資料 4

Work Plan of Project Activities for Fiscal Year

1984/1985 ATA-162

Work plan of Project activities for fiscal year 1984/1985, ATA - 162

I. Work plan of six study groups

II. Dispatch of Japanese experts

III. Study tour and training of Indonesian personnel in Japan

IV. Provision of equipment and machineries

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

Jakarta, 7th February 1984

I. Work Plan of six study groups for 1984/85

Concerning the Project activities, work plan of six study groups is made every year to study and experiment on the major pests and diseases in Indonesia including Pesticide analysis and the computer.

The work plan of six study groups was made for next year, 1984/85, in the wet season and the dry season by the member of study groups.

List of the member of study groups and its programme is given.

Member of the six study groups

1.	Rice gall midge group	:	Dr. Terunobu Hidaka
			Ir. Nyoman Widiarta
			Ir. Sugandi Zainudin
			Ir. Erma Budiyanto
2.	Brown planthopper group	:	Dr. Kazushige Sogawa
			Ir. Soekirno
			Ir. Firdaus Natanegara
			Ir. Ir. Djatnika Kilin (Bogor LP3)
3.	Stemborer group	:	Dr. Shingo Ōya
			Ir. Sulistio Sukamoto
			Mr. Ruswandi
4.	Pesticide group	:	Japanese short term expert
			Ir. Mulyadi Benteng
			Mr. Sutripriarso
5.	Computer group	:	Japanese short term expert
			Mr. Yusmin
			Ir. Miss. Siska Antoinete T.
			Ir. Mrs. Ira Dewanti
6.	Tungro Virus Disease and Green leaf-hopper	:	Dr. Socho Nasu
	- Tungro Virus Disease		Ir. Bambang Suharto
			Ir. Ade Rosamsi
	- Green Leaf-hopper		Ir. Mrs. Siwi (Gobor LP3)

II. Dispatch of Japanese experts, 1984/85

1. Dispatch of short term experts

No.	Speciality	Duration
1)	Pesticide chemist (Analisis of pesticide, quqlitative & quantative)	6 months
2)	Pesticide chemist (Analysis of physical and chemical properties of pesticide)	6 months
3)	Plant pathologist (Rice virus disease)	6 months
4)	Population danamics and data analysis	3 months
5)	Entomologist	1 month
6)	Technician (two persons) (Construction of green house)	1 month x 2 persons

2. Dispatch of long term experts

No.	Speciality	Duration
1)	Entomologist (Stemborers)	25 months
2)	Insect population ecologist (Computer)	25 months
3)	Liaison officer	16 months

The above mentioned Japanese experts are requested to dispatch for next fiscal year, 1984/85 in Indonesia from Japan.

III. Ytsining of Indonesian personnel in Japan

(1984/85)

1.	Name	:	Ir. Siska Antoinete T.
	Subject	:	Computer programme
	Duration	:	6 months
	Post	:	Staff of Subdirectorate of diseases and weed control
2.	Name	:	Ir Nyoman Widiarta
	Subject	:	Plant Protection
	Duration	:	6 months
	Post	:	Staff of Subdirectorate of pest control
3.	Name	:	Ir Sulistio Sukamto
	Subject	:	Plant Protection
	Duration	:	6 months
	Post	:	Staff of Subdirectorate of pest control

Concerning the training in Japan, the above mentioned three assistant counterparts were applied to be participated in the training in 1984/85.

IV. Provision of equipment and machineries

1. A total of 70.592.360 Yen worth of equipment and machineries for this year (1983/84) will be supplied.

   List of equipment and machinery is given.

2. A total of about 50.000.000 Yen worth of equipment and machineries for next year (1984/85) will be supplied.

1)	Auto mobil	:	2.000.000 Yen
2)	Office utencil	:	10.000.000 "
3)	Forecasting experiment equipment	:	20.000.000 "
4)	Audiovisual equipment	:	2.000.000 "
5)	Pesticide analysis equipment	:	16.000.000 "
	Total	:	50.000.000 Yen

II. RENCANA PERCOBANN GROUP STUDY HAMA GANJUR ATA-162 DI KABUPATEN CIREBON

Peroobaan — ANALISA FAKTOR TERJADINYA HAMA GANJUR ANTARA DAERAH ENDEMIK DAN NON ENDEMIK PADA MUSTIM TANAM 1984 DI CIREBON (ATA-162)

Tujuan : Untuk mengetahui mekanimme torjadinya serangan hama ganjur sobagsi implementasi teknik peramalan dan cara pengondalian yang efektif.

Perlakuan : Daerah endemik (KERTASURA):
Tanaman : 5 Mei 1984

Daerah non endemik (BAYALANG):
Tanam : 5 Mei 1984

Keterangan : Tanpa perlakuan insektisida

Ukuran plot : 50m x 20m
terbagi dalam 5 plot secara diagonal

Varietas padi : Cisadane

Jamlah bibit : 3 bibit per rumpun

Umur bibit : 21 hari

Jarak tanam : 25cm x 85cm

Pemupukan : pertama = 67 kg Urea + 100 kg TSP 1 hari scbelum tanam
kedua = 67 kg Urea pada umur 3 minggu setelah tanam
ketiga = 67 kg Urea pada umur 6 minggu setelah tanam

Rumpun contoh : 50 rumpun contoh setiap plot
Total = 50 rumpun x 5 (plot) = 250 rumpun

Pengamatan : 1. a) Pengamatan gejala serangan serangga hama ganjur sobanyak 50 rumpun sotiap plot, dilaksanakan setiap 5 hari sokali dimulai umur 1 minggu setelah tanam

b) Puru ganjur tersebut diambil dan dibelah untuk diamati stadiumnya dan parasit-parssitnya.

2. Pembelahan 20 rumpun disekitar percobaan untuk diamati:

a) Jumlah tolur serangga ganjur pada daun.

b) Jumlah larva, pupa dan parasit-parasitnya.

Hasil percobaan: Hasil percobaan ini dapat menerangkan:

1. Fluktuasi kepadatan populasi musiman dari serangan ganjur.
2. Jumlah generasi awal dan punosk serangan ganjur.
3. Pertambahan populasi pada stadium vegetatif dan penurunannya pada stadium generatif.
4. Hubungan antara jumlah telur - larva, tolur - puru, dan larva - puru untuk penentuan saat pengendalian yang tepet.
5. Hubungan antara iklim mikro dengan terjadinya puru.
6. Keefektifan parasit dan predator.
7. Hubungan antara stadium pertumbuhan tanaman padi dengan serangan serangga ganjur.
8. Hubungan antara jumlah serangga dewasa yang tertangkap oleh lampu perangkap dengan terjadinya puru.
9. Hubungan antara kerusakan oleh serangga ganjur dan hasil panen.

Keterangan:

Plot-plot peroobaan dan metoda pengamatan sama dengan peroobaan yang telah dilaksanakan pada musim tanam 1983/1984.

I. PENCANA PERCOBAAN GROUP STUDY HAMA GANJUR ATA-162 DI LABORATORIUM PENGAMATAN DAN PERAMALAN HAMA DAN PENYAKIT TANAMAN JATISARI, KERAWANG T.A. 1984/1985

A. Percobaan Lapangan

STUDY PERAMALAN KERUSAKAN DAN TIMBULNYA HAMA GANJUR

Percobaan ini adalah program jangka panjang minimal 10 tahun untuk mempelajari mekanisme fluktuasi populasi untuk pengembangan tehnik peramalan hama ganjur.

Varietas	:	Cisedane
Waktu tanam	:	Dimulai dari tanggal 5 Desember 1983, selanjutnya penanaman dilakukan setiap bulan pada tanggal 5 bulan yang bersangkutan.
Jarak tanam	:	25 x 25 cm
Jumlah bibit	:	3 bibit setiap lubang (rumpun)
Pemupukan (Ha)	:	1. 67 kg urea + 10 kg TSP 1 hari sebelum tanam 2. 67 kg urea, 3 minggu setelah tanam 3. 67 kg urea, 6 minggu setelah tanam
Ukuran plot	:	10 x 25 m (sekali tanam) total: 12 (10 x 25) = 3.000 m^2
Pengamatan	:	- Pengamatan dilakukan setiap 10 hari dimulai sejak tanaman berumur 10 hari setelah tanam - Pengamatan gejala serangan dilakukan pada 3 petak pengamatan terletak pada diagonal plot. Setiap pengamatan terdiri dari 50 rumpun yang ditentukan secara acak. - Dua puluh rumpun secara acak dicabut dari plot percobaan untuk pengamatan pembelahan.

B. Percobaan pada Green House

MASS REARING SERANGGA GANJUR

Hal yang dipelajari dari percobaan ini adalah

1. Biologi serangga ganjur
2. Screening varietas dan mekanisme terbentuknya gejala serangan (puru)
3. Screening insektisida dan mekanisme mortalitas.
4. Musuh alami serangga ganjur.

Varietas : Pelita

Bibit : Untuk percobaan ini dipergunakan bibit umur 20 - 30 hari setelah disebar pada box persemaian.

Perlengkapan yang diperlukan :

1. Meja dan rearing cages
2. Box persemaian
3. Kain putih
4. Humidifier
5. Pot
6. Lain-lain (mikroskop, foreceps, aspirator dall).

Percobaan A — ANALISH FAKTOR TERJADINYA HAMA GANJUR ANTARA DAERAH ENDEMIK DAN NON ENDEMIK PADA MUSIM TANAM 1984/1985 DI CIREBON (ATA-162)

Tujuan : Untuk mengetabui mekanisme terjadinya serangan hama ganjur sebagai implementasi teknik peramalan dan cara pengendalian yang efektif.

Perlakuan : Daerah endemik (KERTASURA):
Tanaman awal: 25 Desember 1984
Tanam akhir : 25 Januari 1985
Daerah non endemik (BAYALANGU):
Tanam awal : 5 Desember 1984
Tanam akhir : 25 Januari 1985
Keterangan : Tanpa perlskuan insektiside

Ukuran plot : 50m x 20m
terbagi dalam 5 plot secara diagonal

Varietas padi : Cisadane

Jumlah bibit : 3 bibit per rumpun

Umur bibit : 21 hari

Jarak tanam : 25cm x 85cm

Pemupukan : pertama = 67 kg Urea + 100 kg TSP 1 hari scbelum tanam
kedua = 67 kg Urea pada umur 3 minggu setelah tanam
ketiga = 67 kg Urea pada umur 6 minggu setelah tanam

Rumpun contoh : 50 rumpun contoh setiap plot
Total = 50 rumpun x 5 (plot) = 250 rumpun

Pengamatan : 1. a) Pengamatan gejala serangan serangga hama ganjur sebanyak 50 rumpun setiap plot, dilaksanakan setiap 5 hari sekali dimulai umur 1 minggu setelah tanam

b) Puru ganjur tersebut diambil dan dibelah utuk diamati stadiumnya dan parasit-parasitnya.

2. Pembelahan 20 rumpun disekitar percobaan utunk diamati:

a) Jumlah tolur serangga ganjur pada daun.

b) Jumlah larva, pupa dan parasit-parasitnya.

Hasil percobaan : Hasil percobaan ini dapat menerangkan:

1. Fluktuasi kepadatan populasi musiman dari serangan ganjur.
2. Jumlah generasi awal dan puncak serangan ganjur.
3. Pertambahan populasi pada stadium vegetatif dan penurunannya pada stadium generatif.
4. Hubungan antara jumlah telur - larva, telur - puru, dan larva - puru untuk penentuan saat pengendalian yang tepet.
5. Hubungan antara iklim mikro dengan terjadinya puru.
6. Keefektifan parasit dan predator.
7. Hubungan antara stadium pertumbuhan tanaman padi dengan serangan serangga ganjur.
8. Hubungan antara jumlah serangga dewasa yang tertangkap oleh lampu perangkap dengan terjadinya puru.
9. Hubungan antara kerusakan oleh serangga ganjur dan hasil panen.

Keterangan:

Plot-plot peroobaan dan metoda pengamatan sama dengan percobaan yang telah dilaksanakan pada musim tanam 1984.

Percobaan B. SCREENING VARIETAS PADI TERHADP HAMA GANJUR

Tujuan : Mencari varietas yang tahan terhadap hama ganjur

Waktu : MT 1984/1985 (tanam : 25 Januari 1985)

Lokasi : Desa Kertasura, Kapetakan, Cirebon

Bahan dan Metoda:
- Varietas : 10 mscam varietas
- Ukuran plot : 5 x 10 m
- Jarak tanam : 25 x 25 cm
- Waktu tanam : 25 Januari 1985
- Jumlah bibit Yang ditanam : 3 butir per lubang
- Perlakuan :
  1. Varietas
  2. "
  3. "
  4. "
  5. "
  6. "
  7. "
  8. "
  9. "
  10. "

Rencana percobaan: Rencsna acak kelompok, dengan 4 ulangan tiap perlakuan.

Pengamatan :
a. Tiap plot dismati gejala serangan ganjur (puru) sebanyak 25 rumpun secara acak.
b. Pengamatan dilakukan setiap 14 hari sekali mulai 14 setelah tanam.

Pemupukan :
- Pertama: 67 kg Urea + 100 kg TSP per hektar, diberikan sehari sebelum tanam.
- Kedua : 67 kg Urea per hektar, deberikan 3 minggu sebelum tanam.
- Ketiga : 67 kg Urea per hektar, diberikan 6 minggu setelah tanam.

DENAH PERCOBAAN SCREENING VARIETAS TERHADAP HAMA GANJUR

10 m	6 5 m	7	3	8	5	2	1	10	9	4	ULANGAN I
	3	9	10	5	2	4	6	8	1	7	ULANGAN II
	2	5	3	4	8	10	6	7	9	1	ULANGAN III
	8	1	5	7	9	2	4	3	6	10	ULANGAN IV

* Perincian Bisya Pengujian hama ganjur ATA-162 di Kabupaten Cirebon untuk MT 1984

Analisa Faktor Terjadinya hama ganjur di Kabupaten Cirebon

2 Lokasi : 1. Kertasura, Kepetskan, Cirebon
2. Balayangu, Gegesik, Cirebon

I. Upah pekarja

1.	Pembuatan Plot 2 (lokasi) x 1 (waktu taham) x 7 (orang) x Rp 2.000	Rp. 28,000.-
2.	Penyiapan lahan (3 x dengan oangkul) 2 (lokasi) x 1 (waktu tanam) x 15 orang x Rp 2.000	Rp 60,000.-
3.	Pembuatan persemaian 2 (lokasi x 1 (waktu tanam) x 1 (orang) x Rp 2.000,-	Rp 4,000.-
4.	Penanaman 2 (lokasi) x 1 (waktu tanam) x 6 (orang) x Rp 1.000,-	Rp 12,000.-
5.	Perbaikan pematang 2 (lokasi) x 1 (waktu tanam) x 2 (orang) x 1.000,-	Rp 12,000.-
6.	Penyiangan	
	a. Dengan tangan 2 (lokasi) x 1 (waktu tanem) x 6 (orang) x 3 (ulangan) x Rp 1.000,-	Rp 36,000.-
	b. Dengan landak 2 (lokasi) x 1 (waktu tanam) x 2 (orang) x 2 (ulangan) x Rp 2.000,-	Rp 16,000.-
7.	Panen & pengeringan gabah 2 (lokasi) x 1 (waktu tanam) x 6 (orang) x Rp 2.000,-	Rp 24,000.-
8.	Usaha mencegah serangan tikus (Rodentisida dan plastik 2 (tempat) x Rp 12.000,-	Rp 24,000.-
9.	Upah pengamat (field worker) 2 (tempat) x 2(orang) x 5 (April 1984 Augustus '84 x Rp 27.500,-	Rp 550,000.-
	Total	Rp 766,000.-

ACTIVITIES OF ATA-162 BPH GROUP (1983-1985)

INTRODUCTION

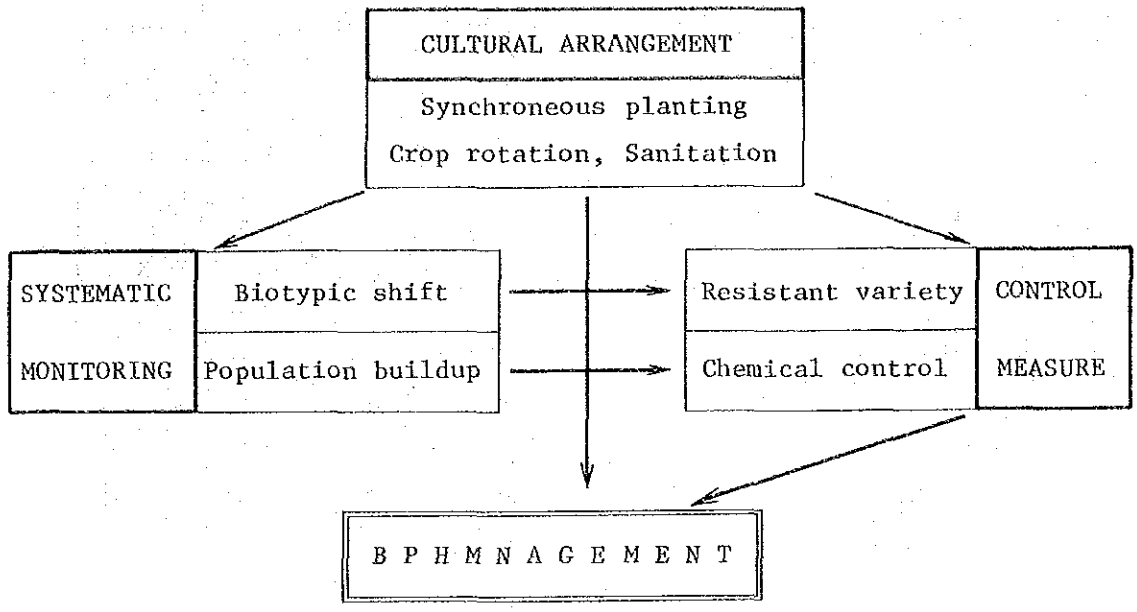
One of the major purposes in the Indonesia-Japan Joint Programme on Food Crop Protection (ATA 162) is to improve the forecasting technology for the insect pests of rice. The brown planthopper (BPH) has dramatically risen as a key pest threatening rice production in tropical Asia soon after launching the rice intensification programmes with introduction of modern high-yielding rice variety and high-yielding technologies. Planting of resistant varieties has not necessarily solved the BPH problem. The occurrence of host resistance-breaking biotypes in the BPH populations further complicated management of the BPH. The practical significance of operational forecasting works are, therefore, increasingly emphasized in order to enforce the effective integrated management of the BPH utilizing resistanct rice varieties and chemical control techniques bilaterally. For the purpose, the forecasting works for the BPH must be composed of the two phases, namely (1) qualitative phasedynamics of biotypic shift in the population, and (2) quantitative phase-dynamics of population density.

