Insect Pest of *Musa acuminata* in Kuala Krau, Pahang.

Presented by:
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Introduction

Taxonomic Hierarchy

Kingdom	Plantae
Division	*Magnoliophyta*
Class	*Liliopsida*
Subclass	*Zingiberidae*
Order	Zingiberales
Family	*Musaceae*
Genus	Musa L.
Species	*Musa acuminata*

Entomology Society of America, 62nd Annual Meeting, November 16-19, 2014 in Portland, Oregon

Introduction

- Natural vegetation of Southeast Asia and native of the Malay Peninsular and adjacent regions.
  (Simmonds, 1987)
- Commonly grown in the humid tropical and subtropical regions.
  (Pillay and Tripathi, 2007)

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Introduction

Fourth world's most important food crop after rice, wheat and maize, with vast majority of the grown and consumed in the tropical and subtropical zones.
(FAO 2002)

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Production is estimated at 98 million tons of which only 7 million tons enter the world market, suggesting that the crop is more important as food for local consumption than for export.
(Robinson, 1996)

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Introduction

- In Malaysia, banana is the second most widely cultivated fruit, covering about 26,000 ha with a total production of 530,000 metric tones. (Mukhtarud-din, 2011)
- However, production is low compared with potential yield (Van Asten et al., 2004) and has been declining (FAO, 2007).

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Introduction

Nmerous types of pests that annihilate bananas, namely, Pseudostem Borer (*Odoiporus longicollis*), Rhizome Weevil (*Cosmopolites sordidus*), Banana Aphid (*Pentalonia nigronervosa*), Fruit and Leaf Scarring Beetle (*Colaspis hypochlora*) and Burrowing Nematode (*Radopholus similis*).

Sunny (2011)

Objectives

1. Identify the major pest on banana farm of indigenous people (*Jahut* ethnic)
2. Detect the possibility of occurrence of newly introduced insect pest species
3. Checklist of insect on *Musa acuminata*

Study site

Farm owned by indigenous people (*Jahut* ethnic)

Kuala Krau, Pahang, Malaysia. (N 03 47' 20.2", E 102 14' 08.1)

Material & Methods

TREE GRADING AND DAMAGE ASSESSMENT

Cosmopolites sordidus

Odoiporus longicollis

Trunk borer

Material & Methods

TREE GRADING AND DAMAGE ASSESSMENT

Root damage

Adoretus sinicus

Material & Methods

DIURNAL SAMPLING

Collecting insect manually

Material & Methods

NOCTURNAL SAMPLING

Light trap

5 light traps from 7.00pm to 12.00am

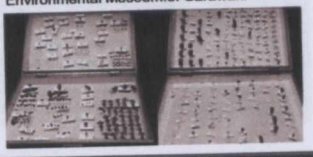
The insect were then collected manually using pill bottle and aspirator.

Material & Methods

SORTING AND IDENTIFICATION

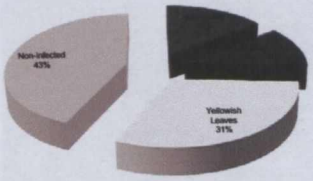
Specimens were sorted to family level according to Borror and Delong (1974) and Triplehorn and Johnson (2004).

Identification was done at Malaysia Department of Agriculture, Entomology Museum of Sepilok and Nature and Environmental Museum.of Sarawak.



Result

TREE GRADING AND DAMAGE ASSESSMENT



280 banana trees in the 6392m³ banana farm owned by indigenous people

Result

INSECTS ABUNDANCE AND DIVERSITY

Table 1: Number of insect collected on 2012 and 2013

Order	No. of family		No. of species		No. of individual	
	2012	2013	2012	2013	2012	2013
Blattoidea	0	2	0	2	0	2
Coleoptera	10	18	14	53	21	141
Diptera	9	11	15	11	19	13
Hemiptera	2	2	3	2	6	5
Hymenoptera	5	11	15	11	50	12
Lepidoptera	10	22	10	22	25	27
Mantodae	0	1	0	1	0	1
Odonata	1	1	1	1	1	1
Orthoptera	3	11	7	11	31	17
Plecoptera	1	0	1	0	1	0

