INSECT DIVERSITY CONSERVATION

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ABSTRACT

Insects are part of complex agricultural ecosystems. Their existence should be kept and maintained to stabilize entire environmental ecosystem. Insects play important role in the world, though they feed on plants and act as pests, but they also provide advantages as beneficial organisms. Approximately 1,000,000 of insect species have been taxonomically described than any other group of animals or plants on ecosystem. Insects are receiving increased attention in conservation assessment and research because of a growing awareness of their importance as keystone species, as indicators of patterns of species richness, and as monitors of environmental changes. Indralaya Campus of Sriwijaya University covers an area of approximately 750 hectares. Of this study, most species found were from order Homoptera (859 species, 28 % of all species found), followed by Hymenoptera (780 species, 24 %).

Key words: *Insect Biodiversity Conservation, Agricultural Ecosystem, Environmental Ecosystem, Beneficial Organisms, Food Webs,*

INTRODUCTION

It is clear stated that, nobody knows about how many of species of organism are on earth. Scientists predict that it is estimated that the number of species vary from 5 to 80 million species or even more, but the figure is most probably in the range of 30 million. Of this number, it is assumed that 1.4 million of these living species have been briefly identified. Of these, about 750.000 are insects, 41.000 are vertebrates and 250.000 are plants. (Ragaei and Allam 1997, Brooks *et al*. 2002, Connor *et al*. 2002). Insects encompass more than 50% of all identified species and are important components for all terrestrial and freshwater aquatic environments. The reasons are species diversity, population size and biomass are very large, and taxonomy and faunal information are not enough for availability. Another reason is the need for taxonomic and biodiversity information gets up greatly, followed by the shortage of taxonomic experts. (Kim 1993, New *et al*. 1995, Fisher 1998, Condon *et al*. 2008).

Approximately 1,000,000 of insect species have been taxonomically described than any other group of animals or plants on ecosystem. It has been shown that the rate of animal and plant extinctions across the world has generally paralleled the human population growth rate, reflecting the increased amount of natural habitat which must be devoted to the fulfillment of societal basic needs (Pyle *et al*. 1981, Niemel *et al*. 2000, Huntly *et al*. 2005).

The substantial benefits to mankind from insects generally receive less publicity than the economic losses that result from their roles as vectors of diseases and as pests of agriculture, fibers and stored goods. The present momentum began in the 1960's, legislative measures were taken in the 1970's and being strengthened in the 1980's and 1990's (Pyle *et al*. 1981, Hughes *et al*. 2000, Losey *et al*. 2006, Franzén *et al*. 2007, Leather *et al*. 2008). Invertebrates are suffering the greatest species loss in the current biodiversity crisis. These animals perform essential ecosystem functions upon which humanity depends, yet they are largely overlooked in mainstream conservation planning. This has potential to be achieved through ecotourism. Within the international tourism industry, ecotourism is the fastest growing subsector, its growth rate being three times that of tourism overall. (Connell, 1996, Schwartz, 1999, Huntly *et al*. 2005).

As a response to government spending cuts in higher education, universities have sought ways of generating alternative sources of income through diversification (Connell, 1996). . Sriwijaya University covers an area 750 hectares, most of areas are vegetation with a lot of varieties of plants. Some areas are aimed for experimental stations for student experiments. Campus-based tourism – focused on ecotourism – is being planned to develop as a significant market.

MATERIAL AND METHOD

Studies have been conducting at Indralaya Campus, Ogan Ilir, South Sumatra, in September 2010 and onward on fields with black inceptisol soils. Observations were carried out on rambutan, star fruit, banana, and orange. The field size in the area is 10 m in length and 25 m in width. Twenty 20 pitfall traps were placed to catch soil insects into the fields, 2.5 m from the field border and 2 m from each other. The traps had a diameter of 10 cm and a depth of 8 cm. They were filled (one third) with 0.1 % formaldehyde solution, some drops of detergent added, and emptied weekly. Additionally, the population density of the predators was measured, by flooding with water, 10 squares of 0.1 m^2 per field (Basedow et al. 1988). Some flying insects are caught by using insect net. All caught insects are killed in a jar filled Potassium Cyanide. For the identification the following sources were used. Most of insects could be identified with the book of Kalshoven, 1981.