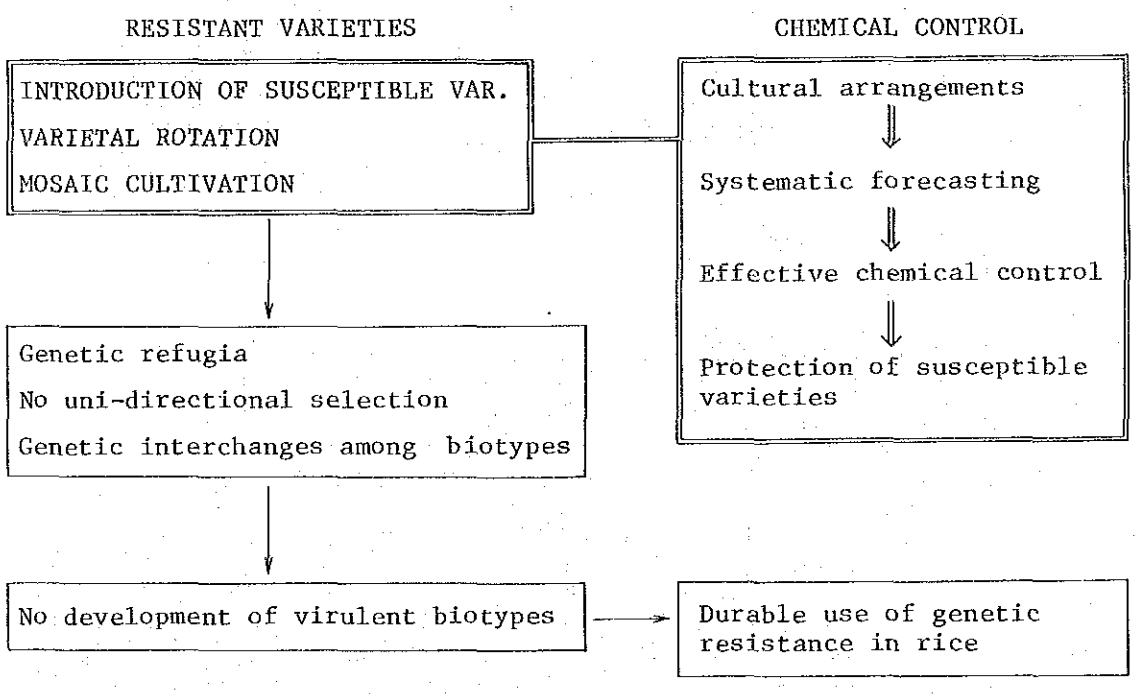
It has been demonstrated that the BPH exists as a complex of populations or demes that have different abilities to infest rice varieties with different genes for resistance. Exposure to a strong selection pressure of resistant varieties result oftenly in BPH populations capable of defeating host resistance by modifing their genetic or physiological makeup. The resulting genetic or physiological strains of the BPH are commonly referred to as biotypes. The development of such host resistance-breaking biotypes in the fields was actually known on IR 26 and IR 42 in Indonesia. The practical significance and durability of resistant varieties depend largely on the prevalence of such virulent biotypes. Therefore, forecasting the shift of BPH biotypes in the field is an important technique in the management of the BPH. For the establishment of the monitoring and forecasting the biotypic shift in the BPH populations, genetic and physiological mechanisms involved in it should be understood fully. At present, following possible mechanisms could be assumed:- (1) Shift or pyramiding of major genes, (2) Recombination of minor genes, and (3) Physiological conditioning. The four types of experiments

described in the first chapter are designed to clarify the genetic and physiological characters.

Sound chemical control is also an useful technology in the integrated management of the BPH. Field studies on the population dynamics of the BPH are another important research activities in the present project. Main points in the population studies are focused to determine the critical stages for forecasting the upsurge of the population, to elucidate the control threshold density at each stage, and to develop standardized methods to monitor the population density at each stage, through analysis of the population quality and dynamics at the BPH hot spots in the farmers's fields. Particularly, the present studies aim to enable the forecast of hopperburn damage by monitoring the immigrant and founder densities at earlier stages in each cropping season so as to materialize the operational control of the BPH before upsurging the populations, which could also be more effective to suppress the prevalence of virus diseases transmitted by the BPH.

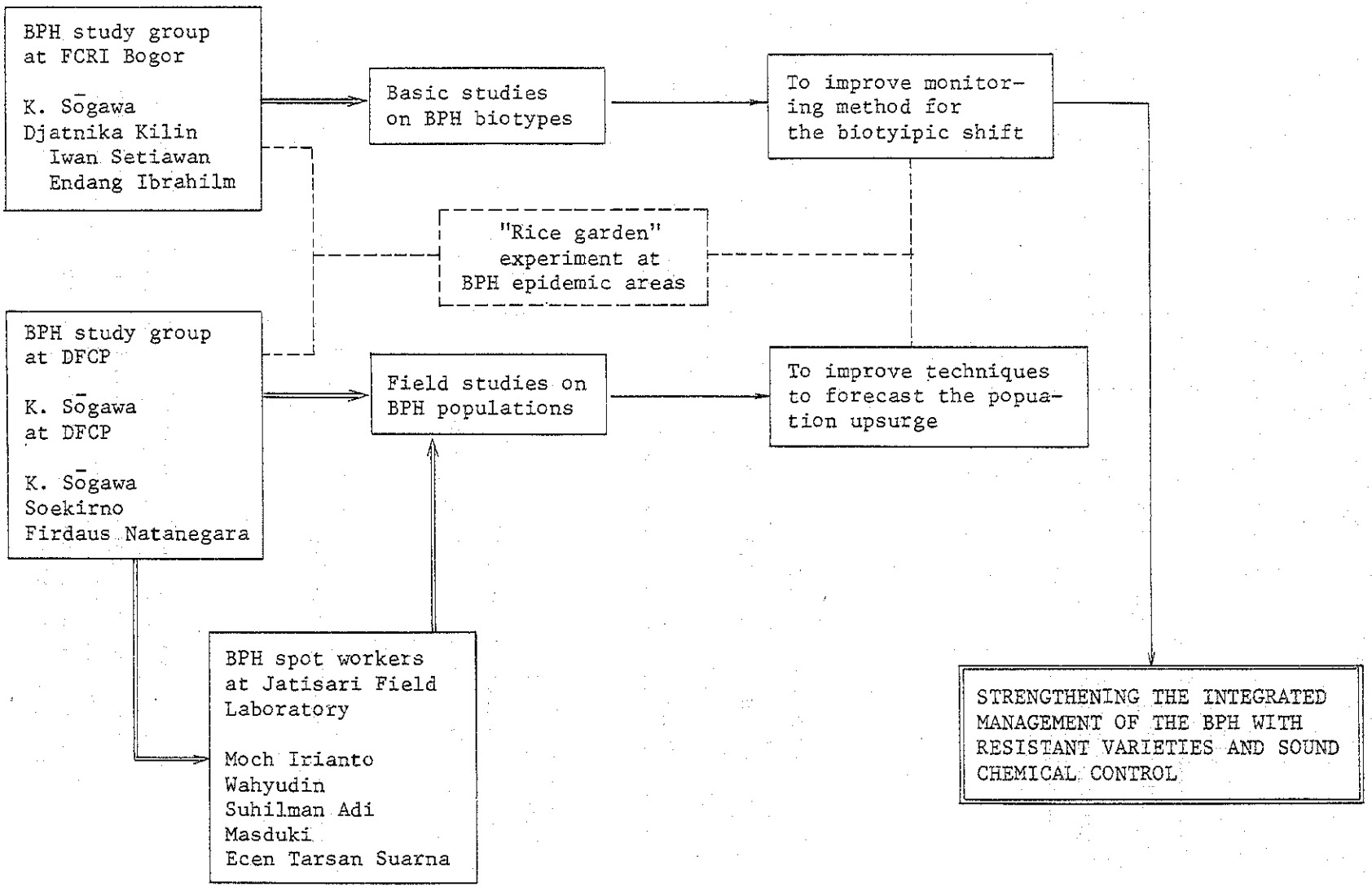
The two series of experiments mentioned above concerning to the two phases in the BPH forecast will be conducted in collaboration with the BPH study groups at the Bogor Food Crop Research Institute and the Directorate of Food Crop Protection.





Basic idea for the BPH management in tropical paddy. Three technical aspect while must be involved in the BPH management (upper), and possible varietal approaches to prevent prevailing virulent biotypes with supplementary use of pesticides only for the protection of suceptible varieties (lower).

Organizations of the BPH studies in the TAT 162



Tentative long-term plan of activities by the BPH-groups

Year	BPH-BIOTYPE STUDIES AT BOGOR	OPERATIONAL FIELD EXPERIMENTS	BPH-ECOLOGY IN WEST JAVA
1983 1983/1984 1984 1984/1985	GENETIC NATURE OF BPH BIOTYPES MODE OF BIOTYPIC SHIFTS 1. Purification 2. Biotype analysis of natural BPH populations 3. Establishment of new biotypes 4. Hybridization experiments	"Rice garden" experiment in North Sumatra	POPULATION ECOLOGY OF THE BPH 1. Basic pattern of population buildup in the field 2. Key stages for forecasting and controlling 3. Control thresholds KEY FACTORS IN POPULATION DYNAMICS 1. Fecundity-host interaction 2. Mortality-bioagent interaction 3. Off-cropping season ecology EVALUATION OF RESUGENCE-FREE INSECTISTATICS FOR BPH MANAGEMENT
1985 1985/1986 1986 1986/1987	NEW VARIETAL APPROACHES FOR BPH MANAGEMENT 1. Biotypic shift under the varietal rotation 2. Biotypic shift under the mosaic cultivation 3. Effect of horizontal resistance on biotypic shift	Nation-wise networks of "rice garden" experiment 1. Ecology 2. Biotype identification 3. Insectistatics	
1987 1987/1988 1988 1988/1989	IMPLEMENTATION OF NEW VARIETAL APPROACHES FOR BPH MANAGEMENT IN PILOT FARMS		SYSTEMATIC MONITORING AND OPERATIONAL CONTROL OF THE BPH IN PILOT FARMS
1989 1989/1990	INTEGRATED MANAGEMENT OF THE BPH BY NEW VARIETAL ARRANGEMENT AND INSECTISTATICS		

OUTLINE OF ACTIVITIES BY THE ATA 162-BPH GROUP IN 1984-1985

I. Field ecology of the BPH population in Northern part of West Java

Purpose of activity

1) Clarification of basic pattern of the population build-up of the BPH in the field (1983-1985).

2) Determination of key stages for monitoring and control of the BPH (1983-1985).

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3) Estimation of control thresholds at each key stage (1983-1985)

4) Analysis of fecundity-host plant interaction (1984-1985).

   i) To compair fecundity of macropterous immigrants and brachupterous inhabitants at different stages of host plant growth.

5) Analysis of mortality-bioagent interaction (1984-1985).

   i) To estimate egg parasitization at different generations.

   ii) To estimate nymphal mortality at different generations.

   iii) Adult longevity of macropterous immigrants and brachypterous inhabitants.

6) Surveilance of the BPH during off-crop seasons (1984-1985).

   i) To find major breeding sites of the BPH during fallow period.

   ii) To monitor immigrant density during fallow period.

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7) Evaluation of insectistatics for BPH management (1984-1985).

   i) To evaluate efficacy of non-resurgence causing insectistatics on the BPH in the field.

   ii) To determine the timing of application.

Location

1) Jatisari Field Laboratory

Analytical experiments 4) and 5) will be mainly conducted as well as other routine experiments.

2) Farmer's fields

i) Rengasdengklok, Karawang
ii) Pagaden, Subang
iii) Kalijati, Subang
iv) Bangodua, Indramayu

In each location, 8 observatory plots (10x10 m^2) are provided for routine observations 1), 2), 3), 6) and 7) by each spot worker.

II. Laboratory analysis of the BPH biotypes

Purpose of activity

1) Purification of known biotypic populations (1983-1985).

2) Analysis of genetic nature of biotypes (1983-1985).

3) Clarification of mechanism and mode of biotypic shifts (1983-1985).

---

4) Evaluation of genetic mosaics (1984-1985).

To simulate the effect of genetic mosaics in host plants in the BPH resistance on the development of virulent genetic makeup in the BPH population.

The North Sumatra population (a virulent biotype) is reared consecutively on different composite varieties which include different resistant genes with different combinations, and change in biotypic nature is observed at each generation.

Composite varieties

a) IR 42 only (control)

b) IR 42 + Pelita I/1 (1 : 1 w/w)

c) IR 42 + IR 26 + Pelita I/1 (1 : 1 : 1)

d) IR 42 + IR 26 (1 : 1)

5) Evaluation of genetic rotation (1984-1985)

To simulate the effect of genetic rotation in host plants in the BPH resistance on the development of virulent genetic makeup in the BPH population.

The Jatisari population (an avirulent biotypes) is reared alternatively on different varieties with different genes for the BPH resistance, and change in biotypic nature is observed at each generation.

Varietal rotation modes

a) Pelita I/1 -- Pelita I/1 -- (control A)

b) IR 42 -- IR 42 -- (control B)

c) IR 42 -- Pelita I/1 -- IR 42 -- Pelita

d) IR 42 -- Pelita I/1 -- IR 26 -- Pelita

e) IR 42 -- IR 26 -- IR 42 -- IR 26 --

III. The "rice garden" experiment

Purpose of activity

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 works.

4) Activation of Field Laboratories.

Location

1) Deli Sergang (Farmer's field), North Sumatra (1983)

2) Wilayah Kerja Field Laboratory, North Sumatra (1984-)

3) Jatisari Field Laboratory, West Java (1984-)
Several other Field Laboratories are under selection.

I. RESEARCH PROGRAMME ON THE DYNAMICS OF BPH BIOTYPES (1983-1985)

1. Purification and maintenance of the BPH biotypes

Purpose: To purify the biotypes 1, 2 and 3, and to maintain the BPH populations existing on Pelita I/1, Cisadane, IR 36 and IR 42 for the present and coming research works.

Materials and methods:

a. To make 20 or more sibling lines for each biotype.
b. To select sibling lines whose varietal reaction (nymphal mortality) are specific for each respective biotype.
c. To combine the selected sibling lines and to maintain them inbreeding successively under an isolated conditions.

Table 1. Varietal reactions of purified biotype 1, 2 and 3.

Biotype	Reaction of differential varieties			Variety used to maintain
	Pelita I/1	IR 26	IR 42	
1	S	R	R	Pelita I/1
2	S	S	R	IR 26
3	S	R	S	IR 42

Remarks:

The BPH biotypes mentioned above should be maintained under well isolated condition, such as separated compartments in a greenhouse.

2. Observation of biotypic shift of the BPH populations under experimental condition

Purpose: To clarify theprocess and mode of biotypic shift of the BPH populations which have different genetic or physiological background regarding to the affinity to resistant rice varieties.

Materials and methods:

a. Five pairs of each biotype are confined on each test variety with a ventilated milar cage, and the progeny is forced to feed on it successively.

b. Biotypic shift is monitored by measuring honeydew excreted by adult females at each generation on test variety.

Table 2 Combinations between biotypes and rice varieties examined in the experiments

Biotype	Pelita I/1	Cisadane	IR36	IR42	IR56
Purified					
1	x	o	o	o	o
2	o	o	o	o	o
3	o	o	o	x	o
Field popul					
Pelita I/1	x	o	o	o	o
Cisadane	x	x	o	o	o
IR 36	x	o	x	o	o
IR 42	x	o	o	x	o

o Varieties on which biotypic shift is examined

In addition to the 5 varieties shown in Table 2, some breeding lines with new resistant genes will be employed.

Points to be studies:

(1) Differential adaptability of each biotype which has different genetic or physiological background to new host varieties with different genes for resistance.

(2) Mode of biotypic shift; monogenic or polygenic nature.

(3) Increase of virulence by shifting host variety from a resistant variety to another resistant ones.

(4) Generations required to shift the biotypic nature.

(5) Stability of biotypic nature on susceptible variety.

3. Comparison of biological and physiological properties among biotypes

Purpose: To clarify the difference in the varietal affinity, infestivity and biotic potential of each biotype.

Materials and methods:

a. Purified biotypes 1, 2 and 3, field populations from Pelita I/1, Cisadane, IR 36 and IR 42, and some new biotypes obtained by the experiment 2.

b. Varietal affinity is examined by the nymphal preference response for the selected differential varieties at seedling stage.

c. Infestivity is evaluated based on the aduit ability to feed on the selected resistant varieties (see the experiment 2).

d. Biotic potential is compared by the relative rate of reproduction on the selected varieties.

Point to be clarified:

(1) Presence of reproductive advantage or disadvantage in each host resistance-breaking biotype.

4. Hybridization experiments

Purpose: To elucidate the genetic nature of each biotype and the genetic interaction between biotypes and varieties.

Materials and methods:

a. Purified biotypes 1, 2 and 3, and selected field populations.

b. Five heterogamic pairs between any 2 biotypes are crossed reciprocally on Pelita I/1 plants.

c. The resulting F1, F2 and BC progenies are maintained on Pelita I/1 plants.

d. Amount of honeydew excreted by the adults and nymphal development on a differential variety are examined on an individual basis at F1, F2 and BF1 generations.

e. Mode of inheritance of each biotypic trait is analysed.

Points to be clarified:

(1) Mode of inheritance of biotypic property

- Hereditable or non-hereditable
- Karyoplasmic or cytoplasmic inheritance
- Monogenic or polygenic nature
- Dominant or recessive nature

Pengamatan Dinamika Populasi Wereng Batang Coklat

Tujuan : Untuk mengetahui perkembangan wereng batang coklat calam satu musim tanam sebagai dasar penentuan model pengamatan.

Lokasi : Kabupaten Karawang, Subang dan Indramayu

Waktu : MT 1983/1984, 1984, 1984/1985

Metode : a. Kultur teknis

- Varietas : Pelita I
- Pupuk : Pemupukan I 67 kg urea/ha + 100 kg TSP/ha (satu hari sebelum tanam)
  Pemupukan II 67 kg urea/ha (3 minggu setelah tanam)
  Pemupukan III 67 kg urea/ha (6 minggu setelah tanam)
- Insektistatik: Buprofezin 25% WP 0.125 kg bahan aktip/ha (6 minggu setelah tanam)
- Jarak tanam : 25 Cm x 25 Cm
- Waktu Tanam : - Bibit ditanam setelah persemaian berumur 25 hari
  - serempak denga petani sekitarnya

b. Petak pengamatan

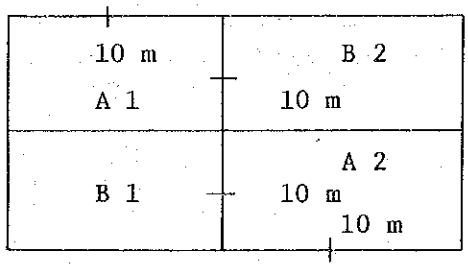
- Banyak petak pengamatan: 8 petak di Kabupaten Karawang
  16 petak di Kabupaten Subang
  8 petak di Kabupaten Indramayu
- Penyebaran dan ukuran : Di tiap desa ditempatkan 4 petak percobaan seperti gambat di bawahini.

