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STUDY ON POPULATION OF FROM *D. MELANOGASTER* KATUL MEDIA FERMENTED *SACHAROMYCES CEREVISAE* AS SWIFLET WOOF

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ABSTRACT

An identification of *D.melanogaster* population has been developed through artifical medium of fermented whole grain waste product by *Sacharomyces cereviceae*; which it's application and simpel technology is highly economic valuable for swift feed to enhance its quality and quantity. Fermented whole grain waste product has not been used as insect feed. In order to unravel the decreasing of fruits production during dry season which implicated the decreasing of *D.melanogaster* population that use as swift feed . This research aim to identify *D.melanogaster* population from banana, compare to artifical medium. Followed by chemical analysis of protein, carbohydrate, fat, mineral, and calorie value; determine the feed availability with swift nest population as well as determine the nutrition chemical compound in swift nest; mass, thickness, protein, carbohydrate, fat and mineral. The fact that fermented whole grain waste product can growth the *D.melanogaster* which is used for swift feed, swift farmers can develop *D.melanogaster* to increase quality and quantity of swift nest. Based on analysis of variance, natural medium from banana on population of *D.melanogaster* growth. For artificial feed, fermented whole grain waste product, the E treatment of *D.melanogaster* with banana fruit show the best result;

Keywords : *D.melanogaster,* swiftlet nest.

A. INTRODUCTION

The development of agriculture is not free from problems breathing pest and disease control , this damage occurs either on the ground , a warehouse , a lot of fruits and vegetables sold in traditional markets and supermarkets look clean and not deformed , but not the least the buyer fruit complain with poor quality fruit they buy . This fact is very influential in vegetable and fruit traders , because fruits and vegetables tersebuat rapid deterioration and rotting (Novizan , 2002) . One cause damage to fruit crops is the Fruit Fly Drosophila sp which is damaging the flesh of the fruit flies that memyebabkan ripe fruit becomes rotten and falling . Fruit flies can be the same size larger or smaller than house flies , fruit flies is composed of a variety of species , but how to handle it , and produce nearly the same destruction. Efforts to reduce and prevent fruit flies done by keeping the orchard , fruit falling in a vat containing input petisida , buried as deep as 75 cm and the soil surrounding the dismantled in order pupae hidden in the ground out , with oil -containing compound citranela isogenol metly eugenol and amyl alcohol which can bind the male fruit flies . One of the fly Drosophila melanogaster is Drosophilidae familia , these flies are small , at high populations can threaten human health , because of his interest in fruits and vegetables , especially materials that undergo fermentation (Matthews and Matthews , 1978) . Imago of flies , measuring length , 2.5 mm - 4.0 mm (Charles and Noerman , 2005) is usually brownish yellow and brownish black . Melatakan eggs a female

can average 50-70 points per day eating an appropriate medium for the larvae is overly ripe fruit and vegetables that have been and will rot or material that is undergoing fermentation . In the dry season production of fruits and vegetables decreases the impact on the population of D. melanogaster fruit flies , fly D. melanogaster is one of the birds' feed (predator) populations of D. melanogaster in order to maintain the waste dry season rice bran (bran) The fermetasi for the development of breeding populations of D. melanogaster . The presence of predators in the world of agriculture is a free-living organism consuming , killing and devouring other organisms directly to the beneficial insects are not enough predators who can be identified from birds to microorganisms that can be separated on the farm . Based on the above meal authors chose to mengiidentifikasi , populations of D. melanogaster and then developed through the artificial medium of rice bran (bran) fermented Sacharomyces cerevoceae , where applications and simple technology for the high economic value of feed bird that can improve the quality as well as the bird's nest swallow . This study aims to determine the populations of D. melanogaster medium banana shoes , which is compared with the artificial media . Followed by chemical analysis of D. melanogaster , protein , carbohydrates , fats , minerals and caloric value and determine the availability of feed to the birds' populations and determine the chemical compounds in the bird's nest covering nutrition , weight , thickness , proteins , carbohydrates , fats , minerals.

