Salutogenesis in agricultural crops

Salutogenesis is the science that seeks to understand how a living being remains healthy. Instead of focusing on the cause of an illness it looks for the processes that keep a being healthy. Considering that, ART is a methodology of processes that looks at the plant physiology to make it work in favor of health. Thus, ART differs from conventional or organic agriculture. Those methodologies are based on the use of inputs in order to cure a disease. Salutogenic management aims to strengthen the vital forces of each crop.

A – How to produce commercially without losing plant health?

ART seeks to balance the crop plant health by management measures that strengthen the vitality of the crops, by favoring their self-protection processes and by stimulating their physiological activity. That approach generates productivity and good food quality. Productivity that is often costly is not ahead of plant health. Productivity is a consequence of health.

Traditionally, the two main goals of a commercial crop production are:

a) high productivity = it is the result of good soil fertility, and depends on predictability of weather conditions and eventually is associated with irrigation.
b) high phytosanitary = it is the result of phytosanitary actions which can be preventive (related to the trophobiosis theory which says that a pest or disease occur when there is excess of amino acids and free sugars) or curative (the use of phyto protective mixtures). The sum of preventive procedures are part of salutogenesis.

The ART management modifies the perspective focused only on the soil quality and recognizes photosynthesis as the main physiological process, the real source of plant nutrition.

- Soil nutrition is responsible for 1/3 of a good harvest.
- The other 1/3 is due to the uninhibited circulation of water into the plants. It is known that irrigation is often the best “fertilization”,
- and the last 1/3 came from cosmic nutrition performed through physiological processes. It is composed of the factors that make photosynthesis possible: light, heat and CO2. There are also the planetary forces. Apparently, they are not in the hands of the farmer, but ART testify that all those cosmic forces can be managed.

Since photosynthesis is the main process of plant nutrition and a physiological process, we arrive at the concept of physiological comfort. To provide this comfort we deliver to crops the optimal conditions to carry out photosynthesis in the most efficient and healthy way.

Crop physiological comfort generates → Productivity Plant healthy Vitalized food with biological quality → They are in the farmer hands and can be managed!

B - Physiological comfort as a key to ART management

We can define physiological comfort as the sum of all factors that affect the physiological balance of a crop generating both productivity and plant health, in a balanced way.

For a long time we have been seeing agriculture governed by the classical agronomic perspective: "it is the soil that supports the plant and productivity is generated by appropriate fertilizing". Little by little irrigation proved that the high availability of water generates more transpiration and photosynthesis. Consequently, an increase in productivity. With the protected cultivation in Brazilian horticulture, heat and CO2 appeared as productive factors as well. Slowly scientists and farmers started to look at physiological factors and have the confirmation that agricultural production is the result of photosynthesis! Soil has a role no more important than water and cosmic nutrition. In the salutogenic approach, the protagonism is shared between the tree top and the root!

Added to the photosynthesis process is the assimilation process. That is the process that generates tissue, produces sugars, starch, proteins and vitamins, and fills grains and fruits with nutritive substances. The assimilation process is also benefited by the ART management as shown below.

C- Factors that generate physiological comfort: management initiatives

The management that aims at the physiological comfort of crops is the proper execution of plant salutogenesis. That is the way to strengthen the vitality of agriculture. The relationship among the components that bring physiological comfort, the physiological effects caused by those components and the necessary management are shown in the table below.

Components of physiological comfort	Physiological Effects	Management
ON THE GROUND (roots)		
Mild nitrogen deficiency	Free nitrogen fixation by the rhizosphere	Onde a year fertilizing with RCW which is rich in C
Mild phosphorus deficiency	High mycorrhizal activity	Combined fertilizing with RCW and green manure.

Balanced availability of macro micronutrients and useful elements	Uninhibited physiological processes	Less limestone and phosphates and more ground silicate rock.
High humus content	Full soil fertility: physical + biological + chemical	Triple fertilizing RCW + green manure and broadleaf weeds management
No offering of luxury nutrition	Moderate and steady growth = healthier	No use of manure or compost
Non-dense and penetrable soil (with macro and micro pores)	Large volume of soil rooted by commercial crops	Green manure up to twice a year
Soil temperature much lower than air temperature	Large volume of active roots	Mulch or covering the soil
Increased water-holding capacity (WHC) of the soil	Promotion of transpiration and photosynthesis which is equivalent to 1/3 of a good irrigation effect	Triple fertilizing RCW + green manure and broadleaf weeds management
High soil aeration	Uninhibited root respiration	Triple fertilizing RCW + green manure and broadleaf weeds management
TREE TOP/LEAVES		
Protection against strong winds, predominance of a light breeze	Transpiration and photosynthesis with no interruption	Windbreak forest strips
Mild nitrogen deficiency	Good physiological finishiment	Double fertilization: RCW and broadleaf weeds
Protection against the excess of sun and heat	Less water deficit and higher LER (land equivalent ratio)	Polycultures in vegetable garden and orchard, forest strips
Regular vegetables tissues	Protection against pathogenic fungus	No use of manure and compost
Uninhibited photosynthesis and assimilation	Complete secondary physiological cycle, and consequently more color, flavor, vitality and production of phytoalexins.	All initiatives above favours those processes
THE ENVIRONMENT (Favouring roots and tree top)		
Overcoming the savannic stage	Absence of negative allelopathy	Selective weeding of grasses and sprawling plants
Presence of spontaneous companion plants	Information exchanging through roots web and mutualistic relationships	Selective weeding of grasses and sprawling plants
Vitalized environment, inspired by the forest environment	A sequency of information forming a physiological web.	All initiatives above
Drought resilience	No shortening of the production cycle	All initiatives above
Horizontal resilience	Activation of the plant self-defense	All initiatives above
Planetary formatives forces	Healthier relation among plants, planets and landscape	RCW and planetary trees

D- Bamboo strength acting in the assimilation process: silica influence on maturation

Plant evolution follows the heat vector. The warmer the climate, the bigger the plants and trees. From Taiga to Tropical Forest, grasses evolved towards the tropic's direction as bamboos. They are the size of a tree and are supported physically by an outer layer hardened by silica. Bamboos elevate silica to the top world configuring the plant influenced by planetary forces. Therefore, Bamboo can be seen as a "planetary tree". Botanically it is a clump of stiffened stalks. It has several characteristics that express the influence of Mars.

That silica, when properly extracted and diluted, is very beneficial on the development and maturation of the physiological processes that happen in the top of trees. It goes from the growth phase to the flowering, fruit formation and even to the seed formation.

Recipe of hot extraction of "bamboo silicon"

a) Mother tincture - basic recipe
- Cook 150g of young bamboo leaves in 5 L of water, for 40 min, at pre-boiling point temperature.
- Strain on a 200 micron mesh
- Place in a sprayer.

b) Dilute the tincture in water- to 10%
- Apply in the field early in the morning.

Bamboo can be cultivated at marginal areas in the farm. Areas that are unsuitable for agriculture such as gullies, deep erosion furrows, marshy areas (not all species of bamboo), very eroded soils, abandoned roads and etc.

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