The nutrition of healthy crops, where to start?

By Cristian Crespo

When we start working on systems that tend toward input reduction or organic farming, the first piece we touch on has to do with the use of herbicides and insecticides. A battery of strategies is then unleashed that necessarily breaks with the idea of monoculture and goes towards the rotation of species, use of cover crops, appropriate machinery for each case, management of adapted varieties, strategic management of grazing, different designs, sowing, and harvest dates among other things to take into account.

Sometimes, it takes a while to realize the relationship between agrochemicals designed to combat weeds, insects, or fungi and chemical synthesis fertilizers. It is common to try to abandon the use of the first while maintaining the yields based on the others, but they were designed to act together, within the same conception.

Conventional agriculture understands nutrition from the perspective of the plant. So, if the plant needs 5 units of nutrient X to reach a certain yield and on the soil, there are only 3, fertilization must provide the remaining 2 units to achieve the expected yield. Thus, the soil begins to be conceived as a pot where we must add the appropriate doses of some nutrients periodically so as not to suffer yields. The selection that has been made of the crops with the greatest economic importance is based on this way of understanding a crop: high response to chemical synthesis fertilizers and low competitive ability against pests and weeds (which determines the dependence on agrochemicals).

In the same way as an athlete who has won a race after consuming some substance that stimulates the nervous system, the plant shows a vigorous response to adding a synthetic nutrient. But, can we ensure that performance or sporting performance over time? At what price? Can we say that this athlete is healthier than the grandfather who goes for a walk every afternoon? Is it appropriate to make a judgment of the health of each one only by the speed they develop? Is it correct then to base only on the yield to evaluate a crop?

If we abandon this conception of the soil-pot-supplier and look at the complexity of this enormous system that we walk on, we will find some of the answers we are looking for to ensure adequate nutrition for healthy crops that are not dependent on industrial chemistry. For example: how do we help (we no longer say “contribute”) to a crop that we see as lacking in nitrogen?

The first thing that comes to mind is the traditional view that suggests the contribution of urea. Now, according to the expected yields and the low nitrogen content that agricultural soils are presenting, enormous doses of urea end up. And that has a significant cost. But it also has the environmental cost of changing the acidity or alkalinity conditions of our soil and affecting the enormous complex of microorganisms that act as a bridge between the root and the soil. This contribution generates a rapid response in the plant (like the one of the runner) that quickly increases water absorption and “inflates” with nitrogen, giving an intense green color. But since it absorbed only one nutrient of the more than 40 that a healthy plant needs (inhibiting or complicating the absorption or metabolism of other nutrients), much of the nitrogen will remain floating in its sap, attracting the attention of an army of fungi and insects that feed on those substances.

And if we create conditions for rusts and aphids, how do we combat them later?

This is without counting the inevitable loss of nutrients that is generated by washing or evaporation or the instability of humus (that enormous black reserve of nutrients that our best soils have) due to changes in the environmental conditions imposed by chemical fertilizer. Fertility is a concept that has to do with the ecological balance to which (oh, paradox!) fertilizer does not contribute.

That is why our gaze can never focus on just one crop and its cycle. Rather, we will achieve the stability of our crops with the sequence of several production cycles. The axis must then be focused on the slow accumulation of organic matter that serves as food for the microorganisms that will be the ones who make the nutrients available for the crops in a comprehensive and balanced way. There will be those who are responsible for lowering nitrogen from the air (and for that, we plant inoculated legumes), others who put the existing phosphorus in the soil into solution, and others who serve as a shield for the plant to defend itself against diseases, others who process organic matter, and so on...

This is basically the heart of agroecological management. Strengthening healthy soil. And understanding it is very important, whether our production is horticultural, dairy, livestock, grain, etc. As a friend says, “Productivity lost today is fertility gained for tomorrow.”

For this, some of the strategies we have at hand may be:

- The contribution of organic matter through rational grazing, the use of cover crops, manure, or crop stubble. Each of them will adapt better to one production system than another and will require knowledge, management, and adequate machinery.
- Incorporation of organic matter external to our farm, such as animal manure, hay waste, industrial by-products, bedding from horses or other animals, and chipping of branches, among other things that - to obtain - we must pay attention to.
- The use of biofertilizers that can provide nutrients in balanced quantity and quality and assimilable forms for rapid use by plants without affecting the equilibrium conditions and at a very low cost.
- The incorporation of complexes of microorganisms that can fulfill a specific role. For example: the inoculation of seeds with consortia of

microorganisms capable of fixing atmospheric nitrogen, solubilizing phosphorus, parasitizing or generating toxicity in insects, etc.

All this without stopping working on aspects such as the selection of cultivars adapted to the environment, conditioning, and design of appropriate machinery, establishment of crop rotation and association, conditioning of animal load, and application of grazing criteria, among other strategies.

The concept of agroecological production emerges when one realizes that the company's prosperity and stability hinge on its capacity to build up organic matter in its soil. There begins the virtuous circle that will result in meat, milk, grains, eggs, vegetables, and other products. Depending on the initial state of the environment, the producer's initiative, the accompanying climate, and our connection to our activities and soil, the results of this process can manifest more or less quickly.

This is why, as we transition towards agroecology, we must prioritize becoming producers of organic matter and promoters of life in the soil. The environment, society, and our pocket will be grateful!!!

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