

Institute of Plant Breeding – Crop Science Cluster
College of Agriculture
University of the Philippines – Los Baños

HOST PLANT RESISTANCE IN MANGO AGAINST FRUIT FLY AND ANTHRACNOSE

Ana Kristine Barcos

Maricel Gonzales

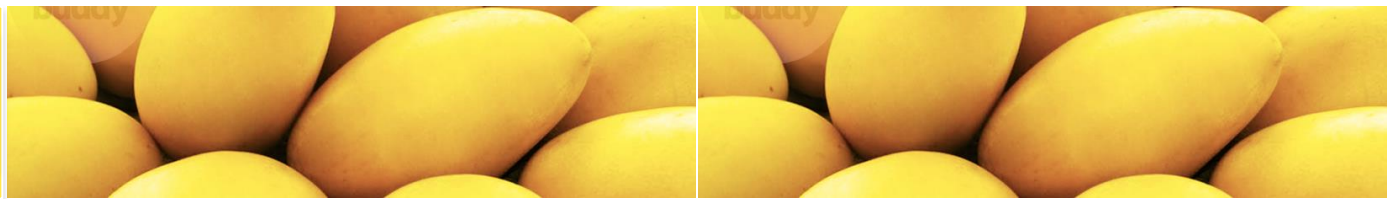
Fe dela Cueva

Rizaline Tiongco

and Maria Luz Sison



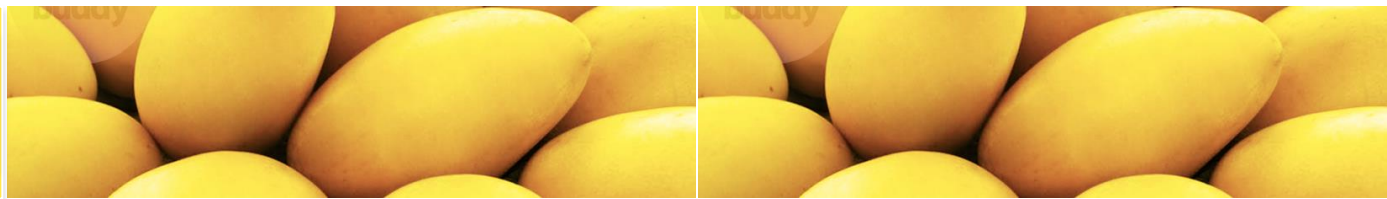
Plant Genetic Resource Division
anabarcos@gmail.com



Executive summary

- The Philippine mango industry is the third largest fruit export of the country after banana and pineapple
- It has been consistently expanding in area harvested from below 80,000 Ha in 1990 to 200,000 Ha by 2009
- Initially, the yield was also increasing, from 6 T/Ha in 1990 to 8T/ Ha in 1997. But currently it has plummeted to only 4T/Ha
- Climate and pests remain major drivers to the decline in production

Bureau of Agricultural Statistics, 2008



Significance of the study

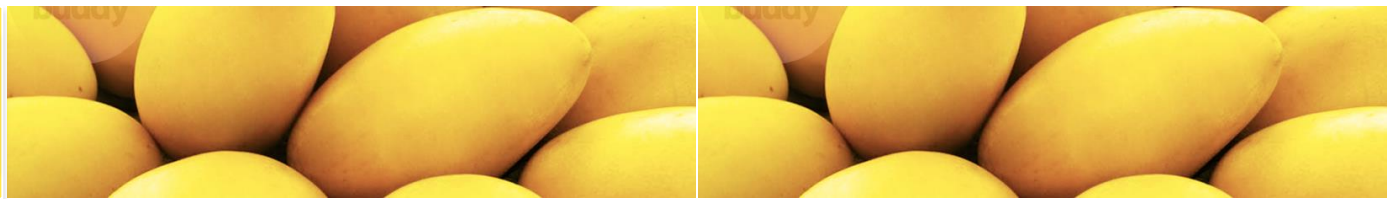
- The integration of different pest management strategies have been developed, however, the search for possible resistance to the pest had not been looked into
- Identification of resistant lines/accessions or varieties may serve as basis for the management of these pests and diseases
- It is also an important aspect for the improvement of Carabao mango through breeding for resistance not only for insect pests but also for diseases