RESULT AND DISCUSSION

Species Found

Most species found were from order Homoptera (859 species, 28 % of all species found), followed by Hymenoptera (780 species, 24 %). They were caught on the leaves, trunks, fruit, and on the above ground. Insects were caught by insect net and or manual, by hand.

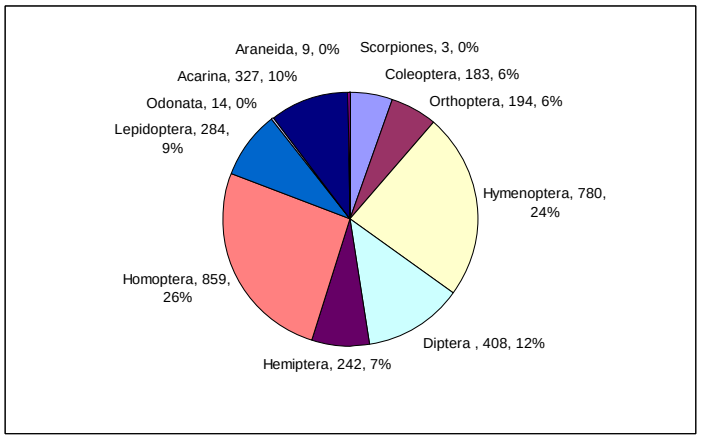

Figure 1. Order and number of species found

Species found could be grouped as insect pests and beneficial organisms. Most species could be identified completely, some are identified only until genera, and some could not be determined yet. Species found are listed in Table 1.

Table 1. Species found by names

CLASS	ORDER	FAMILY	SPECIES	NUMBER
Insecta	Coleoptera	Coccinellidae	*Coccinella arcuata*	4
			Coccinella unidecimpunctata	5
			Epilachna varivestis	6
			Coccinella septempunctata	8
		Cantharidae	*Cantharis nigricans*	21
		Chrysomelidae	*Phyllodecta vitellinae*	3
		Bostrichidae	*Lyctus sp.*	4
		Catantopidae	*Caliptamus italicus*	7
		Phaeostichidae	*Hymnea magna*	17
		Anobiidae	*Ptinus sp.*	11
		Carabidae	*Idacarabus sp*	22
			Clivina sp	10
		Scarabaeidae	*Aphodius sp.*	8
		Cerambycidae	*Batocera sp.*	25
			Uracanthus sp.	11
		Buprestidae	*Diadoxus sp.*	2
			Stigmodera sp.	19
	TOTAL			183
	Orthoptera	Acrididae	*Acrida sp.*	12
			Stropis maculosa	4
			Tapesta sp.	6
			Scurra sp.	11
		Gryllacrididae	*Ametrus sp.*	15
			Apotrechus	7

		Gryllidae	*Acheta domesticus*	9
			Aphonoides sp.	19
			Gryllodes sp.	11
			Oecanthus sp.	21
		Gryllotalpidae	*Gryllotalpa sp.*	5
		Tetrigidae	*Paratettrix sp.*	2
		Pauliniidae	*Paulina sp.*	17
		Rhaphidophoridae	*Cavernotettix sp.*	3
		Tettigoniidae	*Conocephalus longipennis*	26
			Hemisaga sp.	21
			Terpandrus sp.	5
	TOTAL			194
	Hymenoptera	Apidae	*Apis sp.*	26
			Apis dorsata	8
			Apis mellifera	11
			Trigona sp.	16
		Braconidae	*Apanteles sp.*	34
			Aphidius erpi.	21
			Cotesia sp.	21
			Diaeretriella sp.	26
			Dinocampus sp.	25
			Trioxys sp.	52
		Eulophidae	*Tetrastichus sp.*	11
		Formicidae	*Anonychomyrma sp.*	25
			Aphaenogaster sp.	20
			Calomyrmex sp.	14
			Camponotus sp.	17
			Cerapachys sp	1
			Crematogaster sp.	5
			Dolichoderus sp.	12
			Iridomyrmex sp.	18
			Melophorus sp.	17
			Oecophylla spp.	58
			Opisthopsis sp.	31
			Rhytidoponera sp.	26
			Solenopsis sp.	17
		Ichneumonidae	*Diadromus sp.*	21
			Ichneumon sp.	35
			Heteropelma sp.	31
			Pterocormus sp.	21
		Scelionidae	*Scelio sp.*	26
			Trissolcus sp.	17
		Scoliidae	*Campsomeris sp.*	21
		Vespidae	*Polistes sp.*	34
			Vespula sp.	35
			Ropalidia sp.	27
	TOTAL			780
	Diptera	Agromyzidae	*Melanogromyza sp.*	13
			Ophiamya sp.	16
			Phytomyza	26