Result

INSECTS ABUNDANCE AND DIVERSITY

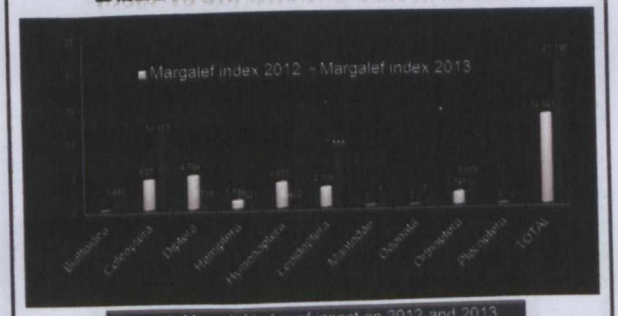


Figure 1: Margalef index of insect on 2012 and 2013

Result

INSECTS ABUNDANCE AND DIVERSITY

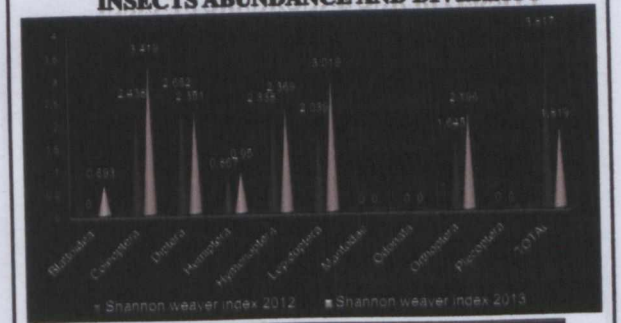


Figure 2: Shannon weaver index of insect on 2012 and 2013

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Result

INSECTS ABUNDANCE AND DIVERSITY

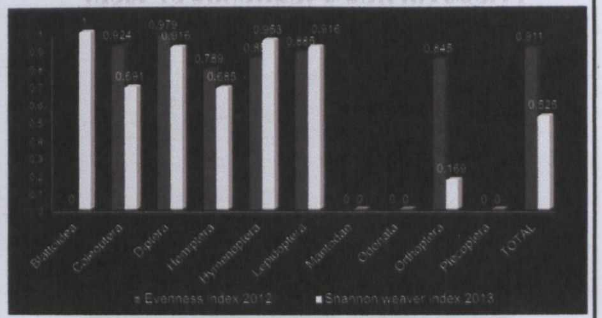

Figure 2: Evenness index of insect on 2012 and 2013

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Result

Table 2: Checklist of insect on *Musa acuminata*

Order	Family	Species
Coleoptera	Alticinae	*Altica cyanea, Weber*
	Brenthidae	*Cubhagogus tristrialies elytralis, Seruma*
	Carabidae	*Miscelus javanus, Klug*
		Egadroma sp.
		Callida Lepida
		Cataascopus sp
	Cerambycidae	*Gnatholea eburifera Thoms*
	Chrysomelidae	*Mimastra semimanginata*
		Monolepta elegantula Boh
		Monolepta cantik sp.
		Lema pecturalis, Baly

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Result

Order	Family	Species
Coleoptera	Cicindelidae	*Cicindelidae aurulrnta F.*
	Curculionoidae	*Rhabdoscelus maculata, Pasc*
		Cosmopolites sordidus
		Odoiporus longicollis
		Paracalendra sp
	Dytiscidae	*Hydraticus planarus, Reg*
	Elateridae	*Miscellaneus sp.*
		Agonischius fasciatus, Cand
	Eucinetidae	*Prosopocoelus squamilateris Parry*
	Hydrophilidae	*Helochares taprobanicus Sharp*
	Lucanidae	*Prosopocoelus squamilateris Parry*
		Hexarthrius sp. Hope
	Lycidae	*Taphes brevicollis*
	Ripiphoridae	*Callirhipis dissimilisWarerh*
		Callirhipis scueellate Firm

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Result

Order	Family	Species
Coleoptera	Scarabaeidae	*Eachlora cupside, Hope*
		Apogonia punctata, Rits
		Adoretus sinicus, Waber
		Apogonia Palawana, Hell
		Meldonthinae sp.
	Staphylinidae	*Pseudoplandria ruficollis, Com*
		Pinophilus sp.
		Philonthus sp.
	Sycdmaenidae	*Cephennium sp*
	Tenebrionidae	*Platycrepis latitasius, Thn*
		Phymatosoma sp
		Tribolium castaleum
		Tribolium sp

