BIBLIOGRAPHY

BASINGAN, EIRA A. Effectiveness of Different Fermented Fruits and Vegetables as Fruit Fly Attractant. Benguet State University. La Trinidad, Benguet.

Adviser: Gemma S. Das-ilen, MSc.,

ABSTRACT

The study was conducted at the Mites Predatory Rearing House, Pomology citrus plantation and zucchini plantations at the organic demo farm at Balili, La Trinidad, Benguet from January 2011 to March 2011 to determine the population and species of fruit fly trapped in the attractant; to identify families of other insects trapped in the attractants and to determine the duration of consumption of the different attractants.

A total of 23 fruit flies were attracted to the trap. All treatments used in the study were found effective in attracting fruit flies. Treatments 4 (mango) and 9 (bell pepper) has the highest trapped fruit fly. There was a total population of 15, 881 insects trapped in all of the attractants with a mean of 5, 293.67.

There were three species of fruit flies trapped in the attractant which are the *Bactrocera dorsalis* Hendel, *Rhagoletis* sp. and the *Bactrocera cucurbitae* with total trapped population of 23, where 17 of which are females and 6 are males.

Other insects trapped belong to 6 orders and 26 families. It was proven from the study that all treatments were effective in trapping fruit flies.

The attractant is effective however it was consumed in 10 days.

TABLE OF CONTENTS

INTRODUCTION

Fruit fly (*Bactrocera* spp.) is one among the many destructive insect pests damaging fruits in the Philippines. They are small, yellowish flies that are commonly attracted to fermenting fruit of all kinds. The adult fruit fly which is noticeably larger than a housefly, is very variable but there are prominent yellow and dark brown to black markings on the thorax. Among the Tephtritidae, the female fruit fly inserts its needle-like ovipositor and lays its eggs into the fruit. The maggots that hatch out of the eggs feed and destroy the tissue in the fruit. Apparently, ripe fruits are preferred for oviposition, but immature ones may also be attacked (Mau and Matin, 2005). Principal fruit hosts are avocado, apple, mango, peach, pear, citrus, coffee, and especially guava. Among vegetables are pepper, tomato, and watermelon (Capinera, 2001).

In La Trinidad, fruit fly damages numerous fruits and vegetables (Kudan, 2007). Economic effects of pest species include not only direct loss of yield and increased control costs, but also the loss of export markets and/or the cost of constructing and maintaining fruit treatment and eradication facilities. The increase of productivity has always been the primary concern in every agricultural and rural developmental efforts. Various methods and technology systems has been employed and looked into as possible solutions to ensure high yields. Most of them come at a certain price. Because of these, experiment on the different fermented locally available and cheap fruits and vegetables should be conducted since pesticides are expensive.

The study was conducted to determine the population and species of fruit fly and other insects trapped in the attractant; to identify families of other insects trapped in the attractants and to determine the duration of consumption of the different attractants.

The study was conducted at the Mites Predator Rearing House, Pomology Citrus Plantation and zucchini plantations at the organic demo farm at Balili, La Trinidad, Benguet. The study was conducted from January 2011 to March 2011.

REVIEW OF LITERATURE

Kinds of Attractants

Chemical Attractant. Pheromones are semio-chemicals that are produced and received by members of the same species, this has a great influence on the behavior and biological processes of insects. Pheromones are produced synthetically and are used in different ways. It can be used as a lure in traps used to monitor pest populations. Pheromones also disrupt mating (Birch and Hayes, 1982).

Plant-based Attractant. These are attractants which generally introduced to plants. These hybrid plants can attract and kill pest that are attacking them. One example is the attractin, a patented environmentally friendly, non-toxic, plant-based attractant which effectively attracts fruit flies including olive and orange fruit fly pest, attractin does not affect honeybees. Attractin was developed by Natural-Agro in 2001 (Birch and Hayes, 1982).

Natural Insect Attractants. Nigg *et al*. (2005) mentioned that extracts of cattle guava was equal in attractiveness to males and females especially with Carribean fruit fly, *Anastrepha suspense* Loew. It was also suggested that host chemicals serve as attractants and the female and male specific attractant and traps could be developed from host kairomone data.

In 2007, Prasad stated that traps baited with some attractive material namely fermented sugar, molasses and poisoned with chemicals have also been found effective in capturing fruit fly adults. In Hawaii, Dekker and Messing (n.d) reported that homemade mixes of vinegar and water and yeast have attracted both males and females of Dipteran species.

Natural insect attractant (NIA) is a mixture of mascuvado sugar and vinegar (1K sugar, 1li vinegar, and 3li water). It can be placed inside a recycled plastic container, improvised for the purpose, and place in strategic position advantageous to catch flies, insects, etc. The natural insect attractant is also excellent in household use; it can practically be placed near open spout, open garbage bin, or a place you knew there is possible presence of insects (McNew, 2009).

Characteristics of *B. dorsalis*

The adult is a clear winged fly with a wingspan of 5.3-7.3 mm and a body length of 6.0-8.0 millimeter (Teparkum, 1998 and Weems and Heppner 2004). Viewed from above, the overall color of the abdomen is basically light brown with dark brown transverse bands and the thorax dark brown with conspicuous markings of yellow or occasionally white. The white spindled-shaped eggs are 1.2 mm in length and 0.2 mm in width. The young maggots are white and when fully-grown are yellowish and about 10.0 mm in length.

The color of the fly is very variable, but there are prominent yellow and dark brown to black markings on the thorax. Generally, the abdomen has two horizontal black stripes and a longitudinal median stripe extending from the base of the third segment to the apex of the abdomen. These markings may form a T-shaped pattern, but the pattern varies considerably. The ovipositor is very slender and sharply pointed (Weems and Heppner, 2004).

Host Plants of *B. dorsalis*

B. dorsalis occurs on a wide range of fruit crops, apples, bananas, guavas, mangoes, oranges, pawpaws, peaches, plums, and tomatoes (Clausen *et al*., 1965).

Likewise, the *Bactrocera dorsalis* attacks over 300 cultivated and wild fruits including, tomato, banana (Clausen *et al*., 1965 and Newell and Haramoto, 1968), bitter melon, citrus, coffee, guava, macadamia, mango, papaya, passion fruit, peppers, avocado, persimmon, and *Annona* (cherimoya, atemoya, sugar apple). This pest will apparently breed in all fleshly fruits. It does not attack cucurbit crops such as cucumber and squash (Newell and Haramoto, 1968).

The *B. dorsalis* has been recorded from more than 150 kinds of fruit and vegetables, including citrus, guava, mango, papaya, avocado, banana (Clausen *et al*., 1965 and Newell and Haramoto, 1968), loquat, tomato, surinam cherry, rose-apple, passion fruit persimmon, pineapple, peach, pear, apricot, fig, and coffee. Avocado, and mango, are the most commonly attacked (Weems and Hepner, 2004).

MATERIALS AND METHODS

Fermented Plant Juice (FPJ)

Ripe citrus, guava (native variety), strawberry, mango, papaya, and banana, were fermented as fruit attractants while chayote, tomato, bell pepper, and cucumber were fermented as vegetable attractants. Two kilos of each fruit and vegetables were used.

