AGRISCIENCE FAIR

Jeremy Falk, University of Idaho

AGRISCIENCE FAIR

- 1. Rules & Procedures for the Event
- 2. Ideas on how to incorporate in your classes
- 3. Resources on developing student displays

- Questions are welcome at any time, but I'll leave time at the end for general questions.

Social Systems

Food & Processing

Animal

Enviro & Nat Resource

Plant Systems

Power & Structure

RULES & PROCEDURES

Agriscience Fair Categories and Divisions

Agriscience Fair Categories

Students can compete in the national agriscience fair in one of six categories:

- Animal Systems
- Environmental Services/Natural Resource Systems
- Food Products and Processing Systems
- Plant Systems
- Power, Structural and Technical Systems
- Social Systems

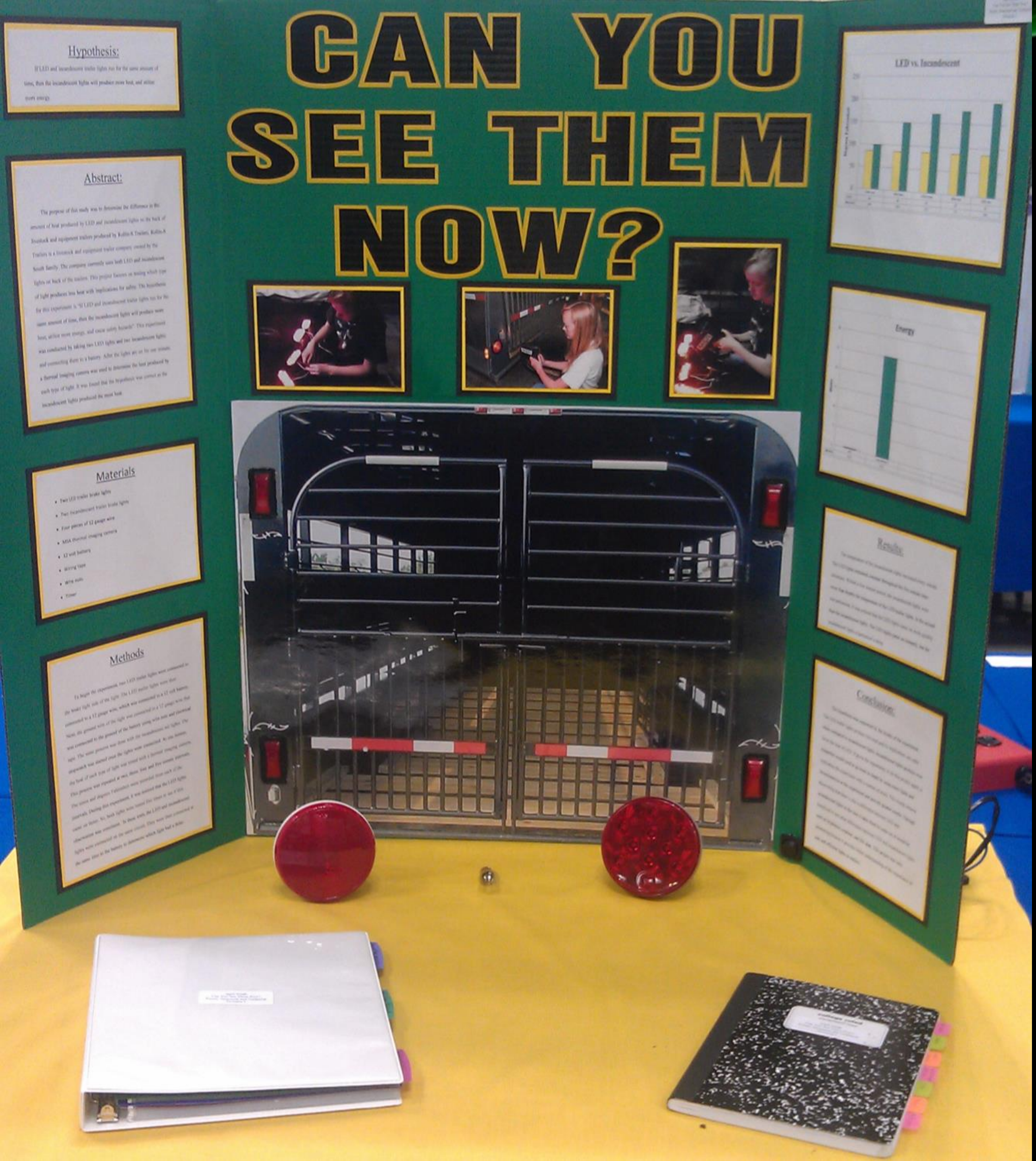
Agriscience Fair Divisions

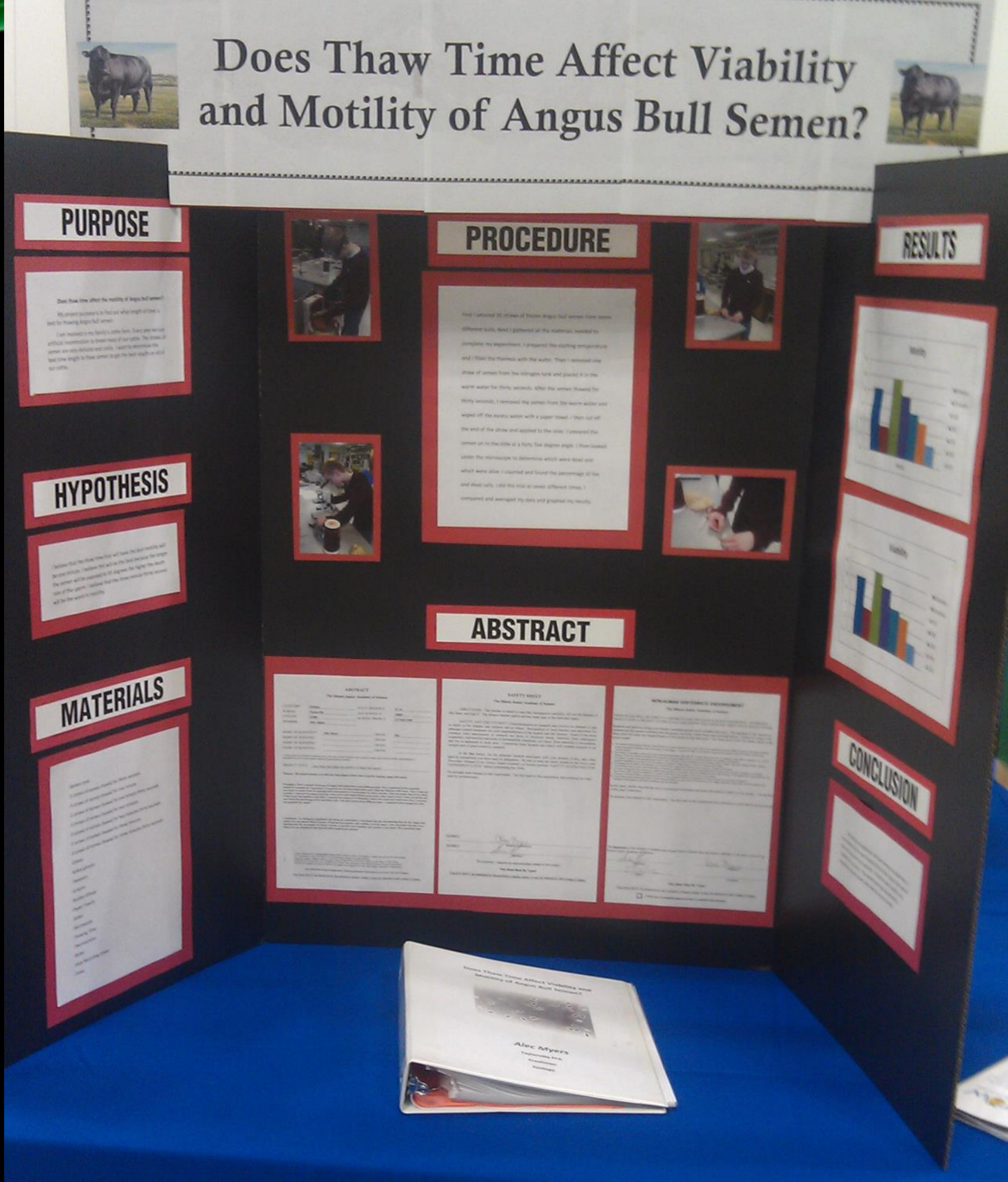
Students can compete in the national agriscience fair as an individual or with a team.

