

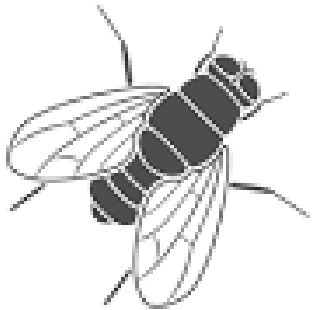
The background is a solid teal color. There are several black, hand-drawn style swirls scattered across the page. A large, white, horizontally-oriented oval with a thin black outline is positioned in the center. To the upper left of this oval are three smaller, white, vertically-oriented ovals of decreasing size, also with thin black outlines, arranged in a line that suggests a thought bubble.

FRUIT TREE PREFERENCES AND TRAPPING RATES OF FRUIT FLIES IN PALAU.

By: Courtney D. Tervet

TABLES OF CONTENT:

- ❖ Background Information
- ❖ Research Questions/ Hypothesis
- ❖ Materials and Methods
- ❖ Results
- ❖ Discussion of Results
- ❖ Conclusion
- ❖ Acknowledgement



Fruit flies are considered to be an important insect pest species of cultivated fruits in the world. Fruit flies are a huge genus with more than 4,500 species in the world. Only 50 species of fruit flies have been identified as major pests.

*In Palau, there are four species of fruit flies that have been identified: Mango fruit fly (*Bactrocera frauenfeldi*), Bread fruit fly (*Bactrocera umbrosa*), Oriental fruit fly (*Bactrocera dorsalis*) and Calophyllum fruit fly (*Bactrocera calophylli*).*

BACKGROUND INFORMATION

The oriental fruit fly, was first detected in Palau in 1996, which is the most destructive species present. Bread fruit fly, Mango fruit fly, and Calophyllum fruit fly were detected in the late 90's, and unlike the oriental fruit fly they are the least destructive

RESEARCH QUESTION/HYPOTHESIS

What are fruit flies?

What are the origin of fruit flies?

What species of fruit flies are commonly found in Palau?

What species of fruit flies are rarely, but have been found in Palau?

What fruit bearing trees are fruit flies attracted to?

What are the methods and ways to catch fruit flies?

Are there ways to solve this issue?

MATERIALS AND METHODS

METHODS

- i. Step one- collected disposed yeast from a local brewery.
- ii. Step two- mix yeast with crushed papaya leaves and isopropyl.
- iii. Step three- Add mixture into a recycled water bottle, and attach 3-d printed attachment onto it.
- iv. Step four- trap to a fruit-bearing tree, and retrieve after a few days.



MATERIALS:

- i. 3D- printed attachment
- ii. Bait (made with yeast from local brewery and crushed papaya leaves)
- iii. Isopropyl
- iv. Recycled bottle
- v. 3D-printer



There are other methods to catch Fruit flies, But here in PCC, we have Discovered our own trapping method.

RESULTS

2019 Results:



#	<u>SPECIES</u>	
	Name:	%
1.	<i>D. lanaiensis</i>	2%
2.	<i>D. sechellia</i>	22%
3.	<i>B. dorsalis</i>	74%
4.	<i>D. pseudoobscura</i>	2%

#	<u>HOSTPLANT:</u>	
	Name:	%
1.	Papaya	5%
2.	Starfruit	7%
3.	Mango	18%
4.	Angel Tree	1%
5.	Lemon	17%
6.	Guava	34%
7.	Unknown tree	20%

- ❖ The 2019 project about fruit flies was conducted by Mederang Takeo. The table indicates her finding, and the host plant

RESULTS

2022 Results:

- ❖ In the 2022 results, this experiment was conducted by Iyeched Sengebau. As you can see in the table, there has been changes ever since 2019...



#	<u>SPECIES</u>	
	Name:	%
1.	D. lanaiensis	13%
2.	D. sechellia	28.3%
3.	B. dorsalis	58.5%
4.	D. pseudoobscura	N/A

#	<u>HOSTPLANT:</u>	
	Name:	%
1.	Papaya	47.4%
2.	Starfruit	N/A
3.	Mango	10.5%
4.	Angel Tree	N/A
5.	Lemon	N/A
6.	Guava	5.3%
7.	Unknown tree	N/A
8.	Banana	10.5%
9.	Imekurs	5.3%
10.	Rebotel	15.8%

RESULTS

2023 Results:

#	<u>SPECIES</u>	
	Name:	%
1.	D. lanaiensis	N/A
2.	D. sechellia	N/A
3.	B. dorsalis	50%
4.	D. pseudoobscura	N/A
5.	B. frauenfeldi	21.4%
6.	B. umbrosa	28.6%

❖ This 2023, I have conducted a thorough experiment on my findings, and in my results, there have been added other species into the findings. The table indicates those findings...

#	<u>HOSTPLANT:</u>	
	Name:	%
1.	Papaya	25%
2.	Starfruit	N/A
3.	Mango	11.1%
4.	Angel Tree	N/A
5.	Lemon	N/A
6.	Guava	19.4%
7.	Unknown tree	N/A
8.	Banana	22.2%
9.	Imekurs	8.3%
10.	Rebotel	2.8%



DISCUSSIONS

Based on my research, it seems that all fruit flies are invasive in Palau. However, there are four species that are commonly found here, including *Bactrocera frauenfeldi*, *Bactrocera umbrosa*, *Bactrocera dorsalis*, and *Bactrocera calophylli*. Interestingly, there are also a few other species, such as *Drosophila lanaiensis*, *Drosophila sechellia*, and *Drosophila pseudoobscura*, that are rarely found in Palau. It's possible that these other species are brought in with international fruits that are shipped from other countries, which could be a cause for concern since these fruit flies can cause significant damage to crops.

SPECIES OF FRUIT FLIES THAT HAVE BEEN CONDUCTED HERE IN PALAU:

1. *Drosophila lanaiensis*-----Endemic to Hawaii
2. *Drosophila sechellia*-----Endemic to Seychelles
3. *Bactrocera. dorsalis*-----Native to large parts of Tropical Asia
4. *Drosophila pseudoobscura*----- Native to North America
5. *Bactrocera frauenfeldi*-----Native to Pacific Region
6. *Bactrocera umbrosa*-----Native to the Pacific Regions
7. *Bactrocera calophylli*-----Native to some parts of Tropical Asia

CONCLUSION

We have discovered various solutions for capturing fruit flies, including a homemade water bottle bait and a 3D-printed attachment. Our research has been successful in catching fruit flies around Palau Community College, Kayangel State, and some areas in Koror State. However, we are now focusing on understanding the root cause of the situation. After conducting a thorough analysis, we have come to the conclusion that fruit flies will take a significant amount of financial and human resources to be completely eliminated from Palau due to their attraction to green waste and compost.

Similar to the Coconut Rhinoceros Beetle, fruit flies lay their eggs on host plants and feed on them until they rot. We have gained a comprehensive understanding of the cause and effect of this situation, and through further experimentation and experience, we hope to prevent this issue from becoming more prevalent in the future.

ACKNOWLEDGEMENT

- Christopher Kitalong, PhD, Pacific Academic Institute for Research (PAIR)
- Palau Community College (Cooperative Research Extension)
- Pacific Academic Institute for Research
- Jacques Idechong- Mentor
- University of Manoa in Hawaii- Coordinating center
- Step-Up Colleagues:
 - Limei Orukem
 - Iara Ngiruos
 - Iyechad Sengebau