These fruits and vegetables were chopped using a knife and chopping board. There were ten plastic pail containers with 5 liter capacity used. Each container was assigned to each of the chopped fruits and vegetables. Likewise, two kilograms of chopped banana trunk (cardava variety) and one kilo of muscovado sugar was added in each container and was mixed thoroughly. Hence, each container contains two kilograms of chopped fruit or vegetable plus one kilogram of muscovado and two kilograms of chopped banana trunk. Each of the containers was covered with a clean manila paper, and tied with a rubber band. It was stored in a cool dry place for 7 days for fermentation. After fermentation, the extract was collected using the plastic pail container and a clean cloth that served as a strainer. Then it was squeezed to further collect the liquid extracts that the latter absorbed.

Vinegar Juice (VJ)

Vinegar juice is the mixture of five gallons of crude vinegar mixed with 2 ½ grounded muscovado sugar. The crude vinegar is used to enhance the aroma of the attractant and was believed to drive away and lessen beneficial insects that will be trapped. The five gallons of crude vinegar and 2 ½ grounded muscovado sugar was placed in a cooking pot and was heated until it boils. When the muscovado sugar was totally diluted and mixed, it was set aside for cooling and added to the fruit and vegetable extract during trapping.

The Trap

The ratio of 1:1 (150 ml fruit or vegetable extracts (FPJ) + 150 ml crude vinegar with muscovado sugar (VJ)) was used. These concentrations were poured on the trap. Thirty-three 1.5 coke containers was used as trapping material. Each of the containers was prepared by making two opening in each side leaving 5.08 cm from the bottom. The cut side of the coke container served as entrance of the insect. A styrofoam plate measuring 22.86 cm diameter was placed on top of the trap to protect the FPJ and VJ dilution from rain water when it rains. A string was tied to the tip of the container, and was hanged using sticks, 15.24 cm above the ground on strawberry and zucchini plants and at the middle of the fruits on citrus trees. The trap was replicated three times and was distributed randomly. One hundred fifty milliliters of the treatments, which are citrus, guava, strawberry, mango, papaya, banana, chayote, tomato, bell pepper and cucumber extract was added with 150 ml vinegar juice. Complete Randomized Design (CRD) single factorial was used in the statistical analysis of the treatments. Plain water was introduced as untreated. The treatments were as follows:

T_0 – 300 ml water

T_1 – 150 ml citrus extract + 150 ml vinegar juice

T_2 – 150 ml guava extract + 150 ml vinegar juice

T_3 – 150 ml strawberry extract + 150 ml vinegar juice

T_4 – 150 ml mango extract + 150 ml vinegar juice

T_5 – 150 ml papaya extract + 150 ml vinegar juice

T_6 – 150 ml banana extract + 150 ml vinegar juice

T_7 – 150 ml chayote extract + 150 ml vinegar juice

T_8 – 150 ml tomato extract + 150 ml vinegar juice

T_9 – 150 ml bell pepper extract + 150 ml vinegar juice

T_{10} – 150 ml cucumber extract + 150 ml vinegar juice

Population of Fruit fly and other Insects Trapped in the Attractant

The population of fruit fly and other insects attracted to the trap was recorded. Collection of trapped insects was done everyday using a screen scoop for the trapped insects to be fresh, body parts intact and visible for easier identification.

Duration of Consumption of the Attractant

The duration of the trap was gathered by counting the number of days from set up until the trap is consumed. The duration is commonly affected by evaporation, temperature and weather.

Identification of the Trapped Insects

The collected insects were spread on a bond paper to dry, to be sorted and were identified using microscope (if necessary) and were documented using a digital camera. The insects were identified from order to family using entomology books and internet. Fruit fly species is identified using the thorax as a basis.

Data Gathered

1. Number and species of fruit fly trapped. Fruit flies trapped were identified into species.

2. Population of trapped insects. This refers to the number of fruit fly and

other insects trapped in the attractant.

3. Duration of the attractant. This refers to how long the trap is effective in trapping insects.

RESULTS AND DISCUSSION

Population of Trapped Fruit fly

The mean population of the trapped fruit fly in each treatment is presented in Table 1. The statistical analysis shows that the population of fruit flies trapped on the different attractants is not significantly different. However, numerically the population of trapped fruit flies was observed highest on treatments 4 (mango) fermented fruit and treatment 9 (bell pepper) fermented vegetable followed by treatments 6, 5, 3 and 2, 8 and 1, 10 and 7 and water.

As observed, there were no fruit flies trapped on water indicating that the formulated attractants used were effective in attracting fruit flies.

The Table 1. also shows that there were 17 fruit flies trapped on the fermented fruits (T_1-T_6) while 6 were from fermented vegetables (T_7-T_{10}), though statistically not significant from each other.

The total number of fruit flies trapped on the attractants also indicates that the fruit flies trapped were attracted on the aroma of the fermented fruit on to which fruits are suitable for egg deposition.

Species of Fruit fly Trapped

The species of fruit flies trapped in the attractant is shown in Table 2. The statistical analysis shows that the number of fruit flies on the different attractants is not significantly different. However, numerically the population of trapped female fruit flies was observed highest on T_4 (mango) as corroborated by Weems and Hepner, 2004 that mangoes are the most commonly attacked by fruit flies. This was followed by T_6

(banana) and T_9 (bell pepper) which has a total of 3 fruit flies, T_2 (guava) and T_3 (strawberry) which is 2 and T_1 (citrus) and T_8 (tomato) with 1 population respectively.

There were three species of fruit flies trapped on the different attractants which are the *Bactrocera dorsalis* (Figure 1), *Rhagoletis* sp. (Figure 2) and the *Bactrocera cucurbitae* (Figure 3).

Table 1. The mean population of trapped fruit flies on the different attractants

TREATMENTS	TOTAL	MEAN
T_0 (water)	0	0.00^b
T_1 (citrus)	1	0.33^a
T_2 (guava)	2	0.67^a
T_3 (strawberry)	2	0.67^a
T_4 (mango)	5	1.67^a
T_5 (papaya)	3	1.00^a
T_6 (banana)	4	1.33^a
SUB TOTAL	17	5.67^a
T_7 (chayote)	0	0.00^b
T_8 (tomato)	1	0.33^a
T_9 (bell pepper)	5	1.67^a
T_{10} (cucumber)	0	0.00^b
SUB TOTAL	6	2.00^a
TOTAL	23	

ns=CV=41.56%
Means with the same letter is not significantly different at 5% level of significance (DMRT)

Table 2. The mean of the different sexes of fruit fly species trapped on the different treatments

TREATMENT	NUMBER OF FRUIT FLY	SEX		TOTAL	MEAN
		F	M		
T_0 (water)	0	0	0	0	0.00^b
T_1 (citrus)	1	1	0	1	0.33^a
T_2 (guava)	2	2	0	2	0.67^a
T_3 (strawberry)	2	2	0	3	0.67^a
T_4 (mango)	5	4	1	5	1.67^a
T_5 (papaya)	3	2	1	3	1.00^a
T_6 (banana)	4	3	1	4	1.33^a
T_7 (chayote)	0	0	0	0	0.00^b
T_8 (tomato)	1	0	1	1	0.33^a
T_9 (bell pepper)	3	3	2	3	0.67^a
T_{10} (cucumber)	0	0	0	0	0.00^b

Figure 1. *Bactrocera dorsalis* Hendel species,
Adult male (left) and female (right) (10x)

Figure 2. Adult female *Rhagoletis sp.* (10x)

Figure 3. Adult male *Bactrocera cucurbitae* species (10x)

Families of Insects Trapped in the Attractant

The mean population of trapped insects on the different treatments shows on Table 3. The statistical analysis shows that the number of insects trapped on the different attractants is not significantly different. However, numerically among the treatments, treatment 1, which is citrus extract, gains the highest trapped population of trapped insects with a mean of 830.33. This is followed by T_9 (bell pepper), T_8 (tomato), T_{10} (cucumber), T_7 (chayote), T_2 (guava), T_3 (strawberry), T_5 (papaya), T_4 (mango) and lastly, T_6 (banana).

