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Testing of Packaging and Use of Attractants to Control Fruit Flies (*Bactrocera dorsalis* **Hendel**) on Guava (*Psidium guajava* **L**.)

Pengujian Pembungkusan dan Penggunaan Atraktan untuk Mengendalikan Lalat Buah (*Bactrocera dorsalis* **Hendel**) Pada **Jambu Biji (***Psidium guajava* **L.)**

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ABSTRACT

The aims of this study to determine: The effect of kinds attractants and time of wrapping on to control of percentage of fruit fly attacks which determined the guava quality. This research was conducted in Durin Jangak Village, Pancur Batu District, Deli Serdang Regency from May to July 2019. This research was conducted using a randomized block design method with three factors: time, wrapping, attractant. The result of this research showed that the treatment by using the white plastic wrapping and attractant traps obtained the highest fruit diameter is 10.23 cm and the lowest treatment with no packaging and without attractant traps is 7.40 cm. In the treatment by using the white plastic wrapping and attractant traps obtained the highest fruit weight is 586 grams and the lowest treatment using without wrapping and attractant traps is 165 grams. At the observation of the highest trapped fruit flies in the treatment without wrapping and attractant traps that were 961 fruit flies and the lowest trapped fruit flies were white plastic wrapping treatments and attractant traps that were 790 fruit flies. In the treatment without wrapping and attractant traps,wrapping gauze and attractant traps obtained the highest percentage of fruit attack, namely 100% and treatment of white plastic wrapping and attractant traps obtained the lowest fruit attack, consist of 33%.

Keywords: *Guava, Wrapping, Attractants, Fruit flies*

ABSTRAK

Penelitian ini bertujuan untuk menguji pengaruh jenis atraktan dan waktu pembungkusanterhadappersentase serangan lalat buah yang menentukan kualitas buah jambu. Penelitian ini dilaksanakan di Desa Durin Jangak Kecamatan Pancur Batu, Kabupaten Deli Serdang dari bulan Mei hingga Juli 2019. Penelitian ini dilakukan dengan menggunakan metode rancangan acak kelompok petak terpisah dengan 3 faktor: waktu, pembungkusan, atraktan. Hasil penelitian ini menunjukan pada perlakuan dengan menggunakan pembungkusan plastik putih dan perangkap atraktan diperoleh diameter buah tertinggi yaitu 10,23 cm dan terendah perlakuan dengan menggunakan tanpa pembungkusan dan tanpa perangkap atraktan yaitu 7,40 cm. Pada perlakuan dengan menggunakan pembungkusan plastik putih dan perangkap atraktan diperoleh bobot buah tertinggi yaitu 586 gram dan terendah perlakuan dengan menggunakan tanpa pembungkusan dan perangkap atraktan yaitu 165 gram. Pada pengamatan lalat buah yang terperangkap tertinggi pada perlakuan tanpa pembungkusan dan perangkap atraktan yaitu 961 ekor dan lalat buah terperangkap terendah perlakuan pembungkusan plastik putih dan perangkap atraktan yaitu 790 ekor. Pada perlakuan tanpa pembungkusan dan perangkap atraktan, pembungkusan kain kasa dan perangkap atraktan diperoleh persentase serangan buah tertinggi yaitu 100% dan perlakuan pembungkusan plastik putih dan perangkap atraktan diperoleh serangan buah terendah yaitu33%.

Katakunci: Jambu biji, Pembungkusan, Atraktan, Lalat Buah

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INTRODUCTION

Guava is a prospective fruit commodity. Currently in Central Java, water guava is prioritized for development because it has economic value, has a wide distribution of climate and high market demand (BPTP Central Java, 2008).

In addition, guava is also classified as a commodity that is traded internationally. The guava plant has spread widely, especially in the tropics. The most widely developed guava plant is a plant that produces red guava fruit because the pulp is sweeter and softer than white guava (Ashari, 2006).

The production of guava in Indonesia every year is experiencing instability. According to data from the Indonesian Central Statistics Agency (BPS), guava production in 2010 was 204,551 tons, an increase in 2011 was 211,836 tons, decreased in 2012 to 208,151 tons, decreased again in 2013, namely 181,632 tons, and in 2014 a little experienced an increase of 187,406 tons, then increased in 2015 namely 195,751 tons and in 2016 namely 206,985 tons. The unstable yield of the guava plant is caused by several factors.

