CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Matthew G. Austin

Project Number
J2001

Project Title
Which Characteristic Is Most Influential in Attracting Bees to a Flower: Fragrance, Color or Flavor?

Abstract

Objectives/Goals
The objective is to determine the color, fragrance, and flavor that are most attractive to bees. Then to determine which of these three characteristics plays the most important role in attracting bees.

Methods/Materials
The color, fragrance, and flavor variables will be isolated to identify the ones that bees tend to go to first. For the fragrance test, several flowers that the bees are known to pollinate will be pulverized individually in a food processor and strained through cheesecloth to collect the residue. The residue will then be streaked into separate circles on a piece of poster board. For the color test, 5-inch diameter circles will be cut out of nine different shades of paper and taped onto another piece of posterboard. For the flavor test, various flavors will smeared into separate circles on another posterboard surface. Then, combinations of the three variables will be made. The bees reactions and selections will be recorded.

Results
When characteristics were tested individually bees were not attracted to color and flavor posterboards. Only the fragrance boards attracted bees. The most popular flower fragrances were Vyron Pom Pons, Waxflower and Freesia. Since no taste preference was established, Bee Syrup was used for all combination boards. When testing combined flavor, color and taste boards, bees favored Stock(fragrance) with purple(color), Freesia(fragrance) with red(color), and Vyron Pom Pons(fragrance) with yellow(color). Combination boards to evaluate color preference showed bees favored yellow, green and light pink.

Conclusions/Discussion
Bees were only attracted to test boards with fragrance. Therefore fragrance is the most influential characteristic in attracting bees to a flower.

Summary Statement
To determine which characteristic is most influential in attracting bees to a flower: fragrance, color or taste.

Help Received
Mike Mulligan, the beekeeper, who advised me throughout my science project and let me use his beehives.My parents for driving me to the test site. Mr. Keller, my science teacher, for encouraging and guiding me throughout my science project.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Kelley C. Boland

Project Number
J2002

Project Title
Ant Attack: Do Ants Bite and Chase Other Insects off Castor Bean Plants?

Abstract

Objectives/Goals
Castor bean plants are invasive shrubs that often have Argentine ants crawling on them. The ants are attracted to extrafloral nectaries, which are nectar producing glands outside the flowers. Because I saw the ants getting nectar from the plant, I wondered if the plant was getting anything in return. I hypothesized that the ants on castor beans would bite and chase away other insects.

Methods/Materials
I tested my hypothesis by doing a series of tests in which I placed locusts on a castor bean stem and recorded the interaction between the ants and locusts. I tested six locusts, one at a time. I also tested one caterpillar.

Results
I found that all of my tested insects were bitten by the ants. In 321 minutes of locust observations, I recorded a total of 198 bites. One of the locusts was bitten 97 times within 28 minutes. All were chased from the stem, where they were bitten most, to a petiole, and out to a leaf, where they were not bitten at all. All six locusts were upset when the ants were biting, and tried to flick the ants away with their legs. The caterpillar was bitten a total of 238 times in 81 minutes and died as a result.

Conclusions/Discussion
My first conclusion is that my hypothesis was supported: all of the insects were bitten and chased by the ants. My second conclusion is that both ants and castor bean plants benefit from this relationship - the ants get food and the plants get protection. My third conclusion is that this is an example of a mutualistic relationship between two species that did not co-evolve; it appears that the ant from Argentina and the plant from Africa and Asia are working together to invade California's wildlands.

Summary Statement
I found a plant-animal mutualism: castor bean plants attract ants by using extrafloral nectaries, and the ants bite and chase other insects away from the plants.

Help Received
Family provided general guidance, transport to and from study site, and assistance in the field; Ms. O'Donnell, advisor, provided helpful suggestions and encouragement.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Elizabeth C. Brajevich

Project Number
J2003

Project Title
Acting Fishy: The Comparison of Growth between Frogs and Trout

Abstract

Objectives/Goals
The objective of this project is to find the internal and external similarities in growth between bullfrogs and freshwater trout.Then trace their ancestry to see which common ancestors they share and what traits they share with their common ancestors as well.

Methods/Materials
MATERIALS;1Bag of compressed algae food pellets,Soft fish net,Tub of lettuce,Digital camera and memory card,Computer,Image analysis oftware called Morphus,table, aquatic plants and sand bags,Plastic aquarium totes with snap on lids,10 gallons of rainwater,5 tadpoles,Fish food container
METHODS;1.Order tadpoles from Bailey#s pet store. 2 Set up tadpoles in there new living environment and see that they are happy and safe.3.Feed the tadpoles small amounts of food multiple times a day and use turkey baster to clean tank feces daily.4.Create a chart in which you can record the length, width, behavior, eating habits, and new body structures of the tadpoles daily. Print with lots of room for observations!5.Take a picture every three days of each tadpole to see size changes. 6.Measure the tadpoles every three days 7.Continue to repeat steps 4, 6, and 7 as specified to keep tadpoles safe and well observed.8.Order trout growth textbook.9.Note and record trout growth and keep track of similarities.10 Find pictures of young trout at the same age as the tadpoles in all the tadpole pictures.11.Compare pictures of tadpoles and trout at same age using the morphology software.12.Compare written notes on tadpoles from charts to the information on growth in the books on trout.13.Compare growth of frogs to growth of trout to try to prove hypothesis.

