PROCEEDINGS

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Research Symposium

Texas Colleges

and Universities

Today's Graduates...

Tomorrow's Agricultural Leaders

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Tarleton State University

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2. **Historical Productivity Increase of Major Crops in the Southern High Plains of Texas.** C. Burton, K. Reck, K. Weyand, S. Nair, and L. A. Wolfskill. *Sam Houston State University.*

3. **Comparison of Forage Sampling Techniques on Yield of Coastal Bermudagrass and Related Nutritive Value Determinations.** M. Carter, R. Harp, D. Kattes, L. Kinman, and F. Owsley. *Tarleton State University*

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18. **Scale-Dependent Soil Bacterial Community Variation.** S. Shawver, D. G. McGahan, and J. A. Brady. *Tarleton State University*

19. **Productivity Trends of Major Crops in Northern High Plains of Texas.** B. Strnadel, A. Smith, S. Nair, and L. A. Wolfskill. *Sam Houston State University*

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ABSTRACTS

1. What's the Point (Worth): A Hedonic Analysis of Whitetail Semen Auction Data.

K. Barnes, F. Mills Jr, S. Nair, L. A. Wolfskill, J. Franken, and D. Ullrich. *Sam Houston State University.*

In 2008, the cervid (i.e., deer) production and hunting industry contributed an estimated $652 million in economic activity in Texas and $3 billion in the US. Antlers of white-tailed deer bucks are prized trophies for hunters, and hence, breeders make great investments to manage genetic potential for antler growth in their herds. Sire selection accounts for up to 90% of genetic changes in managed herds of livestock. Research has investigated the value of sire characteristics using hedonic analysis of auction data for race horses, beef cattle, and dairy bull semen. Similar hedonic analyses have evaluated attributes of hunting leases and permits. However, no hedonic studies have been conducted on auction data for white-tailed deer semen originating from confined white-tailed deer farms in Texas. Therefore, this study investigated specific attributes contributing to the value of white-tailed buck semen using hedonic analysis. Publically available auction data for semen prices, buck antler scores, information denoting whether the buck possessed Texas genetics, whether the buck was considered typical or non-typical, and if the buck was deceased were collected from the Texas Deer Association website. Auction prices ranged from $120/straw to $20,500/straw of semen with a mean price of $2,499/straw. Modeling price as a function of buck characteristics indicated significant premiums for higher antler scores ($p<0.0001$), Texas genetics ($p<0.0001$), and deceased bucks ($p<0.0432$).

2. Historical Productivity Increase of Major Crops in the Southern High Plains of Texas

C. Burton, K. Reck, K. Weyand, S. Nair, and L. A. Wolfskill. *Sam Houston State University*.

The Southern High Plains of Texas (SHP) is the most important cotton growing region in Texas and plays a major role in keeping Texas as the number one cotton producing state in the US. Corn, winter wheat, and grain sorghum are other major crops in the region. Commodity prices are important to a farm's profitability, but are generally out of the producer's hands. Productivity, however, plays a major role in profitability that a producer can control. Yield improvements are reflected in both technological progress (e.g., use of improved varieties and efficient irrigation practices) and the adoption of modern farming practices (e.g., GPS and no-till cropping). This study employed the historical productivity data for corn, cotton, winter wheat, and grain sorghum in SHP from 1974 to 2014 to estimate average annual productivity increases for each of the crops, and to compare these annual increases among the four crops. Relative yield was calculated for each year as the percentage yield in that year relative to the average yield over the entire study period for each crop. Linear regressions were conducted to estimate the productivity gains as a percentage of the average yield for each crop to make a meaningful comparison among the four major crops. The comparison of the relative yields of the four crops showed that cotton (2.05%) had the largest percentage yield increase, followed by corn (0.97%). Wheat yields increased by 0.87% of the average yield every year, but the annual yield increase in grain sorghum was only 0.05%.