The decline in guava production was caused by several factors, including pest attacks. Pests that attack guava fruit are fruit flies. Fruit flies are a pest that causes huge losses to farmers in Indonesia, especially fruit and vegetable farmers. According to Siwi (2004), in western Indonesia, there are 89 types of fruit flies which are indigenous but only 8 are important pests, one of which is *Bactrocera dorsalis*. Fruit flies (*Bactrocera dorsalis*) can cause the fruit to rot or fall prematurely, resulting in poor quality. This fruit fly pest is also a factor in the decline in guava production in North Sumatra. Fruit fly attacks can be controlled by spraying insecticides, either synthetic (chemical) or natural insecticides. Fruit flies are one of the pests that are very detrimental to the production of fruits and vegetables, both in quantity and quality (Rouse et al., 2005).

Fruit wrapping is done by wrapping one by one with plastic or the like which can wrap the fruit so that female flies cannot pierce or lay their eggs into the fruit. Fruit wrapping is a fairly safe method to do because the fruit will not be attacked by fruit flies, the fruit remains smooth without spots and is not contaminated by chemicals. However, it is quite difficult to do if there are many fruits (Untung, 2006).

The wrapping is intended to prevent female fruit flies from laying their eggs on young fruit until the fruit is old or ripe. The advantage of this method is that it prevents fruit fly attacks, is clean, smooth, without chemical contamination.

The usual wrapping is using carbon paper, black plastic, banana leaves, teak leaves, or cloth for small fruits. Efforts to deal with fruit flies are considered ineffective because they still cause other damage. By making a trap that uses an attractant (attractant) containing methyl euganol compounds. With this, the researchers tested the effectiveness of the packaging time and the type of packaging to control fruit fly pests by using attractant traps on guava plants.

MATERIALS AND METHODS

Time and Place of Research

This research was conducted in guava land, Durin Jangak Village, Pancur Batu District, Deli Serdang Regency, at an altitude of ± 60 meters above sea level. This research was conducted from May to July 2019.

Tools and Materials

The materials used for this research were guava (Psidium guajava L.), white plastic, black plastic, gauze in the form of 65% paranet, brown envelope, methyl eugenol, 70% alcohol.

The tools used for this research were scissors, analytical scales, rulers, plastic ropes, calipers, markers, cutters, 600 ml plastic bottles, french, nails, plant cables.

Research methods

The research method used was a randomized block design (RBD) with separate plots. The groups were defined based on different trees and the groupings served as replications.

Factor 1: Time of packing as many as 3 treatments, namely:

- W1: 28 days after flowering (HSB)
- W2: 42 days after flowering (HSB)
- W3: 56 days after flowering (HSB)

Factor 2: There were 5 types of packaging, namely:

- P0: Without packaging

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- P1: Gauze
- P2: Brown Envelope
- P3: White Plastic
- P4: Black Plastic

Factor 3: Attractant Treatment

- A0: Without the use of an attractant
- A1: Using an attractant

The number of treatment combinations, namely:

W1P0A0	W1P1A0	W1P2A0	W1P3A0	W1P4A0
W1P0A0	W1P1A1	W1P2A1	W1P3A1	W1P4A1
W2P0A0	W2P1A0	W2P2A0	W2P3A0	W2P4A0
W2P0A1	W2P1A1	W2P2A1	W2P3A1	W2P4A1
W3P0A0	W3P1A0	W3P2A0	W3P3A0	W3P4A0
W3P0A1	W3P1A1	W3P2A1	W3P3A1	W3P4A1

The number of repetitions of 3 obtained from30 sampled.

(r-1) $\geq$29
30 (r-1) $\geq$29
30r - 30 $\geq$29
30r > 30 + 29
30r > 59
r > 1.96
= 3

Number of treatment levels: 30
Number of repetitions: 3
Number of experimental units: 90
The experimental design model used in this experiment was Yijk
= μ + γ k + αi + βj + (αβ) ij + Eijk

Where :

Yijk : Observation value on the k-k packing time and i-th packaging type treatment, j-th attractant treatment
μ : Common mean
γ k : Effect of k-th wrapping time
ai : Effect of the i-th packaging type
βj : Effect of treatment of the jth attractant
(αβ) ij : The effect of the interaction of the two factors
Eijk : Test error

