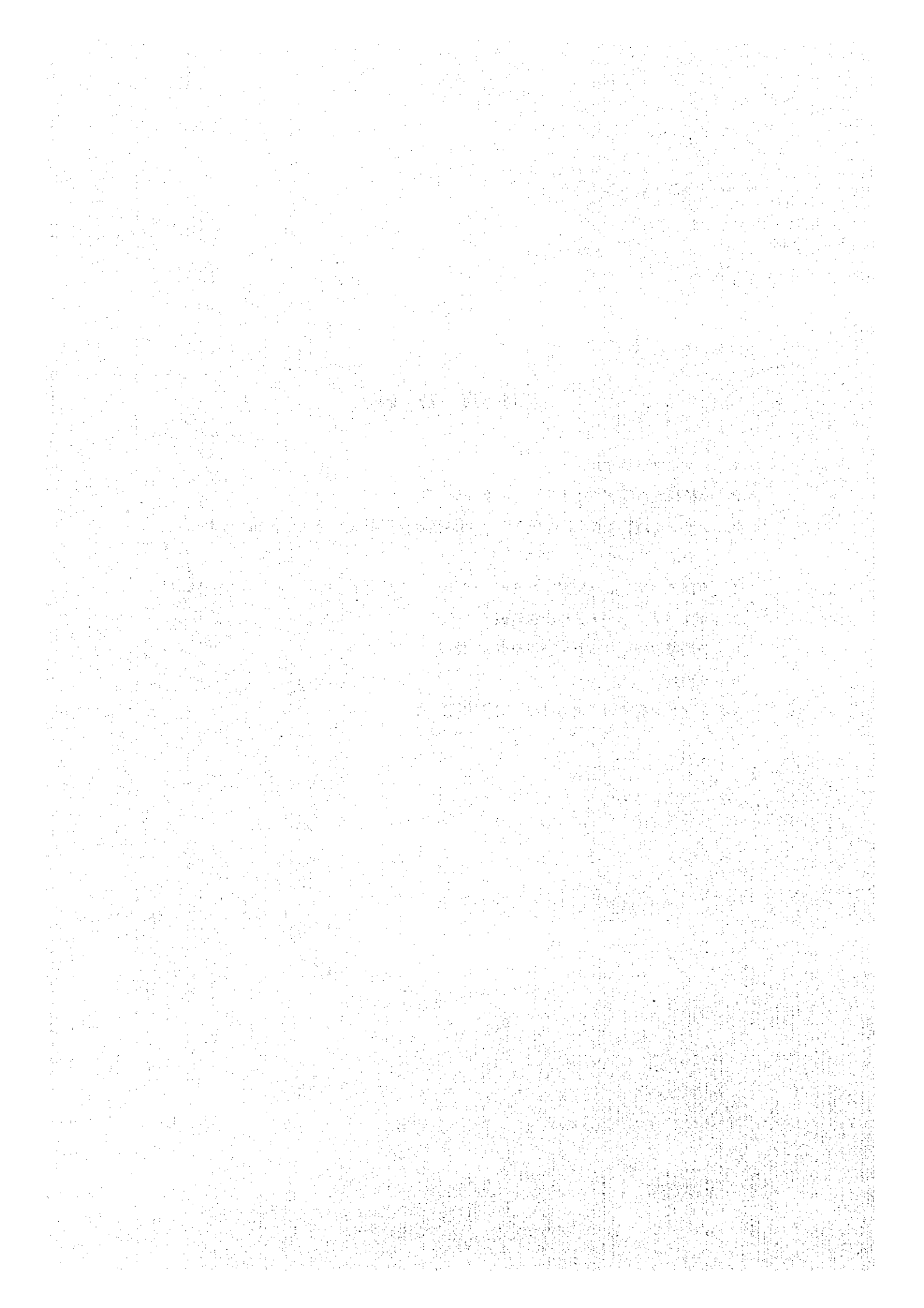


付 属 資 料

1. ミニッツ (英文)
2. 試験研究課題プライオリティーリスト (和文・ポルトガル文)
3. ブラジル農牧公社 (EMBRAPA) 組織図及びEMBRAPA Planning System (SEP) Program 8 (CPATU担当課題)
4. 東部アマゾン農林研究センター (EMBRAPA/Eastern Amazonia) 組織図及びカウンターパート候補研究員表
5. 各農業協同組合員および視察農家面談者
6. 別添表
7. アマゾン農業研究協力計画 実証圃場計画



付属資料1. ミニッツ (英文)

MINUTES OF DISCUSSIONS BETWEEN JAPANESE
PRELIMINARY STUDY TEAM AND
AUTHORITIES CONCERNED OF THE GOVERNMENT OF
THE FEDERATIVE REPUBLIC OF BRAZIL
ON JAPANESE TECHNICAL COOPERATION
FOR THE TECHNOLOGICAL DEVELOPMENT PROJECT
FOR SUSTAINABLE AGRICULTURE
IN EASTERN AMAZONIA, BRAZIL

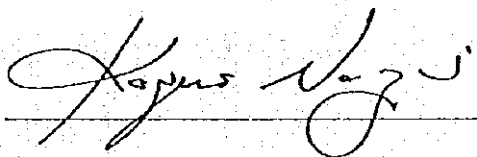
The Government of Brazil made a proposal for the Project-type Technical Cooperation Program to the Japanese Government in implementing " The Research and Development Project for Sustainable Agroforestry and Agroindustry in Eastern Amazonia (hereinafter referred to as "the Proposal").

In response to the Proposal, the Government of Japan sent, through the Japan International Cooperation Agency (hereinafter referred to as "JICA"), a preliminary study team headed by Mr. Kazuo NAGAI (hereinafter referred to as "the Team"), visited Brazil from October 13, 1997 to October 29, 1997 for the purpose of drawing up the Tentative Project Framework of the technical cooperation program. The original project name has been modified to The Technological Development Project for Sustainable Agriculture in Eastern Amazonia, Brazil (hereinafter referred to as "the Project").

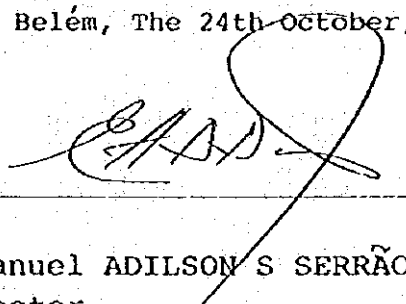
During its stay in Brazil, the Team exchanged views and had a series of discussions with the Brazilian authorities concerned of the Government of Brazil.

As a result of the discussions, the Team and the authorities concerned of the Government of Brazil agreed to recommend to their respective Governments the document attached hereto.

Belém, The 24th October, 1997



Kazuo NAGAI
Leader,
Preliminary Study Team
Japan International
Cooperation Agency, Japan



Emmanuel ADILSON S SERRÃO
Director
Center for Agroforestry
Research of Eastern Amazonia
of EMBRAPA, BRAZIL

ATTACHMENT

1. SITUATION AROUND THE PROJECT

(1) Present Situation of the Agriculture Sector in Amazonia

A. Abstract of Problems in Amazonia

Conservation of tropical rain forests in the Amazon region is very important as a global issue. The acreage of rain forests in the area have the one third of the entire acreage of forests around the globe. The area has been suffered from a lot of environmental problems. It is the most serious issue in the area that extensive agricultural development causes destruction of forests. As we consider how we can eliminate these problems, it is clear that the establishment of sustainable agriculture is essentially needed just as the protection of forests and afforestation.

B. Way of Solving Problems

Cultivation of fruit trees and other perennial crops such as black pepper have been very important for farmers in eastern Amazonia. When we think of how to establish sustainable agriculture, we can choose cultivation of those fruit trees and other perennial crops as a mean of maintaining the total number of trees in the region.

Therefore, establishment of sustainable cultivation of these crops will be indispensable for both development of agriculture and environmental conservation of the area. But for farmers, lack of cultivation techniques and serious damage to crops by both pests and diseases have not allowed stable farming in the area.

(2) Problems Identified under the Present Situation

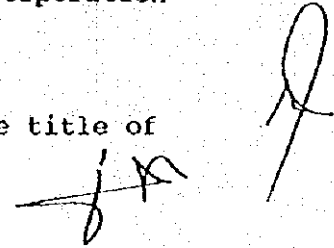
- 1) Unstable productivity of tropical fruits caused by extensive cultivation
- 2) Decrease in the productivity of black pepper cultivation caused by Fusarium disease.
- 3) Unexisting sustainable agricultural systems.

2. OBJECTIVE OF THE PROJECT

To solve the problems described in (2) above, the Project is to be set with the overall goal to extend the cultivation technologies for suitable and sustainable agriculture, and strength farming base at the specified area in the state of Para, with the project-type technical cooperation of the Government of Japan at the Center for Agroforestry Research of Eastern Amazonia of Brazilian Agricultural Research Corporation (EMBRAPA/ Eastern Amazonia)

3. TITLE OF THE PROJECT

As it is mentioned in the cover note, the title of



the Project proposed in the Proposal has been modified to " The Technological Development Project for Sustainable Agriculture in Eastern Amazonia, Brazil ". However the title might be changed in the course of future discussions before the signing on the Record of Discussions.

4. PROJECT AGENCY OF THE BRAZILIAN SIDE

(1) The President of EMBRAPA will have the overall responsibility for the implementation of the Project, as Project Director.

(2) The Director of the EMBRAPA/ Eastern Amazonia, Project Manager of the Project, will be responsible for the administrative and managerial aspects of the Project. The Project manager will appoint one Brazilian coordinator of the Project who will be in charge of supervising all field research as well as, administrative and legal aspects in relation to the Project.

5. SITE FOR THE PROJECT IMPLEMENTATION

EMBRAPA/ Eastern Amazonia, located in Belem, the state of Para, will be the main site of the Project. Tome Açu Experiment Station, located in Tome Açu will be the demonstration site of the Project.

6. MASTER PLAN OF THE PROJECT

The Team discussed a Master Plan of the Project with the Brazilian side. The tentative plan is attached as ANNEX I and may be changed if further discussions will be done in the future.

7. APPRAISAL OF THE PROJECT

(1) Stage of the Project

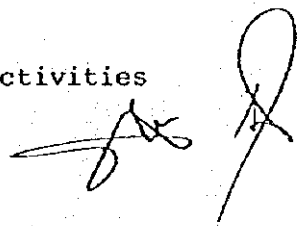
The Team has been assigned because the Japanese Government had identified some feasibility in the proposal. However, assignment of the Team does not mean the final confirmation of the realization of Japanese cooperation to the proposed project. After the Team returns to Japan, the Team will make reports to JICA headquarters and the Ministries concerned to Official Development Assistance (ODA) Program of Japanese Government.

(2) General Priorities for Appraisal

Japanese Government will consider the consistency with the following criteria to identify projects priority through the project appraisal.

1) Global Issues to be Tackled with Global Level.

Environmental protection
Poverty alleviation
Population control
Participation of women in social and economic activities
Extension of fundamental education



2) Criteria for Agricultural Cooperation

Increase of food production

Improvement of living standards, especially for small scale farmers

Environmental protection

8.COMMENTS

(1) Registration of Research Topics in EMBRAPA

The Brazilian side explained the modification of the registration system of research topics in EMBRAPA. All research topics of the Project should be included in the EMBRAPA Research Planning System (SEP).

The Japanese side understood the importance of registration for smooth implementation of the Project to allocate budget which is indispensable as local cost expenditure of Brazilian side.

(2) Collaboration with Farmers for Implementation of the Project.

To attain the objectives of the Project, collaboration of the farmers is necessary for effective implementation of research activities.

Utilization of existing orchards for various experiments and establishment of demonstration farm for verification of research result in farmer's land might be necessary.

Procedures necessary for collaboration with farmers will be done by the Brazilian side.

Agricultural cooperatives such as CAMTA, COOPAMA and COOPARAENSE can be candidates for the organization of the collaboration.

(3) Dispatch of Japanese Specialists for Supplementary Study

After the approval from ministries concerned in Japan, JICA will dispatch the Japanese specialists for supplementary study. The specialists will;

a) survey the existing equipments necessary to implement the project activities.

b) study the equipments necessary to allocate for the implementation of the project activities.

c) formulate the schedule for each topic of the research activities.

d) Prepare the Project Design Matrix (PDM)

e) Confirm progress of necessary procedures taken by the Brazilian side for the Project realization (registration of the research themes, assignment of counterpart personnel, etc.).

(4) Assignment of the Counterpart Personnel

EMBRAPA / Eastern Amazonia agrees with the necessary dedication of the Brazilian researchers of the Project. Full time counterpart personnel for the Japanese experts will be assigned whenever necessary.

(5) Articulation and Communication between Both Sides

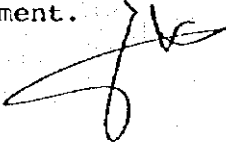
It is extremely important that efficient communication of the Project activities between the Brazilian project team and the Japanese project team especially in regard to the following points;

- a) Assignment of experts
- b) Training of Brazilian counterparts in Japan
- c) Fitting the experts' profiles to the planning of research activities
- d) Submission of reports by the Japanese experts to the project.