Results
Trout and tadpoles both have an notochord, paired appendages, and pass through a stage called the pharygald, in which they look like finless legless creatures with large eyes,mouths,and tails.Their eating habits and intestinal changes are quite similar as well,they eat algea with long intestines and change to eating insects with short intestines.They both develop fins and feet in the same area,directly where the body meets the tail.Both bullfrog tadpoles and baby trout feed off of a yolk sack in their gut for the first five days after birth.Their growth was so similar due to their common ancestors.

Conclusions/Discussion
Bullfrogs and Freshwater trout share many similarities and ancestors, proving my hypothesis corect.

Summary Statement
I observed bullfrogs and trout and found similarities in their growth and then traced their ancestry to see where these traits derived from.

Help Received
Ms. Shell (curent physics teacher) served as my advisor. Mr.Snodgrass(seventh grade teacher) reminded me of the basics of cladogram making. Three of my friends helped in the visual design of the board.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Austin T. Garcia

Project Number
J2004

Project Title
The Lighted Chicken Coop

Abstract

Objectives/Goals
My objective was to determine if laying hen chickens would lay more eggs if artificial light was added each day as compared to laying hen chickens that only had natural light.

Methods/Materials
Ten laying hen chickens were divided into two groups of five and put into separate pens. One pen had natural light only and the other pen had an electric light on a timer. The experiment lasted 50 days. For the first 25 days, the electric light group received a total of 16 hours of combined artificial and natural light. For the next 25 days, the electric light group received a total of 12 hours of combined artificial and natural light. During the 50 days, the chickens in the natural light pen received natural sunlight. The eggs from both pens were collected, counted and the data was recorded each day.

Results
Chickens with 16 hours of light per day produced an average of 4.08 eggs per day. Chickens with 12 hours of light per day produced an average of 3.84 eggs per day. Chickens with only natural light produced an average of 2.82 eggs per day.

Conclusions/Discussion
Chickens that received more light per day laid more eggs, and a reduction in the amount of light per day reduced the number of eggs laid.

Summary Statement
My project is to determine if the amount of light affects egg production for laying hen chickens.

Help Received
My parents helped me set up the chicken coops and helped feed the chickens. They helped me type the report and work on the board layout.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Diana T. Gateno

Project Number
J2005

Project Title
Embryonic Development Rates of Taricha torosa Subjected to Varying Light Levels

Abstract

Objectives/Goals

Question: Does the amount of full spectrum light in a newt egg#s surroundings determine embryonic development and hatch rate?

Hypothesis: The newt eggs will develop and hatch quicker with the equivalent of some sunlight penetration

Methods/Materials

1. Identify a known newt pond location
2. Collect water from adjacent freshwater watershed
3. Hike up to newt pond and check for newt displaying mating behavior.
4. Collect two amplexing pairs of newts (male/female pair in courtship)
5. Measure equal amounts of water (2 cups) for the newt eggs# permanent containers
6. Make sure water samples are at desired temperatures for each tank prior to contact with the eggs.
7. Set up two identical tanks with aerator systems and egg attachment points
8. Allow newts to mate and lay eggs. Remove newts after eggs have been laid.
9. Cover one of the tanks completely so that no light penetrates into the tank, allow the second tank to remain clear for light penetration
10. Tank A will consist of exposure of eggs to full spectrum light
11. Tank B will consist of no light exposure
12. Record any initial differences
13. Check tanks daily and photograph embryos
14. Record time of first noticeable embryonic movement
15. Draw conclusions

Results

Eggs exposed to full spectrum light developed at a faster rate than those kept in a darkened environment. The embryos in Tank A (light tank)developed a comma shape several days ahead of their counterparts in Tank B (darkened tank). They also exhibited movement inside of their eggs at a much earlier

Conclusions/Discussion

Based upon the difference between the samples, I conclude that when female newts lay their eggs in nature, they want to ensure they lay them close enough to the surface of the water so that ultra-violet light penetrates to the eggs. However, if she lays the eggs too close to the water's surface, there is a danger that

Summary Statement

Does exposure of newt eggs to full spectrum light affect the rate of embryonic development?

Help Received

East Bay Regional Park District naturalist Cynthia Taylor oversaw collection and set up of this experiment.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Devon T. Gearhart

Project Number
J2006

Project Title
Captive Lizard Observation

Abstract

Objectives/Goals
The main reason I did this experiment was because I wanted to see how the nocturnal Leopard gecko and the Crested Gecko and the diurnal Bearded Dragon act at different times of the day.

