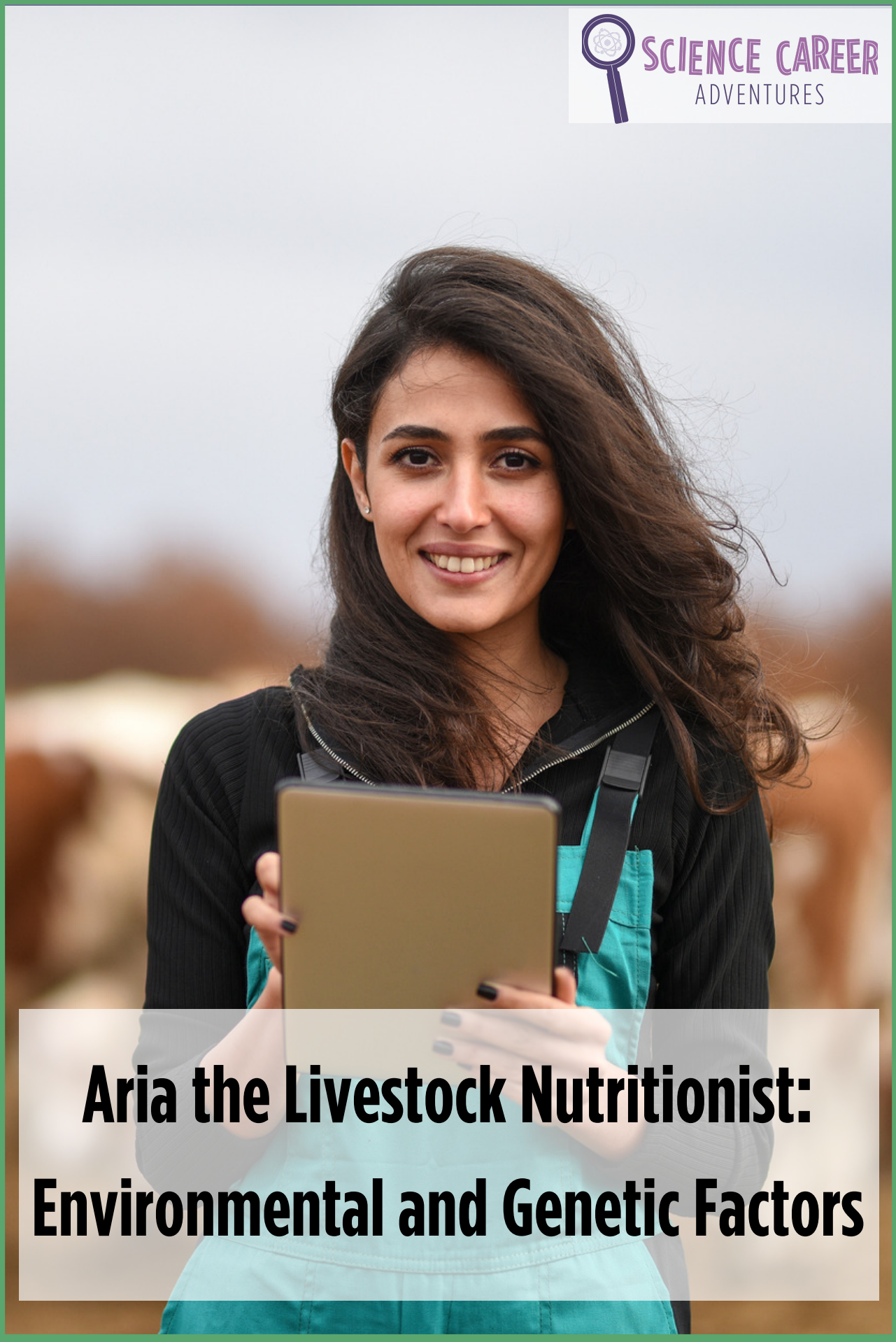
SCIENCE CAREER ADVENTURES



Aria the Livestock Nutritionist: Environmental and Genetic Factors

Who is Aria?

Hello! My name is Aria, and I am a livestock nutritionist. This means that I am an expert in what nutrients animals, like cows, pigs, and sheep, need to grow.

Curious why livestock nutrition is so important?

- Different animals require different nutrients in different amounts. For example, sheep and cows must both have a certain amount of copper in their diet. However, sheep farmers must be very careful not to give their sheep too much copper! Too much copper can be very toxic and can cause illness and death!

- Some livestock eventually end up on our dinner plate. The average person in the United States eats 222.2 pounds of red meat and chicken per year. That's a lot of meat! To keep up with demand, ranchers must ensure that their livestock are properly fed. This means that animals receive all of the nutrients that they need to be able to grow to produce as much meat as possible for customers.

What I Am Working On

Right now, I work at a non-profit that helps teach ranchers how to raise their animals. It is my job to help ranchers make sure that their animals get proper nutrition. Here are a few things that I do as part of my job:

Nutrient Testing:
I perform tests on farmer's soil, plants, and livestock. These tests are important because nutritious plants can only be nutritious if they are grown in nutritious soil. Performing tests lets farmers and ranchers know if they have poor soil and nutrition.