Research Implementation

a. Land preparation

The guava plants in the field consisted of 100 plants with a plant distance of 5 meters x 5 meters, the distance of the plant samples using an attractant and not using an attractant was 50 meters, 15 plants to be used in this study were using attractants and 15 plants using no attractants, the whole plant used in the study of 30 plants.

b. Preparation of Planting Materials

In the preparation of this study, the part of the guava fruit was observed. The guava plant is used as research material for Sari varieties that have been planted in 2014 at a distance of 5 x 5 meters. Each plant had 3 samples used. The total number of fruit samples observed was 90.

c. Treatment Preparation

Treatments Without Wrapping and No Attractant Traps (P0A0), Gauze and No Attractant Traps (P1A0), Brown Envelopes and No Attractant Traps (P2A0), White Plastic and No Attractant Traps (P3A0), Black Plastic and No Attractant Traps (P4A0) , Without Wrapping and Trap Attractants (P0A1), Gauze and Attractant Traps (P1A1), Brown Envelopes and Attractant Traps (P2A1), White Plastic and Attractant Traps (P3A1), Black Plastic and Attractant Traps (P4A1). Tying the top of the wrapper and making a circulation hole, a 60 ml plastic bottle as a place for fruit fly traps, 6 holes of 5 inch holes per bottle, 0.25 ml of metyl eugenol cotton in each bottle, the trap hanging from a branch plant 1 meter high above the ground.

d. Maintenance

During the research, maintenance is still carried out such as land sanitation by cleaning the area around the plant.

Observation Parameters

a. Guava fruit morphology

Observation of fruit morphology after harvest was carried out by directly observing the fruit. By observing the physicality of the fruit, whether it is damaged, such as changes in fruit texture, black spots or inner rot, changes in color in the fruit, the fruit does not develop or harden due to fruit fly attack and the type of packaging.

b. Fruit Diameter (cm)

Observation of the fruit circle at the time of harvest using a caliper which is measured right

in the middle of the fruit (if the fruit is round) and if the shape of the fruit is not round then it is measured by measuring the transverse and longitudinal diameter of several parts of the side of the fruit to obtain the average value from the results of these measurements.

c. Fruit Weight (gram)

Observation of fruit weight at harvest was carried out by weighing the weight of each fruit sample (gram / sample) from each treatment and repeating using analytical scales.

d. Fruit Color

Observation of fruit color after harvesting was carried out by directly observing the fruit color of each treatment and replicating it in the field.

e. Fruit Quality

Observation of the quality of the fruit after harvest is carried out by directly observing the quality of the fruit that has been harvested (weight, diameter, color).

f. Number of Fruit Flies Entering Traps (Tails)

Observation of the number of fruit flies is carried out by counting the number of fruit flies that enter the traps that have been installed on the guava tree. The observation interval was carried out 7 days after carrying out the treatment.

g. Attack Percentage

The percentage (%) of pest attacks on guava is calculated as the percentage of the total plant observed. The percentage of pest attacks is calculated using the formula from (Handoko et al., 2012).

$$P = \frac{n}{N} X\ 100\ \%$$

P = Percentage of guava attack (%)
n = Number of fruit attacked
N = Number of fruits observed

RESULTS AND DISCUSSION

Guava Fruit Morphology

Shows the morphological characteristics of guava detected after receiving treatment with variations in the texture, color and shape of the fruit after harvest, namely with 5 wrapping treatments and 2 attractants, without wrapping and without attractant traps, gauze and without attractant traps, envelopes brown and without attractant traps, white plastic and no attractant traps, black plastic and no attractant traps, no attractant wraps and traps, gauze and attractant traps, brown envelopes and attractant traps, white plastic and attractant traps, black plastic and attractant traps .

From the results obtained, it shows that the best guava fruit is found in white plastic wrapping treatment where the color of the fruit becomes whitish green, the shape of the fruit is round and has an average diameter and weight greater than the others. According to Nasir et al (1991) wrapping can increase production yields and in terms of fruit shape looks attractive.

From the results in the field, the worst guava fruit was found in the treatment without being wrapped and without an attractant trap where the guava fruit had a soft texture change, the color of the fruit turned brown due to fruit fly pests. This is because there is no protection for the guava fruit so that the flies can stick their eggs into the fruit.

Effect of Type and Time of Packaging

According to Sari (2009), the treatment of 1 fruit per crop yields better quality than 2 fruit per crop. Increasing the diameter will result in a higher fruit weight, so that the fruit flesh will be thicker. According to Affandi (2004), the higher weight per fruit and fruit length have thicker pulp.

