** Oral Presenter
*Poster Presenter

Junior Science and Humanities Symposium
Wisconsin-Upper Peninsula of Michigan

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Alyssa Welch – Teacher
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Learning Academy
Enrich Excel Achieve

Cashton High School
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Emma Schlesner
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** Oral Presenter

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Wisconsin-Upper Michigan Symposium Late January or Early February, 2020

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Sponsored by the National Science Teachers Association and the U.S. Armed Forces
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investigation in the future. The results from this experiment have been used by the University of Wisconsin Agriculture Extension Agency to guide hop farmers on maintenance and fertilizer recommendations.

AIDEN COOK Cashton High School
A Survey for the Presence of the Perkinsiella Pathogens on the Epidemics of Amphibians in Wisconsin

Nearly half of the world’s amphibian species are declining or threatened with extinction, and this crisis is attributed to habitat degradation and infectious disease. Although Batrachochytrium dendrobatidis and Ranavirus are the two primary diseases responsible, a third pathogen is emerging and requires further study, Perkinsiella. The purpose of this study was to determine if Perkinsiella is present in the amphibian habitats of Wisconsin. 72 samples were collected from various locations in western Wisconsin by swabbing the external surface of each amphibian. PCR was used to determine the prevalence of Perkinsiella in the samples. The results indicated that Perkinsiella was not present in the studied habitats. Although Perkinsiella was not found in this study, this subject merits further research.

MELISSA KONKEL Big Foot High School
Determining the Effects of Adding Ascorbic Acid to Pomegranate Juice on Antioxidant Levels

The health benefits of antioxidants have become more evident and costly, so determining how much is beneficial when ingrating synthetic antioxidants may expose more of our population to more antioxidants. Pomegranate is naturally high in antioxidants, specifically, pomegranate juice. Ascorbic acid is also an antioxidant. So, which amount of ascorbic acid to 100% pomegranate juice will add the most antioxidants before a negative affect is seen? To accomplish this, 100% pomegranate juice with varying levels of ascorbic acid were created (0%, 0.003%, 0.013%, 0.023%, & 0.033%). Antioxidant amounts were measured using the Briggs-Rauscher reaction, which creates free radicals that laboratory results. We tested the antioxidant properties of hops and had four different experimental groups (rates of nitrogen). Currently, the best option for farmers is to apply 100 lbs of nitrogen per acre. However, the strip rate of nitrogen produced a high cone yield, so we will continue this study to determine if the strip rate could be the better option. The results from the nitrate meter show the correlation is not yet strong enough to be used as a replacement, but we will continue this.

PERLA CASTANEDA Big Foot High School
The Use of Protease K in Extracting DNA from Sheep’s Blood

The purpose of this lab was to test if there is DNA in the plasma of a sheep. 3 tubes were filled with 7 ml of sheep plasma, then they were placed into hot water. After around 15 minutes about 0.001 g Proteinase K was added to 7 ml of water. After 7 days of the plasma and protease mixture were added to each of the tubes, then SOS was added as well as cold ethanol. To test if there was DNA/RNA I tested this with the OPA test, test 1 and test 2. In the end result I came to a conclusion that there was DNA in sheep plasma.

ANAHIS FIGUROA Big Foot High School
Determining Whether Different Types of Light Affect Bacterial Growth in the Environment

The purpose of this experiment is to find out whether different types of light affect the bacterial population. To accomplish this, 3 main trials were conducted using three petri dishes with animal bacteria, are conducted and in those three main trials are three mini trials. Trial 1 will be exposed in sunlight, Trial 2 will be exposed under LED lights and Trial 3 will be irradiated with UV light. In summary, Trial 1 had the most amount of bacterial growth, Trial 2 was inconclusive and so was Trial 3.

IPSC line that stably expresses an shRNA targeted against GATA4 (GAPC5). At day three, the endoderm stage, GATA4 was knocked down by 70% within the GAPC5 expressing cells, whereas no knockdown was achieved in the GAPC5-expressing endothelium efficiently. At day six of differentiation, posterior bud formed in the control cell line and were propagated into stomach organoids. In contrast, the GAPC5 produced almost no budless organoids. To determine why budless morphogenesis was inefficient in the GAPC5, we evaluated the expression profile of markers known to be expressed in posterior foregut organoids. HFM 10 levels did not change; however, SOX2 was decreased in the GAPC5, as compared with control. From preliminary data we can deduce that GATA4 is likely required for human stomach development and GATA4 levels have an effect on SOX2 quantities in posterior foregut organoids. This study adds to the basis that patient derived iPSC cells may be utilized to better examine human development, disease and drug screening.

SIOAN BEAUDOIN Lake Linden-Hubbell High School
Do the Effects of Simulated Nitrogen Deposition on a Hardwood Forest in Michigan Persist After Deposition is Stopped?