- Division I - Individuals in grades 7, 8 and 9
- Division II - Individuals in grades 10, 11 and 12
- Division III - Teams in grades 7, 8 and 9
- Division IV - Teams in grades 10, 11 and 12

TEACHING AGRISCIENCE

- Start with a good question
- Use the Agriscience rubrics to assess class projects
- Resources for students
  - Agriscience Handbook -
    - www.ffa.org/programs/awards/agriscience
  - Science Fair Videos
    - http://www.jpl.nasa.gov/education/sciencefair/


CAN YOU SEE THEM NOW?
Hypothesis:
Abstract:
Materials
Methods
LED vs. Incandescent
Energy
Results:
Conclusion:

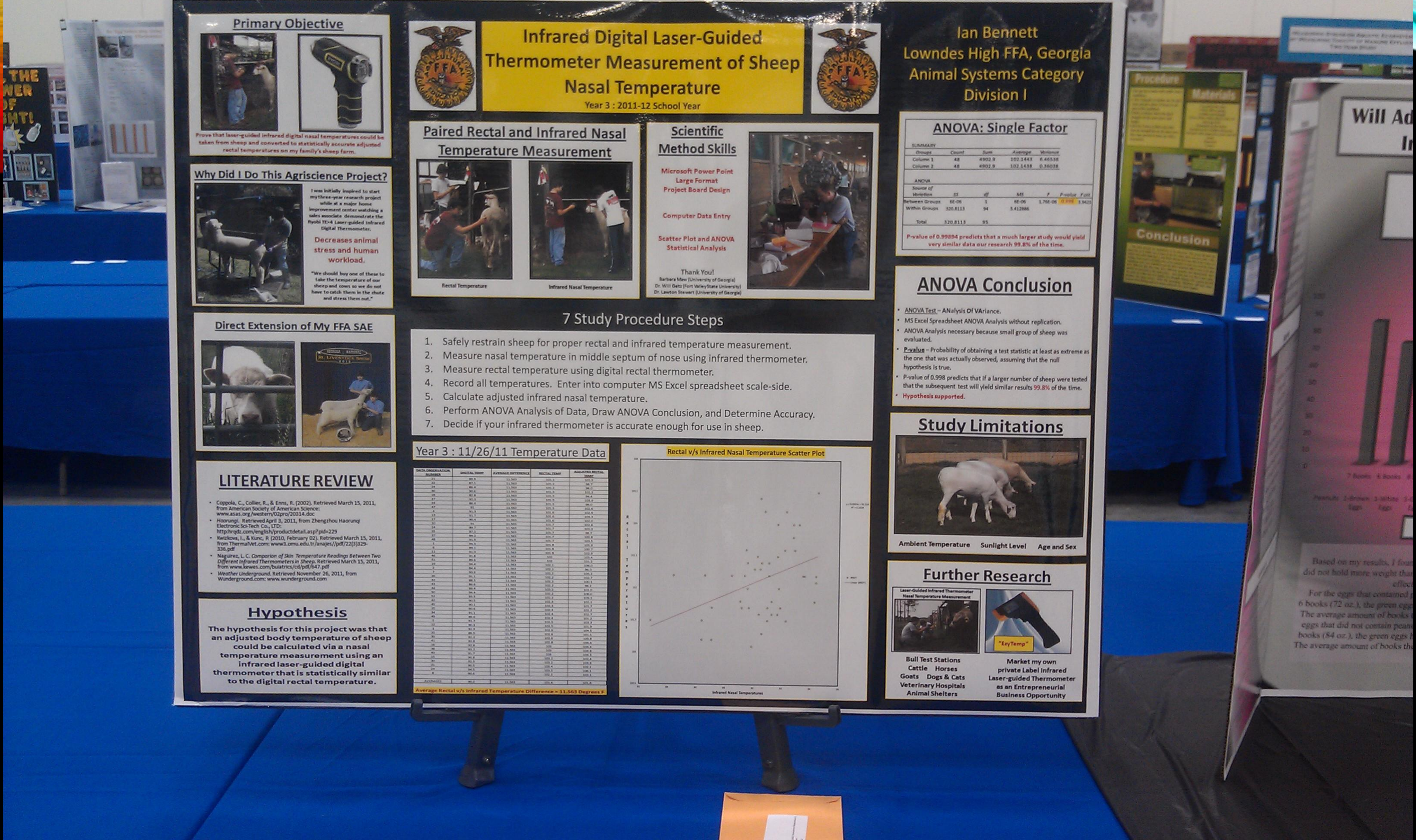

Does Thaw Time Affect Viability and Motility of Angus Bull Semen?
PURPOSE
PROCEDURE
RESULTS
HYPOTHESIS
ABSTRACT
MATERIALS
CONCLUSION
Alec Myers

STUDENT DISPLAYS

Traditionally have been tri-fold displays with markers and cut-out letters, but….

