

Insects Community Study at Acacia Mangium Tree That be Attacked by Ceratocystis Fungi

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ABSTRACT

Study on insects community that come to of February until mid of March 2022. Sample tree is selected purposively, based on attacking case. It is located at road side between Muhajirin mosque, Indralaya, to Tanjung Putus kindergarden school building, Indralaya, South Sumatra. Noted 5 species that sucked the solution at tree bark; 1. *Melanotis leda*. 2. *Vespa affinis*. 3. *Chrysomia megacephala* 4. *Heterotrigona itama* and 5. *Sarcophaga* sp. Diversity index counting had been done and found the fluctuation week by week from first to fourth: 0.735, 0.780, 0.781, 0.752. *M leda*, is the one species that looked had new generation at last week study.

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Received: April 19, 2023; **Accepted:** April 25, 2023; **Published:** April 30, 2023

Keywords: Community, Insects, Diversity

Introduction

Acacia mangium (*A mangium* Willd, family Fabaceae; Bernal et al.,) is an evergreen fast-growing tropical tree, which can grow up to 30 m tall and 50 cm thick, under favorable conditions. It is a low-elevation species associated with rain forest margins and disturbed, well-drained acid soils [1]. It is native to Papua, Western Irian Jaya and the Maluku islands in Indonesia, Papua New Guinea and north-eastern Queensland in Australia. Due to its rapid growth and tolerance of very poor soils, *A. mangium* was introduced into some Asian, African and western hemisphere countries where it is used as a plantation tree. *A. mangium* has good quality wood traits, such as a comparatively low proportion of parenchymatous cells and vessels, white and hard wood, and high calorific value. Therefore, it is useful for a variety of purposes, such as furniture, cabinets, turnery, floors, particleboard, plywood, veneer, fence posts, firewood, and charcoal. It is also being used in pulp and paper making because it has good pulp traits, with high yields of pulp, quality of kraft, and produces paper with good optical, physical and surface properties [2].

During the course of recent disease surveys in *A. mangium* plantations in Indonesia, significant mortality of young trees showing rapid wilt symptoms was observed. Isolates of a *Ceratocystis* sp. were collected from stained vascular tissue on these trees [3]. *Ceratocystis* spp. have increasingly been reported as the cause of wilt and canker of plantation-grown *Acacia* spp. in many areas, world-wide [4]. In Brazil, *C. fimbriata* s.l. has been reported to cause canker and wilt of a *decurrens* Willd and in South Africa, *C. Albifundus* MJ Wingf, De Beer & Morris is considered the most important pathogen of plantation-grown *A. mearnsii* De Wild. and *A. decurrens* trees [5,6].

Christen et al., reported that *C. fimbriata* has a great potential as aroma producer not only from defined media but from natural substrates as well [7]. Furthermore, they reported, the studies made in liquid media, varying carbon and nitrogen sources, showed the ability of the fungus to grow and produce a great variety of fruity aromas from different substrates such as that fish hydrolyzate, potato broth and synthetic compounds. Specially, the glucose/urea and glucose/ammonium sulfate media gave a characteristic and intensive banana aroma. It was found that potato broth and fish hydrolyzate were efficient for biomass production while the former was also found to be adequate for aroma production.

Buttery (1993) in El Hadi et al., wrote about fruits aroma; Aroma compounds are often only released upon cell disruption when previously compartmentalized enzymes and substrates interact. Some aroma compounds are bound to sugars as glycosides or glucosinolates [8].

This study is aimed to know the insects diversity and their diversity fluctuation during attacking period of an *Acacia mangium* tree.

Material and Methods

Sample tree is selected purposively, based on attacking case. It is located at road side between Muhajirin mosque, Indralaya, to Tanjung Putus kindergarden school building, Indralaya, South Sumatra. Notes were made by directly looking at the tree bark during February until March 2022 (4 weeks). Last but not least investigate had been done at April 2022 for checking the tree condition, whether it is still life or has die. Camera was used to make documentation, and number of every insects attracted by bark juice is counted and analysed by Diversity Index of Simpson (Krebs, 1984). Diversity fluctuation is discussed. According to Kempraj et al., in insects, 'olfaction' plays an important role in locating food, mates and oviposition sites [9]. Olfaction is

the ability of insects to perceive and distinguish odours that are mediated through sensory neurons and the brain, leading to a critical and specific behaviour. Exploiting this mechanism, several trapping methods based on pheromones and kairomones are already in use for managing insect pests.