It was apparently shown in the table that all the treatments were effective in trapping insects where in it shows that all are numerically significant but statistical analysis revealed that all the means of the trapped insects were all not significantly different.

The insects trapped in the attractants belonged to 6 orders. These were order Coleoptera which consists of family: Chrysomelidae (Figures 4-6), Coccinelidae (Figures 7-8), Nitidulidae (Figure 9), Scarabaeidae (Figure 10) and Staphylinidae (Figure 11).

Order Diptera, family Calliphoridae (Figure 12), Chironomidae (Figure 13), Culicidae (Figure 14), Drosophilidae (Figure 15), Muscidae (Figure 16), Scatopsidae (Figure 17), Sepsidae (Figure 18), Tabanidae (Figure 19), Tipulidae (Figure 20), and Micropezidae (Figure 21). Order: Hemiptera family Cicadellidae (Figure 22). Order: Hymenoptera Family Apidae (Figure 23), Braconidae (Figure 24), Formicidae (Figure 25), and Ichnuemonidae (Figure 26). Order: Lepidoptera family Noctuidae (Figure 27), Nymphalidae (Figure 28), Plutellidae (Figure 29) and Sesiidae (Figure 30). Order: Neuroptera family Hemerobiidae (Figure 31) and Order: Thysanoptera family Thripidae (Figure 32).

Table 3. The mean population of trapped insects on the different treatments

TREATMENT	TOTAL	MEAN
T_0 (water)	0	0.00[b]
T_1 (citrus)	2 941	830.33[a]
T_2 (guava)	1 417	472.33[a]
T_3 (strawberry)	1 384	461.33[a]
T_4 (mango)	1 207	402.33[a]
T_5 (papaya)	1 341	447[a]
T_6 (banana)	1 155	385[a]
T_7 (chayote)	1 473	491[a]
T_8 (tomato)	1 558	519.33[a]
T_9 (bell pepper)	2 376	792[a]
T_{10} (cucumber)	1 479	493[a]
SUB TOTAL	15 881	5 293.67[a]

Figure 4. Adult Chrysomelid Beetle
Family: Chrysomelidae
Order: Coleoptera

Figure 5. Adult Flea Beetle
Family: Chrysomelidae
Order: Coleoptera

Figure 6. Adult Spotted Tortoise Beetle
Family: Chrysomelidae
Order: Coleoptera

Figure 7. Adult Lady Bird Beetle
Family: Coccinelidae
Order: Coleoptera

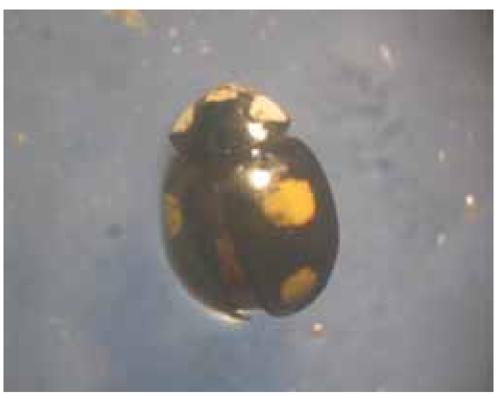

Figure 8. Adult Lady Bird Beetle
Family: Coccinelidae
Order: Coleoptera

Figure 9. Adult Sap Beetle
Family: Nitidulidae
Order: Coleoptera

Figure 10. Adult June Beetle
Family: Scarabaeidae
Order: Coleoptera

Figure 11. Adult Rove Beetle
Family: Staphylinidae
Order: Coleoptera

Figure 12. Adult Blowfly
Family: Calliphoridae
Order: Diptera

Figure 13. Adult Midge
Family: Chironomidae
Order: Diptera

Figure 14. Adult Mosquito fly
Family: Culicidae
Order: Diptera

Figure 15. Vinegar Fly
Family: Drosophilidae
Order: Diptera

Figure 16. Adult House Fly
Family: Muscidae
Order: Diptera

Figure 17. Adult Black Scavenger Fly
Family: Scatopsidae
Order: Diptera

Figure 18. Adult Ant fly
Family: Sepsidae
Order: Diptera

Figure 19. Adult Horse fly
Family: Tabanidae
Order: Diptera

Figure 20. Adult Crane Fly
Family: Tipulidae
Order: Diptera

Figure 21. Adult Stilt Leg
Family: Micropezidae
Order: Diptera

Figure 22. Adult Plant Hopper
Family: Cicadellidae
Order: Hemiptera

Figure 23. Adult Honey Bee
Family: Apidae
Order: Hymenoptera

Figure 24. Adult Braconid Wasp
Family: Braconidae
Order: Hymenoptera

Figure 25. Adult Ant
Family: Formicidae
Order: Hymenoptera

Figure 26. Adult Diadegma
Family: Ichneumonidae
Order: Hymenoptera

Figure 27. Adult Cutworm Moth
Family: Noctuidae
Order: Lepidoptera

Figure 28. Adult Nymphalid Butterfly
Family: Nymphalidae
Order: Lepidoptera

Figure 29. Adult Diamond Back Moth
Family: Plutellidae
Order: Lepidoptera

Figure 30. Adult Clear-winged Moth
Family: Sesiidae
Order: Lepidoptera

Figure 31. Adult Brown Lacewing
Family: Hemerobiidae
Order: Neuroptera

Figure 32. Adult Thrips
Family: Thripidae
Order: Thysanoptera

Duration of Consumption of the Attractants

The duration of efficacy of the attractants is indicated in Figure 33. The graph shows that regardless of treatment in the attractants, there was a decreasing number of insects trapped in day 2 and increased in day 3 and gradually decreasing from days 4 to 10, except treatment 9 which increased in day 1 while gradually decreasing from days 2 to 10.

Nevertheless, it is apparent as presented in the graph that the attractants are decreasing in effectiveness relative to the advancement of time which started from day 3 of the treatments while day 2 in treatment 9. The graph shows that the different treatments (T_1-T_{10}) are effective in trapping insects however the trap was consumed in 10 days.