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Result

Order	Species
Dermaprtera	*Cordax forcipatus, Haam*
	Cordax forcipatus, Haam
	Chaetospania feae, Porm
	Timomenus ricinus, Burr
	Proreus sp.
Diptera	*Phoenacantha sp*
	Triguna sp
[redacted]	

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Result

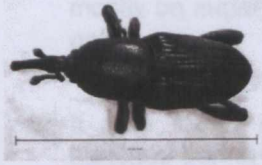
Order	Species
[redacted]	
Lepidoptera	*Chionaema suborta, Wlk*
	Eretomapus flavifusata, Wlk
	Blastobasis ? ochromorpha
	Adra angentilinea, Wlk
	Amerela sp
	Dysphaia malayanus, Guer
	Nacolea octasema
	Tettigonia sp
	Diacrisia sp, Hubn
	Bertula alpheusalis, Walker
	Erionota thrax
	Duomitus sp.
	Syntomidae sp
	Trigonodes hyppasia, Cr.
	Creatonotos transiens, Walker

Result

Order	Species
Mantodea	*Hepalopeza tigrina, Westw*
	Hepalopera tigrina, Westw
Odonata	*Neurothemis fluctians, Kimmins*
Orthoptera	*Tetrix conliactus, Bot*
	Tetrix sp.
	Tetrix sp.
	Callimorpha coccunea, Swinh

Result

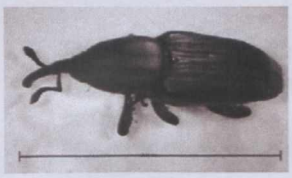
5 species were identified as a pest to *Musa acuminate* banana



Cosmopolites sorditus

Rhabdoscelus obscures

Result



Odoiporus longicollis

***Nacolea octasema* Meyrick**

Result

Erionota thrax

Disscusion

This study confirms that Coleoptera were the major pest in banana farms as reported by Gold et al. (2001) that the banana weevil *Cosmopolites sordidus* is the most important insect pest of banana.

Disscusion

Cosmopolites sordidus is generally not considered a pest in Asia and therefore the insect has been little studied in its presumed area of origin. The larvae bore in the corm, reducing nutrient uptake and weakening the stability of the plant. The weevil damage can result in reduced bunch weights, mat die-out and shortened stand life.

Abera-Kalibata et al. (2008)

Disscusion

- Banana weevil is a difficult pest to work on. The adult is nocturnally active and seldom observed, while the immature stages may be deep within the banana corm.

  Gold et al. (2001)

- The effect of damage was greater on bunch weight than on plant growth and rate of development.

  Rukazambuga et al. (1998)

Disscusion

- *Rhabdoscelus obscurus* has been only recorded in Irian Jaya and Moluccas, mostly on sugar cane, coconuts and wild palms.

  (Chenon et al. 2001)

- It also found in the living tissues of bunches boring inside the peduncle, the rachis or even the spiklets and the fruits.

Disscusion

This species attacks the stalks of healthy, damaged, or stressed sugarcane; the pseudostems of bananas; and the sheaths or stems of palms.

(Giblin-Davis, 2001)

Disscusion

- This species is not known to vector any pathogens or associated organisms.

- However, organisms can invade tissues that have been damaged by *R. obscurus* including red rot, *Colletotrichum falcatum*, and other microbial decomposers.

  (CABI, 2002)

Disscusion

- *Odoiporus longicollis* is also considered a pest to banana.

- The adult weevils feed on living and decomposing banana leaf tissues, but eat little are not considered pests.

  Gold et al. (2002)

- Damage is done by the larval stage. The larvae attack the pseudostem and stem of banana plants, although they will occasionally feed within the rhizome.

Disscusion

- *Nacoleia octasema*, the banana scab moth and the *Erionota thrax,* the palm redeye, banana skipper or banana leaf roller were not considered as major pest to the banana.

- The larvae of *N. octasema* feed on the skin of the banana fruit creating black scars that may greatly reduce their market value but do not normally affect yield.

  (EFSA, 2008)

- The larvae of *E. thrax* feed on leaves.

  (Okolle et al., 2006)