Source: Agricultural Research
Magazine

Objectives

- To confirm the potential resistance of ‘Carabao’ and other mango varieties to fruit fly



Experimental set-up

- Matured mangoes of different varieties were placed inside a screen cage with 5 fruits representing a mango variety
- One sexually mature *B. dorsalis* female were introduced into the cage for each fruit for 24 h
- The fruit flies were observed for their attempts of oviposition during 0.5 hr, 1 h, 3 h, 8 h and 24 h intervals
- Puparia recovered from incubated fruits were counted and held until adult fly emergence
- Emerged adult were then counted and sexed



Figure 1. Fruit fly preference test (R2T7, Red Admin, Tommy Atkins, R2T8, Haden and N.V. Guimaras)

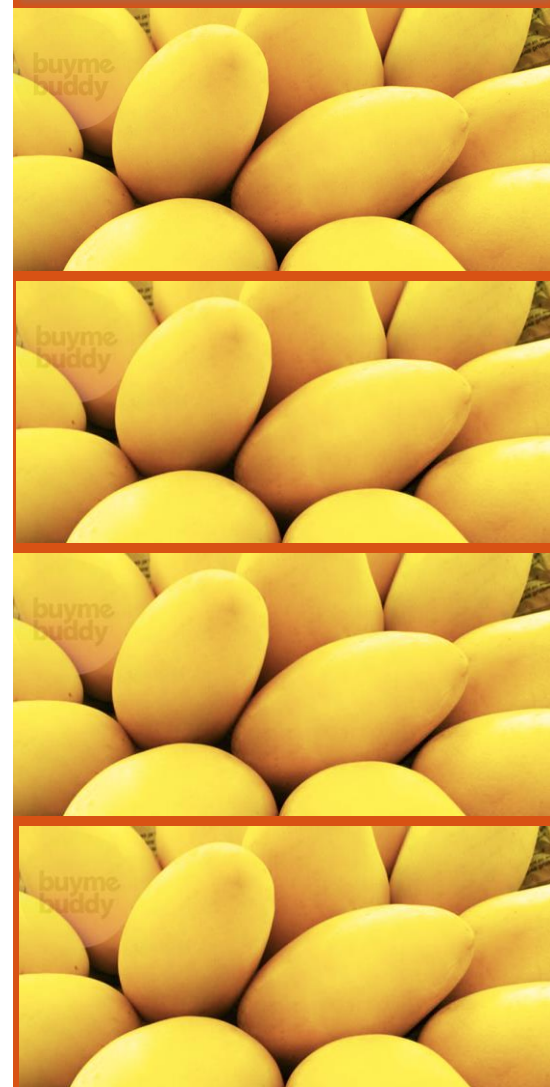
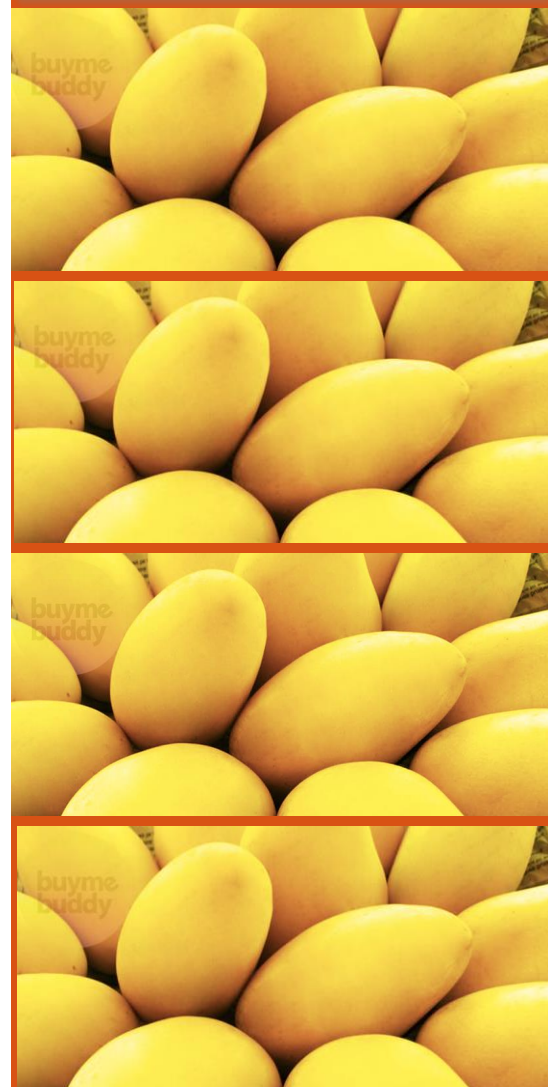