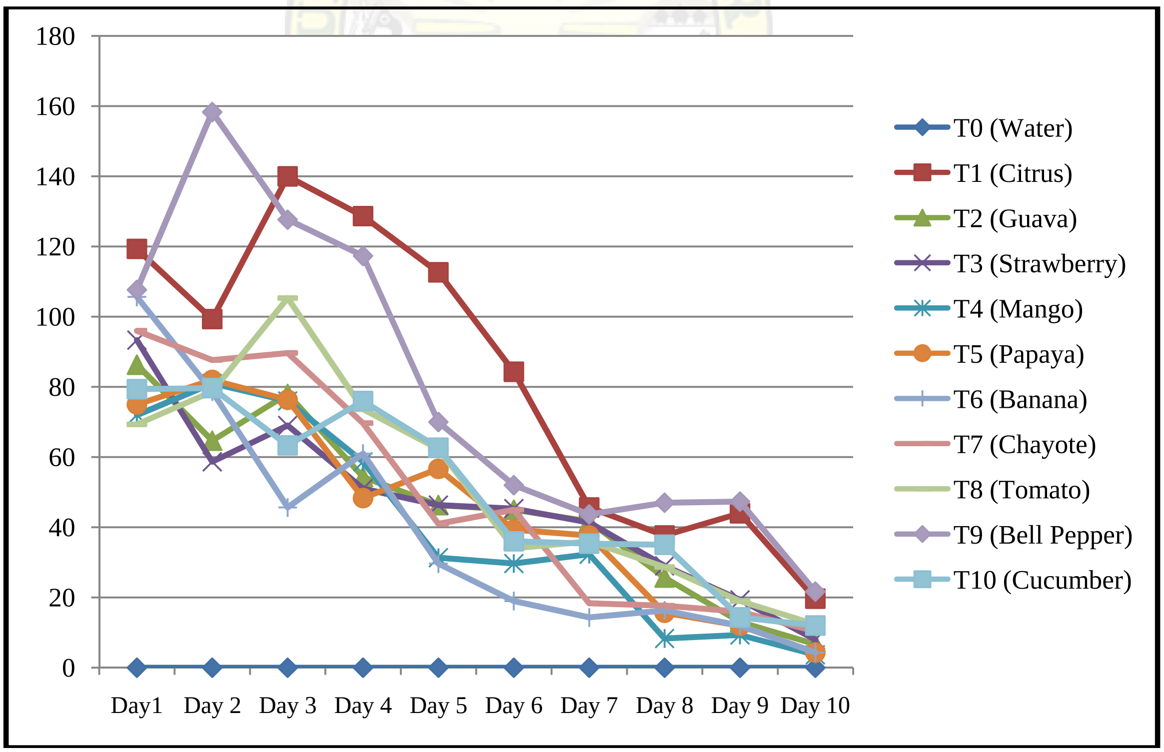

Figure 33. The duration (days) of the attractants set on the zucchini, citrus and strawberry plants (Jan. 28, 2011-March 2, 2011)

SUMMARY, CONCLUSION AND RECOMMENDATION

<u>Summary</u>

The study was conducted at the Mites Predatory Rearing House, Pomology citrus plantation and zucchini plantations at the organic demo farm at Balili, La Trinidad, Benguet from January 2011 to March 2011 to determine the population and species of fruit fly and other insects trapped in the attractant; to identify families of other insects trapped in the attractants and to determine the duration of consumption of the different attractants.

The total population of fruit flies trapped in the attractant has a total of 23. The table also shows that there were 17 fruit flies trapped on the fermented fruits (T_1-T_6) while 6 were from fermented vegetables (T_7-T_{10}), though statistically not significant from each other. There is a total of 15, 881 insects trapped in all of the attractants with a mean of 5 293.67.

All the treatments were effective in trapping insects where in statistical analysis revealed that all the means of the trapped insects were all not significantly different.

There were three species of fruit flies trapped which are the *Bactrocera dorsalis, Rhagoletis* sp. and the *Bactrocera cucurbitae* with total trapped population of 23, where 17 females and 6 males.

The insects trapped in the attractants belong to 6 orders. These were order Coleoptera which consists of 5 families Order Diptera 10 families, Order: Hemiptera 1 family, Order: Hymenoptera 4 families, Order: Lepidoptera 4 families, Order: Neuroptera 1 family, and Order: Thysanoptera 1 family.

The duration of consumption of the attractant lasted for 10 days and was still effective. The third day of collection yields the highest number of trapped insects. The number of trapped insects decreases from days 4 to 10 relative to the advancing time of assessment.

Conclusion

It was proven from the study that all treatments were effective in trapping fruit flies with regards to its statistical analysis, but numerically T_4 (mango) and T_9 (bell pepper) has the highest number of trapped fruit flies. Also the 300 ml trap was consumed in 10 days.

Recommendation

Based on the results of the study, mango and bell pepper is therefore recommended for fruit fly trap formultions. It is also recommended to refill the trap every 10 days.

A follow up study could be done by increasing the amount of the fermented plant extract mixed with vinegar juice.

LITERATURE CITED

BIRCH, M. C. and K. F. HAYES. 1982. Insect Pheromones. The Institute of Biology's StudiesIn Biology # 147. E Arnold, Ltd., London. Pp. 87-100

CAPINERA, J. L. 2001. Handbook of Vegetable Pests. United States of America: Academic Press. Pp 237-238.

CLAUSEN, C.P., D.W. CLANSY, and Q. C. CHOCK. 1965. Biological Control of the OrientalFruit Fly (Dacus dorsalis Hendel) and other Fruit Flies in Hawaii. United States Department of Agriculture Technical Bulletin, P 57.

DEKKER, L. and R. F. MESSING (n.d). Managing Fruit Flies on Farms in Hawaii. Retrieved August 16, 2010 from http://www.ctahr.hawaii.edu/oc/freepubs/pdf/IP-4.pdf

KUDAN, S. B. 2007. Monitoring of fruit fly (*Bactrocera dorsalis* Hendel) population in LaTrinidad, Benguet. BS Thesis. Benguet State University, LaTrinidad, Benguet.

LIM, A. K. 2002. Natural Farming Technology Seminar. Tribal Mission Foundation International Inc. Juan Luna Street, Davao City Pp. 2-3.

MAU, R F.L and J. L. MATIN. 2005. *Bactrocera dorsalis* (Hendel) / Oriental fruit fly. RetrievedAugust 15, 2010 from http://www.extento.hawaii.Edu.

MCNEW, A. 2009. NaturalInsect Attractant: AHome Made Approach. Retrieved September 5, 2010 from http://gomestic.com/gardening/natural-insect-attractant a-homemade-approach/.

NEWELL, I.M. and F. H. HARAMOTO. 1968. Biotic Factors Influencing Populations of *Dacusdorsalis* in Hawaii. Proc. Hawaiian Entomology Society 81-139

NIGG H.N,L. L. MALLORY, S. E. SIMPSON, S. B. CALLAHAM, J. P. TOTH, S. FRASER,M. KLIM, S. NAGY, J. L. NATION and J. A. ATTAWAY. 2005. Caribbean fruit fly, Anastrepha suspense Loew, attraction to host fruit and host kairomones. Retrieved July 29, 2010 from http://www.springerlink.com/content/uv74474j2864p8w3.

PRASAD, J. 2007. Fermented Fruit Juice as Insect Attractant. United States of America: Academic Press. P 45.

