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Final Report

The first problem that sought to address the problem given to us by Silvies themselves was the fact that they wanted us to find the correlation between birth weight and three different kinds of weights. The first weight that we compared birth weight to was the weaning weight which is classified as the weight at which the goats were weaned off their mother's milk. This correlation gives Silvies a better idea of what the right weight is to start taking the kids off of their mother's milk which helps to better manage each goat's health. The next weight that they wanted to correlate against the birth weight against was winter weight which can be classified as the weight that each goat is at during the winter as an adult. Finding the correlation between these two is important to see which goats can survive the harsh climate of the winter and which goats will need more help. If a smaller birth weight correlates to a smaller winter weight, Silvies can better prepare these goats for when winter comes. This also lets them prioritize weaker goats over goats who can more likely survive the winter due to their extra weight. The last weight that they wanted to find the correlation between is the sale weight which can be classified as the weight that each goat is sold at. Finding the correlation between this and the birthweight gives Silvies a better idea of which goats they can start to prepare earlier for sale. If they notice a trend that bigger goats tend to get sold more often, they can separate them from the group and focus care that caters towards goats that will be sold. By identifying these correlations between birth weight and winter, weaning, and sale weights, Silvies can better optimize their care of each goat by splitting up the goats and specializing the care for each group.

The second problem we sought to address was our own chosen topic which was finding the number of goat deaths that happen in each season each year. We thought that this was important for Silvies to know because it would help give them a better understanding of when their goat deaths happen so that maybe they can get a better understanding as to why it is happening. Something that we noticed after finding the death graphs was that the winter of 2022 had the highest deaths by far and also took over for the majority of the deaths that happened in 2022. Silvies can see this trend and look back to what they did or what happened differently that year and that winter to cause such a large increase in the goat deaths.

To address the first problem, we concluded that we needed to split up the weights by type. We were lucky that BWT was an available picklist value because it was simple to store this birthweight in the Goat table. However, none of the other weight types that we were looking for were not accounted for in the SessionAnimalTrait.csv file (even though their picklist values existed). This prompted us to find the weaning, winter, and sale weights through other means. To find weaning weights, we created a view of the Weight table that selected only the liveweight values in the months August and September where the goat was less than 1 year old. This aligns with the definition Silvie gave us of weights “recorded in August or September of that year’s kids.” Winter weights were more simple, as we created a view of Weight where the month was November, December, or January. Finally, sale weight was done by looking at the last_weight attribute of goats whose status was SOLD. In order to solve the problem of uncovering whether birth weight had any correlation to these other weights, we created another view where we took all of these other views and took their averages sorted by birth weight. The birth weight values only had a range of about 14lbs and only went to a single decimal point, so organizing by birthweight is not as unwieldy as it sounds. To determine correlation, we graphed this data on

three separate graphs and calculated variance and covariance for linear regression. In the end, we were unable to plot the linear regression line on top of the already existing graph but decided that looking at the data and graphs was enough to determine whether a correlation was present or not. Another interesting function of our website is the ability to search a birthweight and see every goat in the database with that birthweight and their winter, weaning, and sale weights (if applicable) to help predict future weights of a new goat with the same birth weight.

To solve our second problem of deaths in different seasons and years, we obviously needed to split up the deaths by season. To do this, we created four views of the Death table to split up the deaths, one for each season. We originally had our seasons one month ahead of what they currently are (for example winter was defined as December, January, and February) but after getting Silvie's definition of winter weight being weights recorded in November, December, or January, we moved all of our seasons back by one month to match. To help visualize the data, we created five graphs for our website. One is to show the total number of deaths per year, and the other four graphs show the number of deaths in a particular season. We did this to see if any particular pattern emerged in one of the seasons. Our original plan involved the ability to compare years by entering year numbers to find totals and averages, but once we started playing with the data we realized that this seemed unnecessary. The reason we came to this conclusion was because only 10 years had recorded death information (2015-2024), so displaying all of the information on seasonal deaths on a single page resulted in a fairly small table. The benefit to entering two years to compare them would have pretty much only been removing the other tuples from the table. As a replacement of this feature, we added the ability to enter a year and find all of the goat deaths of that year alongside the date of their death and their age, ordered by death date.

The benefits of the completed project are that Silvies Ranch can easily access information and visualize statistics and information to see certain trends. For example, we provide a weight table so that Silvies can view all weights with a certain Tag ID next to one another. They can additionally look at the graphs to see certain trends based on where a majority of the plotted points lie. In addition to weight tables, we provided easy-to-interpret tables for Silvies to be able to read in terms of seasonal deaths. By each year, they can immediately see how many total deaths there were and the division of seasons, which allows Silvies to be able to take extra precautionary measures during those particular seasons. Visualization of this data can result in resources being better allocated during certain parts of the year and help mitigate losses. Furthermore, determining these patterns in goat deaths can help Silvies identify any potential unexpected factors that contribute towards the mortality rate in the long run, such as if they know many goats caught Syphilis or something similar, how much that affected the mortality rate. The variety of graphs provided can also help benefit Silvies in overall seeing information laid out in a form other than a table. The plotted points may allow Silvies to know certain correlations between certain things.