資料 3

Interim Report (1980/81 - 1983/84) of Indonesia - Japan Joint Programme on Food Crop Protection (ATA - 162)

INTERIM REPORT (1980/81 - 1983/84)
OF
INDONESIA - JAPAN JOINT PROGRAMME ON
FOOD CROP PROTECTION
(ATA - 162)

Directorate of Food Crop Protection
Directorate General of Food Crop Agriculture
Ministry of Agriculture

Jakarta, 7th February, 1984

C O N T E N T S

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I. INTRODUCTION

During the past four years, since the Food Crop Protection Project has been initiated on 18th June, 1980 with a five-year Project, two parties of Project implementation, Indonesian team and Japanese experts team have closely collaborated to implement the Project in an effective and efficient way with the purpose of developping food crop protection technology in order to minimize rice yield losses due to pests and diseases in accordance with the "Master Plan" of the R/D which was authorized on 28th September, 1981 by the Joint Committee meeting.

II. PROJECT ACTIVITIES FOR THE PAST FOUR YEARS WITH SPECIAL TECHNICAL COOPERATION ACTIVITIES

1) Dispatch of Japanese experts

a) Long term experts

Through the past four years, a total of 4 (four) long term experts (including a team leader) and a liaison officer have been dispatched through JICA from the Government of Japan to accomplish the operational targets work of the Project.
The ldong term experts have given advice, suggestions and conducted technological transfer to local MDA staff for forecasting and control studies of the key pests i.e. the brown planthopper, the rice gall midge and the green rice leafhopper.

b) Short term experts

A total of 14 (fourteen) short term experts of several fields such as entomology, plant pathology, agrometeorology and toxicology of rice pests and other fields have joined the Project from Japan for the effective implementation of the Project.

Japanese experts assigned on long term and short term basis from 1980/81 are listed in the appendix - (1)

2) Results of the study by the six study groups

Concerning the Project activities, interim evaluation was carried out on the results of the past three years, the transfer of technology and the results of experiment for the respective research subjects (six subjects). These subjects are the brown

planthopper, the rice gall midge, the rice yellow stem borer, the green rice leafhopper and tungro virus disease attacking rice plants in Indonesia.

Field experiments and studies conducted are centered on these five types of pests and diseases and, in addition to these activities, 1) computerization was commenced for the establishment of data base system and analysis of data from field observation points and 2) analysis of pestigide.

The following study groups were organized.

1. Study group of the rice gall midge
2. Study group of the brown planthopper
3. Study group of the rice yellow stem borer
4. Study group of the tungro virus disease and the green leafhopper
5. Study group of pesticide analysis
6. Study group of computer

Interim study report of the respective study group is shown in the appendix (2).

3) Model Infrastructure Survey Team and Technical Guidance Team

a) Model Infrastructure Survey Team headed by Mr. K. Fukushima have been dispatched on 10th August, 1982 for a 10-day schedule from JICA. The meeting of Model Infrastructure Survey Team was held at the Conference Room, the Central Office, Directorate of Food Crop Protection on 12th August, 18th August and 8th September 1982 for the general discussion on the Model Infrastructure Scheme to be formulated for the Experimental Study Field attached to the Jatisari Observatory Laboratory under the Technical Cooperation Programme of the Government of Japan.

List of Participants of Model Infrastructure Survey Team;

1) Mr. K Fukushima : Leader of Survey Team
2) Mr. K. Egawa : Coordinator of Survey Team
3) Mr. T. Kato : Consultant Nihon Giken Co., Ltd.
4) Mr. Y. Matsukawa : "
5) Mr. M. Yamaguchi : "

b) JICA Technical Guidance Team headed by Dr. Keiji Kiritani visited Jakarta on 16th January, 1983 staying January 28, 1983 to observed and inspect the Study field and up to observing Laboratory at Jatisari and Biological Laboratory at BORIF. A meeting was held at the Conference Room, Central Office, Directorate of Food Crop Protection on 25th January, 1983 for the general discussion and possibility of extension of R/D on ATA 162 for the strengthening of the Project.

List of Participants of Technical Guidance Team:

1) Dr. Jeiji Kiritani : Leader of Technical Guidance Team
2) Mr. Muneo Okada : Entomologist
3) Dr. Yasumasa Watanabe : Plant Pathologist
4) Mr. Hirosahi Saito : Coordinator of Guidance Team

4) Training of Indonesian personnel in Japan

Through the past four years, a total of two Indonesian administrative conterparts have participated in a study trip to study Project related facilities in Japan to discuss the Project programme for the effective implementration of its programme and deepening mutal understanding and cooperation between the the two countries.

Seven assistant counterparts have joined the several technical training courses as counterpart participants and six assistant have also participated in the group training courses in Japan with the purpose of entertaining effective utilization of technology and knowledge concerned with the implementation of the Project programme.

List of the participants is givern in the appendix - (2)

5) Provision of machineries and equipment

During the past four years, JICA has provided machinery, equipment and other matereials necessary for the effective implementration of the Project activities, to the Observatory Laboratory at Jatisari, the Biological Laboratory at Bogor, Research Institute for Food Crops, the pesticide Laboratory at Pasar Minggu and Central Office at Pasar Minggu since 1980/81.

List of major equipment and total amount from 1980/81 to 1983/84 is given in the appendix - (3).

6) Model Infrastructure construction

Model Infrastructure construction was carried out at Experimental Field attached to the Observatory Laboratory at Jatisari for the effective implementation of the Project by JICA. The period of construction works was from 24th March to 20th August, 1983. The works had been completed in August and have contributed to irrigating the experimental field through the dry season and other studies' purpose. Indonesian contribution was purchasing land (50 m^2) for the irrigation canal.

In the appendix - (4), summary of the construction work of Model Infrastructure at Jatisari is given.

7) Computerization of food crop protection data processing.

During the fiscal year 1982/83, majority of the provision of equipment, computer was installed at the Central Office, Directorate of Food Crop Protection, Pasar Minggu with the following purposes :

a) To establish a Data Base System which will be useful for long term programming.

b) To serve to decision making with information obtained from data processing.

c) To increase the efficiency of monitoring, storing, retrieving and processing of data (data management system).

In the appendix - (5), Project Proposal, list of participants of assistant counterparts and description of goods are given.

8) Joint Committee Meeting

Through the past four years, the Joint Committee meeting were held two times and the Working group meeting was held once for the formulation of annual work plan, and other discussion was carried out about training of counterparts & assistant counterparts, results of research, equipment & materials, requirement of experts, etc.

a) For the fiscal year 1981/82, first Joint Committee meeting was held on 28th September, 1981 to authorize the details of the Master Plan and the annual operational work plan.

b) For the fiscal year 1982/83, second Joint Committee meeting was held on 12th July, 1982 to formulate and authorize the annual operational work plan and the Committee results of research, training of counterparts & assistasnt counterparts, Model Infrastructure, provision of equipment & materials requirement of experts, etc.

c) For the fiscal year 1983/84, working group meeting was held on 27th July, 1982.

9) Provision of Indonesian counterpart, assistant counterparts & administrative personnel land, building and facilities.

Indonesian counterparts and assistant counterparts to Japanese expert.

1) Project Leader
2) Counterpart officials to Japanese experts
3) Laboratory assistants
4) Field workers
5) Clerical and service personnel including typists, clerks, drivers and others.

Indonesian staff of above mentioned items from No. 1 to No.5 and offices, laboratories and experimental fields in accordance with the R/D to the Japanese experts.

List of Indonesian staff and related personnel in the Project is in the appendix - 6.

10) Local Counter Budget

Through the past four years the following local counter budget have been provided for the implementation of the Project by the Government of the Republic of Indonesia.

a) 1980/81 Total : Rp. 35,000,000.-
b) 1981/82 Total : Rp. 48,245,000.-
c) 1982/83 Total : Rp. 63,560,000.-
d) 1983/84 Total : Rp. 39,250,000.-

Detail of the local counter budget is in the appendix - 7.

11) Literature

In the fiscal year 1983/84, the following reference books and the leaflet describing the outline of the Project activities were published.

a) The rice gall mitge and control method

This printed materials were published by 2,000 copies and distributed to the staff of Directorate of Food Crop Protection, Agriculture Information Centers and other related institutions.

b) General Information of the Project activities

This leaflet is published in English in parallel with in Indonesia. This print was published by 2,000 copies by JICA.

c) The following papers were presented in the Entomological Society of Indonesia which was held in Jakarta on 24-26 Jan., 1983.

1) Penggunaan pelepah daun padi untuk menguji ketahanan terhadap wereng coklet. (Ir. Djatnika Kilin dan Dr. Susumu Kawabe)

2) Keadaan seragan wereng coklat akhir-akhir ini di Indonesia (Dr. Susumu Kawabe, Ir. Yadi Raksdinata, Mr. Ayi Kusmayadi dan Ir. Djatnika Kilin)

3) Pengamatan serangan Hama Ganjur
(Orseolia oryzae Wood-Mason)
(Ir. Erma Budiyanto, Ir. Gaib Subroto S.W., dan Dr. Terunobu Hidaka)

JAPANESE EXPERTS ASSIGNMENT FROM 1980/81 TO 1983/84

Appendix 1 - 1

No.	Name	Subject	'80.6	'81.6	'82.6	'83.6	'84.6	'85.6
I.	Long Term Experts							
1.	Dr. Socho NASU	Team Leader (Entomologist)		22/3			21/3	
2.	Dr. Terunobu HIDAKA	Entomologist (Rice gall midge)		13/1			31/5	
3.	Dr. Susumu KAWABE	Entomologist (Brown Planthopper)		18/3		17/3		
4.	Mr. Saburo MATSUO	Coordination			30/4		29/4	
5.	Dr. Kazushige SOGAWA	Entomologist (Brown Planthopper)				10/3		9/6
II.	Short Term Experts							
1.	Mr. Hitoshi HONJŌ	Agrometeorologist			15/2 14/4			
2.	Mr. Tsukasa KASHIWA	Toxicologist			7/3 30/3			
3.	Mr. Masaichi TSURUMACHI	Entomologist (Brown Planthopper)				10/11 9/5		
4.	Dr. Yasumasa WATANABE	Plant Pathologist				16/1 30/1		
5.	Mr. Takeo MASUDA	Toxicologist				16/2 29/4		
6.	Mr. Masataka YAMAGUCHI	Supervisor (Model Infrastructure)				26/2	23/8	

Appendix 1 - 2

No.	Name	Subject	'80.6	'81.6	'82.6	'83.6	'84.6	'85.6
7.	Mr. Tamio TANISHITA	Technician (YAG Mini Laser)				14/2 24/2		
8.	Dr. Hiromasa SAWADA Professor	Entomologist (Doctor Course)					20/8 29/8	
9.	Mr. Makoto NISHIKAWA	Technician (Green House)					11/9 25/10	
10.	Mr. Keisaburo SAITO	Technician (Green House)					11/9 25/10	
11.	Mr. Shingo ŌYA	Entomologist (Stem borer)					16/12 15/3	
12.	Dr. Akira ŌUCHI	Plant Pathologist					2/2 15/4	
13.	Mr. J. KANAZ AWA	Toxicologist					20/3 31/5	

LIST OF PARTICIPANTS OF TRAINING IN JAPAN

Appendix 2-1

No. Name Fiscal	Post	Training Subject	Duration	Period
19881/82				
1. Ir. M. Rais L.	Head of Observation Guidance Section	Food Crop Pest Surveillance Forecasting and Control in Japan	1 month	Sep. 6 - Oct. 4
2. Ir. FX. Radjijo	Head of Monitor and llance Section	"	"	"
3. Ir. Ati Wasiati	Head of Preparation of Equipment and Supplies	"	"	"
1982/83				
4. Dr. Ir. Satta Ws.	Head of Subdirectorate of Surveillance and Forecasting	Forecasting System in Japan (Study trip)	1 month & 19 days	March 28 - May 16
5. Ir. Gaib Subroto	Staff of Monitoring and Forecasting Section (Assi. Conterpart of Rice Gall Midge group)	Forecasting Technology and Practical Control Pests and Diseases on Paddy	6 months	Oct. 21 '82 - Mar. 31 '83

Appendix 2-2

No. Name Fiscal	Post	Training Subject	Duration	Period
1983/84				
6. Ir. Haryono Siswomihardjo	Head of Operational Control Section	Crop Protection Aspects (Study trip)	1 month	Oct. 8 - Nov. 8
7. Ir. Irwan Kamal	Staff of Observation Guidance Section (Assi. Counterpart of Tungro disease)	Rice Pest Forecasting and Control	3 months & 16 days	Nov. 8 '83 - Feb. 23 '84
8. Ir. Erma Budiyanto	Staff of Operational Control Section (Assi. Counterpart of Rice Gall Midge)	Practical Control of Rice Insect Pests and Diseases	3 months & 16 days	Nov. 8 '83 - Feb. 23 '84
9. Ir. Mulyadi	Staff of Pesticide Evaluation (Assi. Counterpart of Pesticide Analysis)	Pesticide Quality Control	3 months & 14 days	Oct. 25 '83 - Feb.8 '84

LIST OF PARTICIPANTS OF GROUP TRAINING COURSE IN JAPAN

Appendix 2-3

No. Name / Fiscal	Post	Training Subject	Duration	Period
1980/81				
1. Mr. Akin Artonang	Staff of Plant Protection Center	Pesticide Utilization for Pest Control	4 months & 24 days	Jan. 7 - May 31
1981/82				
2. Mr. Nono Sukana	Coordinator of Observation and Forecasting Laboratory Jatisari	Control of Insect Pests and Rice Diseases	6 months & 14 days	May 26 - Dec. 13
1982/83				
3. Ir. Ayi Kusmayadi	Staff of Sub-directorate of Surveillance and Forecasting (Assi. Counterpart of BPH)	Control of Insect Pests and Rice Diseases	6 months & 22 days	May 22 - Dec. 13
4. Ir. Waluyo	Staff of Sub-directorate of Field Pest Control	"	"	"
5. Ir. Amir S. Lubis	Staff of Sub-directorate of Pesticide	Pesticide Utilization for Pest Control	4 months & 25 days	Jan. 7 '83 - May 31 '83
1983/84				
6. Ir. Yadi Rusyadi	Staff of Sub-directorate of Surveillance and Forecasing (Assi. Counterpart of BPH)	Control of Insect Pests and Rice Diseases	6 months & 19 days	May 26 - Dec. 13

Actual Results of Provision of Equipment and Materials

Appendix 3-1

1. First year (1980/81)

(1)	Automobil	:
(2)	Office Utencil	:
(3)	Forecasting Experiment Equipment	:
(4)	Audiovisual Equipment	:
(5)	Ocean Freight	:
(6)	Insurance Prem	:
	Total amount	: 47,775,700.- Yen

The main machinery, equipment and materials are as follows;

	Name of goods	Quantity
1.	Jeep	4 units
2.	Micro Bus	1 unit
3.	Motor cycle	6 units
4.	Coping machine	2 "
5.	Electric typewriter	3 "
6.	Over head projector	2 "
7.	Air Conditioner	6 "
8.	Refrigerator	4 "
9.	Table balance, electric type	1 unit
10.	Slide processor	2 units
11.	Drying oven	2 "
12.	Hygro-Thermographs	10 "
13.	Actinographs	2 "
14.	Jordan sunshine	2 "
15.	Vanox biological microscope	1 unit
16.	Trinocular microscope	6 units
17.	Automatic camera set for microscope	2 "

2. Second year (1981/82)

(1)	Automobil	:
(2)	Office Utencil	:
(3)	Forecasting Experiment Equipment	:
(4)	General experimental equipments	:
(5)	Forecasting chemicals	:
	Total amount	: 81,675,000.- yen

The main machinery, equipment and materials are as follows;

	Name of goods	Quantity
1.	Jeep	4 units
2.	Motor cycle	10 "
3.	Liquid chromatograph	2 "
4.	Gas chromatograph with attachments	1 unit
5.	YAG Mini laser system	1 "
6.	EMIF wave analyz	1 "
7.	Incubator	1 "
8.	Blood refrigerator	1 "
9.	Bottle cabinet	1 "
10.	Cooling bottle cabinet	1 "
11.	Flexible mantle heaters	1 "
12.	Muffle furnace	1 "
13.	Centrifuge	1 "
14.	Desiccator	2 units
15.	Micro balance	1 unit
16.	Air conditioner	2 units
17.	Freeze dryer	1 unit
18.	Electronic balance	1 "
19.	Recording spectrophotometer	1 "
20.	Binocular micro-scope	1 "
21.	Self-registering thermometer	2 units
22.	Kuderna-Danish Evapora	10 "
23.	Wet digestion apparatus for Hg determination	2 "
24.	Extration apparatus, soxhlet	10 "
25.	Microtome	1 "
26.	Microsyringe	1 "

3. Third year (1982/83)

(1)	Automobil	:
(2)	Office Utencil	:
(3)	Audio-visual Aids and Related Articles	:
(4)	Forecasting Experimental Equipment	:
(5)	Pesticides and other chemicals for study and laboratory works	:
	Total amount	: 100,987,000.- yen

The main machinery, equipment and materials are as follows;

	Name of goods	Quantity
1.	Jeep	1 unit
2.	Micro bus	2 units
3.	Motor cycle	9 "
4.	Electric caluculator	3 "
5.	Computer	1 set
6.	Electric typewriter	2 units
7.	Coping machine	2 "
8.	Video casset recorder	2 "
9.	Camera elmo super 8 mm	1 set
10.	Projector (8m/m)	1 unit
11.	Film editor	1 "
12.	Insect mass rearing bos	21 units
13.	Stereo zoom binocular microscope	3 "
14.	Air conditioner	5 "
15.	Refrigerator	5 "
16.	Automatica dialy allurement insecticide collector	2 "
17.	Green leaf area meter	1 unit
18.	Pesticide sprayer	5 units
19.	Power tiller	2 "
20.	Constant temperature panel form	2 "
21.	Draft chamber	1 unit
22.	Binocular microscope	2 units

	Name of goods	Quantity
23.	Trinocular microscope	3 units
24.	Biological microscope	3 "
25.	Rotary evaporator	1 set
26.	Water bath incubator	2 units
27.	Dry block bath	1 unit
28.	Incubator	6 units
29.	Desiccator	5 "
30.	Recording spectrophotometer	1 unit
31.	Electric balance	1 "
32.	Green house	2 units
33.	Centrifugal evaporator	1 unit
34.	Ace hygrothermometer digital type	2 units
35.	High temperature muffle furnace	1 unit
36.	New abbe refractometer	1 "
37.	Miele automatic washing machines	1 "
38.	IKA universal mill	1 "
39.	Dater record and culuculator	2 units

4. Fourth year (1983/84)

(1)	Automobil	:
(2)	Office Utencil	:
(3)	Forecasting Experiment Equipments	:
(4)	Audiovisual Equipments	:
(5)	Pesticide Analysis Equipments	:
(6)	Ocean Freight	:
	Total amount	: 70,592,360.- Yen

The main machinery, equipment and materials are as follows;

	Name of goods	Quantity
1.	Motor cycle	5 units
2.	Electric typewriter	1 unit
3.	Prefabricated storehouse	2 units
4.	Locker for goods	2 sets
5.	Electric balance, mittler H 80	1 set
6.	Insect specimen cabinet	2 units
7.	Mist blower	5 "
8.	Portable sucking machine	1 unit
9.	Ripening rate measuring apparatus	1 "
10.	Miniature threasher	1 "
11.	Refrigerator	1 "
12.	Rice yield analyzer	1 "
13.	Actinographs	1 "
14.	Combination anemometer with transformer	1 "
15.	Insect rearing house of lighting system	1 "
16.	Deep well pump	1 "
17.	Generator	1 "
18.	Dryning oven	2 units
19.	Voltage stabilizer	1 unit
20.	Infrared spectrophtometer	1 "
21.	Case for infrared spectroph	1 "
22.	High speed TLC scanner	1 set
23.	Coarse balance	2 units

	Name of goods	Quantity
24.	Muffle furnace	1 unit
25.	Vir tis homogenizer	1 unit
26.	Pesticide analytical standards	1 set
27.	Books	

SUMMARY OF THE CONSTRUCTION WORKS OF MODEL INFRASTRUCTURE SURVEILLANCE AND FORECASTING LABORATORY JATISARI

Model Infrastructure of Surveillance and Forecasting Laboratory Jatisari had been carried out for the effective implementation of the Project by Japan International Cooperation Agency (JICA) for a six-months programme.