(6) Participation of EMBRAPA Amapa in the Project Activities

Brazilian side proposed that within the scope and the budget of the Project, EMBRAPA/ Eastern Amazonia will coordinate the participation of EMBRAPA Amapa in the Project.

The Team explained the difficulty of the participation of EMBRAPA Amapa as a sub site of the Project at present. However, the Team agreed to convey the proposal to the Japanese government.



ANNEX I

MASTER PLAN

I. OVERALL GOAL

The cultivation technologies for suitable and sustainable agriculture are extended, and farming base is strengthened in the eastern Amazonia.

II. PROJECT PURPOSE

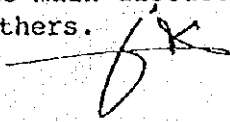

The technologies for suitable cultivation of tropical fruits and black pepper which meet the actual circumstance are developed at the specified area in the state of Para.

III. OUTPUTS AND ACTIVITIES OF THE PROJECT

A) Cupuaçu

1. Selection of cupuaçu trees with high productivity and tolerance to Witche's Broom.
 - 1-1) Selection and evaluation of cupuaçu clones and progenies for high productivity and tolerance to Witche's broom.
 - 1-2) Selection of root stock within the genus of *Theobroma* for drought tolerance, high productivity and dwarfing.
2. Development of methodologies for Witche's broom control
 - 2-1) Studies on chemical control methods
 - 2-2) Studies on integrated disease management methods

B) Selected Tropical Fruit Trees

3. Transferring technologies of selection methods of tropical fruit trees for high productivity.
 - 3-1) Selection and evaluation of graviola, acerola, açaí and others for high quality and high yields.
 - 3-2) Selection of Anonaceae root stocks for tolerance to pests and dwarfing.
 4. Transferring of research technologies in management and cultivation for selected fruit trees (technologies in some subject will be established).
 - 4-1) Studies of utilization of different forms of soil management (mulching and leguminous plants) for the improvement of graviola, acerola and cupuaçu cultivation.
 - 4-2) Studies of fertilization and mineral nutrition of graviola, acerola and cupuaçu
 - 4-3) Studies of pruning and branch training methods of graviola and cupuaçu trees
 - 4-4) Studies of control methods of the main diseases and pests in graviola, acerola and others.
- 
- 

ANNEX I

- 4-5) Studies of biology, massal raising and dispersion of pollinating insects of cupuaçu and maracuja

C) Black Pepper

5. Development of the integrated management control methods of black pepper diseases.

- 5-1) Biological control of *Fusarium solani* disease.
- 5-2) Selection of pepper genus stocks for *Fusarium* disease resistance
- 5-3) Evaluation of black pepper cultivars recently introduced in order to obtain tolerant cultivars against *Fusarium solani* disease.
- 5-4) Study of other important diseases of black pepper.

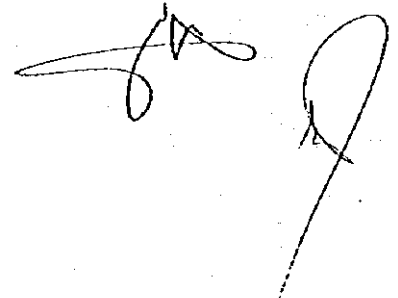
6. Development of black pepper cultivation technologies utilizing of live support.

- 6-1) Evaluation of black pepper cultivation system utilizing live support

D) Mixed Cropping Systems

7. Test and evaluation of sustainable production systems involving mixed tropical species and establishment of demonstration farms.

- 7-1) Test and evaluation of mixed-species production systems involving selected tropical fruit trees and black pepper.
- 7-2) Establishment of demonstration farms of mixed cropping systems for small scale farmers.



付属資料2. 試験研究課題プライオリティリスト (和文・ポルトガル文)

ベレーン市、1997年2月14日

国際協力事業団
ブラジル事務所ベレーン支所
支所長 沢地 真 殿

農業開発基礎調査団から要望のありましたアマソ持続的農業開発計画に係る試験課題のライフ・リストを提出いたします。

なお、ブラジル側と日本側の思考並びに上記調査団との協議の結果、当方の要請は下記の通り応用試験研究課題が研究活動の60～70%をしめることとなりました。

熱帯果樹分野

一 応用試験研究

- ・ 果樹クローン生存競争、高生産性及び病虫害抵抗性品種開発（グレビオラ、クアス、アセロラ、クモトケイ）。
- ・ アセロラ、アカド及びクモトケイの主要病害防除対策研究。
- ・ グレビオラ、アセロラ、クアス及びクモトケイの害虫対策に関する研究。
- ・ クアス及びクモトケイの主要送粉昆虫の飼育及び大量増殖に関する研究。
- ・ クアス、アセロラ、グレビオラ、クモトケイ、カンボラ及びアサイの栄養及び施肥に関する研究。
- ・ クアスの生産性、耐乾性及び矮性を目的としたTheobroma属の台木選抜。
- ・ クアス、クモトケイ、グレビオラ、アブリコ及びアハチ栽培土壌改良・管理に関する数草（マメ科植物等）の選抜試験研究。
- ・ クアス、クモトケイ、アセロラ、グレビオラ、アハチ、アブリコ及びアサイに関する混植栽培システムの確立。
- ・ 生果実の梱包、保存及び流通並びに濃縮ジュース、パルプ、ネクター、菓子類、缶詰め、シム等製造に関する技術開発
- ・ 果実加工に係る経済的パラメータの確立

一 基礎研究

- ・ クアス、グレビオラ、クモトケイ、アセロラ及びカンボラに関する耐病性及び高生産性品種の上質的成木の選抜、導入並びに評価研究
- ・ クアス品種採集コレクションの保持管理研究
- ・ クアスに関する遺伝性及びアソ・インハイム技術による品種（クローン）の特定
- ・ クアス天狗病疫学及び防除対策の継続
- ・ 栽培技術及びリスク減少対策に至る気象条件確立研究

胡椒分野

一 応用試験研究

- ・ 被蔭樹下栽培に関する条件の実証評価
- ・ 生物防除－実証試験研究

- ・胡椒植付経費軽減及び土壌有機物原料確保を目的とした生木支柱栽培技術の確立
- ・胡椒に関する栽培技術及び土壌保持の確立
- ・胡椒を含む混植生産栽培の試験研究
- ・栽培に関する両立性及び生産寿命に至るフザリウム病耐病性台木(胡椒属)の研究
- ・胡椒に関するペパーリン抽出技術及び応用の確立、特に粉末ペパーリンの応用
- ・生産物に関する生産進行及び加工に係る経済的パラメータ並びに流通機構の検討

一 基礎研究

- ・胡椒新品種の導入調査
- ・胡椒の遺伝資源保存園における特性調査
- ・アイソイム分析による野生胡椒の表現型特性調査
- ・胡椒のプラズミド融合(分子標識及び組織培養)、 γ -放射線照射育種等による胡椒の高生産性及びフザリウム病耐性変異雑種の開発。
- ・*Fusarium solani* f. sp. *Piperis*の遺伝特性調査
- ・胡椒に関する*in vitro*技術による*Nectria haematococca* f. sp. *Piperis*菌抵抗性品種の開発
- ・胡椒に関する新たな病害特性調査
- ・胡椒に関する栽培及び保管技術に係る気象条件の逆効果減少対策研究

つきましては、上記に記述しました試験課題を農業開発基礎調査団の調整員役、国際協力事業団農業開発協力部計画課、内海課長代理へ送付方お願い致します。

エマエロ・アディソン・デ・ソウザ・セオン
EMBRAPA/CPATU所長



C.CPATU n° 132/97

Belém, 14 de fevereiro de 1997

Ilm°. Sr.
Dr. MAKOTO SAWAJI
Diretor da JICA-Belém
NESTA

Prezado Senhor,

Em atendimento à solicitação de V.S.ª contida no Ofício JICA-078/96, estamos encaminhando a lista de temas considerados prioritários, resultante da proposta do Projeto "Pesquisa e Desenvolvimento Agroindustrial e Agroflorestal Sustentável para a Amazônia Oriental" - Fase II, e da discussão com a Missão Japonesa de Estudo Básico que veio recentemente ao CPATU.

Considerando a expectativa dos lados brasileiro e japonês e o acordado durante a reunião com a Missão acima referida, estamos propondo que a pesquisa aplicada para o desenvolvimento deverá corresponder entre 60 e 70% do total das atividades previstas.

Fruteiras Tropicais

- Pesquisa Aplicada para o Desenvolvimento

- Competição de clones de fruteiras e seleção de linhagens de alta produtividade e resistência a pragas e doenças (gravioleira, cupuaçuzeiro, aceroleira, maracujazeiro)
- Desenvolvimento de métodos de controle para as principais doenças da aceroleira, abacateiro e maracujazeiro.
- Estudo sobre métodos de controle para as principais pragas da gravioleira, aceroleira, cupuaçuzeiro e maracujazeiro.
- Estudo para a criação massal e distribuição dos principais insetos polinizadores de cupuaçuzeiro e maracujazeiro.
- Estudos de nutrição e adubação das fruteiras (cupuaçuzeiro, aceroleira, gravioleira, maracujazeiro, caramboleira e açaizeiro).
- Seleção de porta-enxertos do gênero Theobroma visando à redução do porte da planta, tolerância à seca e produtividade (cupuaçuzeiro).

★Hoje é dia de fazer o melhor.

Ministério da Agricultura
e do Abastecimento

Empresa Brasileira
de Pesquisa Agropecuária
Embrapa

Centro de Pesquisa Agroflorestal
da Amazônia Oriental
CPATU

Trav. Dr. Eneas Pinheiro sn°
Beirão do Marco
66095-100 Belém-Pa
Caixa Postal 048

Telefons (091) 246-6333
Fax (091) 226-9845
Telex (91) 1210



- Estudos sobre manejo e conservação do solo cultivado com fruteiras (cupuaçuzeiro, maracujazeiro, gravioleira, abricozeiro e abacateiro), através da seleção de fontes de cobertura morta e espécies de leguminosas para cobertura viva.
- Testar sistemas de produção em consórcio envolvendo as principais fruteiras como: cupuaçuzeiro, maracujazeiro, aceroleira, gravioleira, abacateiro, abricozeiro e açazeiro.
- Desenvolvimento de tecnologia referente a embalagens, conservação e transporte de frutas "in natura", sucos concentrados, polpa, néctares, doces, compotas, geléias e outros.
- Estabelecimento de parâmetros econômicos dentro da cadeia produtiva do processamento de frutas.

- Pesquisa Básica

- Seleção, introdução e avaliação de plantas superiores de fruteiras (cupuaçuzeiro, gravioleira, maracujazeiro, aceroleira, caramboleira), promissoras quanto a resistência a doenças e produtividade.
- Conservação da coleção de germoplasma (cultivares) de fruteiras (cupuaçuzeiro).
- Caracterização fenotípica e iso-enzimática de cultivares/clones de fruteiras (cupuaçuzeiro).
- Prosseguir estudos sobre epidemiologia e controle da vassoura-de-bruxa em cupuaçuzeiro.
- Determinação de exigências climáticas visando orientar práticas agrícolas e redução de riscos.

Pimenta-do-Reino

- Pesquisa Aplicada para o Desenvolvimento

- Avaliação, em nível de campo, de acessos adaptados para cultivo sob condição de sombra.
- Controle biológico - Pesquisa aplicada.
- Desenvolvimento de técnicas de cultivo utilizando tutores vivos visando à redução de custos de implantação da pimenta-do-reino e fonte de matéria orgânica própria.
- Definição de sistemas de manejo e conservação do solo para a cultura de pimenta-do-reino cultivada a pleno sol.
- Testar sistemas de produção em consórcio envolvendo a cultura da pimenta-do-reino como um dos componentes.

★Hoje é dia de fazer o melhor.

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Embrapa

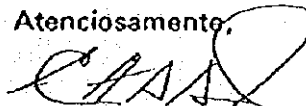
- Estudar porta-enxerto do gênero Piper resistente à fusariose quanto à sua compatibilidade e longevidade de cultivo.
- Estabelecimento do processo tecnológico de oleorresina de pimenta-do-reino e sua utilização em diferentes produtos, com ênfase no oleorresina em pó.
- Definição de parâmetros econômicos dos processos de produção, transformação e análise das cadeias de comercialização dos produtos.

- Pesquisa Básica

- Introdução de novas cultivares de pimenta-do-reino.
- Conservação do Banco Ativo de Germoplasma de pimenta-do-reino.
- Caracterização fenotípica e iso-enzimática das cultivares de pimenta-do-reino ainda não estudadas.
- Obtenção de novas cultivares de alta produtividade e resistência à fusariose através da fusão de protoplastos (marcadores moleculares e cultura de tecidos), uso de irradiação gama e hibridação.
- Caracterização genética de *Fusarium solani* f. sp. *Piperis*.
- Seleção "in vitro" de cultivares de pimenta-do-reino resistente à *Nectria haematococca* f. sp. *Piperis*.
- Identificação de novas doenças de pimenta-do-reino.
- Realização de estudos microclimáticos, visando reduzir efeitos adversos do clima na produção e armazenamento da pimenta-do-reino.