Ukuran petak = 10 X 10 m

Keterangan

A1, A2 = tanpa perlakuan insektistatik

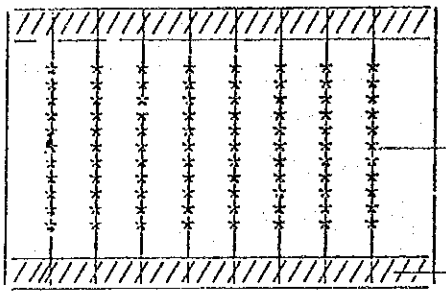
B1, B2 = dengan perlakuan insektistatik



c. Cara Pengamatan:

- Waktu pengamatan = Senin I A1 + I B1 (desa I)
  Selasa I A2 + I B2 (desa I)
  Rabu II A1 + II B1 (desa II)
  Kamis II A2 + II B2 (desa II)
  Jumat, Sabtu: pembuatan laporan

- Banyaknya rumpun contoh:

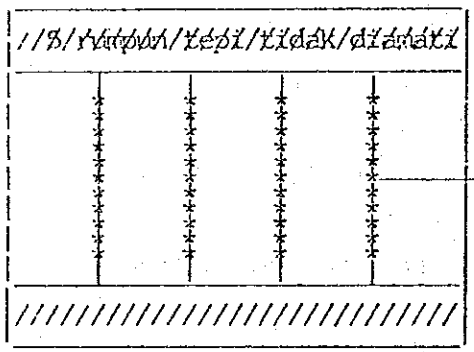


1 s/d 4 minggu setelah tanam.

Jumlah rumpun yang diamati/petak
210 rumpun (7 baris x 30 rumpan)
*rumpun yang diamati
(30 rumpun/baris)

/ lima rumpun tepi tidak diamati

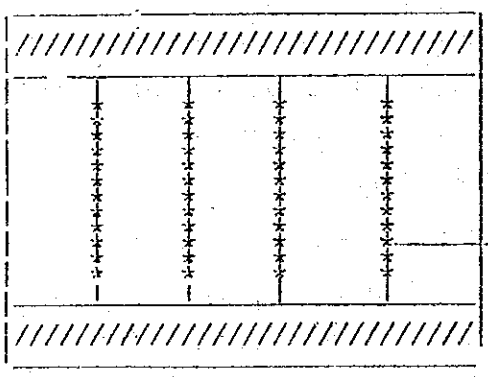
5 5 —— jarak antara baris = 5 rumpun



5 s/d 10 minggu, setelan tanam.

Jumlah rumpun yang diamati/petak
60 rumpun (4 baris x 15 rumpun)
* rumpun yang diamati 15 rumpun
(15 rumpun/baris)
jarak antara rumpun = 2 rumpun

8 8 —— jarak antara baris = 8 rumpun



11 minggu setela tanam s/d panen

Jumlah rumpun contoh yang diamati
per petak 20 rumpun
(4 baris x 5 rumpun)

* rumpun yang diamati 5 rumpun/
baris jarak antara rumpun 6 rumpun

8 8 —— jarak antara baris = 8 rumpun

- Hal-hal yang diamati:

(a) Populasi wereng batang coklat

Dewasa: - Makroptera jantan
- Makroptera betina perawan
- Makroptera betina bunting
- Brakhiptera jantan
- Brakhiptera betina perawan
- Brakhiptera betina bunting

Nimfa : - Kecil (instar 1 s/d 3)
- Besar (instar 3 s/d 5)

(b) Skoring kerusakan

0. Sehat
1. Daun pertama menguning
3. Sebagian daun menguning tetapi tidak hopperbum.
5. Daun-daun menguning, sebagian kerdil. 10 - 25% hopperburn
7. Lebin dari setengah dari seluruh bagian tanaman layu, kerdil dan hopperbum.
9. Seluruh anakan mati.

(c) Hasil panen

Semua hasil tiap petak ditimbang, Z baris tepi tidak ditimbarg

Pengaruh Pemakaian Insektisida dan Insektistatik Terhadap Perkembangan Wereng Batang Coklat

Tujuan : Untuk mengetahui perbedaan pengaruh pemakaian insektisida dan insektistatik terhadap perkembangan wereng batang coklat.

Lokasi : Kebun Percobaan Laboratorium Pengamatan Hama dan Penyakit Tanaman. Jatisari. Jawa Barat.

Waktu : MT 1983/1984, 1984, 1984/1985

Metode : a. Kultur teknis

- Varietas : Pelita I 1
- Pupuk : Pemupukan I, 67 kg Urea/ha + 100 kg TSP/ha
  (satu hari sebelum tanam)
  Pemupukan II, 67 kg Urea/ha
  (3 minggu setelah tanam)
  Pemupukan III, 67 kg Urea/ha
  (6 minggu setelah tanam)
- Insektisida : Diazinon 60 EC 1 liter/ha
- Insektistatik: Buprofezin 25% WP
  0.125 kg bahan aktif/ha
- Jarak tanam : 25 cm x 25 cm
- Waktu pengamatan: - Bibit di tanam setelah persemaian berumur 25 hari
  - Serempak dengan petani sekitarnya

b. Petak pengamatan

A	C2	B_1	D2	D_1
D_1	C_1	A	B2	B_1
B2	D2	C2	C_1	A

ukuran petak: 10 x 10

Keterangan

A = Kontrol

B1 = Diaplikasi Diazinon Pada Umur 6 mst

C1 = Diaplikasi Diazinon pada umur 8 mst

D1 = Diaplikasi Diazinon pada umur 4 mst

B2 = Diaplikasi Buprofesin pada umur 6 mst

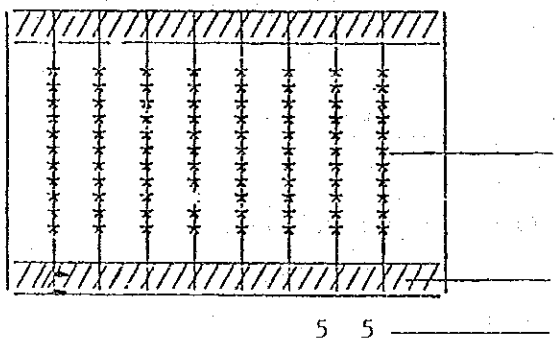
C2 = Diaplikasi Buprofesin pada umur 8 mst

D2 = Diaplikasi Buprofesin pada umur 4 mst

c. Cara Pengamatan

- Waktu pengamatan: Senin = Pengamatan pada petak A
  Selasa = Pengamatan pada petak B1 + B2
  Rabu = Pengamatan pada petak C1 + C2
  Kamis = Pengamatan pada petak D1 + D2
  Jumat = Membuat laporan
  Sabtu = Membuat laporan

- Banyaknya rumpun contoh:



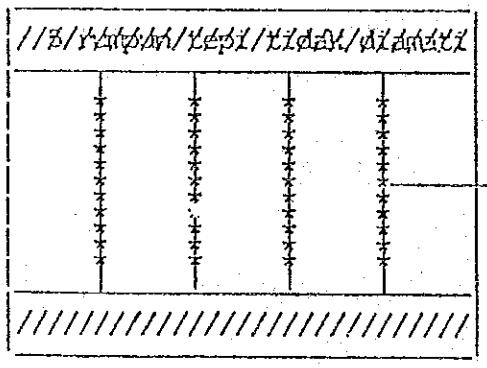
1 s/d 4 minggu setelah tanam

Jumlah rumpun yang diamati/petak
210 rumpun (7 baris X 30 rumpun)

* rumpun yang diamati
(30 rumpun/baris)

/ lima rumpun tepi tidak diamati

jarak antara baris = 5 rumpun

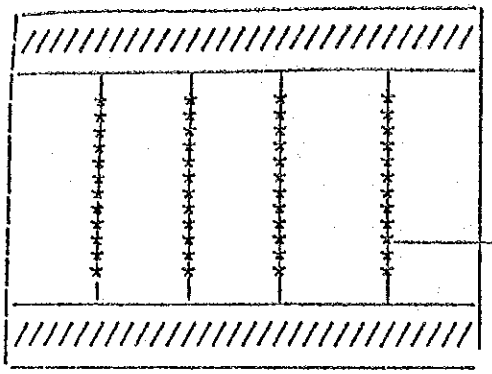


5 s/d 10 minggu setelah tanam

Jumlah rumpun yang diamati/petak
60 rumpun (4 baris x 15 rumpun)

* rumpun yang diamati 15 rumpun
(16 rumpun/baris)
jarak antara rumpun = 2 rumpun

jarak antara baris = 8 rumpun



11 minggu setela tanam s/d panen

Jumlah rumpun contoh yang diamati per petak 20 rumpun (4 baris x 5 rumpun)

* rumpun yang diamati 5 rumpun/baris jarak antara rumpun 6 rumpun

8 8 ——— jarak antara baris = 8 rumpun

- Hal-hal yang diamati:

(a) Populasi wereng batang coklat

Dewasa: - Makroptera jantan
- Makroptera betina perawan
- Makroptera betina bunting
- Brakhiptera jantan
- Brakhiptera betina perawan
- Brakhiptera betina bunting

Nimfa: - Kecil (instar 1 s/d 3)
- Bear (instar 3 s/d 5)

(b) Skoring kerusakan

0. Sehat
1. Daun pertama menguning
3. Sebagian daun menguning tetapi tidak hopperburn.
5. Daun-daun menguning, sebagian kerdil. 10 - 25 % hopperburn
7. Lebih dari setengah dari seluruh bagian tanaman layu, kerdil dan hopperburn
9. Seluruh anakan mati.

(c) Hasil panen

Semua hasil tiap petak ditimbang, 2 baris tepi tidak ditimbang

Pengamatan Dinamika Populasi Wereng Batang Coklat Pada Berbagai Varietas

Tujuan : Untuk mengetahui perkembangan wereng batang coklat pada berbagai varietas dalam satu musim tanam sebadai dasar penentuan model pengamatan.

Lokasi : Kebun Percobaan Lab. Pengamatan Hama dan Penyakit Tanaman, Jatisari. Jawa Barat.

Waktu : MT 1983/1984, 1984, 1984/1985

Metode : a. Kultur teknis

- Varietas : Pelita I_1, Cisadane, IR 26, IR 36, IR 42, Lokal.
- Pupuk : Pemupukan I, 67 kg Urea/ha + 100 kg TSP/ha (satu hari sebelum tanam)
  Pemupukan II, 67 kg Urea/ha (3 minggu setelah tanam)
  Pemupukan III, 67 kg Urea/ha (6 minggu setelah setelah tanam)
- Jarak tanam: 25 cm x 25 cm
- Waktu tanam: - Bibit ditanam setelah persemaian berumur 25 hari.
  - Serempak

b. Petak pengamatan

Ukuran petak : 10 x 10 m

A	B	C	D	A
E	A	F	B	C
D	E	A	F	B
C	D	E	A	F

A = Pelita I_1

B = Cisadane

C = IR26

D = IR36

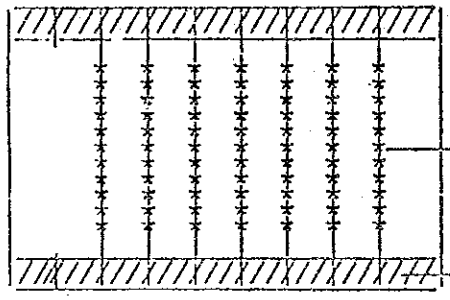
E = IR42

F = Lokal

c. Cara pengamatan

- Waktu pengamatan: - Jumat : petak yang diamati
  A + B + C
  - Sabtu : Petak yang siamati
  D + E + F

- Banyaknya rumpun contoh:



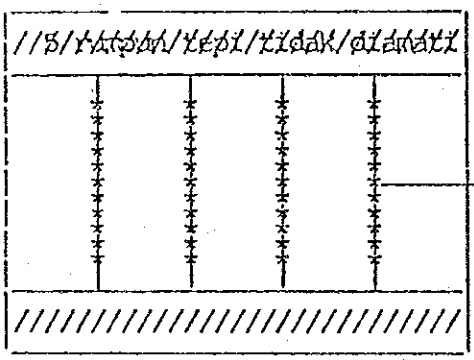
1 s/d 4 minggu setelah tanam

Jumlah rumpun yang diamati/petak
210 rumpun (7 bards x 30 rumpun)

* rumpun yang diamati
(30 rumpun/baris)

/ lima rumpun tepi tidak diamati

5 5 —— jarak antara baris = 5 rumpun



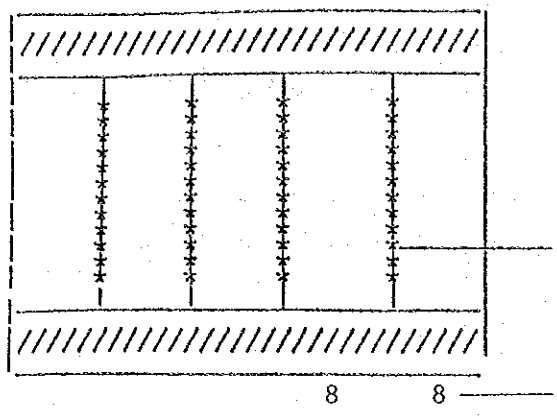
5 s/d 10 minggu setelah tanam

Jumlah rumpun yang diamati/petak
60 rumpun (4 baris x 15 rumpun)

* rumpun yang diamati 15 rumpun
(15 rumpun/baris)

jarak antara rumpun = 2 rumpun

8 8 —— jarak antara baris = 8 rumpun



11 minggu setela tanam s/d panen

Jumlah rumpun contoh yang diamati per petak 20 rumpun (4 baris x 5 rumpun)

* rumpun yang diamati 5 rumpun/baris jarak antara rumpun 6 rumpun

jarak antara baris = 8 rumpun

- Hal-hal yang diamati:

(a) Populasi wereng batang coklat

Dewasa: - Makroptera jantan
- Makroptera betina perawan
- Makroptera betina bunting
- Brakhiptera jantan
- Brakhiptera betina perawan
- Brakhiptera betina bunting

Nimfa : - Kecil (instar 1 s/d 3)
- Besar (instar 3 s/d 5)

(b) Skoring kerusakan

0. Sehat
1. Daun pertama menguning
3. Sebagian daun menguning tetapi tidak hopperburn
4. Daun-daun menguning, sebagian kerdil, 10 - 25% hopperburn
7. Lebih dari setangah dari seluruh bagian tanaman layu, kerdil dan hopperburn
9. Seluruh anakan mati.

(c) Hasil panen

Semua hasil tiap petak ditimbang, 2 baris tepi tidak ditimbang

Pengamatan Dinamika Populasi dan Pengaruh Pemakaian Insektisida Terhadap Perkembangan Wereng Batang Coklat pada Berbagai Varietas.

Tujuan : (1) Untuk mengetahui perkembangan wereng batang coklat pada bergagai varietas dalam satu musim tanam sebagai dasar penentuan model pengamatan.

(2) Untuk mengetahui pengaruh pemakaian insektisida terhadap perkembangan wereng batang coklat pada berbagai varietas.

Lokasi : Wilayah kerja Laboratorium Pengamatam Hama dan Penyakit Tanaman, Pematang Krasaan Sumatera Utara.

Waktu : MT 1983/1984

Metode : a. Kultur teknis

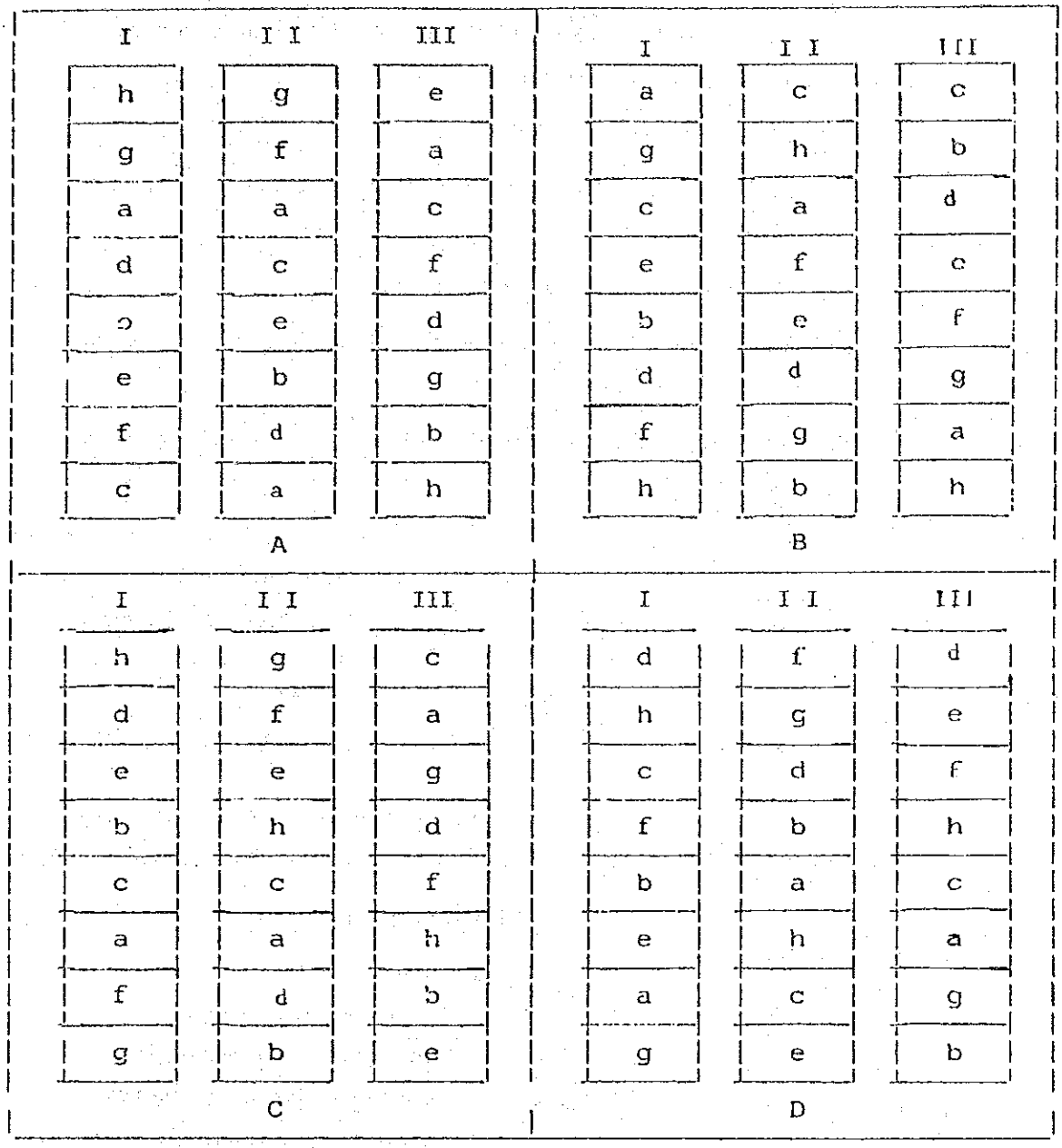
- Varietas : Pelita I, Cisadane, IR26, IR36, IR56, IR42, IR46 dan Bah Bolon
- Pupuk : Pemupukan I: 67 kg urea/ha + 100 kg TSP/ha
  [Aplikasi: satu hari sebelum tanam]
  Pemupukan II: 67 kg urea/ha
  [Aplikasi: 3 minggu setelah tanam]
  Pemupukan III: 67 kg urea/ha
  [Aplikasi: 6 minggu setelah tanam]
- Insektisida: Mipcin 50 WP
- Jarak tanam: 25 cm x 25 cm
- Waktu tanam: - Bibit ditanam setelah persemaian berumur 25 hari
  - Serempak dengan petani sekitarnya

b. Petak pengamatan

Ukuran .....