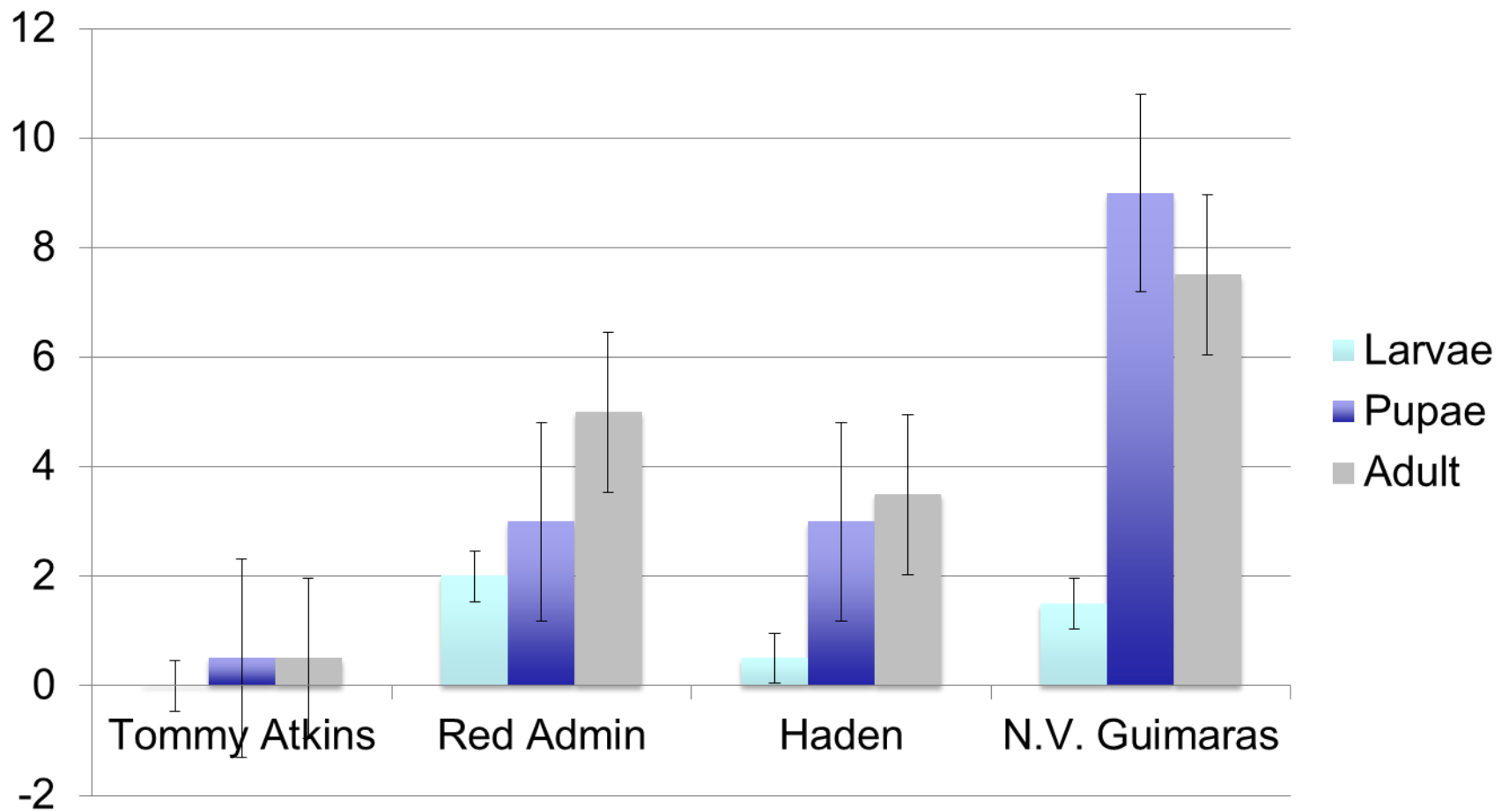
Figure 2. Infested mangoes kept in individual containers for larvae, pupae count and adult emergence (A-R2T7, B-Red Admin, C-Tommy Atkins, D-R2T8, E-T5 and F-N.V. Guimaras)