Methods/Materials
My pet lizards of different species; The Leopard Gecko (Eublepharis macularius), The Crested Gecko (Rharodactylus cilatus) and the Bearded Dragon (Pogano viticeps). I plan to observe them at regular times of the day to determine behavioral patterns and activities of my lizards.

Results
What I learned from my observational experiment was the unpredicted activities of the lizards; for example the nocturnal lizards exibited a good amount of activity during the day. The diurnal lizard exibited nearly no activity during the night, but was alert and active most all the time during the day. My results of their specific activities have been summarized graphically in my display. The activities and behaviiors of feeding, shedding, drinking are all documneted with their affiliated times.

Conclusions/Discussion
My lizard observational study revealed many unique activities and behaviors in my lizards, that I, as the casual lizard pet owner did not observe. What I was able to witness during my observational study however really opened my eyes to what their behavior may be like in their natural habitat and conditions. I also became aware of how their behavior and activities have become modified due to captive conditions. My results are represented both graaphically and in narrative in my completed study results.

Summary Statement
My project is about the behaviors and activities of different species of lizards.

Help Received
I would like to thank my Mom for helping me get the materials. I would like to thank my Dad for helping out with the handling of the lizards, providing knowledge about the lizards, and for taking me to get supplies for my lizards.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
John P. German

Project Number
J2007

Project Title
Let the Bird Fly Faster!

Abstract

Objectives/Goals
My goal of this project is to see if a single homing pigeon will fly faster in cooler morning conditions or in warmer late afternoon conditions.

Methods/Materials
The materials in which I used for this project were; one homing pigeon, a timer, a thermometer, a tablet and pencil, two cell phones, a basket to carry the bird in.
The method in which I used was; take the same homing pigeon in a basket 5 miles away from its loft while another person stays there with a timer, a thermometer, and a cell phone. Call the other person at the loft to start the timer at the same time the bird is let go. Time the bird untill it lands on the roof of the loft. Record the time and temperature when the bird lands on the roof for record keeping. Gather this data in the early morning and late afternoon for 4 consecutive days and present it on a graph.

Results
The homing pigeon consistantly demonstrated faster flight in the warmer late afternoon than in the cooler early morning. The temperature did seem to affect the flight speed of this bird.

Conclusions/Discussion
If a single homing pigeon is flown in the late afternoon when it is warmer, then it will fly faster than if it is flown in the early morning when it is cooler.

Summary Statement
My project is about demonstrating that a single homing pigeon will fly faster in warmer afternoon temperatures rather than in cooler morning temperatures.

Help Received
Mother helped type report; Father helped make graphs on board; Mother and Father helped me by driving to and from bird loft and also by calling me and letting pigeon go.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Taryn T. Harris

Project Number
J2008

Project Title
Anthocyanins vs. Anthoxanthins: Will Helix aspersa Exhibit a Preference?

Abstract

Objectives/Goals
The purpose of this experiment was to see if Helix aspersa or Gastropoda pulmonata would exhibit any preferences for anthocyanin pigments over anthoxanthin pigments in pansies. It seemed the blue and purple pansies in my garden were being eaten more often than the yellow or white pansies. I wondered if this could be true.

Methods/Materials
In my experiment I used premium white, yellow, blue, and purple pansies, snails, and slugs. I placed four pots of colored pansies in four corners of a box and placed a screen lid on top. I made observations for 120 hours. I verified the petal pigments by making extracts from the petals, then testing the extracts with citric acid, vinegar, distilled water, baking soda, washing soda. Universal indicator and narrow range pH paper were used to document the pHs of the test solutions of citric acid, acetic acid, water, baking soda, and washing soda. Three repetitions of the pigment experiment were performed for each of the four petal extracts.

Results
The results of the pansy pigment petal tests revealed that the blue and purple pansies contained anthocyanin pigments, and the yellow and the white pansies contained anthoxanthins. Adult Helix aspersa were usually observed on the blue or purple pansy (anthocyanin) flowers. The younger snails seemed to spend more time on the yellow or white pansies (anthoxanthin pigments). The slugs (Gastropoda pulmonata) were observed on anthocyanin flowers, but not on anthoxanthin (yellow or white) pansies. Gastropoda pulmonata seemed to prefer anthocyanins over anthoxanthins. Adult Helix aspersa seemed to prefer anthocyanins. A few young Helix aspersa were also on the anthocyanin pigmented pansies. The smaller snails seemed to prefer the yellow or white (anthoxanthin) pansies. The Gastropoda pulmonata (slugs) seemed to eat only anthocyanin pigmented pansies.