The construction works was started from 24th March and was finished on 20th August, 1983.

II) Outline of construction works of Model Infrastructure

a) Purpose of construction works of Model Infrastructure

The facilities of the field laboratory in Jatisari, Karawan, should be improved so that the laboratory could function in the future as a model to establish and develop a reporting system and forecasting for rice insect pests and diseases in Indonesia. Then, the Project should immediately proceed as a development project of a model infrastructure of a surveillance and forecasting laboratory in Jatisari.

b) Scale of the Jatisari Field Laboratory

1.	Paddy field	:	2.25 ha
2.	Irrigation canals	:	0.24 "
3.	Drainage canals	:	0.18 "
4.	Farm road	:	0.27 "
5.	Other field	:	0.23 "
6.	Office accommodation and others	:	1.03 "
	Total	:	4.2 ha

c) Reference of the Specification of Model Instructure

d) Cost of construction Model Infrastructure scheme

1.	Direct construction cost	:	Yen 22,588,000
2.	Indirect construction cost	:	" 3,386,000
3.	Overhead expenses	:	" 1,026,000
	Total	:	Yen 27,000,000

e) Amount of money for the contract of construction works

Rp. 73,700,000

f) Contractor

P.T. Dextam Ltd.

g) Contract of construction works period

from 24th March, 1983 to 10th August, 1983

SPECIFICATION OF MODEL INFRASTRUCTURE SCHEME

1.	Land shape adjustment and land levelling		2.25 Ha
2.	Irrigation canals		
	(concrete lining)		550 m
	(earth lining)		1,160 m
3.	Drainage canals		
	(concrete lining or wetstone masenry)		740 m
	(earth lining)		1,215 m
4.	Farm road		
	(surrounding main road)	B = 3.0 m	725 m
	(sub road)	B = 1.5 m	355 m
	(Existing rehabilitation road)	B = 5.0 m - 3.0 m	160 m
5.	Auxiliary water resource		
	(deep well)	L = 50 m	1 no
	(water storage tank)	V = 36 m^3	1 no
	(pump house)	A = 6.3 m^2	1 no
6.	Appurtenant structures		
	(sluice gate)		1 no
	(diversion facility)		1 no
	(water condit pipe line)	Ø = 50 PVD	350 m
	(stering reservior)	V = 800 m^3	1 no
	(water measurement tank)		1 no
	(turn out)		24 nos
	(culvert)		8 nos
7.	Other construction		
	(transfer to meteorological observatory)		250 m^2
	(fence)		815 m

COST OF CONSTRUCTION FOR MODEL INFRASTRUCTURE

		Cost
1.	Direct construction cost	
	1) Land shape adjustment and land levelling	Yen 5,598,000
	2) Irrigation canals	" 2,047,000
	3) Drainage canals	" 2,392,000
	4) Farm roads	" 3,972,000
	5) Auxiliary water resource	" 3,085,000
	6) Appurtenant structures	" 3,045,000
	7) Other construction	" 1,188,000
	8) Temporary works and others	" 1,261,000
	Sub Total	Yen 22,588,000
2.	Indirect construction cost	
	1) Common temporary works	Yen 1,214,000
	2) Overhead expenses	" 1,538,000
	3) Tax	" 634,000
	Sub Total	Yen 3,386,000
3.	Overhead expenses for all construction works	Yen 1,026,000
	Grand Total	Yen 27,000,000

PROVISION OF MACHINERY AND EQUIPMENT

COMPUTERIZATION ON FOOD CROP PROTECTION DATA PROCESSING

I. Project Proposal

1. Project title : Development of computer facilities for forecasting

2. Location : Jakarta

3. Executing Agency : Directorate General of Food Crop Agriculture, Ministry of Agriculture

4. Objectives : To develop and implement computer facilities for data storage

5. Project description : This project directed to develop and implement computer facilities. This project activities consist of:

   (a) development and implementation of computer facilities
   (b) training of programmer and computer operator
   (c) testing and evaluating forecasting model

6. Implementation time : 1982 - 1983

7. Project cost : Total cost $ 109,000.-
   Local cost $ 53,000.-
   Foreign exchange cost $ 56,000.-

8. Amount proposed for commitment

9. Related to technical assistance : This project will be conductor in collaboration with ATA-162.

II. Assistant Counterpart

Name	Final Education	Position	Training about Computer
1. Yusmin B.Sc.	Graduated from Academy Farming 1968	Staff of Sub-Directorate of Pest Observation and Forecasting	In November 1981 till January 1982 as Programmer (fortran) in Jakarta
2. Ir. Siska Antoinete Tampenawas	Graduated from Faculy of Agriculture 1981	Staff of Sub-Directorate of Diseases and Weeds Control	In July 1983 till October 1983 as Programmer (fortran) in Jakarta
3. Ir. Ira Dewanti Israwan	Graduated from Faculty of Agriculture 1981	Staff of Sub-Directorate of Field Pests Control	In July 1983 till October 1983 as Programmer (Cobol)

III. Budget of Computer 1982/83

Computarization *

1. Soft ware supplies	:	Rp. 10,000,000.-
2. Feasibility Studies	:	Rp. 20,000,000.-
3. Operational Cost	:	Rp. 4,100,000.-
Total	:	Rp. 34,100,000.-

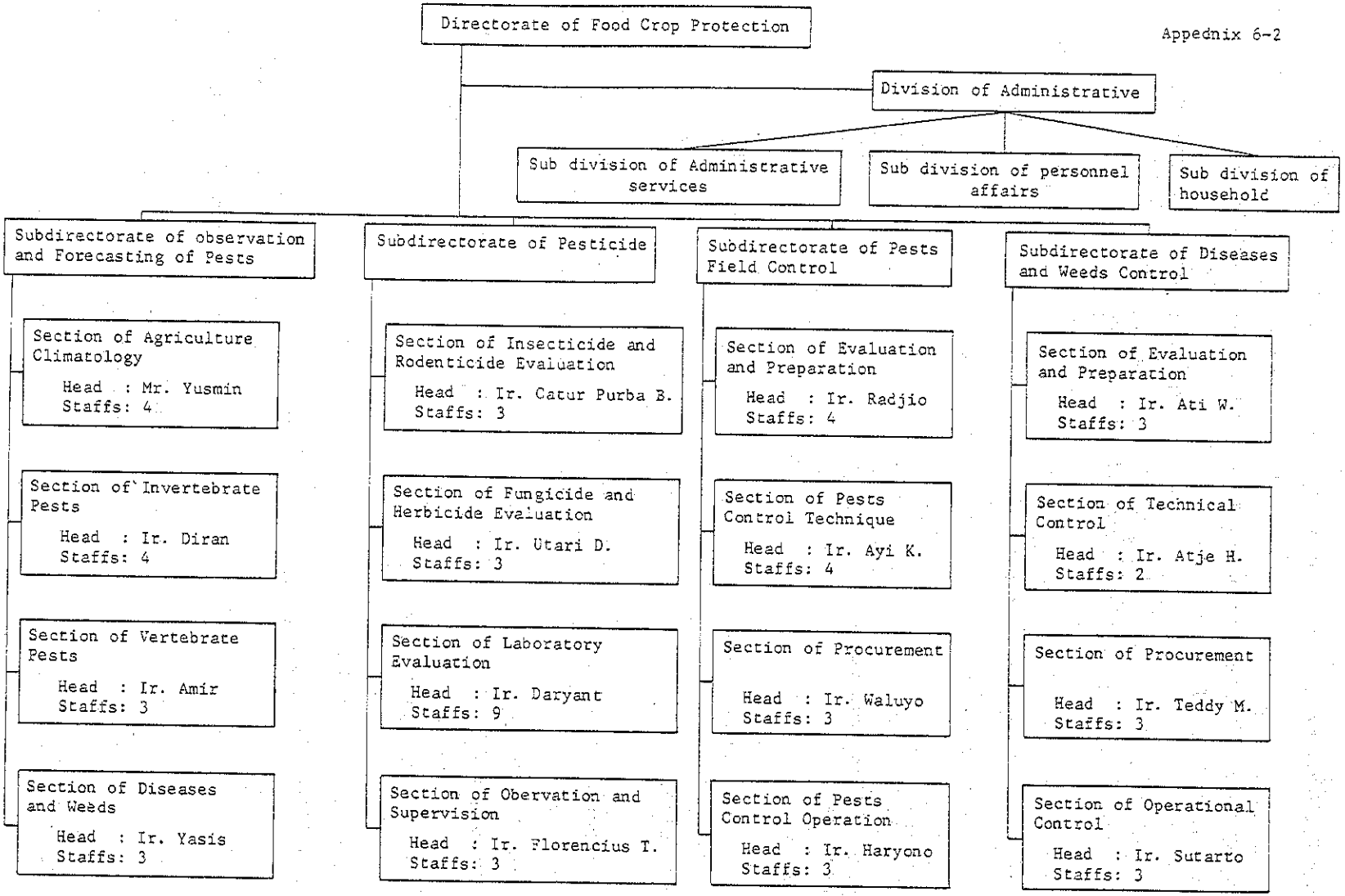
Construction

1. Construction of Computer Room (Budget of 1981/82)	:	Rp. 10,000,000.-
2. Preparation of Computer Room (Budget of 1981/82)	:	Rp. 580,000.-
Total	:	Rp. 10,580,000.-

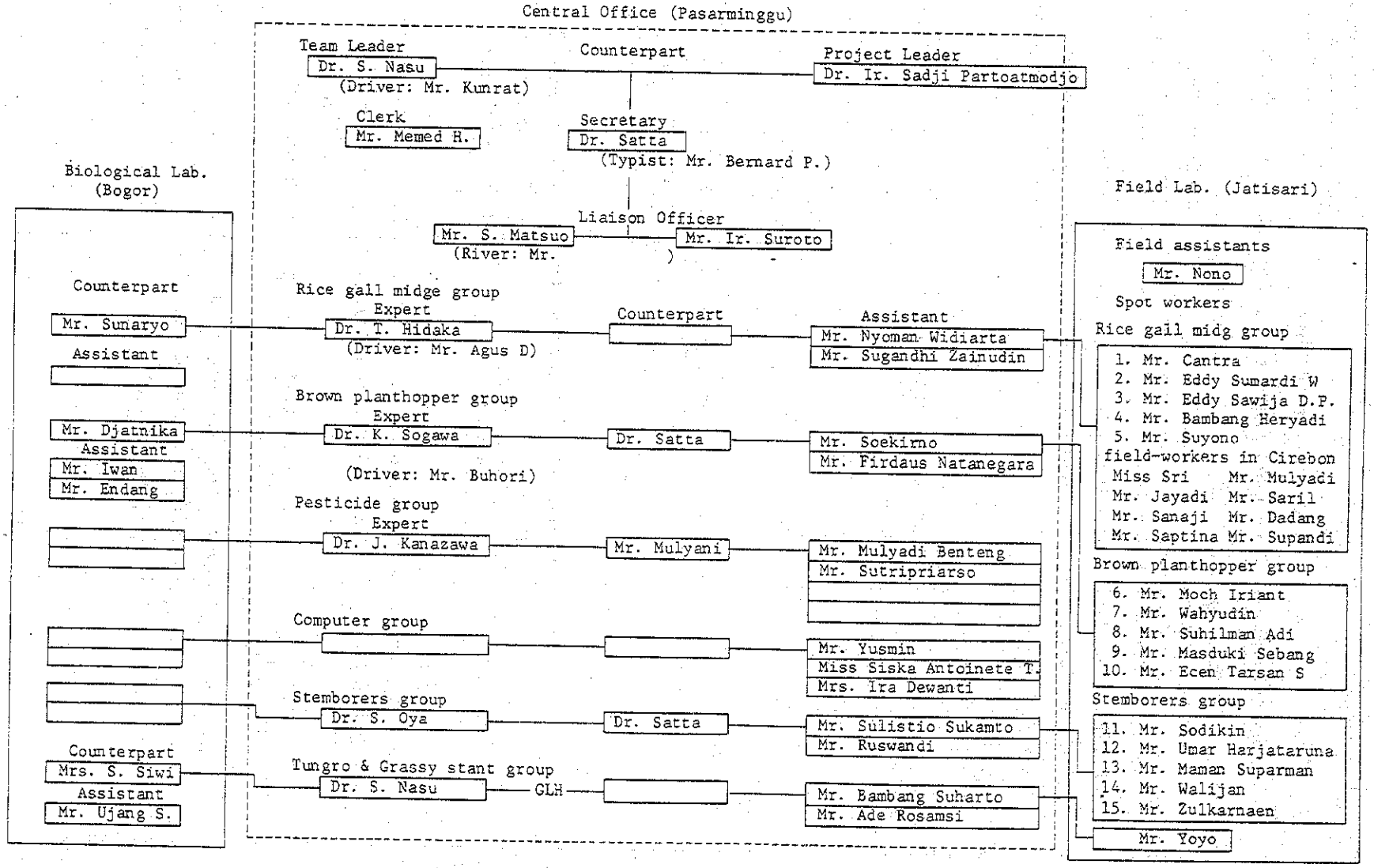
Note : * Not yet authorized

We have provided equipment and materials for computerization which was consisted of the following ;

No.	Description of Goods	Quantity	Unit Price	Amount
1.	Basic Management Equipment	1 pc		¥ 3,700,000.-
2.	Additional Main Memory Tubes	1 pc		¥ 360,000.-
3.	Scientific Feature	1 pc		¥ 270,000.-
4.	Fixed Disk	1 pc		¥ 1,350,000.-
5.	8" Disk Connection Feature	1 pc		¥ 342,000.-
6.	Magnet Disk Connection Feature	1 pc		¥ 90,000.-
7.	Cartridge Magnet Tape Equip.	1 pc		¥ 810,000.-
8.	Cartridge Magnet Tape Equip.	1 pc		¥ 90,000.-
9-1	CRT Display	1 pc		¥ 657,000.-
9-2	"	1 pc		¥ 657,000.-
10.	Standard Key Board	2 pcs	¥108,000.-	¥ 216,000.-
11.	CRT Table	2 pcs	¥ 45,000.-	¥ 90,000.-
12.	Line Printer	1 pc		¥ 2,790,000.-
13.	Transformer	1 pc		¥ 135,000.-
14.	Basic Softwafe	1 pc		¥ 765,000.-
1-1	Firmware for N7017-31E and Test Programme F-1	1 pc		
1-2	Cable for N7017-31E	1 pc		
15.	Stabilizer Matsunaga	1 pc		¥ 292,500.-
			Total :	¥12,604,500.-


Directorate of Food Crop Protection
Division of Administrative
Sub division of Administrative services
Sub division of personnel affairs
Sub division of household
Subdirectorate of observation and Forecasting of Pests
Subdirectorate of Pesticide
Subdirectorate of Pests Field Control
Subdirectorate of Diseases and Weeds Control
Section of Agriculture Climatology
Head : Mr. Yusmin
Staffs: 4
Section of Invertebrate Pests
Head : Ir. Diran
Staffs: 4
Section of Vertebrate Pests
Head : Ir. Amir
Staffs: 3
Section of Diseases and Weeds
Head : Ir. Yasis
Staffs: 3
Section of Insecticide and Rodenticide Evaluation
Head : Ir. Catur Purba B.
Staffs: 3
Section of Fungicide and Herbicide Evaluation
Head : Ir. Utari D.
Staffs: 3
Section of Laboratory Evaluation
Head : Ir. Daryant
Staffs: 9
Section of Obervation and Supervision
Head : Ir. Florencius T.
Staffs: 3
Section of Evaluation and Preparation
Head : Ir. Radjio
Staffs: 4
Section of Pests Control Technique
Head : Ir. Ayi K.
Staffs: 4
Section of Procurement
Head : Ir. Waluyo
Staffs: 3
Section of Pests Control Operation
Head : Ir. Haryono
Staffs: 3
Section of Evaluation and Preparation
Head : Ir. Ati W.
Staffs: 3
Section of Technical Control
Head : Ir. Atje H.
Staffs: 2
Section of Procurement
Head : Ir. Teddy M.
Staffs: 3
Section of Operational Control
Head : Ir. Sutarto
Staffs: 3

Related Organization of the Food Crop Protection Project (ATA-162)



Organization Chart

Directorate of Food Crop Protection, Pasar Minggu, Jakarta

No.	Sub-Directorate	Section	Staff of Section
1.	Sub Directorate of Pest Observation and Forecasting. Dr. Ir. M. Satta Ws.	a) Section of Agriculture Climatology. Mr. Yusmin B. Sc.	1. Ir. Gunardi 2. Sukar 3. Tiger Sagala 4. Ir. Lis Herlawati
		b) Section of Invertebrate Pests. Ir. Diran	1. Ir. Sarsito Wahono Gaib Subroto. 2. Ir. Yadi Rusyadi 3. Ir. Ruswandi Muchtar 4. Mr. Ruswandi
		c) Section of Vertebrate Pests. Ir. Amir	1. Marta Amnan B.Sc 2. Drs. Nanang Yudono 3. Ir. Hatmawati Ugelta
		d) Section of Diseases and Weeds. Ir. Yasis	1. Ir. Irwan Kamal 2. Ir. Ade Rusamsi 3. Ketut Shuarsana
2.	Sub Directorate of Pesticide. Mr. Mulyani Sukardi BSc.	a) Section of Insecticide and Rodenticide Evaluation Ir. Catur Purba Budiman	1. Ir. Ripah Karyatiningsih 2. Ir. Wide Satiyantari 3. Sabrarwati B.Sc
		b) Section of Fungsicide and Herbicide Evaluation Ir. Utari Damiati	1. Ir. Ellen Elvinardewi 2. Ir. Tri Susetio 3. Ir. Endang Hartati

No.	Sub-Directorate	Section	Staff of Section
		c) Section of Laboratory Evaluation. Ir. Daryanto	1. Mulyadi B.Sc 2. Supardjillah B.Sc 3. Abdul Somad 4. Sutripriarso 5. Dedi Mulyadi 6. Wagimin 7. Amiruddin Yosfiah 8. Hasri 9. Dian Mardiana
		d) Section of Observation and Supervision Ir. Florencius Tinambunan	1. Utami Andayani 2. Ir. Hidayat 3. Ir. Siswanto Mulyawan
3.	Sub Directorate Field Fests Control. Ir. V.L. Tjandrakirana	a) Section of Evaluation and Preparation. Ir. F.X. Radjioatmo-widjojo.	1. Ir. Wahyu Indraningsin 2. Ir. Harsono Lanya 3. Ir. Ira Dewanti Israwan 4. Ir. Zainita
		b) Section of Fests Control Technique. Ir. Ayi Kusmayadi	1. Ir. Djoko Priyono 2. Ir. Erma Budiyanto 3. Ir. Sulistio Sukamto 4. Idris Rachman Daeng Matidjang
		c) Section of Procurement. Ir. Waluyo.	1. Ir. Endang Titi Purwani. 2. Osid Hasbullah 3. Ir. Sugandi Zainuddin

