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BIO 209/Cox

Research Project Final Draft

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I. Introduction

Jackass Bitters, *Neurolaena lobata*, is a plant found in tropical regions throughout Central America, Belize, Guatemala, etc. that is used by many indigenous peoples as a medicinal plant. Jackass Bitters is an herb with few main stems and numerous branches on each stem, with the leaves having three distinctive points. It is bitter tasting and has yellow flowers, and typically grows 1-4 meters high. The leaves of this common Central American tall, bushy plant contain a potent anti-parasitic agent (sesquiterpene dialdehyde) that is active against amoebas, intestinal parasites, candida and giarrdia (Wagner, 2000). A tincture of this plant has also been an effective treatment for Type II diabetes and can help regulate blood glucose levels (Raven/Freeman, 121). In addition, Jackass Bitters can be used as an insect repellent.

For this research, I collected numerous leaves from the Jackass Bitters and used them to determine how different dosages of the plant are needed to kill different organisms. I also wanted to collect samples of these parasitic organisms through stream samples and evaluate how much of the plant is needed to effectively kill these organisms. I ended up straying slightly away from this focus once in Sibun, as supplies were limited and the amount of organisms were limited. Through this research, my hypothesis and

experiment focused on the organisms that responded to the set solution of Jackass Bitters. I proposed it would kill all of the organisms, relatively fast.

II. Materials and Methods

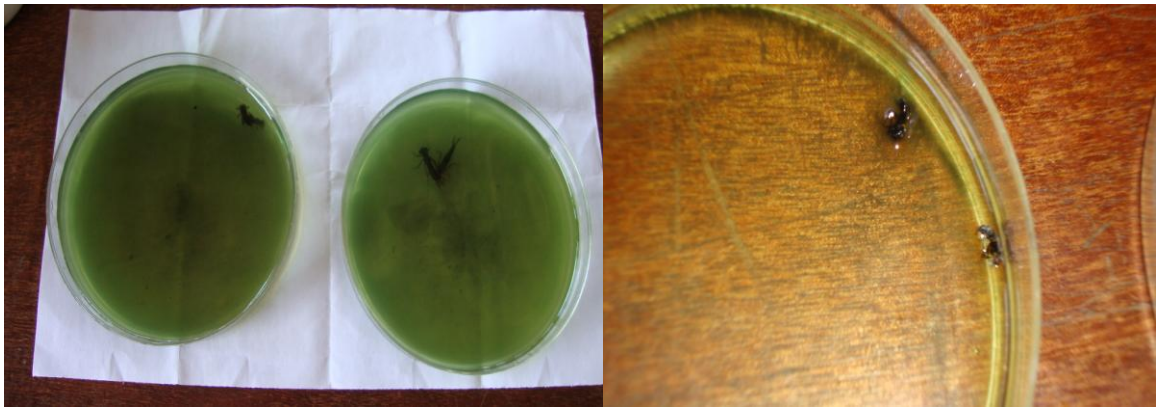
To conduct the research, a grinder and mortar were used, along with five Petri dishes, a ten milliliter test tube, a one milliliter eye dropper (pipette), paper and pencil, sample cups, and a bottle for collecting stream water. Also, a Rapid Test 4-in-1 reader, and a HM digital EC/TPS/Temp Com 100 reader were used; tools for measuring the PH and temperature of the different solutions.

1. The stream organisms that were collected were (2) Crawling Mayflies, (2) Damsel flies, (2) Hellgramites, and (2) Black Fly larvaes. Two Black Ants were also collected back at the station at Sibun.
2. The five different species were separated into different Petri dishes and labeled.
3. The leaves from the Jackass Bitters plant were the only plant material used, and 5.3 grams of the leaves were used for this experiment.
4. The leaves were divided into smaller pieces (easier for grinding) and combined with 30 milliliters of stream water in the mortar.
5. The grinder was then used continuously for about 10 minutes, drawing out the oils from the leaves and creating a rich, green liquid stock.
6. In each Petri dish, 30 milliliters of stream water was added, as well as 2 milliliters of the Jackass Bitters Stock in each dish.

III. Results

The stream water had a ph of 6.8, 209 ppm (water clarity), and had a temperature of 80.2 Fahrenheit (27 Celsius.) The Jackass Bitters stock had a ph of 7.0, 590 ppm, and a temperature of 77.7 Fahrenheit (25.4 Celsius.) The Jackass Bitters stock and the stream water (solution in Petri dishes) had a ph of 6.9, 282 ppm, and a temperature of 80 Fahrenheit (26.7 Celsius.) The results with the black ants were the most shocking, with both dying in about 6 minutes. The Black Fly larvae also died in less than an hour.

Petri Dish Number	Species (2 each)	Amount Jackass Bitters solution Added	Time Added	Result
1	Crawling Mayflies	2 ml/30 ml stream water	2:42pm	No change
2	Damsel Flies	2 ml/30 ml stream water	2:40pm	No change
3	Hellgramites	2 ml/30 ml stream water	2:39pm	No change
4	Black Fly Larvae	2 ml/30 ml stream water	2:37pm	Died at 3:15pm
5	Black Ant	2 ml/30 ml stream water	2:36pm	Died at 2:42pm



IV. Conclusion

Two out of five of the species responded to the Jackass Bitters. After monitoring the other organisms for about another 1 ½ to 2 days, there weren't any changes, and they were released back into the stream. I proposed that all of the organisms would die once exposed to the Jackass Bitters. Perhaps I would have better results if I were able to find specific parasites, amoebas, etc. I also think there is some relation to the organisms that survived and their normal aquatic environment, perhaps the black ants and the black fly larvae simply drowned. It was interesting how fast it killed the ants, however, and provides more validity as the plant being used as a natural insecticide. According to a website for Field Guides in Belize, "Boiled and strained leaves can be used as an insecticide for house and garden plants."

As I imagine, it would be difficult and perhaps impractical to conduct experiments that pertain to specific organisms and study more of the medicinal benefits of this plant, being that time is limited while in Sibun for research and finding the organisms, but it would be very interesting to study various dosages, how long it took to kill parasites, etc. According to Walsh (2003), "Jackass Bitters is a highly respected

medicine used to treat and prevent a variety of parasitic ailments, such as malaria, ringworm, intestinal parasites and organisms, like beefworm. Jackass Bitters is the main ingredient in “Traveler’s Tonic,” a rainforest remedy made in Belize and used for tourists suffering from malaria; it is also used to bath stubborn wounds or infections, including fungal infections.” Another interesting experiment, knowing that it is highly effective against black ants, is to develop the lowest dose needed or the exact amount of the plant needed for the a natural pesticide solution to be effective. I would venture to guess that Jackass Bitters would work on other species of ants, perhaps an experiment could be done on different species, and especially those in developed countries where environmentally unsafe & harmful commercial and residential pesticides are often used. Jackass Bitters has been used in Belizean and Mayan culture, its natural healing capabilities utilized for thousands of years. With more research, perhaps it can be developed into a natural alternative to pharmaceuticals, insecticides, and pesticides.

"For every ailment on earth God has provided a cure. Our task is to find them." - Don Elijio Panti, Shaman of Belize, 1893-1996

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