Consult with Farmers:
I give farmers advice about how to fix any issues with their animal's nutrition. If test results show that a grass hay has low protein as a result of low nutrients in the soil, I might recommend fertilizing the soil to increase the nutrients.

Career Spotlight: Livestock Nutritionist

- Average Salary: 60,000 per year
- Degree Needed: Bachelor of Science (usually in Biology, Animal Science, or Biochemistry)
- Can work in a laboratory, a veterinarian's office, or out in the field (visiting farms, zoos, or other animal homes)

Investigating Environmental and Genetic Factors

As a livestock nutritionist, I am an expert on things that affect the growth of livestock. This is important because ranchers want their livestock to gain weight rapidly. There are two different kinds of factors that determine how fast and how much animals grow:

Genetic Factors
These are factors that are influenced by genes, which are regions of DNA. Genes are inherited from an organism's parents, and create proteins inside the body. These proteins influence growth rate, mature size, and hair color. Genetic factors are things that the animal is born predetermined to have or develop.

Environmental Factors:
Environmental factors are influenced by the environment. They change depending on the environment the organism is exposed to. Examples of environmental factors are sunlight, water, or soil. Environmental factors can interact with genetic factors. For example, sheep DNA has genes that make lambs grow very quickly within their first year of life. As a result, they require a ton of nutrients at a young age. If the environment does not provide these nutrients, the sheep will not grow as quickly or as large as they potentially could have, based on their genes.

Meeting With a Rancher

Today, I am meeting with a rancher who raises cattle, sheep, and pigs. He has noticed that his cattle are losing weight and don't look very healthy. It is my job to figure out if the cattle are losing weight because of an environmental factor, like poor soil quality.

My first step is to look at the foods that the farmer is feeding his cattle. I brought a field testing kit with me today. In my kit, there are several tools that I can use to learn more about the feed the rancher is using.

Hay Probe

This probe is inserted into the side of several hay bales, all cut from the same field. Then, the sample of hay is brought back to the lab and tested for moisture content, protein, fat, and minerals.

Water Testing Kit

I am going to use it to take samples of the water on the ranch for testing. It is possible that the water contains parasites that are implanting themselves in the cow's intestines and making them sick!

Zipper Baggies

I use zipper baggies to collect samples from the field where the cows are right now. I'll collect samples of grass from different areas of the field and take them back to the lab to test for nutrient content.

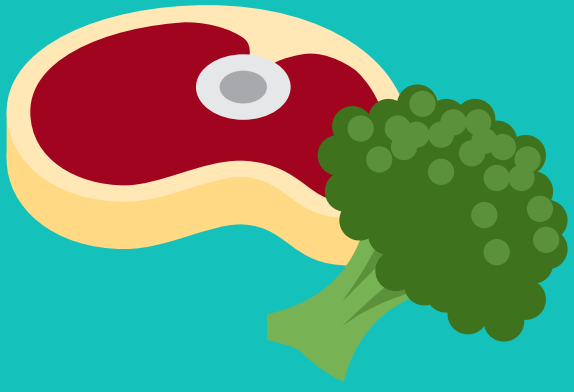
My Results

After I brought the feeds back to the lab and tested them, I found out that both the hay and the pasture grass have low levels of Vitamin A and phosphorus. Vitamin A is a vitamin that is important for growth, development, and good vision. Phosphorus is a mineral that, together with calcium, produces strong bones and helps the immune system function. Both Vitamin A and phosphorus are important for health and growth.

These low levels can happen when there is a drought where the grass grows. A drought is a period of lower than expected rainfall. Droughts can cause less grass to grow in a field. In the area where the grass was grown, the rancher normally sees about 26 inches of rainfall in a year. This year, the field has only gotten 13 inches of rain. That's only half the amount of rainfall! The amount of rainfall in the area is an environmental factor that influences the amount of growth in the rancher's cattle.

Did You Know?

Humans need Vitamin A and phosphorus too! Humans can get their Vitamin A though vegetables like broccoli and their phosphorus through meats and nuts.



My Recommendation

I explained to the rancher that environmental factors are factors that can influence the growth of cattle. I told him that environmental factors are things like the weather, the soil, and the nutrients in feed. If the feed doesn't have enough nutrients in it, it will slow the rate at which cattle can grow.

I am going to recommend that the farmer give the cattle a supplemental mineral feed. A supplement is something that is added into the feed that the cattle normally eat. This supplement will contain phosphorus and Vitamin A, which will balance the cattle's diet. This is important because cattle need Vitamin A and phosphorus to grow.

The need for Vitamin A and phosphorus is a genetic factor that can be influenced by an environmental factor. When there are low levels of Vitamin A and phosphorus, cattle will not be able to gain as much weight as they would normally. This is because genetically, the cattle need a certain amount of phosphorus and vitamin A to grow quickly. Adding supplemental Vitamin A and phosphorus will help the cattle gain weight and be healthier.

I will visit the ranch again in two weeks to check on the cattle and make sure they are gaining weight. I can't wait to see how the cattle's health improves!