PREFERENCES OF FRUIT FLY *BACTOCERA DORSALIS* COMPLEX (DIPTERA : TEPHRITIDAE) ON FIVE MANGO VARIETIES.

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Abstract. Fruit fly is one of key pest attack horticulture products cause damage on fruits that can reducing harvest until 100%. The objective of this research was to study the preference of fruit fly (*B. dorsalis* Complex) on 5 mangoes varieties (Gedong, Arumanis, Cengkir, Bapang, and TO) in the outdoor screen cage (2m x 2m x 2m). Observation was done on the attractiveness of fruit fly oviposition sites compare with the different character of each mango varieties. The research started from December 2007 to March 2008. The experiment was arranged in Random Group Design was carried out with 5 treatments and 5 replications. The result showed that the preferences of fruit fly *B. dorsalis* Complex was different on 5 mangoes varieties. The highest respons of fruit fly attracted to Gedong, followed by Bapang, Cengkir and Arumanis, however the TO not attracted. This results seems there was a correlation between the attractiveness and fruits character such as colors, odor, sugar contents and the thickness of skin.
Keywords: fruit fly, mango, preferences, attractiveness.

Introduction

Fruit fly, *Bactrocera* spp. (Diptera : Tephritidae) is one of potential pest that very detrimental fruits production and vegetable, either through amount or quality (7). This Pest becomes key pest at mango orchard around the world (2), entered in Indonesia (11, 10). From some fruit fly types, *Bactrocera dorsalis* Complex is all the much generate loss. Damage fruit can reach 100% (16, 11, 4, 5).

Variation in genotype susceptibility to insect attack and damage can be exploited when developing advanced level integrated pest management (IPM) programs (8). The genotype preference affects adult distribution and oviposition damage to fruit of apple maggot, *Rhagoletis pomonella* (Walsh), in apple orchards (8), improved knowledge of genotype susceptibility could impact the success of perimeter trapping for control.

Features of plants morphology can produce physical excitement for activity eat insect or activity of egg situating. Variation in color, form, size, violence of plants network, existence of hair and gibbsite can determine how far degree of insect acceptance to plants. In other hand, physiology features that influence insect usually have the shape of chemistry substances that produced by plants metabolism, either primary metabolism or secondary metabolism. Result of primary metabolism like carbohydrate, lipid, protein, hormone, enzyme, inorganic compounds, and others. Some result of primary metabolisms are referred [as] also can become incentive eats, and nutrition for insect (15).

Mango Variety like Gedong have strong odor, its fruit skin rust colored feel sweet, and thick pulp. Arumanis haves odor that sting, green color of leather old and feel sweet,. Cengkir have its odor is not so strong, chromatic fruit skin green yellowish, feel sweet, and fruit skin rather thick. Bapang have specific odor, chromatic fruit skin green yellowish, feel sweet nevertheless sometime felt a few bitter, and have thin fruit skin, whereas TO its odor not too stung, its fruit skin chromatic green, and has thick fruit skin (3).

Bio physic mango like shape, violence, color, and thickness of mango skin will determine how far preference fruit fly to mango. Besides bio physic fruit is referred, odor, glucose, and substance attractant also will have an effect on to preference fruit is referred (8). Preference in each mango variety have not yet many known, until mango variety that resistant to fruit fly have not yet many known. In consequence, needed research basis for knows preference its fruit fly and bearing with bio physic mango and also odor and sugar-content at some mango varieties. With the of preference fruit fly *B. dorsalis* at some mango varieties, then obtained information of mango variety that taken a fancy to and in disfavor with fruit fly *B. dorsalis* and as one of operation action to depress fruit fly attack.

Materials and Method

Test Insect as used in this research is collected from mango orchard of farmer property in Kabupaten Sumedang and Majalengka. Rearing of insect is conducted in Entomological Laboratory, Department of Plant Protection Faculty of Agriculture, Padjadjaran University, in temperature condition 26^{o}C ± 2^{o}C and relative humidity 70-80 % and photoperiod 12 : 12. Sample the effect of field are processed in Entomological Laboratory. Fruit that invested by fruit fly maggot is kept in plastic box (80 x 60 x 40 cm) that in the bottom has been arranged in layers sawdust with thickness 5 cm for pupating. Pupae that formed collected and placed into solder cup and the of. Hereinafter pupae are referred place into gauze box (40 x 40 x40 cm) that in it has been placed pot zap (vol. 100 ml) containing water and cotton, sand sugar, and honey solution, as supply food for adult.
Test Experiment preference fruit fly *B. dorsalis* at some mango varieties executed in two phases that is :

A period of Infested (10 days)

Mango entered was into fairish outdoor screen cage 2m x 2m x last 2m invested 15 tails female imago *B. dorsalis* that has married and ready to lay eggs.