B. METHODS

This research was conducted in the District Kamangta Tombulu Minahasa for 12 months . In locations with a height of 550 meters above sea level (asl) with an average temperature range of 26oC-30oC . Materials and Equipment Materials used in this study were rice bran / bran , bananas , shoes , yeast (Sacharomyces cereviceae) , and honey . While the tool used was the fermentor , pH meter , hand reflaktometer , petridish , microscope , auto Clav , mikrokeldhal micro , soklet , bomb calorimeter , AAS , and tools that support the analysis beaker D. melanogaster. The design of experiments The study was designed as a complete randomized trials with repeated three times for media banana shoes , as well as five treatments and three times re -made for the media . The parameters measured by pH , percent sucrose , determining population size medium banana shoes , the media and media metamorphosis in artificial insects are eaten by the percentage of birds' , the chemical analysis of D. melanogaster , (proteins , fats , carbohydrates , minerals , and calorific value) body weight and feed the birds , the thickness and weight of the nest and the nest of proteins , carbohydrates , fats , minerals from bird nest feed treated D. melanogaster. Working procedure

Before developing D. melanogaster , do pembedakan on swiftlet analyze the number of insects in the gizzard . Further develop D. melanogaster in cultured banana shoes , determine the pH and percent sucrose as a medium life cycle of egg , larva , pupa and imago . Moving the D. melanogaster of media banana shoes , artificial media to A , B , C , D , E , after the adult insects analyzed proteins , carbohydrates , fats , minerals , and the caloric value and determine the best medium of artificial media A , B , C , D , E to D. melanogaster insect breeding . Doing hatching birds ' and weighing the birds' weight and feed children who were given the adult insect D. melanogaster from the first day until able to fly for 45 days . Measuring the thickness of the nest , nest weight and analyzes of bird nest (proteins , fats , carbohydrates , minerals) as well as the time required for nest building of birds treated and non- treated .

observation. Made observations on the life cycle of each treatment by calculating the population of D. melanogaster cultured banana shoes , (generation 1 s / d 3rd generation) , long metamorphosis and do the same thing on artificial media . The next rare daily feeding , weighing and amount of feed consumed , accounted for 45 days . Nesting observation for 65 days in the last swallows building harvested weighed , measured the thickness and weight of chemically analyzed nest swiftlet nests treated and non- treated .

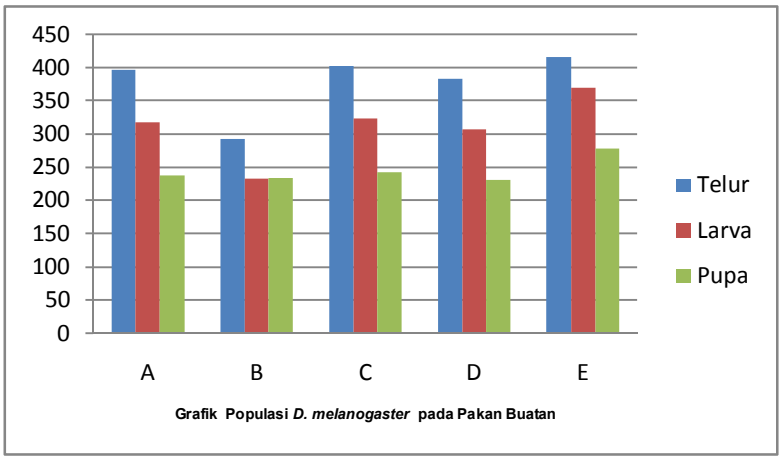
C. RESULT AND DISCUSSION

A. Chemical Analysis Media Alamia Before dimasukakan in fermentator
1). The level of acidity (pH) Natural Foods
Based on the observation level of acidity (pH) of natural food banana shoes , before inclusion in fermentator is 6 . Development of D. melanogaster population started after fertilasi consisting of two periods of the eggs in the embryonic period when fertilasi until such time as the young larvae hatch from eggs more or less within 24 hours , at this time the larvae eat incessantly.
The second period is after the eggs hatch called postembrionik development consisting of stage larva, pupa , and imago .

Table 1 . Development of D. melanogaster populations of banana shoes on artificial food .

D. Population Growth and Long Life of D. melanogaster on Artificial Food .

1) . banana Shoes



Grafik Populasi *D. melanogaster* pada Pakan Buatan

Eggs
Based on the analysis of variance , artificial food very significant effect on the E (416 grains) , A (396 points) , C (402 grains) , D (382 grains) , of the (292 grains) , high egg populations . The invention relates to an insect host by substrate color and odor of volatile oil (Chapman , 1971) . The eggs produced by female insects to a couple of times (during the egg stage) have not much effect on the population because the egg is not moving , not eating , and do not proliferate . The eggs of D. melanogaster . Elliptical -shaped objects are small and are usually placed on the surface of the food . Adult females begin to lay eggs on the second day after becoming adult flies and increased in the week to females laying 50-75 eggs per day . Within 10 days maximum of approximately 400-500 pieces of eggs .
eggs ; D. melanogaster vetillin coated by a thin membrane that surrounds the cytoplasm on the outside and thin silvia dianteriornya two tanks . According to (Borror , 1992) , was a very strong thin membrane called the chorion and coated the outside of the egg chorion . flyblow
Based on the analysis of variance , the food was highly significant , medium A (317 head) , B (233.6 tail) , C (322 head) , D (306 animals) , E (369.3 tail) . Types of food , water content ,

