Video Transcript

Middle and High School Lesson 4: Plant Nutrient Deficiencies

Speaker 1: Now that you know plants need nutrients to grow and produce a crop, let's further investigate what happens to plants when they don't get the nutrients they need. Plants and humans alike needs specific quantities and types of nutrients to remain healthy and grow. Plant roots pull nutrients from the soil. Plants harvested remove those nutrients. Those nutrients are in the stems, and the crops just harvested. If those nutrients are not replenished, the next crop will be deficient.

Speaker 1: Do you know what a plant looks like when it's nutrient deficient? Plants with nutrient deficiencies can tell us they are missing some things through some common signs. Those include stunted growth, yellow, purple or brown leaves, small or no fruit.

Speaker 1: Here is an example of a very healthy petunia plant. It's green, it has lots of pretty flowers on it, it has the nutrients it needs to grow and add color to my landscape. In contrast, this petunia plant is not healthy, it does not have the nutrients it needs to be a beautiful specimen in my landscape. As you can see, the flowers are becoming a little wilted, and there's yellow, all the leaves are yellow, and they should be green. So this plant is telling me that it's missing something. Something that it need is not in the soil. So I am going to have to amend the soil with the right nutrient that it's missing.

Speaker 1: It can be hard to tell when a plant has a nutrient deficiency. The best way to tell is to compare a healthy plant with a plant that doesn't look healthy.

Speaker 2: Welcome to Africa. As a volunteer with Humanity Against Hunger it will be your mission to alleviate the food shortage on this continent.

Speaker 3: Although Africa may be rich with diversity of plant and animal species, it is also rife with hunger and poverty. Starvation and malnutrition abound despite the fact that nearly two thirds of Africans depend on agriculture for their livelihoods. How can this be? How can so many people involved with agriculture be so undernourished? One of the major reasons is a serious depletion of nutrients in the soil. African farmers have traditionally cleared land, grown a few crops, and then moved on to new land, leaving their old land depleted of nutrients. As a soil scientist, or agronomist for Humanity Against Hunger, your task will be to help farmers identify nutrient deficiencies in their crops and provide them with recommendations on how to improve their existing soil with nutrients to increase their crop yields.

Speaker 3: In the village where you will work, the main crop is maize, or maize. Very similar to what you call corn. As this is an older farming community, much of the farmland has been overused and the soil has been depleted of many essential nutrients resulting in small crop yields, and crops that are more susceptible to disease. During your stay in the village, local farmers will show you samples of their maze and describe their growing conditions. You will then be asked to make an initial analysis of what might be wrong with the farmer's soil. To assist you in your analysis click on your field manual for reference, consult it often. After your initial evaluation, you will then need to make a diagnoses by answering a multiple choice question.

Speaker 3: Ready to start?

Speaker 1: Can you give us your name, your title, and your location?

Speaker 4: My names Phil [Phor 00:04:21], I'm a farmer, and I'm in Taylor Ridge Illinois.

Speaker 1: What do you grow on your farm?

Speaker 4: We grow corn and soybeans.

Speaker 1: Some are the leaves are turning yellow in my garden, do you see this in your field? Why does is happen, and what should I do about it?

Speaker 4: I have noticed some yellow leaves in my corn fields this spring. And that was primarily a nitrogen deficiency, there are various nutritional deficiencies that sometimes we notice in our crops. But sometimes a yellowing would be a nitrogen deficiency in our corn field. The one thing that we can do about that is to add nitrogen to the soil, so the plant will not be deficient in nitrogen. And as soon as we do that it will green right up, and the plant health, it'll turn overnight, it's amazing how that small application of nitrogen will help that.

Speaker 1: And how can plant nutrient deficiencies affect your farm as a whole?

Speaker 4: It would greatly decrease my corn yields. I would probably look at maybe a 50% yield reduction and that would be really detrimental to my bottom line.

Speaker 1: What do you do to test for deficiencies?

Speaker 4: Usually in the fall after harvest we'll test all of our soil. And we don't do this every year, but typically every three to four years. And we'll test the soil to make sure our fertilizer, our phosphorous and potassium and some of our micronutrients are at desirable levels. And if we find that the levels in the soil are depleting or getting lower, we'll make the recommended applications to bring those nutrients up to the levels that are recommended by our universities. Sometimes if we see a nutrient deficiency on a plant during the growing season we can make a rescue application. And typically this is done with a high clearance sprayer, and it's usually a liquid form of that fertilizer and we'll apply it directly over the top. And it's really amazing to see the plant, it'll literally change colors within several days once you apply that nutrient to it.

Speaker 1: How do you solve nutrient problems once they are identified?

Speaker 4: We fertilize a little bit differently for various nutrients. The three primary nutrients that we use are nitrogen, phosphorous, and potassium. These three nutrients are concidered the primary nutrients in crop production. No matter what crop you're raising, wheat, corn, soybeans, alfalfa, hay crops, those three nutrients are primary.

Speaker 4: There are various methods to apply nitrogen, it's usually applied by itself. Nitrogen can be found in a liquid form, or a dry form, or even a gas form. We use a lot of anhydrous

ammonia nitrogen, which is injected into the soil as a gas and then it affixes itself to the soil. We also use a lot of liquid nitrogen, and we'll apply that right before we plant the crop and we'll inject that into the soil also. Nitrogen is a little less stable so we like to apply that right when the plant needs it, so directly before we plant it, or even during the plant growth, we'll inject it into the soil when the corn plants are maybe a foot tall.

Speaker 4: Phosphorous and potassium are typically dry, granular fertilizers and they're spread with a large broadcast spreader. Typically, we spread about 300 pounds an acre of those two products combined, so we'll blend those and spread them together just before we plant the corn crop.