b. Petak Pengamatan

Ukuran petak: 5m x 5m



Keterangan: I, II, III = Ulangan

A = Petak Dinamika Populasi

B = Petak yang disemprot pada keturunan populasi migran

C = Petak yang disemprot pada keturunan populasi penetap

D = Petak yang disemprot pada keturunan populasi migran dan penetap

a = Pelita I, b = Cisadane, c = IR26, d = IR36, e = IR56, f = IR42, g = IR46, h = Bah Bolon

- Banyaknya rumpun contoh

  - 1 s/d 4 minggu setelah tanam

    Jumlah rumpun yang diamati adalah 100 rumpun per petak (10 baris x 10 rumpun)

  - 5 s/d 10 minggu setelah tanam

    Jumlah rumpun yang diamati adalah 20 rumpun per petak (5 baris x 4 rumpun)

  - 11 minggu setelah tanam s/d panen

    Jumlah rumpun yang diamati adalah 10 rumpun per petak (5 baris x 2 rumpun)

- Hal-hal yang diamati: (2) Populasi wereng batang coklat

  Dewasa: - Makroptera jantan
  - Makroptera betina perawan
  - Makroptera betina bunting
  - Brakhiptera jantan
  - Brakhiptera betina perawan
  - Brakhiptera betina bunting

  Nimfa : - Kecil (instar 1 s/d 3)
  - Besar (instar 3 s/d 5)

(b) Skoring kerusakan

0. Sehat
1. Daun pertama menguning
3. Sebagian daun menguning tetapi tidak hopperburn.
5. Daun-daun menguning, sebagian kerdil, 10 - 25% hopperburn
7. Lebih dari setengah dari seluruh bagian tanaman layu, Kerdil dan hopperburn
9. Seluruh anakan mati

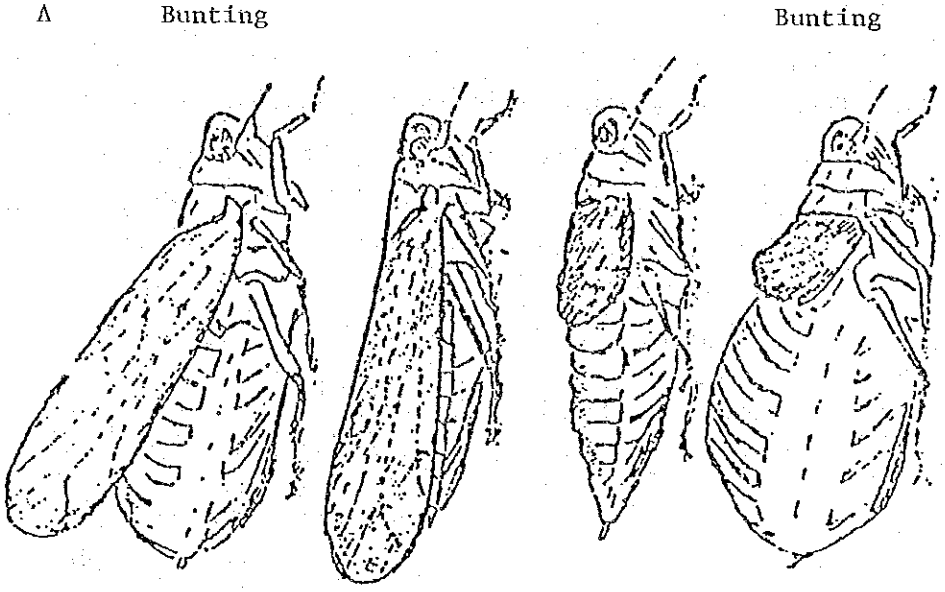
(c) Hasil panen

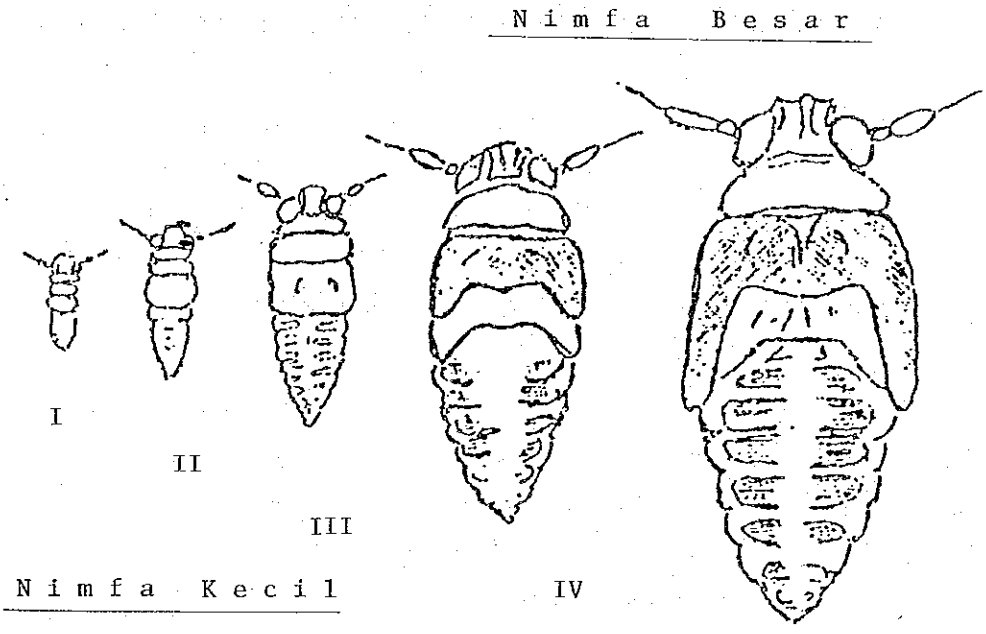
Semua hasil tiap petak ditimbang, 2 baris tepi tidak ditimbang.

A : Perbedaan makroptera dan brakhiptera yang masih perawan dan yang sudah bunting

B : Perbedaan nimfa kecil dan nimfa besap

A





Rencana biaya kegiatan Pengamatan Dinamika
Populasi Wereng Batang Coklat MP 1983/1984
Proyek ATA-162 di Jawa Barat Utara.

1. Karawang:

Ganti rugi 8 petak X Rp 32.500,-	= Rp 260.000,-
Bimbingan Pengamatan Kabupaten 6 bulan X Rp 25.000,- ...	= Rp 150.000,-
Jumlah	= Rp 410.000,-

2. Subang:

Ganti rugi 16 petak X Rp 32.500,-	= Rp 520.000,-
Bimbingan Pengamatan Kabupaten: 6 bulan X RP 25.000,-...	= Rp 150.000,-
Jumlah	= Rp 670.000,-

3. Indramayu:

Ganti rugi 8 petak X Rp 32.500,-	= Rp 250.000,-
Bimbingan Pengamatan Kabupaten: 6 bulan X Rp 25.000,- ..	= Rp 150.000,-
Jumlah	= Rp 410.000,-

Jumlah 1 + 2 + 3 = Rp 1.490.000,-

Work plan of the yellow stem borer in 1983/1984 wet season

Short-term Expert S. Oya

I. Introduction

The rice stem borers are the major insect pests of rice in Indonesia. Damaged area of rice plants attakced by borers is the most enormous among the many rice insect pests. The yellow stem borer, Tryporyza incertulas, is one of the most important insect pests, especially in the service area of irrigation system.

The major purposes of the Indonesia-Japan Joint Programme on Food Crop Protection (ATA-162) are to improve the forecasting technology for the insect pests of rice. It is considered that the observation of light trap, survey of egg mass, dead heart and white panicle are useful methods to forecast the yellow stem borer. To improve the forecasting technology for yellow stem borer, clarification of detailed ecology in each area, generation and cropping season and also the trend of population dynamics, and analysis of relationship between the population density and the yield losses, etc. should be needed.

The studies of stem borer group are now being carried out at the Jatisari field laboratory. Therefore, this work plan is a partial addition in the work plant of the yellow stem borer group.

(I) Studies on the population dynamics of the yellow stem borer in Jatisari field laboratory.

Purpose : To examine (1) the mortality of each development stage of borer (egg, larva, pupa), (2) dispersal pattern of larva in connection with both the development of larva and rice plant, (3) occurrence trend of the damaged stem and the infectivity of larva to attack the rice plant.

Materials and methods

a) In wet season, population density of the yellow stem borer is usually very low. Therefore, the egg masses deposited by the adults collected by light trap are inoculated on the rice plants in the fields.

The rice plants are covered with a mosquito net (125 x 125 x 90 cm, 14 x 14 mesh) to prevent the natural oviposition of the other moths. Each mosquito net box contain 25 hills of rice plant.

b) Whole hills in the net boxes are dissected every week. Experiments are conducted by three replications and continued for 6 weeks after egg mass inoculation.

c) These experiments should be carried out two times in wet season as borer has two generations in one crop season.

d) Other practices : Field size : 10 x 50 m
Variety : Cisadane
Planting practices : Ordinary practices in Jatisari field laboratory without pesticide application.

(II) Obervation of field population trends of the yellow stem borer in different cultivation system area in northern part of West Java Province.

Purpose : To clarify (1) the occurrence trends of damaged stems in relation to light trap records and field population of yellow stem borer under the different cultivation system area.

Materials and methods:

Observation spots : Subang region: 4 spots (different sea level area)
Indramayu region: 4 spots (synchronized and complexed transplanting area)

Observation fields: Pick up from the observatory units without pesticide application.

Sampling methods : Visual counting for the adult egg, damaged stem and dissection of damaged stem.

Observation trip and interval: Two days trip from Jatisari. Once a week during the wet season.

Materials methods:

Water pan trap is placed in the paddy field of Jatisari laboratory. Two species of male moths should be collected by this sex pheromone trap.

Synthetic sex pheromone is replaced once a month. The number of the captured male moths is counted every morning.

(III) Analysis of light trap records in West Java Province.

Purpose : To clarify (1) the seasonal prevalence of adult emergence, (2) annual trends of occurrence, (3) to find out the unknown factors for regulating the occurrence of yellow stem borer.

Materials and methods:

Light trap records : Daily record as possible for several years as a reliable classification.

Other data : a) Whole rice cultivation area, occurrence or damaged area, degree of damage. These data have to be prepared in each observatory unit and season.

b) Temperature records in each light trap (from meteorological agency) and precipitation data from August to December.

c) Cultivation practices : Synchronized or complexed area, mainly alternation of practices and changed year of it. (pesticide application, fertilizer and important things to affect the yellow atem borer)

(IV) Preliminary trapping experiments of the pink stem borer moths by using the synthetic sex pheromone.

Purpose : To improve the forecating technology of the pink stem borer, Sesamia inferenns, and army wor, Pseukaletia separata, synthetic sex pheromone of the army work are used to collect both species of male moths. The components of the sex pheromone are (Z) - 11-hexadecenyle acetate and (Z) - 11-hexadecenol (ratio = 4 : 1). The synthetic sex pheromone was synthesised by Takeda Chemical Company.

Work plan of the yellow stem borer in 1984/1985 fisical year

Introduction

The yellow stem borer is one of the most important insect pests of rice in Indonesia, especially in West Java province. The population density in wet season is usually low. But in dry season, it become to increase and attack the rice plants seriously. Parcentage of damaged tillers are frequently more than 30. Under these situation, to improve the forecasting technology for the yellow stem borer is very import. There are many unknown factors to forecast and control the yellow stem borer. It needs to be carried out the foundamental ecological studies of the yellow stem borer, analysis of light trop records, the studies of economic threshold of rice plants and the clarification of pesticide application time.

(1) Observation of the seasonal prevalance of the yellow stem borer in different cultivation area in northern part of West Java province.

Purpose: To clarify the seasonal prevalnece of the yellow stem borer and occurrence of damaged tillers in connection with the light trap records.

Materials and methods:

Observation fields: Pick up the paddy field from different cultivation system area and different sea level area. In each observation spot, it must be prepared the ordinary planting practices field and without pesticide application field.

Sampling methods:

Visual counting for the adults, eggs, damaged tillers and dissection of damaged tillers to find out the growth stage of larvae.

Interval of observation:

Once a week among both the wet and dry season.

(2) Studies on the population dynamics of the yellow stem borer in Jatisari field laboratory.

Purpose: To clarify (1) the mortality of each development stage of yellow stem borer, (2) the paratisism of natural enemies and the species of enemies in each stage of borer and each cropping season, (3) the disparsal pattern of the larva, (4) the occurrence trends of the damaged tillers, (5) infectivity of larva to attack the rice tillers, (6) the determination of economic threshold of rice plants.

Materials and methods:

Egg masses are inoculated on the rice plant in the paddy field. The rice plants are covered with mosquito nets. The rice plants in the net boxes are dissected every week. These studies are carried out in each generation of the borer and each cropping season of rice plants.

PESTICIDE ANALYSIS PROGRAM IN 1984/1985

1. Pesticide residue analysis

1.1 Name of expert; Dr. Kanazawa

1.2 Duration : 3 months (March, April, May, 1984)

1.3 Location : Pesticide Laboratoy, Directorate of Food Crop Protection, Jakarta.

1.4 Objectifes : - to know the pesticide residue in food crops, vagetables, waters, sediments and animal tissue.
- to train the laboratory officials

1.5 Activities :

1.5.1 Samples will be analyzed are:

a. Food crops: high fatty food, medium fatty food, low fatty food
b. Vegetables
c. Palm oil
d. Waters
e. Soil/sediments
f. Animal tissues

1.5.2 Pesticide residue will be determined are:

a. Organophosphates, for example monocrotophos
b. Organocarbamates, for example carbaryl, carbofuran, aldicarb
c. Antibiotics, for example oxytetracycline, kasugamycine
d. Synthetic phyrethroid, for example fenvalerate, deltamethrine permethrine
e. Bacillus thuringiensis
f. Fumigants, for example methyl bromide, phosphin, pirimiphos methyl
g. Phytohormon

2. Pesticide formulation quality control analysis

2.1 Name of expert: Dr. Sakai (?)

2.2 Duration : 5 months (July - November, 1984)

2.3 Location : Pesticide Laboratory, Directorate of Food Crop Protection, Jakarta

2.4 Objectifes : - to know and to control the quality of pesticide
- to train the laboratory officials

2.5 Activities :

2.5.1 Quality control analysis for active ingridients, for example organophosphate, organocarbamate, synthetic pyrethroid, antibiotic, Bacillus thuringiensis, fumigant and phytohormon

2.5.2 Quality control analysis for inert ingridients, for example:
- solvent
- emultifier
- surfactant

2.5.3 Stability test of formulation

3. Physical and chemicals properties determination

3.1 Name of expert: Dr. Murai (?)

3.2 Duration : 3 months (January - March, 1985)

3.3 Location : Pesticide Laboratory, Directorate of Food Crop Protection, Jakarta

3.4 Objectifes : - to determine the physicals and chemicals properties of pesticide formulation
- to train the laboratory officials

3.5 Activities :

Physicals and chemicals properties analysis on many pesticide formulations, for examples:
- Emultified concentrate
- Wetable powder
- Dust
- Granule
- Water soluble
- ULV
- etc.

4. Pesticide pack and container test (if possible)

4.1 Name of expert: - (?)

4.2 Duration : 3 months (January - March, 1985)

4.3 Location : Pesticide Laboratory, Directorate of Food Crop Protection, Jakarta

4.4 Objectifes :
- to know the best form, shape, colour, etc., of pesticides container
- to know the quality of pesticide container
- to train the laboratory officials

4.5 Activities :

4.5.1 Physicals and mechanicals test for the container

4.5.2 Chemicals test for the container

5. Maintenance and repair for electrical equipment (if possible)

5.1 Name of expert: - (?)

5.2 Duration : 3 months (January - March, 1985)

5.3 Location : Pesticide Laboratory, Directorate of Food Crops Protection, Jakarta

5.4 Objectifes :
- to maintenance and repair the electrical equipments to make them still in good condition and ready for use
- to train the laboratory officials

5.5 Activities : Service, repair and calibration of the electrical equipments, for example Gas Chromatography, High Performance Liquid Chromatography, Infra Red Photometer, Spectrophotometer. U-Visible

Time schedule of the Pesticide Analysis Program in 1984/1985

No.	Activities	March '84	April '84	May '84	June '84	July '84	Aug. '84	Sept. '84	Oct. '84	Nov. '84	Dec. '84	Jan. '85	Feb. '85	March '85
1.	Pesticide residue analysis													
2.	Pesticide formulation quality control analysis													
3.	Physical and chemical properties determination													
4.	Pesticide pack and container test (?)													
5.	Maintenance and repair for electrical equipment (?)													

WORK PLAN OF OBSERVATIONAL STUDY FOR CONTROL RICE TUNGRO VIRUS (RTV) DISEASE IN 1984/1985

TUNGRO GROUP:

1. Dr. Socho Nasu
2. Ir. Bambang Soeharto
3. Ir. Ade Rusamsi

Jakarta

February, 1984

WORK PLAN OF OBSERVATIONAL STUDY FOR CONTROL RICE TUNGRO VIRUS (RTV) DISEASE IN 1984/1985

I. INTRODUCTION

Nowadays the major disease of rice in Indonesia is Rice Tungro Virus (RTV) disease. The attack of this disease cause irreparable damage, consequently reducing crop yield considerably. It was known that the disease had existed in Indonesia since "mentek" symptom was found in 1959. The disease has synonim, these are Mentek (Java and Sumater), Habang (South Kalimantan), Cella-pance (South Sulawesi) and Kebebeng or Bangsel (Bali).

Some explosion/outbreak of RTV disease have happened in Indonesia in 1969-1970 the attack of this disease took-place in South Sumatera and Lampung at the area of 5000 ha, in 1970-1972 in South Kalimantan about 6000 ha. In 1980-1981 in Bali about 4341 ha, West Nusa Tenggara 2255 ha, West Java 30 ha, and East Java 83 ha.

II. BACKGROUND

The virus is known to be transmitted by Nephotettix virescens, N. malayanus, N. nigropictus, N. sympatricus, N. parvus and Recilia dorsalis. Amont the greenleafhopper (GLH) especially N. virescens is more efficient species than the other species to transmit the disease.

Tungro-infected rice plants, especially susceptible variaties, are stunted and the number of tillers are lightly reduced. The leaves are yellow, slightly rolled outward and somewhat spirally twisted. The plant becomes stunted through a shortening of both the leaf sheath and leaf blade. The degree of stunting varies among rice varieties and reduction in plant height decrease with increasing plant age at the time of infection. Tillering is also influenced by the age of plant at the time of infection. The number of tillers is significantly reduced when plants are infected at the early stages of growth. Yellowing, which ranges from light yellow to orange yellow usually starts from the tip of the lower leaves. The colour varies among rice varieties and with environmental conditions. The young leaves of infected plants are often mottled or have pale green to whitish stripes of various length running parallel to the veins. Root development is poor. Infected plants may die but usually they live until maturity.

Infected plants take longer to mature because of delayed flowering. The panicles are often small, sterile, and not completely exserted. The symptom is seen a week after infection. If plants were not attacked until the age of two months, the latter attack would not make loss.

Noticed those factor above, observation on composition and population density of vectors (insect vectors) must be held periodically by using of light-trap or sweet nets. The use of this activity is the early prediction forecasting on their distribution and prevention can be made. To pest observers are very important in area of Rural Extension Center Area (RECA). They have to observe and note about the pest and disease in rice field continuously, so they give recommendation of control.

