THE IMPORTANCE OF WINTER

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MANY OF US HAVE COVERED UP a patch of sod in autumn, only to find it ready to take off growing again in spring. However, if in summer we cover the same patch of sod, it is dead and decaying in only a month or so. Why are things so different in winter? Many plants go dormant in winter, yet they burst forth regenerated in spring. Something of special importance to agriculture goes on in winter that we tend to pay little attention to, and what if we use this to improve what we grow?

BRIX

A refractometer measures the diffraction of light as it passes through plant juice. The solids dissolved in this liquid increase the angle of diffraction, which is measured as Brix. Carbohydrates tend to predominate in sap, but it also contains enzymes, hormones, mineral chelates, and amino acids. High Brix usually means rich plant chemistry, not just high sugar—with one important exception. Under dry conditions, plants that take up nitrate and other salts can run short of water and be high Brix but low complexity. In this dry scenario, high Brix means low sugar, low energy, and a plant with little life force. This exception proves the rule that, ordinarily, high Brix means efficient, high-energy, high-complexity crops that pests and diseases find too dense and robust to digest.

Generally, low Brix warns that something needs to be done. If the right things are done, Brix will improve—sometimes dramatically. However, since a refractometer does not say what to do, over-reliance on it can lead to false hopes of fixing things once they are broken. Remedy may fall short, and even expensive inputs such as kelp and foliar chelates may fail to lift crops out of their doldrums.

Commonly, vigor lags and crops run out of puff after the summer solstice when sap flow tapers back from its peak, and we need to understand that winter is what sets the stage for high Brix in late summer.

LIFE PROCESSES

As crop seeds sprout, they give off nourishment for nitrogen-fixing microbes, which in turn feed protozoa and other digestive organisms that provide a freshly digested stream of amino acids around plant roots. As long as soluble nitrogen levels are low and soil energy and mineral supplies are high, microbes living around crop roots can supply amino-acid-rich nutrient uptake. This assures photosynthetic efficiency, which results in further abundant root exudation. The more energy given off as root exudates, the more abundant the nitrogen fixation and nutrient development can be, and the lower the levels of nitrogen salts, the more easily crops develop complex amino acids, better photosynthesis, and more energy for microbial activity in the soil. Then the system increasingly builds vigor and complexity, which shows up as high Brix. It is the old story of improving and enhancing a dynamic interplay between what goes on above ground and what goes on below.

HOW LIFE FORCE WORKS

The key characteristic of life energy is that it accumulates: it flows from lower concentration to higher concentration. Thus, life begets more life—it is the only thing that does. In biodynamics this life force is called ether.

There is both free-flowing life energy, such as accumulates in clouds or crystals, and there is bound life energy as in living organisms. Free-flowing life energy—such as the warmth, light, tone, and life ethers—tends to accumulate in bound form where carbon-based life forms are rich. Thus clouds, which coalesce moisture, rain more over dense forests and rich grasslands than over bare landscapes.

Since the sun is by far the most organized body in the solar system, warmth and light ether spiral in from beyond the earth, passing through the Saturn, Jupiter, and Mars vortexes and bringing with them the influences of Mars (blossoming), Jupiter (fruiting), and Saturn (ripening) as they soak into the earth on its dark side and escape to organize the atmosphere on the sunny side. Warmth and light work on the substances of plants to drive sap vigor and photosynthesis. The intensity of their association and the extent to which they are incorporated into the plant is a measure of the plant's vitality and how well these forces work in tandem with its chemistry and its structure.

The situation is somewhat different with the tone and life ethers that organize the plant's chemistry and structure. Although the sun is the focus of warmth and light, the sun's further densifications of the ether as tone

and life—which carry with them the influences of Mercury (digestion) and Venus (mineral activation), as well as the moon (nitrogen fixation and growth)—are reflected onto the earth, particularly at full moon.

In summer, especially in the higher latitudes, the warmth and light ethers flow forth strongly and soak in weakly. In winter, this situation reverses as the sun spends more of the day below the horizon than it does above. Then the outward flow on winter days is weak, and the inward flow on winter nights is strong. This means both the warmth and light and the tone and life ethers build up in the soil foodweb during winter, as the warmth and light are not carrying the tone and life back upwards from the earth. Moreover, since they build up in winter, they draw organization more strongly into the earth's oceans, soils, and biosphere.