Fruit Diameter

Time 28 Day After Planting (DAP)

In observing the diameter of the guava fruit, It was found that the highest average observation of guava fruit diameter was found in the P3A1 treatment (white plastic and attractant traps) which was 10.10 cm and the lowest average was in the P0A0 treatment (without wrapping and attractant traps) was 7.27 cm as seen in the table 1.

Time 42 HSB

In observing the diameter of guava fruit, it was found that the highest average observation

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of guava fruit diameter was found in the P3A1 treatment (white plastic and attractant traps), which was 10.07 cm and the lowest was in the P0A0 treatment (without wrapping and without attractant traps), namely 7, 17cm as shown in table 1.

Time 56 HSB

In observing the diameter of guava fruit, it was found that the highest average observation of guava fruit diameter was in the P3A1 treatment (white plastic and attractant traps), which was 10.23 cm and the lowest was in the P0A0 treatment (without wrapping and without attractant traps) as 7, 40 cm as shown in Table 1.

Table 1. Diameter of Guava

Treatment	Fruit Diameter (cm)		
	W1	W2	W3
P0A0 (No Packaging and No Trap Attractant)	7.27	7.17	7.40
P1A0 (Gauze and No Trap Attractant)	8.23	7.40	8,03
P2A0 (Brown Envelope and No Attractant Trap)	9.63	9,17	9.07
P3A0 ((White Plastic and No Trap Attractant)	9.37	8.93	9.23
P4A0 (Black Plastic and No Attractant Trap)	9,17	8.67	8.33
P0A1 (No Wrapping and Trap Attractant)	7,70	7,20	7.67
P1A1 (Gauze and Attractant Trap)	9.03	9.47	7.87
P2A1 (Brown Envelope and Attractant Trap)	10.03	8.80	9.30
P3A1 (White Plastic and Attractant Trap)	10.10	10.07	10.23
P3A1 (Black Plastic and Attractant Trap)	8.87	9.67	9.93

W1 = 28 DAP, W2 = 42 DAP, W3 = 56 DAP

Growth is the change in guava, both the weight of the fruit size and the weight of the fruit within a certain time. Treatment of guava fruit diameter seeds for 56 days indicate that the guava fruit has grown, this can be seen from the change (increase) in fruit diameter.

Weight of Fruit Jambu Seed

Time 28 DAP

In observing the weight of guava fruit, it was found that the highest average weight of guava fruit was observed in the P3A1 treatment (white plastic and attractant traps), which was 581 grams and the lowest was in the P0A0 treatment (without wrapping and without attractant traps), which was 197 grams as shown in Table 2.

Time 42 DAP

In observing the weigh of guava fruit, it was found that the highest observation average weight of guava fruit was found in the P3A1 treatment (white plastic and attractant trap), namely 559 grams and The lowest average was found in the P0A1 treatment (without being wrapped and trapping the attractant), which was 156 grams as shown in Table 2.

Time 56 DAP

In observing the weight of guava fruit, it was found that the highest average weight of guava fruit was found in the P3A1 treatment (white plastic and attractant traps), which was 586 grams and the lowest was in the P0A1 treatment (without being wrapped and trap attractant), which was 165 grams as seen. in Table 2 below.

Table 2. Weight of Guava Fruit. Information: W1 = 28 DAP, W2 = 42 DAP, W3 = 56 DAP

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Treatment	Fruit weight (gram)		
	W1	W2	W3
P0A0 (No Packaging and No Trap Attractant)	197	163	199
P1A0 (Gauze and No Trap Attractant)	257	194	223
P2A0 (Brown Envelope and No Attractant Trap)	488	420	419
P3A0 ((White Plastic and No Trap Attractant)	378	426	388
P4A0 (Black Plastic and No Attractant Trap)	361	369	339
P0A1 (No Wrapping and Trap Attractant)	264	156	165
P1A1 (Gauze and Attractant Trap)	344	472	254
P2A1 (Brown Envelope and Attractant Trap)	576	383	412
P3A1 (White Plastic and Attractant Trap)	581	559	586
P3A1 (Black Plastic and Attractant Trap)	413	461	497

Based on observations, it shows that the treatment of white plastic and attractant traps is the highest average weight of guava fruit, this is because the composition of white plastic and attractant traps greatly affects the weight growth of guava, so that the light and air humidity needs of guava are met and experience rapid growth. significant. According to Damayanti (2000), the effect of the type of wrapping (gauze, brown envelope, black plastic and white plastic) on the weight of guava fruit showed significantly different results for those without wrapping and without attractant traps. The brown and white plastic envelope wrapping can increase the weight of guava fruit by 24.4% and 19.6%. This is supported by the data I got in the field that the P3A1 type of wrapping (white plastic and attractant trap) has the highest average weight of 586 grams compared to other types of wrapping and it can also be seen that the P0A0 treatment type (without wrapping and without attractant trap) has a fruit weight the lowest.