3. Comparison of Forage Sampling Techniques on Yield of Coastal Bermudagrass and Related Nutritive Value Determinations

M. Carter, R. Harp, D. Kattes, L. Kinman, and F. Owsley.
Tarleton State University

The purpose of this study was to compare forage production yield through three sampling techniques (ST) (Jenquip's Rising Plate Meter (RPM), USDA Grazing Stick (GS), and forage clippings (FC)). In addition, a secondary purpose was to determine a relationship between the tested measurement tools to forage yield, and the relationship of nutritive value related to forage growth and maturity. The research pasture of coastal bermudagrass (CB) was divided into a randomized block design and was evenly designated into 16 blocks (replications). Blocks were evenly and randomly assigned to the two treatment types (fertilized and non-fertilized). Once treatments were assigned to their designated replication, the pasture was shredded to 2.54cm of stubble for re-growth. The CB was allowed a 17 d regrowth period before data was obtained. Three collection dates were designated and data was collected on d 17, 24, and 31 of re-growth. Following wet weight collections, forage samples were dried to obtain dry matter percentage (DM) and nutritive value determination at Texas A&M AgriLife in Stephenville, Texas. Significant three-way interaction was determined between date*fertilizer*ST ($P < 0.05$) on yield per day. A significant correlation of R = .743 was determined between FC and RPM ($P < 0.001$). Additionally, a significant relationship of R= .827 was determined between FC and GS ($P < 0.001$).

4. The Effects of Olive Pomace on Weight Gain in Capris aegagrus hircus as a Model for Ruminants

K. Fenske, J. Burke, P. Urso, M. M. Beverly, S. F. Kelley, M. J. Anderson, J. L. Leatherwood, and K. J. Stutts. *Sam Houston State University.*

In the livestock industry, feed is the most varying cost of production. A producer's goal is to find a feedstuff that is effective at promoting fat deposition, while maintaining a low cost. A by-product of olive oil, olive pomace, is an underutilized source of energy from fat that can be fed to livestock. Twenty-eight Spanish influence goats were fed varying amounts of pomace with a protein pellet to balance the ration to 2% of their body weight. The four test groups (n=7) consisted of a 3:1, 1:1, and 1:3 olive pomace to feed ratio (O:F) as well as a control containing no pomace. All groups received molasses at 0.5% BW to improve the palatability of the feed. Over a 49-day trial, the 1:1 and 1:3 groups were the most efficient in their average daily gain (ADG), 0.1258 and 0.1020 lbs/day, respectively. The control group maintained their condition and weight throughout the trial. The 3:1 group was the least efficient, by continually losing an average of 0.0476 lbs/day starting at day 14. These results portray the 1:1 and 1:3 pomace groups are an effective additive to maintain average daily gain when compared to the control group ($p>0.36$), but does not have the protein content to be the main ingredient or self-sustaining ration. Therefore, olive pomace is an efficient additive at lower levels mixed with a protein supplement when focusing on ADG. Further research is needed to determine the cost efficiency of the pomace as a supplemental feed source.

5. Influence of Soil Amendments on Soil Organic Matter in a Polish Agricultural Research Field

A. Hardy, S. Różański, and D. G. McGahan. *Tarleton State University.*

The relationship between manure application and increased soil organic matter is well documented, but the influence of mineral fertilizer treatment is less clear. Soil samples were collected in 2015 from a long-term agricultural research field in Wierzchucinek, Poland. The field receives manure and four inorganic NPK fertilizer treatments in a randomized complete block design. The samples were evaluated for soil organic matter using a modified Walkley-Black method and also loss on ignition. The two methods are compared to each other as well as among treatment groups. Results from the loss on ignition method were higher than those from the modified Walkley-Black, suggesting that non-organic soil components are volatilized during ignition. Soil organic matter, regardless of method, was influenced by manure treatment ($p<0.05$) and was not influenced by nitrogen addition. Manure addition remains the best option for producers interested in increasing the organic matter content of their soil.

6. Water Use in Huntsville, Texas: The Value of Wasted Water.

D. Jackson, B. Jones, A. Johnson, L. A. Wolfskill, T. Pannkuk, and S. Nair. *Sam Houston State University*.

The efficient use of irrigation water in suburban landscapes is a key focus point for water conservation. Residential landscapes are frequently given more water than is required to maintain their aesthetic appearance. As a result, optimization of landscape irrigation quantities can yield significant water and money savings. The purpose of this research is to identify how much suburban outdoor irrigation water is applied, quantifying the use and overuse in terms of both volume and value of waste. A dataset containing 36 months of water usage for 1267 Huntsville, TX homes in one residential neighborhood was received from the city water department. Outdoor water usage was calculated using formulas derived from the literature. Landscape water requirements were then determined based on monthly rainfall and evapotranspiration. From these data, we calculated how much excess water over the theoretical requirement was being wasted by overwatering. Using the Huntsville water rates, a value was placed on the cost of overwatering. Simple Linear Regression was used to estimate the influence of cost of overwatering outdoors on indoor water usage. Our analysis showed that the value of monthly outdoor water wasted by 1267 Huntsville homes totaled $11,394.04, with an average of $9.25/month per home. It was interesting to note that 2.77% of homes wasted in excess of $50 per month (over $600/ year). The regression analysis indicated that the indoor water usage was positively correlated to the value of water wasted outdoors ($p<0.001$). For each dollar wasted outdoors, these residences typically use 44.1 more gallons indoors.