No. Sub-Directorate	Section	Staff of Section
	d) Section of Pests Control Operational. Ir. Haryono Siswomihardjo	1. Ir Soekirno 2. Ir. Firdaus Natanegara 3. Ir. Nyoman Widiarta
4. Sub Directorate of Diseases and Weeds Control Ir. Kasmo	a) Section of Evaluation and Procurement. Ir. Ati Wasiati.	1. Ir. Siska Antoinete Tampenawas. 2. Ir. Tuti Hendrawati 3. Ir. Faizar Th.
	b) Section of Technical Control. Ir. Atje Hikamat	1. Ir. Cahyaniati 2. Ir. Djoned Adi Sardjito.
	c) Section of Procurement. Ir. Teddy Mustapa	1. Ir. Herdradjat Natawidjaya 2. Yul Erdi 3. Maria Ruben
	d) Section of Operational Control. Ir. Sutarto Alimoeso	1. Ir. Bambang Soeharto 2. Ir. Yuli Hartono 3. Ir. Irwan Adam
5. Sub Directorate of Administration. Drs. Wayan Kantun Tirthayasa.	a) Section of Official Letter Pitoyo (Group of Processing)	1. Bernard Pondag 2. Noersiah Noeroet 3. Asmara Murni 4. Tugiman 5. H. Asenih 6. Rachmat 7. Sri Cahyaniwati 8. Soepardi 9. Akup Jakar 10. Yahman 11. Iskandar

No.	Sub-Directorate	Section	Staff of Section
5.	Sub Division of Administration	b) Section of Maintenanoe of Mobil.	1. Soerya Ali 2. Zainuddin 3. Hartoko 4. Saih 5. Matamin
		c) Library	1. C. Sarsono Haryanto BA
		d) Section of Official Trip	1. Aceng Mohamad Samsu BA 2. Sri Indarti 3. Amsaris
		e) Section of Fileing	1. Sukeri 2. Sri Sugiatmi 3. Paidin 4. Hanapi 5. Aat Ahadiati 6. Hotma 7. Soegihardjo Arman 8. Yanes Siagian 9. Memed Haryana (ATA-162)
		f) Section of Secretariate Directorate	1. Ir. Soeroto 2. Ir. Firman Butar Butar 3. Yoyoh Rokhayah 4. Amsudin

No.	Sub-Directorate	Section	Staff of Section
5.2	Sub Division of Houshold Abu Mansjur Nusi BA	a) Section of Maintenance	1. O. Soeganda 2. Soeyono 3. Sara Soebrata 4. Minan 5. Ayat 6. Eddy Riyanto 7. Soekarman 8. Kadi 9. Toha
		b) Section of Accomudation	1. D. Soenarto B.Sc 2. Djoko Soetrisno BA 3. Taufik Manan Bc HK 4. H. Hasan Basri 5. Soekardjan 6. Yahman Noor
		c) Section of Financial	1. Soeharto 2. Kadar Soeratno BA 3. Agus Soedradjat 4. Djumitra 5. Makful 6. Murdani 7. Henny Muryaningsih 8. Elisa Utari 9. Wayan Srinandhy 10. Nuryati 11. Soediman 12. Wakidi Riyanto 13. Muntalih 14. Munadi 15. Indriyanto

No.	Sub-Directorate	Section	Staff of Section
		d) Section of Security	1. Soehardjono 2. Hoesin 3. Saiman
		e) Driver	1. Soeparyo 2. Kunrat 3. Sigit Soebali 4. Tjahyadi 5. Ramlan 6. Buchori 7. Agus Djunaedi 8. Wagino 9. Kasman 10. Kasman 11. Abdurachman 12. Zaini
5.3	Sub Division of Personal Affairs. Drs. Soegiarto M.	a) Section of Administrative Personal Affairs	1. Indriastuti
		b) Section of Planning Personal Affairs.	1. Heru Ragunanto
		c) Section of Personal	1. Darmono 2. Syarifuddin
		d) Section of Pension	1. Heru Sriwiandjono
		e) Section of Salary	1. M. Djamin BA 2. Kris Eddy Winarno 3. Tarmidi 4. Sahak

Local Counter Budget

No. fiscal	Activities	Total amount
1980/81		
1.	Handling cost	Rp. 94,169,000
	* included	
	a) Rehabilitation of Jatisari Laboratory and garage	
	b) Foundation of Green house and garage at Jatisari ; Rp. 8,478,300	
	c) Rehabilitation of Laboratory, Guest hourse and Green House at Jatisari ; Rp. 16,517,000	
1981/82		
1.	Materials	
	a) Stationaries, fertilizers, seeds, pesticides	Rp. 1,000,000
2.	Trip expenses	
	a) Technical guidance	Rp. 21,450,000
	26 provinces x 3 times x Rp. 275,000	
3.	Miscellaneous expenses	
	a) Vehivles maintenance	
	- Jeep 4 units x Rp. 1,050,000	Rp. 4,200,000
	- Truck 1 unit x Rp. 1,600,000	Rp. 1,600,000
	- Bus 1 unit x Rp. 1,600,000	Rp. 1,600,000
	- Motor cycles	
	6 units x Rp. 225,000	Rp. 1,350,000
	b) Secretarial expenses ;	Rp. 2,500,000
	Telephone, telegramme, telex, electricity, etc.	
	c) Evaluation and Report	Rp. 2,000,000
	d) Training for plant protection staffs	Rp. 2,000,000
	e) Meeting for planning and evaluation	Rp. 1,000,000
	2 times x Rp. 500,000	
	f) Publication	Rp. 610,000
	g) Handling cost	Rp. 8,935,000
	Total	Rp. 48,245,000

No.	Activities	Total amount
1982/83		
1.	Wages and Salaries	
	a) Honorariums for spot workers 144 man month x Rp. 25,000	Rp. 3,600,000
2.	Materials	
	b) Stationaries	Rp. 500,000
3.	Trip expenses	
	a) Monitoring and Guidance 16 Orovinces x Rp. 220,000	Rp. 3,520,000
	b) Survey and observation by counterparts and assistant counterparts 60 man trip x Rp. 200,000	Rp. 12,000,000
	c) Trip of Laboratorium staff 48 man trip x Rp. 50,000	Rp. 2,400,000
	d) Spot workers trip 144 man month x Rp. 15,000	Rp. 2,160,000
4.	Miscellaneous expenses	
	a) Secretarial expenses Telephone, telegramme, telex, electricity and etc.	Rp. 2,500,000
	b) Pest observation and experimentation	Rp. 19,780,000
	c) Meeting of pest observers 4 times x 150 man day x Rp. 5,000	Rp. 3,000,000
	d) Training for spot workers 2 times x Rp. 300,000	Rp. 600,000
	e) Meeting for planning and evaluation 2 times x Rp. 500,000	Rp. 1,000,000
	f) Equipment maintenance	Rp. 2,500,000
	g) Handling cost	Rp. 10,000,000
	Total	Rp. 63,560,000

No. fiscal	Activities	Total amount
1983/84		
1.	Wages and Salaries	
	a) Honorariums for spot workers 144 man month x Rp. 25,000	Rp. 3,600,000
2.	Materials	
	a) Vehicles maintenance	
	- Jeep ; 2 jeeps x Rp. 1,050,000	Rp. 2,100,000
	- Motor cycles ; 12 cycles x Rp. 225,000	Rp. 2,700,000
3.	Trip expenses	
	a) Survey and observation 90 man trip x Rp. 200,000	Rp. 18,000,000
	b) Trip of Laboratorium staff 25 man trip x Rp. 50,000	Rp. 1,250,000
	c) Trip of Spot workers 144 man month x Rp. 15,000	Rp. 2,160,000
4.	Misellaneous expenses	
	a) Pest observation and experimentation	Rp. 8,000,000
	b) Lodging of spot workers 12 man year x Rp. 120,000	Rp. 1,440,000
	Total	Rp. 39,250,000

Activities of Rice Gall Midge Study Group in the period 1981 - 1983

Activities	Results
1. Analysis of the monitoring data of the Rice gall midge (RGM)	1. In Indonesia, the monitoring data has been obtained for 8 years since 1976. 2. RGM occurs mainly in Java Island, specially serious incidence was seen in West Java. 3. The incidence of RGM has been remarkahlly decreased from 1976 to 1983 due to well managed control programme under INSUS and INMAS 4. RGM is one of destructive insect pests in the wet season, RGM gaves less incidence in the dry reason.
2. Field Investigation on occurence and damaged caused by RMG	1. Field investigation was carried out by the Expert, Assistant Counterpart, the spot-worker in low land and high land paddy field in West Java since 1981/82 2. RGM seriousely occurred in lowland paddy field such as part of Subang in the wet season. Percentage of damaged tillers by gall reached 85% in 1981/82. In the dry season, the infestation was less than 5% by gall damages and RGM is indicated not to be important economically. 3. In high land areas i.e. Sumedang, Bandung, Cianjur, Sukabumi and Bogor, infestation of RGM was low throughout the year. RGM was found to be well controlled by the parasites, i.e. Platygaster oryzae, Neanastathus oryzae, Obtusiclava oryzae and the predators, Amblyseius imbricatus, Ophionia indica etc. Parasitism reached about 45% of galls in all seasons. 4. The consecutive planting is more effective for conserving the natural enemies than the synchronized planting (two times plantings) 5. Positive relationship between damaged tillers and population of predator, Amblyseius imbricatus, was recognized. The predator is understood to be the most important to control number of RGM eggs.

Activities	Results
	6. A long and serious drougth occurred at the end of 1982, transplanting was delayed about 1.5 month. The drought remarkablly affected occurrence of RGM which showed less damage than that of usual years in West Java. Mortality rate of RGM became high by long drought. 7. In West Java, willd rice as one of the alternative host plants was not found. Leersia hexandra is, growing in huge areas near paddy fields but was not enough host plant for the occurrence of RGM. Two galls of RGM in Sukamandi and Cirebon were found on L. hexandra. 8. During off season of rice (September - November) RGM could not survive in the low land paddy fields. RGM population was maintained in the consecutive planting areas which are considered to occurring source of RGM to lowland paddy fields by the short distance migration in the wet season. 9. In the consecutive planting areas (highland), the parasites of RGM have a alternate host insect, Orseoliela sp., which is attacking the Alang Alang wild grasses.
3. Factor analysis of occurrence and damage caused by RGM.	1. The analysis was studied from view point of a) damage difference between the wet and dry seasons and b) between low and high infestation areas in the wet season in Cirebon, West Java. 2. The transplanting time was one of the important factors to control of RGM. Transplanting in January was resulted with higher damage of RGM than planted in December. Transplanting in December was clarified to avoid serious damage of the insect. At present, 95% of total paddy fields in Cirebon were practiced to transplant in December. 3. Survival rate of RGM increased under high humidity with rain in the wet season, however RGM population prominently decreased with high mortality rate under dried condition with comparatively long sunshine duration in the dry season.

Activities	Results
	4. In Cirebon, the parasites and predator were not active. These natural enemiss were not found for 30 days after transplanting. The parasitism was at least 15% and the parasites were not effective for control of RGM during the vegetative growth stage of rice plants in lowland areas of paddy fields and started to appear from 40 days after transplanting. 5. A peak occurrence of RGM appeared at the end of March, RGM has 3 - 4 generations during the planting season. The 3rd generation reached a peak of the insect population by light trap and sampling studies in the experimental fields. 6. Population of RGM in the early planting (December) start to slightly increased, however RGM in the late planting (January) remarkablly propagated during the vegetative growth period. 7. Factors affecting population decrease are the early planting, generative growth stage of rice plants, low humidity with long sunshine duration, parasites and predator after the booting stage of rice plants. Factors affecting population increase are the late planting, vegetative growth stage, high humidity (75%) with rain, low activity of parasites and predators. 8. Positive relationship between number of adults and galls was recognized and then the number of adults of the next generation can be possible to estimate. High correlation (0.900) in the developmental stages including growing stage of rice plants is as follow, % damage by gall - damage by Larvae + pupae + galls, Number of eggs - Neanastahus oryzae, Tillers - galls, Panicie primordia - pupae, and 3rd larvae + propupae - pupa. Correlation - 0.800 was also recognized a total of 29 items among the developmental stages of RGM.

Activities	Results
4. Injurious level for control of RGM	1. The following relationship between damaged tillers by galls vs number of panicles - 0.799, damaged tillers by larvae + galls vs rice yield = -0.896, number of panicles vs rice yield = 0.981 2. The injurious level necessary for insecticide application is a) 5% of damaged tillers by gall, b) 10% by damaged tillers larvae+galls at 14 days after transplanting or 24 days after transplanting. 3. In endemic area of RGM, insecticide must be applied in the seedlings at 10 days before transplanting. at least, two time applications of granular insecticide (i.e. Ekalux 5% G or Furadan 3% G) are needed at the rate of 0.5 Kg of A.I./ha at 14 and 28 days after transplanting. 4. Careful monitoring of the injurious level by the observers and the farmers in the late planting areas must be practiced and preventive control technology is established.
5. Field screening of resistant varieties to RGM	1. The resistant varieties (6 varieties from Thailand, 2 from India, and 4 from Indonesia) tested were in the moderate resistant to RGM. These varieties examined were RD 11, MN-62M, RD4, RD21, RD23, RD29, Phaelgune, Surekh, and GH27. 2. These varieties can be recommended to transplant in the occurring areas or the late planting areas of RGM except MN-62M which is a sensitive to photoperiodism.
6. Field screening of insecticides for control of RGM	1. The effective insecticides for control of RGM were Ekalux 5% and Furadan 3% followed by Diazinon M 5%. Number of galls occurred per hill were 1.64 in Ekalux, 3.92 in Furadan, and 6.22 in Diazinon M. Number of panicles per hill were 17.74 in Ekalux, 16.68 in Furadan, and 15.49 in Diazinon M.

Activities of Study on the Brown Planthopper (BPH), in the period 1981 - 1983

No.	Activity	Purpose of activity	Year of implementation	Location	Results
1.	Observation of population dynamycs of the brown planthopper (BPH) in Nothern parts of West Java wet season 1981/1982	1) To study the population dynamycs of the BPH 2) To develop practical sampling technique for the BPH in the fields	September 1981 to April 1982	Karawang, Subang and Indramayu	1) During the observation period, the BPH population in the Northern part of West Java was very low. We can only find the white-backed planthopper in the field. 2) Sticky plate method (tapping method) was very effective to count the 1st instar nymph of the BPH
2.	Field and pot experiments on the mechanism of resurgence	To know the mechanism which induced the occurence of resurgence	May 1982 to August 1982 Nov. 1982 to Feb. 1983	Jatisari Field Laboratory, Karawang	Repeated applications of a certain kinds of insecticides change physiology of rice plants and increase the reproduction rate of the BPH remarkably.
3.	Experiments on the effect of incolation intensity to the population growth of the BPH	To know the effect of insolation intensity to the population growth of the BPH	November 1982 to February 1983	Jatisari Field Laboratory, Karawang	1) On a susceptible variety, Pelita, intensive insolation decreased the development and fecundity of the BPH. 2) On a resistant varieties Cisadane, the reproduction rate was raised significantly in the shaded plot. 3) Especially moderate resistant varieties may be more susceptible to the BPH during wet season than dry season.
4.	Observation of population dynamics of the BPH in Northern part of west Java, in wet season 1982/1983	1) To study the population dynamics of the BPH 2) To develop the sampling techniques such as visual counting, sweeping net and tapping for estimating the population density of the BPH	November 1982 to February 1983	Karawang, Subang and Indramayu Hired farmers fields planted with susceptible Pelita Ten Pelita fields were located in each Kabupaten (Except for Indramayu we only hire 5 fields)	1) The immigrant population was started to be catched at four to five weeks after transplanting. Migrant population density was as low as 0.01 to 0.06 macropterus adults per hill. 2) The progeny of immigrant population was found at the fourth to seventh week. Population of the progeny was very low. 3) The peak of population was found at the 11th to 13th week. Most of the BPH were nymphs. 4) Hopperburn was found on paddy plants only at the stage of 13th week after transplanting at 3 location in Karawang. The population density was very high more than 2,000 nymphs per hill.

No.	Activity	Purpose of activity	year of implementation	Location	Results
					5) Tapping method was very effective to separate nymphal instar of the BPH and to detect the 1st instar nymphs.
5.	Fields surveillance on the BPH occurence in West Java, North Sumatra and Aceh	1) To know the fluctuation of BPH populations in many places in Indonesia	June 1981 to January 1983	Several kabupaten in West Java province : Sukabumi, Serang, Pandeglang, Cianjur, Bandung and Tasikmalaya	1) Acreage of paddy field planted with susceptible varieties was very limited During the period of June 1981 untill january 1983 in West Java, the population of the BPH was very low.
		2) To check BPH's ability to attack resistant varieties			2) In Karawang, Subang, Serang and Sukabumi, nymphs were found on resistant varieties PB 42, IR 36 and cisadane.
					3) In same place in West Java, The BPH started to estabish sucsesive generation on resistant varieties.
					4) In North Sumatra, population density of the BPH and degree of damage caused by BPH on PB 42 and same others resistant varieties are almost the same as susceptible variety.
					5) The ability of the BPH populations in North Sumatra to attack resistant varieties with the bph-2 gene is higher than population from others area.

No.	Activities	Purpose to activities	Year of implementation	Location	Result
6	Field ecology of the BPH population in Northern part of West Java	1) Clarification of basic pattern of the population build up of the BPH in the field 2) Determination of key stages for monitoring and control of the BPH 3) Estimation of control threshold at each key stage	April to September 1983	1) Rengasdengklok Karawang 2) Jatisari, Karawang 3) Pagaden, Subang 4) Kalijati, Subang 5) Bangodua, Indramayu. Totally 40 observatory plots were set up in the above places.	1) In Pelita fields, the BPH builds up population through three distinct stages : (1) Macropterous immigrant stage (G-0) at 20 - 40 DAT (2) Brachypterous stationary stage (G-1) at 50 - 60 DAT (3) Hopperburn-causative stage (G-2, G-3) after 70 DAT. 2) Maximum densities of macropterous immigrant at 20 - 30 DAT and brachypterous females at 50 - 60 DAT are the critical target for forecasting the subsequent population upsurge. 3) Tentative control threshold at the both stages are 0.2 - 0.5 and 2 5 females per hill. Application of the insecticides should be timed to the peak population of nymph derived from immigrant or brachypterous females at stationary stage.
7	Laboratory analysis of the BPH biotypes	1) Purification of the biotypic populations 2) Analysis of genetic nature of biotypes 3) Clarification of mechanism and mode of biotypic shifts.	1983 to 1984	Laboratory of BPH forecasting, Bogor Research Institute for Food Crop	1) Purification of excisting biotypes and establishment of new biotypes on selected resistant rice varieties are in progress. 2) It is becoming evident that biotypes are genotypically heterogeneous, and their host resistance-breaking ability is a polygenic trait. 3) The North Sumatra populations of the BPH developed on IR 42 were identified as a biotype 3 which are virulent only to IR 42, ASD 7, and Pelita 1/1. They have no ability to feed on Mudgo, Babawee, Cisadane, IR 36 and IR 56. 4) Host resistance-breaking ability of the North Sumatra population is mostly lost by hybridization with biotype 1. It declined quickly on susceptible varieties too.