Fruit Color

The packaging treatment resulted in differences in temperature and relative humidity in the packaging. There are indications that the wrapping increases the temperature and decreases humidity. Wrapping using plastic increases a higher temperature and relative humiditylower than paper wrapping. Different colors and packaging materials affect the absorption of light transmission transmitted into the fruit. Differences in the color of the packaging produce different quality of light and wavelengths that affect fruit growth and development (Zhang et al., 2015). Fruit wrapping affects the brightness of the fruit color. All the wrapping treatments resulted in better fruit skin brightness values than fruit without wrapping. Moon et al., (2015) also reported that the brightness of 'Shiranuhi' mandarin orange peel increased with the presence of fruit wrapping. In guava during fruit ripening, the chlorophyll content of the fruit decreases and the fruit carotenoids increase which results in a change in fruit color from green to yellow (Jain et al., 2003).

The low fruit brightness (L) and chroma values in the non-wrapping treatment described the appearance of guava which was darker and dull in color. The above is in accordance with what the researchers got in the field, where the packaging with white plastic and attractant traps (P3A1) got a better fruit color, namely whitish green compared to other types of packaging, and it can also be seen from the data obtained that guava without wrapping and without attractant traps (P0A0) have a fruit color that is much darker and duller than others where on average fruit without packaging has a dark green and brown green color. It is well known that black objects, such as plastic, appear black because they absorb all wavelengths in white light and do not reflect them.Each treatment, inthis matterwhite plastic provides a dominating color compared to other treatments, namely

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whitish green which can be stated as the best color compared to other treatments.

Fruit Quality

External quality is no less important than the internal quality of the fruit, namely by paying attention to the outer appearance of the fruit such as uniform size, attractive color and no physical damage. If there is damage to the skin of the fruit, it will reduce consumer assessment of the fruit (Broto, 2009).

The factors that influence the quality are genetic factors, pre-harvest environment, post-harvest treatment and the interactions between the various factors above. In general, consumers or people in the market want guava that has a large size, few seeds, a good aroma, and a balanced sweet and sour taste.

The treatment by wrapping using white plastic and attractant traps was able to improve the quality of the fruit the best compared to other treatments. This is also evidenced by the diameter and weight valuesof the fruit which are higher.

Number of fruit flies that enter the trap

The use of methyl eugenol provides an attraction for fruit flies to approach the trap so that the number and types of fruit flies trapped are quite high and varied. The different types of treatment in the success of trapping fruit flies were not much different from one treatment to another. Damage to guava fruit due to fruit fly attacks can reach 100%.

The control of guava fruit flies that is commonly done by farmers is by wrapping the fruit. The method of controlling fruit flies that is considered effective and efficient is by using attractants (sedatives) containing methyl eugenol compounds (Wong et al., 1985). Methyl eugenol as an attractant is only able to attract male B. dorsalis fruit flies (Trisawa and Wikardi, 1997a). To see the difference in the number of fruit flies trapped in each treatment can be seen in Table 3 below.

Table 3. The number of fruit flies trapped

Treatment	Days to…										Average
	35	42	49	56	63	70	77	84	91	98	
P0A1	1111	724	874	940	1232	791	947	902	954	1138	961.3
P1A1	880	495	611	1078	936	950	795	825	896	927	839.3
P2A1	1045	797	790	1257	1104	732	784	984	954	896	934.3
P3A1	924	778	832	817	845	587	697	741	756	926	790.3
P4A1	1507	669	855	799	845	771	737	696	876	912	866.7

P0A0 - P4A0 = No attractants; P0A1 - P4A1 = With attractants

Based on the data above, at the 35th to 98th day of observation, it shows that the highest number of fruit flies caught was in the 35th observation with the number of flies caught 1507 in the P4A1 treatment (black plastic and drag traps) while the lowest fruit flies were found. On the 42nd observation DAP, the number of fruit flies caught was 495 in P2A1 treatment (gauze and attractant traps). The results of the observation of the highest average trapped fruit flies were found in the P2A1 treatment (without wrapping and without attractant traps) with an average number of 961.3 tails, while the lowest average trapped fruit flies were found in the P3A1 treatment (white plastic and attractant traps) with an average number of 790.3 individuals.

