

# IICA



Consultant Final Report  
IICA/EMBRAPA-PROCENSUL II

BREEDING FOR BACTERIAL SPOT RESISTANCE  
(Xanthomonas campestris pv. pruni)

IICA  
PM-84/  
BR-89/  
08

ESCRITÓRIO NO BRASIL

00001624

BREEDING FOR BACTERIAL SPOT RESISTANCE  
(Xanthomonas campestris pv. pruni)

BV004243

IICA  
CMA41BR  
84-08

Layne, Richard Evelyn Claude.

Breeding for bacterial spot resistance (*Xanthomonas campestris* pv. *Pruni*). Consultant final report IICA/EMBRAPA-PROCENSUL II/por Richard Evelyn Claude Layne.-Brasília : IICA/EMBRAPA, 1989. p. (IICA. Série Publicações Miscelâneas, A4/BR89-008).

ISSN 0534-0591

1. Genética Vegetal-Varietade Resistente. I.  
Título. II. Série.

CDU 632.938  
AGRIS F30;H20

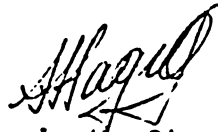
## APRESENTAÇÃO

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 Agrícola 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 H. Stagno  
Coordenador Contratos IICA/EMBRAPA



INTER AMERICAN INSTITUTE FOR COOPERATION ON AGRICULTURE  
IICA/IBRAPA CONTRACT

CONSULTANT FINAL REPORT

1. Consultant's full name: *Richard Evelyn Claude Payne*
2. Specialist in: *Bacteriology, plant genetics and peach production*
3. Title of IICA Project: *2:SB.3*
4. IBRAPA Program for which consultancy is provided:

PROGRAMA: *PROGENSA II*

SUBPROGRAMA: *02-PEQUENA VEGETAL*

IICA Project Activity Code: <i>2.SB.3.02</i>		Administrative Code: <i>R 4548 PIB 03102</i>	
Title of Activity of IICA Project corresponding to this consultancy	<i>Cooperation with IBRAPA on research activities in the field of crop production.</i>		
CONSULTANT CONTRACT PERIOD	DUTY LOCATION (Center)		
<i>75 days, January/1989</i>	<i>CRIFT-Pedrolan</i>		
CONTRACT EXTENSION PERIOD (if any)	DUTY LOCATION (Center)		

5. Financial support: *PROGENSA II*

## 6. ACTIVITIES UNDERTAKEN BY THE CONSULTANT AND RESULTS

### 6.1 RESEARCH DONE UNDER DIRECT RESPONSIBILITY OF THE CONSULTANT

Research activities developed	Results Achieved
<p>1. To obtain an overview of the peach, nectarine and plum breeding programs at CNPFT-Pelotas and to discuss major breeding objectives with particular reference to breeding for bacterial spot resistance (<u>Xanthomonas campestris pv. pruni</u>) with the breeders and pathologists working on this problem at Pelotas.</p>	<p>The peach and plum breeding programs at CNPFT - Pelotas were reviewed in depth with Dr. Maria Raseira and Dr. Bonifacio Nakasu. Laboratory, greenhouse and field research plots were visited, bacterial spot in the peach and plum germplasm collections was assessed as well as among the peach and nectarine hybrids and advanced selections. The author discussed in detail with Dr. Raseira and Dr. Fortes the method he has successfully employed in assessing bacterial spot resistance of leaves and fruit in the field and explained the rating system used for selecting hybrid seedlings, advanced selection, and for selecting resistance parents. This was done by examining infected plants in the research orchards at Pelotas and in the germplasm collection. He indicated the levels of infection that could be tolerated in selection for resistance. He discussed some of his earlier work done in screening for disease resistance in the greenhouse under warm (25 to 30°C), humid (100%), conditions in selection for bacterial spot resistance using young hybrid seedlings about 50 cm in height.</p>
<p>2. To provide information and ideas that might be useful in breeding and selecting for bacterial spot resistance in peach and nectarine, and to provide other technical information on fruit cultivars and fruit production recommendations used in Ontario, Canada that might be useful to the professional and technical staff at CNPFT-Pelotas.</p>	<p>The author provided a list of the cultivars and selections in the germplasm collection at the Harrow Research Station and identified the ones that might be best to use as parents in breeding for improved bacterial spot and brown rot resistance. In addition, he provided a complete list of peach, nectarine and apricot germplasm in each of the major collections in Canada. He provided, for photocopying, important research papers on breeding and screening for bacterial spot resistance in peach and provided 95 research abstracts on bacterial spot taken from the world literature from 1970 to 1988. He provided copies of work sheets used in evaluation of hybrid seedlings, advanced selections and cultivars;</p>



6. ACTIVITIES UNDERTAKEN BY THE CONSULTANT AND RESULTS

6.1 RESEARCH DONE UNDER DIRECT RESPONSIBILITY OF THE CONSULTANT

Research activities developed	Results Achieved
-------------------------------	------------------

evaluation cards used by cooperators engaged in testing of Harrow selections, and cards used for evaluation of processed fruit in the Harrow breeding program. He provided written descriptions of promising new peach and apricot selections from the Harrow breeding program that could be tested in Pelotas. He provided copies of the two most important extension bulletins used by commercial fruit growers in Ontario, Canada: 'Fruit Varieties', and 'Fruit Production Recommendations'; for the general information of the professional and technical staff at CNPFT-Pelotas.