and cross-sectional area . Food grain size effect on the development of a type of searangga .
Larvae ; D. melanogaster white , shaped like a segmented worm with a mouth and brownish black , has a pair of spiracles are located on the anterior and posterior ends . D. melanogaster experienced a skin substitute (instars) and lasts for three times where the first instar (I) larvae after hatching , the second instar (II) the appearance of the teeth in the mouth to eat black preparation for the third instar (III) the preparation to form pupae and moving kepinggir - edge fermentator the place dry and then stopped moving Pupa. Based on the analysis of variance , artificial food very significant effect on pupal populations . Media A (237 head) , B (233.6 tail) , C (241.6 tail) , D (229.8 tail) , E (277.3 tail) .
Pupa ; D. melanogaster occurs when larvae instar (III) brown body that contract (shorten) the cuticle be hard and pigmented called fourth instar (IV) is characterized by the Establishment wing head and foot pads . In the pupal stage larvae in a passive state (inactive) . In this time the larvae towards / into adult flies Imago. Based on the analysis of variance , significant artificial food . Reproduction insect nutritional decline due to low population and development is also influenced by the type and amount of food . Media A (166 head) , B (175.33 tail) , C (164.33 tail) , D (166.33 tail) , E (195.33 tail) .
Imago or adult flies aged about 10 days after discharge from the pupa , the wing can not be grown and still a bit pale and after approximately 10 days 9 hours fly females to mate . E. The protein in insects D. melanogaster. In insects as well as other animals one of the major biochemical activity at the cellular level is the synthesis of proteins , where the characteristic features of insects holo metabola is a change in the form of larvae into the imago (adult) at the time of metamorphosis . Fat bodies of insects is a major organ of metabolic processes a wide variety of biochemical substances and their role is crucial , especially in stadia pradewasa . Insects holometabola , during the development of insect larvae fat body responsible for the synthesis of various proteins in insect hemolimfanya synthesized in the fat body of an average protein synthesis at high body fat at the start of the growth of larvae and then decreases . Protein hemolimfa stored as vesibel to transport lipids (fats) , carbohydrates , and hormones . Synthesis and release of specific protein hemolimfa by fat body from larvae that were growing and the disposal and storage of these proteins in the same tissue for further development is controlled by hormones .
For that we should not be surprised when the insect protein in insects D. melanogaster showed high numbers , the protein results in laboratory analysis around 55.19 % . In addition to high-protein insects are relatively low fat content and a clean source of food by eating plants / fruits fresh . Chemical analyst Table D. melanogaster No. Parameter Analysis Method of Analysis Results

1 Protein 55.19 % Makrojeldahl
2 6.75 % Fat Extraction
3 1.80 % Carbohydrates Hydrolysis
4 Sodium (Na) 3.55 ppm AAS
5 Potassium (K) 50.34 ppm AAS
6 Calories 288.71 cal / g calculation
Insect D. melanogaster high protein (55.19 %) as the birds' feed

F. Presentation Given Insects In Bird Treatment and Non- Treatment .
Table . Percentage Insects On The Swallow gizzard Kamangta What Not Provided treatment .

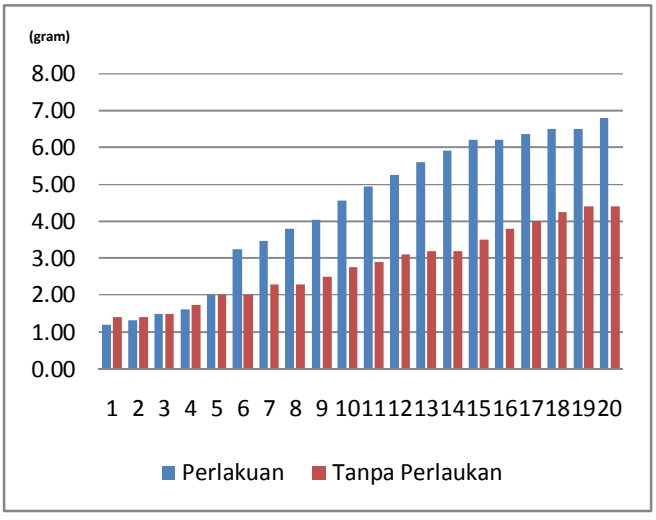
Ordo	**Famili**	**Presentase (%)**
Diptera	Drosophilidae Phoridae	45
Cleoptera	Tenebrionidae	20
Homoptera	Aleyrodidae	10
Isoptera	Kaloptermitidae	10
Lain-lain	-	15*

Table. Percentage Insects On The Swallow gizzard Kamangta treated.