Pelo exposto, solicitamos encaminhar a Proposta acima apresentada ao Sr. SUSUMO UCHIUMI, Coordenador Administrativo da Missão encarregada de avaliar o Projeto Fase II e Diretor da Divisão de Planejamento do Departamento de Cooperação para Desenvolvimento da Agricultura da JICA.

Atenciosamente,



EMANUEL ADILSON DE SOUZA SERRÃO
Chefe Geral da EMBRAPA-Amazônia Oriental

ccpetu 132/Jejuá

★Hoje é dia de fazer o melhor.

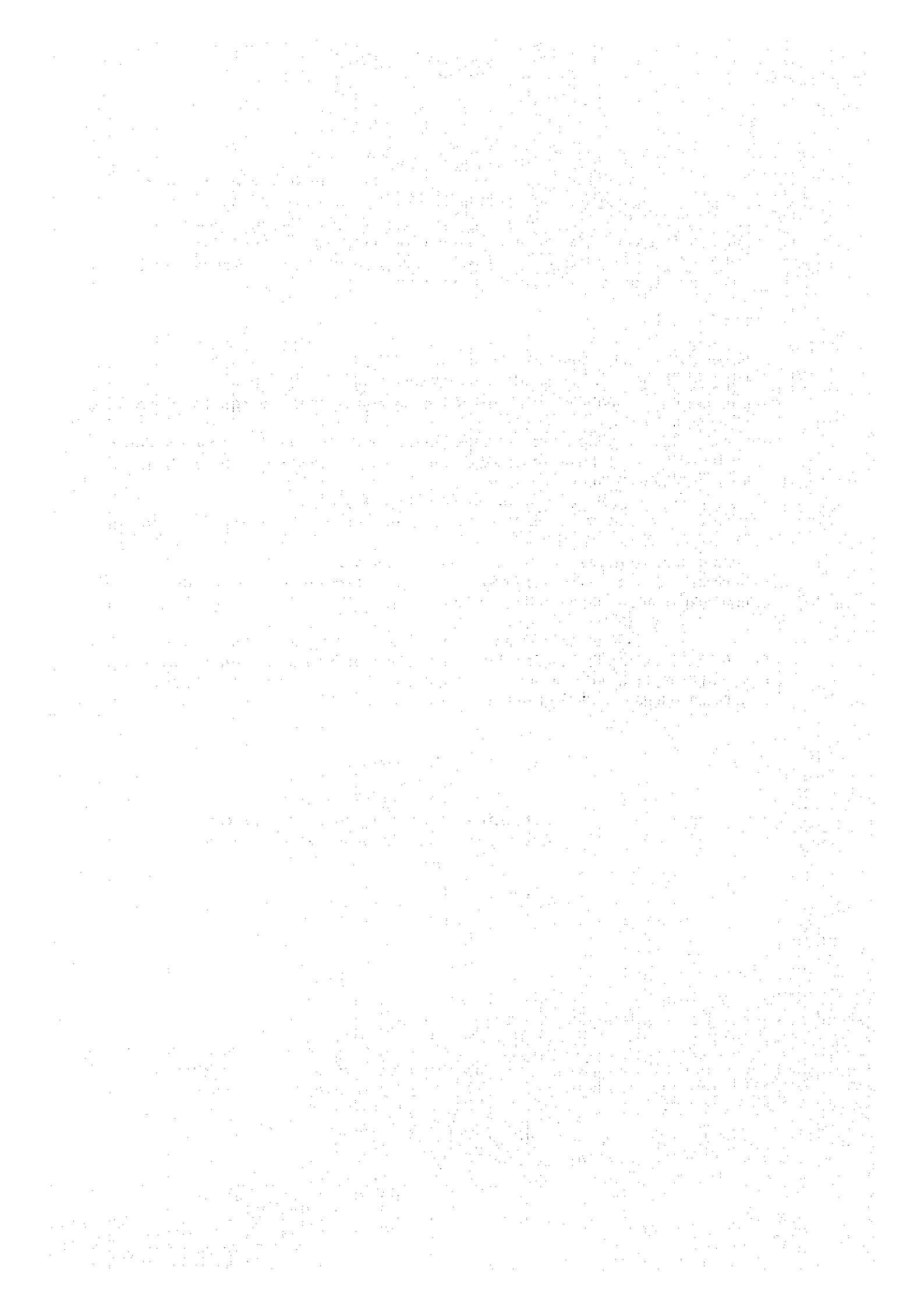
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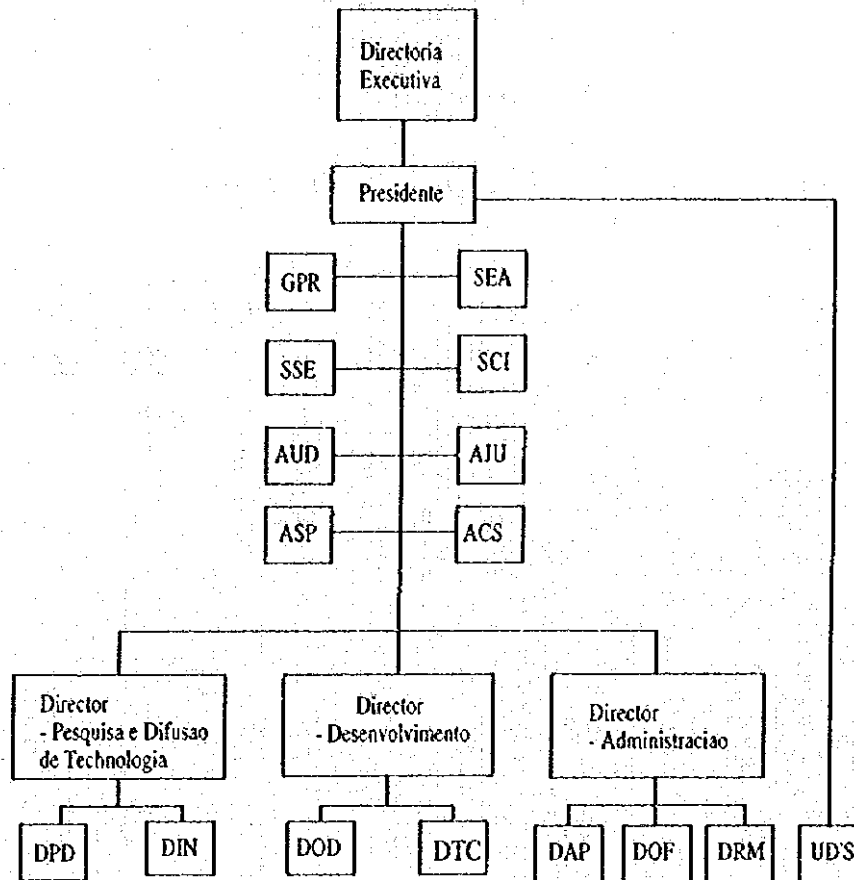


付属資料 3. ブラジル農牧公社 (EMBRAPA) 組織図及び

EMBRAPA Planning System (SEP) Program 8 (CPATU担当課題)

ESTRUTURA ORGANICIONAL BASICA DA EMBRAPA

1997



- GPR - Office of the President
- SEA - Secretariat for Strategic Management
- SSE - Secretariat for Support of State Agricultural Research Systems
- SCI - Secretariat for International Cooperation
- ACS - Council for Social Communication
- ASP - Council for Congressional Affairs
- AJU - Council for Legal Affairs
- AUD - Council for Internal Auditing
- DAP - Human Resources Administration Department
- DTC - Technology Transfer and Marketing Department
- DIN - Information Science Department
- DOD - Organization Development Department
- DAF - Finance Department
- DPD - Research and Development Department
- DRM - Materials and Services Department
- UDS - EMBRAPA Units



Program 8

Forestry and Agroforestry Production Systems

Executive Secretariat: CPATU -
Center for Agroforestry Research of
Eastern Amazonia



Agroforestry systems constitute an alternative for the production of food, wood and other products not made from wood. They also play an important role in the conservation and maintenance of tropical ecosystems. They can also play an important role in the short run for the development of

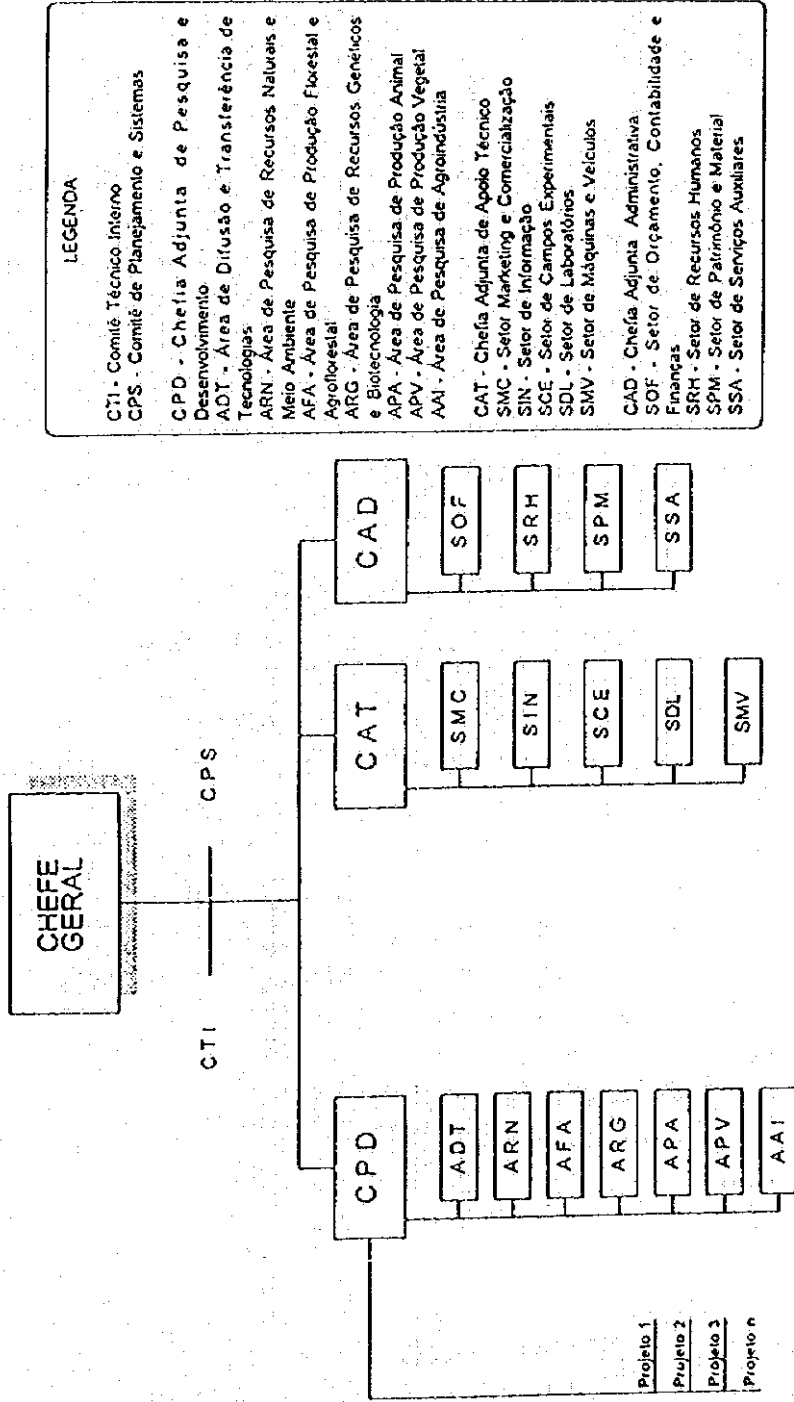
sustainable agriculture in Brazil. However, these systems need to be studied from a technical and scientific point-of-view in order to improve their efficiency and efficaciousness thus adjusting to the social, cultural, political and economical changes.

This Program has as its principal aims: a) the development of production system for planted forests to increase their productivity and better the quality of the wood, growth in efficiency and reduction of the costs of exploration with transportation and processing of forestry raw materials, silviculture and management; b) development of systems to permit the rational management of natural forests with a view to using them in a sustainable way, preserving the capacity for production and preserving their environmental characteristics; and c) development of agroforestry systems in order to optimize the use of the land with the obtaining integrated and economic of foods, wood and other products not made from wood.