In forests, chronic nitrogen deposition has been shown to increase carbon stored in the ecosystem and reduce carbon dioxide flux to the atmosphere from soil respiration. From 1994 to 2017, simulated elevated atmospheric N deposition was added to two experimental forests in Michigan. Measurements were made at the northernmost site. Located in Twin Lakes, MI, in 2018, the first year after N additions had ended. I hypothesized that even though the experimental inputs of N have stopped, the suppression of soil respiration on the N addition plots would continue. Soil respiration was tested using a soil CO2 flux chamber (model LI-800, LI-COR Environmental, Lincoln, NE) with a 10 cm survey chamber (model 8100-102). The testing was done six times in July and August of 2018. In 2019, the soil respiration levels for the N addition plots were similar to the control. This contrasts with 2017 and earlier when soil respiration for the N addition plots was reduced by 13%, which contrasts with my hypothesis. This means that in 2018 either the respiration from the autotrophs, heterotrophs, or both was no longer suppressed. This would cause more carbon to be released by this respiration. This would mean that trees are now using less carbon for photosynthesis and more is available for use by herbs.

ALYSSA CARPENTER Cashton High School
Nitrogen Fertilizer Management for Hops in Wisconsin

An increase in demand for hops in Wisconsin has led to a climb in hops production. Because of this, the old practices of hops farming need to be examined, as the nutrient management recommendations for hops in Wisconsin may be obsolete. There were two purposes of this experiment: to find the amount of nitrogen that produces the highest amount of cone yield and to test if a nitrate ion meter used in the fields is accurate enough to be a replacement for laboratory analysis. Nitrogen analysis of hops and had four different experimental groups (rates of nitrogen). Currently, the best option for farmers is to apply 100 lbs of nitrogen per acre. However, the strip rate of nitrogen produced a high cone yield, so we will continue this study to determine if the strip rate could be the better option. The results from the nitrate meter show the correlation is not yet strong enough to be used as a replacement, but we will continue this.

BRYCE PETERSON Big Foot High School
Testing Organic Corn Products for GMO In Co-existence

I tested these organic corn products to see if they were truly organic because I wanted to know if producers were actually telling us the truth. I had read an article about Monsanto, an agrochemical company, suing organic farmers. They claimed that organic farmers were spraying their crops with Monsanto’s crops. I was curious as to the result of this research and asked the question: Is organic cornmeal truly organic? This product proved to be false. No GMO was detected in the cornmeal. I also wanted to know if organic cornmeal and non-GMO cornmeal was both tested for GMO’s then the organic meal should be negative and the non-GMO meal not. My results showed that both meals tested positive for GMO’s and the organic meal was not significantly lower in GMO’s. Therefore, finding the optimum amount of nitrogen will be beneficial to all crop growers. There were two objectives of this experiment. The first, to gather more corn nitrogen data that will allow the Statewide MNRT database to be validated. This database provides a guideline for the amount of nitrogen to be applied to corn crops, based on soil type, previous crop, and other factors. The second objective is to assess the correlation of crop light reflection measurements taken with a Crop Circle sensor (proximal active sensor) and a MicroBee RedEdge drone (aerial passive reflectance sensor) and also evaluate their ability to predict yield. These technologies measure two indices, NDVI and NRE, which are the difference of two different wavelengths reflected by plants. From these results, we can measure the Economic Optimum Nitrogen Rate, which is consistent with the current nitrogen guidelines in our area for a 0.1% Risk Price ratio. Also, there is a very close correlation between the Crop-Circle measurements and drone measurements, which is excellent.

AFYA QURSHY Milwaukee School of Milwaukie
Role of GATA4 in Early Gastrintestinal Tract Development

GATA4 is a transcription factor critical in the developmental process and early differentiation of the gut-trestinal tract. Studies using genetically modified mouse models have shown GATA4 is necessary for glanspid stomach development, yet its role in humans is unknown.

We hypothesize that GATA4 is required for human stomach development. To address our hypothesis, we utilized the human induced pluripotent stem cells (iPSCs) into stomach organoids. The differentiation of iPSCs into stomach organoids recapitulates the stages of human stomach development in vitro. To study GATA4 during human stomach development, we generated an

Poster Presentations

AMANDA BENEDER Big Foot High School
The Effect of Calcium Carbonate in Water on the Color of Processed Vegetables

The testing of lime content in water and its effect on food processing was conducted because in Walnut, Wisconsin’s water there are high lime levels. The rationale was to figure out whether or not if more lime would affect processing results. As of now the agriculture industry needs water to produce and process food. Primarily because without clean food less appealing and less profitable. It also shows that the processing of water can affect food quality, in addition, this benefits the agriculture industry by finding out the value to efficiently and inexpensively alter water quality for food processing. This experiment used red cabbage and spinach as the test food sources. Calcium carbonate was added (30, 150, 100 mg, control) to water and then processed when ready. Results showed that the more lime you add and then boil the red cabbage/spinach the darker the water gets and the more color pulled from the food. More specifically, that lime in water has more effect on the color of processed food. When food processing companies decide where to locate a facility if less money is needed to change the water quality the more attractive the location site.

ANAHIS FIGUROA Big Foot High School
Determining Whether Different Types of Light Affect Bacterial Growth in the Environment

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