7. Student Recruitment: What Is It That REALLY Makes Them Say "Yes!"?

S. Koehl, B. Whitten, D. Pavelock, and S. Nair. *Sam Houston State University*.

Multiple research studies have examined the factors that affect a student's choice of a university. Facing a drastic budget reduction to the department's recruiting efforts, researchers sought to determine which activities had the greatest return on investment, thereby hoping to provide a future focus on those activities with the greatest impact. Beginning freshmen and first-semester transfer student were asked to identify the single most significant factor that made them say "yes" to the university. They were asked to further identify five other major factors influencing their decision. Surveys were distributed in entry-level agriculture classes within the first two weeks of the Fall 2015 semester. Responses were receive from 117 transfer students and 109 beginning freshmen. The highest percentage (20.88%) of responses for the "single most important factor" was provided for "I liked a specific program of study or major". Of the other 27 possible responses, none other exceeded 10%. When asked to identify five "other important factors", almost two-thirds (64.66%) cited "I like a specific program of study or major". "I liked the size of the campus" received the second most responses (56.63%), followed by "close to home" (53.01%), and "cost was cheaper compared to other universities" (51.00%). No other possible response exceeded a 50% response rate; however, freshmen students more frequently cited "I attended an FFA or 4-H event on campus" as an important factor ($p=0.05$), and the "reputation of the department" was more influential for Caucasian students than African American ($p=0.061$) and Hispanic ($p=0.005$) students.

8. Is Success in Leadership Development Events Simply a Numbers Game?

S. Koehl, B. Whitten, D. Pavelock, and S. Nair. *Sam Houston State University*.

High schools within each state are often separated by size prior to participating in competitions. Especially in athletics and academic events, schools are classified according to enrollment so that that they compete against similar-sized schools. Such is not the case in the FFA. Chapter membership in Texas varies from less than 50 members to more than 800 members, yet these chapters compete against all others regardless of their membership numbers. The Texas FFA State Leadership Development Events include 13 events in areas such as parliamentary procedure, FFA knowledge, agricultural issues, and public relations. State-qualifying teams advance through district and area levels, with the top two teams in each event at the area level advancing to state. Researchers examined whether chapters with larger memberships or more teachers experienced more success at the state competition. Chapters with two teachers had the largest percentage of qualifiers (41.96%), finalists (30.26%), and top 5 placings (36.59%), but chapters with three teachers had the most state winners (45.45%). No state winning teams came from single-teacher departments, one came from a four-teacher department, and one came from a chapter with more than four teachers. Regarding membership levels, chapters with 101-200 members comprised the largest percentage of qualifiers (32.87%) and finalists (30.26%), but chapters with 201-300 members achieved the most top 5 placings (29.27%); however, the 101-200 member chapters fielded more than half (54.55%) of the state winning teams. Only one winning team came from each of these: 51-100 members, 301-400 members, more than 400 members.

9. A Longitudinal Study of Agricultural Literacy and Farm Policy Perspectives among Undergraduate Students in Agricultural Sciences

K. A. Laqua, S. Nair, and F. D. Mills, Jr. *Sam Houston State University.*

US food and agricultural policy can be a sensitive subject. Since university agricultural students may soon influence agricultural policy, does the level of agricultural literacy and personal backgrounds influence their views towards agricultural policy? The Food and Fiber System Literacy instrument, and the Consumer Preferences for Farm Policy/USDA Budget survey were administered to students enrolled in Introduction to Professional Leadership Skills (Intro) and in Agriculture and Government Programs (Policy) at Sam Houston State University. A one-tailed t-test was used to compare agricultural literacy between students in the two courses. Results indicated students enrolled in Policy were significantly more agriculturally literate than students enrolled in Intro ($p<0.001$). Students were asked to apportion USDA's budget into six categories using a $100 scale. No significant difference existed in how Intro and Policy students allocated the budget. Students' level of agricultural literacy and demographic background were regressed on a series of seven Likert-type scale questions related to farm policy. Three of the seven Likert-type scale statements were significantly influenced by at least one of the explanatory variables. Women, political Independents, and students from family farms supported the statement that farm programs ensure food security for US citizens. Students in Intro, older students, students identifying as Republicans, and those from family farms believe farm programs preserve the beauty of rural landscapes. Male students and students identifying as Republicans prefer less government interference in markets. Interestingly, greater agricultural literacy among students in this study had no impact statistically on their views related to farm programs.