Fruit fly Preference test

Mango variety	0.5 hr	1 hr	3 hr	8 hr	24 hr	Mean
Tommy Atkins	2	2	0	0	0	0.8
Red Admin	0.5	0	2	0.5	0	0.6
Haden	4.5	4	4	0	0	2.5
N.V. Guimaras	1.5	2.5	2	0.5	1	1.5

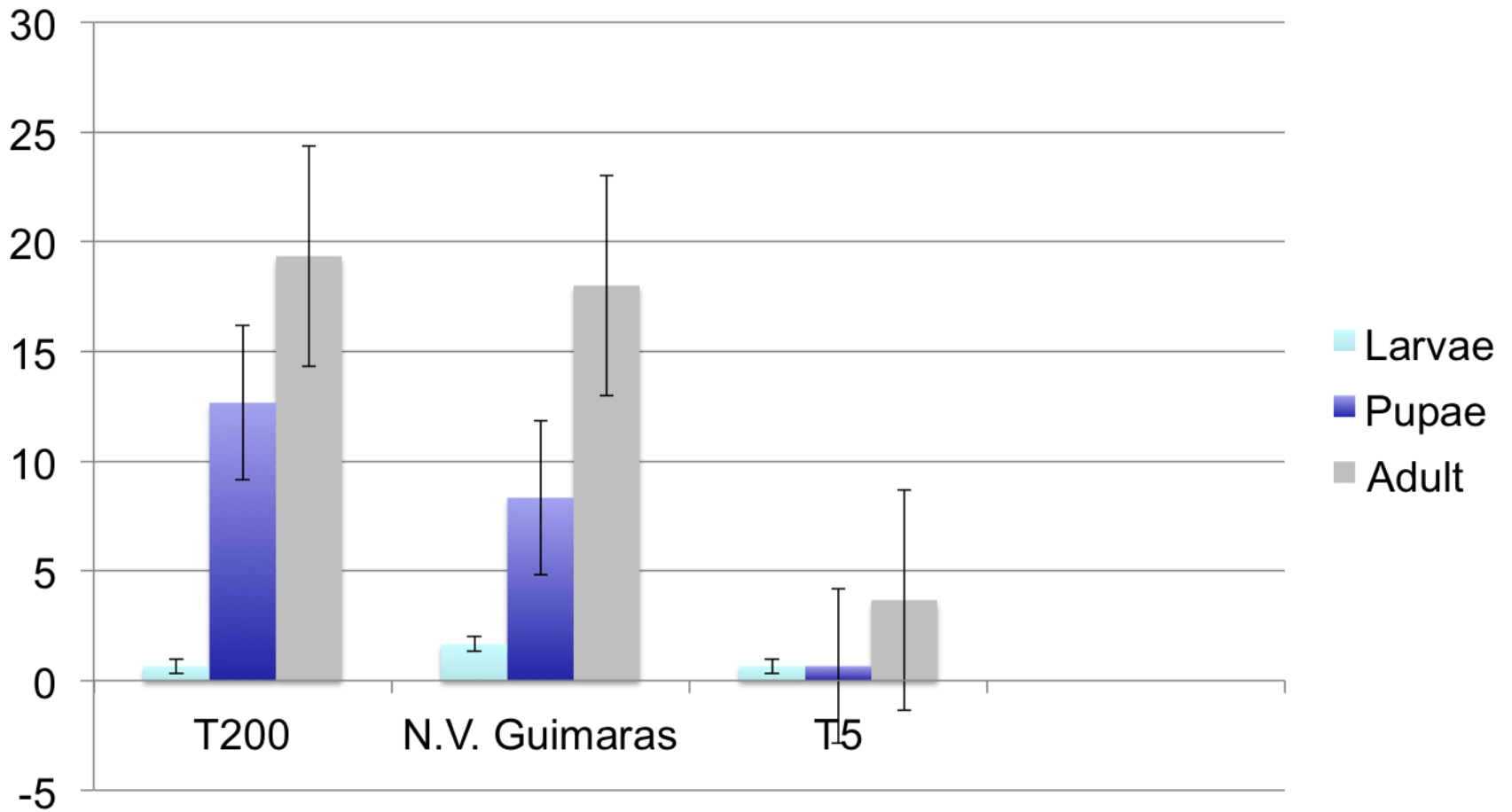
Larvae-Pupae-Adult Count



Fruit fly Preference test

Mango variety	0.5 hr	1 hr	3 hr	8 hr	24 hr	Mean
T200	2	1.66	1.66	1.33	0.33	1.4
N.V. Guimaras	2	2	3.33	2	0	1.86
T5	1	2.66	1.66	0.33	2	1.53