TEPARKUM, S. 1998. Pests of Mango. November 2005, Virginia Polytechnic Institute and StateUniversity. Arthropod Management in Fruit Crops. Retrieved August 14, 2010 from http://www.ento.vt.edu/Fruitfiles/mangoIPM/mangoIPM .HTM# Oriental%20fruit

WEEMS, H.V., J.B. HEPPNER. 2004. Oriental Fruit Fly. Retrieved August 15, 2010 fromhttp://www.creatures.ifas.ufl.edu/fruit/tropical/oriental_fruit_fly.htm.

APPENDICES

Appendix Table 1. Total and mean of female fruit fly species

SPECIES	REPLICATION			TOTAL	MEAN
	I	II	III		
Bactrocera dorsalis	1	6	3	10	3.33[a]
Rhagoletis sp.	1	0	2	3	3.33[a]
Bactrocera cucurbitae	1	1	1	3	1.00[a]

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DF	SS	MS	F VALUE	Pr > F 0.5	Pr > F 0.1
Treatments	2	10.889	5.444	2.23[ns]	5.14	10.92
Error	6	14.667	2.444			
TOTAL	8	25.556				
CV=87.95%					ns	

Appendix Table 2. Total and mean of male fruit fly species

SPECIES	REPLICATION			TOTAL	MEAN
	I	II	III		
Bactrocera dorsalis	0	3	1	4	1.33[a]
Rhagoletis sp.	1	0	0	1	1.00[a]
Bactrocera cucurbitae	0	2	0	2	0.67[a]

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DF	SS	MS	F VALUE	Pr > F 0.5	0.1
Treatments	2	1.556	0.778	0.58[ns]	5.14	10.92
Error	6	8.000	1.333			
TOTAL	8	9.556				

CV=148.46% ns

Appendix Table 3. Mean of sexes of the fruit fly species

SPECIES	SEX		TOTAL	MEAN
	F	M		
Bactrocera dorsalis	11	4	15	5.00[a]
Rhagoletis sp.	4	1	5	1.67[a]
Bactrocera cucurbitae	2	1	3	1.00[a]

Appendix Table 4. Duration of consumption and total population of insects trapped in the different treatments

DAYS OF COLLECTION	NUMBER OF INSECTS TRAPPED										
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9	T_{10}
1	0	358	259	280	216	225	317	288	208	323	238
2	0	297	194	176	243	246	236	263	236	475	239
3	0	420	234	207	228	229	137	269	316	383	190
4	0	385	162	153	176	144	183	208	221	352	228
5	0	338	139	139	94	170	89	123	187	209	187
6	0	253	135	136	89	118	57	135	102	156	107
7	0	137	125	124	97	113	43	55	108	131	106
8	0	113	77	87	25	47	49	53	86	141	105
9	0	132	39	58	28	36	30	48	57	142	43
10	0	58	20	24	11	13	14	31	37	64	36
TOTAL	0	2491	1417	1384	1204	1341	1155	1473	1558	2376	1479

Appendix Table 5. Mean of the total population of insects trapped in the different Treatments

DAYS OF COLLECTION	NUMBER OF INSECTS TRAPPED										
	T_0	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9	T_{10}
1	0	119.33	86.33	93.33	72	75	105.67	96	69.33	107.67	79.33
2	0	99	64.67	58.67	81	82	78.67	87.67	78.67	158.33	79.67
3	0	140	78	69	76	76.33	45.67	89.67	105.33	127.67	63.33
4	0	128.33	54	51	58.67	48	61	69.33	73.66	117.33	76
5	0	112.67	46.33	46.33	31.33	56.67	29.67	41	62.33	69.67	62.33
6	0	84.33	45	45.33	29.67	39.33	19	45	34	52	35.67
7	0	45.67	41.67	41.33	32.33	37.67	14.33	18.33	36	43.67	35.33
8	0	37.67	25.67	29	8.33	15.67	16.33	17.67	28.67	47	35
9	0	44	13	19.33	9.33	12	12	16	19	47.33	14.33
10	0	19.33	6.67	8	3.67	4.33	4.33	10.33	12.33	21.33	12
TOTAL	0	830.33	472.33	461.33	402.33	447	385	491	519.33	792	159.67

Appendix Table 6. Population of Apidae trapped in the attractants

TREATMENTS	REPLICATION			TOTAL	MEAN
	I	II	III		
T_0	0	0	0	0	0^b
T_1	0	0	0	0	0^b
T_2	1	1	0	2	0.67^a
T_3	0	0	0	0	0^b
T_4	0	0	1	1	0.33^a
T_5	0	1	0	1	0.33^a
T_6	0	0	0	0	0^b
T_7	0	0	0	0	0^b
T_8	0	0	0	0	0^b
T_9	0	0	0	0	0^b
T_{10}	0	1	0	1	0.33^a

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DF	SS	MS	F VALUE	Pr > F 0.5	0.1
Treatments	9	1.500	0.67	1.250^{ns}	3.35	5.49
Error	20	2.667	0.133			
TOTAL	29	4.167				
CV=24.73%					ns	

Appendix Table 7. Population of Braconidae trapped in the attractants

TREATMENTS	REPLICATION			TOTAL	MEAN
	I	II	III		
T_0	0	0	0	0	0^b
T_1	1	9	1	11	3.67^a
T_2	1	11	2	14	4.67^a
T_3	2	9	2	14	4.33^a
T_4	0	27	3	30	10.00^a
T_5	10	10	1	21	7.00^a
T_6	1	10	1	12	4.00^a
T_7	6	6	2	14	4.67^a
T_8	3	6	4	13	4.33^a
T_9	3	7	2	12	4.00^a
T_{10}	6	6	8	20	6.67^a

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DF	SS	MS	F VALUE	Pr > F 0.5	0.1
Treatments	9	106.67	11.852	0.332^{ns}	3.35	5.49
Error	20	714.00	35.700			
TOTAL	29	820.67				
CV=43.51%					ns	

Appendix Table 8. Population of Calliphoridae trapped in the attractants

TREATMENTS	REPLICATION			TOTAL	MEAN
	I	II	III		
T_0	0	0	0	0	0^b
T_1	8	6	32	46	15.33^a
T_2	3	4	20	27	9.00^a
T_3	4	3	22	29	9.67^a
T_4	3	5	20	28	9.33^a
T_5	6	3	14	23	7.67^a
T_6	3	11	18	32	10.67^a
T_7	4	5	23	32	10.67^a
T_8	0	4	5	9	3.00^a
T_9	13	11	35	59	19.67^a
T_{10}	3	2	30	35	11.67^a

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DF	SS	MS	F VALUE	Pr > F 0.5	0.1
Treatments	9	531.33	59.037	0.518^{ns}	3.35	5.49
Error	20	2281.333	114.067			
TOTAL	29	2812.67				
CV=45.70%					ns	

Appendix Table 9. Population of Chironomidae trapped in the attractants

TREATMENTS	REPLICATION			TOTAL	MEAN
	I	II	III		
T_0	0	0	0	0	0[b]
T_1	32	4	7	43	14.33[a]
T_2	22	6	20	48	16.00[a]
T_3	20	4	15	39	13.00[a]
T_4	20	2	12	34	11.33[a]
T_5	18	9	27	57	18.00[a]
T_6	31	4	10	45	15.00[a]
T_7	34	6	13	53	17.67[a]
T_8	29	10	11	50	16.67[a]
T_9	30	5	6	41	13.67[a]
T_{10}	7	3	8	18	6.00[a]