Home

付属資料4. 東部アマゾン農林研究センター (EMBRAPA / Eastern Amazonia)
組織図及びカウンターパート候補研究員表

ORGANOGRAMA DO CPATU - CENTRO DE PESQUISA AGROFLORESTAL DA AMAZÔNIA ORIENTAL



LEGENDA

- CTI - Comitê Técnico Interno
- CPS - Comitê de Planejamento e Sistemas
- CPD - Chefe Adjunta de Pesquisa e Desenvolvimento
- ADT - Área de Difusão e Transferência de Tecnologias
- ARN - Área de Pesquisa de Recursos Naturais e Meio Ambiente
- AFA - Área de Pesquisa de Produção Florestal e Agroflorestal
- ARG - Área de Pesquisa de Recursos Genéticos e Biotecnologia
- APA - Área de Pesquisa de Produção Animal
- APV - Área de Pesquisa de Produção Vegetal
- AAI - Área de Pesquisa de Agroindústria
- CAT - Chefe Adjunta de Apoio Técnico
- SMC - Setor Marketing e Comercialização
- SIN - Setor de Informação
- SCE - Setor de Campos Experimentais
- SDL - Setor de Laboratórios
- SMV - Setor de Máquinas e Veículos
- CAD - Chefe Adjunta Administrativa
- SOF - Setor de Orçamento, Contabilidade e Finanças
- SRH - Setor de Recursos Humanos
- SPM - Setor de Patrimônio e Material
- SSA - Setor de Serviços Auxiliares

カウンターパート研究員表

1) クブアスー

クブアスー天狗巣病耐病性系統及び高生産性種の選抜

- ・ Mr. RAFAEL MOISÉS ALVES - 育種
- ・ Mr. JOSÉ PAULO CHAVES DA COSTA - 育種

クブアスー天狗巣病防除法の確立

- ・ Mrs. MARIA DE LOURDES REIS DUARTE - 植物病理
- ・ Mrs. RUTH LINDA BENCHIMOL STEIN - 植物病理

2) 選定熱帯果樹

選定熱帯果樹において実用性の高い台木の選抜

- ・ Mr. JOSÉ PAULO CHAVES DA COSTA - 育種
- ・ Mr. ANTONIO DE BRITO SILVA - 昆虫 (害虫対策)
- ・ Mrs. LINDAUREA ALVES DE MELLO - 昆虫 (害虫対策)

選定熱帯果樹の栽培管理技術の確立

- ・ Mr. DILSON AUGUSTO CAPUCHO FRAZÃO - 栽培/植物栄養学
- ・ Mr. ARMANDO KOUZO KATO - 栽培/農業生態学
- ・ Mr. RAIMUNDO FREIRE DE OLIVEIRA - 土壌肥料
- ・ Mr. EMMANUEL DE SOUZA CRUZ - 土壌肥料
- ・ Mr. EDUARDO JORGE MAKLOUF DE CARVALHO - 土壌物理
- ・ Mr. MOACIR AZEVEDO VALENTE - 土壌管理
- ・ Mr. JEFFERSON FELIPE DA SILVA - 栽培
- ・ Mr. AUSTRELINO SILVEIRA FILHO - 雑草防除
- ・ Mrs. MARIA DO SOCORRO PADILHA - 育種
- ・ Mr. JOSÉ EDMAR URANO DE CARVALHO - 種子管理技術
- ・ Mr. CARLOS HANS MULLER - 栽培
- ・ Mrs. MARCIA MOTTA MAUÉS - 昆虫
- ・ Mr. ANTONIO DE BRITO SILVA - 昆虫
- ・ Mr. LUIZ POLTRONIERI - 植物病理
- ・ Mrs. LINDAUREA ALVES DE SOUZA - 昆虫
- ・ Mr. RAFAEL MOISÉS ALVES - 育種

3) 胡椒

フザリウム総合防除法の改善

- ・ Mrs. RUTH LINDA BENCHIMOL STEIN - 植物病理
- ・ Mrs. MARIA DE LOURDES REIS DUARTE - 植物病理
- ・ Mr. FERNANDO CARNEIRO DE ALBUQUERQUE - 植物病理
- ・ Mr. JOSÉ PAULO CHAVES DA COSTA - 育種
- ・ Mrs. MARLI COSTA POLTRONIERI - 育種
- ・ Mr. ORIEL FILGUEIRA DE LEMOS - バイオテクノロジー

生木支柱栽培技術の確立

- ・ Mr. ARMANDO KOUZO KATO - 栽培/農業生態学
- ・ Mr. LUCIANO CARLOS TAVARES MARQUES - 複合農林業システム

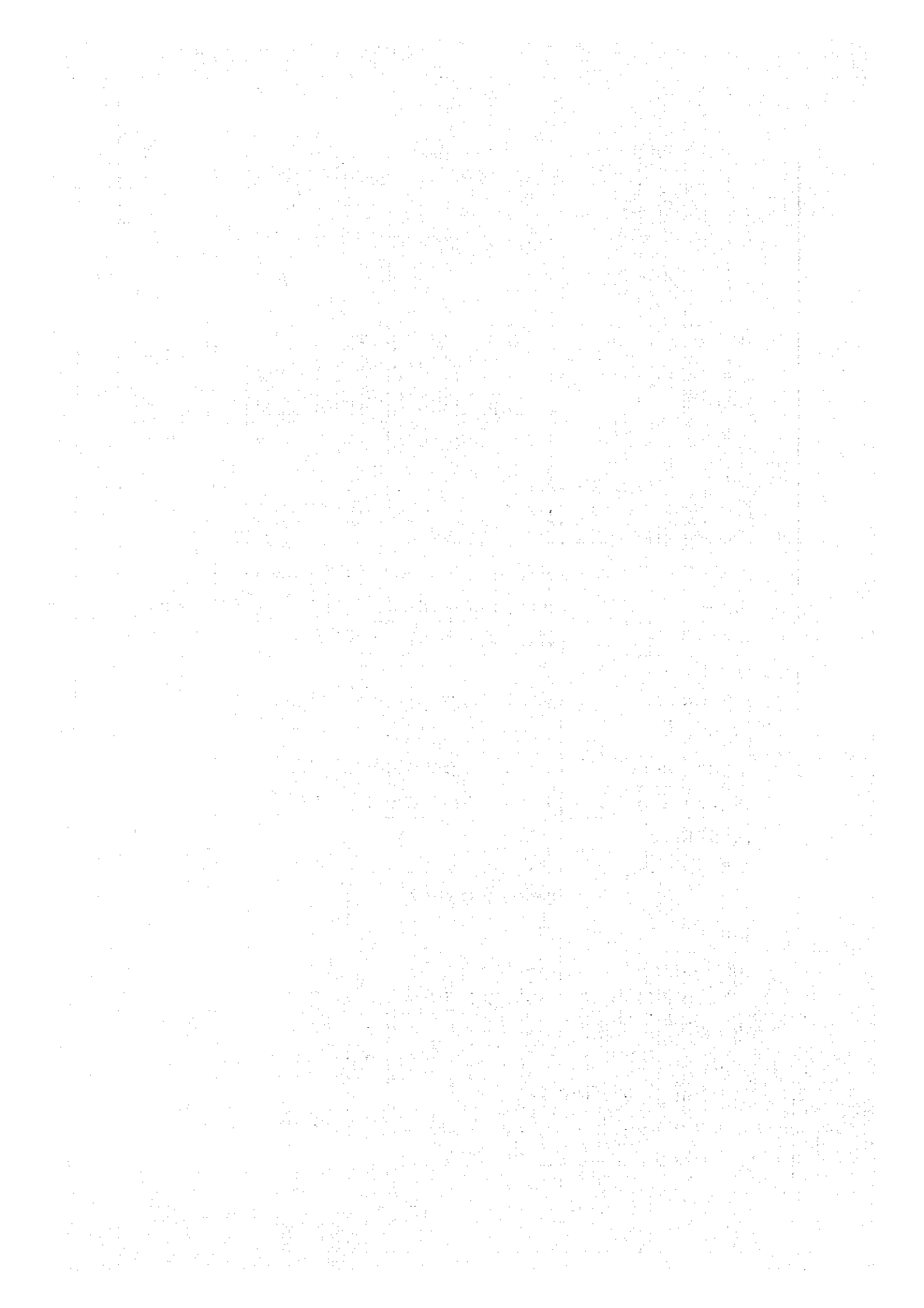
4) 混植栽培

- ・ Mr. ARMANDO KOUZO KATO - 栽培/農業生態学
- ・ Mr. LUCIANO CARLOS TAVARES MARQUES - 複合農林業システム
- ・ Mr. DILSON AUGUSTO CAPUCHO FRAZÃO - 栽培/植物栄養学
- ・ Mr. CARLOS HANS MULLER - 栽培
- ・ Mr. OSCAR LAMEIRA NOGUEIRA - 栽培
- ・ Mr. FERNANDO CARNEIRO ALBUQUERQUE - 植物病理
- ・ Mr. EDUARDO JORGE MAKLOUF DE CARVALHO - 土壌物理
- ・ Mr. MOACIR AZEVEDO VALENTE - 土壌管理
- ・ Mr. RAIMUNDO COSME OLIVEIRA JÚNIOR - 土壌管理
- ・ Mrs. MARIA DE LOURDES REIS DUARTE - 植物病理
- ・ Mr. RAIMUNDO FREIRE DE OLIVEIRA - 土壌肥料
- ・ Mrs. THEREZINHA XAVIER BASTOS - 農業気象
- ・ Mr. DINALDO RODRIGUES TRINDADE - 植物病理
- ・ Mr. LUIZ POLTRONIERI - 植物病理
- ・ Mr. ANTONIO DE BRITO SILVA - 昆虫
- ・ Mrs. LINDAUREA ALVES DE SOUZA - 昆虫
- ・ Mr. MOACYR BERNARDINO DIAS FILHO - 植物生理学

付属資料5. 各農業協同組合員および視察農家面談者

主な面談者

地区名・氏名	所属機関・役職
1. トメアスー移住地	
伊藤ジョージ	トメアスー総合農業協同組合 理事
坂口ワタル	トメアスー総合農業協同組合 理事
平水 繁	トメアスー総合農業協同組合 理事
稲田洋一	トメアスー総合農業協同組合 理事
小長野道則	トメアスー総合農業協同組合 理事
宮川マサシ	トメアスー総合農業協同組合 理事
斉木ヒトシ	トメアスー総合農業協同組合 理事
新井範明	トメアスー農村振興協会 会長
海谷英雄	トメアスー農村振興協会 役員
小長野道則	調査訪問予定農家 (クプアスー、胡椒)
平水 繁	調査訪問予定農家 (クプアスー、胡椒、トゲバンレイシ)
稲田洋一	調査訪問予定農家 (アセロラ、トゲバンレイシ)
谷沢	調査訪問予定農家 (アボカド)
2. カスタニャール地区	
神園正生	アマゾンカ農業協同組合 理事
山瀬楯雄	アマゾンカ農業協同組合 理事
宇田川 勇	アマゾンカ農業協同組合 理事
井上フトシ	アマゾンカ農業協同組合 理事
池間玄昭	日系社会シニア・ボランティア
堂原リカルド	調査訪問予定農家 (マラクジャ)
竹下	調査訪問予定農家 (クプアスー)
神園正生	調査訪問予定農家 (クプアスー)
下前原テルオ	調査訪問予定農家 (アプリコ)
3. サンタイザベル、サントアントニオ地区	
中田澄人	調査訪問予定農家 (マンゴスチン)
北川和雄	調査訪問予定農家 (アセロラ)
4. EMBRAPA/CPATU	
ディルソン・フラゾン	研究員 (EMBRAPA/CPATU所長代理)
加藤アルマンド	研究員 (熱帯果樹)



付属資料6. 別添表

表-1. 北部ブラジルにおけるブラジル主要短期作物の生産量及び全国シェア

表-2. 北部ブラジルにおけるブラジル主要短期作物の生産性

表-3. 北部ブラジルにおけるブラジル主要永年作物の生産量及び全国シェア

表-4. 北部ブラジルにおけるブラジル主要永年作物の生産性

表-5. 北部ブラジル主要果樹名一覧

表-1. 北部ブラジルにおけるブラジル主要短期作物の生産量及び全国シェア (1993) (%)

作物名	Rondonia	Acre	Amazonas	Roraima	Para	Amapa	Tocantine	7州小計	BRASIL	シェア
ジュート	-	-	1,971	-	1,699	-	-	3,670	3,670	100.00
キヤッサバ	579,899	394,443	384,284	41,454	3,329,088	21,737	139,004	4,889,909	21,910,868	22.32
コム	209,756	48,620	2,485	34,500	286,169	255	-	581,785	10,142,934	5.74
フェジヨン	85,165	10,921	1,774	1,080	41,718	38	-	140,696	2,479,175	5.68
トウモロコシ	306,098	61,170	7,630	5,000	299,262	207	81,829	761,196	30,064,975	2.53
メンカ	24,989	-	-	-	1,031	-	-	26,020	1,127,326	2.31
ダイズ	-	-	-	-	-	-	26,506	26,506	22,694,398	0.12
トマト	-	-	1,007	300	-	-	-	1,307	2,339,885	0.06

出典：Anuario Estatístico DO Brasil - 1994 (IBGE)

表-2. 北部ブラジルにおけるブラジル主要短期作物の生産性 (1993) (kg/ha)

作物名	Rondonia	Acre	Amazonas	Roraima	Para	Amapa	Tocantine	BRASIL
ジュート	-	-	1,335	-	1,365	-	-	1,349
キヤッサバ	17,073	18,326	11,799	13,818	13,369	9,546	16,550	12,076
コム	1,678	1,544	1,323	3,632	1,476	704	-	2,294
フェジヨン	554	663	774	600	586	388	-	638
トウモロコシ	1,814	1,753	1,988	1,000	1,311	659	1,148	2,533
メンカ	1,547	-	-	-	523	-	-	1,222
ダイズ	-	-	-	-	-	-	1,662	2,135
トマト	-	-	11,847	10,000	-	-	-	43,801