Larvae-Pupae-Adult Count

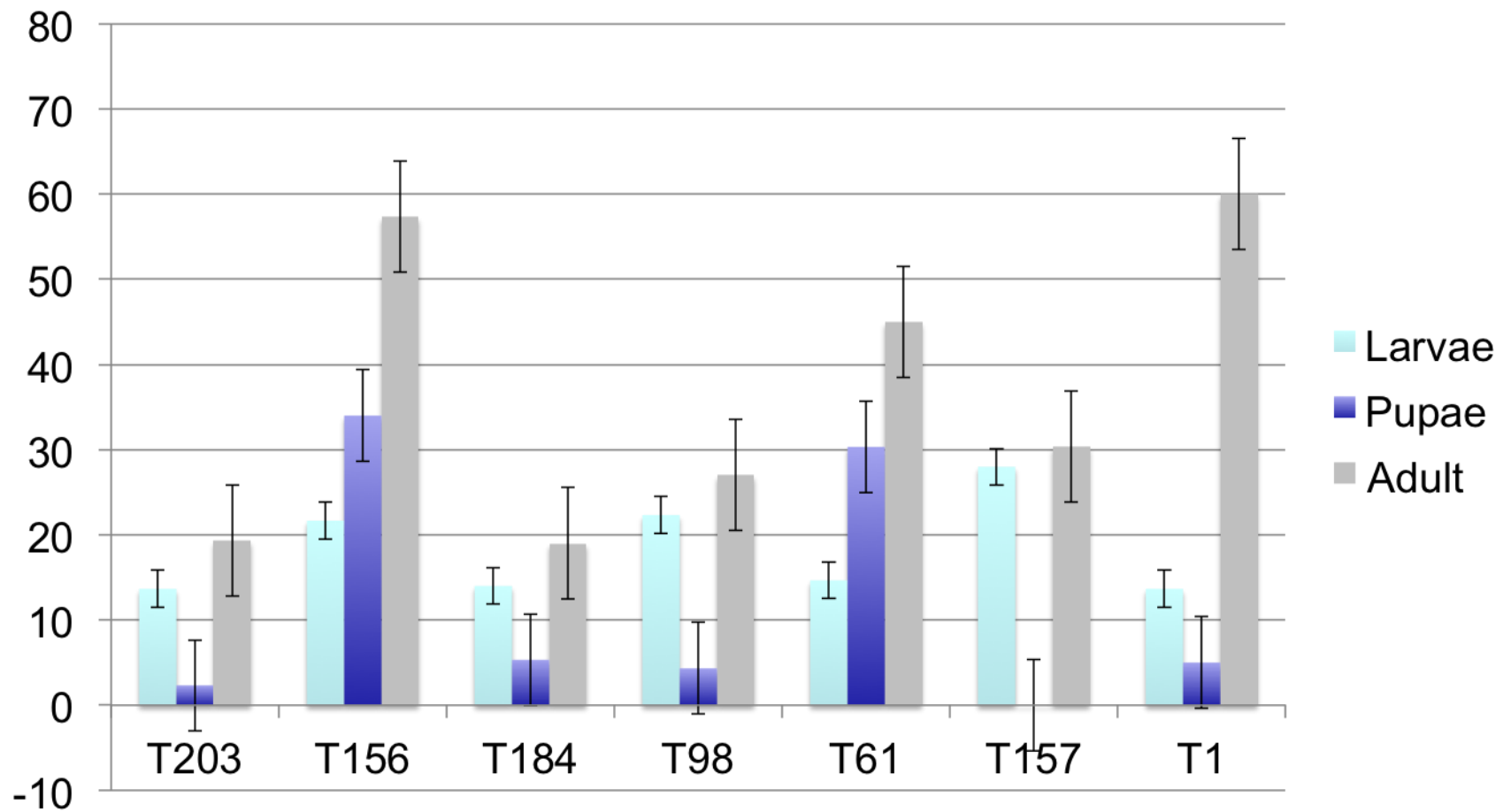


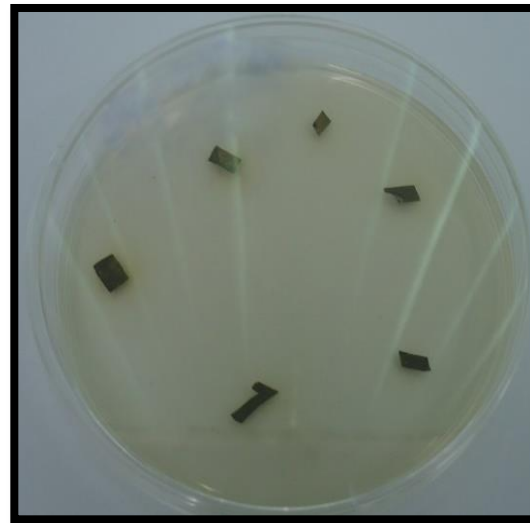
Fruit fly Preference test

Mango variety	0.5 hr	1 hr	3 hr	8 hr	24 hr	Mean
T203	1.33	2	1	0.33	1.67	1.27 cd
T156	2	2	2.67	0.67	0.33	1.53 cd
T184	2	3	3	3.33	3	2.87 b
T98	0.67	2	1.67	0.33	0	0.93 d
T61	4.67	5.67	6.33	5.33	4	5.2 a
T157	1.33	1	3	2.67	5.67	2.73 bc
T1	3.33	3.33	2.67	1	0	2.07 bcd

*Means with the same letter are not significantly different (Tukey's Test: $\alpha = 0.05$)