Conclusions/Discussion
In my second experiment, which tested only white pansies (anthoxanthins) and deep purple pansies (anthocyanins), I numbered 30 large and small snails and placed them in a box. Every 24 hours, I would rotate the box so sunlight would not be an issue. The results of this experiment were that the young and adult snails preferred purple pansies (anthocyanins). There were never more than two Helix aspersa, young or adult, on the white pansies. This second experiment verified that Helix aspersa exhibited a preference toward anthocyanin-pigmented pansies.

Summary Statement
I noticed the blue and purple pansies (anthocyanin pigments) in my garden seemed to be eaten by Helix asperesa more frequently than the white or yellow pansies (anthoxanthin pigments); my project attempted to discover if this might be true.

Help Received
Thanks to my mother, who drove me to Armstrong Garden Center to purchase the pansies. Thanks to my science teacher who supervised me in the school laboratory and provided me with citric acid.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Nanor H. Kassabian

Project Number
J2009

Project Title
Too Hot, Too Cold, Just Right: The Effect of Temperature on the Development Time of Drosophila melanogaster

Abstract

Objectives/Goals
The objective of my experiment was to find out how temperature affects the development time of Drosophila melanogaster. My hypothesis was that as the temperature increased, the development time of the fruit flies decreased.

Methods/Materials
First, I anesthatized the flies by cooling them in the freezer. Next, I separated the males from the females. Then, I put ten pairs of each into nine labeled containers. I set the fruit flies in the areas of each of their experimental temperatures, and observed them for their development.The materials that I used were: areas with the experimental temperatures, wild fruit fly culture, magnifying glass, fruit fly media, thin paint brush, light source, gloves, cold surface, nine labeled containers with lids, and a measuring cup.

Results
I found out that at the lower and higher temperatures there were less flies. There were much more flies at 25º C. At 28º C, the fruit flies developed quicker, but were less. The 20º C temperature resulted in the longest development time of Drosophila melanogaster.

Conclusions/Discussion
These results agreed with my research, but the development time of all three temperatures took longer than I expected. For example, at 20º C, development time took about 23 days, but according to my research, at 18º C, it should have taken about 19 days. At 25º C, development time took about 16 days, but based on my findings should have taken about 9 days. At 28º C, development time took about 11 days, but based on my research should have taken 7 days.

Summary Statement
My project is about how temperature affects the development time of the fruit fly, Drosophila Melanogaster.

Help Received
Mother helped in handling the flies; Father helped in organizing the display board and taking pictures.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
McKay Mohun; Carl Olson

Project Number
J2010

Project Title
Eggxactly: Incubation Information

Abstract

Objectives/Goals
Our objective was to determine the relationship of incubation time and egg volume in various bird species.

Methods/Materials
We selected several bird species based on their availability of fertile eggs and different egg sizes. our final selection included two species of quail, chicken, and duck eggs. we purchased an incubator that could accomadate all of our selected eggs.

After measuring the volume of all the eggs, we placed them in the incubator at a set temperature, which was a mean of the ideal incubation temperature for all four bird species. When the eggs hatched, we recorded the date and time. We then composed a chart showing the average time of hatching and average volume of the eggs.

Results
We calculated the mean incubation times from the actual recorded time to hatching for various bird species. These data points were plotted on the Y-axis of a graph agaist X-axis which showed the average volume of each bird species.

Conclusions/Discussion
We concluded that our project's hypothesis was met because in general, egg incubation time is proportionate to egg volume. The information from our project expands the knowledge in ornithology by showing that, in general, eggs with a larger volume take a longer period of time to incubate than eggs with a smaller volume.

Summary Statement
To evaluate the relationship of incubation times and egg volumes in a variety of bird species.

Help Received
Mother helped support idea for project and helped type report; Partner's mother helped in getteing all supplies.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Julia M. Riedelsheimer

Project Number
J2011

Project Title
Comparing Aggressive Behavior of Chicken Genders at Various Stages of Development

Abstract

Objectives/Goals
I will compare aggressive behavior in chicken genders at various stages of development. I will determine if roosters are more aggressive than hens when they encounter different challenge obstacles. I am using 10 roosters and 10 hens. I will do this investigation in a 7 by 4 foot rectangular box. I will test 5 chickens at a time: 3 roosters and 2 hens. I will put the chickens at one end of the box and the food at the other. I will measure aggressive behavior by timing to see which chicken gets to the feed first. The first challenge is a 10 inch wall to see how quickly the chickens get over the wall to the feed. The second challenge is to put a fan behind the food. The third challenge is a small feeding container. I will do 20 trials for every challenge. I will use 4 month old chickens and then I will repeat this investigation with three week old chicks and compare the results. I will learn if roosters are more aggressive in feeding then hens and at what stage this occurs.

Methods/Materials
10 hens(4 months)10 roosters,7 by 4 foot box,10 inch board, feed,tape,fan,4 hen chicks, 4 rooster chicks,long feeder,small feeding container,stop watch

Results
Control with the 4 month old chickens, the hens the quickest average 38.70 seconds. 10 inch wall the roosters were first average 40.49 seconds. Strong wind the roosters first average 46.23 seconds. Single small feed container the roosters were first average 31.49 seconds. The results for the 3 week old chicks are still in progress.