I recommend using a template!

www.postersession.com/templates



Primary Objective
Prove that laser-guided infrared digital nasal temperatures could be taken from sheep and converted to statistically accurate adjusted rectal temperatures on my family's sheep farm.
Infrared Digital Laser-Guided Thermometer Measurement of Sheep Nasal Temperature
Year 3 : 2011-12 School Year
Ian Bennett
Lowndes High FFA, Georgia
Animal Systems Category
Division I
Why Did I Do This Agriscience Project?
I was initially inspired to start my three-year research project while at a major home improvement center watching a sales associate demonstrate the Ryobi TE>4 Laser-guided Infrared Digital Thermometer.
Decreases animal stress and human workload.
"We should buy one of these to take the temperature of our sheep and cows so we do not have to catch them in the chute and stress them out."
Paired Rectal and Infrared Nasal Temperature Measurement
Rectal Temperature
Infrared Nasal Temperature
Scientific Method Skills
Microsoft Power Point
Large Format
Project Board Design
Computer Data Entry
Scatter Plot and ANOVA Statistical Analysis
Thank You!
ANOVA: Single Factor
P-value of 0.99894 predicts that a much larger study would yield very similar data our research 99.8% of the time.
Direct Extension of My FFA SAE
7 Study Procedure Steps
1. Safely restrain sheep for proper rectal and infrared temperature measurement.
2. Measure nasal temperature in middle septum of nose using infrared thermometer.
3. Measure rectal temperature using digital rectal thermometer.
4. Record all temperatures. Enter into computer MS Excel spreadsheet scale-side.
5. Calculate adjusted infrared nasal temperature.
6. Perform ANOVA Analysis of Data, Draw ANOVA Conclusion, and Determine Accuracy.
7. Decide if your infrared thermometer is accurate enough for use in sheep.
ANOVA Conclusion
ANOVA Test – ANalysis Of VAriance.
MS Excel Spreadsheet ANOVA Analysis without replication.
ANOVA Analysis necessary because small group of sheep was evaluated.
P-value – Probability of obtaining a test statistic at least as extreme as the one that was actually observed, assuming that the null hypothesis is true.
P-value of 0.998 predicts that if a larger number of sheep were tested that the subsequent test will yield similar results 99.8% of the time.
Hypothesis supported.
Study Limitations
Ambient Temperature
Sunlight Level
Age and Sex
LITERATURE REVIEW
Year 3 : 11/26/11 Temperature Data
Rectal v/s Infrared Nasal Temperature Scatter Plot
Infrared Nasal Temperatures
Average Rectal v/s Infrared Temperature Difference = 11.563 Degrees F
Further Research
Laser-Guided Infrared Thermometer Nasal Temperature Measurement
"EzyTemp"
Bull Test Stations
Cattle Horses
Goats Dogs & Cats
Veterinary Hospitals
Animal Shelters
Market my own private Label Infrared Laser-guided Thermometer as an Entrepreneurial Business Opportunity
Hypothesis
The hypothesis for this project was that an adjusted body temperature of sheep could be calculated via a nasal temperature measurement using an infrared laser-guided digital thermometer that is statistically similar to the digital rectal temperature.

The Effect Jig Color has on Attracting Bluegill

Hypothesis

For recreational fishing, Bluegill will be more attracted to pink jigs than green, black, white and yellow

Problem

When picking fishing jigs, what color will produce the most success when fishing for pan fish?

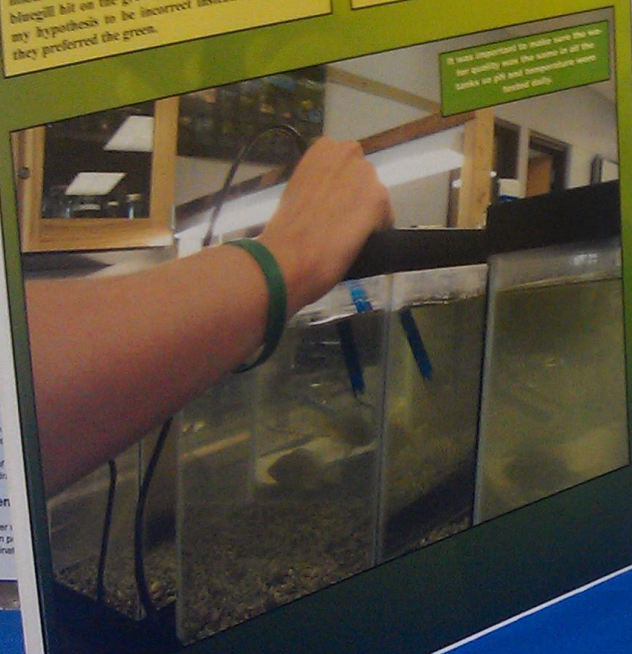
Abstract

My purpose for doing this experiment is to figure out which color jig will produce the most success when fishing for bluegill. When I have talked to other fisherman and guides, they all have a different opinion on the jig color. But everyone has said to use a smaller jig head, so I configured that into my experiment by picking a 1/32 ounce jig. I picked a light fishing line that has low visibility that I use on my fishing poles. I set the jig up on the line so it would sit directly in the middle of the tank. After the 5 days of testing the bluegill hit on the green jig the most. The data proved my hypothesis to be incorrect instead of the pink jig they preferred the green.