出典：Anuario Estatístico DO Brasil - 1994 (IBGE)

表-3. 北部ブラジルにおけるブラジル主要永年作物の生産量及び全国シェア (1992) (%)

作物名	Rondonia	Acre	Amazonas	Roraima	Para	Amapa	Tocantins	7州小計	BRASIL	シェア (%)
マラクジヤ	-	1,391	5,176	-	1,688,211	-	-	1,694,778	3,485,410	48.62
バナナ	24,323	8,738	3,188	464	37,959	143	6,833	81,648	562,358	14.52
オレンジ	89,541	12,349	54,768	4,080	8,999,969	3,745	6,370	9,170,822	98,411,455	9.32
パイイヤ	11,936	1,278	1,072	2,129	55,229	-	846	72,490	854,703	8.48
生食果実	18,920	4,240	5,030	-	46,147	-	40	74,377	1,575,523	4.72
アボカド	-	4,728	1,405	36	14,652	-	-	20,821	446,966	4.66
パイナップル	6,584	410	4,912	424	18,675	331	3,064	34,400	825,994	4.16
レモン	45,822	2,241	1,240	3,803	97,173	-	-	150,279	7,090,508	2.12
タンジェリン	-	5,221	-	827	81,541	-	160	87,749	4,452,481	1.97
ココナツ	6	-	-	-	25,288	12	-	25,306	33,034	76.61
オイルパーム	-	-	-	-	418,275	44,000	-	462,275	652,541	70.84
ガラナ	145	12	252	-	74	-	-	483	2,349	20.56
ウルクン	-	-	-	-	1,764	-	-	1,764	10,335	17.07
工業作物	20,536	88	682	29,428	-	-	-	50,734	328,536	15.44
ココナツ	6,151	172	100	-	130,572	-	-	136,995	891,023	15.38
コーヒー	137,227	780	924	-	42,747	-	51	181,729	2,588,745	7.02
ゴム	435	-	6	-	1,153	-	-	1,594	48,374	3.30
サトウキビ	-	-	108,409	-	451,930	-	172,914	733,253	244,303,448	0.30
カシューナツツ	-	-	-	-	21	-	-	21	107,955	0.02

出典：Anuario Estatístico DO Brasil - 1994 (IBGE). サトウキビは1993年データ。

表4. 北部ブラジルにおけるブラジル主要永年作物の生産性 (kg/ha)

作物名	Rondonia	Acre	Amazonas	Roraima	Para	Amapa	Tocantine	BRASIL
マラクジヤ	-	46,366	15,090	-	155,211	-	-	106,858
バナナ	857	1,181	761	386	1,395	690	617	1,090
オレンジ	89,357	102,908	34,751	13,600	130,885	49,276	37,251	99,535
パイヤ	14,108	9,681	27,487	51,926	40,940	-	31,333	40,761
生食果実	19,169	94,222	44,513	-	62,109	-	40	32,808
アボカド	-	30,114	40,142	3,600	45,083	-	-	29,257
パイナップル	8,550	4,823	8,255	5,300	19,473	6,245	11,432	22,084
レモン	65,741	106,714	47,692	76,060	241,124	-	-	168,604
タンジェリン	-	98,509	-	28,517	273,627	-	80,000	100,778
コショウ	1,200	-	-	-	991	1,200	-	1,134
オイルパーム	-	-	-	-	13,241	11,000	-	8,062
ガラナ	145	250	120	-	440	-	-	350
ウルグン	-	-	-	-	1,187	-	-	1,375
工業作物	467	334	307	572	-	-	-	449
ココナツ	2,311	3,739	5,882	-	11,017	-	-	3,716
コーヒ-	1,123	939	946	-	2,205	-	980	1,035
ゴム	644	-	857	-	555	-	-	1,046
サトウキビ	-	-	34,514	-	53,885	-	38,137	63,237
カシユーナツ	-	-	-	-	875	-	-	155

出典：Anuario Estatístico DO Brasil - 1994 (IBGE)
データ：1992(サトウキビは1993)

表-5. 北部ブラジル主要果樹名一覧

調査団使用名	和名(慣用名)	学名	英名	ポルトガル語名	植物分類
グラビオーラ	トケハシレイシ	<i>Annona muricata</i> Linn.	Soursop	Graviola	モクレン目バンレイシ科 バンレイシ属
アボカド	アボカド	<i>Persea americana</i> Miller	Avocado	Abacate	モクレン目クスノキ科 アボカド属
マラクジヤ	パッション・フルーツ カタモトケイ	<i>Passiflora edulis</i> f. <i>flavicarpa</i> <i>Passiflora edulis</i> Sims*	Passion Fruit	Maracujá	ストケイトケイソウ科 ストケイトケイ属
アセロラ	アセロラ	<i>Malpighia Emerginata</i> DC.	Barbados cherry	Acerola	ヘンルウダ目キンントラノオ科 マルピゲイア属
クアアスー	クアアスー	<i>Theobroma grandiflorum</i> K.Schumann		Cupuacu	ゼニアオイ目アオギリ科 カカオ属
カランボーラ	スターフルーツ	<i>Averrhoa Carambola</i> Linn.	Carambola	Carambola	アウロソウ目カタバミ科 ゴレンシ属
アブリコ	マメリンゴ	<i>Mammea americana</i> Linn.	Mamey-apple	Abrico-do-Para	オトギリソウ目 オトギリソウ科マンメア属
アサイ	アサイヤシ	<i>Euterpe oleracea</i> Martius	Assai Palm	Acai	シユロ目シユロ科 アサイヤシ属

* 現行当該地域の栽培品種は、*Passiflora edulis* f. *flavicarpa* (=黄色種) と *Passiflora edulis* Sims (=紫色種) の交雑種。

- 参考文献： 1. 「ブラジルの果実」 昭和52年5月 熱帯農業研究センター 橋本 梧郎著
 2. 「熱帯果樹栽培ハンドブック」 96年1月 AICAF 大東 宏著
 3. 「南米農業要覧」 昭和49年3月 海外移住事業団編・監修
 4. 「熱帯果樹と樹木作物」 96年5月 岸本 修著

付属資料7. アマゾン農業研究協力計画 実証圃場計画

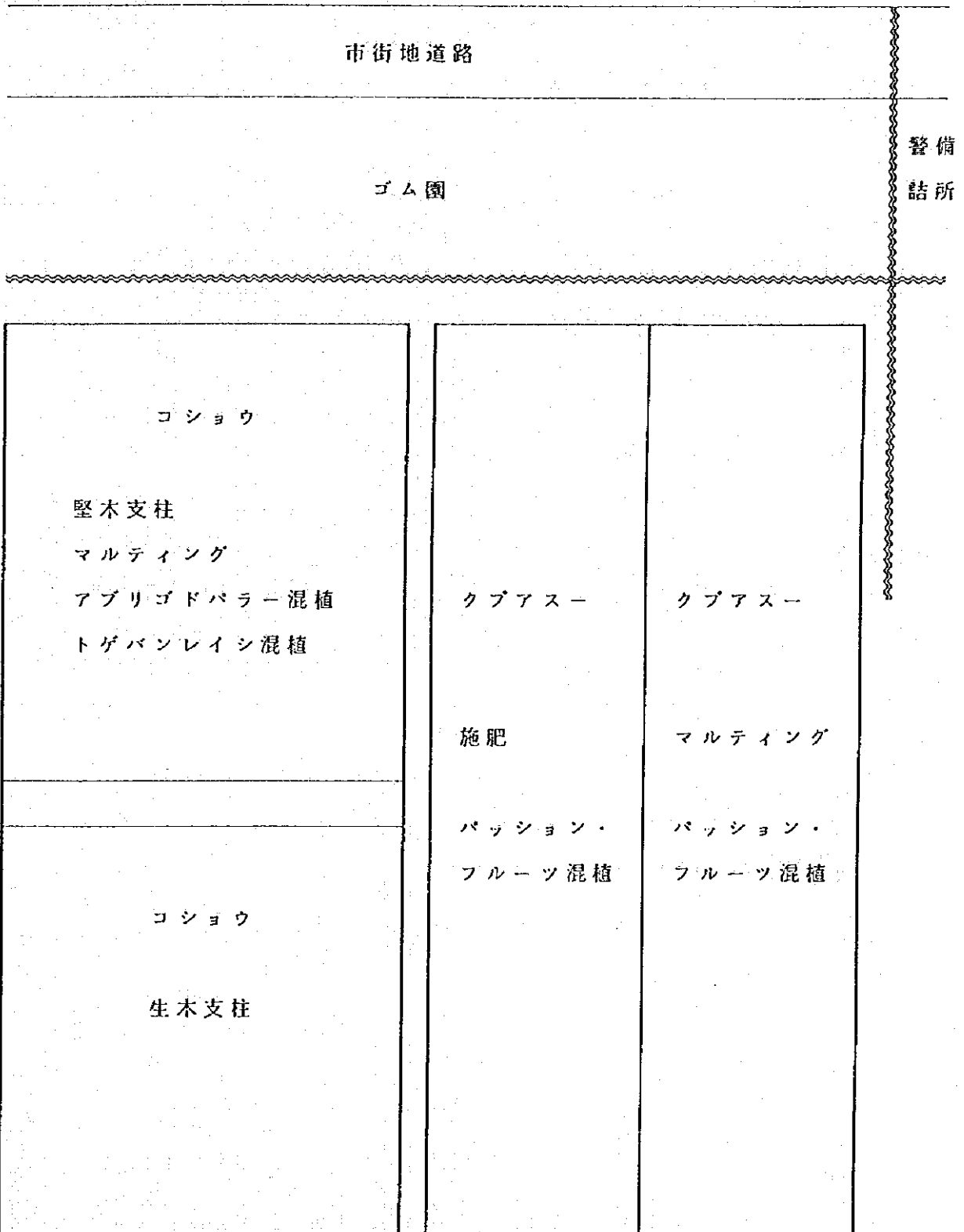
(1) 第1実証圃場見取図 (CPATU)

- 1) コショウ堅木支柱栽培実証圃場計画配置図
- 2) コショウ生木支柱栽培実証圃場計画配置図
- 3) クブアスー混植栽培実証圃場計画配置図 (マルチング)
- 4) クブアスー混植栽培実証圃場計画配置図 (マルチング、系統図)
- 5) クブアスー混植栽培実証圃場計画配置図 (施肥)
- 6) クブアスー混植栽培実証圃場計画配置図 (施肥、系統図)

(2) 第2実証圃場見取図 (INATAM)

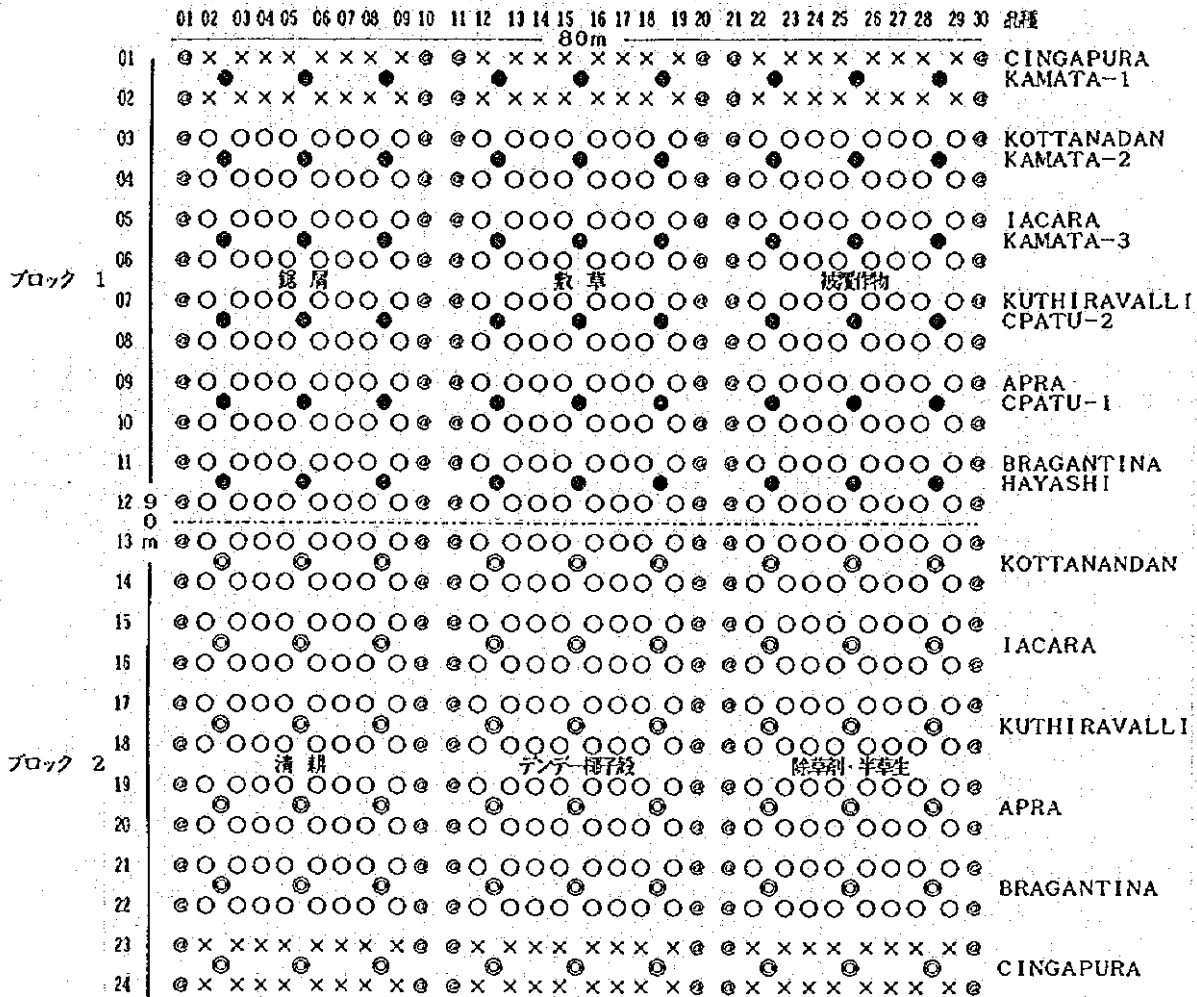
- 1) コショウ堅木支柱、生木支柱及び混植栽培実証圃場計画配置図
- 2) クブアスー混植栽培実証圃場計画配置図 (マルチング、系統図)
- 3) クブアスー混植栽培実証圃場計画配置図 (マルチング、測定図)