Conclusions/Discussion
I learned that the roosters at four months of age, are more aggressive than hens when there are different challenges in place. When the hens and roosters were timed in the control, the hens on average got to the food first. When I placed different variables like the wall and the fan, the roosters showed their aggressiveness over the hens by getting to the food first. The challenge that showed the most difference was the small feed container. The chickens I used were only 4 months old and I can already see the aggressive behavior compared to the hens. I plan to continue this experiment with 3 week old chicks and compare the results. In my experiment so far I found that in a non-challenging environment the gender feeding habit did not change. When forced with a challenge the male definitely becomes more aggressive. Further testing with 3 week old chicks is necessary to see if this behavior continues.

Summary Statement
The purpose of my project is to compare aggressive behavior in chicken genders at various stages and determine if roosters are more aggressive then hens when they encounter different challenge obstacles.

Help Received
Mother helped type my report

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Sarah Y. Root

Project Number
J2012

Project Title
Can Desert Tortoises (Gopherus agassizii) See Color?

Abstract

Objectives/Goals
My goal was to see if desert tortoises (Gopherus agassizii) can see color.

Methods/Materials
A box was built and X#s marked for the placement of roses and the tortoise. Carnation pairs were randomly chosen and assigned to the left or right X position. A sunny day was chosen since it warmed up the desert tortoise#s metabolism. Also, I did not feed the tortoise for 48 hrs so she was motivated to go after the carnations. There were 10 conditions with 6 trials each. I recorded which carnation the tortoise went to and attempted to eat first.

Results
My hypothesis was not supported because maybe the desert tortoise can actually see color. Of the 10 conditions, in only 3 conditions was each of the pair chosen equally. Overall, the tortoise chose the white carnation 67% of the time versus any of the color carnations 33% of the time. There was no preference for the color red, either. However, there was a left versus right preference. The carnation on the left was chosen 62% of the time versus 38% for the carnation on the right.

Conclusions/Discussion
The most obvious reason my hypothesis was not supported may have been because the desert tortoise can actually see color. The small sample size (n=1) probably contributed to the findings. However, because the desert tortoise is endangered, it would have been difficult to use a larger number. Also, desert tortoises don#t eat carnations, but really like roses. Unfortunately, roses have a scent and I wasn#t testing to see if tortoises could smell. Finally, It#sa was not used to being in the box I built. She was very distracted and didn#t focus on the experiment as much as would have helped to really test the hypothesis. Knowing if a desert tortoise can see color can help when a tortoise is sick and needs to eat. If there really is a preference for the color red, or just color in general, then they can be given red roses or red apples or a colorful food, to get them to start eating and get healthier.

Summary Statement
My project tested to see if desert tortoises can see color.

Help Received
Dr. Dunn provided support & enthusiasm; Mr. Joseph helped proofread & offered suggestions; Dad & my friend Rico helped the build box; my mom typed most of the paper and this form.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Brian K. Schuh

Project Number
J2013

Project Title
Snakes in the Wild

Abstract

Objectives/Goals
Does the species of snake and how it lives determine the size of the head and the body?

If a snake is poisonous or a snake is nonpoisonous and lives in a rainforest,then the size of the head and body will be bigger than nonpoisonous snakes that live in habitats other than rainforests. I believe this because in the rainforest snakes must deal with larger pray and this should make their heads and bodies bigger. I also know that poisonous snakes have to hold their poison in their head right behind their eyes so this will make poisonous snakes have bigger and wider heads than nonpoisonous snakes.

Methods/Materials
I started the experiment by searching for places that I could get my hand on some real snake skeletons. I finally found some snake skeletons at the Santa Barbara Museum of Natural History with their vertebrae scientist. I then measured in 7 different spots of the skeletons: Head length, Head width, Total Length, 10 cm behind the head, Widest spot of the body, At their vent, At the end of the tail.

Materials: Snake Skeletons from the Santa Barbara Museum of Natural History; Snake Skeletons from UCSB Center for Biodiversity & Ecological Restoration; Metric System Caliper.

Results
The results show that if the snake is poisonous or lives in the rain forest then the head and body size will be bigger than the nonpoisonous snakes that do not live in the rainforest. The results support my hypotheses that poisonous snakes or nonpoisonous snakes that live in the rainforest will be bigger. This makes perfect sense because snakes that are poisonous have to have room in the head to keep their poison and snakes in the rainforest will be bigger because they have to deal with larger prey.

