PROCEEDING

The 2nd International Seminar of Basic Science

Natural Science For Exploration The Sea-Island Resources

Ambon, May 31st 2016

Organized by

Faculty of Mathematics and Natural Science

Pattimura University

PROCEEDINGS

The 2nd International Seminar of Basic Science

"Natural Science for Exploration The Sea-Island Resources"

Poka-Ambon, 31st May 2016

Mathematic and Natural Science Faculty
Universitas Pattimura
Ambon
2016

PROCEEDINGS

The 2nd International Seminar of Basic Science
May, 31st 2016

ISBN : 978-602-97522-2-9

Mathematic and Natural Science Faculty
Universitas Pattimura
Ir. M. Putuhena St.
Kampus Poka-Ambon
Pos Code 97233
Email:fmipa_unpatti@gmail.com

2nd edition

Welcoming Address By The Organizing Committee

Today, We have to thank the The Almighty Allah SWT for the implementation of this international seminar. This is the second seminar about Basic Science in The Faculty of MIPA Pattimura University. The seminar under the title “Natural Sciences for Exploration the Sea-Island Resources” will be carried out on May 31st 2016 at Rectorate Building, Pattimura University. There are 200 participants from lecturers, research institute, students, and also there are 34 papers will be presented.

My special thanks refer to the rector of Pattimura University and the Dean of MIPA Faculty, Prof. Dr. Pieter Kakissina, S.Pd., M.Si. I also would like to express my deepest gratitude to Prof. Amanda Reichelt-Brushett, M.Sc., Ph.D. ; Kazuhiko Ishikawa, Ph.D. ; Nicolas Hubert, Ph.D. ; Prof. Dr. Kirbani Sri Brotopuspito ; Prof. Dr. Marjono, M.Phil. ; Gino V. Limon, M.Sc., Ph.D. as the keynote speakers.

The last, We hope this international seminar usefull for all of us, especially Mollucas People and very sorry if any mistake. Thank you very much.

Dr. La Eddy, M.Si.
Chairman of Organizing Committee

Opening Remarks
By Dean of Mathematic and Natural Sciences Faculty

I express my deepest gratitude to The Almighty God for every single blessing He provides us especially in the process of holding the seminar until publishing the proceeding of International Seminar in celebrating the 18th anniversary of MIPA Faculty, Pattimura University. The theme of the anniversary is under the title "Natural Sciences for Exploration the Sea-Island Resources". The reason of choosing this theme is that Maluku is one of five areas in Techno Park Marine in Indonesia. Furthermore, it is expected that this development can be means where the process of innovation, it is the conversion of science and technology into economic value can be worthwhile for public welfare especially coastal communities.

Having the second big variety of biological resources in the world, Indonesia is rich of its marine flora and fauna. These potential resources can be treated as high value products that demand by international market. Basic science of MIPA plays important role in developing the management of sustainable marine biological resources.

The scientific articles in this proceeding are the results of research and they are analyzed scientifically. It is expected that this proceeding can be valuable information in terms of developing science and technology for public welfare, especially people in Maluku.

My special thanks refer to all researchers and reviewers for your brilliant ideas in completing and publishing this proceeding. I also would like to express my gratefulness to the dies committee-anniversary of MIPA Faculty for your creativity and hard working in finishing this proceeding, God Bless you all.

Prof. Dr. Pieter Kakisina, S.Pd., M.Si.
Dean of Mathematic and Natural Sciences Faculty

ACKNOWLEDGMENT

The following personal and organization are greatfully

acknowledgment for supporting

"The 2nd International Seminar of Basic Science 2016"

Hotel Mutiara Ambon

Contents

PROCEEDINGS
The 2nd International Seminar of Basic Science
May, 31st 2016

VOLUME AND PRODUCTION OF BEE PROPOLIS ON VARIOUS MEDIA *TRIGONA SPP* NATURAL NEST IN THE VILLAGE WAESAMU KAIRATU WEST DISTRICT DISTRICT WEST SERAM

Debby Dijola Moniharapon[1], Jacobus S. A. Lamerkabel[2] dan Thresya S. Kwalomine[3]

[1]Department of Biology, Faculty of Mathematic and Natural Sciences, Universitas Pattimura, Ambon, Moluccas, Indonesia
[2]Faculty of Agriculture, Universitas Pattimura, Ambon, Moluccas, Indonesia
[3]Study Program of Biology, Faculty of Education and Teacher Training Universitas Pattimura, Ambon, Moluccas, Indonesia