(1) 第1実証圃見取図 (CPATU)



第1実証園場 (CPATU)

1) コショウ (堅木支柱、マルティンク、アプリゴドバラートトグバンレイシ混植)



説明:
 コショウ : 供試作物: ○ ○ ○ ○ ボーダー作物 : ⊙ ⊙ ⊙ ⊙ 雑草作物: × × × ×
 アプリゴドバラ : ● ● ● ● トグバンレイシ: ⊙ ⊙ ⊙ ⊙
 排水溝 : -----

植栽間隔:
 コショウ=2.5*2.5*5.0m
 アプリゴドバラ及びトグバンレイシ=7.5*7.5*12.5m

図1: 堅木支柱及びマルティンク使用のアプリゴドバラ混植のコショウ栽培実証園場。ペレン、1.0HA、コショウ 720本 + アプリゴドバラ 54本 + トグバンレイシ 54本

第1実証圃場 (CPATU)

2) コショウ (生木支柱)

		01	02	03	04	05	06	07	08	09	10	80m										品種					
ブロック 1 生木支柱 インドセンダン	01	@	x	x	x	x	x	x	x	x	@	@	x	x	x	x	x	x	@	@	x	x	x	x	x	@	CINGAPURA
	02	@	x	x	x	x	x	x	x	x	@	@	x	x	x	x	x	x	@	@	x	x	x	x	x	@	CINGAPURA
	03	@	o	o	o	o	o	o	o	o	@	@	o	o	o	o	o	o	@	@	o	o	o	o	o	@	KOTTANADAN
	04	@	o	o	o	o	o	o	o	o	@	@	o	o	o	o	o	o	@	@	o	o	o	o	o	@	KOTTANADAN
	05	@	o	o	o	o	o	o	o	o	@	@	o	o	o	o	o	o	@	@	o	o	o	o	o	@	IACARA
	06	@	o	o	o	o	o	o	o	o	@	@	o	o	o	o	o	o	@	@	o	o	o	o	o	@	IACARA
	07	@	o	o	o	o	o	o	o	o	@	@	o	o	o	o	o	o	@	@	o	o	o	o	o	@	KUTHIRAVALLI
	08	@	o	o	o	o	o	o	o	o	@	@	o	o	o	o	o	o	@	@	o	o	o	o	o	@	KUTHIRAVALLI
	09	@	o	o	o	o	o	o	o	o	@	@	o	o	o	o	o	o	@	@	o	o	o	o	o	@	APRA
	10	@	o	o	o	o	o	o	o	o	@	@	o	o	o	o	o	o	@	@	o	o	o	o	o	@	APRA
	11	@	o	o	o	o	o	o	o	o	@	@	o	o	o	o	o	o	@	@	o	o	o	o	o	@	BRAGANTINA
	12	@	o	o	o	o	o	o	o	o	@	@	o	o	o	o	o	o	@	@	o	o	o	o	o	@	BRAGANTINA
ブロック 2 生木支柱 メキシカン ライラック	13	@	o	o	o	o	o	o	o	@	@	o	o	o	o	o	o	@	@	o	o	o	o	o	@	KOTTANANDAN	
	14	@	o	o	o	o	o	o	o	o	@	@	o	o	o	o	o	@	@	o	o	o	o	o	@	KOTTANANDAN	
	15	@	o	o	o	o	o	o	o	o	@	@	o	o	o	o	o	@	@	o	o	o	o	o	@	IACARA	
	16	@	o	o	o	o	o	o	o	o	@	@	o	o	o	o	o	@	@	o	o	o	o	o	@	IACARA	
	17	@	o	o	o	o	o	o	o	o	@	@	o	o	o	o	o	@	@	o	o	o	o	o	@	KUTHIRAVALLI	
	18	@	o	o	o	o	o	o	o	o	@	@	o	o	o	o	o	@	@	o	o	o	o	o	@	KUTHIRAVALLI	
	19	@	o	o	o	o	o	o	o	o	@	@	o	o	o	o	o	@	@	o	o	o	o	o	@	APRA	
	20	@	o	o	o	o	o	o	o	o	@	@	o	o	o	o	o	@	@	o	o	o	o	o	@	APRA	
	21	@	o	o	o	o	o	o	o	o	@	@	o	o	o	o	o	@	@	o	o	o	o	o	@	BRAGANTINA	
	22	@	o	o	o	o	o	o	o	o	@	@	o	o	o	o	o	@	@	o	o	o	o	o	@	BRAGANTINA	
	23	@	x	x	x	x	x	x	x	x	@	@	x	x	x	x	x	@	@	x	x	x	x	x	@	CINGAPURA	
	24	@	x	x	x	x	x	x	x	x	@	@	x	x	x	x	x	@	@	x	x	x	x	x	@	CINGAPURA	

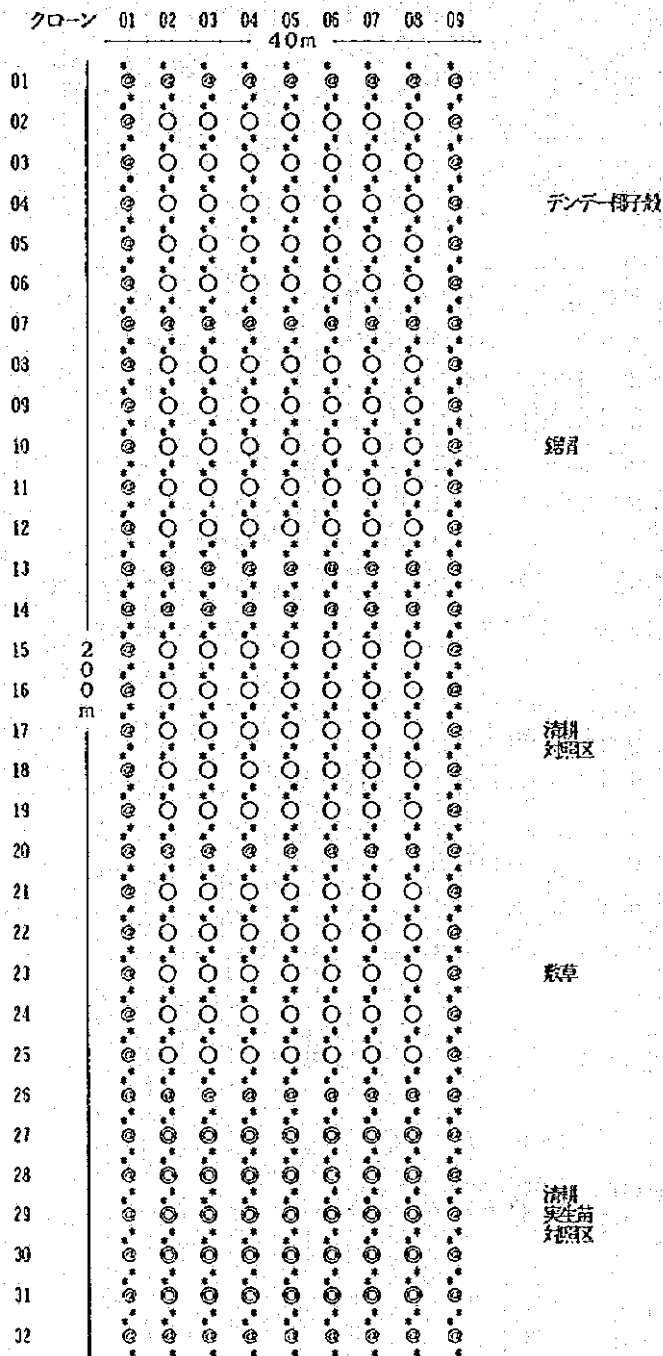
説明: コショウ: 供試作物: ○ ○ ○ ○ ボーダー作物: @ @ @ @ 雑草作物: x x x x
排水溝: -----

植栽間隔: コショウ及び生木支柱=2.5*2.5*5.0m

図2: 生木支柱使用のコショウ植栽圃場、ペレン、1.0HA、コショウ 720本 + 生木支柱 (インドセンダン) 360本 + 生木支柱 (メキシカンライラック) 360本

第1実証圃場 (CPATU)

3) クアアスー (マルティンク、パッションフルーツ混植)



説明: クアアスー (授木苗) : ○ ○ ○ ○ ボーダー樹 (授木苗) : ⊙ ⊙ ⊙ ⊙ 清耕区 (実生苗) : ⊖ ⊖ ⊖ ⊖
 パッション・フルーツ : * * * *

植栽間隔:
 クアアスー = 6.0 * 5.0m
 パッション・フルーツ = 3.0 * 5.0m

図3: マルティンク使用及びパッション・フルーツ混植のクアアスー栽培実証圃場、ペレン、1.0HA、
 クアアスー 288本 + パッション・フルーツ 576本
 クローン (区画) 位置: 01 02 03 04 05 06 07 08 09
 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

第1実証圃場 (CPATU)

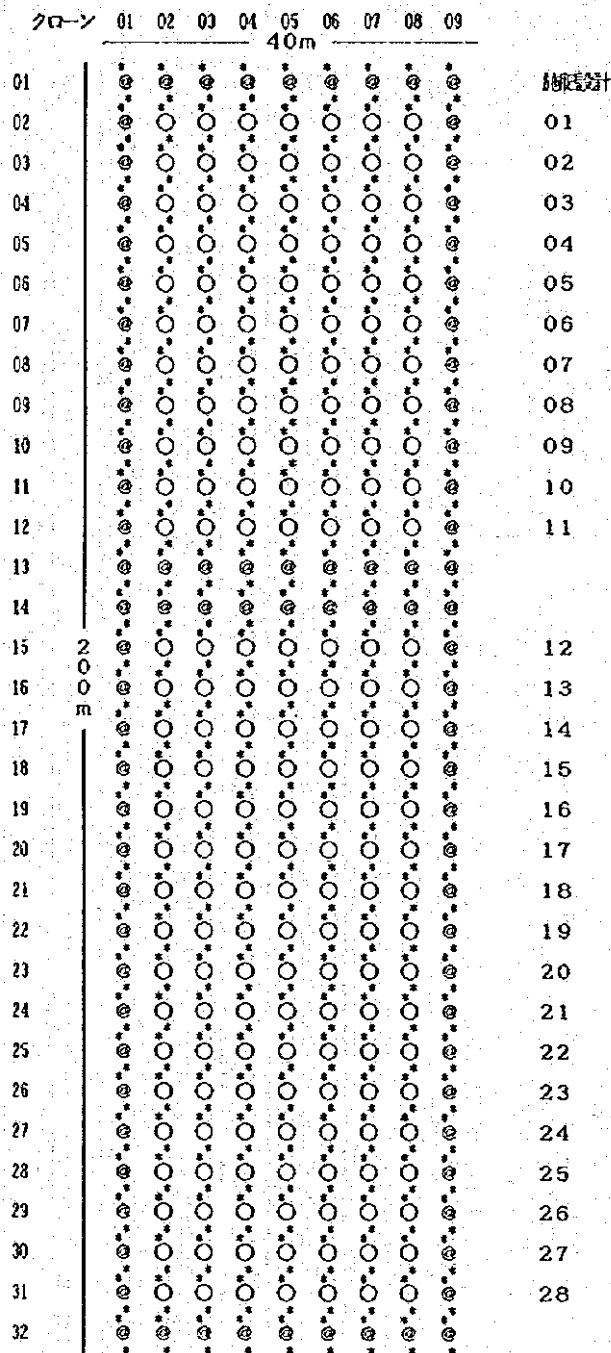
4) クブアスー (マルティンゴ、パッションフルーツ混植)