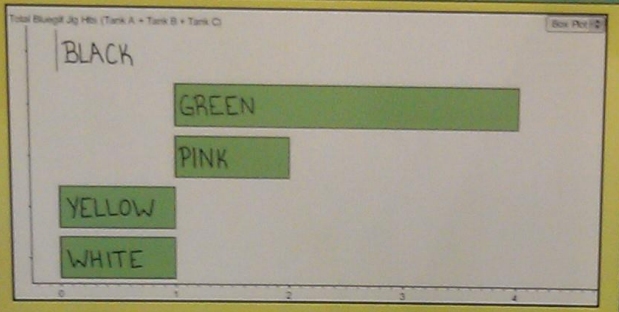
Variables

Independent Variables
- Jig Color
- Genetics of Fish

Dependent Variables
- Water Conditions
- Placement of the Jig when it's in the tank
- The size of the bluegill
- Size and type of environment



Data/Results



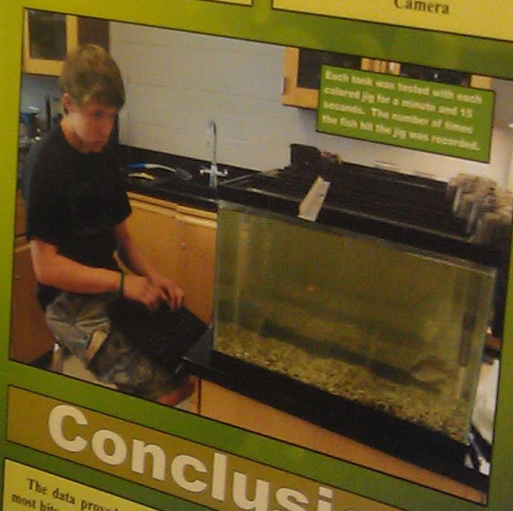
Black Jig compared to Green Jig had P-value = 0.18

Procedure

1. Set up three tanks with stable water conditions.
2. Put 2 bluegill of similar size in each tank and give them 24 hours to adjust to the conditions.
3. Make a system where the jig is dropped at the same place and height.
4. Test for 5 days to find a jig color that the bluegill hit on the most over that time period to come up with a conclusion.

Materials

3 ten gallon fish tanks
3 Water filters/ pumps
6 similar sized bluegill
Green, White, Yellow, Black, Pink 1/32 ounce jig heads
Homemade jig line holder
4 pound test low-visibility fishing line
Lab quest with temperature probe and PH probe
Stopwatch
Camera



Conclusion

The data proved my hypothesis to be incorrect. The green jig had the most hits on it which was 6 times in the five days, pink was next with 4 hits, yellow and white both had 1, and black did not have any hits in the 5 days of testing. Once I got everything after a few setbacks it went very well the water conditions were very consistent and the fish's behavior didn't vary at all. But with different fish they may have different genetics but theoretically they should be attracted to the same colors. And with only two fish it isn't quite the same as a lake but it is similar. For bluegill, fishing with a green jig will produce the most success. With this knowledge fishermen will have more success when fishing and save money when the buy their supplies.

ASK A QUESTION

Out of Bamboo, Poly and Flexible cutting boards: Which is best likely to cause cross-contamination?

DO BACKGROUND RESEARCH

We researched the answers to the following questions:

What is cross-contamination?

Cross-contamination is the unintentional transfer of microorganisms, chemical contaminants or allergens substances from food, person, or objects to another food product. (Food Safety Program for Pharmaceutical Manufacturers)

How does cross-contamination occur?

Food preparation, food contact surfaces, and people are important sources of cross-contamination. Raw food can contain harmful bacteria which can contaminate other products that are in direct contact. Residues on equipment may also provide opportunities for contamination. (Food Safety Program for Pharmaceutical Manufacturers)

What does cross-contamination cause?

Cross-contamination can cause food poisoning, when harmful bacteria get transferred to ready to eat products. (Food Safety Hotline, Food Standards Agency)

CONSTRUCT A HYPOTHESIS

The Bamboo cutting board will hold the most bacteria, while the flexible board will hold the least amount of bacteria.

TEST WITH AN EXPERIMENT

Step One: First we went to the store and bought new cutting boards and chicken. We also bought a new sponge for washing.

Step two: Next we made a home made agar gel to put in our petri dishes. We then filled them with the gel.

Step three: Third, we washed the new cutting boards for a minute with dawn dishsoap, we also rinsed for a minute in the hottest tap water possible. Then we dried them with a clean towel.

Step four: Once the boards were completely dry we cut the chicken. After we cut one piece on each board we swabbed the boards and put each one in its own petri dish and labeled the tops and "not washed". We then taped them shut and put them in a box.

Step Five: Next we washed the boards again for another minute with dawn, we also rinsed with hot water for a minute just like before. After we dried them we swabbed each board again labeling them with the tops and "washed", and put them in the box.

Step Six: Finally we made sure all the dishes were sealed, we also swabbed the sponge and made a dish for that. We then put the dishes in the oven with a pot of boiling water under it for half an hour to start the growing process. The dishes then got put back into the box which then got sealed and sat on the counter for about a month. (We had already made a control dish as well.)

DRAW A CONCLUSION

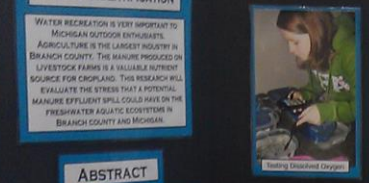
When we compared what we were growing in our petri dishes, the results surprised us. The poly cutting boards grew the most bacteria, not the wood. However, the flexible board did grow the least amount like we predicted. We decided that the cuts went deeper into the poly board which gave the bacteria more room to grow and multiply. Even though the flexible board didn't grow as much bacteria as the Bamboo or the poly it still grew some. So to avoid cross contamination you should buy flexible cutting boards, but you should have a seperate cutting board for meat. Do not cut your vegetables and other things that may not need cooked on the same board you cut your meat on. The results may not be in your favor!

Measuring Stress on Aquatic Ecosystems by Measuring Toxicity of Manure Effluent Two Year Study

Problem Identification

Water recreation is very important to Michigan outdoor enthusiasts. Agriculture is the largest industry in Branch County. The manure produced on livestock farms is a valuable nutrient source for cropland. This research will evaluate the stress that a potential manure effluent spill could have on the freshwater aquatic ecosystems in Branch County and Michigan.

Abstract



Experiment Design

Manure Effluent was collected from a Dairy Farm in Southern Michigan. Effluent was collected from two different ponds. Water was collected from a drain on a tiled field where effluent was spread.

Manure Effluent concentrations were tested at 3%, 6%, and 10% levels.

Drain water was used at 100% concentration.

Five fat head minnows were placed in each concentration level containing 1500ml of total solution. Aerators were used in each container.

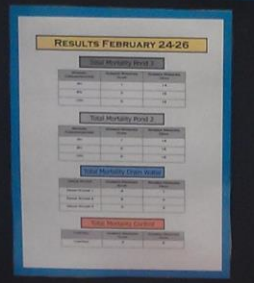
Fat Head Minnows are a sensitive sentinel species in fresh water ecosystems and are widely used for ecotoxicological studies.