No.	Activities	Purpose of activities	Year of implementation	Location	Results
					5) A BPH ecotype feeding on Leersia hexandra was discovered. Reproductive isolation and incompatible host selection behavior were disclosed between Leersia-BPH and rice-BPH.
8	The "rice garden" experiment	1) Examination of population dynamics of the BPH in BPH-epidemic areas 2) Determination of biotypic nature of the BPH population in BPH-epidemic areas 3) Demonstration and extension of BPH-forecasting fields.	July - December 1983	Lubuk Pakam, Deli Serdang, North Sumatra	1) Very quick population build up was observed following an early and intensive immigration. Consequently brachypterous females appear as early as at 40 DAT. But subsequent progenies declined because of drought condition. 2) Significant differences in the BPH density at 6 different stages were found among 7 varieties planted at the "rice garden". The BPH reproduced only on IR 42 as well as on Pelita 1/1, while the density was very low on IR 42 IR 56 and Bahbolon. These results indicated again that the present BPH population in North Sumatra is a biotype 3 adapted to IR 42. 3) IR 42 and Pelita 1/1 were also seriously infected with grassy stunt virus. 4) Usefulness of the "rice garden" for qualitative and quantitative forecasting on the BPH population was well demonstrated.

Ecological studies on brown planthopper in wet season in North West Jawa

MR M. Tsurumachi (JICA, Japan)

IR Irwan K. (Directorate of Food Crop Protection, Indonesia)

Report of the research activities during 9 Nov. 1982 to 8 May 1983 in Indonesia-Japan Joint Food Crop Protection Project (ATA0162)

(Extract)

Introduction

In tropical regions, resistant rice varieties are regarded as primary control measure of brown planthopper (BPH). On the other hand modern or native varieties susceptible to BPH are also cultivated more or less widely. Often they exceed resistant rice in quality of product or in productivity. BPH also has developped their biotypes which attacks resistant rice. Still, need for chemical control does not become small.

So far as we know, chemical applications seem to be not so effective as expected in the actual rice fields. Very often they seem to show failures to protect rice production from BPH injury.

In order to improve a system of surveilance and control or to establish strategy of the use of varietal resistance, we need more understanding about the BPH ecology. Research results have been accumulated about the ecological aspects of BPH in tropical regions. Still there are many disagreements in the basic understanding of BPH Ecology, such as patterns of population growth, dispersal, or morphism in the paddies.

We tried to get more clear-cut understanding about BPH bionomics in wetseason of North West Jawa.

We express deep gratitude to the members of ATA-162, the Authorities concerned and local staffs of the pest forecasting offices and of the pest control offices.

Conclusions

Informations from the officials and from farmers indicate that the occurrences of BPH and WBPH of 1982/83 wet season were much severer than in normal years.

So far as we observed, damages of these outbreaks did not occurred in a large scale, if speaking about the general situations in North West Jawa. Even though severe outbreaks of BPH and WBPH were observed in several areas, on most of paddies and susceptible rice varieties, populations of BPH did not rise to dangerous levels without any chemical applications.

For these 5 years, no breakdown did developped on resistant rice varieties in the surveyed areas.

So far judging from these two facts, we regard today's status of BPH in the surveyed areas as one example of successful control of this insect.

For the targets of further researches, the improvements of chemical application in emergency seems to be urgent. The emphasis will be on how to determine control practice to get enough effect and also to avoid excessive applications. We observed failures of chemical control frequently. We do not have any firm evidences in this area about the positive resurgence of BPH which was studied by IRRI, but judging from the circumstances here and in Thailand where heavy chemical sprays and heavy occurrences of BPH frequently co-existed at the same areas, it is desirable to avoid excessive chemical use.

Another and more basic future target of researches seems to be the analysis of some examples of successful BPH control where no breakdown of resistant rice varieties occurred for quite a long period, namely North West Jawa, Thailand, Philippines, etc. An emphasis will be on the ecological aspects in the development of biotypes.

2. Growth patterns in paddy populations. (Experimental populations)

Method

Population growth was studied in paddy fields by released BPH. BPH females were prepared for releasing in screen cages covering 4 to 9 rice plants in paddy. Around 20 females of macropterous or brachypterous forms (seed females) were collectted from paddy rice, rice nurseries or from other field cages. 20 seed females produced around 1,000 females during 25 day rearing in field cage. 90 to 95% of the females was brachypterous form in this experiments. These brachypterous females were used as the initial populations. These females were transferred by insect aspirater on rice plants carefully. 3x3 to 5x5 rice plants were inoculated with 5 to 40 females per one hills. Regular estimate of populations were carried out by visual count. At the beginning of experiments, some plots were equipped with a fence of mosquito net for fear of free dispersion

of initial females, but as the dispersion was not so significant, every plots were kept under complete open conditions.

Result and discussions

ean longevity of female adults was calculated as around 3 days by decline in number of the released females (Fig. 3, Fig 4). Number established was estimated as around 80% by estrapolation. The difference between the number released and the number established was assumed to the unstable conditions of insects just after releasing manipulation and partly due to our ability of visual counting. Any way this estimates showed almost same value with the experiments of same design in Thailand.

Population trends in plots inoculated on 4 and 5, January were presented in Fig 4 and 5. Populations in these plots started with 2.6 and 7.4 individuals/ hill and reached around 1,000 nymphs/hill after two reproductions. The rice suffered hopperburns. When started in younger rice stage (Fig. 5), brachypterous form seemed to show bigger portions in the first reproduced generation.

40 B-females/hill was inoculated on 19 January. Only 16 of them were observed next day by visual count (Fig 6). Booting stage of rice prevented effective visual count. Infants of inoculated population destroyed rice plants when they reached emergency stage of BPH.

10, 20, and 40 B-females/hill were inoculated on 4 February to the rice of tillering stage. 3.5, 9.5, 23.7 individuals/hill were detected next day by visually. When this inoculations were started, quite a high natural populations existed already. At the end of February, quite a high population seemed to exist in the inoculated plots. These were regarded as the mixture of natural and experimental populations. Sequential populations did not occurred.

The trend of the experimental populations are summarized in Table 1. The reproductive rate of populations became smaller in later calender dates. The result was out of our anticipations. Natural population trends in susceptible rice varieties in low land also followed along the same line of this experiment. We had not expected that Pelita paddies which were transplanted in earlier calender dates were more sensitive to hopperburn than the same

variety started later in the season. Immigration of BPH were more plenty in later period of wet season.

Pelita fields transplanted in November in the Laboratori started with almost undetectable low initial populations until January and reproduced secuential populations which rised to the population levels causing partial hopperburn by clumped space distribution or entire hopperburns. Pelita paddies which started on December to March in the Laboratori did not sufferred any outbreak of BPH without chemical sprays. Immigrant and sequential populations in these paddies were at quite a high levels and decreased in last rice growth stage. On a farmer's pelita which started on December, the BPH population approached dangerous density in spite of frequent chemical sprays. On a local rice variety and a pelita paddies which started in January and February rather plenty immigrant and nymphal inflow from nursery did not reach hopperburn density levels without chemical applications in Karawan.

One possible hypothesis for this rather curious trend might be assumed to the balances of BPH and its natural enemies. In later period of wet season in low land rice area, more mirids were detected by light trap at Jatisari. IRRI researches showed the importance of Microvelia, researchers in Thailand regarded egg parasites as regulating factors. Regretfully, we did not

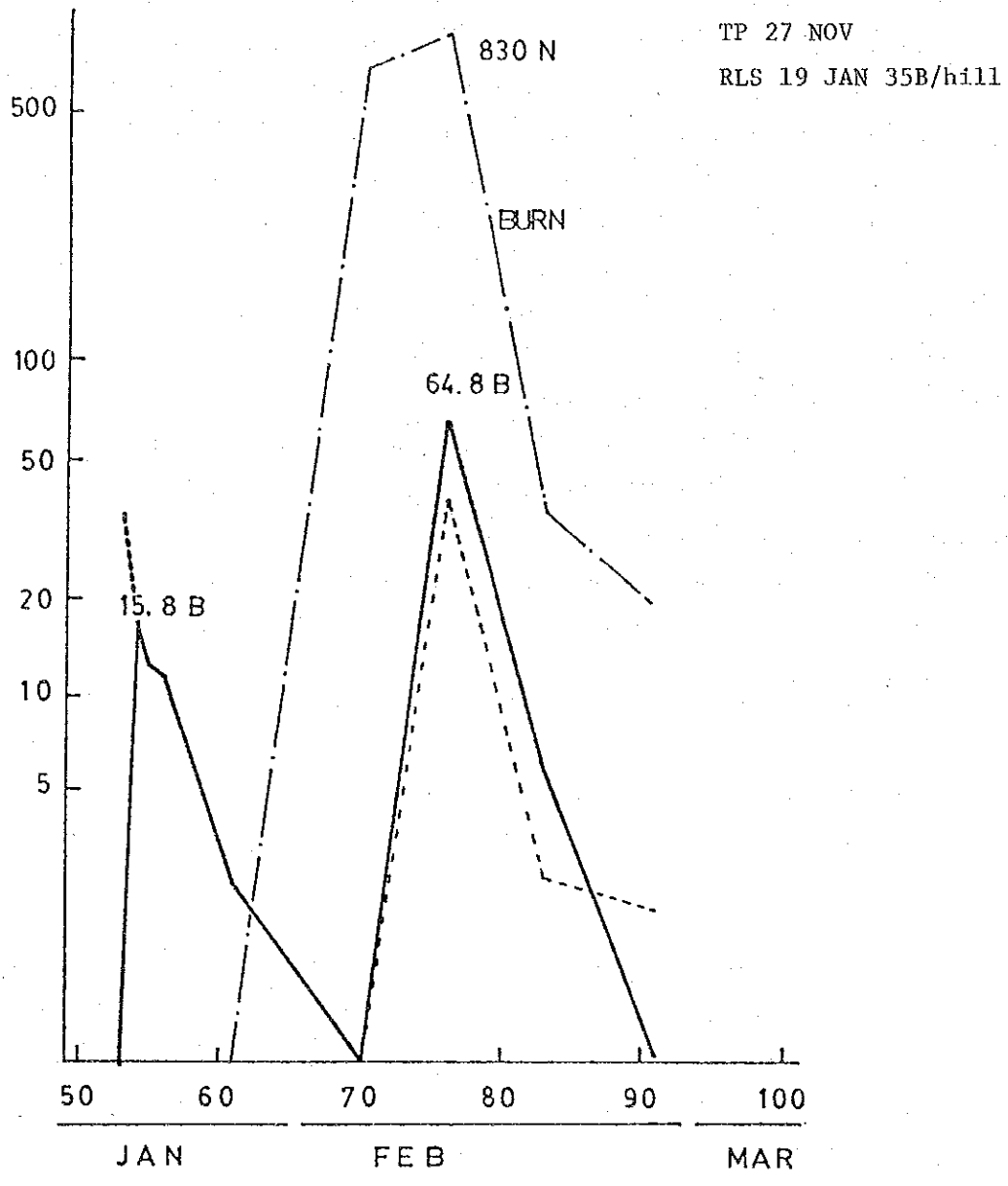


Fig. 7 Population trend of BPH. Initial population was inoculated on 19 January 1983 on Pelita, 53 days after transplanting.

Activities of Study on Pesticide Analysis in the Period 1981 - 1983

No.	Activities	Purpose activities	Year of implementation	Location	Results
1.	Determination of Organophosphate and Organochlorine pesticides by Thin layer Chromatography	To know the active ingridient obtained in a formulation.	1982/1983	Pesticide Laboratory Directorate of Food Crop Protection Pasar Minggu.	Have been increasing of staffs skill.
2.	Qualitatives and quantitative analysis by Gas Chromatography	To know the formulation quality of pesticide	1982/1983	Pesticide Laboratory Directorate of Food Crop Protection Pasar Minggu.	Most of pesticide could be desected specially for organo Chlorine and organo phosphate
3.	Residue monitoring	To know the pesticide residue on vegetables and food crops	1982/1983	West Java	Pesticide residue are was found but very low. (still far lower than residue tolerance)

Activities	:	Research on tungro virus disease
Purpose	:	1. To Study the distribution of RTV disease in Indonesia from various cooperations
		2. To study simple method of serology
Year of implentation:		1980 to 1984
Location	:	1. Indonesia
		2. Laboratory of pest and disease of food crop Bogor
Result	:	1. The tungro was spread in Java, Bali, Sumatera, Kalimantan, Sulawesi in 1980 to 1982.
		2. In Pekalongan, Yogjakarta and Bali, the virus epidemic become more widely distributed.
		3. The simple method of serology is SSEM (Spesific Serology by Electron Microscopy) The tungro desease was ditected by antiserum from Dr Hibino and result was clear positif

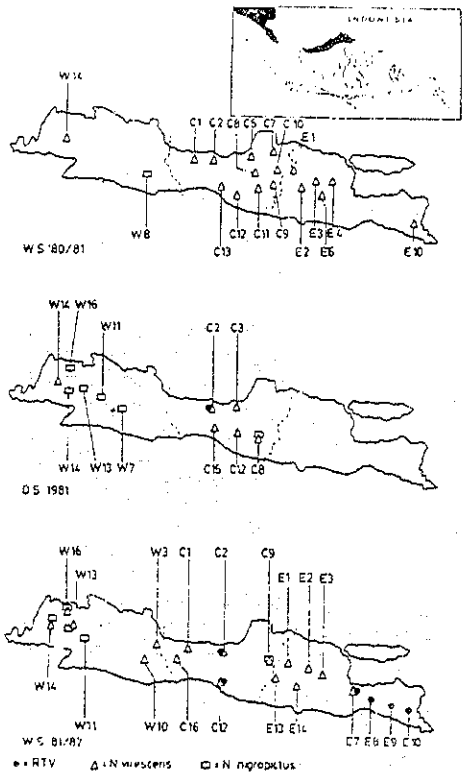


FIGURE16. DISTRIBUTION OF N.virescens AND N.nigropictus AT SELECTED LOCATIONS (MORE THAN 10 INSECTS PER 25 SWEEPS) AND INCIDENCE OF RTV

FIGURE 17. LOCATIONS OF RICE TUNGRO VIRUS (RTV) INCIDENCE IN INDONESIA AND DISTRIBUTION OF N. virescens

Increased populations of N. virescens are indicative of the potential of RTV incidence as shown in Figures 16 and 17.

Examination under the electron microscope of suspected RTV infected plants reveals that RTV occurred at Lumajang, Pasuruhan, Jember, Banyuwangi (E. Java); Pekalongan, Yogyakarta (C. Java); Simalungun (N. Sumatra); Lubuk Alung (W. Sumatra); Kutai (E. Kalimantan); Pontianak (W. Kalimantan); Barambai (S.Kalimantan); Palu (C. Sulawesi); and Lombok. No samples of Nephotettix were received from Simalungun, Pontianak and Kutai.

ACKNOWLEDGEMENT

We are indebted to Dr. S. Nasu, Japanese expert under ATA-162 Project, Directorate of Plant Protection, Jakarta, Indonesia, who provided us with some of the Nephotettix specimens (from Central and South Sulawesi) used in this study and for his technical guidance.

REFERENCES

Bernsten, R.H., B.H.Siwi and H.M. Beachell (1982). The Development and diffusion of rice varieties in Indonesia. IRRI Research Paper Series No.71. January 1982.

Fachruddin (1980). Tungro dan species wereng hijau pada tanaman padi di Bali. Unpublished mimeograph, 8 pp.

Ghauri, M.S.K. (1971). Revision of the genus Nephotettix Matsumura (Homoptera: Cicadellidae) based on the type material. Bulletin of Entomological Research 60 : 481-512.

Halteren, P.V. (1979). The insect pest complex and related problems of lowland rice cultivation in South Sulawesi, Indonesia. Mededelingen Landbouwhogeschool, Wageningen, Nederland 79 - 1 (1979) : 111 pp.

Hokyo, N.A. Otake, and T. Okada. (1977). Species composition of Nephotettix (Homoptera: Cicadellidae) in West Malaysia and Indonesia. Applied Entomological Zoology 12 (1) : 83-85.

Ling, K.C. (1975). Experimental epidemiology for rice tungro disease Part I. Effect of some factors of vector (N. virescens)on disease incidence. Philippine Phytopathology 11, 11-20.

Oka, I.N. (1971). On an outbreak of a rice disease showing tungro symptoms in South Kalimantan, South Sumatra and Lampung provinces. Unpublished mimeograph, 4 pp.

_____(1977). Virus disease of food crops in Indonesia and their control. Tropical Agriculture Research Series 10, 37-43.

Ou, S.H. (1965). Rice diseases of obscure nature in tropical Asia with special reference to "mentek" disease in Indonesia. International Rice Commission Newsletter 14, 4-10.

Rao, P.S., Shagir Sama, Koesnang and P. van Halteren (1976). Green leafhopper infestation in South Sulawesi. Rice Entomology Newsletter 4, 5 pp.

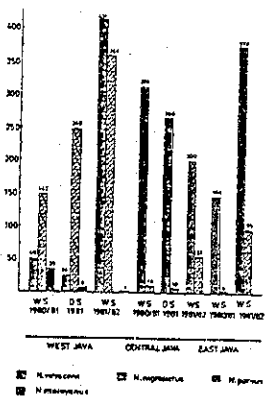
Rivera, C.T., S.H. Ou, and D.M. Tantera (1968). Tungro disease of rice in Indonesia. Plant Disease Report 52, 122-124

Shagir Sama, Koesnang (1980). Laporan hasil peninjauan serangga tungro pada PB 36 di daerah Bali, 21-25 Desember 1980. Lembaga Penelitian Maros, 14 pp.

ACTIVITIES OF STUDY GROUP ON THE GLHs GENUS NEPHOTETTIX MATSUMURA

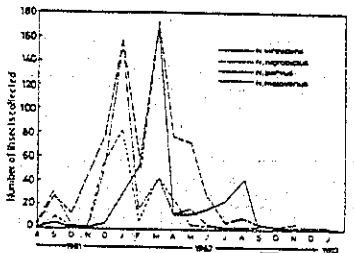
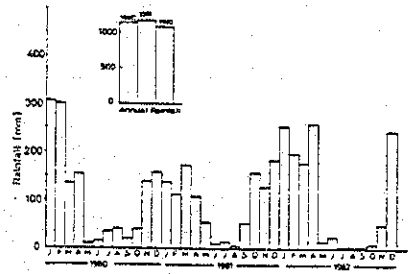
DURING THE PERIOD 1981 - 1984

No.	ACTIVITIES	PURPOSE	YEAR	LOCATION	RESULTS
1	Extensive Survey	A faunistic survey on the species composition and distribution of GLHs and the spread of RTV.	1981-1982	Java Island	Four species of Nephotettix have been recorded i.e.N,virescens,N,nigropictus N.malayanus, and N.parvus. The first two species were the most widely distributed, while the other two were collected only at Sukamandi, West Java. N.virescens the most efficient vector of RTV, has been recorded as the dominant species in almost all survey sites, except in West Java during WS 1980/1981 and DS 1981.. Hence, the recent outbreak of RTV in several regions such as Pekalongan(1981), Yogyakarta(1982), East Java(1982), Bali(1980) etc. Distribution map has been published. There has been a major change in the composition of rice cultivars used by farmers in Indonesia within the last 10 years such as IR26, IR34, IR36, IR42, Cisadane. IR36 was the most widely planted variety and relatively high numbers of N.virescens were collected on IR36. The relationship of species composition of Nephotettix and diffusion of HYV with multiple resistence to diseases and insects in Indonesia is still not fully understood and needs further study. An outbreak of tungro on IR36 which was reported to be resistent to tungro and N.virescens indicates the danger of planting a single variety for several successive seasons. In RTV outbreak areas, 99% of Nephotettix collected was N.virescens with very high population density (more than 100/25 strokes). So increased population of this species are indicative of the potential of RTV incidence.
2	Identification of GLHs,samples received from various cooperators in Indonesia	The change in the techniques of species identification from external characters to male genitalia has ensured more accurate species diagnoses. Accurate identification is first prerequisite to a rational pest management programme, and strengthen forecasting and monitoring systems.	1980-1983	Laboratory of BORIF	Out of 1550 sample specimens examined, two species i.e. N.virescens and N.nigropictus, one sub species, N.nigropictus yapicola and 5 specimens of undescribed species were recorded. N.virescens being the dominant one. N.virescens from Java and N.virescens from South Sulawesi differ in the mean number of teeth on eadeagus and pygofers (4,36 and 5,64 for South Sulawesi and 3,53 and 4,67 for Java, respectively).