10. Arthropod Diversity Response to Deforestation and Desertification in the Sahel.

B. Lingbeek, C. Higgins, D. Kattes, J. Muir, and T. Schwertner. *Tarleton State University.*

Biodiversity loss due to anthropogenic activities is occurring at alarming rates around the world. I conducted a biodiversity study in Senegal, which is a country in West Africa suffering from environmental degradation. I researched ground-dwelling arthropod diversity within protected areas and communal lands to determine the effects of deforestation and desertification on biodiversity in the Sahel. I collected arthropods with pitfall traps at three locations in the dry and rainy season of 2014. I collected a total of 123,512 arthropods and calculated species richness and Shannon diversity for arthropod orders, beetle families, and ant genera. I conducted independent t-tests to compare diversity between the protected area and communal land. Results show greater arthropod order diversity within protected areas, beetle family diversity varies depending on location and season, and ant genus diversity is greater in communal lands. The difference in results illustrates the importance of studying multiple locations, seasons, and taxonomic groups before drawing conclusions about the biodiversity of an ecosystem.

11. Changes in Recommended Planting Dates and its impact on Peanut Quality Attributes

J. Long, R. Herrington, C. Krahn, F. Mills, and S. Nair. *Sam Houston State University.*

Before 1985, peanuts were generally planted in late April in the southeastern US. The emergence of spotted wilt of peanuts, caused by tomato spotted wilt virus (TSWV), greatly increased plant death and yield losses for peanuts planted in this time period. To reduce risk exposure to TSWV, research suggested planting after May 1, preferably May 11-31. However, the indeterminate growth pattern of peanuts and the later planting influenced peanut kernel physiology, particularly kernel maturity. Over time, new TSWV-resistant cultivars were released in hopes that earlier planting could recur. Therefore, the purpose of this study was to assess the effect of planting date on kernel maturity and peanut flavor to predict planting date for optimal maturity. This study used field experimental data on four peanut cultivars planted on seven planting dates at the University of Georgia (UGA) Ponder Farm. The effect of planting dates on fat content, sugar content and the sensory attribute, roasted peanut, were investigated using analysis of variance (ANOVA) for a randomized complete block design followed by mean separation using Least Significant Difference (LSD). The results revealed that planting dates significantly influenced the fat and sugar content of peanuts ($p<0.005$), but did not have significant impact on roasted peanuts. The sample from PD 5 was the most mature based on highest fat and lowest sugar content. In Oilseeds, including peanuts, fat and sugar content are inversely related. Based on one year of data, earlier planting dates in mid to late-April have no advantage over sowing peanuts in mid-May.

12. Using Remote Cameras to Monitor Species Visitation at Feeder Stations

E. Merdian, T. Zobrist, M. Hale, D. Ullrich, and M. M. Beverly. *Sam Houston State University*

Providing supplemental feed to white-tailed deer is a common wildlife management technique used by Texas landowners. This supplemental feed provides a source of protein to maintain body condition, antler growth and increase reproduction. Feeder use by non-target species (e.g., raccoons, birds, skunks) often accounts for more than 50% of the activity at feeder stations (Rollins, 2002) thus providing less protein to the deer. This study examined how often non-target wildlife species visit white-tailed deer feeder stations during a selected time of the year. This data is the first part of a year-long data collection process. Fifteen gravity feeders were weighed and refilled weekly with approximately 16 pounds of corn. Each feeder was equipped game cameras to monitor wildlife species. During February 6 – 19, 2016, 2143 wildlife visitations at the 15 feeder sites were documented. Of the 2,143 visitations only 15.35% were made by the target species, white-tailed deer. The greatest percentage of visitations were made by the non-target species raccoons at 73.26%. Other non-target species that visited the feeders were skunks, feral hogs, armadillo and squirrels. Being able to control the non-target species will the help landowners lower feed costs and grow healthier and larger white-tailed deer.