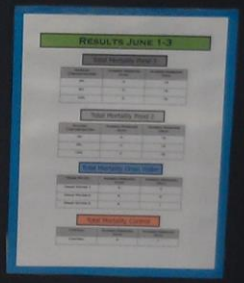
Three Replications were performed at each trial.

Observations were recorded for forty-eight hours.

The first trial ran February 24-26 and the second trial ran June 1-3.

Data Collection





Conclusion

Hypothesis

Fat Head Minnows placed in a 3% (or 6%) manure effluent concentration will experience a mortality rate of 0% within 48 hours.

Fat Head Minnows placed in a 10% manure effluent concentration will experience a mortality rate of 100% within 48 hours.

Fat Head Minnows placed in tap drain water from a field where manure effluent was applied will experience a mortality rate of 0% within 48 hours.

Future Research

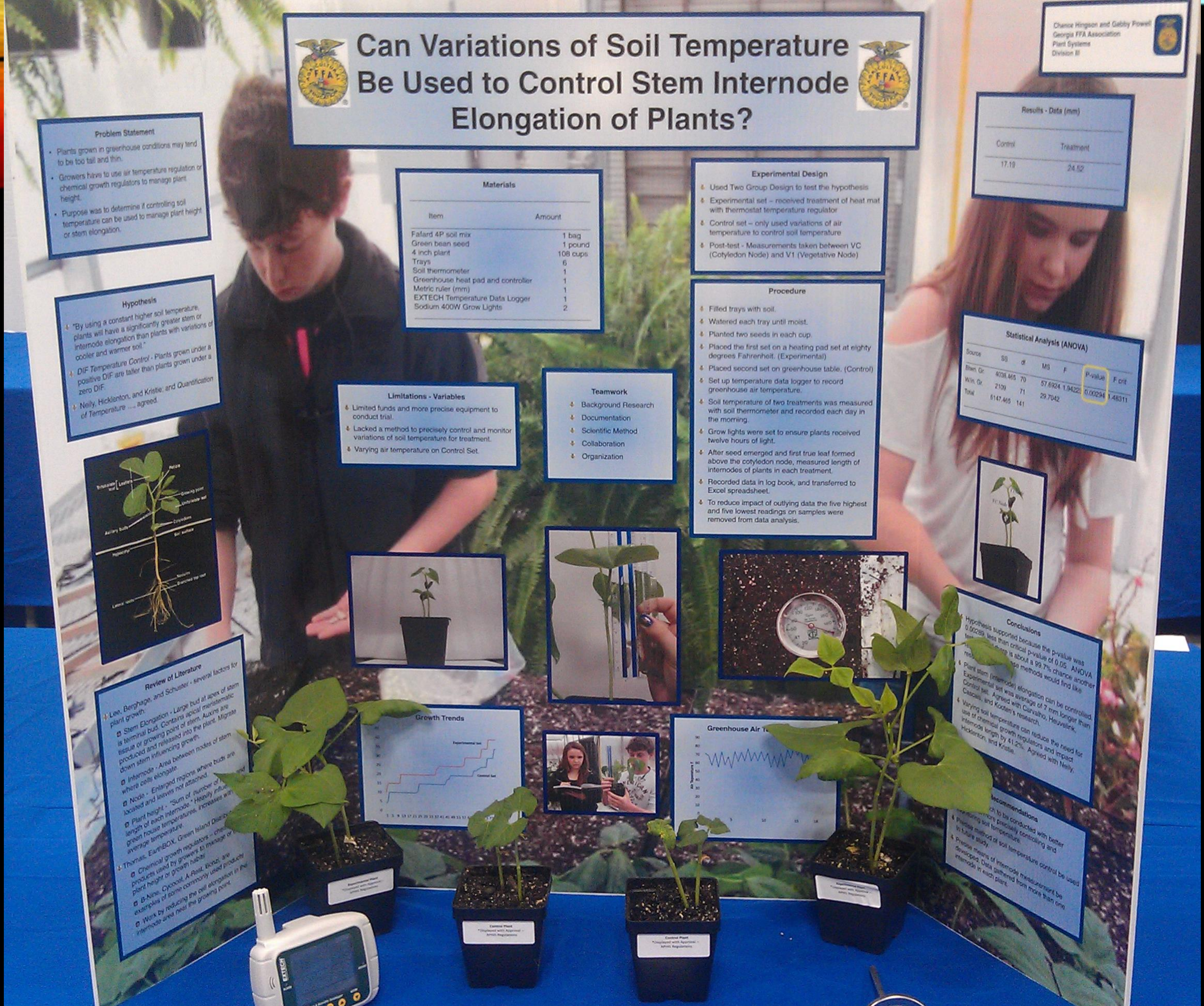
"Measuring Stress on Aquatic Ecosystems by Effluent Toxicity"

Caitlyn Howes
8th Grade

Branch Area Careers Center FFA Chapter
366 Morse St. Coldwater, MI 49036


Abstract
Methods
Purpose
Data
Question
Hypothesis
Materials
Feed Analysis
FEED THE NEED
Photo Documentation
Charts
Results
Conclusion
Discussion
Recommendations
Further Studies
Statistical Analysis


How Do Farmers Use Social Networking to Their Advantage?
PURPOSE
MATERIAL LIST
HYPOTHESIS
Methods
Like us on Facebook!
Meigs County FB