TABEL I SPECIES COMPOSITION OF ADULT NEPHOTETTIX SAMPLES RECEIVED FROM DIFFERENT REGIONS IN INDONESIA, 1980 - 1983

Region	Year	N,virescens	N,nigropictus	N,nigropictus yapicola	Others
Kendal, C. Java	1980	5	20	-	-
Kendal, C. Java..	1981	16	6	-	-
Pekalongan,C.Java.	1981	266	2	1	-
Sleman,C.Java	1980	7	-	-	-
Mojosari,East Java	1980	10	-	-	-
Banyuwangi,East Java	1981	51	3	-	-
Bali	1981	8	-	-	-
West Sumatera,	1980	67	20	-	-
South Kalimantan	1981	37	67	-	-
Lombok	1981	17	-	-	-
South Sulawesi	1981	186	8	-	-
Luwu, South Sulawesi	1981	73	-	-	-
Palu, C.Sulawesi	1982	29	-	-	-
Manado, North Sulawesi	1983	429	-	248	5

No.	ACTIVITIES	PURPOSE	YEAR	LOCATION	RESULTS
3	Identification of GLHs from light trap catches at Sukamandi, West Java.	Idem No. 2	1981-1983	Laboratory of BORIP	Out of 1644 Nephotettix specimens collected, 4 species were identified i.e. N.virescens, N.nigropictus, N.malayanus and N.parvus, N.nigropictus (453 ♀, 232 ♂) outnumbered the other species during this period. The number of N.virescens and N.parvus caught were approximately half that of N.nigropictus; (185♀, 195 ♂) for N.virescens and (203♀, 146♂) for N. parvus, respectively. Fewest ~~number~~ of N.malayanus were caught (183♀, 470♂) approximately one third the number of N.nigropictus. The population of N.virescens fluctuated at a low level from August to December 1981, increased to a peak in March 1982, and decreased sharply in April. A second minor peak occurred in August after which the population declined to low levels. The situation was different for N.nigropictus, when the population fluctuated at rather low levels from August to October 1981, increased dramatically in November and reached two high peaks in December 1981-January 1982 and March-April 1982. The population then dropped to low levels from August 1982 to January 1983. The peak population of N.parvus was in December 1981-January 1982, and population was also rather high during September 1981, March and May 1982. N.malayanus followed a similar pattern, but at lower levels than N.nigropictus and N.parvus (see Figure 1).  Figure 1 : Number of Nephotettix spp. caught in a light trap at Sukamandi, August 1981 to January 1983.  Figure 2 : Rainfall during 1980, 1981 and 1982 at Sukamandi, West Java. An extended dry period occurred in July to November 1982, as indicated by the rainfall pattern (see Figure 2). Consequently the wet season started late resulting in delayed planting of the wet season rice crop. This may be the reason why the population of Nephotettix spp. from August 1982 to January 1983 was very low compared to corresponding months in 1981. In sweepings from various weeds at Sukamandi in 1983, N.malayanus was much more common than N.nigropictus. From 15 samples (25 strokes per sample only 9 specimens of N.nigropictus and 84 of N.malayanus were caught. No N.virescens or N.parvus were collected from the weeds. This can be understood for N.virescens which has a greater preference for rice as its host than do the other three species. But the host plant preference of N.parvus is still not understood. This species was caught only in the light trap but not by sweeping either from rice plants or gramineae weeds.
4	Intensive Survey	To study phenology and seasonal fluctuation, population balance, and sex ratio in the field samples.	1982-1983	Citamiang and Karanganyar (West Java)	At Citamiang N.nigropictus occurred more on grasses than on rice plants. Population of N.nigropictus fluctuated during the survey period, the highest peak occurred around mid August 1982 and three other peaks occurred on early July 1982, mid-Feb.1983 and by the end of March 1983. N.nigropictus was alsofound on Cisadane, IR36 and local varieties at Citamiang but at lower population levels. Relatively high population of N.nigropictus was foundon Cisadane on July 21, 1982 at the time when the population on grasses dropped to a low level. Another peak population of N.nigropictus at Citamiang occurred on Cisadane, IR36 and local varieties by the end of March 1983. From early September until early December 1982 there was no rice plant in the field at Citamiang, but N.nigropictus may still survive on grasses.

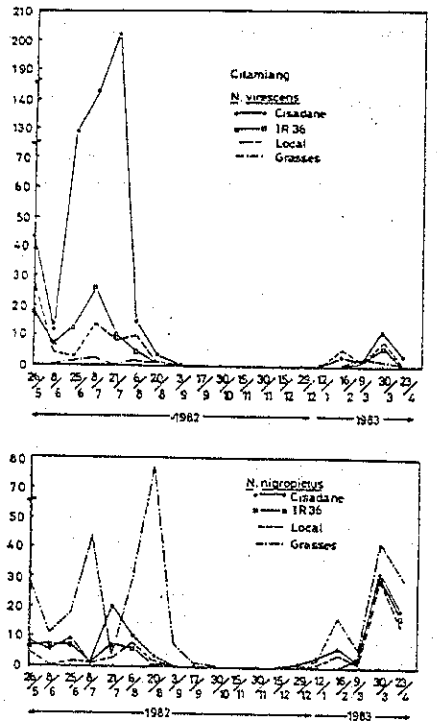


Fig.3 Population fluctuation of N.virescens (above) and N. nigropictus (below) on Cisadane, IR 36, Local and weeds at Citamiang, Piered, Purwakarta every 25 strokes 2 weeks interval, during 1982-1983.

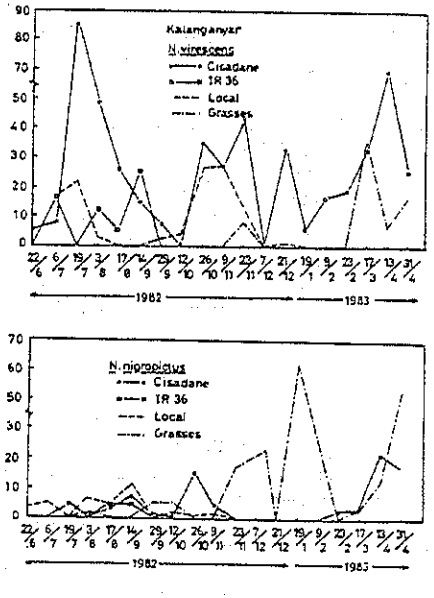


Fig.4 Population fluctuation of N.virescens (above) and N.nigropictus (below) on Cisadane, IR 36, Local and weeds at Kalanganyar.

5 Life history of Nephotettix spp. in laboratory	To study life history and reproduction of N.virescens N.malayanus; N.nigropictus.	1983-1984	Laboratory of BORIF

RESULTS

At the same location N.virescens gave a completely different picture. High population of N.virescens occurred on rice from early June until early August 1983 with peaks occurring in July 1982. The highest peak occurred on Cisadane on July 21, 1982 while much lower peaks occurred on IR36 and local variety on July 8, 1982. This suggests that Cisadane was more preferred by N.virescens over IR36 and local varieties. During the same period, very low numbers of N.virescens were caught on grasses.

From early September until the end of December 1982 there was no rice crop in the field hence no N.virescens could be caught on rice. Interestingly during this period no. N.virescens could be caught from grasses at Citamiang.

The population of N.virescens started to build up again in January 1983, although no single specimen could be caught for about 4 months. It is still not understood from where N.virescens originated to start its initial population build up in January 1983. During the survey period both N.nigropictus and N.virescens occurred at Citamiang. However, there seems to be a host discrimination between the two species. Whenever there was a rice crop in the field N.virescens multiplies very rapidly particularly on Cisadane, while N.nigropictus will confine itself on grasses.

On the other hand, when there is no rice crop in the field, N.virescens will completely disappear, while N.nigropictus may still survive on grasses. The situation in Kalanganyar is quite different. Rice crop is present all year around, hence population of N.virescens fluctuates very widely according to varieties planted with several peak occurring during the survey period. The highest peak occurred on Cisadane suggesting Cisadane was more preferred by N.virescens over IR36 and local varieties. This confirms the result obtained at Citamiang. N. nigropictus is also present all year round with wide fluctuations, but is mostly confined on grasses. This again suggests that grasses are the most preferred host of N.nigropictus.

The fact that no single N.virescens specimen could be caught at Citamiang for about 4 consecutive months (Sept.to Dec.1982), but started to build up again in January 1983 raised the question whether or not it hybernates on weed or possibly it migrates from other remote places.

	N.virescens	N.malayanus	N.nigropictus
-The number of eggs laid by a female	TNI	Leersia	IR36
	365	35.5	(not yet observed)
-Pre-oviposition period(day)	4-15	9.1	-
-egg period(day)	9.0	9-10	-
-nymphal period(day)	20.0	19.12	17.81
-Adult longerity(day)	40(♀);32(♂)	8.66(♀);7.15(♂)	7.66(♀);4,93(♂)

No.	ACTIVITIES	PURPOSE	YEAR	LOCATION	RESULTS
					Out of 150 nymps of N.malayanus observed in individual test tubes with Leersia hexandra as food, only 60 (26♀, 34♂) attained the adult stage with 60% mortality rate. The nymphs started to die from the second instar onwards, with mortality higher in older than in younger nymphs. While 150 young hatched larvae with TNI as food have never reached adulthood.
6	Rearing of pure colonies of N. virescens in individual test tubes	To provide pure colonies population of Java and South Sulawesi, to be used for differential reaction of some rice varieties.	1983-1984	Laboratory of BORIF	The Java and South Sulawesi populations were reached in the fourth generation in the laboratory. Unfortunately the mortality was very high. Another method of rearing will be conducted. Preliminary results of differential reaction of four rice varieties to South Sulawesi colony is as follows :

	Mortality (%) South Sulawesi	Mortality (%) Java
IR8	59,6	
ASD7	97,1	
TNI	49,2	Still in progress
Pankhari 203	96,8	

7	Rearing of pure colonies of N. nigropictus on IR36	To study the possible adaptation of N. nigropictus on IR36	1983	Laboratory of BORIF	All specimens died after 3 generations in the test tubes experiment.
8	Morphological aspects to study external and internal structures in males and females within and between population of GLHs from different geographical regions of Indonesia.	To throw light on the possibility of the presence of geographical variation based on morphological characters the real numbers of species present in Indonesia and their distribution.	1983-1985	Laboratory of BORIF	Programme of study leading to Dr. of Science degree.

A summary report

on

the rice gall midge study group
(ATA 162)

in 1982/1983

By

Dr. Terunobu Hidaka[1], Mr. Erma Budianto[2]

Mr. Subroto Wahono Gaib Sarihito[3]

and

Mr. Nyoman Widiarta[3]

1) An Expert of rice entomology (ATA 162)

2) Pest Control Section, Directorate of Food Crop Protection

3) Forecasting Section, Directorate of Food Crop Protection

August 31 1983

Introduction

It is well known that a long and serious drought had been occurred in Java Island at the end of 1982. Then, transplanting of rice plants was remarkablly delayed nearly one month comparing with the previous year 1981. In Cirebon where the field experiments of the rice gall midge have been carried out since 1981/1982, transplanting was exceptionally done from January to February in the wet season 1983.

In such abnormal weather condition, it si the most important to investigate on effect of serious drought on the rice gall midge occurrence. The authors have no any information whether or not the data on insect occurrence were obtained under serious drought which is said to be occurred every 10 years such as 1962, 1972, and 1982 in Indonesia.

In present report, the results obtained in the field experiments of the rice gall midge are briefly summarized according to the following study subjects. 1) Field survey of occurrence and damage caused by the insect, 2) Mechanism of population fluctuation of the insect affected by biological and physical factors, 3) Injurious level, 4) Field screening of resistant variety and 5) Field screening of insecticides for control of the rice gall midge.

1) Field survey of occurrence and damage caused by the rice gall midge

The field survey has been conducted a total of 6o localities in 11 Regencies in West Java by the expert, 3 assistant counterparts, and 5 spot-workers (observer at present).

As given in Tables 1 - 2, serious damage was seen at Widasari in Indramayu, Geyongan in Cirebon, Dawuan and garawangi in Majalenka. In these areas, it is interesting to note that, at first, the insect damage was rather low in the tillering period, however, damage started to gradually increase in unproductive tillers only from the panicle primordium formation stage to the booting stage. Therefore, rice yield was not so affected by the insect attack. It is considered that population increase was distinctly delayed by the long drought, then, the insect attacked only unproductive tillers and fortunately productive tillers to make panicles were insured. In the other areas, the insect was considered to be not economically important. During the dry season, the infestation by the insect was observed to be very low.

In the parasites activities as given in Tables 1 - 2, parasitism was clearly higher in Sumedang, Cianjur, Sukabumi, and Bogor than in low land areas. The parasites are consisting of Platygaster oryzae and Neanastathus oryzae and can be able to maintain their population in high level, this may concern concecutive transplanting throughout the year. However, the along alang gall midge, which occurs in the dykes in paddy fields, is also found to be important as an alternate host of the parasites. As shown in Tables 3 - 4, two kinds of the parasites were found in Sukabumi on the along along gall midge. This is a new record to the science. Then, the alang alang gall midge is certified to be a source of the parasites occurrence.

A predator, Amblyseius imbricatus C & R., is also important species to attack eggs of the rice gall midge. Relationship between the rice gall midge and the predator occurrence is analyzing based on the materials collected in paddy fields by the sweeping method in West Java, now in progress.

A part of the data obtained by the field survey carried out in Cirebon by the spot-workers is given in Tables 5 - 6. It is obvious that infestation of the rice gall midge is distinctly higher in the wet season than in the dry season as also seen in Karawang and Subang. So far as the field survey is concerned, high infestation in the dry season has not been observed in West Java, Indonesia. In paddy fields in low land area, parasitism is to be always lower than in high land fields. This may be caused b y the off season of rice from September to November and low population of the rice gall midge in the dry season. The concecutive cultivation of rice plants with different growing stages is effective for maintaining parasite population.

2) Mechanism of population fluctuation of the rice gall midge and factors affecting population dynamics

In the field experiments at Kertasura and BPP Byalangu in Cirebon, the studies have been carried out to clarify the population dynamics tc be enable forecasting method of the insect pestin the following viewpoints, a) difference of population fluctuation between the dry and wet seasons, b) different planting dates in the wet season (transplanted in January and February) and c) low

and high infestation areas in Cirebon (BPP Bayalangu and Kertasura) in 1982/1983.

As given in Table 7, population density of the rice gall midge is quite different from the planting dates. The number of developmental stages of the insect is the lowest in the dry season crop in 1982 and the highest in the wet season crop transplantied in February 5 1983. During the wet season, population of the insect is observed to be higher planted February than in January. As mentioned above, transplanting of rice planting could not be done in December due to serious drought in 1982. This tendency of population fluctuation of the insect was also observed in BPP Bayalangu (10w infestation area) throughout the year as given in Table 8. It is clear that the rice gall midge must be controllws mainly in the wet season crop. The insect is easily able to increase the population during the wet season even in low infestation area as seen in BPP Bayalangu.

As shown in Figures 1 - 3, seasonal fluctuation of number of the developmental stages of the insect is observed. In the dry season 1982, number of eggs were very low, then a peak of each generation in the planting period can not be observed. On the other hand, number of edds were sharply increased in the wet season crop of rice. About 3 peaks of number of eggs were observed in both planting dates. These peaks were observed to occur at the same time after transplanting even in the different planting dates. Laraval occurrence was also as well as fluctuation of eggs. Generation of larval stage is observed to be not so clear. However, occuring pattern of larvae was to be somewhat irregular in the planting period, 3 peaks seem to be observed. These peaks were observed to be different from the planting dates, a big peak occurred in 50 days after transplanting on February 5 1983.

The hymenopterous parasites, Platygaster oryzae, Neanastathus oryzae, and Obtusiclava oryzae, were also investigated on effectiveness for control of the rice gall midge in Kertasura and BPP Bayalangu. As given in Table 7 - 8, it is concluded that these parasites have not shown any important role for depressing the insect population because the population was very low in all planting dates. The parasites appeared from 25 days after transplanting on May 5 1982, as well as 40 days planted on January 20 and 35 days planted February 5

in Kertasura respectively. However, no parasite was found in rice fields planted on May 5 1982 at BPP Bayalangu. However, the parasites start to occur at 80 days after transplanting on January 3 and at 50 days after transplanting on February 5 respectively. It is understood that the parasites appearence was earlier in Kertasura than in Bayalangu.

A predator, Amblyseius imbricatus, is also one of important natural enemies of the rice gall midge. The relationship between the predator and the host insect is investigation now in progress.

The meteorological factors i.e. precipitation, air temperature, relative humidity, sunshine duration, sun energy, wind direction and velocity are also studied in both Kertasura and BPP Bayalangu. The micro-climathology i.e. temperature, humidity and water temperature is checked among rice hills in the experimental fields. The effect of the meteorological factors on the rice gall midge population has been studied now in progress.

Continuous field experiments of the rice gall midge are needed to analyze the relationship between the insect and related factors.

3) Injurious level for control of the rice gall midge

In the field experiments on the injurious level, an insecticide, Ekalux 5% granule, was applied at the rate of 1 kg (A.I.) per hectare and application times were 1, 2, 3, 4, and 5 at the interval of 10 days after transplanting.

As given in Table 9, a) effective timing of application is recognized to be 2 times at 10 and 20 days after transplanting. More than 3 times application are not needed in order to be economically minimized number of the application times. However, one time application was not obtained to be effective control. b) in the relationship between damaged tillers and number of panicles, 9.37 panicles per hill were formed at 2 times application. However, number of panicles in non treatment and one time application were 7.10 and 6.97 respectively. Rice yield was observed to increase from 10 kg to 15 kg/50 m^2 in proportion to the increase of application amount of the insecticide. A high significance between yield and damaged tillers, number of panicles and damaged tillers, and number of panicles and yield was recognized as given in Table 9.

Early finding of percentage of damaged tillers especially within 30 days after transplanting is the most important for control of the rice gall midge. From the results obtained in the field experiment, 10 % of damaged tillers are suggested to be critical level necessary for control measures. Checking time for percentage of damaged tillers must be done at 14 and 28 days after transplanting. 20 hills of rice plants are sampled at random for each checking time, all of tillers are carefully dissected by a shaving razor to collect larvae of the rice gall midge for calculating percentage of damaged tillers. Number of sampling hills are 20 which are considered to effectively cover 3 to 5 hectares.

4) Field screening of resistant variety to the rice gall midge

As shown in Table 10, a total of 11 varieties were examined such as 6 varieties from Thailand, 2 from India and 3 from Indonesia. The following varieties, RD 11, RD 4, MN-62M, Phaelgune, Surekh and GH 27 showed the moderate resistance to the insect. However, the other varieties are identified to be the susceptible. Some of the varieties were observed to be seriously attacked by the white backed planthopper, Sogatella frucifera. RD 4, RD 11, RD 9, MN-62M, Phaelgune and Surekh were damaged by the hopper from 70 days after transplanting. It can be said that varietal resistance between the rice gall midge and the white backed planthopper was seen different reaction for each varieties. Multiple resistant varieties are needed to establish for control of the key pests of rice plants in future.