Incubation period (20 days)

After a period of infested (10 day), mango of each variety in incubation for 20 days. During incubation, coop wears lint that have small pore as anticipation from other insect trouble.

Attack Intensity

Intensity of fruit fly attack *B. dorsalis* to group of mango variety during infested (10 days) calculated by using formula as follows :

$$I = \frac{LM_i}{LM_n} \times 100\%$$

Explanation :

I = Attack Intensity (%)

L Mi = Amount of consequence rough poke hole oviposition egg at one mango variety during infested (10 days).

L Mn = Amount of consequence rough poke hole oviposition egg at all of mango variety during infested (10 days).

The experiment was arranged in Randomized Group Design was carried out with 5 treatments and 5 replications. As for examinee treatment is five mango varieties that is Variety Gedong, Cengkir, Arumanis, T O, and Bapang.15 mango entered into coop (every variety 3 units), every mango variety referred bound by using is infested last nylon string. 15 tails female *B. dorsalis* that has copulation and ready to lay eggs. To test existence of difference between value of treatment average used Duncan at reality level 5 % by using computer program SPSS Version 13.

RESULT AND DISCUSSION

Attack Intensity

Thickness of fruit skin and sugar-content at various of mango varieties influence percentage of attack intensity *Bactrocera dorsalis* Complex. Base Table 1. its can be seen that attack intensity *B. dorsalis* at various of mango varieties different each other, where intensity lower happens at variety TO that is 0 % whereas highest intensity happens at variety Gedong that is as high as 60 %.

Table 1. Attack Intensity of *B. dorsalis* Complex, Thickness of skin, and Total of Sugar content Total in 5 Mango Varieties

Mango Variety	Average of skin thickness (mm)	Total of sugar content (%)	Attack Intensity 10 DAI (%)
Gedong	1.13	42.14	60.00 c ± 27,9
Cengkir	1.14	45.58	40.00 bc ± 27.9
Arumanis	1.08	50.25	13.32 ab ± 18.24
Bapang	1.13	46.24	26.66 bc ± 27.9
TO	1.16	38.15	0.00 a ± 0.0

Attack intensity at variety Gedong differs reality with variety Arumanis and variety TO that is as high as 13,32 % and 0%. Variety Gedong are most taken a fancy to by *B. dorsalis* as the place lay eggs, compared to other variety. This is due variety Gedong haves strong aroma and thin skin which is about 1.13 mms and have rust colored skin till orange so it's can draw fruit fly *B. doralis* to put down egg. According to Soeroto dkk., (1995) fruit fly activity in finding plants host are determined by aroma and color. Aroma that released mango stimulates fruit fly *B. dorsalis* to come. *B. dorsalis* prefers yellow and white color is compared to other colors. Damage level at variety Cengkir and variety Bapang not differs reality with variety Gedong that is each of 40 % and 26,66 %, anticipated because the three of variety are referred as have odor that sting and have green and chromatic skin

yellowish till orange. Damage level at variety smallest TO of all variety that is as high as 0 %, this condition because variety TO not have aroma until fruit fly gone off to come, chromatic green, and have thickest fruit skin that is 1.16 mm.

Variety of Gedong are most taken a fancy to as the place oviposition egg because have odor the most sting than other variety so it's can draw fruit fly to come and put down egg. According to(8) aroma that generated by plants can draw insect to eat and put down egg. In other hand, variety Gedong also haves feel that quite sweet with sugar-content content as high as 42.14%. Sugar Content determines preference fruit fly to kinds of fruit (9), then getting higher sugar content that existed in fruit will prefer by fruit fly (Table 1). (8) state that there is some factors that can influence insect in spreading or seeking host, one of them is physical factor and chemistry that existed in plants.