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DF	SS	MS	F VALUE	Pr > F 0.5	0.1
Treatments	9	340.833	37.870	0.297[ns]	3.35	5.49
Error	20	2553.333	127.667			
TOTAL	29	2894.167				
CV=35.97%					ns	

Appendix Table 10. Population of Chrysomelidae trapped in the attractants

TREATMENTS	REPLICATION			TOTAL	MEAN
	I	II	III		
T_0	0	0	0	0	0.00[b]
T_1	2	0	0	2	0.67[a]
T_2	1	1	0	2	0.67[a]
T_3	1	0	1	2	0.67[a]
T_4	0	0	0	0	0.00[b]
T_5	1	0	1	2	0.67[a]
T_6	1	0	0	1	0.33[a]
T_7	3	2	0	5	1.67[a]
T_8	1	0	0	1	0.33[a]
T_9	3	0	1	4	1.33[a]
T_{10}	0	0	1	1	0.33[a]

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DF	SS	MS	F VALUE	Pr > F 0.5	0.1
Treatments	9	6.667	0.741	0.926[ns]	3.35	5.49
Error	20	16.000	0.800			
TOTAL	29	22.667				
CV=36.86%					ns	

Appendix Table 11. Population of Cicadellidae trapped in the attractants

TREATMENTS	REPLICATION			TOTAL	MEAN
	I	II	III		
T_0	0	0	0	0	0.00^b
T_1	0	0	0	0	0.00^b
T_2	0	0	0	0	0.00^b
T_3	0	0	0	0	0.00^b
T_4	0	0	0	0	0.00^b
T_5	0	0	0	0	0.00^b
T_6	0	0	0	0	0.00^b
T_7	0	0	0	0	0.00^b
T_8	0	0	0	0	0.00^b
T_9	0	0	0	0	0.00^b
T_{10}	0	1	0	1	0.33^a

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DF	SS	MS	F VALUE	Pr > F 0.5	0.1
Treatments	9	3.00	0.33	1.00^{ns}	3.35	5.49
Error	20	0.667	0.33			
TOTAL	29	0.967				
CV=13.05%					ns	

Appendix Table 12. Population of Coccinelidae trapped in the attractants

TREATMENTS	REPLICATION			TOTAL	MEAN
	I	II	III		
T_0	0	0	0	0	0.00^b
T_1	2	0	0	2	0.67^a
T_2	2	1	0	3	1.00^a
T_3	0	0	0	0	0.00^b
T_4	1	0	0	1	0.33^a
T_5	0	2	0	2	0.67^a
T_6	1	1	0	2	0.67^a
T_7	0	0	0	0	0.00^b
T_8	0	0	0	0	0.00^b
T_9	1	0	0	1	0.33^a
T_{10}	0	0	0	0	0.00^b

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DF	SS	MS	F VALUE	Pr > F 0.5	0.1
Treatments	9	3.633	0.404	0.865^{ns}	3.35	5.49
Error	20	9.333	0.467			
TOTAL	29	12.967				
CV=34.81%					ns	

Appendix Table 13. Population of Culicidae trapped in the attractants

TREATMENTS	REPLICATION			TOTAL	MEAN
	I	II	III		
T_0	0	0	0	0	0.00[b]
T_1	2	0	0	2	0.67[a]
T_2	2	1	0	3	1.00[a]
T_3	0	0	0	0	0.00[b]
T_4	1	0	0	1	0.33[a]
T_5	0	2	0	2	0.67[a]
T_6	1	1	0	2	0.67[a]
T_7	0	0	0	0	0.00[b]
T_8	0	0	0	0	0.00[b]
T_9	1	0	0	1	0.33[a]
T_{10}	0	0	0	0	0.00[b]

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DF	SS	MS	F VALUE	Pr > F 0.5	0.1
Treatments	9	3.633	0.404	0.865[ns]	3.35	5.49
Error	20	9.333	0.467			
TOTAL	29	12.967				
CV=34.81%					ns	

Appendix Table 14. Population of Drosophilidae trapped in the attractants

TREATMENTS	REPLICATION			TOTAL	MEAN
	I	II	III		
T_0	0	0	0	0	0.00[b]
T_1	104	1 261	153	1 518	506.00[a]
T_2	42	346	16	404	134.00[a]
T_3	137	218	75	430	143.33[a]
T_4	40	203	9	252	84.00[a]
T_5	76	290	15	381	127.00[a]
T_6	44	141	34	219	73.00[a]
T_7	164	173	43	380	126.67[a]
T_8	235	391	41	667	222.33[a]
T_9	463	618	32	1 113	371.00[a]
T_{10}	122	342	30	494	164.67[a]

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DF	SS	MS	F VALUE	Pr > F 0.5	0.1
Treatments	9	516514.533	57390.504	0.875[ns]	3.35	5.49
Error	20	1312103.333	65605.167			
TOTAL	29	1828617.867				
CV=59.85%					ns	

Appendix Table 15. Population of Formicidae trapped in the attractants

TREATMENTS	REPLICATION			TOTAL	MEAN
	I	II	III		
T_0	0	0	0	0	0.00^b
T_1	0	3	0	3	1.00^a
T_2	1	0	0	1	0.33^a
T_3	0	0	0	0	0.00^b
T_4	1	0	0	1	0.33^a
T_5	0	0	0	0	0.00^b
T_6	0	1	2	3	1.00^a
T_7	0	1	0	1	0.33^a
T_8	0	1	0	1	0.33^a
T_9	0	0	0	0	0.00^b
T_{10}	1	0	0	1	0.33^a

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DF	SS	MS	F VALUE	Pr > F 0.5	0.1
Treatments	9	3.633	0.404	0.712^{ns}	3.35	5.49
Error	20	11.333	0.567			
TOTAL	29	14.967				
CV=35.64%					ns	

Appendix Table 16. Population of Hemerobiidae trapped in the attractants

TREATMENTS	REPLICATION			TOTAL	MEAN
	I	II	III		
T_0	0	0	0	0	0.00[b]
T_1	0	0	0	0	0.00[b]
T_2	0	0	0	0	0.00[b]
T_3	0	0	0	0	0.00[b]
T_4	0	0	0	0	0.00[b]
T_5	0	1	0	1	0.33[a]
T_6	0	0	0	0	0.00[b]
T_7	0	0	0	0	0.00[b]
T_8	0	0	0	0	0.00[b]
T_9	0	0	0	0	0.00[b]
T_{10}	0	0	0	0	0.00[b]

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DF	SS	MS	F VALUE	Pr > F 0.5	0.1
Treatments	9	0.300	0.33	1.000[ns]	3.35	5.49
Error	20	0.667	0.33			
TOTAL	29	0.967				
CV=13.05%					ns	

Appendix Table 17. Population of Ichneumonidae trapped in the attractants

TREATMENTS	REPLICATION			TOTAL	MEAN
	I	II	III		
T_0	0	0	0	0	0.00^b
T_1	0	0	1	1	0.33^a
T_2	0	0	0	0	0.00^b
T_3	0	0	0	0	0.00^b
T_4	0	0	0	0	0.00^b
T_5	0	1	0	1	0.33^a
T_6	0	0	0	0	0.00^b
T_7	1	0	0	1	0.33^a
T_8	0	0	0	0	0.00^b
T_9	0	0	0	0	0.00^b
T_{10}	3	0	0	3	1.00^a

