Harness plant energy efficiently

By World Focus Agri

The concept of mass and energy balance is not new. Any biological system, including the human body, depends on this balance. In crop cultivation, much energy and cost are put into providing for plants' needs in terms of mass balance; in other words, bringing the soil and/or growth medium into balance in terms of nutrients and other relevant aspects.

The question, however, is how can energy be managed efficiently in a plant? While all the nutrients in the soil may be balanced, the results are not always as expected – lush growth does not occur, pathogens gain a foothold, or harmful insects use the crops for reproduction. Consequently, the yield falls short of the crop's genetic potential.

The solution to this problem is efficient energy management in the plant and soil.

The effect of ETP

Some systems in nature, such as the effect of metabolites on soil life, enable plants to manage their energy optimally. The key to success lies in certain secondary metabolites that organisms secrete. Like urea and glomalin, epipolythiodioxopiperazines (ETP), an enzyme derived from *Trichoderma* fungi, is supposed to be freely available in nature.

Onion seed at Augrabies at 3ℓ/ha with a yield of 1,2tons/ha at 98% germination.

Effective plant energy management lies in ETP, which organisms return to the plant as metabolites in the symbiotic relationship when it is active in the rhizosphere.

It is sometimes difficult to get the rhizosphere in a commercial environment to function effectively so that the living organisms secrete enough ETP to achieve the desired effect. For this reason, ETP in the form of Gliogrow can be used as a foliar spray to obtain the desired results.

The effect of ETP on the plant is as follows:

- Increased root growth activity since the plant still wants to access the metabolite.
- Increased enzyme activation for the plant's metabolic management and nutrient uptake.
- Increase in the concentration of complex plant sugars or nutrients (degrees Brix).
- Increase in the concentration of abscisic acid and plant sap conduction.
- Increased photosynthetic activity.
- Balance between photosynthesis and respiration.

Additional benefits

If this effect of increased enzyme activation is used further along in the energy management and plant protection process, the following can be expected:

- By using ETP with an essential but difficult to absorb leaf element such as calcium (Ca), the effect can be exceptional. The combination of the increased enzyme activation and secondary metabolite-gelated Ca forms Ca-calmodulin (enzyme), which acts as a second messenger for the synthesis of 'protective' proteins.
- A similar effect can be obtained with the increased uptake of potassium (K) by the secondary metabolite-gelated K to keep the ripening enzyme concentrations constant. This ensures a more even ripening process.

Soya beans in Delmas receiving a second application of Gliogrow.

- Due to the above changes in plant metabolism, there is a significant increase in sugar, starch and amino acid production within the plant. These extremely favourable conditions result in improved flower and fruit formation and therefore increased yield and shelf life.

A further increase in plant energy can be achieved through the optimal management of applied nitrates in relation to ammonium in the plant. This can be accomplished by using the secondary metabolite gelation of Ca and K as an alternative to Ca nitrate and K nitrate. As a result, the plant has to reduce fewer nitrates to amines for the Krebs cycle, which is necessary to produce amino acids. The lower reduction rate results in reduced plant respiration, which results in the valuable complex plant sugars and available energy being retained.

Gliogrow is a natural product that leaves no residue after application and can be used effectively on any crop before the plant enters phases with high energy demands, such as initiation, cell division and fruit set.

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