## 6.2 SUPPORT TO RESEARCH UNDERTAKEN BY OTHER EMBRAPA RESEARCHERS

Research activities developed	Results achieved
a) To determine whether elongate black lesions found on peach stems associated with leaves that had a severe infection of bacterial spot were summer cankers caused by <u>X. campestris</u> pv. <u>pruni</u> (Dr. Fortes, Dr. Raseira).	Representative shoots with black stem lesions were collected from the orchard, examined under the microscope for presence of bacteria, and isolations were attempted on PDA. If these lesions prove to contain the pathogen, they could represent a very important source of inoculum and an overwintering site for the pathogen.
b) To determine whether tree death in a commercial orchard (Mr. Alcantara) was caused by <u>Verticillium</u> wilt (Dr. Fortes, Dr. Raseira).	The author examined trees that were removed in December 1988 because they were dying from wilt. He found vascular discoloration symptoms in stems and roots that suggested on the basis of symptoms that the major cause of tree death might be from <u>Verticillium</u> wilt. Representative samples were collected and isolations were attempted on PDA on January 6, 1988 by Dr. Fortes technician. This orchard was planted immediately after an old peach orchard had been removed. This is not a good practice because it can result in serious replant problems and a buildup of <u>Verticillium</u> wilt in the soil.

**6.3 TRAINING ACTIVITIES DEVELOPED BY THE CONSULTANT**

Date	Training subject matter	Type of event*	Number of beneficiaries	
			from EMBRAPA	From other institutions
Jan/89	Peach breeding in Canada - emphasis on breeding for bacterial spot resistance	Seminar	18	03

\* Short courses, seminars, conferences, etc.

**6.4 IN-SERVICE TRAINING PROVIDED BY THE CONSULTANT**

In-service training subject matter	Names of counterparts
Methods used in rating peach trees for bacterial spot resistance of leaves and fruit.	Dr. Maria Raseira Dr. Joel Fortes

6.5 ACTIVITIES IN SUPPORT OF RESEARCH STRATEGY AND PLANNING

Research subject matter	Research program to which subject matter is concerned
-------------------------	---

Genetic exchange of germplasm with specific traits.	The fruit breeding programs at EMBRAPA and with Agriculture Canada could benefit from an exchange of suitable germplasm of peach, nectarine, apricot, pear, plum cherry and apple.
---	--

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
--	---

Breeding for disease resistance in peach	Dr. R.E.C.Layne, Dr. J.A. Traquair at Agriculture Canada (Harrow) Dr. N.W.Miles at IIRIO, OMAF, Vineland Station Ontario, Canada Dr. Alan Biggs Agriculture Canada (Vineland).
Plum breeding	Dr. G.Tehrani, Ontario Ministry of Agriculture and Food Horticultural Research Institute of Ontario, Vineland Station, Ontario.
Pear breeding	Mr. David Hunter, Harrow Research Station, Harrow, Ontario, Canada.
Apple breeding	Dr. David Lane, Agriculture Canada, Research Station, Summerland British Columbia, Canada.

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

---

The author was impressed with the research facilities at CNPFT-Pelotas. (1) The research in breeding for bacterial spot resistance in peach and plum would be aided by someone well trained in phytobacteriology. (2) A cooperative program of regional testing of advanced selections with selected growers would be helpful in ensuring that only the most bacterial spot resistant selections are introduced for commercial use. (3) Equipping a laboratory for bacteriology research would be helpful. Controlled environment facilities that could provide very high relative humidity (90 to 100%) and control temperatures between 25 to 30°C would be important if screening for disease resistance (bacterial spot) is to be undertaken. (4) Establishment of effective linkages with breeders and pathologists in Canada might be helpful in transferring technology and encouraging work transfers between EMBRAPA and Agriculture Canada. (5) Exchange of germplasm between Canada and Brazil could strengthen the breeding programs in each country e.g. disease resistant sources, high soluble solids, late blooming, etc. (6) The author is willing and interested in exchanging Prunus and Pyrus germplasm with counterparts at CNPFT-Pelotas and providing information on stone fruit breeding and peach orchard management.

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

---

1. To visit the Research Station at Pelotas for two three week periods in 1989 and 1990 each period consisting of the last week of November and first two weeks of December.
2. To emphasize field evaluation of bacterial leaf and fruit spot in peach, nectarine and plum at Pelotas, Cascata and Vacaria.
3. To exchange pollen of peach, nectarine and plum of mutual interest to achieve genetic progress in breeding for resistance.  
To exchange budwood of specific clones of interest to breeders at EMBRAPA and counterparts in Canada.

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

---

My visit to EMBRAPA CNPFT-Pelotas was very interesting and rewarding. The program for my visit was well organized and provided opportunities to review the fruit breeding research at Pelotas and to see commercial peach orchards that were representative of the region. Dr. Maria Raseira was most knowledgeable and helpful in explaining the research with fruit breeding at Pelotas and the system of culture and the cultivars used by commercial growers. The visits to the station and grower orchards were most helpful in forming an overall impression of the problem and possible avenues of research that may prove useful.

Date:

January 1989

Signature



## 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.



Esta publicação foi reproduzida na Gráfica do Escritório do IICA no Brasil, em Brasília, em janeiro de 1989, numa tiragem de 100 exemplares.

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