		Bombyliidae	*Bombylius sp.*	24
		Cecidomyiidae	*Contarinia sp.*	5
			Diadiplosis	7
			Heteropeza sp.	14
			Mycophila sp.	10
			Rhopalomyia sp.	5
		Chloropidae	*Oscinella sp.*	8
		Muscidae	*Atherigona exigua*	18
			Musca domestica	15
			Musca corvina	12
		Phoridae	*Megaselia sp.*	16
		Sarcophagidae	*Sarcophaga sp.*	21
		Tephritidae	*Bactrocera cucurbitae*	38
			Bactrocera dorsalis	45
			Bactrocera papayae	56
			Bactrocera umbrosa	38
			Bactrocera musae	21
	TOTAL			408
	Hemiptera	Aleyrodidae	*Aleurocanthus sp.*	26
			Aleurodicus sp.	41
			Bemisia tabaci	37
			Trialeurodes sp.	21
		Anthocoridae	*Xylocoris sp.*	36
		Pentatomidae	*Nezara viridula*	26
			Piezodorus sp.	34
		Reduviidae	*Pristhesancus sp.*	21
	TOTAL			242
	Homoptera	Aphididae	*Acyrthosiphon sp.*	36
			Aphis craccivora	42
			Aphis glycines	47
			Aphis gossypii	41
			Brevicorynae sp.	38
			Eriosoma sp.	52
			Macrosiphum sp.	53
			Myzus persicae	68
			Neotoxoptera	41
			Rhophalosipum sp.	38
			Sitobion sp.	25
			Toxoptera sp.	46
		Cicadellidae	*Cicadella sp.*	6
			Empoasca sp.	14
		Coccidae	*Coccus sp.*	47
			Pulvinaria sp.	49
		Pseudococcidae	*Trionymus sp.*	56
			Geococcus sp.	24
			Planococcus sp.	75
			Pseudococcus sp.	61
	TOTAL			859

	Lepidoptera	Hesperiidae	*Allora sp.*	34
			Anisynta sp.	21
			Chaetocneme sp.	27
			Croitana sp.	43
			Hesperilla sp.	44
			Mesodina sp.	52
			Neohesperilla sp.	37
			Parnara sp.	26
	TOTAL			284
	Odonata	Libellulidae	*Nannophyia sp.*	8
			Diplacodes sp.	6
	TOTAL			14
ARACHNIDA	Acarina	Acaridae	*Rhyzoglyphus sp.*	35
			Tryophagus sp.	27
		Ixodidae	*Amblyomma sp.*	18
			Haemaphysalis sp.	12
			Ixodes sp.	26
		Tetranychidae	*Bryobia sp.*	28
			Oligonychus sp.	36
			Panonychus sp.	41
			Petrobia sp.	46
			Tetranychus sp.	58
	TOTAL			327
	Araneida	Araneidae	*Arachnura sp.*	3
			Eriophora sp.	2
			Ordagrius sp.	4
	TOTAL			9
	Scorpiones	Bothriuridae	*Cercophonius spp.*	2
		Urodacidae	*Urodacus sp.*	1
	TOTAL			3

Plants as hosts of the insects were available on the experimental site. The insects were not controlled. It could be assumed that the number of insects found was related to the absence of insecticide application. Some insects were pests for other plants which are planted surrounding experimental site, and some were beneficial organisms, such as predators and parasitoids.

CONCLUSION

Eight orders of insects and three orders of arachnids were found, total number were 3000 species in area 250 m^2. It could be concluded that experimental site of Indralaya Campus has a high diversity and abundance of insects and arachnids and is suitable for conservation area and as an object for ecotourism for students and people who are living around the university.

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