Can Variations of Soil Temperature Be Used to Control Stem Internode Elongation of Plants?
Chance Hingson and Gabby Powell
Georgia FFA Association
Plant Systems
Division II
Problem Statement
Plants grown in greenhouse conditions may tend to be too tall and thin.
Growers have to use air temperature regulation or chemical growth regulators to manage plant height.
Purpose was to determine if controlling soil temperature can be used to manage plant height or stem elongation.
Hypothesis
"By using a constant higher soil temperature, plants will have a significantly greater stem or internode elongation than plants with variations of cooler and warmer soil."
DIF Temperature Control - Plants grown under a positive DIF are taller than plants grown under a zero DIF.
Neily, Hickenton, and Kristie; and Quantification of Temperature ..., agreed.
Materials
Item
Amount
Fafard 4P soil mix
1 bag
Green bean seed
1 pound
4 inch plant
108 cups
Trays
6
Soil thermometer
1
Greenhouse heat pad and controller
1
Metric ruler (mm)
1
EXTECH Temperature Data Logger
1
Sodium 400W Grow Lights
2
Experimental Design
Used Two Group Design to test the hypothesis
Experimental set – received treatment of heat mat with thermostat temperature regulator
Control set – only used variations of air temperature to control soil temperature
Post-test - Measurements taken between VC (Cotyledon Node) and V1 (Vegetative Node)
Procedure
Filled trays with soil.
Watered each tray until moist.
Planted two seeds in each cup.
Placed the first set on a heating pad set at eighty degrees Fahrenheit. (Experimental)
Placed second set on greenhouse table. (Control)
Set up temperature data logger to record greenhouse air temperature.
Soil temperature of two treatments was measured with soil thermometer and recorded each day in the morning.
Grow lights were set to ensure plants received twelve hours of light.
After seed emerged and first true leaf formed above the cotyledon node, measured length of internodes of plants in each treatment.
Recorded data in log book, and transferred to Excel spreadsheet.
To reduce impact of outlying data the five highest and five lowest readings on samples were removed from data analysis.
Results - Data (mm)
Control
Treatment
17.19
24.52
Statistical Analysis (ANOVA)
Limitations - Variables
Limited funds and more precise equipment to conduct trial.
Lacked a method to precisely control and monitor variations of soil temperature for treatment.
Varying air temperature on Control Set.
Teamwork
Background Research
Documentation
Scientific Method
Collaboration
Organization
Review of Literature
Growth Trends
Greenhouse Air
Conclusions
Recommendations

The Coolest Clipper Lubricant

Background

- Many animals require shearing with clippers to remove excess hair or wool.
- Clippers range in price from as low as $10 to upwards of $700.
- Friction causes the blades to heat up. Overheated clipper blades can make the animal being sheared nervous and will want to hold still, and in extreme cases may hurt the animal's sensitive skin.
- Additionally the very sharp clipper blades can become dull when hot and even make sharpening them much more difficult and sometimes impossible.
- Clipper blades require oils, lubricants or similar products to keep the clipper blade cool. Using an oil or lubricant to reduce friction and lower blade temperature is very common when using clippers.
- Lubricants marketed as clipper blade oils contain various ingredients and range from very viscous pourable oils to much thinner aerosol sprays.
- Lubricants range in price from $2 - $20

Need For Study

Depending on the size of the animal or volume of animals needing to be clipped, clipper users will always need some type of clipper lube to cool their clipper blades. Manufacturers might always recommend their own brand of oils for proprietary economic reasons, but clipper owners and users might want to know which oil products truly cool clipper blades most effectively, even if it is finding the difference between more viscous pourable oils or the thinner oils like those from an aerosol spray can. Ultimately this research will determine the most effective product for cooler clipper blade combs, allowing for an educated purchase of oil and lengthening the life of the clipping equipment and saving resources.

Hypothesis

If different oils/ lubricants are applied to the clipper blade, then the clipper will run at a various temperatures.

Experimental Design

Dependent Variable: The temperature of the clipper blades.

Independent Variable: The oil applied to the clipper blades.

Control: The use of no oil/no lubricant.

Constant: The clippers will be used in consistent environments and a consistent amount of oil/lubricant will be applied. The clipper blades will be tested from a warm room temperature and two blades will be run for 5-6 minutes, an amount of time similar to a clipping session.

Replication: Two different clippers with the normal range six different oils/lubricants and two extra clipper blades.

Repetition: Each clipper will be run for 10 minutes with each oil/lubricant.

Abstract

Countless livestock breeders and FFA members clip and groom their livestock, primarily sheep, cattle, goats and hogs for market, show, sale or exhibition. As these animals are being clipped, the clipper blades commonly become hot due to the high speeds of the motors and the friction of the comb and blade. Lubricants are used to keep the friction to a minimum, reducing the heat of the blades and increasing the longevity and degree to which the blades remain sharp.

In this experiment, close work was done to use both clippers and lubricants that were industry standard, readily available and safe. The results of this study will indicate the most effective lubricant at keeping clipper blades coolest over a 10 minute period of constant usage.

Using Heiniger and Oster Shearmaster clippers, Andis Cool Care Plus, Oster Kool Lube, Andis Clipper Oil, Oster Blade Lube, Wahl Blade Ice, and Tri-Flow Superior Lubricant were independently applied to the clipper blades until saturated. The blade temperatures were recorded prior to being turned on and every minute while in operation for 10 minutes, without any lubricant reapplication.

The data and results supported the hypothesis stating that if different lubricant application were applied to the clipper blades, various operating temperatures would exist, and further identified extreme differences in blade temperature, indicating that the lubricants were not all equal and potentially had various properties and additives. Three lubricants, Oster Blade Lube, Wahl Blade Ice, and Tri-Flow Superior Lubricant lowered the temperature of the Heiniger clippers while they were running. However Andis Cool Care Plus had a negative effect on the blades as they ran warmer than the operation of the clippers without any lubricant at all. Wahl Blade Ice was the lubricant with the combined lowest operating temperature yet the more significant information gathered: lubricants are not all equal.

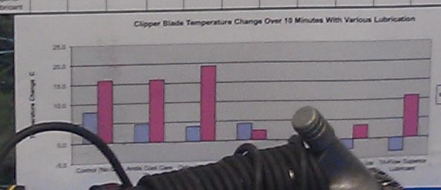
Further study should be conducted to explore the lubricants contents to isolate the most effective lubricant for clipper blades. Additionally, to better the experiment and get more conclusive data, it would be best to further test these lubricants on even more clipper manufacturers and to repeat the trials multiple times on each clipper. Furthermore, decreasing experimental errors of unequal blade tension between lubricant applications, and inconsistent initial blade temperatures shall create more accurate and significant results.