Ordo	**Famili**	**Presentase (%)**
Diptera	Phoridae Psychodidae Drosophilidae	75
Coleoptera	Tenebrionidae Silvamidae	20
Lain-lain	-	5*

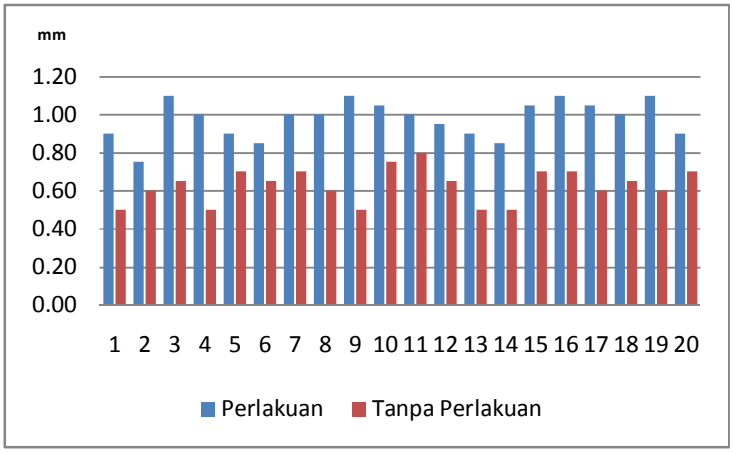
Note *: other; insect was identified as damaged. Swiftlet treated, take the order diptera and coleoptera. Non-free treatment to fly and prey on the order of the Homoptera, Isoptera, diptera, coleoptera and other insects are not detected proving that the location of the bird cage and the ecosystem environment favorable to the development of swiftlet (predators). Observation of the relationship between the number of birds feeding and body weight in birds treated with variable amounts of feed (X) and weight ($\hat{Y}$) r = 0.9 with the regression y = 1.43 x + 1.67 where price x 0.02 , thit = 26, 16> t 0.99 (43) = 1.17 this means that there is a highly significant positive correlation between the amount of feed and weight.

Weight Charts Swallow Treatment and Without Treatment



Based on observations of the thickness of a bird's nest , nest weight with treatment and without treatment with the null hypothesis as follows :

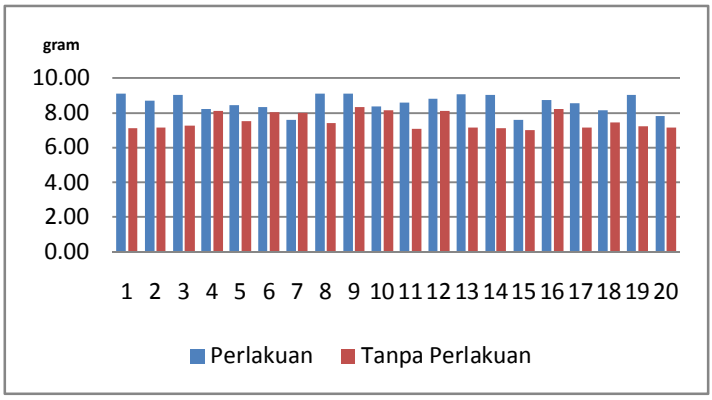
Reject , if thit > ttab
To test this hypothesis , compared to the average thickness of a given bird nest treatment ( ) with a bird's nest without treatment ( ) during the experiment .
= 0.98 with S1 = 0.0968
= 0.62 with S2 = 0.0887
S2 0.00862
thit 12.26
For α = 0:01 , thit = 12:26 > t0 , 99 (38) = 2.42 . This means that the average thickness of the bird's nest in the treatment of very , markedly higher than the thickness of the bird's nest naturally (without treatment) .
The thickness and weight of the bird's nest is very real treatment is higher than the thickness of the non- treatment birds' nests x = 0.01 , thit = 12.26 > 0.99 t (38) = 2.42 . Reject Ho if thit > t0.99 (38) = 2.42, this means that the average weight of edible bird's nest in a very real treatment is higher than the weight of non- treatment birds' nests .
Graph thickness Swallow's Nest Treatment and Without Treatment



Heavy Bird's Nest
Based on observations, it turns heavy bird nest treated higher than the natural bird's nest (without treatment), null hypothesis is formulated as:

Reject, if thit> ttab
To test this hypothesis, compared to the average weight of a given bird's nest treatment () with a natural bird nest / no treatment () during the experiment.
= 8.56 with S1 = 0.4867
= 7.52 with S2 = 0.4588
S2 0.2237
(Vincent, 1991)
thit 6.95 For α = 0:01, thit = 6.95> t0.99 (38) = 2.42. This means that the average weight of birds' nests in the treatment of very, markedly higher than the natural bird's nest weight (without treatment).