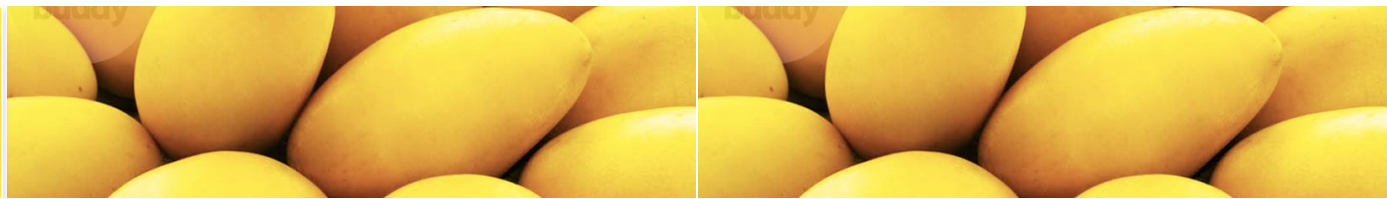
Larvae-Pupae-Adult Count





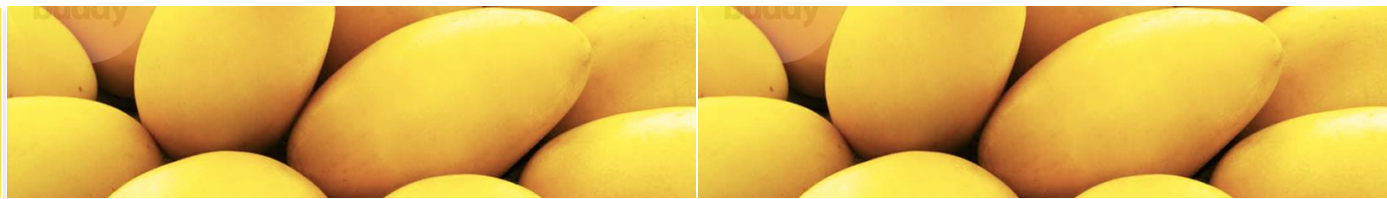
Objectives

- To confirm the potential resistance of 'Carabao' and other mango varieties to anthracnose



Experimental set-up

- Mangoes were thoroughly washed with water and disinfected with 20% sodium hypochlorite for 10 min
- Mangoes were rinsed in three changes of distilled water and blot-dried with sterile paper towel
- Placed the mangoes inside improvised moisture chamber

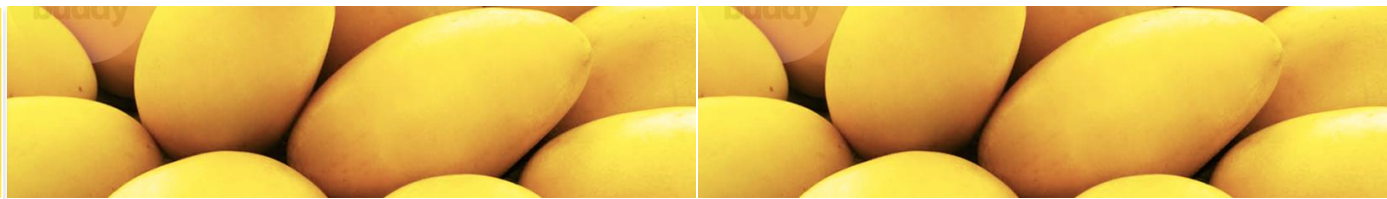


Experimental set-up

- Artificial inoculation of mango fruits was carried out aseptically by pin-pricked and dropped set method with 1×10^6 spore suspension of *Colletotrichum gleosporoides*
- A total of ten varieties were inoculated and fruits were observed daily for symptom expression
- Fruits were evaluated using Percent Diseases Intensity (PDI)

Confirmatory fruit evaluation of mango selections with resistance to anthracnose under laboratory conditions

Tree No.	Reaction
1	Intermediate
5	Intermediate
11	Intermediate
65	Intermediate
156	Resistant
157	Intermediate
184	Intermediate
185	Intermediate
200	Intermediate
203	Intermediate



Confirmatory fruit evaluation of mango selections with resistance to anthracnose under laboratory conditions