13. An Analysis of a Professional Development Workshop for School-Based Agriculture Teachers: A Focus on Oxygen Fuel Welding/Cutting/Bending, & Plasma Arc Cutting.

W. H. Pierce, C. L. Roe, P. R. Saucier, and J. E. Muller.
Sam Houston State University

The Science, Technology, Engineering, and Mathematics (STEM) career fields, and those who work in them, are critical engines of innovation and growth (Babco, 2004). While only about five percent of the U.S. workforce is employed in STEM fields, the STEM workforce accounts for more than fifty percent of the nation's sustained economic growth (Babco). The purpose of this study is to determine the professional development needs of Texas agricultural mechanics teachers in regards to oxygen acetylene bending/cutting/welding and the plasma arc cutting processes. Our research was conducted in the fall of 2015, during a four-day (32 hour), STEM-based, metal fabrication workshop that was held at Sam Houston State University for Texas agricultural science teachers (N = 15) (Saucier, Pierce, & Muller, 2015). Day two of the workshop included oxygen fuel bending/cutting/welding, and plasma arc cutting, STEM concepts, and teaching ideas (Saucier et al., 2015). To evaluate the workshop, a questionnaire was administered pre and post workshop. The participants were asked to respond to an instrument that contained 38 Likert type questions about different aspects of each process to determine a teacher's ability level. Overall results indicated teachers had professional development needs in the areas of oxygen fuel bending, cutting, and welding, plasma arc cutting. Additionally, results indicated the workshop was effective in increasing teacher's competence. Researchers determined that the most common professional development need were skills relating to the CNC plasma cutting system. For the oxygen acetylene processes, the majority of the in-service need were found within the welding process.

14. An Analysis of a Professional Development Workshop for School-Based Agriculture Teachers: A Focus on the GMAW and SMAW Processes.

W. H. Pierce, C. L. Roe, P. R. Saucier, and J. E. Muller.
Sam Houston State University

The Science, Technology, Engineering, and Mathematics (STEM) career fields, and those who work in them, are critical engines of innovation and growth (Babco, 2004). While only about five percent of the U.S. workforce is employed in STEM fields, the STEM workforce accounts for more than fifty percent of the nation's sustained economic growth (Babco). The purpose of this study is to determine the professional development needs of Texas school-based agricultural mechanics teachers in regards to the Gas Metal Arc Welding (GMAW) and Shielded Metal Arc Welding (SMAW) processes. Our research was conducted in the fall of 2015, during a four-day (32 hour) STEM-based, metal fabrication workshop that was held at Sam Houston State University for Texas agricultural science teachers (N = 15) (Saucier, Pierce, & Muller, 2015). Day one of the workshop included GMAW, SMAW, STEM concepts, and teaching ideas (Saucier et al., 2015). To evaluate the workshop, a questionnaire containing 20 questions was administered pre and post workshop. The participants were asked to respond to an instrument that contained Likert type questions about various aspects of the processes to determine a teacher's ability level. Overall results indicated teachers had professional development needs in the areas of GMAW/SMAW. Additionally, results indicated the workshop was effective in increasing teachers GMAW/SMAW competence. Researchers determined that the most common professional development need were skills in both processes relating to the ability to weld in the overhead position.

15. An Analysis of a Professional Development Workshop for School-Based Agriculture Teachers: A Focus on Metal Fabrication Equipment.

C. L. Roe, W. H. Pierce, P. R. Saucier, and J. E. Muller.
Sam Houston State University

In agricultural mechanics laboratories, knowledge and skills are critical for all school-based agriculture teachers (Saucier, Terry, & Schumacher, 2009). Based upon a review of literature, the importance of recognizing the professional development needs of agriculture teachers have been identified through a vast array of research surrounding secondary agricultural mechanics curriculum. Sam Houston State University held a four-day (32 hour) STEM-based, metal fabrication workshop for Texas agricultural science teachers (N = 15) in the fall of 2015 (Saucier, Pierce & Muller, 2015). The third day of the teacher workshop included instruction over multiple types of metal fabrication equipment along with concepts and teaching ideas that were STEM related (Saucier et al., 2015). The purpose of this study was to determine the metal fabrication equipment professional development needs of Texas school-based agriculture teachers who instruct and manage within an agriculture mechanics laboratory. The research objectives for this study were: (1) Determine the ability levels of Texas agricultural mechanics teachers use of metal fabrication equipment found in high agriculture mechanics laboratories; (2) Determine the effectiveness of the workshop in regards to increasing teacher competence in using metal fabrication tools; (3) Determine school-based agricultural mechanics teacher's competence to instruct and evaluate students use of metal fabrication equipment. The results indicated that Texas school-based agriculture mechanics teachers (N=15) had in-service needs that included various types of metal fabrication tools and had a great need for maintenance knowledge of metal fabrication equipment. This need affected their competence when evaluating students working with metal fabrication tools.