ABSTRACT

Trigona spp is a stingless bee honey that produces propolis (adhesive), bee wax (beeswax), bee bread and honey. *Trigona spp* inserted into Melliponidae family. This research aims to determine the volume and the amount of production propolis of stingless bee (*Trigona spp*) on a variety of media natural nests and to find out the volume of media natural nests of stingless bee (*Trigona spp*). In this research the methods used are: interviews, surveys and descriptive. Sampling directly at the research site of natural nests dismantled are done randomly. Samples taken in the form of propolis. Methods of data collection taken from the observed variables are presented in the form of descriptive narrative in the form of tables, pictures and descriptions. Data analysis technique used was a completely randomized design. The results showed that the total production of propolis increases with the increase in the volume of natural nests of various media. The total volume of natural nests media nako glass frame is 1756.6 cm^3 with total production of propolis on average 54 g. The total volume of natural bamboo nest media 5619.9 cm^3 with total production of propolis average 74 g. Similarly, the trunk has a total media volume 81310.8 cm^3 nest with total production of propolis on average 435.3 g. As for the crack media houses have media types natural nests studied natural nests media nako glass frame (the size of the smallest volume), media natural bamboo nest, natural nest media trunk (largest volume size) and natural nests media crack in the door of the house.

Keywords: Propolis, *Trigona* spp, Media Nest Natural.

INTRODUCTION

Indonesia is known internationally as a country rich in honey bee (Suranto, 2007). According Hadisoesilo (2001) the types of native bees Indonesia namely Apis dorsata (forest bees), Apis cerana (local bee), Apis andreniformis (bee dwarf), Apis nigrocinta (local bee Sulawesi), Apis koschevnikovi (bee red), Apis nuluensis (mountain bee) and Trigona spp (bee klanceng).

Although Indonesia is rich in honey bees, honey production nationally but very low at an estimated 8,800 tons per year. This is still far from the needs of national consumption reached about 25,000 tons per year. To cover the shortfall of 16,200 tons of imported salt from the honey producing countries of the world, such as China, Australia and Argentina

(Husaeni, 2012). These imports mainly done by the food industry, the pharmaceutical industry and the cosmetics industry because of the continuity and quality is guaranteed.

Trigona spp is a stingless bee honey to produce propolis (adhesive), bee bread (bee bread), bee wax (beeswax) and honey which has a high economic value and efficacious for the health (Lamerkabel, 2011). Stingless bee included in family Melliponidae. Honeybees are less popular in producing honey than family Apidae Apis mellifera bees like honey that produces about 30 to 50 kg per colony per year and the bees Apis cerana which is approximately 7 kg of honey per colony per year. However, bee Trigona spp have the privilege that is able to produce propolis of approximately 3 kg per colony per year compared to the genus Apis that produce propolis only about 200 to 300 grams per colony per year (Soekartiko, 2009). Propolis is used by bees to sterilize the hive Trigona spp, stop the growth and spread of bacteria, viruses and fungi (Angraini, 2006). In addition, propolis is also useful for strengthening and patching leaky nest.

Nesting is one of the important factors for the growth, proliferation and production of bee Trigona spp. The nesting bee Trigona spp, namely: in the cavities of the trunk or branches of trees, in the joints of bamboo, the cracks of door and window frames, cracks the foundation stone of the house, in a metal pipe, cracks frame glass windows Nako and in plastic pipe (Lamerkabel, 2011).

Community on the island of Ambon calling bee Trigona spp in the local language that is "mai-mai toher". Villagers called the bee Trigona spp weaisamu in day-to-day language is bingkalang. Propolis, bee bread and honey produced by bees stingless this-nor has long been used as a source of food or drink naturally nutritious and traditional medicine to cure toothache, hemorrhoids, ulcers, asthma, cough, scarlet fever, cuts and burns (Lamerkabel, 2007).

Research on the production of honey, propolis, royal jelly, bee pollen (pollen bee), bee bread (bread bee), propolis and bee wax (candles, night) on the results of beekeeping superior species Apis mellifera using box (stup) has a lot to do. However, research on the production of honey, bee pollen, bee bread, propolis and bee wax on natural nesting habitat types of local honey bee Apis cerana, Apis dorsata and Trigona spp in Maluku province is relatively small (Lamerkabel, 2011).

The aim of this research is to know the volume and the amount of production propolis of stingless bee (Trigona spp) on a variety of media natural nests.

MATERIALS AND METHODS

Place and Time

Research is located in the village Waisamu Kairatu District of West Seram and lasts from October-November 2014.