LIME, SILICA AND CLAY

From analytical chemistry, Rudolf Steiner realized lime and silica lie at opposite poles in living organisms. Where lime has a close relationship with amino acids, proteins, and DNA, silica is mostly found in tough carbon structures such as cell walls, connective tissues, and transport vessels. Steiner called this the lime/silica or earthly/cosmic polarity, while pointing to clay as the mediator between their extremes.

In spring and summer, the buoyant cosmic light and warmth work upward from within the earth via silica towards the sun, lifting lime, amino acids, and minerals into growth, blossom, and fruit. Since warmth and light flow from beyond the earth toward the sun via silica, as the summer reaches its longest day the light forces reach the peak of their upwelling, after which sap vigor may decline even though warmth is still increasing. Thus, late-summer crops may suffer if the earth has not built up sufficient reserves of warmth and light ether over the previous winter.

In autumn and winter, the denser earthly forces of tone (chemistry) and life—reflected from the sun via Mercury, Venus, and the moon—gain the upper hand as warmth and light recede and the summer's vegetation is digested back into the earth. As the earth absorbs these fallen summer substances, along with the tone and life ethers working through them, it organizes stable clay/humus complexes while the earthly forces of chemistry and structure, along with the substances they work upon, build up and reach their maximum in mid-winter.

In the flowering process, where phosphorous, a component of clay, works with light, flowers have sugary nectar on the silica/female side, while on the lime/male side there is protein-rich pollen. Seed is formed by the plant separating its lime and silica forces and re-joining them into a new plant born out of a fresh union of the cosmic and earthly forces in its surroundings.

A MYSTERY SOLVED

We may have thought that in winter the earth goes to sleep, but winter is the season when the plants above the earth fall down to be digested while warmth and light recede into the soil and the earth becomes inwardly sensitive and alive. There in winter the forces of warmth and light are caught up by lime, while the forces of tone and life are caught up by silica, and both substances are enlivened by their complimentary processes. Then in spring the earth dozes off to sleep and "dies" again as plant growth outwardly expresses the activity that took place within the earth in winter when it was sensitive and alive. In winter many perennials go dormant above ground while their root growth comes to life. What warmth and light do within the earth is seen in the abundant upwelling of sugary sap in Canadian maples in the spring. The amount of sugar maples produce speaks volumes about what warmth and light can do within the earth over winter.

Thus. in the sod that survives covering up over winter. we see the forces of warmth and light—that in summer worked in the leaf—now join up with the roots' tone and life. On the other hand, since plants must have a connection between cosmic warmth and light and earthly tone and life, in summer when we break the connection with tone and life in the soil while warmth and light are at work in the atmosphere, the plant dies.

Summer crops rising into the atmosphere are expressing the dreaming of the earth as it sleeps. It is no accident that "awake" winter crops like wheat, barley, and rye live right at the soil surface all winter and spread out a network of fine, sensitive roots brimming with life. Then, as the earth dies off again in spring, these cereals go through a tremendous spurt of growth above ground, making fat heads of grain.

BALANCE AND REMEDY

When the cosmic and earthly streams are out of balance, crops can either be undernourished and burn up from insufficient lime forces or they can be too lush to ripen without problems due to insufficient silica forces. What we really want is to strengthen both streams in a balanced way. Understanding life forces and how they arise can help us balance and enrich either or both streams as needed. By building a balance of life forces into the soil over winter, we can ensure that it streams back warmth, light, tone, and life strongly enough to last through the entire summer.

Rudolf Steiner's Agriculture Course introduced horn manure and horn silica as preparations made with cows' horns as the focal device to build coherent forces into the substances used to fill them. According to accounts, he used clay to close the open ends of the horns. These remedies were meant to impart new vitality to the earth. To gain an appreciation of a cow horn's resonant power, hold an empty horn up to your ear and imagine the coherence produced by that resonance working on the contents while buried in the soil for six months. The horn manure enriches and enhances the tone and life while the horn silica enriches and enhances the warmth and light streams discussed previously. As the life forces build in the soil, they draw in a stronger and stronger stream of life forces from their surroundings. Winter is perfect to boost both polarities so that the following summer they stream back and sustain healthy crops.

If boosted only with the biodynamic horn manure, tone and life can build up strongly over winter, and without sufficient balance by the silica forces the digestive and nutritive processes may overwhelm the fruiting and ripening processes in late summer when warmth and light decline. This can spell trouble with low Brix at the end of the summer crop cycle where insects and diseases digest crops before harvest. To correct for this, balance soil applications of horn manure by also applying horn silica to the soil in winter.

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