16. An Analysis of a Professional Development Workshop for School-Based Agriculture Teachers: A Focus on Trailer Design and Fabrication.

C. L. Roe, W. H. Pierce, P. R. Saucier, and J. E. Muller.
Sam Houston State University

For student instruction to be effective, agriculture teachers who instruct in agriculture mechanics laboratories must be technically competent and able to safely manage these unique laboratory facilities (Saucier, McKim, 2010). In secondary agriculture education, a significant and long standing part of instruction is agricultural mechanics (Shultz, Anderson, Shultz & Paulsen, 2014). Through review of literature, researches have noted that the in-service needs of secondary agriculture educators is a highly important topic. Sam Houston State University held a four-day (32 hour) STEM-based metal fabrication workshop for Texas agricultural science teachers (*N*= 15) in the fall of 2015 (Saucier, Pierce & Muller, 2015). During the fourth day of the workshop, teachers used all of the STEM related skills, instruction, and concepts learned from the previous three days of workshops to fabricate and construct a 6'x10' bumper pull trailer. The purpose of this study was to evaluate the effectiveness of the workshop, and to understand the professional development needs of the workshop participants. The research objectives for this study were: (1) Determine the initial competence level of Texas agriculture teacher's (*N*=15) use of metal fabrication skills to construct a 6'x10' bumper pull trailer; (2) Determine the effectiveness of the workshop in regards to increasing teachers competence in trailer construction. Results from this study indicated that Texas agriculture teacher's (*N*=15) had the greatest needs in the ability to develop, plan, and work step by step when constructing a trailer.

17. An Examination of the Shortage of Agricultural Mechanics Teachers in Texas: A Review of Desired Employability Characteristics by Administrators and Local School Districts.

C. L. Roe, P. R. Saucier, and J. E. Muller. *Sam Houston State University*

Each year in public education, teacher turnover and the subsequent teacher replacement is a challenge for school administrators. Based upon a review of literature, teacher shortages in agricultural education have stemmed from job satisfaction issues (Bennett et al., 2002; Necomb, Betts, & Cano, 1987, Walker, Garton, & Kitchel, 2004), individual teacher effectiveness (Berns, 1990; Grady & Burnett, 1985), long working hours related to the position (Murray, Flowers, Croom, & Wilson, 2011), and high stress both in and out of the classroom (Lawver & Smith, 2014). The purpose of this non-experimental, mixed methods study was to analyze all (N = 115) of the Texas agricultural mechanics teacher position announcements for the 2014-2015 academic year that were posted on career websites to determine the characteristics of the position and the qualifications desired of these specialized teachers by local school districts. The research questions for this study were as follows: (1) What were the characteristics advertised of Texas agricultural mechanics teacher positions for the 2014-2015 academic year? (2) What qualifications were desired by local school districts in Texas for agricultural mechanics teacher positions, as determined by electronic position announcements from academic career websites? The majority (95.7%) of these announcements were posted on the VATAT website. Additionally most of these positions were advertised as 12 month positions (35.7%) or year round positions. The majority of these positions were at the high school level (69.6%), paid a stipend for FFA duties (37.4%), with (17.4%) of agricultural mechanics positions being located in Area 7.

18. Scale-Dependent Soil Bacterial Community Variation

S. Shawver, D. G. McGahan, and J. A. Brady. *Tarleton State University*

Soil microbes drive nutrient cycling, and communities are influenced by the unique ecosystems within each horizon via the changes in texture, nutrients, moisture, and gas exchange. Our objective was to determine the morphological and taxonomic scales at which these differences may be observed. We collected soil samples by horizon in 10 pits randomly located in soil mapped as Windthorst fine sandy loam. We sequenced prokaryotic DNA using Illumina MiSeq (Illumina, San Diego, CA). Sequence reads were analyzed using Qiime and the Greengenes database. Statistical analyses were done within Qiime and include Principle coordinate analysis and Kruskal-Wallis ANOVAs. Differences in both α and β diversity were clear between A and B horizons. However, when comparing α and β diversity by horizon number, it was apparent that each horizon was similar to the one directly above and below it. When comparing bacterial community composition by taxonomic scales, only 5 phyla were variable among horizon number ($\alpha = 0.01$), but 39 genera differed ($\alpha = 0.05$). The ability of scientists to detect differences in soil microbial communities using current technology is dependent upon the scale chosen to analyze data and the methods of sampling.