5) Field screening of effective insecticides for control of the rice gall midge

As shown in Tables 11 - 12, 6 kinds of granular insecticides were examined at Kertasura in Cirebon for finding effective insectsides. In the trial, Ekalux 5 G and Furadan 3 % were used as the standar insecticides. These insecticides examined were applied at 14 and 28 days after transplanting at the rate of 0.5 kg (A.I.) per hectare.

As the results obtained from the trial, effective insecticide except the standard ones was not found. Diazinon M was fairely good comparing with non treatment plot, however Ekalux 5 % and Furadan 3 % were more effective than Diazinon M. Number of galls per hill was less than 7 in Ekalux 5 %, Furadan 3 % and Diaginon M, however more than 11 galls in other insecticides. Although number of panicles was not recognized to be different in these insecticides examined, rice yield was higher in order of Furadan 3 %, Ekalux 5 %, Padacin 5 %, and Diazinon M.

6) Recommendation

1. One of the field experiments, "the factor analysis of the rice gall midge occurrence" has been successfully carried out in 1981/82 and 1982/83 in Cirebon in order to clarify mechanism of population dynamics of the insect. The experiment is suggested to be important for establishing PRACTICAL forecasting method in Indonesia. However, the experiment of the factor analysis is needed at least more than 5 years to accumulate enough data of the biological and physical factors. Therefore, all data of these factors are computerized to make important relationship between the insect and factors for complete the forecasting technology.

2. In Cirebon, many kinds of rice insect pests occurs and give serious damage to rice plants every years. In another word, fauna of rice insect pests are more rich than any other places in West Jave. There is a sufficient place to do integrated study and extension programs not only of rice insect pests but also up land crop pests. Therefore, a Center for the integrated study and extension including training should be established. This Center will cover about 200,000 ha including paddy fields and up land crop fields such as corn, soybeans, mungbeans, sugercane, onion, sweet potatos, water melon and vegetables etc. Cirebon is considered to be good living condition for staff of the Center.

3. A total of 8 field workers (graduated from Agricultural High School) have joined to the field experiments of the rice gall midge in Kertasure and BPP Bayalangu in Cirebon since 1981/82.

However, 4 out of 8 field workers have succeeded to be extension worker (PPL) in 1981/82. Then, new 4 field workers are added to the field experiments of the insect and training for them is done by the assistant counterparts. There are still some problems of activity of the field workers so that effective supervise for them must be done with tight control through the staffs of the Cirebon Agricultural Extension Services, Rural Extension Services (BPP), and the assistant counterparts of ATA 162. The latter should stay at Cirebon at least 14 days per month for supervising the field workers and increasing the experience of the field study.

4. In the endemic areas of the rice gall midge i.e. Cirebon, Majalenka, and a part of Subang in West Java, insecticide application to the rice seedling nursery in the late planting is needed at 10 days before transplanting. Two kinds of insecticides, Furadan and Ekalux, are recommended to apply at the rate of 0.50 kg (active ingr-edient) per hectare.

5. Monitoring to detect galls of the rice gall midge by the farmers in their own paddy fields is needed within 14 days after transplanting. If galls are found, it is suggested to be the timing of the insecticide application. In this case, larval infestation is more than 10 percent of damaged tillers. At first, training of the progressive farmers for detect galls in some model areas in West Java must be done as soon as possible.

   In order to help the observers activity, these progressive farmers are expected to be useful for monitoring of rice insect pests in moderate sized areas of paddy fields. More exact data of damage by rice insect pests will be obtained to be enable for practical forecasting method.

6. In indonesia, there are difficulties to directly utilize the technology transfered from the foreign countries. It is considered that Indonesia is required a big strategy to make her own technology fitted to the environmental conditions. Therefore, in the Food Crop Protection, basic study in the paddy fields in relation to forecasting and control methods is much more needed in the agro-economic areas in the long term basis for finding Indonesian technology.

(Table 1) Incidence of the rice gall midge in the wet season in West Java.

Locality	Checking Period.	Rice variety.	Damaged tillers(%) 1982	Damaged tillers(%) 1983	Parastitism(%) 1982	Parastitism(%) 1983
1. Waluya, Bekasi	Jan-April	Cisadane	20,79	5,58	22,17	2,50
2. Pusakaratu, Subang	Jan-April	Ayung Cisadane	72,51	4,26	20,49	2,12
3. Widasari, Indramayu	Jan-April	Cimandiri	29,34	48,16	1,56	12,43
4. Geyongan, Cirebon	Jan-April	IR-36 Cisadane	-	92,16	-	11,68
5. Dawuan, Majalengka	Jan-March	Cisadane	85,37	70,04	8,69	25,83
6. Garawangi, Majalengka	Jan-March	Cisadane	98,41	90,85	9,16	20,05
7. Paseh, Sumedang	Dec-Febr.	Omas merah	76,00	19,26	37,76	50,90
8. Kota Kaler, Sumedang	Dec-Febr.	Omas merah	0,14	6,85	34,85	43,24
9. Citali, Sumedang	Dec-Febr.	Saigon Terondol	40,22	25,54	59,37	46,66
10. Pakeumitan, Bandung	Jan-March	Cisadane	1,76	1,51	45,16	10,52
11. Sahbaner, Cianjur	Jan-March	Cisadane	4,24	0,00	32,72	0,00
12. Sirnagalih, Cianjur	Jan-April	Cisadane	4,85	10,74	49,20	47,28
13. Sukalarang, Sukabumi	Jan-May	Local var.	5,71	1,55	12,24	10,00
14. Cijalingan, Sukabumi	Dec-March	Cisadane	36,69	0,68	46,75	50,00
15. Caringin, Bogor	Dec-April	Pelita	11,66	25,45	57,85	42,67

(Table 2) Incidence of the rice gall midge in the dry season in West Java.

	Checking period.	Rice variety	Damaged tiller(%) 1981	Damaged tiller(%) 1982	Parasitism(%) 1981	Parasitism(%) 1982
1. Waluya, Bekasi	July-Sept	Cisadane	0,20	2,66	0	34,61
2. Purwakarta, Subang	May -Aug.	Cisadane	4,57	1,26	33,34	21,42
3. Widasari, Indramayu	May -June	IR-36	10,15	4,88	5,35	42,46
4. Geyongan, Cirebon	July-Aug.	Cisadane	-	22,86	-	15,73
5. Dawuan, Majalengka	May-July	IR-36 Cisadane	1,05	1,18	0	12,50
6. Garawangi, Majalengka	May-July	IR-36 Cisadane	2,60	33,76	4,16	21,85
7. Paseh, Sumedang	May-Aug.	Omas merah	6,20	3,21	11,36	32,25
8. Kota Kaler, Sumedang	June-Aug.	IR-36 Cisadane	7,56	0,85	12,06	20,00
9. Citali, Sumedang	June-Sept	Saigon	37,19	15,39	42,59	30,89
10. Pakeumitan, Bandung	Aug-Dec.	Local var. Cisadane	15,10	0,42	41,70	0
11. Sahbaner, Cianjur	May-Sept.	Pelita Cisadane	6,89	2,58	32,63	6,45
12. -"-	Oct.-Dec.	Pelita	8,00	0,72	36,36	20,00
13. Sirnagalih, Cianjur	Aug.-Dec.	Pelita	9,45	6,37	44,54	7,31
14. Sukalarang, Sukabumi	June-Sept. Oct.-Dec.	Local var. -"-	2,69 3,71	1,59 0.22	0 19,35	0 0
15. Cijulingan, Sukabumi	July-Oct.	Local var. Cisadane	7,38	11,76	19,29	34,64
16. Caringin, Bogor	June-Aug. Oct.-Dec.	Pelita Pelita	5,92 0,54	3,68 -	19,35 28,57	36,73 -

(Table 3) Occurrence of the Alang-alang gall midge and its parasites at Cijalingan in Sukabumi, West Java.

Po = Platygaster oryzane
No = Neanastathus oryzae
Oo = Obtusiclava oryzae

Checking date	No. of galls	Larva	Pupa	Adult	Parasite			Parastism (%)
					Po	No	Oo	
July 20,'82	53	0	0	47	6	0	0	11.32
Aug. 24,	20	0	0	18	2	0	0	10.00
Sep. 29,	3	0	0	3	0	0	0	0
Oct. 28,	18	0	0	18	0	0	0	0
Dec. 20,	53	0	1	52	0	0	0	0
Jan. 22,'83	135	0	1	126	8	0	0	5.92
Feb. 25,	30	0	2	26	2	0	0	6.66
March 25	123	5	8	97	13	0	0	10.56
Apr. 21,	25	0	4	15	6	0	0	24.00
May 16,	100	0	2	89	8	1	0	9.00
June 14,	146	0	7	117	21	1	0	15.06
July 19,	24	0	1	19	4	0	0	16.66
Aug. 23,	69	0	2	57	10	0	0	14.49

(Table 4) Occurrence of the Alang-alang gall midge and its parasites at Cijalingan in Sukabumi, West Java.

Po = Platygaster oryzae
No = Neanastathus oryzae
Oo = Obtusiclava oryzae

Checking date	No. of galls.	Larva	Pupa	Adult	Parasite			Parasitism (%)
					Po	No	Oo	
July 20,'83	86	0	2	78	6	0	0	6.97
Aug. 24,	32	0	2	20	10	0	0	31.25
Sept. 29,	2	0	1	1	0	0	0	0
Oct. 28,	4	0	1	2	1	0	0	25.00
Dec. 20,	21	0	5	16	0	0	0	0
Jan. 22,'83	9	0	0	9	0	0	0	0
Feb. 25,	1	0	0	1	0	0	0	0
March 25,	37	0	4	32	1	0	0	2.70
Apr. 21,	13	0	2	11	0	0	0	0
May 16,	22	0	0	21	1	0	0	4.54
June 14,	27	0	4	21	0	2	0	7.40
Jul7 27,	25	0	0	25	2	0	0	8.00
Aug. 23,	16	0	3	13	0	0	0	0

(Table 5) Percentage of damaged tillers caused by the rice gall midge and parasitism at Dukuh in Cirebon, West Java.

Locality	Checking date	Planting date	Rice variety	Damaged tillers(%) Gall	Damaged tillers(%) Larva+gall	Parasitism (%)
		Jan. 5,'82	IR36			
Dukuh	Jan. 13,'82			0	0	0
Kapetakan	20			1.36	7.54	28.57
Cirebon	27			0.77	6.45	60.00
	Feb. 3			0.54	26.08	0
	10			2.51	32.44	15.62
	17			5.49	22.64	0
	24			7.58	22.07	0
	March 3			11.41	23.01	0
	10			16.73	27.52	0
	17			24.74	25.80	0
	24			42.37	54.59	0
	31			55.04	66.27	2.87
	April 7			65.70	73.28	4.95
	14			74.80	79.25	21.92
	21			71.33	83.74	15.12
		May 8,'82				
Dukuh	May 19,'82			0	0	0
Kapetakan	26			0.15	4.42	0
Cirebon	June 2			0.51	0.51	0.20
	9			0.54	0.92	28.57
	16			1.12	2.85	5.00
	23			1.16	3.74	0
	30			2.06	5.46	0
	July 7			1.01	2.20	0
	14			1.84	1.84	0
	21			-	-	-
	28			0.90	0.90	0
	Aug. 4			0.55	0.55	0

(Table 6) Percentage of damaged tillers caused by the rice gall midge and parasitism at Dukuh in Cirebon, West Java.

Locality	Checking date	Planting date	Rice variety	Damaged tillers(%) Gall	Damaged tillers(%) Larva+gall	Parasitism (%)
		Jan.22,'83	Cisadane			
Dukuh	Feb. 2,'83			2.30	2.30	0
Kapetakan	9			2.77	9.09	0
Cirebon	16			4.08	24.77	3.92
	23			2.53	7.81	0
	March 2			3.79	7.67	1.29
	9			5.60	16.60	3.57
	16			5.49	15.15	8.86
	23			8.94	16.28	5.22
	30			5.60	16.60	0.20
	April 6			11.37	23.44	7.73
	13			9.39	18.46	3.40
	20			8.60	17.94	3.57
		May 22,'83	IR36			
Dukuh	June 1,'83			0	0	0
	8			1.01	3.96	0
	15			1.20	1.20	0
	22			2.33	12.84	0
	29			1.07	4.29	0
	July 13			-	-	-
	20			0.25	0.25	0
	27			0.84	0.84	0
	Aug. 3			0.77	0.77	0
	10					
	17					
	24					
	31					
	Sep. 7					

(Table 7) Total number of developmental stages of the rice gall midge collected in sampling period at Kertasura in Cirebon, West Jave.

	Transplanting date	No.of eggs	Larvae	Pupae	Adults	Galls	Parasites
The dry season 1982	May 5,'82	165	166	34	45	128	49
a) The Wet Season 1982/83	Jan.20,'83	4497	598	327	529	1054	198
b) The Wet Season 1982/83	Feb. 5,'83	6176	1024	372	682	1295	241
The dry season 1983	May 20,'83	1002	90	41	74	122	7

(Table 8) Injurious level for control of the rice gall midge at Kertasura in Cirebon, West Java.

Application time	Damaged tillers (%)	No. of panicles/hills	Rice yield Kg/50 m^2
1	31.80	7.10	10.32
2	3.82	9.37	12.05
3	3.60	8.99	13.22
4	1.10	9.50	13.42
5	4.56	9.23	15.07
Control	41.96		10.32

Remarks: a) The insecticide, Ekalux 5% G, was examined at the rate of 1.0 Kg (A.I)/ha.

b) Application time, 1 = 10 days after transplanting, as well as 2 = 10 and 20, 3 = 10, 20 and 30, 4 = 10, 20, 30 and 40, 5 = 10, 20, 30, 40 and 50 days respectively.

c) Rice yield (y) to Damage (x), r = 0.757, Y = 13.69 x - 0.06

d) Rice yield (y) to Panicle (x), r = 0.677, Y - 4.81 x + 0.92

e) Panicle (y) to Damage (x), r = 0.968, Y = 9.45 x - 0.06

(Table 9) , Field screening of rice varieties to the rice gall midge at Kertasura in Cirebon, West Java, 1982/1983.

Varieties Examined	Seeds from	Damaged tillers (%)							
		14	28	42	56	70	84	98	days after transplanting.
1. RD - 11	Thailand	0	0.63	0.31	0.58	4.54	X	X	
2. MN-62M	Thailand	0	0	0	0	X	X	X	
3. RD - 4	Thailand	0	0.47	0.21	0.24	6.50	X	X	
4. RD - 21	Thailand	0	0.96	1.21	6.87	27.42	2.49	0.52	
5. RD - 23	Thailand	0	0.90	0.53	1.98	22.76	2.86	0.38	
6. RD - 9	Thailand	0	0.72	0.37	1.44	15.05	0.63	X	
7. Cisadane	Indonesia	0	1.50	0.63	7.77	29.18	3.83	1.78	
8. IR - 36	Indonesia	0	0.09	0.41	2.80	10.60	1.53	-	
9. Phaelgune	India	0	0.10	0.09	0.04	X	X	X	
10. Surekh	India	0	0	0.06	0.16	0.49	X	X	
11. GH - 27	Indonesia	0	0	0	0.13	0.78	0.23	0	

X = seriously damaged by Sogatella frucifera

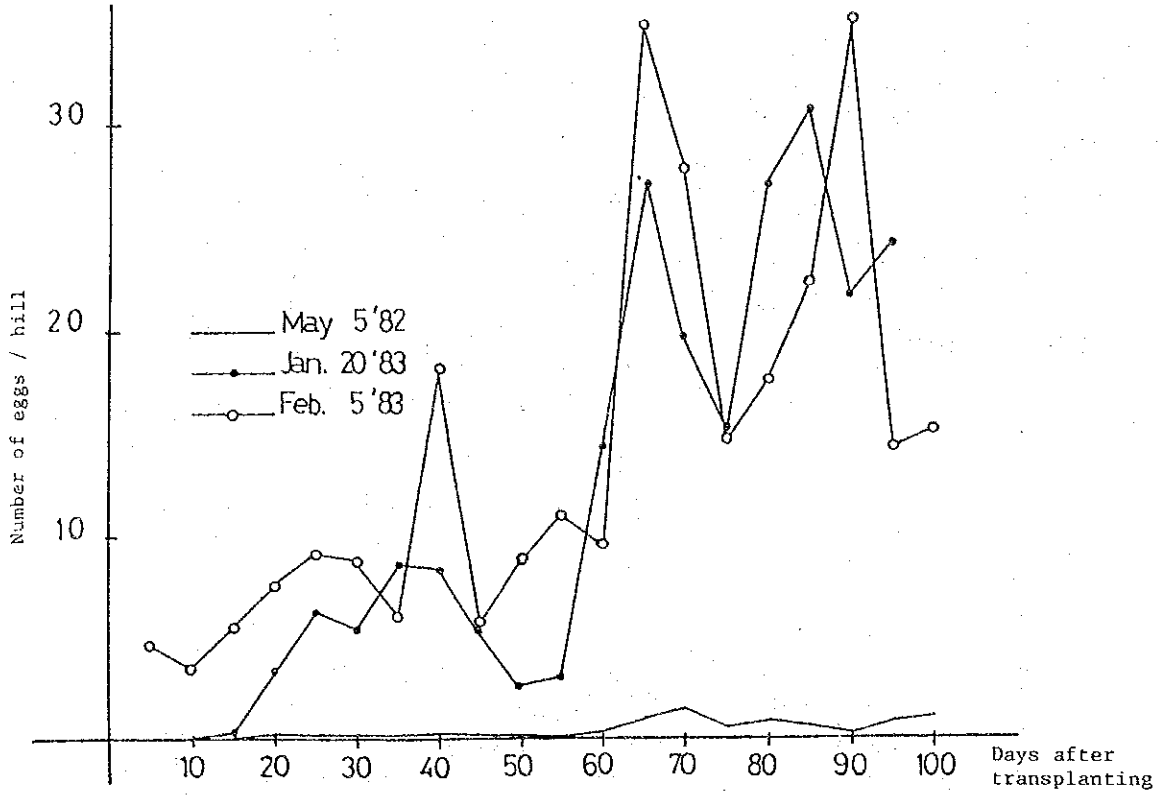
- = already harvested

(Table 10) Field screening of insecticides for control of rice gall midge at Kertasura in Cirebon, West Java, 1982/1983.