Tools and Materials

Tools and materials used in this study are: chainsaws, machetes, hammers, axes, levers, a digital camera, a clear plastic (capacities of 3 kg), paper labels, meter, rope, forks, spoons, buckets ngan, buckets, stationery writing, natural nests (Nako glass frame, joints of bamboo, tree trunks and the door frame) bee Trigona spp, propolis, bee bread, honey, bee colonies Trigona spp, cigarettes and water.

Research Methods

The method used is the method of interviews, surveys and descriptive, where data obtained from the samples were analyzed according to the statistical methods used are then presented in tabular form. The measured parameters are: total production of propolis, bee bread and honey and volume (cm3) of natural nests. Supporting the observed variables are: the color of propolis, bee bread and honey bee Trigona spp in various natural nests. Data obtained combined with literature supporting that more optimal results. Data is presented in the form of descriptive narrative, in the form of tables, pictures and descriptions. Each volume of natural bee hive *Trigona spp* calculated using the formula, as follows: Natural nests nako glass frame and the door frame using the formula:

$$V=p.l.t$$

Where:

v: volume (cm^3)
p: length (cm)
l: width (cm)
t: height (cm)

Natural nest of bamboo and tree trunks using the formula:

$$V \text{ tube} = \text{Alas Size x Height} = \pi r^2.t$$

If the diameter is known only then the formula can be changed to:

$$V \text{ tabung} = {}^{1}/_{4}\pi d^2.t$$

Where:
v: volume (cm3)
d: diameter of the circle (cm)
r: radius or radius = d
t: tube height (cm)
$\pi = 3.14$

Field research

The search for Trigona spp bee colonies that are in the natural nest nako glass frame, bamboo rods media, media trunk and slit door frame house located in residential areas Waesamu village Kairatu Western District of Ambon Island.

Total samples collected and used to calculate the parameters of the production amount (g) of propolis and volume (cm3) as many as 12 natural nests of bees Trigona spp. Details as follows: 3 natural nests nako glass window frame; 3 natural nest of bamboo; 3 natural nest door frame and 3 natural nest tree. Samples of each of the natural nests of bees Trigona spp containing propolis, bee bread and honey harvesting.

Results harvesting of each hive propolis naturally be inserted into clear plastic bags (capacity of 3 kg) which has been labeled. Weigh each propolis from natural nests directly at the sites. Observe also the color of propolis.

Data analysis

To find out how diet affects the variable volume natural nests with variable products from bee Trigona spp. Then do the analysis of product moment correlation (Pearson Product Moment) using the equation according to Jarrel and McClellen (1993) are as follows:

$$r = \frac{n(\Sigma XY) - (\Sigma X)(\Sigma Y)}{\sqrt{[n(\Sigma X^2) - (\Sigma X)^2]}\ \sqrt{[n(\Sigma Y^2) - (\Sigma Y)^2}}$$

Information:

r = The correlation coefficient

n = number of samples

Correlation in statistical science means the relationship between two variables or more. The relationship between the two variables is called bivariate correlation (bivariate correlation). Simple correlation coefficient indicates how much the relationship between two variables.

Product Moment often called Pearson Product Moment. Correlation values (r) ranges from 1 to -1, the value closer to 1 or -1 means the relationship between two variables is getting stronger, whereas values close to 0 means the relationship between two variables is getting weaker. A positive value indicates a relationship in the direction (X rises then Y rises) and a negative value indicates an inverse relationship (X increases, the Y down). If the correlation coefficient is found +1 then the relationship is referred to as a perfect correlation or perfect linear relationship with a slope (slope) is positive. Conversely, if the correlation coefficient is found -1, then the relationship is referred to as a perfect correlation or perfect linear relationship with a slope (slope) is negative. In a perfect correlation is not needed anymore testing hypotheses about the significance between variables are correlated, because the two variables have a perfect linear relationship. This means that the variable X has a very strong relationship with the variable Y. According Sugiyono (2007) guidelines to provide interpretation of the correlation coefficient as follows Tabel 1.

Table 1. Interpretation of Correlation Coefficient

The amount of "r" product Moment	Interpretation
0,00 - 0,199	Lery low
0,20 - 0,399	Low
0,40 - 0,599	Moderate
0,60 - 0,799	Strong
0,80 - 1,000	Very strong

Significance test of correlation coefficient was used to test whether the relationships that occur on two or more variables. For example, from the case over a wide range and production volume of natural nest propolis, Bee bread and honey, so if the relationship or the conclusions drawn can apply to both variables.