III. OBJECTIVES

The purpose and significance of the observational studies for control RTV disease proposed here, are summarized as follows:

1. To clarify the basic population dynamics of GLH and the epidemiology of RTV disease in various climatic regions.
2. To strengthen the basic knowledge of the staff who concerns to pest management of the GLH and RTV disease field ecology.
3. To activate field laboratory.
4. To improve the forecasting technology.

These observational studies involve the following activities:

A. Surveillance and monitoring on GLH and RTV disease

Objectives:
- To obtain and mapping of the distribution pattern of population of GLH and RTV disease incidence
- To observe the fluctuation of GLH composition
- To observe an outbreak area distribution and factors that influence on it

The location for this activities will be held in Central Java (Pekalongan and Batang Districts), Bali and West Nusa Tenggara, South and Central Sulawesi.

B. Workshop meeting

This meeting is useful to discuss on data obtained, to solve the problems and find out better approaches for the GLH and RTV disease management.

C. Publication of the results

- supply of handbooks about identifying the disease and the insect vectors, observation and forecasting method and its control. Particularly for pest observers plant protection officers, and extension workers.
- the leaflets about practical guidances to control RTV disease. Especially for farmers.

IV. PROCEDURES

1. Size of each unit plot is: 5m x 5m

2. Rice varieties are varieties that susceptible to RTV disease, for Cisadane, Pelita, IR 36, etc.

3. Cultural practices:

- Preparation of seedlings
- Transplanting time : 21 days old seedling must be transplanted on time
- Number of seedlings : 2 seedlings/plant hole
- Planting space : 25cm x 25cm
- Application of fertilizers:

  1st: Urea 67kg/ha + TSP 100 kg/ha (1 day before transplanting)

  2nd: Urea 67kg/ha (3 weeks after transplanting)

  3rd: Urea 67kg/ha (6 weeks after transplanting)

4. Treatment:

- Eradication control method: is to discard or to pull up tungro-infected plants (or source of inoculum)
- Chemical control method : in this method is to make use of carbofuran and buprofezin insecticides

  1st application : at nursery-bed as soil-incorporation

  2nd application : 1 week after transplanting
- Uncontrolled method

5. Observations (see also Appendix A)

- To observe on GLH population density in nursery-bed by using of sweep-net, with 25 single strokes, at 1 week after sowing.
- To observe the percentage tungro-infected young plant. Counting the infected and the healthy one from every 100 hills. It is conducted 3 weeks after transplanting.
- To observe the percentage of tungro-infected ratoon hills. Counting from every 100 ratoon hills.
- Sampling size: all object (all hills) within 5m x 5m plot must checked.
- Yield of variety tested: all hills within the plots of each treatment are harvested when ripped and grain weight is recorded.

Appendix A

Method of determination on field observation plot

The observation studies of RTV disease is carried out in the area of Rural Extension Center Area (RECA). The location for this studies in each RECA is according to the data on incidence of TRV disease in the last planting season. The mentioned location have to in areas that show the heaviest or as endemic area of RTV disease infestation.

Three surveillance stages based on phases of plant growth, these are: seedling stage, young plant and ratoon stages.

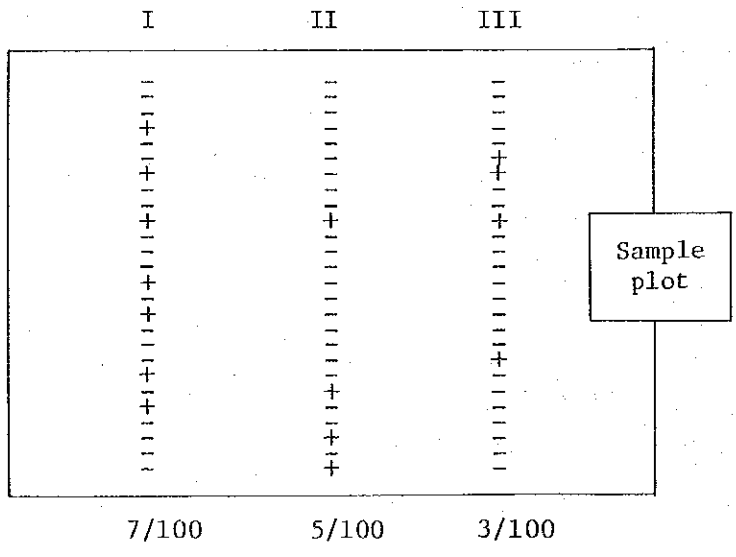
Seedling state:

Surveillance of population density will be carried out when seedling have 2-3 leaves, by using sweep-net with 25 single strokes and 1.0 m width. The caught insects (vectors) are collected in plastic-envelope and then by using of aspirator composition of GLH, number of BPH, WBPH and Zigzag leafhopper are recorded. In addition, data obtained on GLH and other insects composition are recorded from light-trap manner.

Young plant stage:

The observation is carried out 3 weeks after transplanting with method is the same as seedling stage. Besides this, we have to check about tungro incidence. The tungro-infected plants are marked with the positive code (+) and the healthy ones with negative code (-). The sample hills must be in plant rows. Number of hills observed are 100 hills with at least 3 replication.

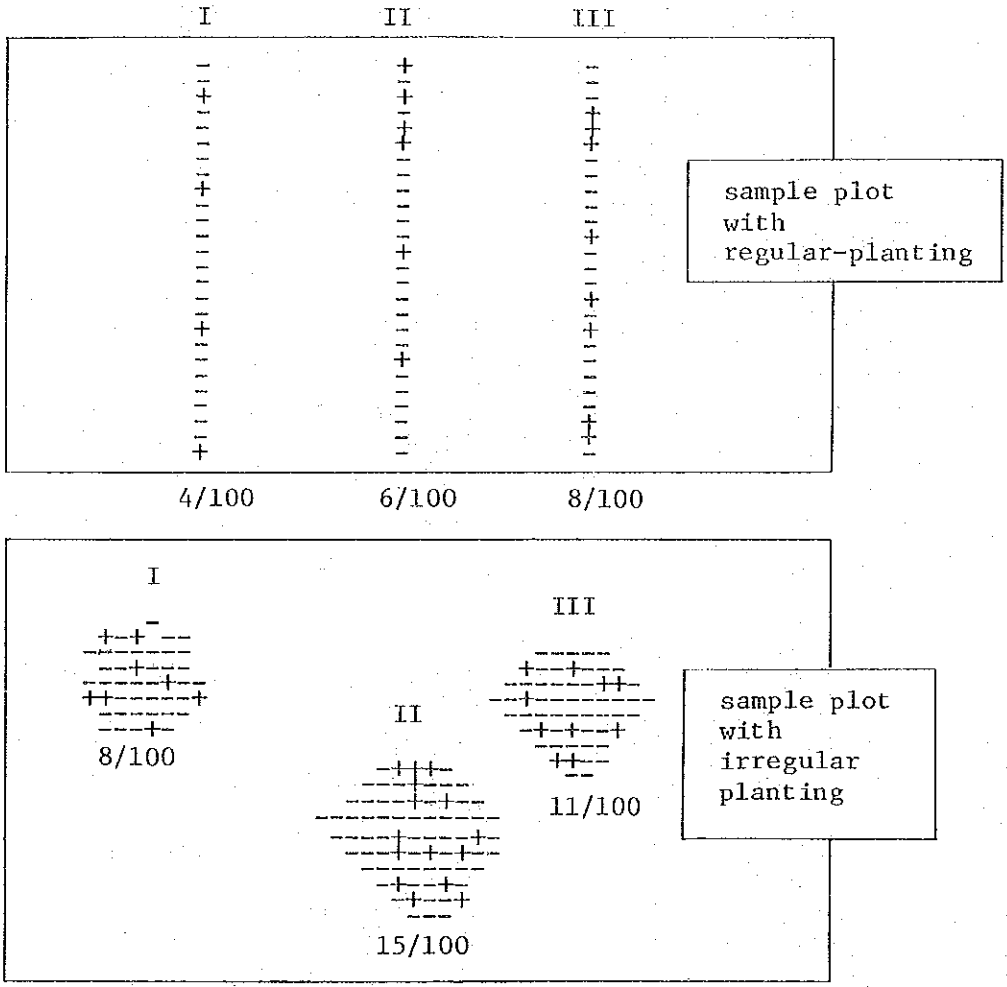
For example:



Ratoon stage:

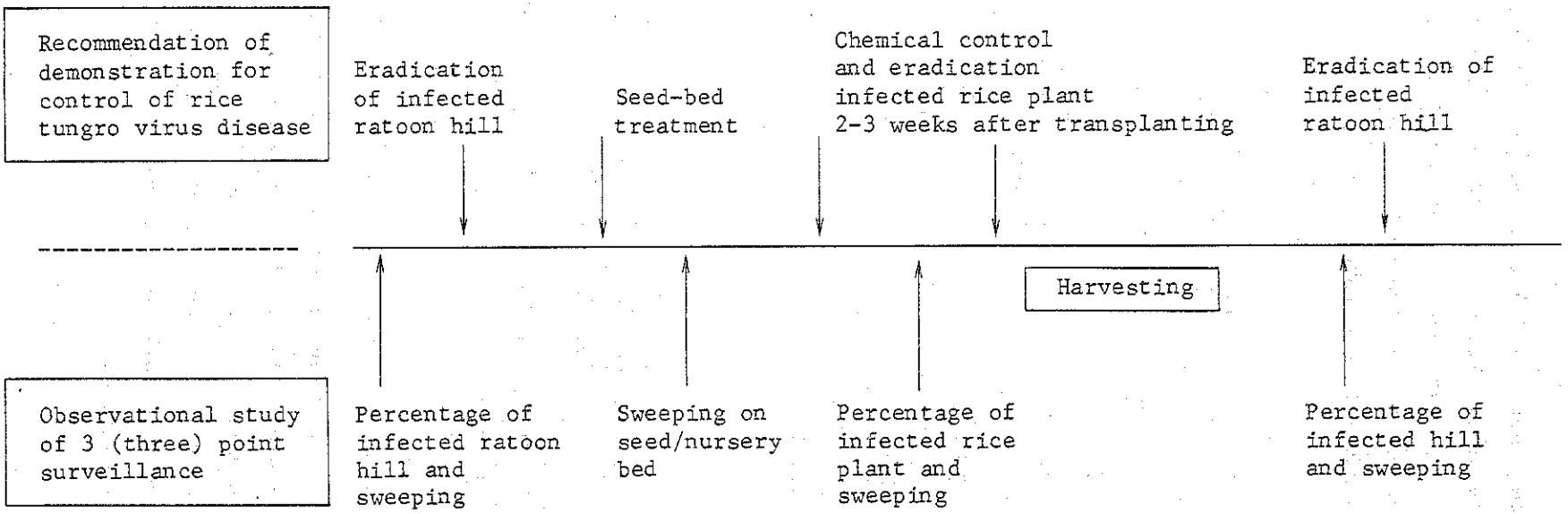
At this stage, surveillance conducted 2-4 weeks after harvesting. The tungro-infected ratoon hills are marked with positive code (+) and the healthy ones with negative code (-). In regular planting, the samples must be in a rows and in irregular planting the samples are in block/group of ratoon hills that contain tungro-infected ratoon hills.

For example:



Notes: Continuously/periodically of surveillance on GLH composition and fluctuation, and RTV disease incidence in every stages of plant growth (ratoon stage, nursery-bed stage and until 3 weeks young plant stage) are very necessary and must be held. Data obtained from these activities can give early warning system in forecasting and control of RTV disease incidence.

Obervational studies and recommendation for control Rice Tungro Virus (RTV) disease



REPORT OF OBSERVATION STUDY OF RTV

Date of observation: ..... Rice plant stage: seedling/rice plant/ratoon *)

Province: ..... Date of sowing/planting/harvesting *)

Kabupaten: .....

Observation area/R.E.C.A.: ..... Age of rice plant: ..... d.a.t.

Desa: ..... Variety: .....

Altitude: ..... meters from sea level

A. Sweeping on the seedbed/young rice plant *)

Plot code: .....

Species	Imago			Nymph				Total Imago+ Nymph
	Female	Male	Total	Young instar	Medium instar	Old instar	Total instar	
1. N. virescens	.....	.....	.....	.....	.....	.....	.....	.....
2. N. nigropictus	.....	.....	.....	.....	.....	.....	.....	.....
3. R. dorsalis	.....	.....	.....	.....	.....	.....	.....	.....

B. Percentage of infected rice plant/ratoon *) by tungro disease

Plot code: .....

Sample hills of rice plant/ratoon *)	Percentage of infected hill
1. 100 hills, 1st. repl.	...../100
2. 100 hills, 2nd. repl.	...../100
3. 100 hills, 3rd. repl.	...../100

*) Delete whichever is inapplicable.

..... 19..

Pest observer,

NIP. .....

OBSERVATIONAL STUDIES FOR CONTROL RTV DISEASE BUDGETING IN 1984/1985

I. Intensive observational studies on RTV disease control (500 m^2)

(1) Cost and salary

a.	Land cultivation until ready for planted (including-plotting and nursery bed)	Rp	25,000.00
b.	Transplanting	Rp	7,500.00
c.	Cultivation (fertilizing, weed control, irrigation)	Rp	10,000.00
d.	Harvesting	Rp	5,000.00
e.	Salary of field worker 5 locations x 1 person x 5 months x Rp 35,000.00	Rp	875,000.00
	Total (1)	Rp	922,500.00

(2) Paddy field for rent

	1 season x Rp 50,000.00	Rp	50,000.00
	Total (2)	Rp	50,000.00

(3) Materials

a.	Seeds 5 kg	Rp	1,500.00
b.	Fertilizers (20 kg Urea + 10 kg TSP)	Rp	4,500.00
c.	Label-board	Rp	10,000.00
d.	Rodenticides and insecticides	Rp	10,000.00
e.	Plastic-bag for harvesting	Rp	5,000.00
	Total (3)	Rp	31,000.00
	Total I (1 + 2 + 3)	Rp	1,003,500.00
	2 (two) seasons need	Rp	2,007,000.00

II. Guidance and supervision

No.	Provinces	Frequencies	Days	Man	Lumpsum (Rp)	Transport (Rp)	TOTAL (Rp)
1.	Central Java	8x	6	2	2,016,000	500,000	2,516,000.00
2.	South Sulawesi	3x	5	1	315,000	720,000	1,035,000.00
3.	Centrl Sulawesi	3x	5	1	315,000	1,008,000	1,323,000.00
4.	Bali and West Nusa Tenggara	4x	7	1	588,000	842,000	1,430,400.00
					Total II		6,304,400.00

III. Publication of manual

1.	Handbooks for officers:	1,500 ex x Rp 2,000.00 =	Rp	3,000,000.00
2.	Leaflets for farmers :	1,500 ex x Rp 400.00 =	Rp	600,000.00
		Total III	Rp	3,600,000.00
		GRAND TOTAL (I + II + III)	Rp	11,911,400.00

STUDY GROUP ON THE GLHs GENUS NEPHOTETTIX MATSUMURA DURING THE PERIOD 1984-1985

Introduction:

The correct identity of insect pests material used in any biological investigation, surveillance and monitoring is essential. However, unless the taxon under investigation is thouroughly revised it is not possible to know its correct identity.

Surveillance and monitoring of insect pests (tungro and GLHs vector, BPHs etc.) have been observed by light trap (daily) and sweeping (weekly) by extension workers. Unfortunately, the experimental test insects are discarded subsequent to the completion of the observation.

For the purposes of confirmation and clarification of the identity of the test insect, it is essential to maintain voucher specimens of material and properly labelled (including the name of the worker, purpose of study, date of collection, locality, host plant etc.) and deposited in BORIF (c/o. S. Suharni Siwi) for future reference and further study. Special attention should be given to those specimens which successfully transmitted the plant pathogen. The reasons why we have to start to do this work are:

1) The concept of the taxon may change with improvement in our knowledge as a result of study of more extensive material, and due employments of refined techniques;

2) More over, species previously considered to be widely distributed are found perhaps to be composed of two or more closely related species.

3) The presence of genetic variation in polytypic species such as GLHs group or BPHs group consitute the elements for potential specification in the long run. In short run, the habits can be materially changed by man's practices of agriculture. It is important to take this microevolutionary aspects into account to modify crop-protection programme.

In case of GLHs study during the period of 1984-1985 special attention will be given to revise the genus Nephotettix in Indonesia, to throwlight the possibility on the presence of geographical variation, key to separate the different species and their distribution.

1. Title : Morphological aspects to study the presence of conspicuous morphological differences among conspecific individuals and populations of GLH species.

   Purpose : The study of external and internal structures in males and females within and between population of GLHs from different geographical regions of Indonesia will throw light on the possibility of the presence of geographical variations, the real number of species present sibling species, cryptic closely related species etc.
   Although taxonomy is still in the initial stage using morphological characters, attempts are being made to study differential reation of rice varieties with gene for resistance to GLH.

   This study will include several activities:

   1. General morphology, female, male, larvae;
   2. Micro geographic variation or spatial variation;
   3. Geographic variation;
   4. Key to separate the different species;
   5. Morphological deviation
      - inter specific crosses
      - pure colonies (laboratory)

2. Title : Host plants descrimination

   Purpose : To study host plants preference for survival and multiplication.

Annual Work Plan of Computer

1983/1984

One of the activities of Indonesia Japan Joint Food Crop Protection Project is the utilization is the utilization of Computer in plant protection program.

Computer as a new system which in the implementation involves the installation of hardward (machines), software (Computer program, procedures, forms), and brinware (personnel). The steps involved in implementation of a new system can be very complex and demanding. To make implementation proceed as smoothly as possible, an implementation plan should be work out.

A. Pre installation

1. Building preparation

The building which is built still need some improvement to be a computer room. The improvement involves installation of power supply, air conditioner, storage facilities, furnitures etc.

2. Personnel training

Initial selection and education of personnel who will operate the computer should be started as soon as possible while the installation of computer being done. Computer operator training must be completed before the computer installed. A computer library should also be established to control the movement of tapes disks and to protect them from fire, humidity and contamination.

B. Installation

As the computer room preparation is accomplished computer installation can be started. In the physical installation planning involves floor space partitioning, checking others equipment such as electric circuit, storage facilities, furnitures, electric wall sockets etc.

C. Post-installation

1. Bench mark test: a run test to see how long the computer will takes to run a certain program application.

2. Personnel development

The implementation of computer based system involves among others an installation of brainware (personnel). To improve the knowledge and to strengthen the skill of personnel, some courses to be given whether domestic or abroad.

3. Data processing application

The application of computer system can be started as the hardware is ready to run, the brainware is established and the software is prepared. It involves in application is the frequency and appropriate cycle of data processing. To keep the flow of data, data processing sequence always in good order the priority scale of data should be made.

An expanding computer configuration or development of Computer System due to increasing of information demand whether in volume or time, variability of application would be considered in the coming year.