Percentage of Fruit Fly Attacks

Host availability is thought to affect the incidence rate and attack percentage because not all trees experience a 100% ripening phase. Senoaji and Praptana (2013), Increased susceptibility of plants to pathogens occurs when N levels are high.

Fruit wrapping is one of the most effective controls on the percentage of fruit fly attack, there is a relationship between wrapping and fruit fly attack rates as seen in Table 4. In addition, the attack rate of fruit flies is smaller on wrapped fruit compared to

unpackaged fruit. The results of the percentage of fruit fly attacks from the first week to the last week of observation are shown in Table 4 below.

Table 4. Percentage of fruit fly attack

Treatment	Percentage (%)
P0A0 (No Packaging and No Trap Attractant)	100%
P1A0 (Gauze and No Trap Attractant)	100%
P2A0 (Brown Envelope and No Attractant Trap)	88%
P3A0 ((White Plastic and No Trap Attractant)	88%
P4A0 (Black Plastic and No Attractant Trap)	88%
P0A1 (No Wrapping and Trap Attractant)	77%
P1A1 (Gauze and Attractant Trap)	77%
P2A1 (Brown Envelope and Attractant Trap)	44%
P3A1 (White Plastic and Attractant Trap)	33%
P3A1 (Black Plastic and Attractant Trap)	66%

Table 4 above shows that from the first week to the last week of observation, all treatments were attacked by fruit flies with the percentage of attacks that still varied. According to the data above the attack The lowest fruit fly was in the P3A1 treatment (white plastic and attractant traps) with only 33% attack percentage and the highest was in treatment P0A0 and P1A0 with attack percentage of 100%. It can also be seen that the type of packaging without attractant traps has a higher mean percentage of fruit fly attack than types of packaging with the addition of an attractant. Thus there is an effect of the type of treatment and attractant traps on the percentage of fruit fly attacks. The percentage of fruit fly attacks has a value that is not much different in each treatment. All the wrapping treatments without the addition of attractant traps had attack percentage values that were not much different from one another. In the type of wrapping treatment with the addition of attractant traps there is a difference in the percentage value of fruit fly attacks in each treatment, but not significant.

CONCLUSION

There is an effect of the type of wrapping treatment and time on fruit quality (diameter, weight and color) where P0A0 treatment (without wrapping and without attractant trap) has the lowest fruit quality and P3A1 treatment (white plastic and attractant trap) has the best fruit quality compared to other types. other treatment.

There was no significant effect between the type of packing and attractant on the number of fruit flies trapped. Most of the treatments resulted in the number of flies that were not significantly different. The treatments that produced the highest average number of trapped fruit flies were in the P0A1 treatment (without packing and attractant traps) and the P3A1 treatment (white plastic and attractant traps) produced the lowest average number of fruit flies. There is an effect of the type of wrapping with the percentage level of fruit fly attack, the type of treatment without the addition of an attractant trap has a higher percentage of attack than the type of treatment added with an attractant trap. The lowest attack percentage value was found in the P3A1 treatment (white plastic and attractant traps).

REFERENCES

Affandi, I. 2004. Evaluation of Horticultural Characteristics of Six Melon (Cucumis melo L.) Hybrids (Ser II) Results of Crosses from the Center for Fruit Studies Tropical Fruits (PKBT) IPB. Essay.

Azmal AZ, and Fitriani. 2006. Surveillance on the Distribution of Fruit Fly Species in Belitung and East Belitung Districts, Tanjung Pandan Plant Quarantine Station, Available athttp://www.ditlin.hortikultura.go.id/lalat-nuah/lalat_buah.htm-123k, Accessed on Oct, 18. 2020

Broto W. 2009. Postharvest fruit handling technology for the market. Bogor

(ID): Center for Agricultural Postharvest Research and Development.

Central Java Agricultural Technology Research Center [BPTP]. 2008. Prima Tani in Banjarnegara Regency.http: //www.litbang.deptan.go.id.htm [Accessed July 14, 2011].