1. Determining Hypothesis
   Ho: There is no significant relationship between intelligence with achievements learn
   Ha: There was a significant relationship between intelligence with achievements Learn
2. Determining the level of significance

Tests using two-sided tests with significance level α = 5%. (A test done two sides as to determine whether or not a significant relationship, if one side is used to determine the relationship of smaller or larger).
The level of significance in this case means we take the risk of one in the decision to reject a true hypothesis as much as 5% (5% significance or 0.05 is the standard measure often used in research)

3. Criteria Testing
   Ho accepted if Significance> 0.05
   Ho is rejected if the significance <0.05
4. Comparing significance
   The significance value 0.004 <0.05, then Ho is rejected

RESULTS SND DISCUSSION

Results

The results showed that the volume and production in various media hive propolis varies naturally, are presented in Table 2.

Table 4. Volume and propolis production in various media natural nests.

Media nest	Volume nest (cm^3)	Production propolis (g)
Nako glass frame 1	914,3	81
Nako glass frame 2	424,7	35
Nako glass frame 3	417,6	46
Amount	**1.756,6**	**162**
Average	**585,5**	**54**
Bamboo 1	1.550,5	51
Bamboo 2	3.508,1	150
Bamboo 3	561,3	21
Amount	**5.619,9**	**222**
Average	**1.873**	**74**
Tree trunk 1	20.054,7	110
Tree trunk 2	34.004,3	576
Tree trunk 3	27.251,8	620
Amount	**81.310,8**	**1.306**
Average	**27.103,6**	**435,3**
Cracks door 1	15.840	235
Cracks door 2	9.384	337
Cracks door 3	8.505	124
Amount	**33.729**	**696**
Average	**11.243**	**232**

Source: Research Data, 2

The research data (Table 2.) shows that the number of propolis production increased with the increase in the volume of natural nests of various media. The total volume of natural nests media nako glass frame is 1756.6 cm3 with total production of propolis on average 54 g. The total volume of natural bamboo nest media 5619.9 cm3 with total production of propolis average 74 g. Similarly, the trunk has a total media volume 81310.8 cm3 nest with total production of propolis on average 435.3 g. As for the crack media house has a total volume of 33 729 cm3 nest with total production of propolis

Discussion

Propolis is a resin adhesive material is collected by worker bees from buds, bark or other parts of plants. Propolis include compounds formed from bee saliva *Trigona spp* with the sap of pepohonan.Lebah *Trigona spp* including bees without sting that produces propolis with the quantity and quality are very high when compared with other bees. The total amount of production in various media propolis natural nest with different volume for this study is 2386 g. The nest media volume (total 81310.8 cm3) and the propolis highest production (average 435.3 g) is the natural nest tree trunk media, while the media hive smallest volume (total 1756.6 cm3) and the propolis production fewest (average -rata 54 g) is the natural nests media nako glass frame.

Media major natural nests allegedly had an optimal temperature so that the worker bees Trigona spp strata can perform activities either; guarding the nest of pathogens and natural enemies, caulking damaged nests and take and collect the sap (resin), nectar and pollen of various plants that are around radius fly foraging. In addition, in accordance with the function of propolis in the hive bee Trigona spp namely to protect the nests from different pathogens and predators then the production of propolis most is the media trunk large volume, it is presumably because the bees strata of workers Trigona spp carry, store and use propolis in the natural nest tree trunk media that a large volume more (Figure 1).

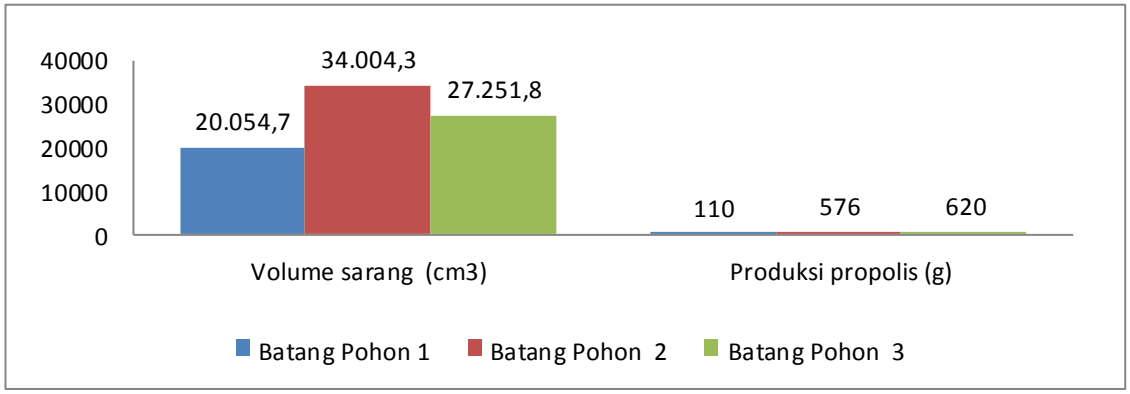

Figure 1. Graph greatest volume and the amount of production in the media hive propolis highest tree trunk

While natural nests media nako glass that has a small volume is thought to have a high temperature so that the activity of the worker bee Trigona spp be low to make, store and use propolis in the hive as protection against pathogens and natural enemies. This is evident from the amount of production of propolis on natural nests media Kaco nako slightly (Figure 2).