GANTT CHART OF COMPUTER WORK PLAN 1983/1984

ACTIVITIES	MONTH											
	4	5	6	7	8	9	10	11	12	1	2	3
A. PRE-INSTALLATION												
1. BUILDING PREPARATION	xxx	xxx	xxx									
2. PERSONNEL TRAINING			xxx									
B. INSTALLATION				xxx								
C. POST-INSTALLATION												
1. B.M. TEST				xxx								
2. PERSONNEL DEVELOPMENT									xxx	xxx	xxx	xxx
3. DATA PROCESSING					xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx
4. CONFIGURATION DEVELOPMENT											xxx	xxx

Budget of Computer Work Plan 1983/1984

Activities	Items	Budget
A. Pre-Installation		
1. Building	Room construction	Rp. 7,560,000.-
	Glass wall constr.	Rp. 450,000.-
	Electric & AC installation	Rp. 376,000.-
2. Personnel/Operator Training		Training fee including in purchasing price
B. Installation:		
Computer installation	Computer installation	Cost of installation included in purchasing price
C. Post-Installation:		
1. Bench-Mark test	Program run test	-
2. Personnel Development	Personnel education	Rp. 250,000.-
3. Data processing	Software supplies (Fl.disk, forms, stationaries)	Rp. 34,100,000.-
4. Computer system expansion	Hardware supplies:	
	CRT Display - 2 pcs	¥ 1,400,000.-
	Std Keyboard - 2 pcs	¥ 250,000.-
	CRT Tables - 2 pcs	¥ 100,000.-
	Fixed Disk - 1 pcs	¥ 1,400,000.-
5. Maintenance	Maintenance and Repairs	unconfirmed

Data processing activities:

A. Data processing:

- Ret rieving	Rp. 2.700.000,-
- Classification	2.700.000,-
- Data base construction	5.400.000,-
- Programming	2.500.000,-
- Team-work meeting	2.250.000,-
- Reporting	4.450.000,-
	Rp. 20.000.000,-

B. Hardware and Software supplies:

- High speed Magnetic Tape Unit	Rp. 7.475.000,-
- M.T.U. adapter	Rp. 7.475.000,-
- Magnetic Tape Unit	
- Floppy Disk	500.000,-
- Continuous form	400.000,-
- Cartridge MTU	175.000,-
- Line printer ink ribbon	450.000,-
- Coding form	500.000,-
- Stationaries	500.000,-
	Rp. 10.000.000,-

C. Operational Costs :

- Overtime working fee	Rp. 2.500.000,-
- Building maintenance	1.200.000,-
- Safety apparatus	400.000,-
	Rp. 4.100.000,-
TOTAL (A+B+C)	Rp. 34.100.000,-

資料 6

Pre Evaluadion Strenghtening of Plant Protection Service

(ATA-162)

Pre evaluation
Strengthening of plant protection service
(ATA-162)

1. Introduction

The Indonesia Japan joint programme on strengthening of plant protection service (ATA 162) has gone along four years since the record of discussion was signed on June 18th 1980. In accordance with the master plan the project conducted studies on rice insect pests and diseases at observatory laboratory Jatisari, and concentrated area in the northern part of West Java, Biological Research in rice insect pests and diseases at Biological Laboratory Bogor Research Institute for Food Crop, Analysis of Pesticides at Pesticide Laboratory, Pasar Minggu, Programming of annual operational plan and offer of technical advices for food crop protection at Central Office Pasar Minggu, and other activities such as: exchange of information, specimen and research reports, upgrading the capabilities of food crop protection staffs and workers and activities to be agreed by the authorities concerned of the two governments. In order to know the progress if the joint project, the government of Indonesia authorized a preevaluation team to evaluate the project. The other hand the project will terminate on June 1985, so the pre-evaluation team will suggest the possibility of requesting of extension and expansion for secondary crops such as soy bean, peanut and corn in accordance with the requesting letter from Director General of Food Crop Agriculture for extension of the ATA 162 project, deated September 9th 1983.

II. Members of pre evaluation team

1. Sulbiyati - Director of Programming Directorate General of Food Crop Agriculture, Head of the team.
2. Triwibowo - Head of monitoring and evaluation Subdirectorate, Directorate of Programming, Secretary of the team.
3. Sukisno - Staff of Subdirectorate of Programme and Project Cooperation, Directorate of Programming, Member of the team.

4. Subiyanti - Staff of Bureau of Bureau of Foreign Cooperation Department of Agriculutre, Member of the tesm.

5. Paulus Mulyanto - Staff of Secretary of Cabinet, Member of the team.

6. Sutarto Alimuso - Staff of Directorate of Food Crop Protection, Member of the team.

7. Suroto - Staff of Directorate of Food Crop Protection, Member of the team.

8. I Nyoman Ardha - Staff of Bureau of Planning Department of Agriculture, Member of the team.

9. Ruanadi - Staff of Bappenas, Member of the team.

However, the team members Mr. Ardha and Mr. Ruanadi could not attend at this duty because of the bustle of their job respectively.

III. The method of evaluation

Meeting together the project counterpart held on January 21th 1984 at Directorate of Food Crop Protection.

Meeting together the team leader ATA 162 and expert held on January 23rd 1984 at Directorate of Food Crop Protection, Pasar Minggu. Discussion together team leader expert counterpart and assistant counterparts held on January 26th 1984 at Directorate of Food Crop Protection, Pasar Minggu. Observation and discussion at pesticide laboratory and computer room. Discussion and observation the Biological laboratory together counterparts at Bogor Research Institute of Food Crop, Bogor. Discussion and field observation the forecasting laboratory at Jatisari. Discussion together chief and staffs of the food crop agriculture service at Cirebon held on January 27th 1984 and field observation at Kapetakan.

IV. Result of the pre evaluation

In accordance with the Master plan of ATA 162, the activities are going along smoothly. The summary result of the pre-evaluation is enclosed.

V. Conclusion

Some activities should be continued during fiscal year 1984/1985, the last fiscal year of joint project ATA 162.

Some activities should be extended because of the importance of pests and disease on their role to attack the rice field, and the developing of new biotype especially Brown Plant Hoper.

Although a lot of achievement are found out through the expertise of this joint project ATA 162, the extension of ATA 162 for the minimum extension is 2 years, still be necessary to finish the study concerning major pests and diseases and also to spread transfer of technology to Indonesian Counterparts.

Summary Activities have been done

and proposal for expanded ATA-162 Project

Master Plan 1980-1985 and it's Specification (1)	Realization up to January 1984 (2)	Activities will be expanded (3)	Location (4)	Additional activities will be expanded (5)	Location (6)
1. Laboratorium observation at Jatisari. A. Study on pest and diseases of Rice plant	1. Brown Planthopper 1.1 Intensive of field study on population dynamic. 1.2 Field experiment on study factor attribute to the resurgency. 1.3 Field experiment on correlation between shading and population growth. 1.4 Field survey of occurrence and damage caused by BPH in West Java, North Sumatera and Aceh. 1.5 Field experiment on determination characteristic of Biotype and population dynamic BPH of North Sumatera colony at Deli Serdang North Sumatera.	1. Brown Planthopper 1.1 Field experiment on determination characteristic of biotype, damage and population dynamic of BPH on various rice varieties (Rice garden) 1.2 Biotipe management in order to minimize biotype determination through Field experiment of mosaic planting and variety rotation. 1.3 Quick test biotype of BPH	CRIA, Bogor, West Java. North Sumatera CRIA, Boger, West Java Jatisari Lab. West Java CRIA Bogor	A. Improvement observation and forecasting system pest and diseases of rice plant. Rice plant. 1. Rat Study on behavior, population dynamic evaluation damage and improvement of control method. 2. Arm work a. Study on injurious level. b. Study on forecasting damage and occurrence of army worm. c. Study on reaction variety to the army worm. d. Study on distribution pattern of army worm in various paddy field with difference cropping pattern.	 West Java Central Java East Java & Lampung West Java Central Java
	2. Rice Gal Midge (RMG) 2.1 Field experiment of factor analysis of RGM occurrence areas and low infestation areas	2. Rice Gall Midge 2.1 Field exeriment of factor analysis of RGM occurrence between seriously damage areas and low infestation areas.	West Java		

(1)	(2)	(3)	(4)	(5)	(6)
	2.2 Field experiment on determination various factor for control the RGM. a. Injurious level b. Screening resistant variety. c. Screening insecticide. d. Application insecticide Ekalux 5G based on injurious level. 2.3 Forecasting study on occurrence and damage caused by RGM. 2.4 Mass rearing of RGM 2.5 Field survey of RGM	2.2 Field experiment of screening resistant variety for control RGM.	West Jawa	3. Ragged stunt Diseases a. Observation population density of insect vector, Percentage of damage tiller and infested stubblet. 4. Blast. a. Study on epidennology of Blast. b. Study on ras shifting patogen of Blast. B. Improvement observation and forecasting system pest and diseases of secondary crop.	CRIA, Bogor North Sumatera
	3. Rice Stem borer. 3.1 Study on population dynamic.	3. Rice Stem borer. 3.1 Study on forecasting occurrence of Rice stem borer and its natural enemies. 3.2 Study on distribution pattern of Rice stemborrer in various planting pattern. 3.3 Field experiment on determination of injurious level. 3.4 Field experiment of resistant variety due to Rice Stem borer.	West Java West Java West Java	B.1 Corn 1.1 Borer. a. Study on injurious level. b. Study on occurrence and damage caused by borer. c. Study on variety reaction concerning with borer. d. Study on distribution pattern of borer. 1.2 Downy mildew. a. Study on epidemiology of downy mildew.	CRIA, Bogor Lampung Central Java and East Java CRIA, Bogor Lamping, Central Java, East Java.
	4. Tungro Virus diseases Observation of Tungro infection on seed bed, plantation and stubble.	4. Tungro Virus diseases. 4.1 Study on forecasting system occurrence of tungro virus diseases.	Central Java, Bali, West Nusa Tenggara, South Sumatera.	B.2 Peanut. 2.1 Virus diseases and it's vector Aphis sp a. Study on population dynamic of insect vector.	CRIA, Bogor Lampung Central Java East Java & Yogyakarta

(1)	(2)	(3)	(4)	(5)	(6)
		4.2 Study on distribution pattern and population dynamic insect vector and epidemiology of Tungro Virus diseases in various paddy field.	Central Java, Bali and West Nusa Tenggara	b. Epidemology study of virus diseases in various Clymatic of	
				B.3 Soy bean.	
	5. Green Leaf Hopper (GLH) 5.1 Monitoring composition species of GLH in seriously damage areas at Pekalongan (Central Java) and Bali.	5. Green Leaf Hopper. 5.1 Monitoring composition species of GLH in seriously damage areas at Central Java and Bali for implement forecasting occurrence and distribution of virus virus Tungro disease.		3.1 Virus diseases. a. Study on distribution pattern and population dynamic insect vector of the virus, epidemology of the virus diseases in various clymate of soy bean plantation.	CRIA, Bogor, Central Java, West Java Lumpung
B. Construction of model infrastructure experimental field of observationed forecasting laboratory at Jatisari.	The construction overwhelm 1. Arrangement and leveling 2.25 ha of experimental field. 2. Construction of irrigation canal. 3. Construction of drainage canal. 4. Construction and rehabilitation roud around and cross experimental field. 5. Construction equipment which support water resource. 6. Appurtenant structure. 7. The other construction overwhelm removal meteorogycal station and set barbed wire and fence to prevent rat.	Construction of storage and green house.		3.2 Rust. a. Study on epidemology of rust diseases.	CRIA, Bogor
				3.3 Seedling fly, leaf beetle, pod borer and sucking insect. a. Study on observation method and control threshold of the pest of the pest.	Lampung
				C. Study on natural enemies of important insect pest. 1. Potency natural enemies of BPH and rice stem borer. 2. Affect of insecticide application to the natural enemies.	CRIA, Bogor Jatisari Lab.

(1)	(2)	(3)	(4)	(5)	(6)
C. Rehabilitation of the observation and Forecasting Laboratory at Jatisari.	Rehabilitation overwhelm 1. Laboratory building 2. Green house 3. Guest house 4. Increase of electric power from 1.5 KVA to 10 KVA. 5. Construction 90 m^2 of garage.			D. Study on improvement of integrated pest control with approximation on ecology and cropping as base of control strategy.	Northern part of West Java.
D. Establish Central of Forecasting Pest of Rice Plant.		Construction of laboratorium, inoculation room, library, office etc. at Jatisari.			
II. Biological research on rice insect pest and diseases at Center Research Institute for Agriculture (CRIA), Bogor.					
A. Brown Plant Hopper	1. Basic studies for forecasting of BPH occurrence 1.1 Establishment of quantitative methods for BPH biotype evaluation. 1.2 Establishment of formula to estimate population density by sticky plate method. 1.3 Resurgence and fecundity. 1.4 Mechanism of varietal resistance. 1.5 Analysis of feeding behavior by EMIF. 1.6 Analysis of factor affecting population fluctuation and damage.				

(1)	(2)	(3)	(4)	(5)	(6)
	2. Research programme on the dynamic. 2.1 Purification and rearing biotype of BPH. 2.2 Biotype shift of BPH in laboratory condition. 2.3 Comparison biology and fisiology (affinity, enfestifity and biotic potency) among the biotype. 2.4 Experiment on biotype hybridiation.	To continue previous activity.			
B. Green Plant Hopper	Study on the relationship between Nephotettix sp composition and tungro incidence. 1. Habitat 2. Phenology and seasonal fluctuation of GLH. 3. Population balance, sex ratio in the field samples. 4. Wing dimorphism in the field and in Laboratory. 5. Parasitism, eggs, larvae and adult. 6. Reproduction 7. Ebnyonic development 8. Larvae development 9. Hibridization studies 10. Host plant disermination	To continue previous activity.			

(1)	(2)	(3)	(4)	(5)	(6)
III. Pesticide Laboratory at Pasar Minggu.	1. Determination of pesticide quality. 1.1 Collection of pesticide samples. 1.2 Analysis quality of pesticide sample. 2. Determination of pesticide residue. 2.1 Collection of crop samples. 2.2 Analysis of pesticide residue. 3. Physical and chemicals properties study and checking a quality of pesticide container.	1. Programming activities group study of BPH, RGM, Rice stem borer and Tungro in the field and laboratory. 2. Computerize processing data of plant protection. 2.1 Training staff 2.2 To prepare soft ware 2.3 Data classification 2.4 Arrangement of Computer programme. 2.5 Arrangement of Computer programme.			Data processing and determine forecasting method of key pest such as BPH, RGM, GLH, Rice stem borer and supported by agroclymate data.
IV. Central office at Pasar Minggu. Programming of annual operational plan and offer of technical advices for food protection.	1. Programming activities grou group study of BPH, RGM, Rice stem borer, Tungro diseases in the field and laboratory. 2. Computerize processing data of plant protection 2.1 Training staff 2.2 Room preparation 2.3 Installing computer				
V. Other activities.	1. Changing in information speciment investigation report and issue guide book of Rice Gall Midge 2. Training for increase capability staff of plant protection. 2.1 Study trip 5 persons 2.2 Individual training 4 persons 2.3 Group training 6 Total 15 persons.	1. Compile guide book for introduction and control pest and diseases of rice plant and secondary crop. 2. For more distribute of transfer technology, increase capability of plant protection staff is still needed to train at least 15 staffs. Individual training is necessary special on virus diseases, pesticide etc.			

Tentative long-term plan of activities by the BPH-groups

Year	BPH-BIOTYPE STUDIES AT BOGOR	OPERATIONAL FIELD ESPERIMENTS	BPH-ECOLOGY IN WEST JAVA
1983 1983/1984 1984 1984/1985	GENETIC NATURE OF BPH BIOTYPES MODE OF BIOTYPIC SHIFTS 1. Purification 2. Biotype analysis of natural BPH populations 3. Establishment of new biotypes 4. Hybridization experiments	"Rice garden" experiment in North Sumatra	POPULATION ECOLOGY OF THE BPH 1. Basic pattern of population buildup in the field 2. Key stages for forecasting and controlling 3. Control thresholds KEY FACTORS IN POPULATION DYNAMICS 1. Fecundity-host interaction 2. Mortality-bioagent interaction 3. Off-cropping season ecology EVALUATION OF RESURGENCE-FREE INSECTISTATICS FOR BPH MANAGEMENT
1985 1985/1986 1986 1986/1987	NEW VARIETAL APPROACHES FOR BPH MANAGEMENT 1. Biotypic shift under the varietal rotation 2. Biotypic shift under the mosaic cultivation 3. Effect of horizontal resistance on biotypic shift	Nation-wise networks of "rice garden" experiment 1. Ecology 2. Biotype identification 3. Insectistatics	
1987 1987/1988 1988 1988/1989	IMPLEMENTATION OF NEW VARIETAL APPROACHES FOR BPH MANAGEMENT IN PILOT FARMS		SYSTEMATIC MONITORING AND OPERATIONAL CONTROL OF THE BPH IN PILOT FARMS
1989 1989/1990	INTEGRATED MANAGEMENT OF THE BPH BY NEW VARIETAL ARRANGEMENT AND INSECTISTATICS		

STUDY GROUP ON THE GLHs GENUS NEPHOTETTIX MATSUMURA DURING THE PERIOD 1984-1985

Introduction:

The correct identity of insect pests material used in any biological investigation, surveillance and monitoring is essential. However, unless the taxon under investigation is thouroughly revised it is not possible to know its correct identify.

Surveillance and monitoring of insect pests (tungro and GLHs vector, BPHs etc.) have been observed by light trap (daily) and sweeping (weekly) by extension workers. Unforunately, the experimental test insects are discarded subsequent to the completion of the observation.

For the purposes of confirmation and clarification of the identity of the test insect, it is essential to maintain voucher specimens of material and properly labelled (including the name of the worker, purpose of study, date of collection, locality, host plant etc.) and deposited in BORIF (c/o. S. Suharni Siwi) for future reference and further study. Special attention should be given to those specimens which successfully transmitted the plant pathogen. The reasons why we have to start to do this work are:

1) The concept of the taxon may change with improvement in our knowledge as a result of study of more extensive material, and due employments of refined techniques;

2) More over, species previously considered to be widely distributed are found perhaps to be composed of two or more closely related species;

3) The presence of genetic variation in polytypic species such as GLHs group of BPHs group constitute the elements for potential speciation in the long run. In short run, the habits can be materially changed by man's practices of agriculture. It is important to take this microevolutionary aspects into account to modify crop-protection programme.

In case of GLHs study during the period of 1984-1985 special attention will be given to revise the genus Nephotettix in Indonesia, to throwlight the possibility on the presence of geographical variation, key to separate the different species and their distribution.

1. Title : Morphological aspects to study the presence of conspicuous morphological differences among conspecific individuals and populations of GLH species.

   Purpose : The study of external and internal structures in males and females within and between population of GLHs from different geographical regions of Indonesia will throw light on the possibility of the presence of geographical variations, the real number of species present sibling species, cryptic closely related species etc.
   Although taxonomy is still in the initial stage using morphological characters, attempts are being made to study differential reaction of rice varieties with gene for resistance to GLH.

   This study will include several activities:

   1. General morphology, female, male, larvae;
   2. Micro geographic variation or spatial variation;
   3. Geographic variation;
   4. Key to separate the different species;
   5. Morphological deviation
      - inter specific crosses
      - pure colonies (laboratory)

2. Title : Host plants descrimination

   Purpose : To study host plants preference for survival and multiplication.

SOME CONSIDERATIONS FOR EXTENSION OF ATA-162 PROJECT

Modern intensive agricultural practices to provide food for the increasing population creates conditions in which species of insects which are of little or no economic important become serious pests due to changes in the eco-systems. A justified way to overcome pest problems is to set up an integrated pest management program. Being species specific, the program requires accurate identification of the pest in question. This needs a biosystematics approach from the very beginning.