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DF	SS	MS	F VALUE	Pr > F 0.5	0.1
Treatments	9	2.833	0.315	0.859^{ns}	3.35	5.49
Error	20	7.333	0.367			
TOTAL	29	10.167				
CV=31.29%					ns	

Appendix Table 18. Population of Micropezidae trapped in the attractants

TREATMENTS	REPLICATION			TOTAL	MEAN
	I	II	III		
T_0	0	0	0	0	0.00^b
T_1	0	0	1	1	0.33^a
T_2	0	0	0	0	0.00^b
T_3	0	1	0	1	0.33^a
T_4	0	0	0	0	0.00^b
T_5	0	1	0	1	0.33^a
T_6	0	0	0	0	0.00^b
T_7	0	0	0	0	0.33^a
T_8	0	0	0	0	0.00^b
T_9	1	1	0	2	0.67^a
T_{10}	0	2	0	2	0.67^a

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DF	SS	MS	F VALUE	Pr > F 0.5	0.1
Treatments	9	2.167	0.241	1.204^{ns}	3.35	5.49
Error	20	4.000	0.20			
TOTAL	29	6.167				
CV=27.60%					ns	

Appendix Table 19. Population of Muscidae trapped in the attractants

TREATMENTS	REPLIATION			TOTAL	MEAN
	I	II	III		
T_0	0	0	0	0	0.00[b]
T_1	67	27	167	261	87.00[a]
T_2	24	24	224	272	90.67[a]
T_3	36	49	260	328	115.00[a]
T_4	23	45	118	186	62.00[a]
T_5	38	60	147	245	81.67[a]
T_6	29	27	145	201	67.00[a]
T_7	31	41	332	404	134.67[a]
T_8	31	69	93	193	64.33[a]
T_9	64	12	312	388	129.33[a]
T_{10}	48	28	233	309	103.00[a]

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DF	SS	MS	F VALUE	Pr > F 0.5	0.1
Treatments	9	18800.133	2088.904	0.184 [ns]	3.35	5.49
Error	20	226775.333	11338.767			
TOTAL	29	245575.467				
CV=48.41%					ns	

Appendix Table 20. Population of Nitidulidae trapped in the attractants

TREATMENTS	REPLICATION			TOTAL	MEAN
	I	II	III		
T_0	0	0	0	0	0.00[b]
T_1	8	62	8	78	26.00[a]
T_2	10	61	7	78	26.00[a]
T_3	16	74	5	95	31.67[a]
T_4	4	35	0	39	13.00[a]
T_5	4	43	1	48	16.00[a]
T_6	2	26	10	38	12.67[a]
T_7	14	63	11	88	29.33[a]
T_8	4	51	2	57	19.33[a]
T_9	16	67	5	88	29.33[a]
T_{10}	8	63	16	87	29.33[a]

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DF	SS	MS	F VALUE	Pr > F 0.5	0.1
Treatments	9	1442.133	160.237	0.202 [ns]	3.35	5.49
Error	20	15862.667	793.133			
TOTAL	29	17.304				
CV=57.93%					ns	

Appendix Table 21. Population of Noctuidae trapped in the attractants

TREATMENTS	REPLICATION			TOTAL	MEAN
	I	II	III		
T_0	0	0	0	0	0.00[b]
T_1	39	17	15	71	23.67[a]
T_2	74	20	24	118	39.67[a]
T_3	35	30	30	95	31.67[a]
T_4	55	15	43	113	37.67[a]
T_5	40	24	33	97	32.33[a]
T_6	65	20	39	124	41.33[a]
T_7	25	16	17	58	19.33[a]
T_8	15	16	24	55	18.33[a]
T_9	35	24	29	88	29.33[a]
T_{10}	34	5	35	74	24.67[a]

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DF	SS	MS	F VALUE	Pr > F 0.5	0.1
Treatments	9	1802.700	200.300	0.815 [ns]	3.35	5.49
Error	20	4912.667	245.633			
TOTAL	29	6715.367				

CV=25.02% ns

Appendix Table 22. Population of Nymphalidae trapped in the attractants

TREATMENTS	REPLICATION			TOTAL	MEAN
	I	II	III		
T_0	0	0	0	0	0.00[b]
T_1	0	0	0	0	0.00[b]
T_2	0	0	0	0	0.00[b]
T_3	0	0	0	0	0.00[b]
T_4	1	0	0	1	0.33[a]
T_5	0	0	0	0	0.00[b]
T_6	0	0	0	0	0.00[b]
T_7	0	0	0	0	0.00[b]
T_8	0	0	0	0	0.00[b]
T_9	0	0	0	0	0.00[b]
T_{10}	1	0	1	2	0.67[a]

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DF	SS	MS	F VALUE	Pr > F 0.5	0.1
Treatments	9	1.367	0.152	2.278 [ns]	3.35	5.49
Error	20	1.333	0.067			
Total	29	2.700				
CV=20.81%					ns	

Appendix Table 23. Population of Plutellidae trapped in the attractants

TREATMENTS	REPLICATION			TOTAL	MEAN
	I	II	III		
T_0	0	0	0	0	0.00[b]
T_1	1	0	0	1	0.33[a]
T_2	0	0	0	0	0.00[b]
T_3	0	0	0	0	0.00[b]
T_4	0	0	0	0	0.00[b]
T_5	0	0	0	0	0.00[b]
T_6	0	0	1	1	0.33[a]
T_7	0	0	0	0	0.00[b]
T_8	0	0	1	1	0.33[a]
T_9	0	0	1	1	0.33[a]
T_{10}	1	0	1	2	0.67[a]

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DF	SS	MS	F VALUE	Pr > F 0.5	0.1
Treatments	9	0.800	0.089	0.667 [ns]	3.35	5.49
Error	20	2.667	0.133			
TOTAL	29	3.467				
CV=23.06%					ns	

Appendix Table 24. Population of Sesiidae trapped in the attractants

TREATMENTS	REPLICATION			TOTAL	MEAN
	I	II	III		
T_0	0	0	0	0	0.00[b]
T_1	0	0	0	0	0.00[b]
T_2	0	0	0	0	0.00[b]
T_3	0	0	0	0	0.00[b]
T_4	0	0	0	0	0.00[b]
T_5	0	0	0	0	0.00[b]
T_6	0	0	0	0	0.00[b]
T_7	0	0	0	0	0.00[b]
T_8	0	0	1	1	0.33[a]
T_9	0	0	1	1	0.33[a]
T_{10}	0	0	0	0	0.00[b]

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DF	SS	MS	F VALUE	Pr > F 0.5	0.1
Treatments	9	0.300	0.33	1.000 [ns]	3.35	5.49
Error	20	0.667	0.33			
TOTAL	29	0.967				
CV=13.05%					ns	