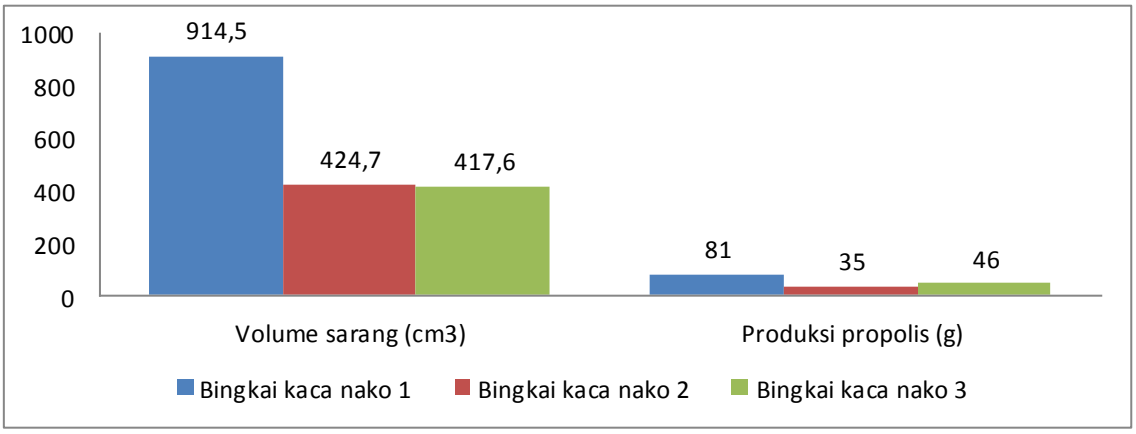

Figure 2. Graph smallest volume and the amount of production in the media hive propolis fewest glass frame Nako

Propolis from bees *Trigona spp* physical characteristics such as density plastic, clay and sticky. How to harvest bee propolis Trigona spp bit more difficult if one with the hive propolis, or bee propolis solid physical pattern. Charasteristic Trigona is plastic, clay and sticky and, if stored at low temperatures propolis bee Trigona spp can survive when compared with bee Apis mellifera. At high temperatures (70oC) propolis changes phase from solid to liquid, (Suputa and Arminudin, 2007). Propolis products from a variety of natural bee hive Trigona spp can Liha in Figure 3.

Figure 3. Propolis products in various media natural nests. A. Propolis in natural nests media nako glass frame, B. Media hive propolis on natural bamboo, C. Propolis in the natural nest tree trunk media, D. Propolis in natural nests media gap door

CONCLUSION

1. The total amount of production of propolis, bee Trigona spp natural nests of various media during the course of a study, namely: 2.460 g, 1.617 g and 4,730 g.
2. The volume of production of propolis biggest and most are in the natural nest tree trunk media.
3. Volume of natural bee hive media Trigona spp affect the amount of production propolis. The results of the bivariate correlation analysis shows that the volume of natural nests have a significant effect on the amount of production in various media propolis natural nests.

REFERENCES

Angraini. 2006. Potential Trigona spp Honey Bee Propolis as Anti-Microbial Materials (thesis). Bogor. Faculty of Mathematics and Natural Sciences, Institut Pertanian Bogor.

Husaeni, E. A. 2012. Potential Production of stands Kaliandra Nectar from Red Flowers (Calliandra calothyrsus Meissn). Proceedings of the workshop Cultivation of Honey Bees for Improved Public Welfare. Perum Perhutani, Jakarta

Lamerkabel. 2007 Honey Bee in Maluku province, types and ways of cultivation. Proceedings BPTP Maluku.

Soekartiko, B. (2009). The development of national and world beekeeping. (Papers). http://trigonasfarmer.blogspot.com. Retrieved on Saturday, February 2, 2013.

Supata and Arimudin A. F. 2007.Beternak Bee. Citra Adi Parama, Yogyakarta Suranto. 2007.Terapi Honey. Sower Self Reliance. Jakarta.


Design By : Hanter Olong