Conclusions/Discussion
The more humid and more trees there are in the area the bigger the snakes should be, there are always exceptions especially in the poisonous snake category. This is because the more humid you get the larger the prey item are so the larger the snake is.
Some of the specimens were incomplete do to packing and unpacking this could throw off the data a little.
On one the sets of data that was necessary to make a box and whisker plots there was gaps in the data so I had to estimate how big that snake would have been to complete the plot.
The age of the snake will affect how big the snake is and this might throw off the data.

Summary Statement
Discovering the size of the snake to where and how they live.

Help Received
Paul Collins at SB Museum and Mark Holmgren at UCSB for snake skeletons, dad with charts

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Andrew Schwandt; Bradley Schwandt

Project Number
J2014

Project Title
Humwhere over the Rainbow: Do Hummingbirds Prefer Colored Nectar from the Warm End of the Color Spectrum?

Abstract

Objectives/Goals
The objective of our project was to determine if hummingbirds preferred colored nectar from the warm end of the color spectrum (red, yellow) versus the cool end (blue, violet). Knowing that hummingbirds are attracted to red and orange flowers, we predicted that they would prefer colored nectar that resembled those flowers. Further studies showed that other variables must be considered, includng color order, height, position, location, and color of feeder.

Methods/Materials
We compared the consumption levels of six different colors of sugar water, representing nectar, placed in identical feeders hanging from different heights in our backyard for 10 days, changing nectar in all feeders once the first feeder fell below 200 mL. We used a 500 mL glass measuring cup, a stainless steel tablespoon, 6 identically labeled feeders, 10 bungee cords (6-18", 2-24", 2-30"), a 44-ounce cup, a 1-cup measuring cup, assorted food color dye, pure cane sugar, and warm tap water. Our nectar consisted of 700 mL warm tap water, 1 cup of sugar, and 4 drops of food coloring. We tested clear (control), red, yellow, green, blue, and violet nectar.

Results
In our original experiment, with a cumulative total of 2,400 mL of colored nectar, in each color, offered to the hummingbirds over a period of 10 days, they drank 2,000 mL of yellow, 1,800 mL of violet, 1,000 mL of red, 400 mL of blue, 400 mL of green, and 400 mL of clear. They drank 2,950 mL of red and yellow combined (warm end), and 1,725 mL of blue and violet combined (cool end).

Conclusions/Discussion
We concluded that, although cumulatively, the hummingbirds preferred the warm end colors, the two most popular individual colors were yellow and violet, not red, thereby rejecting our hypothesis! The yellow and violet feeders were hung the highest distance from the ground with the shorter 18" bungee cords, and this discovery took our research in entirely different directions. Due to their protective survival mechanisms, hummingbirds were more concerned with the safety, height, positioning, location, and color of feeders, rather than nectar color. In order to fuel their active metabolisms, they were more interested in sugar content and accessibility of feeders. Clear nectar may be healthier and equally as attractive as colored nectar, while eliminating potentially harmful dyes from their systems.

Summary Statement
Our project tests whether hummingbirds prefer colored nectar from the warm end orthe cool end of the color spectrum, while considering nectar color, color order, height, position, location, and feeder color.

Help Received
Dr. Altshuler and Dr. Welch from UCR contributed to our research, our dad helped design the topper, our brother helped with the graphs, our mom typed the project and helped with the board, and Mr. Poulsen took high-speed pictures.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Eric H. Sorensen

Project Number
J2015

Project Title
Does Dusting Honeybee Colonies with Pollen Supplement Benefit the Hive?

Abstract

Objectives/Goals
To find out if pollen supplement dislodges parasitic mites as well or better than powdered sugar dusting. To find out if pollen supplement also feeds the bees effectively. To see if pollen supplement dusting results in an increase in brood.

Methods/Materials
10 one story beehives with removable bottoms, Contact paper, Pollen supplement, Powdered sugar, Measuring cup,Bee brush,Smoker,Lumber crayon, coumaphous strips, Tweezers, daily pill container, microscope and slide, glycerin, isopropyl alcohol

Results
Average mite drop pollen supplement .95 mites. Average mite drop powdered sugar 1.05. Brood increased by 1.3 combs. The hives cleaned up the pollen supplement 100% of the trials. No pollen supplement was found in any of the samples taken from the comb.

Conclusions/Discussion
Overall I found that pollen suplement dusting was not benefical to the hive. It did not dislodge mites better than powdered sugar.
I could not prove that the number of brood combs increased.
Although the bees cleaned up the pollen supplement, I was unable to find it stored in the combs as pollen is.

Summary Statement
Determines if dusting honeybees with pollen supplement dislodges parasitic mites as well as feeding them.

Help Received
My parents put a miticide strip in test hives as they do in all beehives each spring to combat the varroa mite, a parasite of honeybees.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Lauren A. Sorge

Project Number
J2016

Project Title
Wasp Warfare: Measuring How Parasitoid Wasp Population Controls Eucalyptus Psyllid

Abstract

Objectives/Goals
The objective of my project is to determine if the parasitoid wasps, released by the University of California, Berkeley in 2000, are controlling the red gum lerp psyllid population in three San Diego County locations: Rancho Santa Fe, Scripps Ranch, and Quivira Basin, and to determine which of the three areas has the largest parasitoid wasp population.