Appendix Table 25. Population of Scarabaeidae trapped in the attractants

TREATMENTS	REPLICATION			TOTAL	MEAN
	I	II	III		
T_0	0	0	0	0	0.00[b]
T_1	0	7	2	9	3.00[a]
T_2	0	2	1	3	1.00[a]
T_3	0	7	2	9	3.00[a]
T_4	0	8	1	9	3.00[a]
T_5	0	6	6	12	4.00[a]
T_6	0	17	1	18	6.00[a]
T_7	0	5	0	5	1.67[a]
T_8	0	6	1	7	2.33[a]
T_9	0	11	0	11	3.67[a]
T_{10}	0	0	0	0	0.00[b]

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DF	SS	MS	F VALUE	Pr > F 0.5	0.1
Treatments	9	75.367	8.374	0.403 [ns]	3.35	5.49
Error	20	416.000	20.800			
TOTAL	29	491.367				
CV=65.91%					ns	

Appendix Table 26. Population of Scatopsidae trapped in the attractants

TREATMENTS	REPLICATION			TOTAL	MEAN
	I	II	III		
T_0	0	0	0	0	0.00[b]
T_1	102	345	70	517	172.33[a]
T_2	42	86	132	260	86.67[a]
T_3	29	100	158	287	95.67[a]
T_4	73	214	43	330	110.00[a]
T_5	103	190	120	413	137.67[a]
T_6	79	121	109	309	103.00[a]
T_7	52	111	90	253	84.33[a]
T_8	75	216	84	375	125.00[a]
T_9	186	101	181	468	156.00[a]
T_{10}	53	75	164	292	97.33[a]

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DF	SS	MS	F VALUE	Pr > F 0.5	0.1
Treatments	9	24442.800	2715.867	0.516 [ns]	3.35	5.49
Error	20	105204.000	5260.200			
TOTAL	29	129646.800				
CV=27.57%					ns	

Appendix Table 27. Population of Staphylinidae trapped in the attractants

TREATMENTS	REPLICATION			TOTAL	MEAN
	I	II	III		
T_0	0	0	0	0	0.00^b
T_1	0	0	0	0	0.00^b
T_2	1	0	0	1	0.33^a
T_3	0	1	1	2	0.67^a
T_4	1	0	0	1	0.33^a
T_5	0	0	0	0	0.00^b
T_6	0	0	0	0	0.00^b
T_7	0	0	0	0	0.00^b
T_8	0	0	2	2	0.67^a
T_9	0	0	0	0	0.00^b
T_{10}	0	1	0	1	0.33^a

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DF	SS	MS	F VALUE	Pr > F 0.5	0.1
Treatments	9	2.033	0.226	0.847^{ns}	3.35	5.49
Error	20	5.333	0.267			
TOTAL	29	7.367				
CV=29.47%					ns	

Appendix Table 28. Population of Sepsidae trapped in the attractants

TREATMENTS	TREATMENTS			TOTAL	MEAN
	I	II	III		
T_0	0	0	0	0	0.00[b]
T_1	0	0	79	79	26.33
T_2	0	0	29	29	9.67[a]
T_3	0	0	32	32	10.67[a]
T_4	1	0	18	19	6.33[a]
T_5	0	1	16	17	5.67[a]
T_6	0	0	9	9	3.00[a]
T_7	0	0	62	62	20.67[a]
T_8	2	0	18	20	6.67[a]
T_9	2	1	25	28	9.33[a]
T_{10}	0	0	17	17	5.67[a]

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DF	SS	MS	F VALUE	Pr > F 0.5	0.1
Treatments	9	1473.200	163.689	0.358 [ns]	3.35	5.49
Error	20	9142.000	457.100			
TOTAL	29	10615.200				
CV=100.27%					ns	

Appendix Table 29. Population of Tabanidae trapped in the attractants

TREATMENTS	REPLICATION			TOTAL	MEAN
	I	II	III		
T_0	0	0	0	0	0.00^b
T_1	0	0	0	0	0.00^b
T_2	0	0	0	0	0.00^b
T_3	0	0	0	0	0.00^b
T_4	0	1	0	1	0.33^a
T_5	0	0	0	0	0.00^b
T_6	0	0	0	0	0.00^b
T_7	0	0	0	0	0.00^b
T_8	0	0	0	0	0.00^b
T_9	0	0	0	0	0.00^b
T_{10}	0	0	0	0	0.00^b

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DF	SS	MS	F VALUE	Pr > F 0.5	0.1
Treatments	9	0.300	0.33	1.000^{ns}	3.35	5.49
Error	20	0.667	0.33			
TOTAL	29	0.967				
CV=1.000%					ns	

Appendix Table 30. Population of Tephtritidae trapped in the attractants

TREATMENTS	REPLICATION			TOTAL	MEAN
	I	II	III		
T_0	0	0	0	0	0.00^b
T_1	0	1	0	1	0.33^a
T_2	0	2	0	2	0.67^a
T_3	1	1	0	2	0.67^a
T_4	1	4	0	5	1.67^a
T_5	1	1	1	0	1.00^a
T_6	0	1	3	4	0.00^b
T_7	0	0	0	0	0.00^b
T_8	0	1	0	1	0.33^a
T_9	0	1	4	5	1.67^a
T_{10}	0	0	0	0	0.00^b

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DF	SS	MS	F VALUE	Pr > F 0.5	Pr > F 0.1
Treatments	9	10.700	1.189	0.892^{ns}	3.35	5.49
Error	20	26.667	1.333			
TOTAL	29	37.367				
CV=41.56%					ns	

Appendix Table 31. Population of Tipulidae trapped in the attractants

TREATMENTS	REPLICATION			TOTAL	MEAN
	I	II	III		
T_0	0	0	0	0	0.00[b]
T_1	0	0	0	2	0.67[a]
T_2	1	0	1	2	0.67[a]
T_3	2	0	2	4	1.33[a]
T_4	4	0	0	4	1.33[a]
T_5	1	0	1	2	0.67[a]
T_6	0	0	1	1	0.33[a]
T_7	1	1	5	7	0.00[b]
T_8	3	0	2	5	0.33[a]
T_9	0	0	0	0	0.00[b]
T_{10}	3	0	0	3	1.00[a]

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DF	SS	MS	F VALUE	Pr > F 0.5	0.1
Treatments	9	12.667	1.407	0.716 [ns]	3.35	5.49
Error	20	39.333	1.967			
TOTAL	29	52.000				
CV=44.08%					ns	

Appendix Table 32. Population of Thripidae trapped in the attractants

TREATMENTS	REPLICATION			TOTAL	MEAN
	I	II	III		
T_0	0	0	0	0	0.00^b
T_1	0	0	0	0	0.00^b
T_2	0	0	0	0	0.00^b
T_3	0	0	0	0	0.00^b
T_4	0	0	0	0	0.00^b
T_5	0	0	0	0	0.00^b
T_6	0	0	0	0	0.00^b
T_7	0	0	0	0	0.00^b
T_8	0	2	0	2	0.67^a
T_9	0	0	0	0	0.00^b
T_{10}	0	0	0	0	0.00^b

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DF	SS	MS	F VALUE	Pr > F 0.5	0.1
Treatments	9	1.200	0.133	1.000^{ns}	3.35	5.49
Error	20	2.667	0.133			
TOTAL	29	3.867				
CV=21.67%					ns	