Signature.

L. Fredric Hugh

Programa II. Geração e Transferência de Tecnologia

O Programa de Geração e Transferência de Tecnologia é a resposta do IICA a dois aspectos fundamentais: (i) o reconhecimento, por parte dos países e da comunidade técnico-financeira internacional, da importância da tecnologia para o desenvolvimento produtivo do setor agropecuário; (ii) a convicção generalizada de que, para aproveitar plenamente o potencial da ciência e da tecnologia, é necessário que existam infra-estruturas institucionais capazes de desenvolver as respostas tecnológicas adequadas às condições específicas de cada país, bem como um lineamento de políticas que promova e possibilite que tais infra-estruturas sejam incorporadas aos processos produtivos.

Nesse contexto, o Programa II visa a promover e apoiar as ações dos Estados membros destinadas a aprimorar a configuração de suas políticas tecnológicas, fortalecer a organização e administração de seus sistemas de geração e transferência de tecnologia e facilitar a transferência tecnológica internacional. Desse modo será possível fazer melhor aproveitamento de todos os recursos disponíveis e uma contribuição mais eficiente e efetiva para a solução dos problemas tecnológicos da produção agropecuária, num âmbito de igualdade na distribuição dos benefícios e de conservação dos recursos naturais.

INSTITUTO INTERAMERICANO DE COOPERAÇÃO PARA A AGRICULTURA

O Instituto Interamericano de Cooperação para a Agricultura (IICA) é o organismo especializado em agricultura do Sistema Interamericano. Suas origens datam de 7 outubro de 1942, quando o Conselho Diretor da União Pan-Americana aprovou a criação do Instituto Interamericano de Ciências Agrícolas.

Fundado como uma instituição de pesquisa agrônômica e de ensino; de pós-graduação para os trópicos, o IICA, respondendo às mudanças e novas necessidades do Hemisfério, converteu-se progressivamente em um organismo de cooperação técnica e fortalecimento institucional no campo da agropecuária. Essas transformações foram reconhecidas oficialmente com a ratificação, em 8 de dezembro de 1980, de uma nova convenção, que estabeleceu como fins do IICA estimular, promover e apoiar os laços de cooperação entre seus 31 Estados membros para a obtenção do desenvolvimento agrícola e do bem-estar rural.

Com um mandato amplo e flexível e com uma estrutura que permite a participação direta dos Estados membros na Junta Interamericana de Agricultura e em seu Comitê Executivo, o IICA conta com ampla presença geográfica em todos os países membros para responder a suas necessidades de cooperação técnica.

As contribuições dos Estados membros e as relações que o IICA mantém com 12 Países Observadores, e com vários organismos internacionais, lhe permitem canalizar importantes recursos humanos e financeiros em prol do desenvolvimento agrícola do Hemisfério.

O Plano de Médio Prazo 1987-1991, documento normativo que assinala as prioridades do Instituto, enfatiza ações voltadas para a reativação do setor agropecuário como elemento central do crescimento econômico. Em vista disso, o Instituto atribui especial importância ao apoio e promoção de ações tendentes à modernização tecnológica do campo e ao fortalecimento dos processos de integração regional e sub-regional.

Para alcançar tais objetivos o IICA concentra suas atividades em cinco áreas fundamentais, a saber: Análise e Planejamento da Política Agrária; Geração e Transferência de Tecnologia; Organização e Administração para o Desenvolvimento Rural; Comercialização e Agroindústria, e Saúde Animal e Sanidade Vegetal.

Essas áreas de ação expressam, simultaneamente, as necessidades e prioridades determinadas pelos próprios Estados membros e o âmbito de trabalho em que o IICA concentra seus esforços e sua capacidade técnica, tanto sob o ponto de vista de seus recursos humanos e financeiros, como de sua relação com outros organismos internacionais.

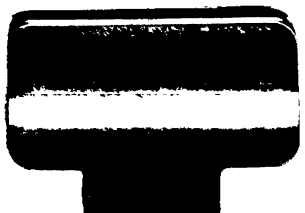
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Responsáveis pela reprodução: Jadir José dos Santos e Murillo Sodré da Silva.

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