In many developing countries including Indonesia however research along this line is being neglected due to lack of scientific manpower and inadequate research facilities. The ability to make quick and accurate diagnosis is severely handicapped by the multiplicity and fantastic variety of forms in which insect associated with crop eco-systems and generally inadequate state of knowledge of such insect fauna.

Until now there is no organization in Indonesia devoted to offer quick insect diagnostics to farmers, plant protection workers, plant scientists and other experimental researchers due probably to the fact that inspect taxonomy and bio-systematics is an unattractive discipline. Yet, this field is quite essential.

Realizing the importance of bio-systematics approach to cope with the ever increasing insect pest problems, the following aspects should receive attention:

1. Offering specialization in insect applied taxonomy in relation to the various pest problems, hence the need a modern systematic study at M.S. and Ph. D. levels;

2. More attention should be paid to enlarge the existing systematic collection and set up a well organized a national insect collection program for reference and study with the following plan of work and responsibilities:

   a) Collect and receive insect specimens associated with crops in various agro-ecosystems and maintain and curate such collection permanently;

b) Develop an identified reference collection by sending materials to local or foreign experts whenever available;

c) Provide a speedy and authentic pest diagnostic service on identity and other related aspects with the help of literature and act as a clearing house for specimens sent from Indonesian to specialists abroad;

d) Develop facilities for receiving identified specimens and collections from workers and maintain them as voucher specimen for future use by scientists;

e) Conduct surveys of crop ecosystems to make authentic records of insect pests and their natural enemies and publish such records;

f) Provide relevant information on the biology, distribution, dispersal and migration of insect pests and mite of agriculture.

The above mentioned activities are essential to back-up the establishment of an effective pest forecasting system in the long run.

Project ATA-162 is moving in this direction. However, much is still to be done and the expertise of Japanese experts is needed to strengthen research along this line and train Indonesian Counterparts.

No.	Provinsi	Stemborer						BPH						Gallmidge					
		1980		1981		1982		1980		1981		1982		1980		1981		1982	
		Ha	Int	Ha	Int	Ha	Int	Ha	Int	Ha	Int	Ha	Int	Ha	Int	Ha	Int	Ha	Int
1.	D.I. Aceh	7,226	15.4	4,537	14.5	6,636	19.5	8,056	21.1	2,940	24.6	11,488	24.4	0		200	10.8	0	
2.	North Sumatera	4,406	6.8	904]	12.2	2,443	8.7	8,589	10.8	1,725	8.7	16,727	18.0	0		0		10	8.5
3.	West Sumatera	1,476	5 5.3	1,024	5.0	387	7.3	5,452]	9.2	276	5.8	275	20.9	0		32	8.4	0	
4.	Rizu	1,538	12.6	1,611	29.4]	667	16.8	188	16.9	503	55.6	161	22.4	0	90.0	0		0	
5.	Jambi	2,046	17.1	155	14.6	0		897	25.0	25	5.8	30	20.0	0		0		0	
6.	Bengkulu	83	5.0	375	14.4	1,430	9.9	382	7.8	605	24.7	632	12.0	487	20.0	32	4.1	100	0.8
7.	South Sumatera	1,358	13.4	7,055	19.4	1,224	27.6	1,923	0.4	2,951	29.1	314	19.0	0		0		50	2.6
8.	Lampung	9,793	4.4	18,363	4.1	11,895	4.4	5,069	4.3	8,418	30.9	4,466	14.4	501	3.3	1,556	2.3	958	2.8
9.	West Java	57,778	11.5	88,179	17.0	41,824	12.3	26,794	14.9	19,702	20.9	13,998	19.4	15,640	12.3	11,800	15.0	14,016	12.7
10.	Central Java	74,697	9.0	71,931	7.9	46,802	8.4	3,527	11.7	5,907	11.7	2,348	7.9	11,111	9.7	10,724	5.4	7,270	5.8
11.	D.I. Yogyakarta	6,345	6.3	6,551	6.5	3,330	6.2	1,312	30.5	3,500	11.4	116	8.2	191	3.5	350	9.7	1,069	6.8
12.	East Jawa	7,231	7.5	5,368	7.3	2,971	8.2	1,101	16.5	1,212	13.8	1,393	17.3	768	10.1	647	5.0	135	10.1
13.	Bali	4,196	21.8	2,444	16.3	1,930	13.5	503	18.1	614	17.8	1,267	14.3	133	27.1	30	8.3	140	6.4
14.	West Nusa Tenggara	6,319	8.1	6,943	9.1	4,636	6.2	2,697	19.1	4,615	19.0	1,164	8.5	7,443	11.7	42	3.1	172	3.2
15.	East Nusa Tenggara	75	30.1	91	12.2	1	20.0	329	39.0	107	34.3	0		0	0	0		0	
16.	South Kalimantan	2,788	10.8	1,948	6.9	1,482	12.7	6,148	14.0	1,957	8.2	1,125	31.1	240	5.0	20	5.0	0	
17.	West Kalimantan	1,200	14.1	3,598	5.4	576	16.4	78	21.8	609	15.0	221	25.3	30	20.0	4	24.0	0	
18.	Central Kalimantan	1,424	38.3	191	37.6	150	33.1	192	52.3	129	39.8	0		0		20	7.6	49	24.0
19.	East Kalimantan	330	23.8	1,169	10.7	1,180	9.2	6	14.4	79	24.0	114	6.6	30	4.9	0		20	20.0
20.	North Sulawesi	970	10.0	1,431	17.1	1,015	10.4	19	8.7	892	25.9	5	9.0	5	9.0	0	4.0	97	4.0
21.	Central Sulawesi	-	-	1,111	6.7	-	-	-	-	7	0.2	-	-	-	-	0		0	
22.	South Sulawesi	29,441	9.9	44,911	10.6	16,766	12.4	5,943	15.3	2,175	19.7	4,865	29.6	6	3.0	23	5.0	0	
23.	South East Sulawesi	6,538	4.1	6,570	2.3	3,401	3.9	177	12.1	114	21.1	100	18.0	0	-	0		0	
24.	Maluku	66	7.4	0	0	0		0		5	50.0	0		0				0	
		227,369	10.0	276,460	12.5	150,795	10.3	79,388	14.2	58,279	20.9	61,699	20.4	36,601	11.3	25,480	9.8	24,113	9.8

No.	Provinsi	Rat						Army Worm						Rice Bug					
		1981		1982				1980		1981		1982		1980		1981		1982	
		Ha	Int	Ha	Int	Ha	Int	Ha	Int	Ha	Int	Ha	Int	Ha	Int	Ha	Int	Ha	Int
1.	D.I. Aceh	9,851	17.1	4,957	17.6	19,146	26.2	3,521	15.3	17,938	24.1	6,344	26.5	22,408	14.8	1,1446	20.8	1,156	26.5
2.	Nort Sumatera	10,761	16.6	5,224	13.9	7,399	15.7	639	9.8	647	6.5	538	9.0	5,557	11.3	2,318	10.0	2,667	11.2
3.	West Sumatera	3,116	12.3	3,589	11.8	3,640	15.8	128	4.2	50	3.8	5	4.5	2,262	6.8	908	5.5	616	5.8
4.	Riau	1,509	22.7	1,621	25.0	1,872	29.6	102	4.6	31	25.0	5	8.9	1,691	9.8	1,129	12.5	0	0.0
5.	Jawbi	20	15.0	10	1.3	0		304	23.1	0	0.0	0	0.0	1,063	18.1	10	20.0	849	10.3
6.	Bengkulu	2,278	38.8	1,183	18.5	1,652	13.4	208	3.8	237	4.6	168	4.0	272	5.1	382	7.4	1,242	6.5
7.	South Sumatera	3,000	19.8	8,093	13.3	4,503	22.6	113	36.5	127	36.9	195	13.4	169	7.1	729	7.4	3,739	13.6
8.	Lampung	5,039	11.2	14,846	20.5	8,790	18.2	1,142	5.1	1,261	14.9	2,244	7.4	4,511	7.7	6,631	6.7	26	12.3
9.	West Java	64,679	13.7	46,806	15.4	49,482	15.3	17,219	13.3	20,171	15.4	10,312	16.0	24,658	16.7	16,576	10.9	8,216	11.6
10.	Central Java	72,147	17.0	52,009	13.4	50,850	14.6	16,846	11.3	20,731	13.4	4,881	14.6	38,313	8.3	23,570	6.7	11,922	4.3
11.	D.I. Yogyakarta	4,719	15.9	1,434	17.0	1,282	16.2	897	10.0	870	7.8	229	8.0	2,184	11.2	1,760	4.9	1,009	5.3
12.	East Jawa	20,574	14.1	12,178	14.8	9,153	15.3	5,521	13.4	2,104	9.9	469	18.9	25,746	11.1	10,747	12.2	3,153	8.4
13.	Bali	4,853	19.5	3,371	16.5	1,014	10.2	641	22.7	1,387	21.1	822	13.3	1,508	29.5	1,449	15.7	464	10.7
14.	West Nusa Tenggara	2,142	11.2	5,226	8.1	4,609	11.5	1,461	9.5	2,016	13.3	1,176	6.3	3,885	5.2	9,771	8.6	3,563	8.1
15.	East Nusa Tenggara	1,210	51.3	76	17.2	2,851	57.2	0	0.0	83	25.1	0	0.0	322	40.5	28	12.6	0	0.0
16.	South Kalimantan	3,414	16.5	4,002	15.4	1,996	19.8	80	1.8	92	6.5	858	19.6	1,435	16.1	1,050	16.4	975	12.6
17.	West Kalimantan	1,844	19.7	4,788	8.6	968	8.7	56	34.2	792	6.2	35	21.3	389	14.6	2,603	12.3	847	14.5
18.	Central Kalimantan	3,384	63.8	273	17.3	174	25.9	0	0.0	0	0.0	0	0.0	462	34.1	30	25.0	59	17.7
19.	East Kalimantan	259	10.3	863	11.5	766	9.7	9	12.9	63	9.6	24	23.7	271	11.2	242	12.5	254	4.9
20.	North Sulawesi	587	12.2	587	11.6	603	28.1	326	12.1	368	16.0	911	15.2	2,206	9.3	1,472	10.7	1,223	9.6
21.	Central Sulawesi	-	- -	1,355	6.6	-		-	-	6	0.3	-	-	-	-	1,126	6.0	-	-
22.	South Sulawesi	11,166	24.4	16,782	20.3	17,778	23.8	7,653	13.1	5,074	26.2	4,150	20.2	6,376	14.1	10,332	15.7	3,876	17.6
23.	South East Sulawesi	3,079	9.9	9,273	1.3	5,858	4.7	359	6.8	2,957	3.4	1,218	2.5	760	17.9	191	14.5	284	11.0
24.	Maluk	0		0		0		0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
		229,763	15.9	198,546	14.5	194,386	17.657,279		12.6	77,006	16.8	34,582	16.7	126,544	11.7	94,500	10.1	46,381	9.8

	Blast Disease						Rice Tungro/virus Disease						Grassy Stunt					
	1980		1981		1982		1980		1981		1982		1980		1981		1982	
	Ha	Int	Ha	Int	Ha	Int	Ha	Int	Ha	Int	Ha	Int	Ha	Int	Ha	Int	Ha	Int
1. D.I. Aceh	1,337	14.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	5	3.0	0	0.0	0	0.0
2. Nort Sumatera	100	20.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	25.0	0	0.0
3. West Sumatera	255	3.5	38	12.1	84	19.2	4	5.0	17	26.8	22	3.9	0	0.0	0	0.0	7	3.0
4. Riau	148	23.3	403	29.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
5. Jambi	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
6. Bengkulu	0	0.0	0	0.0	141	18.6	0	0.0	0	0.	0	0.0	0	0.0	0	0.0	0	0.0
7. South Sumatera	0	0.0	0	0.0	463	40.9	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
8. Lampung	420	5.1	178	2.9	1,981	11.0	20	40.0	0	0.0	64	40.0	0	0.0	50	36.5	38	36.1
9. West Java	774	12.7	1,432	18.4	748	11.1	60	66.7	24	33.1	18		166	47.3	41	61.7	81	68.8
10. Central Java	422	6.3	1,814	8.2	594	16.5	10	30.0	55	32.8	220	10.1	88	33.5	155	41.5	17	15.6
11. D.I. Yogyakarta	238	44.9	71	17.1	22	6.0	0	0.0	2	3.0	97	16.9	0	0.0	314	39.4	25	11.0
12. Eart Java	47	11.8	236	10.8	53	9.1	0	0.0	31	26.8	30	4.3	0	0.0	0	0.0	30	4.3
13. Bali	3	7.3	1	15.0	9	8.2	3,410	37.6	885	16.5	17	10.2	6	29.1	0	0.0	0	0.0
14. West Nusa Tenggara	18	15.0	60	10.0	85	18.0	89	8.2	2,684	9.3	872	9.5	0	0.0	0	0.0	0	0.0
15. East Nusa Tenggara	0	0.0	5	25.0	0	0.0	5	45.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
16. South Kalimantan	0	0.0	0	0.0	0	0.0	600	10.0	6	13.1	0	0.0	0	0.0	0	0.0	0	0.0
17. West Kalimantan	0	0.0	680	10.0	0	0.0	0	0.0	0	0.0	155	48.8	0	0.0	0	0.0	0	0.0
18. Central Kalimantan	6	42.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	66	11.8	0	0.0	0	0.0
19. Eart Kalimantan	10	2.0	27	36.1	28	11.0	0	0.0	0	0.0	18	4.4	7	4.6	51	5.5	49	4.7
20. North Sulawesi	76	60.0	37	32.3	0	0.0	0	0.0	2	7.0	288	9.6	0	0.0	0	0.0	0	0.0
21. Central Sulawesi	-	-	0	0.0	-	-	-	-	0	0.0	-	-	-	-	0	0.0	-	-
22. South Sulawesi	42	20.0	784	50.0	467	62.7	1,453	45.6	2,395	36.1	2,970	40.0	0	0.0	0	0.0	0	0.0
23. South East Sulawesi	20	0.4	1,533	3.6	0	0.0	0	0.0	0	0.0	618	51.1	0	0.0	0	0.0	0	0.0
24. Maluku	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Total	3,854	13.8	7,299	15.4	4,675	19.3	5,651	36.6	6,101	21.3	5,389	32.8	338	34.9	613	38.8	247	31.8

Tanaman : Jagung

Tahun : 1982

No.	Provinsi	Perusak akar Hollotrichia heleri		Agrotis-spp		Atherigona Exiqua		Ulat grayak		Sesamia-inferens		Pyrausta-nubilalis		Heliothis spp		Ulat		Ulet		Burung-kaka tua	
		L	I	L	I	L	I	L	I	L	I	L	I	L	I	L	I	L	I	L	I
1.	D.I. Aceh	-	-	3	5,0	-	-	-	-	-	-	-	-	7	5,0	-	-	-	-	-	-
2.	Sumatera Utara	37	43,9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3.	Sumatera Barat	-	-	-	-	1	0,5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4.	Riau	14	7,0	161	26,2	85	26,2	37	17,7	138	28,8	-	-	39	43,0	-	-	-	-	-	-
5.	Jambi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6.	Bengkulu	35	10,6	74	12,6	-	-	-	-	5	18,0	-	-	-	-	-	-	-	-	-	-
7.	Sumatera Selatan	-	-	28	70,6	-	-	-	-	-	-	-	-	29	8,2	-	-	-	-	-	-
8.	Lampung	-	-	657	3,0	52	10,2	-	-	95	3,3	-	-	-	-	-	-	-	-	-	-
9.	DKI. Jakarta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10.	Jawa Barat	-	-	-	-	-	-	266	22,2	85	41,5	-	-	-	-	-	-	-	-	-	-
11.	Jawa Tengah	2	4,0	372	12,5	17	6,8	986	9,1	192	3,4	15	5,4	-	-	-	-	3	20,0	-	-
12.	D.I. Yogyakarta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13.	Jawa Timur	3	5,0	96	13,8	1	5,0	484	27,7	1	20,0	103	1,8	1	10,0	4	11,0	-	-	-	-
14.	Bali	-	-	2	17,5	-	-	34	17,8	-	-	-	-	-	-	-	-	-	-	-	-
15.	Nusa Tenggara Barat	-	-	-	-	-	-	5	3,0	-	-	-	-	-	-	-	-	-	-	-	-
16.	Nusa Tenggara Timur	-	-	-	-	-	-	598	25,2	-	-	-	-	-	-	-	-	-	-	-	-
17.	Kalimantan Selatan	9	28,2	49	21,0	-	-	38	19,0	12	14,2	-	-	-	-	-	-	-	-	-	-
18.	Kalimantan Barat	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19.	Kalimantan Tengah	-	-	6	11,9	-	-	32	11,3	7	8,6	-	-	-	-	-	-	-	-	-	-
20.	Kalimantan Timur	-	-	30	23,1	3	9,0	18	18,7	-	-	-	-	-	-	-	-	-	-	-	-
21.	Sulawesi Selatan	17	39,7	-	-	17	14,1	50	31,6	1	30,0	-	-	22	7,0	-	-	-	-	-	-
22.	Sulawesi Tenggara	-	-	-	-	-	-	7	4,3	-	-	6	4,2	-	-	-	-	-	-	-	-
23.	Sulawesi Tengah	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24.	Sulawesi Utara	88	13,3	120	3,5	-	-	-	-	70	3,3	21	5,5	-	-	-	-	-	-	115	37,6
25.	Maluku	69	8,9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Jumlah	274	17,6	1598	10,8	176	17,9	255	18,6	606	15,0	145	2,8	98	21,6	4	11,0	3	20,0	115	37,6

Tanaman Kedelai Tahun 1982 (lanjutan)

No.	Provinsi	Gajah		Tikus		Slerospora maydis		Helinthosporium turcicum		Babi		Uret	
		L	I	L	I	L	I	L	I	L	I	L	I
1.	D.I. Aceh	-	-	-	-	-	-	-	-	-	-	-	-
2.	Sumatera Utara	-	-	-	-	312	33,0	-	-	105	19,1	-	-
3.	Sumatera Barat	-	-	-	-	-	-	-	-	8	11,3	-	-
4.	Riau	-	-	86	39,6	1304	63,7	-	-	770	39,1	-	-
5.	Jambi	-	-	-	-	-	-	1	90,0	-	-	-	-
6.	Bangkulu	-	-	-	-	-	-	-	-	15	10,5	-	-
7.	Sumatera Selatan	23	19,2	-	-	-	-	-	-	175	24,5	-	-
8.	Lampung	-	-	-	-	253	17,4	-	-	-	-	-	-
9.	DKI. Jakarta	-	-	-	-	-	-	-	-	-	-	-	-
10.	Jawa Barat	-	-	-	-	10	1,5	-	-	33	52,6	3	20,0
11.	Jawa Tengah	-	-	1571	10,8	98	4,5	9	5,7	262	32,2	-	-
12.	D.I. Yogyakarta	-	-	-	-	-	-	-	-	-	-	-	-
13.	Jawa Timur	-	-	252	11,6	54	31,4	7	11,0	-	-	-	-
14.	Bali	-	-	-	-	11	39,5	-	-	-	-	-	-
15.	Nusa Tenggara Barat	-	-	-	-	4	40,3	-	-	13	15,8	-	-
16.	Nusa Tenggara Timur	-	-	90	76,7	1737	46,3	-	-	238	49,8	-	-
17.	Kalimantan Selatan	-	-	-	-	-	-	4	6,0	249	14,0	-	-
18.	Kalimantan Barat	-	-	-	-	-	-	-	-	-	-	-	-
19.	Kalimantan Tengah	-	-	-	-	-	-	-	-	4	8,9	-	-
20.	Kalimantan Timur	-	-	-	-	-	-	-	-	20	54,9	-	-
21.	Sulawesi Selatan	-	-	-	-	6	8,3	3	35,0	829	40,1	-	-
22.	Sulawesi Tenggara	-	-	-	-	3	4,1	-	-	3046	15,6	-	-
23.	Sulawesi Tengah	-	-	-	-	-	-	-	-	-	-	-	-
24.	Sulawesi Utara	-	-	-	-	-	-	-	-	79	29,0	-	-
25.	Maluku	-	-	-	-	-	-	-	-	-	-	-	-
	Indonesia	23	19,2	1999	15,1	3792	47,7	24	14,5	5846	25,1	3	20,0