クローン	01	02	03	04	05	06	07	08	09	
	40m									
01	B1	1	2	3	4	5	6	7	B1	
02	B2	1	2	3	4	5	6	7	B2	
03	B3	1	2	3	4	5	6	7	B3	
04	B4	1	2	3	4	5	6	7	B4	デンター椰子数
05	B5	1	2	3	4	5	6	7	B5	
06	B6	1	2	3	4	5	6	7	B6	
07	B1	1	2	3	4	5	6	7	B1	
08	B2	1	2	3	4	5	6	7	B2	
09	B3	1	2	3	4	5	6	7	B3	
10	B4	1	2	3	4	5	6	7	B4	総計
11	B5	1	2	3	4	5	6	7	B5	
12	B6	1	2	3	4	5	6	7	B6	
13	B1	1	2	3	4	5	6	7	B1	
14	B1	1	2	3	4	5	6	7	B1	
15	B2	1	2	3	4	5	6	7	B2	
16	B3	1	2	3	4	5	6	7	B3	
17	B4	1	2	3	4	5	6	7	B4	清耕 総区
18	B5	1	2	3	4	5	6	7	B5	
19	B6	1	2	3	4	5	6	7	B6	
20	B1	1	2	3	4	5	6	7	B1	
21	B2	1	2	3	4	5	6	7	B2	
22	B3	1	2	3	4	5	6	7	B3	
23	B4	1	2	3	4	5	6	7	B4	数草
24	B5	1	2	3	4	5	6	7	B5	
25	B6	1	2	3	4	5	6	7	B6	
26	B1	1	2	3	4	5	6	7	B1	
27	◎	◎	◎	◎	◎	◎	◎	◎	◎	
28	◎	◎	◎	◎	◎	◎	◎	◎	◎	
29	◎	◎	◎	◎	◎	◎	◎	◎	◎	清耕 実生苗 総区
30	◎	◎	◎	◎	◎	◎	◎	◎	◎	
31	◎	◎	◎	◎	◎	◎	◎	◎	◎	
32	◎	◎	◎	◎	◎	◎	◎	◎	◎	

説明:
 クブアスー: 供試樹 (接木苗) 140樹 (1=174, 2=186, 3=624, 4=215, 5=286, 6=554, 7=513 各20樹)
 (供試樹 (実生苗) 35樹)
 ホーダー樹 (接木苗) 94樹 (1=174, 2=186, 3=624, 4=215, 5=286, 6=554, 7=513 各06樹)
 (1=03-11 12樹, B2=04-14, B3=23-12, B4=23-08, B5=01-04, B6=22-3 各08樹)
 ホーダー樹 (実生苗) 19樹
 合計 288樹 (接木: 234樹 + 実生苗: 54樹)

第1実証圃場 (CPATU)

5) クアアスー (施肥、パッションフルーツ混植)



説明:

クアアスー : (供試樹 (接木苗)) : ○ ○ ○ ○ ボーダー樹 (接木苗) : ⊙ ⊙ ⊙ ⊙ 供試樹 (実生苗) : ⊖ ⊖ ⊖ ⊖

パッション・フルーツ : * * * *

植栽間隔:

クアアスー = 6.0 * 5.0m

パッション・フルーツ = 3.0 * 5.0m

樹数計:

3² = 27 樹計 + 1 微量要素効地区

図4:

施肥基準及びパッション・フルーツ混植のクアアスー樹各植栽間隔、ベレン、1.0HA、

クアアスー 288本 + パッション・フルーツ 576本

クローン (系統) 位置: 01 02 03 04 05 06 07 08 09

↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓

第1実証圃場 (CPATU)

6) クブアスー (施肥、パッションフルーツ混植)

クローン	01	02	03	04	05	06	07	08	09	
	40m									
01	B1	1	2	3	4	5	6	7	B2	樹数計
02	B1	1	2	3	4	5	6	7	B2	01
03	B1	1	2	3	4	5	6	7	B2	02
04	B1	1	2	3	4	5	6	7	B2	03
05	B1	1	2	3	4	5	6	7	B2	04
06	B1	1	2	3	4	5	6	7	B2	05
07	B1	1	2	3	4	5	6	7	B2	06
08	B1	1	2	3	4	5	6	7	B2	07
09	B1	1	2	3	4	5	6	7	B2	08
10	B1	1	2	3	4	5	6	7	B2	09
11	B1	1	2	3	4	5	6	7	B2	10
12	B1	1	2	3	4	5	6	7	B2	11
13	B1	1	2	3	4	5	6	7	B2	
14	B1	1	2	3	4	5	6	7	B2	
15	B1	1	2	3	4	5	6	7	B2	12
16	B1	1	2	3	4	5	6	7	B2	13
17	B1	1	2	3	4	5	6	7	B2	14
18	B1	1	2	3	4	5	6	7	B2	15
19	B1	1	2	3	4	5	6	7	B2	16
20	B1	1	2	3	4	5	6	7	B2	17
21	B1	1	2	3	4	5	6	7	B2	18
22	B1	1	2	3	4	5	6	7	B2	19
23	B1	1	2	3	4	5	6	7	B2	20
24	B1	1	2	3	4	5	6	7	B2	21
25	B1	1	2	3	4	5	6	7	B2	22
26	B1	1	2	3	4	5	6	7	B2	23
27	B1	1	2	3	4	5	6	7	B2	24
28	B1	1	2	3	4	5	6	7	B2	25
29	B1	1	2	3	4	5	6	7	B2	26
30	B1	1	2	3	4	5	6	7	B2	27
31	B1	1	2	3	4	5	6	7	B2	28
32	B1	1	2	3	4	5	6	7	B2	

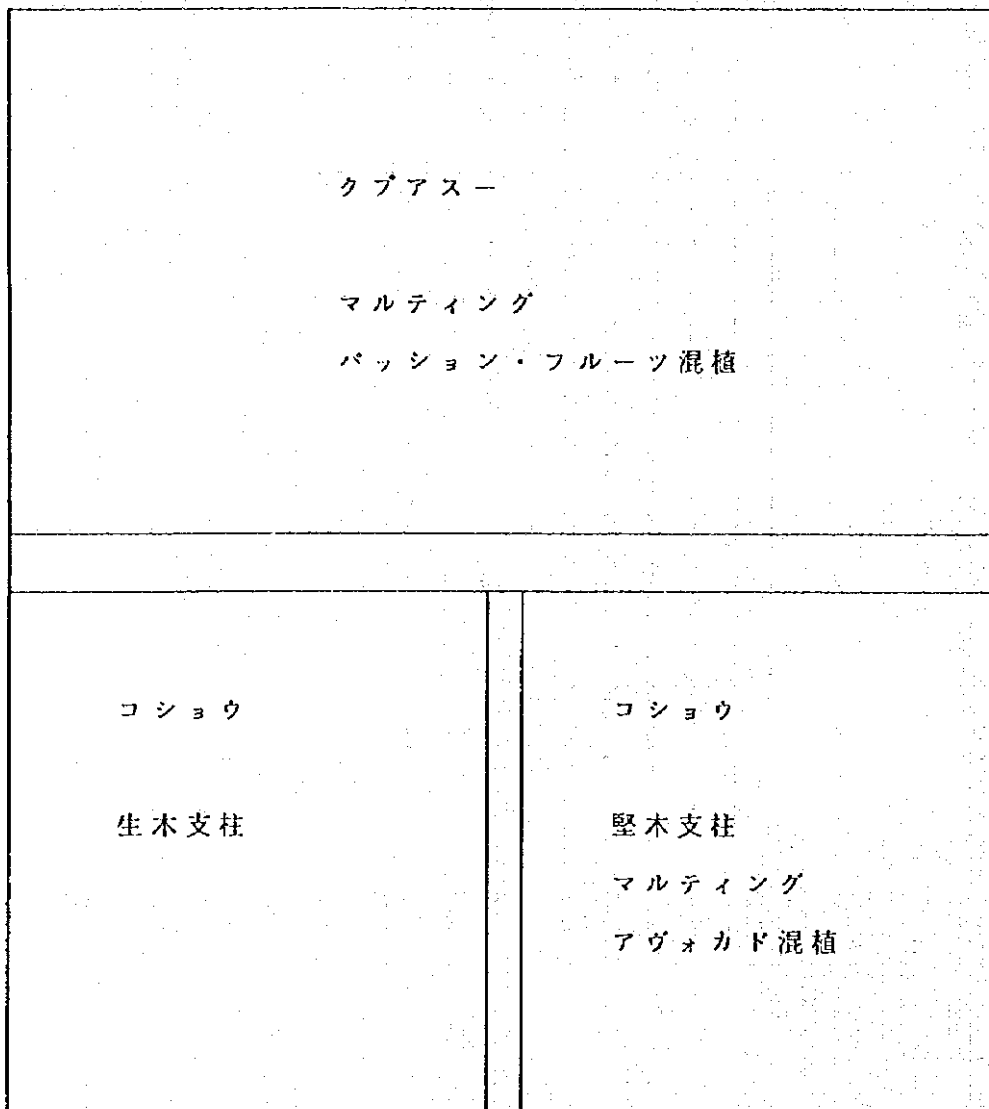
説明: クブアスー (母樹 (雑木苗)) 196樹 (1=174, 2=186, 3=624, 4=215, 5=286, 6=554, 7=513 各28樹)
 ボーダー樹 (雑木苗) 92樹 (1=174, 2=186, 3=624, 4=215, 5=286, 6=554, 7=513 各04樹)
 B1=434, B2=1074 各32樹
 合計 288樹

(2) 第2実証圃場見取図 (INATAM)

本部

市街地道路

支配人宅

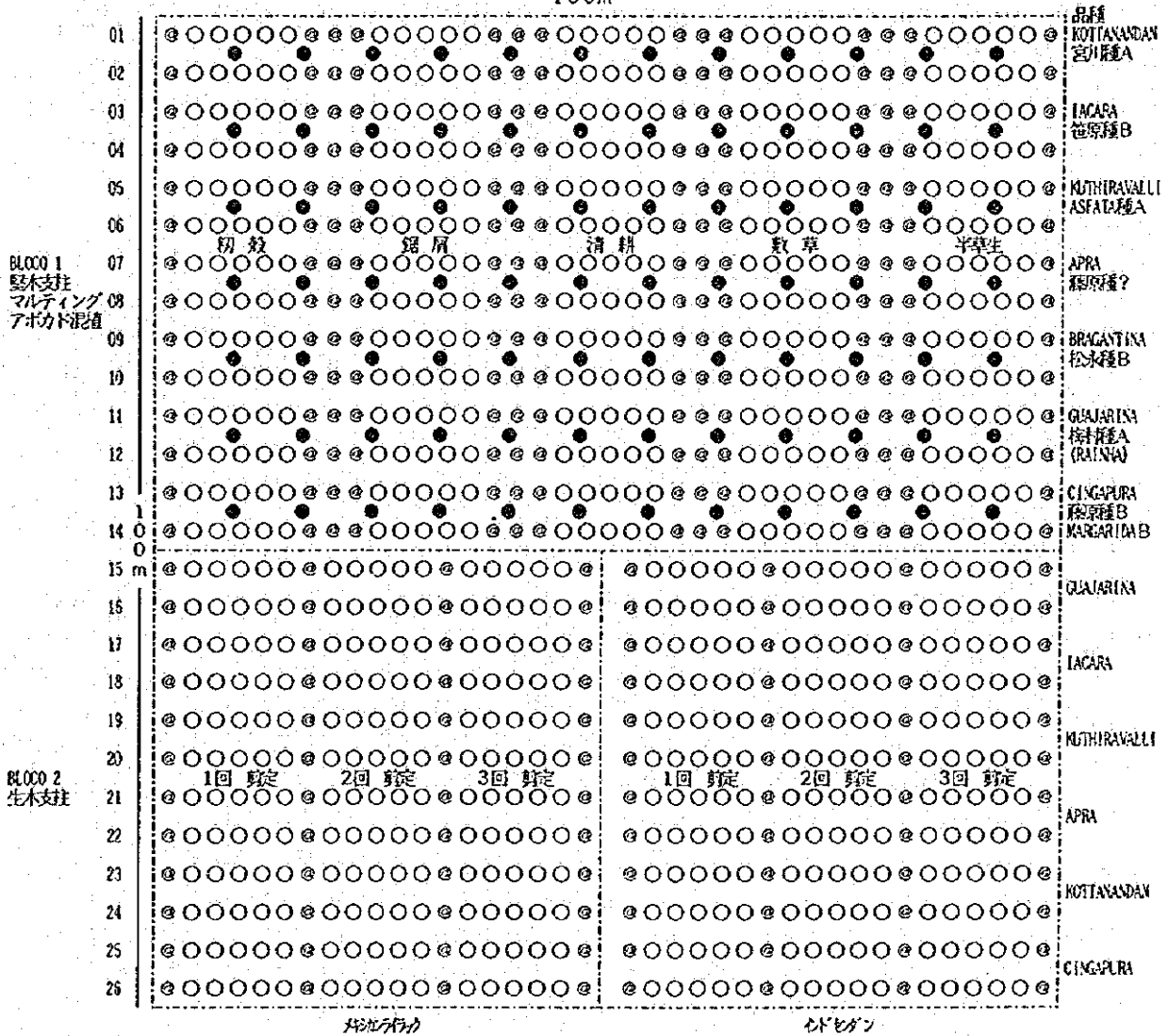


コショウ
母樹圃場

第2実証圃場 (INATAM)