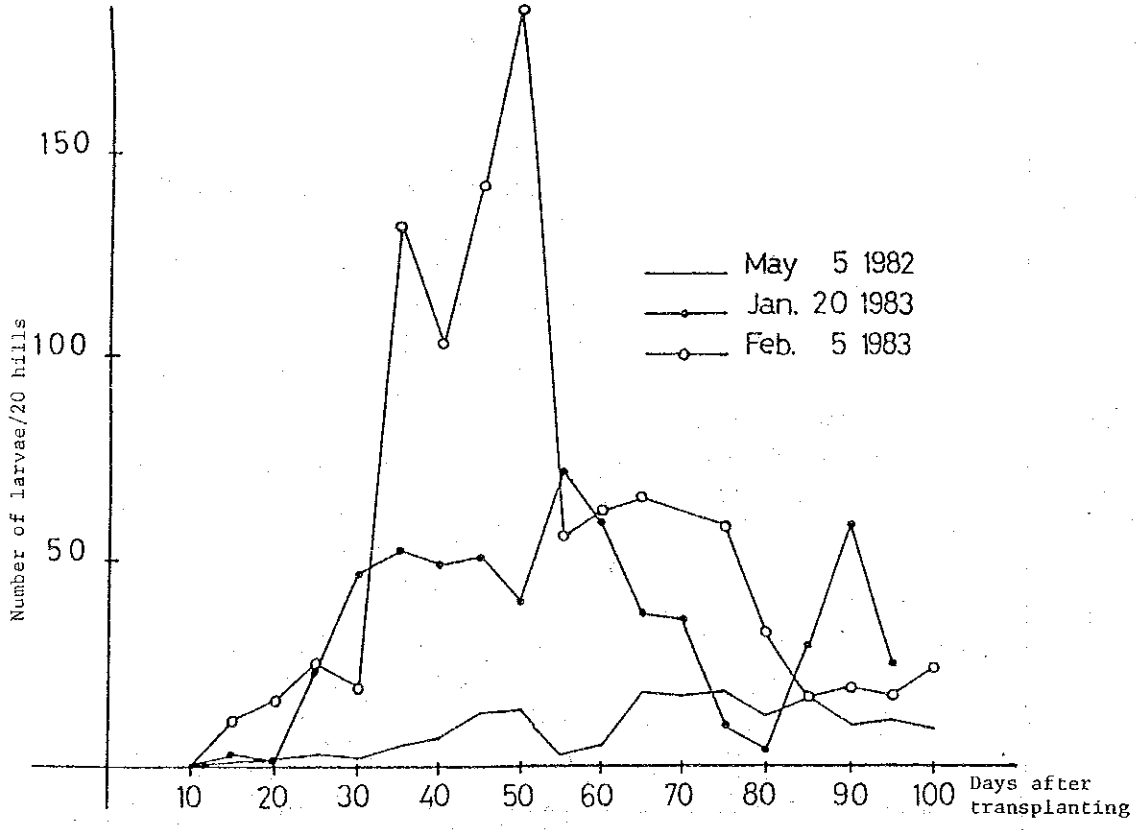
	Inspecticides Examined	Damaged tillers(%) (Transformed)	No. of gall/hill	Panicles/ hill	Rice yield Kg/50 m^2
1.	Diazinon M	24.15	6.22	15.49	12.73
2.	Padacin 5%	33.50	11.32	16.58	9.36
3.	Padan 10%	44.47	15.62	15.68	13.56
4.	Ekalux 5%	6.13	1.64	17.74	14.00
5.	Diazinon 5%	42.10	13.13	14.57	11.13
6.	Furadan 3%	14.95	3.92	16.68	14.10
7.	Control	33.69	11.57	16.37	9.00

(Table 11) Fluctuation of precentage of damaged tillers in field screeninng of insecticides for control of the rice gall midge at Kertasura in Cirebon, West Java 1982/1983.

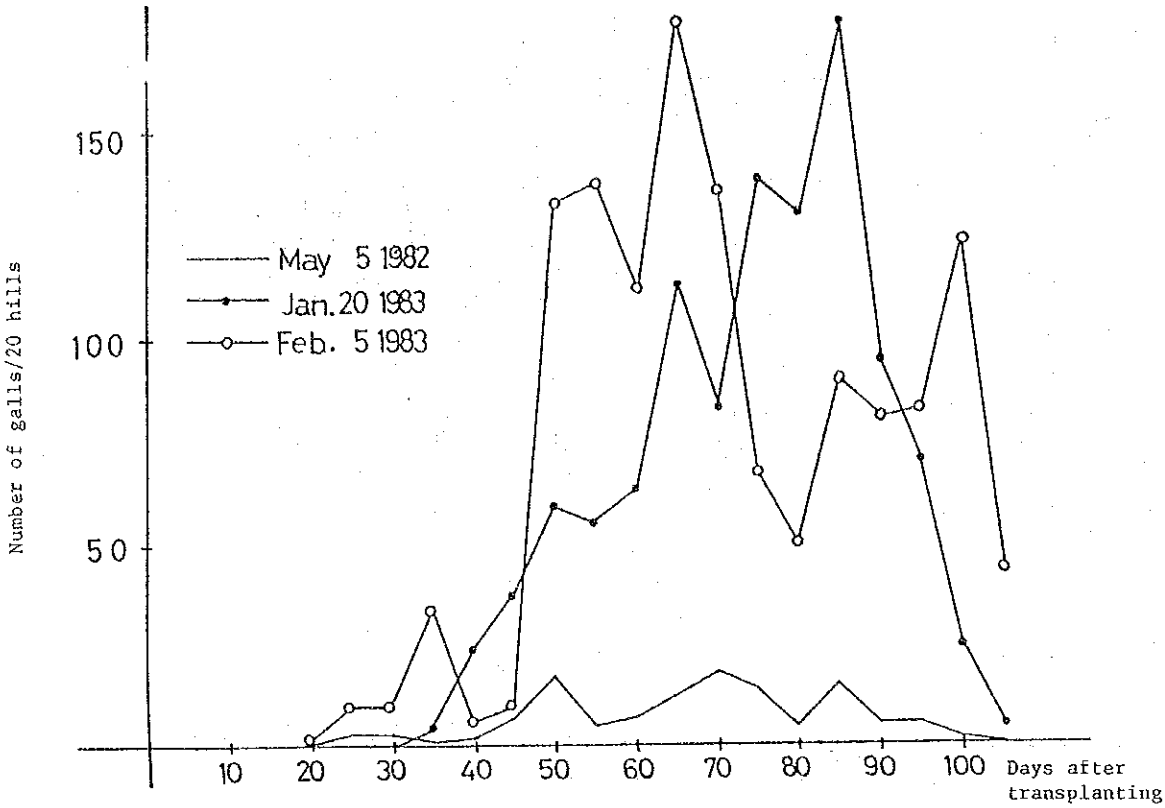
Insecticides Examined	Damaged tillers (%)							
	14	28	42	56	70	84	98	days after transplanting
1. Diazinon M	0	0.64	0.37	2.43	20.77	0.99	0.34	
2. Padacin 5%	0	1.54	0.37	4.44	26.47	1.61	1.81	
3. Padan 10%	0	1.72	0.91	5.35	35.25	3.44	1.83	
4. Ekalux 5%	0	1.78	0.11	0.04	4.73	0.53	0.59	
5. Diazinon 5%	0	2.69	0.79	5.05	33.63	2.63	0.90	
6. Furadan 3%	0	1.30	0.10	0.61	14.45	1.45	0.31	
7. Control	0	3.07	0.76	5.90	25.85	0.96	0.96	



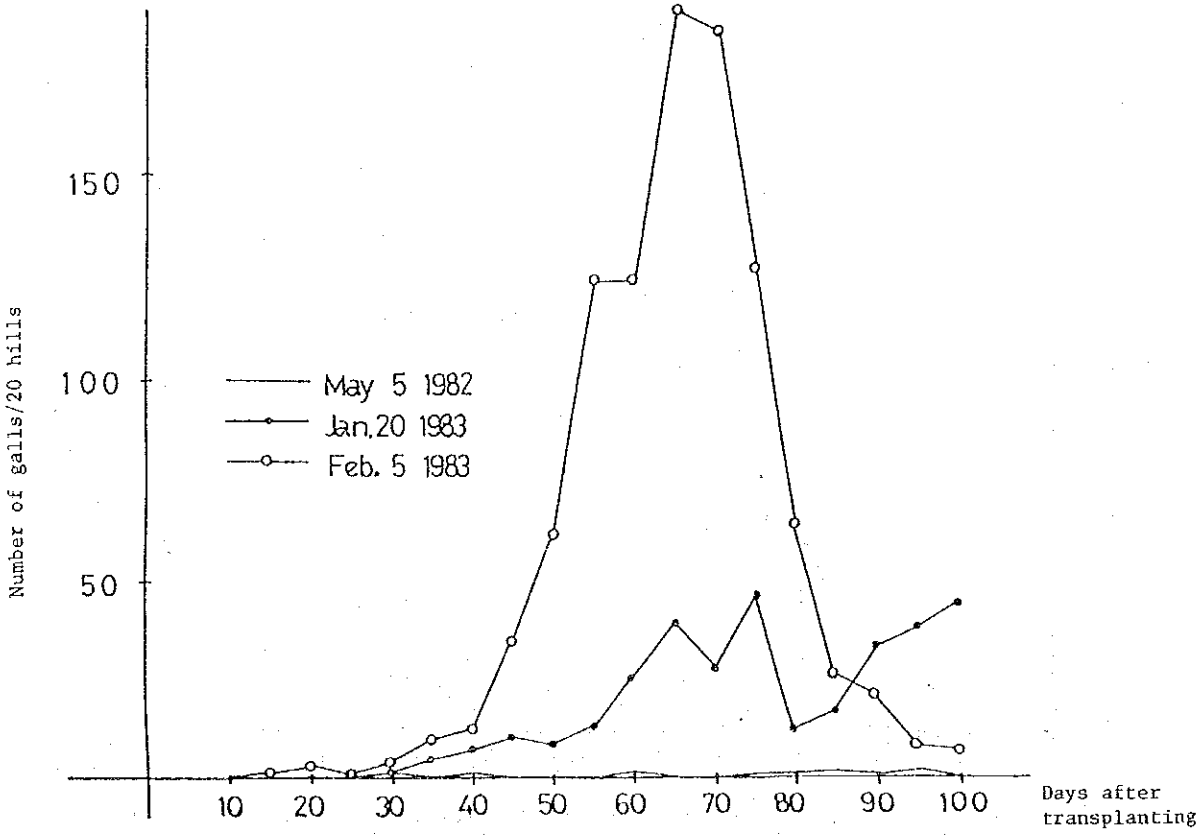
(Fig. 1) Fluctuation of number of eggs at the different planting dates at Kertasura in Cirebon, West Java



(Fig. 2) Larval occurrence in the different planting dates at Kertasura in Cirebon, West Java



(Fig. 3) Gall occurrence in the different planting dates



(Fig. 4) Gall occurrence in the different planting dates

(Table 12) Annual work plans of the rice gall midge study group under the Food Crop Protection Project ATA-162 from '81/82 - '83/84

Subjects	1981	1982	1983	1984
I. Central Office at Pasar Minggu.				
(1) Program for improving forecasting method of the national level.				
1) Analysis of the monitoring data	⊢———	———	———	———⊣
2) Field study of gall midge incidence	⊢———	———	———⊣	
II. Jatisari Field Laboratory.				
(1) Ecological studies for improving surveillance technology.				
1) Factor analysis of gall midge occurrence between serious damaged areas and low infestation areas.		⊢———	———	———⊣
2) Injuries level for control of gall midge.		⊢———	———⊣	
3) Field screening of resistant varieties.			⊢———	———⊣
4) Field screening of insecticides for control of gall midge			⊢———	———⊣
5) Timing of insecticide application in different damaged level				⊢———⊣
6) Occurrence and damaged caused by the rice gall midge at the different planting dates				⊢———⊣
7) Mass rearing				⊢———⊣
III. Research Institute for Food Crop of Bogor.				
(1) Physiological and Ecological studies for forecasting.				
1) Mechanism of gall formation	X	X	X	

Activities of Rice Gall Midge Study Group in the period 1981 - 1983

Activites	Results
1. Analysis of the monitoring data of the Rice gall midge (RGM)	1. In Indonesia, the monitoring data has been obtained for 8 years since 1976. 2. RGM occurs mainly in Java Island, especially serious incidence was seen in West Jave. 3. The incidence of RGM has been remarkahlly decreased from 1976 to 1983 due to well managed control programme under INSUS and INMAS 4. RGM is one of destructive insect pests in the wet season, RGM gaves less incidence in the dry season.
2. Field Investigation on occurence and damaged caused by RGM	1. Field investigation was carried out by the Expert, Assistant Counterpart, the spot-worker in low land and high land paddy field in West jave since 1981/82. 2. RGM seriousely occurred in lowland paddy field such as part of Subang in the wet season. Percentage of damaged tillers by gall reached 85% in 1981/82. In the dry season, the infestation was less than 5% by gall damages and RGM is indicated not to be important economically. 3. In high land areas i.e. Sumedang, Bandung, Cianjur, Sukabumi and Bogor, infestation of RGM was low throughout the year. RGM was found to be well controlled by the parasites, i.e. Platygaster oryzae, Neanastathus oryzae, Obtusiclava oryzae and the predators, Amblyseius imbricatus, Ophionial indica etc. Parasitism reached about 45% of galls in all seasons. 4. The consecutive planting is more effective for conserving the natural enemies than the synchronized planting (two times plantings) 5. Positive relationship between damaged tillers and population of predator, Amblyseius imbricatus, was recognized. The predator is understood to be the most important to control number of RGM eggs.

Activities	Results
	6. A long and serious drougt occurred at the end of 1982, transplanting was delayed about 1.5 month. The drought remarkably affected occurrence of RGM which showed less damage than that of usual years in West Java. Mortality rate of RGM became high by long drought. 7. In West Java, willd rice as one of the alternative host plants was not found. Leersia hexandra is growing in huge areas near paddy fields but was not enough host plant for the occurrence of RGM. Two galls of RGM in Sukamandi and Cirebon were found on L. hexandra. 8. During off season of rice (September - November) RGM could not survive in the low land paddy fields. RGM population was maintained in the consecutive planting areas which are considered to occurring source of RGM to lowland paddy fields by the short distance migration in the wet season. 9. In the consecutive planting areas (highland), the parasites of RGM have a alternate host insect, Orseoliela sp., which is attacking the Alang Alang wild grasses.
3. Factor analysis of occurrence and damage caused by RGM.	1. The analysis was studied from view point of a) damage difference between the wet and dry seasons and b) between low and high infestation areas in the wet season in Cirebon, West Java. 2. The transplanting time was one of the important factors to control of RGM. Transplanting in January was resulted with higher damage of RGM than planted in December. Transplanting in December was clarified to avoid serious damage of the insect. At present, 95% of total paddy fields in Cirebon were practiced to transplant in December. 3. Survival rate of RGM increased under high humidity with rain in the wet season, however RGM population prominently decreased with high mortality rate under dried condition with comparatively long sunshine duration in the dry season.

Activities	Results
	4. In Cirebon, the parasites and predator were not active. These natural enemies were not found for 30 days after transplanting. The parasitism was at least 15% and the parasites were not effective for control of RGM during the vegetative growth stage of rice plants in lowland areas of paddy fields and started to appear from 40 days after transplanting. 5. A peak occurrence of RGM appeared at the end of March, RGM has 3 - 4 generations during the planting season. The 3rd generation reached a peak of the insect population by light trap and sampling studies in the experimental fields. 6. Population of RGM in the early planting (December) start to slightly increased, however RGM in the late planting (January) remarkablly propagated during the vegetative growth period. 7. Factors affecting population decrease are the early planting, genetative growth stage of rice plants, low humidity with long sunshine duration, parasites and predator after the booting stage of rice plants. Factors affecting population increase are the late planting, vegetative growth stage, high humidity (75%) with rain, low activity of parasites and predators. 8. Positive relationship between number of adults and galls was recognized and then the number of adults of the next generation can be possible to estimate. High correlation (70.900) in the developmenttal stages including growing stage of rice plants is as follow, % damage by Larvae + pupae + galls, Number of eggs - Neanastahus oryzae, Tillers - galls, Panicie primordia - pupae, and 3rd larvae + Propupae - pupa. Correlation r 70.800 was also recognized a total of 29 items among the developmental stages of RGM.
4. Injurious level for control of RGM	1. The following relationship between damaged tillers by galls vs number of panicles r = -0.799, damaged tillers by larvae + galls vs rice yield r = -0.896, number of panicles vs rice yield r = 0.981

Activities	Results
	2. The injurious level necessary for insecticide application is a) 5% of damaged tillers by gall, b) 10% by damaged tillers larvae + galls at 14 days after transplanting or 24 days after transplanting. 3. In endemic area of RGM, insecticide must be applied in the seedlings at 10 days before transplanting. at least, two time applications of granular insecticide (i.e. Ekalux 5% G or Furadan 3% G) are needed at the rate of 0.5 Kg of A.I./ha at 14 and 28 days after transplanting. 4. Careful monitoring of the injurious level by the observers and the farmers in the late planting areas must be practiced and preventive control technology is established.
5. Field screening of resistant varieties to RGM	1. The resistant varieties (6 varieties from Thailand, 2 from India, and 4 from Indonesia) tested were in the moderate resistant to RGM. These varieties examined were RD 11, MN-62M, RD4, RD21, RD23, RD29, Phaelung, Surekh, and GH27. 2. These varieties can be recommended to transplant in the occurring areas or the late planting areas of RGM except MN-62M which is a sensitive to photoperiodism.
6. Field screening of insecticides for control of RGM	1. The effective insecticides for control of RGM were Ekalux 5% and Furadan 3% followed by Diazinon M 5%. Number of galls occurred per hill were 1.64 in Ekalux, 3.92 in Furadan, and 6.22 in Diazinon M. Number of panicles per hill were 17.74 in Ekalux, 16.68 in Furadan, and 15.49 in Diazinon M.