Methods/Materials
Three boxes were prepared for each location by placing a funnel inside the lid and sealing an upside-down, clear plastic bowl over the funnel. Next, eucalyptus trees were inspected in each location, and 20 branches infested with the red gum lerp psyllid were collected from each location. The lerps on each of the leaves were counted, and the branches were placed into the boxes and sealed shut. Once the parasitoid wasps living inside of the lerps reached maturity, they emerged through the funnel and into the plastic bowl. Then the wasps were counted. The experiments were conducted in the fall of 2007 and then repeated in the winter and spring of 2008.

Results
After comparing the data, Rancho Santa Fe had the largest population of parasitoid wasps with a total of 21. Scripps Ranch and Quivira Basin each had 11. Quivira Basin had the highest number of red gum lerp psyllids, and Scripps Ranch had the lowest until the spring samples were collected and it was observed that the population soared.

Conclusions/Discussion
When the red gum lerp psyllid population is compared with the number of wasps that emerged in the experiments, it appears that Rancho Santa Fe has the most parasitoid wasps and the least number of red gum lerp psyllids. The data shows that Scripps Ranch may have a declining wasp population because of the high numbers of red gum lerp psyllids and the low number of emergent wasps. This data suggests that the Scripps Ranch eucalyptus trees should continue to be monitored for the parasitoid wasp, as should all of San Diego County, due to the extreme fire danger caused by dead or dying eucalyptus trees.

Summary Statement
The purpose of this project is to monitor three areas of San Diego County's parasitoid wasp population, which is responsible for controlling the red gum lerp psyllid that is attacking eucalyptus trees in California.

Help Received
Phone interviews: Dr. Kent Daane, UC Berkeley and David Shaw, UC Cooperative Extension; Mom did all the driving; Dad assisted with the data and graphs; Debbie Culley helped edit the report.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Mackenzie L. Spencer

Project Number
J2017

Project Title
Spaced Out: A Study of Perching Distances between Pigeons

Abstract

Objectives/Goals
My objective was to find out if there is a common perching distance between pigeons on different perches. One population perched on light post, the other on telephone wires.

Methods/Materials
To start my experiment I used a sextant to find the distance of side "a" of a right triangle, or how tall the lamp post and telephone wire was. I then paced out side "b" from the base of the lamp post and telephone wire to the point where I was taking the pictures. I then used these two distances to calculate side "c" (the hypotenuse) of my right triangle which was the distance from the pigeons. To measure the distance between the pigeons I put pieces of colored tape at different distances from each other on a handball backboard and took pictures of the tape at the three different distances I took the pigeon pictures from. I then used the tape pictures as my measurement tool to measure the distance between pigeons in the photos at each of the perch locations. I then tallied the data and analyzed the information in pie charts for each of the different populations and the populations combined.

Results
I found that there is a common or preferred perching distance between the pigeons, but it was somewhat dependent on the size of their perch. For the lamp post pigeons the pigeons preferred a distance from 4 to 13 inches apart while the telephone wire pigeons preferred a distance from 17 to 29 inches and 46 to 50 inches apart. Therefore, the larger the perch the larger the distance is between pigeons. However, I found, when the data was combined for the two perches, 67% of the pigeons still perched less than 41 inches apart which showed that the perch size can only affect the perching distance so much and then their desire to be social takes over.

Conclusions/Discussion
My results somewhat supported my hypothesis that there would be a common or preferred distance between the pigeons. It supported it because there was a common distance between the pigeons. It did not support it because depending on the perches there was a larger or smaller common distance between the pigeons. The information gathered from this project expands our knowledge of zoology because by reading about my project we can use the information in future projects in management of pigeons or similar social birds.

Summary Statement
My project is about the perching distance between pigeons and how it relates to their perch size.

Help Received
Parents drove me to pigeon destination and craft store to buy supplies for board; cousin taught me how to use sextant; Mother's co-worker printed out title on large-scale printer at work.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Joseph S. Stearns

Project Number
J2018

Project Title
Planaria Regeneration

Abstract

Objectives/Goals
The objective of my experiment was to determine if a magnetic field, and the intensity thereof, has an effect on the rate of regeneration of a planaria.

Methods/Materials
Three test groups of planaria were used, each consisting of three planaria cut laterally and placed in a separate, sterile Petri dish. One test group wasn't exposed to any magnetic field as a control, one test group was exposed to a magnetic field of two magnets, and one test group was exposed to the magnetic field of four magnets.

Results
I observed the groups three times and found that the weaker magnetic field of two magnets increased the rate of regeneration the most, though the magnetic field of four magnets also increased the rate of regeneration.