19. Productivity Trends of Major Crops in Northern High Plains of Texas

B. Strnadel, A. Smith, S. Nair, and L. A. Wolfskill. *Sam Houston State University.*

The Northern High Plains (NHP) of Texas is an important agricultural region in the state. Corn, cotton, winter wheat, and grain sorghum are the major crops grown in NHP. Technological advances in irrigation and plant breeding, as well as the adoption of enhanced agronomic practices by the region's agricultural producers have greatly improved input use efficiency and productivity of these crops over time. Dwindling water supplies, increasing cost of production, and the need to feed a rapidly growing population make efficiency and productivity improvements important concerns for both producers and policy makers. This study uses historic production data to compare the yield trends of irrigated corn, cotton, wheat, and grain sorghum in the Texas NHP between 1970 and 2014. Irrigated corn yields increased 1.74 bu./acre/year while grain sorghum yields decreased by 0.08 bu./acre/year for irrigated crop and increased by 0.16 bu./acre/year for dryland crop. Wheat yields increased by 0.38 bu./acre/year for irrigated crop and by 0.25 bu./acre/year for dryland crop. Annual productivity increase was 18 and 5.2 lbs./acre, respectively, for irrigated and dryland cotton. Productivity of all the crops (irrigated only) were compared using relative yield (yield as a percentage of the average yield for the time period for each crop) to account for differences in units and average yields. Cotton showed the largest annual productivity increase (2.77%) followed by corn (1.29%).Winter wheat showed 0.53% yield increase per year while grain sorghum showed only 0.45% annual yield increase.

20. Economics of Meat Quality

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Meat prices vary on a daily basis based on the geographical region, breed, and meat quality, making it difficult for producers to determine the best time to send their cattle to slaughter. The objective of this study was to develop a method utilizing current prices and costs to determine the optimal sale weight to maximize profit. By taking national averages for the 2014 cattle market, a basic model was developed to reach this maximum point based on yield grade, quality grade, and hot carcass weight premiums and discounts applied to the standard base $205.68 per hundred weight. Once total sale price of the animal was calculated, live weight brackets were developed to determine the weight gain needed to break into the next hundred weight price. Cost of gain per pound was figured to evaluate if it was profitable to feed into the next weight bracket or sell at the current weight. 2014 market averages showed that 1520 pounds was the most profitable live weight to sell at using current data. After this weight, cost of gain exceeds additional revenue made due to the sharp discounts incurred at 1000 pounds hot carcass weight. While this optimal weight conflicts with current industry norms, this was based on national average of all breeds in all regions over a year span. This model could be tailored to any operation and become regional and breed specific. Furthermore, it can be updated daily as market prices fluctuate and also aid in the purchase of futures contracts when using future prices as the achieved sales price.

21. Evaluation of a Feed Supplement and its Effects on Feed Intake in Whitetail Deer

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Whitetail deer require optimal nutrition in intensively managed systems. Summer is the grave time when nutrient requirements are crucial for deer, yet feed consumption typically decreases as body and environmental temperature rises. This study focused on increasing feed intake during warm months of the year with a ration containing an additive thought to reduce body temperature. Forty deer were grouped by sex and age and divided into eight pens containing five deer each. Alternating pens, a control and test feed was provided to the deer ad libitum for a three month period, August 1 – October 31, 2015. Eating patterns of deer fed the control vs test ration were monitored using game-cameras. Cameras captured images at five minute intervals for the duration of the study. Time at the feeders was recorded using three, 2-hour intervals. The test group had a longer average overall time at the feeder ($P < 0.01$) due to a tendency ($P = 0.10$) for more time at the feeder in the morning. Even though an increased feeding time was seen in the test group during the evenings, time at the feeder was the lowest ($P < 0.01$) for both treatments during this peak temperature interval when compared to cooler intervals. While the additive added to the ration did increase overall time at the feeder, it did not affect the feeding time during the hottest part of the day as predicted.