From Tiny Seeds to Mighty Harvests: The Magic of Compounding Effects

Discussing the Three Rules of Adaptive Stewardship

What Are The Three Rules of Adaptive Stewardship

The three rules of adaptive stewardship aim to help farmers graze successfully to achieve healthy crops, restore soil health, and increase crop yield. This document will focus on the rule of compounding and cascading effects. This rule concerns the idea that the environment that you curate will have direct effects on the gene expression of your crops and the overall health of your soil.

The Rule of Compounding and Cascading Effects

Imagine a cascading waterfall: small water droplets from high elevation accumulate as they descend down rocks. The droplets form creeks, rivers, and then waterfalls which eventually lead to lakes or oceans. Every decision and practice you make for your farm results in a series of cascading effects, positive or negative in nature. Anything you do will have an effect on your farm fields; it is never a neutral effect.

Making Observations

Monitoring the changes that you make in your fields allows you to make observations of how these changes are affecting your farm. When you make detailed and insightful observations, this builds your sense of intuition. Using this intuition and learning from the observations you have made, you can make better management decisions that result in positive compounding effects for your farm.

What Are Epigenetics?

Epigenetics are the modification of gene expression from the environment rather than the change in genetic code. They play a huge role in compounding effects. A good example of epigenetics is the Arctic hare:

- In the summer and springtime, the hare's fur turns brown to camouflage with the brown grass and soil.
- In the wintertime, the hare's fur turns white to camouflage with the snow and ice.

This is the environment's influence on gene expression in the Arctic hare.

How Can Epigenetics Be Used On a Farm?

Epigenetics can be applied on a farm by integrating the rules of adaptive stewardship into farm fields. Here are a few examples:

- Increasing plant species diversity
  - Diverse species can produce various secondary and tertiary chemicals which are used by microbes, animals, and humans. This increases medicinal properties for animal and human consumption, as well as attracts unique microbes in the soil.
- Apply adaptive grazing measures
  - Modifying your grazing system maintains an environment that is subject to small instances of disturbance for your crops. With adaptive grazing, the crops will learn how to adapt to random changes (i.e. generate more energy, produce more seeds, etc.)
- Greatly reduce tillage
  - Too much disturbance can damage roots and microbial networks in the soil. Plants growing in highly disturbed soil will be unable to generate enough energy to grow and make important compounds because they need to armour themselves constantly against an ever-changing environment.

Take a Look at a Scenario of a Farm Practicing a Set-Stock Grazing System

In this system, livestock will graze the paddock for an extended period of time. Favoured plants will be repeatedly grazed, causing them to weaken and eventually die out. Unfavoured plants will be under-grazed, thus allowing them to spread. Eventually, the entire paddock will be full of less desirable plants.

Cattle begin to overgraze the paddock. The overgrazing causes root death in the plants because the plant above ground is being eaten, and there is not enough time for the roots to provide nourishment to rebuild the plant organs. This leads to vulnerabilities to diseases. Roots that are dying cannot produce exudates to share with microbes, so the microbiome suffers as well.
Bare spots develop where the plants die, exposing the soil to sun which promotes water loss through evaporation.

Weeds that may have lower nutritional content are less favoured by livestock, and they will spread seed faster and replace the nutritional, beneficial plants. They will proliferate quickly, thereby reducing biodiversity in the field. Therefore, because of one decision made for a grazing system, biodiversity has decreased, soil armour has been reduced, living roots are no longer in the ground, and water is lost due to bare spots in the soil.

How Can You Make Positive Compounding Effects?

- Recognize that EVERY decision you make has an effect; positive or negative but never neutral
- When trialing a new idea, make small or gradual changes on a small scale
- Go to your fields every day and observe any changes
- Make notes of what changed
- If something is changing for the worse, consider why this may be and decide how you can adapt accordingly

What Is the Takeaway Message?

The goal is to have positive compounding effects (an action that you do that has positive impacts on everything in your farm) resulting in positive epigenetic effects (the environment has a positive effect on your crops, providing better growing conditions).