Conclusions/Discussion
My hypothesis was therefore incorrect. Further experiments could test what particular range of magnetic intensity on the guass meter affects planaria the most.

Summary Statement
Does a magnetic field, and the intensity thereof, have an effect on the regeneration rate of planaria.

Help Received
My mom helped me type and took some of the digital pictures of my experiment.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Madison T. Vogt

Project Number
J2019

Project Title
Non-Toxic Detour Ants

Abstract

Objectives/Goals
To find non-toxic substances that repel ants

Methods/Materials
Tested each ingredient using 30 ants per substance. Ingredients included cinnamon, salt, black pepper, cayenne pepper, Borax, and vinegar. Used stop watch to time how long the ants remained in the barrier. Created barrier using a 10 cm lid on a paper plate.

Results
Cinnamon was the most repellant substance tested taking an average of 177.15 seconds for the ants to cross the barrier. Borax and salt were the next most effective with black pepper, cayenne pepper and Borax being the least effective.

Conclusions/Discussion
Cinnamon shows some effectiveness and potential in repelling ants. Dry substances with strong smells seem to be the most repellent against ants.

Summary Statement
Non-toxic substances that repel ants.

Help Received
Mother and Aunt helped with experiment.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Jessica J. WuWoods

Project Number
J2020

Project Title
Which Sugar(s) Do Hummingbirds Prefer?

Abstract

Objectives/Goals
Hummingbirds will prefer sucrose more than other sugars because scientific research has shown that flowers visited by hummingbirds mainly have sucrose in their nectar. My objective is to test this hypothesis by feeding different sugars to hummingbirds in backyard feeders.

Methods/Materials
A. Make 30% (w/v) sugar solutions (of fructose, glucose, maltose, mannose, sucrose). B. Prepare two feeders from 10 ml plastic hypodermic syringes with millimeter markings. C. Fill each syringe with 10 ml of different sugar solutions. D. Hang up two syringe feeders on wire holders in our backyard gazebo. E. Measure and record the amounts (in ml) of sugar solution consumed in each feeder after 24 hours. F. To test for feeder position preference, eight trials of the sucrose solution (vs sucrose solution) were tested at two feeder positions. Position one is closer to the garden, position two is closer to the house. G. To test for sugar preference, at least three trials of each sugar solution (vs sucrose solution) were measured at alternating feeder positions.

Results
At least three hummingbirds (two Anna's and one Allen) were observed to visit the experimental feeders everyday. My data showed that hummingbirds prefer to feed on sucrose, followed by fructose and glucose. But the hummingbirds really disliked maltose and mannose, as they did not drink these solutions at all.

Conclusions/Discussion
My experimental results support my hypothesis, that hummingbirds prefer the sucrose sugar solution. From my literature research, the sugars found in almost all nectars from flowers visited by hummingbirds in the wild are mainly sucrose, with some fructose and glucose. My data validates the idea that hummingbirds prefer certain flowers because of the high sucrose content in the nectar. Maltose and mannose sugars are not present in the flower nectars that hummingbirds consume. Based on my experimental data, the best artificial nectar for feeding hummingbirds is to use a mixture of sucrose and fructose sugar solutions.

Summary Statement
Testing the sugar preference of hummingbirds.

Help Received
My Father provided the various sugars and editing for my report.

CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Megan R. Zink

Project Number
J2021

Project Title
Light vs. Dark

Abstract

Objectives/Goals
Before I started doing my experimant, I wondered why in the winter there weren't a lot of button quail eggs in our aviary, but in the summer there were many eggs. My goal was to prove my hypothesis: Would a button quail lay more eggs in an all light environment than a quail in a no light envirnment. I also tested the eggs' circumference in millimeters.

Methods/Materials
I used chicken wire, sand, duct tape, food dishes, boxes, and a plant light to make my structure that the birds were going to live in for the week I was testing. I recorded my data every night at approximately the same time and gave them all new water and food.

Results
My results were that the all light quail laid five eggs while the no light quail laid three eggs and the half and half quail laid none. My results for the circumference of the eggs were for the all light envirnment: 65mm, 62mm, 0mm, 65mm, 62mm, 0mm, and 65mm. For the no light envirnment: day 4, 66mm, day 5, 63mm, and the second egg laid on day 5, 64mm.

Conclusions/Discussion
In conclusion, I found out that my hypothesis was correct. I think that the no light quail laid eggs when I thought it would not was because the box it was in protected it from the weather while the half and half was not protected from the weather. When I was testing, Santa Barbara was colder then usual so that might have changed my data.

Summary Statement
My project was about whether our button quail would lay more eggs in an all light environment than a quail in a no light environment and whether it affected the circumference of the eggs.

Help Received
Mom helped with report; Dad helped with cage building; Patty Murphy helped by being my mentor and answering questions I needed to know; and Ms. Wilson(science teacher) for her comments when reviewing my report.