Table I: Heiniger Clipper Blade Temperatures in Degrees Celsius

	Minute 0	Minute 1	Minute 2	Minute 3	Minute 4	Minute 5	Minute 6	Minute 7	Minute 8	Minute 9	Minute 10	Total Difference from 0 - 10	Average
Control (No Oil)	21.9	24.9	26.4	30.1	25.8	26.7	26.1	30.6	26.6	31.3	29.8	7.9	27.5
Andis Cool Care Plus	21.0	21.2	24.5	28.5	26.2	25.6	26.1	24.3	24.8	24.8	25.6	4.6	24.8
Oster Kool Lube	22.2	19.3	21.4	24.0	25.6	25.1	24.3	24.4	26.1	26.1	26.0	3.8	24.0
Andis Clipper Oil	22.8	23.6	26.5	28.4	26.4	25.1	29.4	28.0	28.1	28.1	27.1	4.3	26.7
Oster Blade Lube	22.0	16.7	15.2	20.5	17.4	18.2	18.8	19.1	18.3	18.3	17.6	-4.4	18.6
Wahl Blade Ice	18.0	16.7	14.1	15.2	17.0	15.0	14.8	13.5	13.9	13.9	15.5	-2.5	15.2
Tri-Flow Superior Lubricant	20.6	15.2	15.2	16.4	15.4	15.8	18.6	19.5	21.6	20.7	17.1	-3.5	17.8

Table II: Oster Clippers Blade Temperatures in Degrees Celsius

	Minute 0	Minute 1	Minute 2	Minute 3	Minute 4	Minute 5	Minute 6	Minute 7	Minute 8	Minute 9	Minute 10	Total Difference from 0 - 10	Average
Control (No Oil)	21.8	25.6	29.7	31.7	32.1	33.1	35.0	34.8	35.6	37.5	37.9	16.0	32.3
Andis Cool Care Plus	20.7	25.6	29.5	30.9	33.8	36.0	37.4	36.5	35.7	38.1	36.7	16.0	32.8
Oster Kool Lube	23.8	34.6	39.0	42.7	49.7	46.7	48.3	38.8	46.4	36.4	43.1	19.3	40.9
Andis Clipper Oil	23.5	20.3	19.5	21.3	22.1	21.3	23.0	23.4	24.2	24.8	26.0	2.5	22.7
Oster Blade Lube	18.4	16.0	20.5	19.2	23.0	21.2	23.5	22.5	22.8	24.4	25.5	7.1	21.5
Wahl Blade Ice	18.6	13.0	16.8	19.1	20.1	18.6	20.2	24.6	30.5	24.6	22.2	3.6	25.8
Tri-Flow Superior Lubricant	19.1	22.7	19.1	25.3	24.8	26.2	26.7	28.0	24.7	29.0	30.0	10.9	25.1



Protocol

1. Assure clipper blades are properly tensioned.
2. Apply the test oil/lubricant to both sets of clipper blade combs until they become saturated and drip excess oil.
3. Determine comb temperature of the tips of the clipper teeth. (Using the IR thermometer.) Record temperature.
4. Turn clippers on.
5. Each minute determine the comb temperature for each set of clippers for 10 minutes. Record temperature.
6. Allow clippers and combs to cool to room temperature.
7. Disassemble clipper blades and combs and completely wipe down with paper towels.
8. Reassemble and properly tension the cutter blades.
9. Repeat step 1-8 with each different oil/lubricant for each clippers.

Materials

- Heiniger Livestock Clippers (LR33A04)
  - Comb: Oster #4AU
- Oster Livestock Clippers (Stewart Shearmaster EWH10C)
  - Comb: Laster HB23
- Andis Cool Care Plus — 15.5 oz. Aerosol Can
- Oster Kool Lube — 14 oz. Aerosol Can
- Andis Clipper Oil — 4 oz. Pour Top Can
- Oster Blade Lube — 4 oz. Pour Top Can
- Wahl Blade Ice — 14 oz Aerosol Can
- Tri-Flow Superior Lubricant — 6 oz Aerosol Can
- Infrared Thermometer — (General IRT207)
- Stopwatch
- #3 Standard Screwdriver
- Paper towels

Summary of Data

[illegible] for data collected it was discovered that where different oils or lubricants were applied the temperature of the clippers varied from 14.0 degrees Celsius all the way to [illegible] degrees Celsius. From the data collected Wahl Blade Ice was the lubricant which kept both the Heiniger Clippers and the Oster Clippers running at the coolest degrees Celsius. [illegible] Heiniger clippers it proved to operate the Heiniger Clippers at the coolest degrees [illegible] and the Oster Kool Lube operates the Oster Clippers at the [illegible]

Conclusion

[illegible] hypothesis stated that if different oils/lubricants are applied to the clipper blade, then the clippers will run at a various temperatures. The results supported the [illegible] Celsius all the way to [illegible] Celsius. [illegible] Heiniger clippers and the [illegible] Oster Clippers [illegible]

Everyone Needs a Value Meal– Even Chickens!

PURPOSE

To establish which type of feed should be fed to baby chicks.

HYPOTHESIS

If the protein content of feed is related to the growth of baby chicks, then those fed higher protein will grow faster.

PREDICTION

Chicks fed an 18% protein ration will grow faster than those fed an 8% ration.

PROCEDURE




MATERIALS



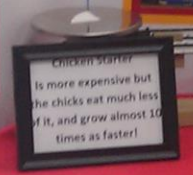

VARIABLES

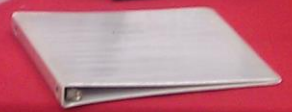

RESULTS




CONCLUSION

Chicks fed an 18% protein ration grew almost 10 times faster than those fed an 8% ration during a two week feeding period.





HOG WILD

Finding the Best Hog Attractant

INTRODUCTION

Feral Hogs are an invasive species in Florida. These wild hogs damage agriculturalist's crops, can spread disease to livestock, and compete with native species for food.

This experiment's goal was to find the best wild hog attractant. The best attractant could be used by landowners and wildlife officials to trap and relocate or eradicate feral hogs.

PROCEDURE

1. Put the three different attractants which are 25 lbs. of dry corn, 25 lbs. of corn soured with 5 gallons of water, and 25 lbs. of corn soured with 64 fluid oz. of malt-liquor into three separate five gallon buckets
2. Leave the attractants in a sheltered area for six days
3. Take the attractant to an area that's inhabited by many hogs, dig a two feet deep one feet deep holes in three different areas at least a half mile away from the each other, and then pour the attractant around the top and down inside the hole
4. Put a digital trail camera nearby to get pictures of animals at the attractants
5. Leave the camera for seven days, then go get the camera and make observations and record data on the pictures taken

HYPOTHESIS

My hypothesis was that corn soured with malt-liquor would attract the most hogs.

MATERIALS

- 75 lbs. of corn for each test
- Posthole diggers
- Water
- 64 fluid ounces of malt-liquor for each test
- 3 five gallon buckets
- 3 digital trail cameras


Pouring malt liquor in the corn


Placing the attractant in the hole

VARIABLES

Independent variable: different attractants used

Dependent variable: number of hogs that came to the attractants


Positioning a trail camera on a tree


A wild hog at an attractant


Clipping bushes for the best camera shot

GRAPH

DATA

The most hogs came to corn soured with water in both tests. Corn soured with malt-liquor attracted the second most hogs each time. Dry corn attracted the fewest hogs during both tests.