Weight Charts Swallow's Nest Treatment and Without Treatment



When food available for the birds in the vicinity of the building energy treated birds to search for food, does not require a long time to find / hunt for food outside the building, especially in the dry season. When hunting birds feed away from buildings, insects gained less than the needs and birds suffering from fatigue, the possibility of getting lost or birds can not return original place of occupancy. Backup saliva prepared for nest building and in particular the protein is reduced impact on the formation of a nest of thin / thick not.

Table. Results of Chemical Analysis of swallow's nests

No	Parameter (%)	Analysis Results		Analysis Method
		Treatment	Without Treatment	
1	Fat	0,30	0,21	Hydrolysis
2	Protein	52,05	52,47	Makrokjeldhal
3	Carbohydrate	16,32	16,33	Hydrolysis
4	Calcium	2,26	0,19	AAS
5	Potassium	2,36	3,18	AAS
6	Magnesium	0,05	0,07	AAS
7	Sodium	0,13	0,18	AAS

CONCLUSION

Insect D. *melanogaster* is an insect living on fruits and media that undergo fermentation , it can be seen clearly when fruits or vegetables and garbage who started / would rot . These insects are interesting to study because living around humans (insects settlement) of the order Diptera Drosophilidae family .

These insects examined in the Village Kamangta with a height of 500-600 m above sea level in fermentator intended bred again swiftlet larvae feed children , imago (adult) for the adult birds' feed .

Some of the scientific information about the contribution of D. *melanogaster* is used to control feed swiftlets (collacalia fuchifaga) of larvae and adults very well with the value of 55.19 % protein , which is bred from natural media (banana shoes) and fermentation of bran / rice bran .

1 . Based on the analysis of variance showed that the natural medium of banana shoes gave a positive response in the growth of insect populations of D. *melanogaster* , for artificial feeding fermented bran treatment E to D. melanogaster best of feed nutrients banana shoe types significantly influenced the development of the fly population D. *melanogaster* fruit and the largest population in the natural medium banana shoes . Besides comparison nisba kelamin1 male and 5 females and D. melanogaster population growth process starts from mating behavior , egg laying , and the process of metamorphosis . 2 . Artificial feed (artifical food) intended to divert the insects D. *melanogaster* from multiplying in the months naturally cultivated , while the bran / rice bran fermented pest activity is expected to result from D. *melanogaster* decreases and reduced and will be a source of feed swiftlets (predators) . Predators can be cultivated in areas mountains at an altitude up to 1000m above sea level between 300m asl apart in coastal areas .

3 . Feed type (insect D. *melanogaster*) as the birds' feed high protein significantly affect the thickness of the bird's nest . For $\alpha = 0:01$, thit = 6.95 > t0.99 (38) = 2.42 and weight of the non- treatment nest .

In organoleptic form nests did not differ either in form and color , and the provision of D. *melanogaster* as feed can reduce the duration of post -harvest dry season from 80 days to 65 days .

4 . There is a linear relationship between the amount of feed and weight of children swallow , for $\alpha = 26.16$ 00:01 thit > t0 , 95 (43) = 1.67 means that there is a highly significant positive correlation between the amount of feed (x) and weight (y) the regression Y = 1.43 x + 1.67 . Imago D. melanogaster , have a high protein 55.19 % for $\alpha = 4.56$ 0:01 thit > t0 , 95 (43) = 1.67 weight chicks fed researcher significantly higher than the child's weight bird that fed their parent in other words that the D. *melanogaster* both being fed to birds' . B. Advice This study can be used as a reference for the control of insect pests of fruit fly D. *melanogaster* by exploiting predators (birds') is very beneficial because it targets precisely to the target pest , and does not provide impact resistance on non-target insects than the use of pesticides . Another advantage is the predator birds' nests can produce high economic value of birds and insects D. *melanogaster* easy to breed in a short time (10-13 days) , in addition to the insect pest is below 4 mm, which can lead to pests and diseases in plants and plants can be controlled without the use of pesticides . Voting should be based on the principle of sustainability in order to nest swiftlet population does not experience stress and nest remains sustainable production in post-harvest production , as well as the quality and quantity is maintained nest .