1) コショウ (B1 = 堅木支柱、マルティング、アヴォカド混植、B2 = 生木支柱)

01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
100m



説明:
 コショウ : 供試作物: ○ ○ ○ ○ ボーダー作物: ⊠ ⊠ ⊠ ⊠
 アヴォカド: ● ● ● ●
 排水溝: - - - - -

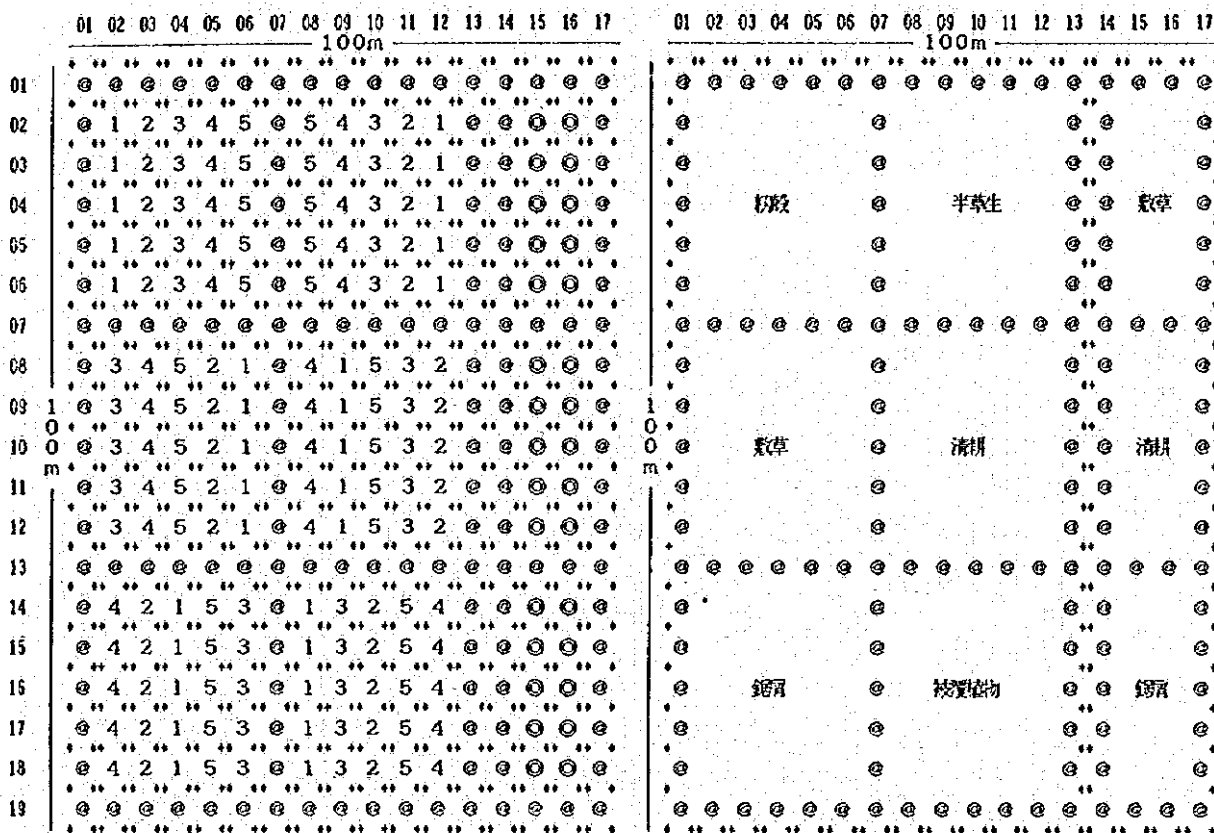
植栽間隔:
 コショウ及び支柱 = 2.5 * 2.5 * 5.0m
 アヴォカド = 7.5 * 7.5 * 12.5m

図6:
 生木支柱及び堅木支柱、並びにマルティング使用のコショウ栽培実証圃場、トメアスー、1.0HA、
 コショウ 1002本
 + 堅木支柱 546本 + 生木支柱 (インドセンゲン) 228本 + 生木支柱 (メキシカンライラック) 228本 = 計1002本
 アヴォカド 84本

ブロック 1 : 546本	KOTTANANDAN = 78本	ブロック 2 : 456本	KOTTANANDAN = 76本
	IACARA = 78本		IACARA = 76本
	KUTHIRAVALLI = 78本		KUTHIRAVALLI = 76本
	APRA = 78本		APRA = 76本
	BRAGANTINA = 78本		BRAGANTINA = 76本
	GUAJARINA = 78本		CINGAPURA = 76本
	CINGAPURA = 78本		

第2実証圃場 (INATAM)

2) クブアスー (マルティンク、パッション・フルーツ混植、交配親和性)



説明:
 クブアスー : (樹式樹 (クローン番号, 接木苗) : 1, 2, 3, 4, 5 (樹式樹 (実生苗) : ◎ ◎ ◎ ◎
 ホーダー樹 (接木苗, 実生苗) : @ @ @ @
 パッション・フルーツ : * * * *

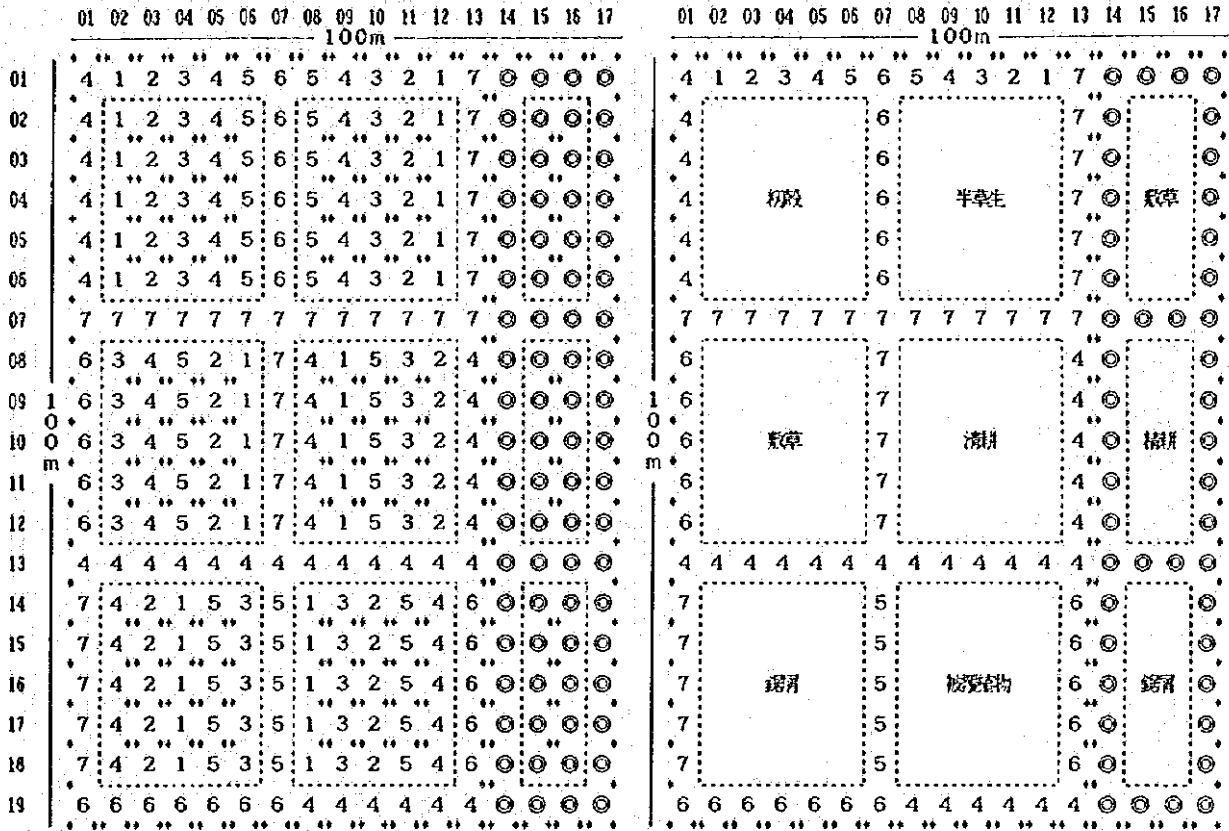
系統由来 (クローン番号) :
 1, 2, 3, 4=CAMTA (小長野農園) 5=CPATU

植栽間隔:
 クブアスー =6.0*5.0m
 パッション・フルーツ=3.0*5.0m

図5:
 マルティンク樹及びパッション・フルーツ混植のクブアスー実証圃場、トメアスー、1.0HA
 クブアスー 323本 + パッション・フルーツ 680本

第2実証圃場 (INATAM)

3) クアアスー (マルティンダ、パッション・フルーツ混植、交配親和性)



説明:

クアアスー: 供樹 (接木苗)

150樹 No1=04-14 30樹
 No2=23-12 30樹
 No3=23-08 30樹
 No4=01-04 30樹
 No5=222-3 30樹

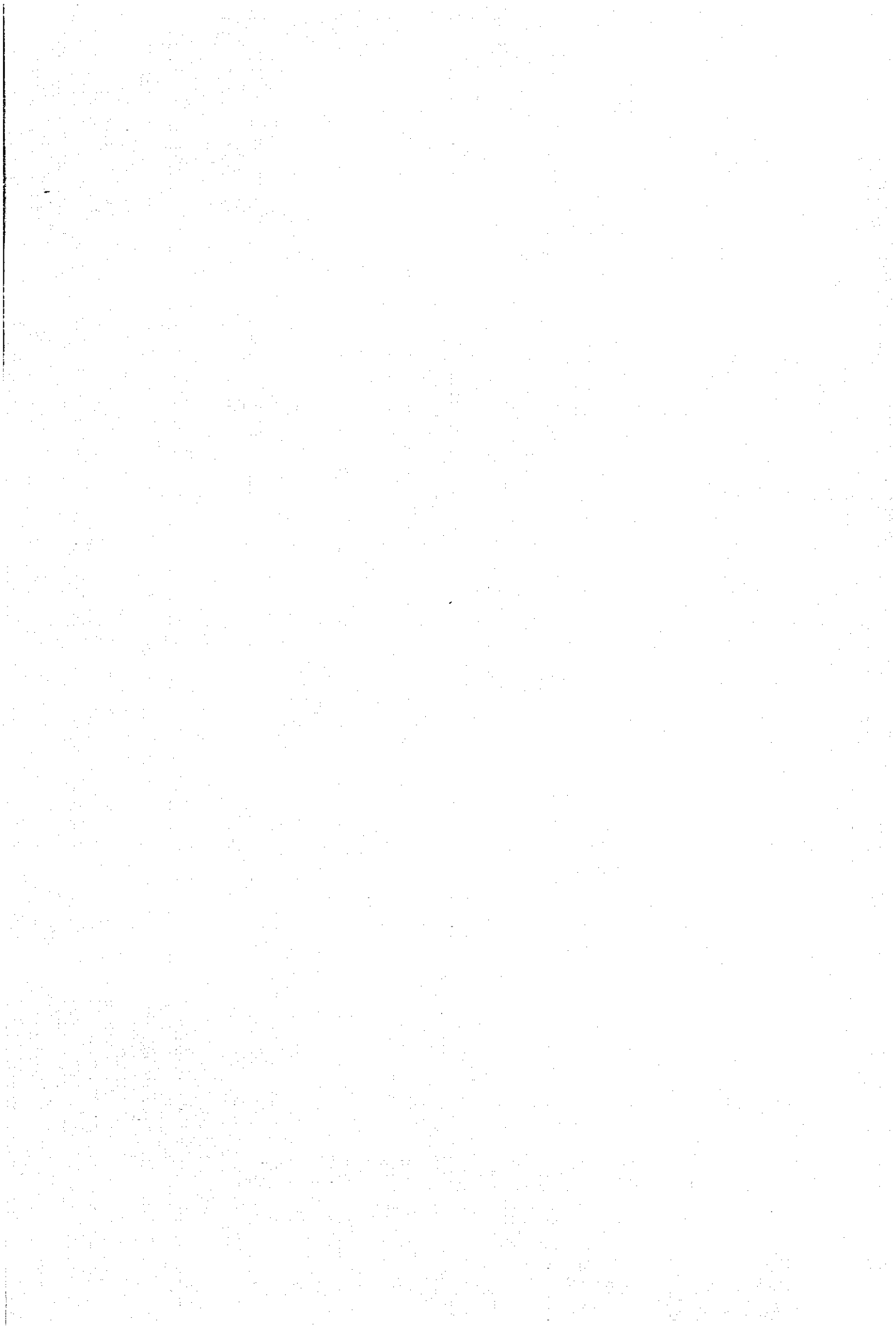
供樹 (実生苗)
 ボーダー樹 (接木苗)

30樹
 97樹 No1=04-14 2樹
 No2=23-12 2樹
 No3=23-08 2樹
 No4=01-04 2樹+30樹
 No5=222-3 2樹+5樹
 No6=08-04 23樹
 No7=09-11 29樹

ボーダー樹 (実生苗)

42樹

合計 323樹 (接木苗: 247樹 + 実生苗: 76樹)



JICA