Luas dan Intensitas per Hama/Penyakit per Indonesia

Tahun : (1978 - 1982)
Tanaman : Jagung

Nomor Urut	Tahun : 1978			Tahun : 1979			Tahun : 1980			Tahun : 1981			Tahun : 1982		
	Hama/Penyakit	L	I	Hama/Penyakit	L	I	Hama/Penyakit	L	I	Hama/Penyakit	L	I	Hama/Penyakit	L	I
1.	Sclerospora maydis	27,127	34.3	Sclerospora maydis	19,879	35.4	Babi	16,184	52.3	Sclerospora maydis	6,548	44.6	Babi	5,846	25.1
2.	Ulat grayak	14,588	24.o	Tikus	7,809	32.9	Ulat grayak	14,359	32.8	Babi	17,649	11.3	Sclerospora maydis	3,792	47.7
3.	Babi	8,326	31.6	Ulat grayak	8,492	27.0	Sclerospora maydis	8,927	41.5	Kumbang/Landak	1,851	25.0	Ulat grayak	2,555	18.6
4.	Tikus	7,141	15.0	Babi	3,496	26.6	Pyrausta nubilalis	2,656	62.3	Ulat grayak	3,952	11.1	Tikus	1,999	15.1
5.	Kumbang/Landak	7,814	12.1	Ulat Agrotis	2,702	18.1	Ulat Agrotis	3,578	18.0	Tikus	2,929	13.7	Agrotis spp	1,598	10.8
6.	Ulat Agrotis	4,642	16.2	Helminthosporium	580	53.4	Tikus	3,091	19.4	Puccinia spp	888	40.5	Sesamia inf.	606	15.0
7.	Perusak akar	4,427	13.0	Perusak akar	1,468	24.6	Sesamia inferms	1,326	23.1	Ulat Agrotis	1,653	13.9	Perusak akar	274	17.6
8.	Sesamia inferns	1,020	52.3	Heliothis spp	1,064	19.0	Ulat daun	2,522	12.1	Helminthosporium	497	44.3	Burung kakatua	115	37.6
9.	Pyrausta nubilalis	3,403	14.2	Sesamia inferns	592	12.8	Atherigona exigus	841	27.9	Perusak akar	394	13.1	Atherigona exigua	176	17.9
10.	Heliothis spp	1,811	8.5	Atherigona exigus	647	5.7	Perusak akar	1,912	12.1	Sesamia inferns	373	12.5	eliothis sp	98	21.6
11.	Atherigona exigua	697	11.9	Ustilage maydis	71	15.3	Kera	133	31.0	Atherigona exigua	870	4.8	Gajah	23	19.2
12.	Burung	617	12.0	Pyrausta nubilalis	195	5.2	Heliothis spp	264	9.2	Pyrausta nubilalis	194	11.7	Pyrausta nubilalis	145	2.8
13.	Helminthosporium	1,327	2.5	Kera	25	29.1	Helminthosporium	106	14.4	Heliothis spp	287	6.0	Helminthosporium trans.	24	14.5
14.	Ustilago maydis	85	38.2				Belalang	15	20.0	Ustilago maydis	136	10.9	Uret	3	2.0
15.	Kera	93	14.8							Burung	34	15.8			
16.	Belalang	17	73.2							Kera	26	9.8			
17.	Puccinia spp	13	70.8							Gibberella fujikurdi	15	8.8			
18.	Ulat daun	5	6.5							Ulat daun	1	1 2.0			
		88,453	22.6		48,897	29.4		55,832	35.5		38,299	18.6		17,426	22.2

Tanaman Kedelai Tahun 1982

No.	Provinsi	HAMA DAN PENYAKIT																	
		Agromyaa phaesoli		A. Nojae		A. dolicho-pilima		Longitartus surturelhinuius		Stomopteryx subsecivella		Afidenta gradaria		Tetramyclus binocukulus		Hrmossca sp		Aphis gossypiy	
		L	I	L	I	L	I	L	I	L	I	L	I	L	I	L	I	L	I
1.	D.I. Aceh	123	8,1	75	11,1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.	Sumatera Utara	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3.	Sumatera Barat	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4.	Riau	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5.	Jambi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6.	Bengkulu	11	11,6	38	11,2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7.	Sumatera Selatan	19	18,6	-	-	11	11	14,1	-	-	-	-	-	-	-	-	-	-	-
8.	Lampung	682	4,4	219	5,8	86	3,1	-	-	-	-	-	-	-	-	37	6,0	450	28,8
9.	DKI. Jakarta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10.	Jawa Barat	21	70,9	112	42,1	-	-	-	-	42	60,0	3	4,0	-	-	-	-	-	-
11.	Jawa Tengah	285	15,2	177	9,5	25	5,0	428	12,0	998	28,6	-	-	85	5,0	77	43,0	4	5,0
12.	D.I. Yogyakarta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13.	Jawa Timur	16	7,8	-	-	123	22,1	358	26,4	3	10,0	-	-	-	-	-	-	11	4,0
14.	Bali	6	15,8	-	-	5	50,0	77	9,7	-	-	-	-	-	-	-	-	-	-
15.	Nusa Tenggara Barat	98	11,6	-	-	-	-	496	11,5	-	-	-	-	-	-	-	-	80	16,5
16.	Nusa Tenggara Timor	-	-	-	-	-	-	35	25,0	-	-	-	-	-	-	-	-	-	-
17.	Kalimantan Selatan	-	-	44	10,0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18.	Kalimantan Barat	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19.	Kalimantan Tengah	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20.	Kalimantan Timur	-	-	21	21,8	3	9,0	7	22,9	-	-	-	-	-	-	-	-	-	-
21.	Sulawesi Selatan	27	16,1	11	52,5	-	-	32	28,9	-	-	-	-	-	-	-	-	-	-
22.	Sulawesi Tenggara	1020	4,0	55	4,4	-	-	-	-	953	4,2	-	-	-	-	-	-	-	-
23.	Sulawesi Tengah	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24.	Sulawesi Utara	10	10,5	6	3,5	-	-	-	-	-	-	-	-	31	9,7	-	-	-	-
25.	Maluku	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Jumlah	2318	7,0	758	14,1	253	14,0	1433	16,0	1996	17,6	3	1,0	116	6,2	114	31,0	545	26,3

Tanaman Kedelai Tahun 1982 (lanjutan)

No.	Provinsi	HAMA DAN PENYAKIT															
		Lamprosema indicata		Phaedonia inclusa		Prodenia litura		Plusia chalcites		Etiella zinckinella		Riptortus linearis		Nesara viridula		Walang sangit	
		L	I	L	I	L	I	L	I	L	I	L	I	L	I	L	I
1.	D.I. Aceh	-	-	33	6,2	-	-	37	9,2	-	-	-	-	18	2,5	-	-
2.	Sumatera Utara	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3.	Sumatera Barat	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4.	Riau	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5.	Jambi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6.	Bengkulu	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7.	Sumatera Selatan	115	9,2	-	-	-	-	-	-	-	-	-	-	9	22,0	-	-
8.	Lampung	-	-	-	-	17	5,0	-	-	456	5,2	-	-	-	-	-	-
9.	D.K.J. Jakarta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10.	Jawa Barat	1205	9,1	-	-	1	90,0	-	-	-	-	-	-	-	-	-	-
11.	Jawa Tengah	-	-	2298	4,2	4567	26,4	10	25,0	-	-	-	-	18	5,0	-	-
12.	D.I. Yogyakarta	2	5,0	-	-	-	-	113	6,7	-	-	-	-	-	-	-	-
13.	Jawa Timur	9	5,7	692	21,2	1227	21,9	-	-	308	16,7	-	-	20	20,0	1	3,0
14.	Bali	550	14,8	-	-	135	40,8	169	21,0	-	-	-	-	-	-	-	-
15.	Nusa Tenggara Barat	-	-	-	-	-	-	-	-	50	12,0	75	12,0	43	5,1	-	-
16.	Nusa Tenggara Timur	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17.	Kalimantan Selatan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18.	Kalimantan Barat	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19.	Kalimantan Tengah	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20.	Kalimantan Timur	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21.	Sulawesi Selatan	-	-	157	14,4	13	19,3	-	-	39	39,4	26	48,7	30	10,0	-	-
22.	Sulawesi Tenggara	923	5,7	-	-	-	-	300	3,6	74	4,7	-	-	-	-	-	-
23.	Sulawesi Tengah	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24.	Sulawesi Utara	-	-	-	-	-	-	-	-	7	3,0	-	-	-	-	-	-
25.	Maluku	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Jumlah	2804	9,1		8,4	5960	25,7	629	9,5	934	9,4	101	21,4	138	9,1	1	3,0

Tanaman Kedelai Tahun 1982 (lanjutan)

No.	Provinsi	HAMA DAN PENYAKIT											
		Ulat		Tikus		Babi		Xanthomonas phaeseoli		Pseudominas glyoyne		Virus	
		L	I	L	I	L	I	L	I	L	I	L	I
1.	D.I. Acah	-	-	-	-	-	-	-	-	-	-	-	-
2.	Sumatera Utara	17	10,0	9	10,0	-	-	-	-	-	-	-	-
3.	Sumatera Barat	-	-	-	-	-	-	-	-	-	-	-	-
4.	Riau	2	25,0	41	25,0	25	19,1	-	-	-	-	-	-
5.	Jambi	-	-	-	-	-	-	-	-	-	-	-	-
6.	Bengkulu	-	-	-	-	1	9,2	-	-	-	-	-	-
7.	Sumatera Selatan	-	-	-	-	22	82,5	27	71,3	-	-	-	-
8.	Lampung	-	-	-	-	-	-	-	-	-	-	154	25,0
9.	D.K.I.	-	-	-	-	-	-	-	-	-	-	-	-
10.	Jawa Barat	-	-	-	-	-	-	-	-	-	-	-	-
11.	Jawa Tengah	859	22,5	2	5,0	-	-	-	-	-	-	-	-
12.	D.I. Yogyakarta	-	-	-	-	-	-	-	-	-	-	-	-
13.	Jawa Timur	95	7,6	86	10,0	-	-	10	5,0	-	-	2	4,0
14.	Bali	-	-	-	-	-	-	-	-	4	5,0	-	-
15.	Nusa Tanggara Barat	-	-	-	-	-	-	-	-	-	-	-	-
16.	Nusa Tenggara Timur	-	-	-	-	-	-	-	-	-	-	-	-
17.	Kalimantan Selatan	-	-	-	-	38	10,3	-	-	-	-	-	-
18.	Kalimantan Barat	-	-	-	-	-	-	-	-	-	-	-	-
19.	Kalimantan Tengah	-	-	-	-	21	30,4	-	-	-	-	-	-
20.	Kalimantan Timur	-	-	-	-	-	-	-	-	-	-	-	-
21.	Sulawesi Selatan	-	-	-	-	87	65,1	-	-	-	-	-	-
22.	Sulawesi Tenggara	-	-	-	-	15	90,0	-	-	-	-	-	-
23.	Sulawesi Tengah	-	-	-	-	-	-	-	-	-	-	-	-
24.	Sulawesi Utara	-	-	-	-	1	1,0	-	-	-	-	-	-
25.	Maluku	-	-	-	-	-	-	-	-	-	-	-	-
	Jumlah	973	20,3	138	14,4	210	49,3	37	53,4	4	5,0	156	24,7

Luas dan Intensitas Serangan per Hama/Penyakit per Indonesia

Tahun : (1978 - 1982)
Tanaman : Kedele

Urut	Tahun : 1978			Tahun : 1979			Tahun : 1980			Tahun : 1981			Tahun : 1982		
	Hama/Penyakit	L	I	Hama/Penyakit	L	I	Hama/Penyakit	L	I	Hama/Penyakit	L	I	Hama/Penyakit	L	I
1.	Longi tarsus sut	5,817	18.6	Longitarsus sut	8,907	23.2	Prodensia litura	14,451	20.7	Prodenia litura	5,445	18.3	Prodenia litura	5,960	25.7
2.	Agromyza phas.	5,274	15.6	Agromyza sojae	5,655	9.4	Longitarsus sut	4,428	20.9	Etiella zinck	1,926	15.6	Stomopteryr subs	1,996	17.6
3.	Tikus	2,202	24.4	Phaedonia inc	4,080	12.4	Agromyza phas	6,265	13.7	Nezara viridula	1,863	16.3	Phedonia incl.	3,180	8.4
4.	Pseudomonas gl.	5,813	7.0	Colletotrichum glycine	1,156	39.2	Tetranychus bin	1,134	37.3	Plusia chalcites	1,258	14.8	Lamprosema ind.	2,804	9.1
5.	Agromyza dol.	2,232	13.6	Prodemia litura	3,450	12.6	Phaedonia incl.	3,451	8.6	Longitarsus sut.	1,724	10.6	Ulat	973	20.3
6.	Agromyza sojae	3,302	9.0	Agromyza phas.	3,224	12.8	Empoasca sp.	1,291	14.3	Agromyza sojae.	1,647	9.6	Agromyza phas.	2,318	7.0
7.	Phaedonia incl.	1,809	13.5		1,661	16.1	Agromyza sojae	1,296	13.3	Agromyza phas.	489	32.3	Aphis goss	545	26.3
8.	Xanthomonas ph.	915	21.5	Aphis gossypii	948	19.3	Tikus	914	17.1	Phaedonia incl.	1,797	7.3	Agromyza sojae	758	14.1
9.	Nezara viridula	1,773	9.9	Lamprosema ind.	1,775	10.2	Etiella zinck	1,401	11.1	Pseudomonas gl.	312	32.5	Babi	210	49.3
10.	Etiella zinck	651	17.9	Tikus	993	15.1	Aphis gossypii	294	49.2	Empoasca sp.	592	12.5	Etiella zinck	934	9.4
11.	Babi	437	25.4	Etiella zinck	1,721	7.8	Babi	389	32.7	Babi	1,570	4.6	Plusia cal	629	9.5
12.	Lamprosema ind.	397	2.61	Stomopteryi sub.	763	16.5	Belalang	130	96.9	Xanthomonas sol.	399	15.6	Agromyza dol.	253	14.0
13.	Xanthozonas sol.	415	21.0	Plusia calcites	1,144	9.9	Lamprosema ind.	305	30.8	Aphis gossypii	658	8.0	Empoasca sp.	114	31.0
14.	Uret	465	19.2	Nezara viridula	279	16.2	Ulat daun	328	27.1	Lamprosema ind.	295	15.7	Virus	156	24.7
15.	Empoasca sp.	735	10.9	Pseudomonas gl.	107	31.3	Nezara viridula	735	11.1	Tikus	289	12.1	Ryptortus lin	101	21.4
16.	Plusia chalcites	862	9.1	Riptortus lin	224	19.9	Stomopteryr bin	316	24.4	Ulat daun	336	9.3	Tikus	138	14.4
17.	Prodenia litura	443	16.7	Ulat daun	194	17.2	Plusia chalcites	610	9.8	Stomopteryx subs	192	13.2	Xanthomonas phas	37	53.4
18.	Colletotrichum gl	169	37.3	Tetranychus bin	306	9.3	Uromyses phas.	213	14.5	Walang sangit	247	9.7	Nezara viridula	138	9.1
19.	Stomopteryx subs.	682	7.9	Empoasca sp.	38	31.0	Ulat grayak	59	47.0	Sclerotium rolf.	188	10.5	Tetranychus bin.	116	6.2
20.	Tetranychus bin.	359	6.9	Xanthomonas gl.	196	6.0	Agromyza dol.	192	4.7	Xanthomonas gl.	34	47.7	Afidenta gradar	3	10.0
21.	Aphis gossypii	168	9.7	Babi	20	24.4	Burung	10	10.0	Agromyza dol.	151	9.5	Pseudomonas gl.	4	5.0
22.	Afidenta gradaria	31	15.7	Afidenta gradaria	29	5.2	Xanthomonas phas.	3	10.0	Pseudomonas tab.	4	90.0	Walang sangit	1	3.0
23.	Kera	10	46.8							Tetranychus bin.	111	2.2			
24.	Piptortus lin.	5	66.8							Afidenta gradaria	5	21.6			
	Jumlah	43,890	14.4		37,026	17.0		38,656	17.4		24,509	15.9		23,954	15.4

資料 6

Some Considerations for Extension of ATA-162 Project

（作物保護局作成資料）

SOME CONSIDERATIONS FOR EXTENSION OF ATA-162 PROJECT

Modern intensive agricultural practices to provide food for the increasing population creates conditions in which species of insects which are of little or no economic important become serious pests due to changes in the eco-systems. A justified way to overcome pest problems is to set up an integrated pest management program. Being species specific, the program requires accurate identification of the pest in question. This needs a biosystematics approach from the very beginning

In many developing countries including Indonesia however research along this line is being neglected due to lack of scientific manpower and inadequate research facilities. The ability to make quick and accurate diagnosis is severely handicapped by the multiplicity and fantastic variety of forms in which insect associated with crop eco-systems and generally inadequate state of knowledge of such insect fauna.

Until now there is no organization in Indonesia devoted to offer quick insect diagnostics to farmers, plant protection workers, plant scientists and other experimental researchers due probably to the fact that insect taxonomy and bio-systematics is an unattractive discipline. Yet, this field is quite essential.

Realizing the importance of bio-systematics approach to cope with the ever increasing insect pest problems, the following aspects should receive attention:

1. Offering specialization in insect applied taxonomy in relation to the various pest problems, hence the need a modern systematic study at M.S and Ph.D. levels;
2. More attention should be paid to enlarge the existing systematic collection and set up a well organized a national insect collection program for reference and study with the following plan of work and responsibilities:

    a) Collect and receive insect specimens associated with crops in various agro-ecosystems and maintain and curate such collection permanently;

b) Develop an identified reference collection by sending materials to local or foreign experts whenever available.

c) Provide a speedy and authentic pest diagnostic service on identity and other related aspects with the help of literature and act as a clearing house for specimens sent from Indonesian to specialists abroad.

d) Develop facilities for receiving identified specimens and collections from workers and maintain them as voucher specimen for future use by scientists.

e) Conduct surveys of crop ecosystems to make authentic records of insect pests and their natural enemies and publish such records.

f) Provide relevant information on the biology, distribution, dispersal and migration of insect pests and mite of agriculture.

The above mentioned activities are essential to back-up the establishment of an effective pest forecasting system in the long run.

Project ATA-162 is moving in this direction. However, much is still to be done and the expertise of Japanese experts is needed to strengthen research along this line and train Indonesian Counterparts.