Inoculated mango fruits 5 DAI

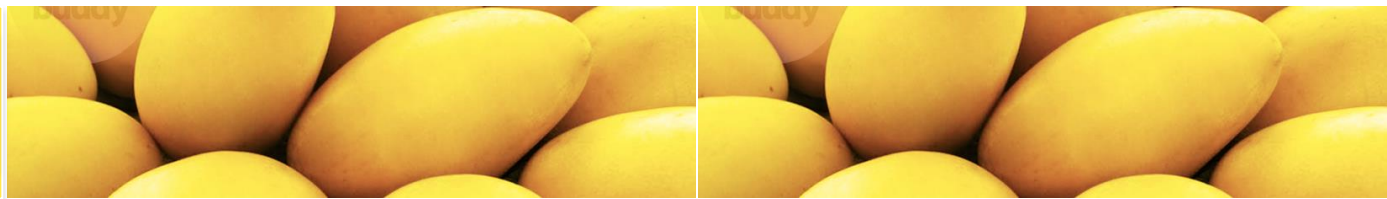


Confirmatory fruit evaluation of mango selections with resistance to anthracnose under laboratory conditions

1ST Batch

- T200 and T5 exhibited 5.9cm and 6.1cm lesions 5 days after inoculation (DAI)

Tree No.	5 DAI (cm)
200	5.9
5	6.1



Confirmatory fruit evaluation of mango selections with resistance to anthracnose under laboratory conditions

Inoculated mango fruits 3 DAI



Confirmatory fruit evaluation of mango selections with resistance to anthracnose under laboratory conditions

2nd Batch

Tree No.	5 DAI (cm)	7 DAI (cm)
1	10.3	24.9
11	10.5	18.1
65	13.4	19.1
156	7.6	16.9
157	6.0	18.8
184	8.6	24.5
185	14.6	20.3
203	9.0	12.7



Confirmatory plant evaluation of mango selections with resistance to anthracnose under laboratory conditions

- Out of 10 mango selections, only 2 showed lesions 1 month after inoculation



Confirmatory fruit evaluation of mango selections with resistance to anthracnose under screen house conditions

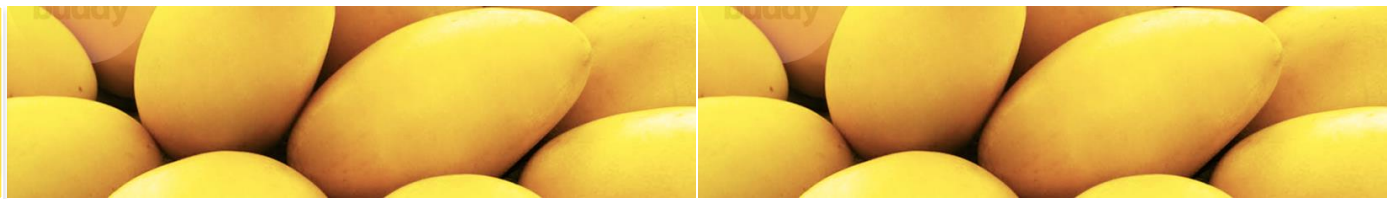
List of mango selections screened for anthracnose resistance

Tree No.	Reaction
La Union	
42/22	Resistant
21	Resistant
65	Resistant
From Breeder's Plot	
12-114 La Union	Intermediate
34	Unknown
12-209/203 Quezon	Unknown
12-182 Haden	Resistant
3A	Unknown
4A Quezon	Unknown
Ilocos Sur	
Candon	Unknown



Plant evaluation of NSIC varieties for resistance to anthracnose under screen house conditions





Plant evaluation of NSIC varieties for resistance to anthracnose under screen house conditions

- A total of 14 NSIC varieties were collected and grafted
- Four (4) varieties showed lesions 1 month after inoculation
 - Juani 1
 - Sweet Elena
 - Fresco
 - JTA Sweet
- Sweet Elena and Juani 1 exhibited the most number of lesions

Thank you for your attention!