Results and Discussion

Investigation on the data and analyses, found the results as be written at below table 1.

Table 1: Fluctuation of Attracted Insects Individual Number and Their Diversity during 4 Weeks

Species	Feb18, 22	Feb 25,22	March 4, 22	March 11, 22
<i>Melanotis leda</i>	2	2	4	2
<i>Vespa affinis</i>	1	2	3	1
<i>Chrysomya megacephala</i>	0	1	2	2
<i>Heterotrigona itama</i>	2	2	2	2
<i>Sarcophaga sp</i> <i>Heterotrigona itama</i>	2	3	2	2
<i>Simpson Diversity index</i>	0.735	0.780	0.781	0.752

Table 1 shows that 5 species of insects attracted to solution and foam that come out from under bark tree. Diversity index of those five species tend to stable from week to week during one month study. One month after, the tree become death with yellowish leaves. Related to coexistence some species in the same place and same time, Becerra explained that it is the process of natural succession to climax community, where increase of diversity of insects and plants of their hosts, considered as mechanism where the niche should be different [10]. Visualization of this coexistence, could be seen at youtube video by this link: https://youtu.be/gW1em8_kkcs

Field study shows, the behavior of those five insects species; when an individu meet the other individu of different species, one of them should fly away. And then come back to another area of attacked bark for continue sucking solution.

Nair and Sumardi (2000) in Anonymous (2011) had reported that that the insenst usually borredinto A mangium trees, is *Xylocopa festiva*, but it is not found in this investigation [11]. Climate, furthermore microclimate, is the factor that affect the existency of insect pest in their host tree [12]. So, it could be different the diversity of insects pest between wet and dry season.

Based on above table 1, could be seen that *Melanotis leda*, a Lepidoptera, brown butterfly, was a kind of insect that visit the A mangium bark for feeding need. Hamer et al., had published that *M Leda* is a species of butterfly that feeding on fermented fruits in Tropical rain forest of Kalimantan [13]. The second insect species, *V affinis*, according to Lin is a generalist that feeds on both carbohydrates (tree sap, nectar, fruits and larvae saliva) and proteinaceous food (carrion, Polistinae and Apis species). *Heterotrigona itama*, or *Trigona*, or *Tetragonula*, is a species of stingless bee that had been published living in Indralaya by Marisa, which this species could made the nest in streetlight pole at road side [14, 15].

Sontigun et al., noted that *C. megacephala*, and other blow fly species like *Chrysomya albiceps* and *Lucilia eximia*, which fecundity was not significantly affected by changes of microclimate like temperature [16]. This result suggested that fecundity is probably influenced by the ecological niches occupied by this species, which seasonal and environmental changes may affect the abundance of food resources, e.g. the presence of plants, fruits, animal carcasses or dung. Mello-Patiu et al. (2014) in Valverde-Castro et. at., explained that adult flies of *Sarcophaga sp* feed on nectar, fruit juice, and proteins taken from decomposing matter such as excrements and carrion [17].

Last, the number of diversity index of insects, shows there is no big difference price between week to week. If the number of Simpson Diversity Indices is ranged between 0 until 1; the result of weekly looks around 0.73 to 0.78. It is mean quite divers but generally stable.

Summary

Conclusions could be found as followed; it is noted 5 species that sucked the solution at tree bark; 1. *Melanotis leda*. 2. *Vespa affinis*. 3. *Chrysomya megacephala* 4. *Heterotrigona itama* and 5. *Sarcophaga sp*. Diversity index counting had been done and found the fluctuation week by week from first to fourth in not big different, tend to stable: 0.735, 0.780, 0.781, 0.750.

M leda, is the one species that looked had new generation at last week study. All species are overcome interaction but no fighting in resource competition.

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