CONCLUSION

My hypothesis was disproved by the data because the most hogs came to the corn soured with water. The water causes the corn to ferment quickly and smell stronger than the other attractants, thus it brought in the most hogs. So, corn soured with water was the best attractant.

Further Testing: I would like to test this experiment with different independent variables next time, and would like to find the most cost efficient attractant.

A Comparison of Mulch Color and Its Effect on Soil Temperature

Lexi Stroud and Mary Swanberg
Elk Grove FFA, California
Novice Team
200 Environmental Science

Introduction

Mulch is very important to the germination and growth of plants. Mulch is any type of material that is laid over the top of soil and helps suppress weeds, keep the soil cool, and make gardens improve their overall look.

The mulch can affect the temperature of the soil, root growth, moisture of the soil, and the overall appearance of a garden and properties. It also stabilizes soil temperature and improves the aesthetics of landscape and adds to the property value. Mulch reduces the heaving of small plants as a result of alternate freezing and thawing of the soil in autumn, winter and spring. It is also used to reduce soil erosion on landscapes that are sloped and it retains water.

There are many different types of mulch that a person could use such as: bark, plastic, compost, composted manure, grass clippings, newspaper, straw and salt hay and shredded leaves. Bark mulch is most commonly used. It is used so widely because of its ability to decompose and helps the conservation of water immensely. Although bark mulch is the most popular, it often attracts termites and other insects. Cedar mulch, however, has natural oils in the wood that repel insects but is more costly than other mulches. Colored mulch and natural colored mulch have similar benefits. Natural colored mulch is cheaper, but still used less than artificially colored mulch. This experiment will be testing the affects that artificially colored mulch has on the temperature of the soil beneath it.

In gardening, it's essential for the producers to know the conditions in which they are farming. Farmers need to test the lighting, water, pH level, nutrients and temperature of the soil. Even in this age where there is greenhouse technology that controls the environments, they still need to test the soil of the outdoor soil beds because many farmers still farm outdoors. The mulch can affect the evaporation of water. This is important to many states that are currently or commonly in droughts that need to conserve as much water as possible while still making profit and supporting the needs of the consumers. The temperature of the soil greatly effects the germination and root growth of the plants. Soil temperature differs for different plants and crops. If the different colors produce different temperatures, then farmers could use this information to help the growth of the plants.

Design

- **Independent Variable:** The color of the mulch
- **Dependent Variable:** The soil temperature
- **Constants:** The soil, mulch (black and red), soil thermometer, and the weather conditions
- **Number of Repetitions:** Once a day for six days in the same week

Hypothesis

If the black mulch and the red mulch are in the same environment and get the same care, then the temperature of soil under the black mulch will be higher.

Graphs and Tables

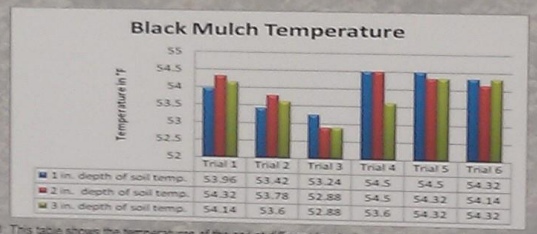
Figure 1

	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Trial 6
1 in. depth of soil temp.						
2 in. depth of soil temp.						
3 in. depth of soil temp.						

Figure 2

	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Trial 6
1 in. depth of soil temp.						
2 in. depth of soil temp.						
3 in. depth of soil temp.						

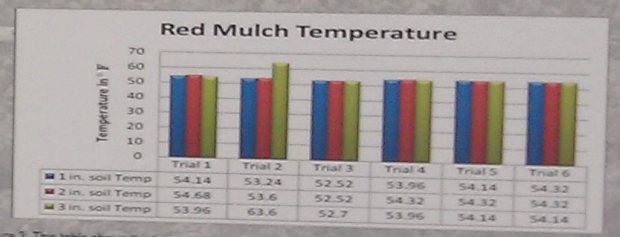
Figure 3



	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Trial 6
1 in. depth of soil temp.	53.96	53.42	53.24	54.5	54.5	54.32
2 in. depth of soil temp.	54.32	53.78	52.88	54.5	54.32	54.14
3 in. depth of soil temp.	54.14	53.6	52.88	53.6	54.32	54.32

Figure 1: This table shows the temperatures of the soil at different levels (i.e. one inch below the soil) with black mulch on top.
Figure 2:This table shows the temperatures of the soil at different levels (i.e. one inch below the soil) with red mulch on top.

Figure 4



	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Trial 6
1 in. soil Temp	54.14	53.24	52.52	53.96	54.14	54.32
2 in. soil Temp	54.68	53.6	52.52	54.32	54.32	54.32
3 in. soil Temp	53.96	63.6	52.7	53.96	54.14	54.14

Figure 3: This table shows the temperatures of the soil at different levels (i.e. one inch below the soil) with black mulch on top.
Figure 4:This table shows the temperatures of the soil at different levels (i.e. one inch below the soil) with red mulch on top.

Purpose and Objectives

This experiment was conducted to see the difference between two different colored. The objective is to find the soil temperatures and compare them to find out which produces higher temperatures.

Methods and Materials

A 182.88 centimeter by a 91.44 centimeter soil bed is cut into two halves (Group A and Group B.) Both groups are in the same amount of sunlight/shade and the same care. Group A will have black bark mulch laid down on top of it with no crops growing. Group B will have barn red bark mulch laid on top of it with no crops growing. Each group will be tested once a day for six days in the same week. Three 30.48 centimeter by 30.48 centimeter sections of each group will be tested. The temperature of one section of each group will be tested at 2.54 centimeters. The temperature of one section of each group will be tested at 7.62 centimeters. The temperature of one section of each group will be tested at 12.7 centimeters. The soil thermometer will be left in the soil for five minutes. After the temperature is taken, it will be recorded and then after all trials it will be averaged for the different and compared to the other group.

Conclusion

The temperatures of the soil were almost exactly the same for both the red and black mulch. The black mulch ended up having higher average temperatures. This result is similar to the results of the prior studies.

One recommendation would be to do this experiment in the summer months when the sun is out longer. Doing this during the winter months results in lower temperatures that are closer together. Also because most crops are grown in the summer months and the mulch could help the plants. Another recommendation is to do the trials in different weeks as opposed to doing it all in the same week so the differences in the temperature are significant.