At Table 1. attack intensity at variety Cengkir and Bapang not differs reality that is 40 % and 26.66 %. Second variety are referred have characteristic bio physic mango that much the same to, that anticipated become fruit fly cause take a fancy to it to put down egg. But, if seen from economic value its variety Cengkir have high economic value are compared to variety Bapang, then variety Bapang can be made as [the] trap plants at mango orchard that is by plant variety are referred as in garden boundary and expected can depress fruit fly attack at mango orchard that have economic value high that is at variety Gedong, Cengkir, and Arumanis. Intensity of fruit fly attack is influenced also by fruit maturity level, because matured fruit more haves aroma that sting, interesting color, and low fruit hardness (softer) until fruit fly will be easier to suck ovipositor to put down egg. Getting higher fruit maturity level then will getting higher also mount its damage (14).

Growth of *B. dorsalis* Complex

During a period of infested which is about 10 day, attack intensity *B. dorsalis* highest, happened at variety Gedong. That also in proportion to egg amount put down. During a period of infested, egg amount that put down by *B. dorsalis* are not perceived directly because very small egg size and located in mango. According to Sarwono (2003) egg of mango fruit fly have length 0,3 mms and diameter 0,1 mms. Female Fruit fly put downs egg into fruit with ovipositor suck (1). Indirectly, egg amount that put down by fruit fly shown by larva amount *B. dorsalis* Complex that emerge of each mango variety during incubation (20 days) (Table 2)

Table 2. Total of *B. dorsalis* that emerge in 5 mango variety during inkubation (20 days)

Mango Variety	**Average of Total *B. dorsalis* that emerge (tail)**
Gedong	5,0 c ± 2,45
Cengkir	4,0 bc ± 3,39
Arumanis	1,0 ab ± 1,41
Bapang	3,2 bc ± 3,42
T O	0,0 a ± 0,00

Base Table 2. amount of *B. dorsalis* that emerge most at most at variety Gedong that is 5 tails. To the number of amount imago B. dorsalis that emerge at variety Gedong shows this mango variety prefers by *B. dorsalis* as place lay eggs. Whereas

variety TO apparition lowest adult that is 0 tails. This condition indicates that variety unwelcome TO fruit fly to put down egg because of variety TO haves thick skin that is 1.16 mms and not have aroma or aroma specific.

The lay of egg relates to attack intensity *B. dorsalis* because imago put downs egg in the hole small rough poke, until egg situating is also influenced by factor bio physic mango in each mango variety like skin thickness and mango color. Variety Gedong haves yellow color rather orange until fruit fly interests to put down egg, in other hand also have thin skin that is 1.13 mm until facilitate fruit fly for suck of ovipositor into mango skin. Differ from variety TO that less taken a fancy to by fruit fly as place lay eggs, because has thick fruit skin that is 1.16 mm until intensity low attack and apparition adult even also differs reality with variety Gedong. Variety Gedong prefers as [the] place lay eggs before variety TO are also enabled because higher its sugar content. Host found on sugar Content influences fruit fly imago in putting down egg, because sugar content is referred required for next generation growth (8).

Base skin thickness and sugar-content content, variety Arumanis haves flimsiest skin and its sugar-content content higher range from to other variety. However at experiment, variety quicker Arumanis decays compared to other variety, until cause aroma that generated is reek and mango skin are grown mushroom then fruit fly not take a fancy to it. Fruit fly in lay of egg will be more opting mango that has been ripe because has thin skin and pulp that is not hard (14). Vitamin Content C and sugar at mango determine fruit fly like, more and more high vitamin content C and sugar at mango, will be growing taken a fancy to by fruit fly. In other word level maturity of mango very determines fruit fly population. Quality of food has an effect on to larva growth and adult (11). Apparition Amount imago that not too much also supported with its minim female amount of fruit fly rough poke. Female Imago fruit fly put downs egg in teams that is 2-15 items. Female Fruit fly can put down egg 1 – 40 items every day (12). Getting higher level of attack intensity *B. dorsalis* at mango during infestation (10 days) in proportion to amount apparition imago *B. dorsalis* during incubation (20 days). Apparition imago influence by some factors among others content of chemistry substances that implied in mango. (13) state that preference insect to type of food influence by prescriptive stimulation of chemistry substances feel, odor, and nutrition quality. In other hand, growth, growth, and mortality insect is influenced by quality and food amount.

Conclussion

The preferences of fruit fly *B. dorsalis* Complex was different on 5 mangoes varieties. The highest respons of fruit fly attracted to Gedong, followed by Bapang, Cengkir and Arumanis, however the TO not attracted. This results seems there was a correlation between the attractiveness and fruits character such as colors, odor, sugar contents and the thickness of skin.

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