ACTIVITIES OF STUDY GROUP ON THE GLHs GENUS NEPHOTETTIX MATSUMURA IN THE PERIOD 1981 - 1984

No.	ACTIVITIES	PURPOSE	YEAR	LOCATION	RESULTS
1.	Extensive Survey	A faunistic survey on the species composition and distribution of GLHs and the sprea of RTV.	1981-1982	Java Island	Four species of Nephotettix have been recorded i.e. N.virescens, N.nigropictus N.malayanus, and N.parvus. The first two species were the most widely distributed, while the other two were collected only at Sukamandi, West Java. N.virescens the most efficient vector of RTV, has been recorded as the domiantt species in almost all survey sites, except in West Java during Dry season 1981. Hence, the recent outbreak of RTV in several regions such as Pekalongan (1981), Yogyakarta (1982), East Java (1982), Bali (1980) etc. Distribution map has been published. There has been a mayor change in the composition of rice cultivars used by farmers in Indonesia within the last 10 years such as IR26, IR34, IR36, IR42 Cisadane. IR36 was the most widely planted variety and relatively high numbers of N.virescens were collected on IR36. The relationship of species composition of Nephotettix and diffusion of HYV with multiple resistence to diseases and insects in Indonesia is still not fully understood and needs further study. An outbreak of tungro on IR36 which was reported to be resistent to tungro and N.virescens indicates the danger of planting a single variety for several successive seasons. In RTV outbreak areas, 99% of Nephotettix collected was N.virescens with very high population density (more than 100/25 strokes). So increased population of this species are indicative of the potencial of RTV incidence.
2.	Identification of GLHs, samples received from various cooperators in Indonesia	The change in the techniques of species identification from external characters to male genitalia has ensured more accurate species diagnoses. Accurate identification is first prerequisite to a rational pest management programme, and strengthen forecasting and monitoring systems.	1980-1983	Laboratory of BORIF	Out of 1550 samples specimens examined, two species i.e. N.virescens and N.nigropictus; one sub species, N.nigropictus yapicola and 5 specimens of undescribed species were recorded. N.virescens being the dominant one. N.virescens from Java and N.virescens from South Sulawesi differ in the mean number of teeth on eadeagus and pygofers (4.36 and 5.64 for South Sulawesi and 3.53 and 4.67 for Java, respectively). TABLE I SPECIES COMPOSITION OF ADULT NEPHOTETTIX SAMPLES RECEIVED FROM DIFFERENT REGIONS IN INDONESIA, 1980 - 1983

Region	Year	N.virescense	N.nigropictus	N.nigropictus Yapicola	Others
Kendal, C. Java	1980	5	20	-	-
Kendal, C. Java	1981	16	6	-	-
Pekalongan, C. Java	1981	266	2	-	-
Sleman, C. Java	1980	7	-	-	-
Mojosari, East Java	1980	10	-	-	-
Banyuwanji, East Java	1981	51	3	-	-
Bali	1981	8	-	-	-
West Sumatera	1980	67	20	-	--
South Kalimantan	1981	37	67	-	-
Lombok	1981	17	-	-	-
South Sulawesi	1981	186	8	-	-
Luwu, South Sulawesi	1981	73	-	-	-
Palu, C. Sulawesi	1982	29	-	-	-
Manado, North Sulawesi	1983	429	-	218	-

No.	ACTIVITIES	PURPOSE	YEAR	LOCATION	RESULTS
3	Identification of GLHs from light trap catch es at Sukamandi, West Java.	Idem No. 2	1981-1983	Laboratory of BORIF	Out of 1644 Nephotettix specimens collected, 4 species were identified i.e. N.virecsens, N.nigropictus, N.malayanus and N.parvus, N.nigropictus (453 ♀, 232) out numbered the other species during this period. The number of N.virescens and N.parvus caught were approximately half that of N.nigropictus (185 ♀, 195) for N.virescens and (203 ♀, 146) for N.parvus respectively. Fewest to of N.malayamus were caught (183 ♀, 470) approximately one third the number of N.nigropictus. The population of N.virescens fluctuated at a low level from August to December 1981, increased to a peak in March 1982, and decreased sharply in April. A second, minor, peak occurred in August after which the population declined to low levels. The situation was different for N.nigropictus, when the population fluctuated at rather low levels from August to October 1981, increased dramatically in November and reached two high peaks in December-January and March - April. The population then dropped to low levels from August 1982 to January 1983. The population of N.parvus was in December - January, and population was also rather high during September 1981, March and May 1982. N.malayanus followed a similar pattern, but at lower levels than N.nigropictus and N.parvus (see attachment). An extended dry period occurred in July to November 1982, as indicated by the raifal pattern (see attachment). Consequently the wet season started late, resulting in delayed planting of the wet season rice crop. This may - be the reason why the population of Nephotettix spp. from August 1982 to January 1983 was very low compared to corresponding months in 1981. In sweepings from various weeds at Sukamandi in 1983, N.malayanus was much more common than N.nigropuctus. From 15 samples (25 strokes per sample) only 9 specimens of N.nigropuctus and 84 of N.malayanus were caught. No N.virescens or N.parvus were collected from the weeds. This can be understood for N.virescens which has a greater preference for rice as its host than do the other three species. But the host plant preference of N.parvus is still not understood. This species was caught only in the light trap but not by sweeping either from rice plants or gramineans weeds.
4	Intensive Survey	To study phenology and seasonal fluctuation, population balance, and sex ratio in the field samples.	1982-1983	Citamiang and Kalanganyar (West Java)	At Citamiang N.nigropictus occurred more on grasses than on rice plants. Population of N.nigropictus fluctuated during the survey period, the highest peak occurred around mid August 1982 and three other peaks occurred on early July 1982, mid-Feb. 1983 and by the and of March 1983. N.nigropuctus was also found on Cisadane, IR36 and local varieties at Citamiang, but at lower population levels. Relatively high population of N.nigropictus was found on Cisadane on July 21, 1982 at the time when the population on grasses dropped to a low level. Another peak population of N.nigropictus at Citamiang accurred on Cisadane, IR36 and local varieties by the end of March 1983. From early September until early December 1982 there was no rice plant in the field at Citamiang, but N.nigropictus may still survive on grasses.

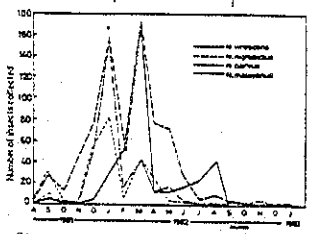


Figure 1: Number of Nephotettik spp. cauhrin a light trap at Sukamandi, August 1981 to January 1983.

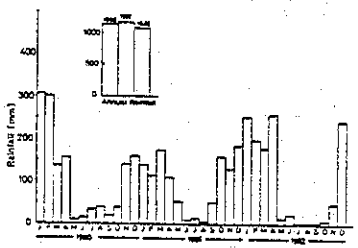
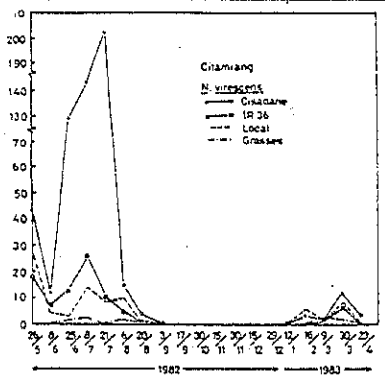
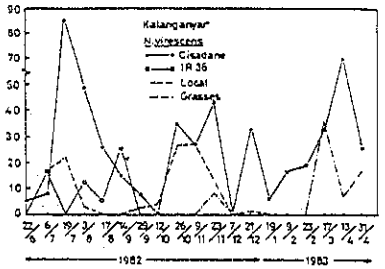
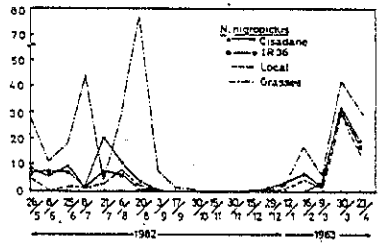


Figure 2: Rainfall during 1980, 1981 and 1982 at Sukamandi, West Java.

No.	ACTIVITIES	PURPOSE	YEAR	LOCATION	RESULTS







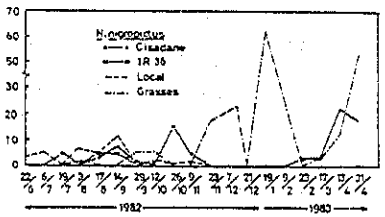


Fig. 2 Population fluctuation of N.virescens (above) and N.nigropictus (below) on Cisadane, IR36, Local and weeds at Citamiang, Pirred, Purwakarta every 25 strokes 2 weeks interval, during 1982-1983.

Fig. 3 Population fluctuation of N.virescens (above) and N.nigropictus (below) on Cisadane, IR36, Local and weeds at Katanganyar.

At the same location N.virescens gave a completely different picture. High population of N.virescens occurred on rice from early June until early August 1983 with peaks occurring in July 1982. The highest peack occurred on Cisadane on July 21, 1982 while much lower peaks occurred on IR36 and local varieties on July 8, 1982. This suggents that Cisadane was more preferred by N.virescens over IR36 and local varieties. During the same period, very low numbers of N.virescens were caught on grasses.

From early September until the end of December 1982 there was no rice crop in the field hence no N.virescens could be caught on rice. Interestingly during this period no N.virescens could be caught from grasses at citamiang. The population of N.virescens started to build up again in January 1983, although no single specimen could be caught for about 4 months. It is still no understood from where N.virescens originated to start its initial population build up in January 1983. During the survey period both N.nigropictus and N.virescens occurred at Citamiang. However, there seem to be a host discrimination between the two species. Whenever there was a rice crop in the field N.virescens multiplies very rapidly particularly on Cisadane. While N.nigropictus will confine itself on grasses.

On the other hand, when there is no rice crop in the Field, N.virescens will completely disappear, while N.nigropictus may still survive on grasses. The situation in Katanganyar is quite different. Rice crop is present all year around, hence population of N.virescenscens fluctuates very widely according to varieties planted with several peak occurring during the survey period. The highest peak occurred on Cisadane suggesting Cisadane was more preferred by N.virescens over IR36 and local varieties. This confirms the result obtained at Citamiang. N.nigropictus is also present all year round with wide fluctuations, but is mostly confined on grasses. This again suggests that grasses are the most preferred host of N.nigropictus.

The fact that no single N.virescens specimen could be caught at Citamiang for about 4 consecutive months (Sept. to Dec. 1982), but started to build up again in January 1983 raised the question whether or not it Hybernates on weed or possibly it migrates from other remote places.

5	Life history of Nephotettix spp. in laboratory	To study life history and reproduction of N.virescens, N.malayanus N.nigropictus.	1983-1984	Laboratory of BORIF

	N.virescens	N.malayanus	N.nigropictus
	TN_1	Leersia	IR36
-The number of eggs laid by a female	365	35.5	(not yet observed)
-Pre-oviposition period(day)	4-15	9.1	-
-egg period (day)	9.5	9-10	-
-nymphal period (day)	20.0	19.12	17.81
-Adult longevity (day)	40( );32( )	8.66( ); 7.1( )	7.66( ); 4.93( )

No.	ACTIITIES	PURPOSE	YEAR	LOCATION	RESULTS
					Out of 150 nymphs of N.malayanus observed in individual test tubes with Leersia hexandra as food, only 60 (26 , 34) attained the adult stage with 60% mortality gate. The nymphs started to die from the second instar onwards, with mortality higher in older than in younger nymphs. While 150 young hatched 7rvae with TNI as food have never reached adulthood.
6	Rearing of pure colonies of N.virescens in individual test tubes.	To provide pure colonies population of Java and South Sulawesi, to use for differential reaction of some rice varieties.	1983-1984	Laboratory of BORIF	The Java and South Sulawesi populations were reached in the fouth generation in the laboratory. Unfortunately the mortality was very high. Another method of rearing will be conducted. Preliminary results of differntial reaction of four rice varieties, to South Sulawesi colony is as follows:

	% of mortality South Sulawesi	% of mortality Java
IR8	59.6	Still in Observation
ASD7	97.1	
TNI	49.2	
Pankhari 203	96.8	

7	Rearing of pure colonies of N.nigropictus on IR36.	To study the possible adaptation of N.nigropictus on IR36.	1983	Laboratory of BORIF	All specimens died after 3 generations in the test tubes experiment.
8	Morphological aspects to study external and internal structures in males and femals within and between population of GLHs from different geographical regions of Indonesia.	To throw light on the possibility on the precence of geographical variation based on morphological characters the real numbers of species present in Indonesia and their distribution.	1983-1985	Laboratory of BORIF	Programme of study leading to Dr. of Science degree.

COMPUTER SYSTEM
IN
DIRECTORATE OF FOOD CROP PROTECTION

INTRODUCTION

The function of the Directorate of Food Crop Protection (DFCP) among others are establishing a system of collection data of pest-diseases, climatic data, and pests diagnose and forecasting. To carry out the fuction DFCP do some activities such as observation of pest-diseases infestation, observation of climatic factors, pest diagnose and forecasting, and other pest control management activities.

One of the activities of Indonesia-Japan Joint Food Crop Protection Project (IJFCP) is the utilization of computer for data processing in plant protection program. Computer system is a data processing unit that carries out some activitiers which is close-related to decision - making process, has its objective the coordination of actions involving people, equipment, time and funds and it should produce result as :

- the right information for the right people, in time;
- improvement of decision quality;
- increased capacity to process volumes of works;
- ability to perform work that was previously impossible.

In an other words the system should provide information that is Consistent, Accurate, Timely, Economically feasible, and Relevant (CATER).

ORGANIZATION

Computer system is a data processing unit also an informastion management all at once, it is consists of equipments, procedures, data and personnel. Therefore the implementation of computer system involves the installation of hardware/machines, software (computer program, procedures, forms), and brainware/personnel. The major new ingredients in the implementation of computer-based system are more sophisticated hardware and more complicated software.

Realizing how important personnel in any activities of the system, the management should be able to established a data processing organization which consists of personnel through a careful selection. To carry out the functions of electronic data processing system it can be divided into :

a. Management
b. System Analysis
c. Programming
d. Operation
e. Technics
f. Administration

Looking to the hardware/machine of NEC system 100/85 to be installed has its configuration as follows:

Table 1. Configuration of NEC system 100/05 computer of Directorate of Food Crop Protection

No.	Description of equipments	Quantity
1.	Basic Management Equipment	1 pc.
2.	Additional Main Memory Tubes	1 pc.
3.	Scientific Feature	1 pc.
4.	Fixed Disk	1 pc.
5.	Disk Connection Feature	1 pc.
6.	Magnet Disk Connection Feature	1 pc.
7.	Cartridge Magnetic Tape Equipment	1 pc.
8.	C.M.T.E. Adaptor	1 pc.
9.	Line Printer	1 pc.
10.	Transformer	1 pc.
11.	C.R.T. Display	2 pcs.
12.	Standard Keyboard	2 pcs.
13.	C.R.T. Tables	2 pcs.
14.	Basic software	1 pc.
15.	Test Program	1 pc.

Based upon its capacity NEC system 100/85 computer can be classified as a medium-scale computer, therefore its organization structure can be simplified as follows :

a. Management

The manager coordinates the computer system and responsible of data processing and information management.

b. System Analysis and Programming

System Analyst and Programmer in charge of the development of data processing design, input - output forms, system analysis and development of computer programmes.

c. Computer Technics and Operations

This section put in charge of computer operations, computer maintenance, data storage and data management.

d. Administration

The administration section carries out all secretarial activities related to computer system's function.

IMPLEMENTATION PLANNING

The steps in implementation a computer-based system can be very complex and demanding. The implementation planning can be divided into: pre installation, installation, and post installation planning.

a. Pre installation planning

Some decisions or activities should be carried out in this phase are building preparation for location of the computer, the decision of computer application, and selction and education of personnel.

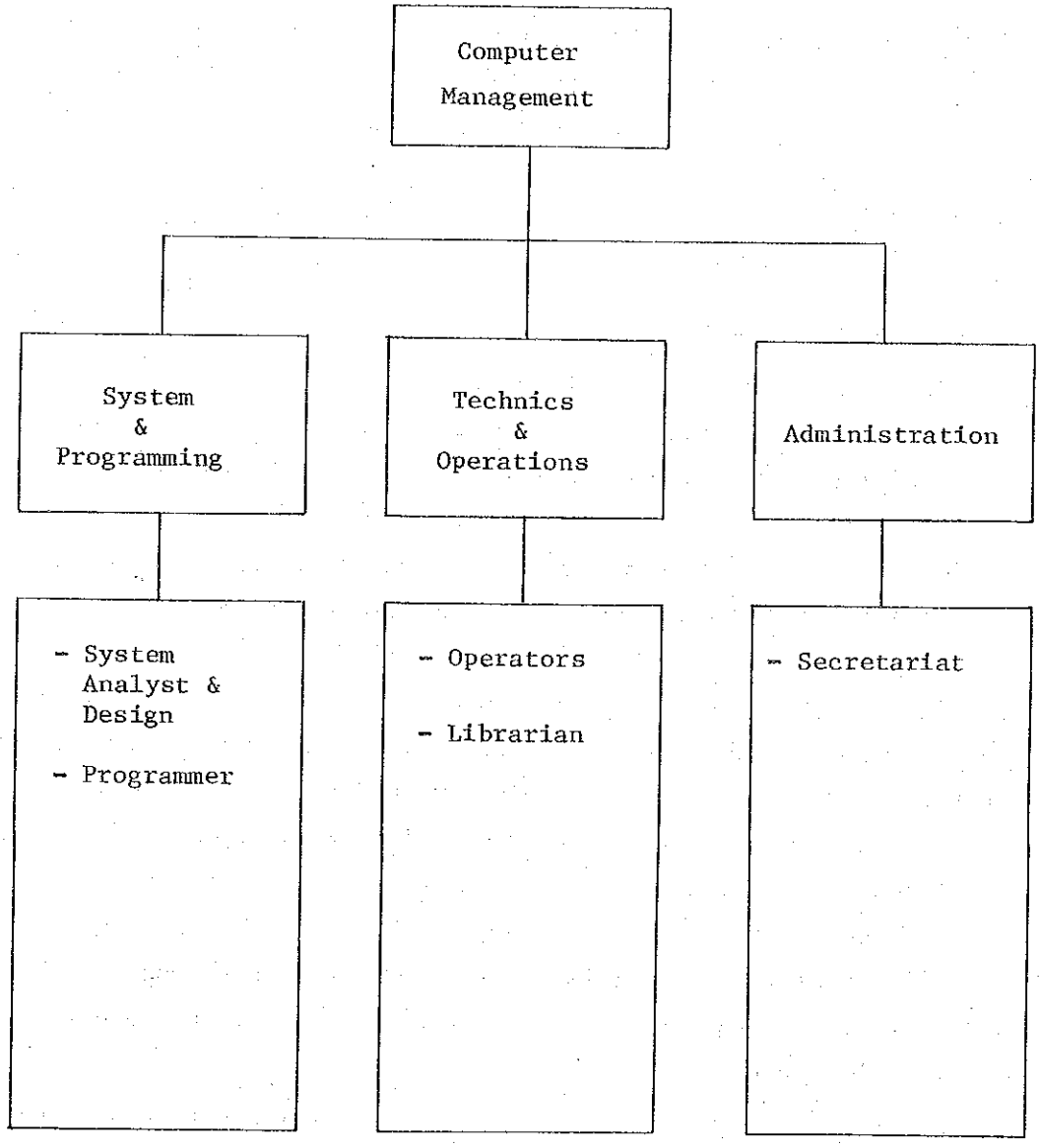
Computer is an electronic equipment which in its installation requires a certain condition such as temperature and humidity of its room, electricity, floor, etc. Therefore in building preparation these requirements should be fulfilled.

In the implementation of computer-based system first of all is to decide what application are to be put on the computer, involves a study to determine priorities. That is, which applications should be put on the computer first, second and so on. The main application of computer in DFCP is processing of pest-diseases data and to establish a forecasting design in plant protection program.

After deciding the application, the next step is to decide the computer hardware which fit the applications, modularity and equipments that can provide the needed programming languages and other softwares. In this case, IJFCP has decided a NEC system 100/85 computer will be installed in DFCP based upon the prediction of volume of data to be processed in DFCP. The configuration of the computer already itemized above.

In establishing electronic data processing organization probably the most important single item is the careful selection of a seasoned computer system manager. Last but not least an initial selection and education of the personnel who will operate the computer system. Some

Structure of Computer System
Organization



staffs of DFCP has trained in Programming Course especially FORTRAN IV and Applications of Package Programmes (Linear Programming, Biomedical Program and Statistical Package for Sosial Science). There are also staffs has been trained in Programming Course in COBOL and FORTRAN IV languages.

Connecting with the installation of NEC system 100/85 computer, NEC Company through its agent offer instruction classes for data processing personnel and teach a basic computer concepts to high level technical familiarity with NEC system 100/85 equipment being installed.

b. Installation planning

The next phase is the physical installation planning, that is the installation of the computer itself. Preliminary checking the computer room is very important. Some items to be checked among others are electric circuit, air conditioning, floor, space partitioning, storage facilities and miscellaneous items, for example furniture, telephone, etc.-

c. Post installation planning

After the installation of hardware/machine the first of all to be done is bench mark test, that is, test run one of the application on the computer to see how long it takes to run. For this purpose NEC system 100/85 computer provided a test program.

The implementation phase with some programming can be started after the top management fully approved the system and orders that it be implemented. At this point the analyst and the programmer together should be ready to implement the new computer-based system. Actual implementation of the new system can begin at this point using either a parallel or a one - for - one plan or some blend of the two.

The development of computer personnel is very important, the quality of information produced by the system indicates the personnel. That is why in computer system there is proverb "garbage in garbage out (GIGO)". To improve the skill and knowledge and to strengthen the system, personnel education through some courses whether domestic or abroad is needed.

An expanding computer configuration or development of computer system due to increasing of application to fulfil increasing demand of information should be considered. Correspond to the consideration is important to understand the modularity of the machine installed, and what kind of equipment to be added to match the extending application.