

REDWOOD (*Pterocarpus indicus* Wild) and BREADFRUIT (*Artocarpus communis*) BARK SAP AS ATTRACTANT OF STINGLESS BEE (*Trigona* spp)

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ABSTRACT :

An investigation about the power of redwood bark sap to invite stingless bee arrival had been done at Biology campus area, The University of Sriwijaya, Indralaya, South Sumatera, Indonesia; during Nopember 2010. Redwood breadfruit bark have been hurt for outcoming the red sap, and duration time for stingless bee arrival be measured then. Meanly, in 17 minutes, stingless bee had came for red sap; and in 5 minutes for breadfruit . Chemical test of redwood sap after soluted in methanol and put on gelsilicon chromatography with ethil-acetate and methanol (1:1), and sprayed by sulphic acid indicate that the compounds is terpenid (tannin) for red wood sap, and tannin and alcaloid for bread fruit sap

Keywords: *Pterocarpus indicus*, *Trigona* sp, bark sap.

1.INTRODUCTION

At an afternoon, one year ago, a neighbor cut the red wood trunks in front of the House. Many red elastic sap/gum came out from the bark, and lot of insects, stingless bee, hold the gum and keep it in their leg baskets. These phenomena was interested. What were the chemical compounds in the red sap? And what for stingless bee to keep it? The study on *Trigona* and *Pterocarpus* begin at that day. Even, *Trigona* sp, also be found at bread fruit sap too, many months later.

At least there are 100.000 chemical compounds produced by 200.000 species of flowering plants in their growth and development. Most of them were not essential for physiological process of that plant. The structure of more than 6000 alkaloids, 3000 terpenoids, some thousands of phenylpropaniod , 1000 flavonoid, 500 quinons, 650 polyacetylene and 400 of amino acidshad been known. Most of chemical compounds of plant identified, were functioned as volatile attractant for insects. Attaction of those compounds processed by diffusion in the air (Metcalf, 1992).

In Philippines, stingsless bees are mass produced for pollination and honey production. During the swarming season (February-March) strong colonies are divided. Broad chambers containing queen cells are removed along with same adult bees, and placed 1-2 metres away from the original colony. These so called 'starter' colonies are then allowed to rear their own queen (Fajardo and Cervancia, 2011).

The nest of stingless bees usually consist of an external tube, internal tunnel, resin dumps, wax dumps, foot pots for storing pollen and honey, brood and nest envelopes like involucre and batumen. Brood cells, honey pots and pollen pots are arranged in separate clusters. Brood cells and food pots made of cerumen which is a mixture of wax and resin.(Pooley and Michener, 1969 in Danaraddi, 2007). Eltz et al. (2002) in Danaraddi (2007) reported the nest density of *Trigona collina* Smith, was generally high in sites located in the Sipilok forest fragment

(mean 8.4 nest/ha). Nest densities in continuous forest were all low (between 0 and 2.1 nest/ha, mean 0.5 nest / ha).

Boogert et al. (2006) found that species *Trigona corvina*, scent marked a high quality food source and that they used their own scent marks to relocate it in choice experiment. Boogert studied for some species were bumblebees, honey bees and stingless bees.

Stingless bees need flower nectar and pollen for their food. Stingless bees could find the food until 500 metres (Baconawa 1999 cit. Abdillah 2008). Nectar of rubber plant and Cassava even were got by *Trigona* from their stem (Abdillah, 2008). Compared with *Apis*, population of *Trigona* colony were larger (Anonymous 2001 cit. Abdillah 2008).

MacArthur and Pianka argued that to obtain food, any predator (herbivore) must expend time and energy, first in searching for its object, and then in handling it (i.e. Pursuing, subduing and consuming it). Searching is bound to be directed, to some extent, toward particular food/prey type, but while searching, a predator/herbivore is nevertheless likely to encounter a wide variety of food items. (Begon, M., Harper, J.L. and Colin R Townsend, 1986).

2 .EXPERIMENTAL. Redwood and breadfruit bark have been hurt for outcoming the red sap, and duration time for stingless bee arrival be measured then by watch (searching time). Five hurt done, and mean of data were measured. . Chemical test of redwood sap after soluted in methanol and put on gelsilicon chromatography with ethil-acetate and methanol (1:1) for redwood sap; and n-hexan for breadfruit, and sprayed by sulphic acid 10 % after dried. The colour of spot were watched then (Thin Layer Chromatography) as published by

3. RESULT AND DISCUSSION

Below table describe the time that were needed by *Trigona* sp1 to find and arrived at bark hurt of *P indicus*:

NO OF REPLICATION	REDWOOD	BREADFRUIT
1	19	3
2	15	4
3	18	5
4	16	4
5	17	9

As Begon et al. (1986) explained, it is needed a certain time for insect to find the foot object (searching time). *Trigona* sp1 (smaller) need about 17 minutes to find the red wood gum. Furthermore, *Trigona* sp2 (bigger) need about 5

minutes to find the object. Because the sap of those trees were not nectar and pollen organ; it must be used of *Trigona* spp for nest built (see Baconawa 1999 cit. Abdillah 208).

And table below explain the result of chemical compound test by sulphic acid Reagent :

NO	SAMPLE (SAP)	COLOUR AFTER REAGENT TEST
1	RED WOOD	BROWN (TERPENOID)
2	BREAD FRUIT	VIOLET-BROWN (TANNIN) AND YELLOW (ALCALOID)

Figure 1 (from left to right): Red wood bark hurt and red gum/sap came out (left); Thin Layer Chromatography test of Redwood gum by H₂SO₄ reagent. (middle) and spot of gum drop of red wood (right).



Figure 2. Two species of *Trigona* spp, the bigger (left) attracted to bread fruit sap and the smaller (right) attracted to red wood gum.



It could be seen, that the species of *Trigona* spp show difference in liking the sap of tree bark. The smaller, came to red wood gum and the bigger came to bread fruit sap.

4. CONCLUSION

Red wood and breadfruit bark sap attract *Trigona* spp for nest material. It taked time about 17 minutes to find red wood gum by *Trigona* sp1 and 5 minutes to find breadfruit sap by *Trigona* sp2.

ACKNOWLEDGEMENT

We thank the rector of The University of Sriwijaya for facilitation and funding; and to RAFSS 2011 UTM for giving the presentation chance.

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