Central Bureau of Statistics. (2017, June 06) [BPS]. Central Bureau of Statistics Dynamic Table. Taken back from the Central Bureau of Statistics:https://www.bps.go.id/site/resultTab

Damayanti, M. 2000. The Effect of Type of Packaging and Wrapping Time on Quality of Water Guava Fruit. Department of Agricultural Cultivation. Faculty of Agriculture. Bogor Agricultural Institute. Bogor.

Department of Agricultural Cultivation. Faculty of Agriculture, Bogor Agricultural University.7 December 2011.

Ministry of Agriculture, 2005. Fruit Fly (Bactrocera dorsalis). Dalam: http:// ditlin.hortikultura.go.id/opt/jeruk/lalatbuah/lalat.htm, Retrieved June 6, 2014.

Ministry of Agriculture, 2007. Report on the Implementation of Working Group Coordination (POKJA) on Fruit Fly Pest Management, Bali.

Ditlintan. 2008. Guidelines for Food Crop Protection Observation and Reporting. Director of Plant Protection. Directorate General of Food Crops. Jakarta.

Habazar, T. and Yaherwandi. 2006. Biological Control of Plant Pests and Diseases. Andalas University Press. Padang.

Indriyanti DR. 2011. Exploration and potential of processed waste compounds as attractants for fruit flies Bactrocera carambolae (Diptera: Tephritidae). Dissertation report. UGM Yogyakarta.

Jain, N., K. Dhawan, S. Maholtra, R. Singh. 2003. Biochemistry of fruit ripening of guava (Psidium guajava L.): compositional and enzymatic changes. Plant Foods for Human Nutr. 58: 309-315.

Kardinan A. 2003. Fruit Fly Control Plants. Jakarta: Agro Media Pustaka.

Kardinan, Agus. 2008. Prospects of Aromatic Plants in Overcoming Mosquito and Flies Problems. Journal of Industrial Crops Research and Development, Volume 14 Number 1, Pages 25-23.

Misan. 2011. The effect of the type of packaging and the time of packaging on the quality of water guava fruit (Syzgium samarangense). Essay. Undergraduate Program, Bogor Agricultural University.

Nasir, N. Jumjunidang and Harlion. 1991. The effect of wrapping on the appearance of banana peels of Buai / Ambon, Barangan and Raja lemongrass varieties. Journal of horticulture. 4 (3): 42- 48.

Moon, DG, SW Ko, SG Han, CH Kim, CK Lim, JH Joa. 2015. Effect of bagging on 'Shiranuhi' mandarin fruit quality during growth and storage. Intl. J. Eng. and Appl. Sci. 2 (7): 2394-3661.

Rouse, P., PF. Duyck, S. Quilici and P. Ryckewaert. 2005. Adjustment of Field Cage Methodology for Testing Food Attractions for Friut Flies (Diptera: Tephritidae). Ann. Entomol. Soc. Am. 98 (3): 402-408.

Ryugo, K 1988. Fruit Culture It's Science and Art. John Wilwy and Sons Inc. USA.

Sari, AYN 2009. Effect of Number of Fruits and Toping (Toping) on Fruit Quality in Cultivating Melon (Cucumis melo L.) Using Hydroponic System. IPB.http: // repository.ipb.ac.id /bitstream / handle / 123456789/11454 / A09ayn.pdf? sequence = 2 downloaded 22 March 2015.

Siwi. 2014. Important types of fruit flies in Indonesia and their host plants. Center for Research and Development of Agricultural Biotechnology and Genetic Resources. Bogor

Trisawa, IM and EA Wikardi. 1997a. Response of Fruit Flies (Bactrocera dorsalis Hendel.) To Melaleuca bracteata Oil. Proceedings of the National Seminar on Entomology Challenges in the XXI Century, Bogor branch of PEI: 255-267

Wong, TTY, DO Mc Innis and N. Mochizuki. 1985. Seasonal Distribution and Abundance of Adult Male Oriental Fruit Flies (Diptera: Tephritidae) in Kula, Maui Hawaii. J. Econ. Entomol 78: 1267 - 1271.

Zhang, B., RJ Ma, ZX Cia, CH Zhang. ZM Yan. 2015. Effect of preharvestmicro environment inside bags on peach fruit quality. Plant Physiol.12: 38-42