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GROEI

Uitgawe 29: 2025 Winter

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LAEVELD AGROCHEM GROEI 29

Inhoudsopgawe

JULIE / AUGUSTUS 2025

BOODSKAP VAN

Kobus Meintjes

Hoof Uitvoerende Beampte

Om op die drempel van ’n nuwe seisoen te staan, is ’n reuse voorreg. Elke nuwe seisoen bring ’n geleentheid om dit wat ons reeds geleer het toe te pas, om strategieë te verfyn en ons vorige prestasies te oortref.

Saam met die opwinding van die nuwe seisoen is daar altyd onsekerheid – die weer, markpryse, die kompleksiteit van ons politieke landskap. Dít hou ons op ons knieë.

Ons LAC-familie betree hierdie jaar sy eie nuwe seisoen. Na 33 merkwaardige jare aan die stuur, staan oom Nick Liebenberg nou terug. Ons eer sy nalatenskap en alles wat hy saam met Corné en die toegewyde LAC-familie opgebou het.

Tydens ons LAC-konferensie in Junie het oom Nick en Corné kosbare stories uit die verlede met ons gedeel. Ons het die maatskappy se groei oor die afgelope 33 jaar gevier en hom vereer vir sy visie, harde werk en leierskap. Mag hierdie kosbare stories uit die verlede ons altyd herinner aan die groot genade wat ons tot hier gebring het, asook aan die groter doel van hierdie besondere maatskappy.

Alhoewel verandering ’n konstante reisgenoot op LAC se pad was, het ons visie nooit verander nie: ***Impak deur verhoudings en innovasie. Hierdie LAC-roeping staan vas!***

Geniet die foto’s van die konferensie in hierdie GROEI-uitgawe! Ek hoop dit dra die LAC-gees en opgewondenheid oor die toekoms oor aan elkeen van julle. Laat ons die lesse uit die verlede gebruik om ons in staat te stel om ’n selfs groter impak in die toekoms te maak.

Sterkte met die seisoen wat voorlê.
Dit bly ’n voorreg om ’n impak te maak op die boer se plaas.

Groete Kobus

Meer foto’s op die middelste bladsy.

GROETE VAN

Corné Liebenberg

Direkteur: Markontwikkeling en Innovasie

Beste Laeveld-familie

Hierdie winteruitgawe van ***Groei*** is weereens propvol warm wenke, iets waardevols oor meeste gewasse, vir oud en jonk, slim en baie slim. Ons glo sterk in die *pay it forward*-beginsel, so deel gerus die boekie met almal wat jy dink daarby kan baat. As jy nog een soek, stuur bloot ’n e-pos of vra jou naaste agent – ons sal dit by jou kom aflewer.

Die grootste nuus is dat ons bestuurspan ná 34 jaar ’n bietjie aangepas is, Kobus Meintjes slaan nou die sweep. Hy en die span het ons missie bietjie afgestof en dit vereenvoudig na: *“Impak deur verhoudings en innovasie.”* Dit som perfek op wie Laeveld Agrochem is, hoe ons tot hier gekom het, en waarna ons streef in die toekoms.
Sien die leierskapspan op die volgende bladsy.

Vir ons begin alles by ***verhoudings*** – vanaf ons verhoudings tuis (anders bring jy jou probleme werk toe), tot ons verhoudings onder mekaar by die hoofkantoor, met ons takke en agente (franchisees) in die veld, en dan bowenal julle: ons kliënte, wat feitlik altyd ook ons vriende raak. As hierdie verhoudings reg is en die nodige vertroue bestaan, weet julle dat ons agente deur dik en dun by julle sal staan en ons weet dat betalings vir ons oplossings betyds sal wees, sodat ons kan aanhou om net die beste kundigheid, produkte en dienste aan julle te bied.

Natuurlik is innovasie vanselfsprekend. As ons nie voortdurend innoveer nie; in denke tot by oplossings; raak ons net so irrelevant soos ’n DVD-winkel, ’n Kodak-kamera of ’n faksmasjien. Ons het twee mense wat voltyds aan ons span se *mental wellness* werk, en ons IT-afdeling bestaan uit ses persone, waarvan sommige spesialiste in AI (Kunsmatige Intelligensie) is. Dit alles sodat ons die beste en mees relevante oplossings aan julle, ons kliënte, kan bied.

Maar goeie verhoudings en slim innovasies beteken niks as ons nie iets daarmee ***maak*** nie. Wat laat jou in die oggend uit die bed spring en uitsien om werk toe te gaan? As dit geld, sukses, ’n groot omset, winste of enige iets met geld te doen het, sal dit maar tragies wees. Ek het nog nooit iemand ontmoet wat blywende geluk met geld alleen bereik het nie. Alles kom eers regtig bymekaar wanneer ons ’n **IMPAK** maak. ’n Impak onder mekaar, by die kantoor, by julle en op julle plase, in die onderskeie 75 dorpe waar ons LAC-depots is, en reg oor die land.

Van ’n Genesis-kospakkie tot ’n AgricultSURE-saadpakkie waarmee iemand sy eie groentetuin kan begin, tot opleiding oor hoe om dit te doen en alles wat tussen in gebeur. Van saffraan en speserytuine tot organiese heuning en “save the bee”-inisiatiewe, tot AI-opleidingsprogramme vir skoolkinders – so maak ons daagliks êrens in die land ’n verskil in iemand se lewe, en op so ’n manier dat die persoon op sy eie voete kan staan en hopelik ook weer ’n vuurtjie van hoop by iemand anders kan aansteek (’n *pay it forward,* soos in die inleiding genoem).

Verkoop Laeveld gif? Ja, seker ook. Bring ons voedselsekerheid? Beslis. Maak ons daagliks êrens ’n impak? Baie beslis. **BOU** ons ons land op met **LAND-BOU**? Nou praat jy! Eenhonderd persent ja, so seker soos wat jy hier lees.

Dankie dus vir elkeen van julle wat in ons droom en visie glo, en ons toelaat om dit uit te kan leef. Dit is julle ondersteuning wat dit vir ons moontlik maak. Ons droom is om aan te hou om van krag tot krag te gaan, net soos ons ook graag wil hê dat julle van krag tot krag moet gaan. Dan **SAL** ons hierdie pragtige land, deur **LAND-BOU** weer ’n wêreldleier maak, soos wat dit hoort.

Ons is hier om te bly – en ons weet, julle ook.

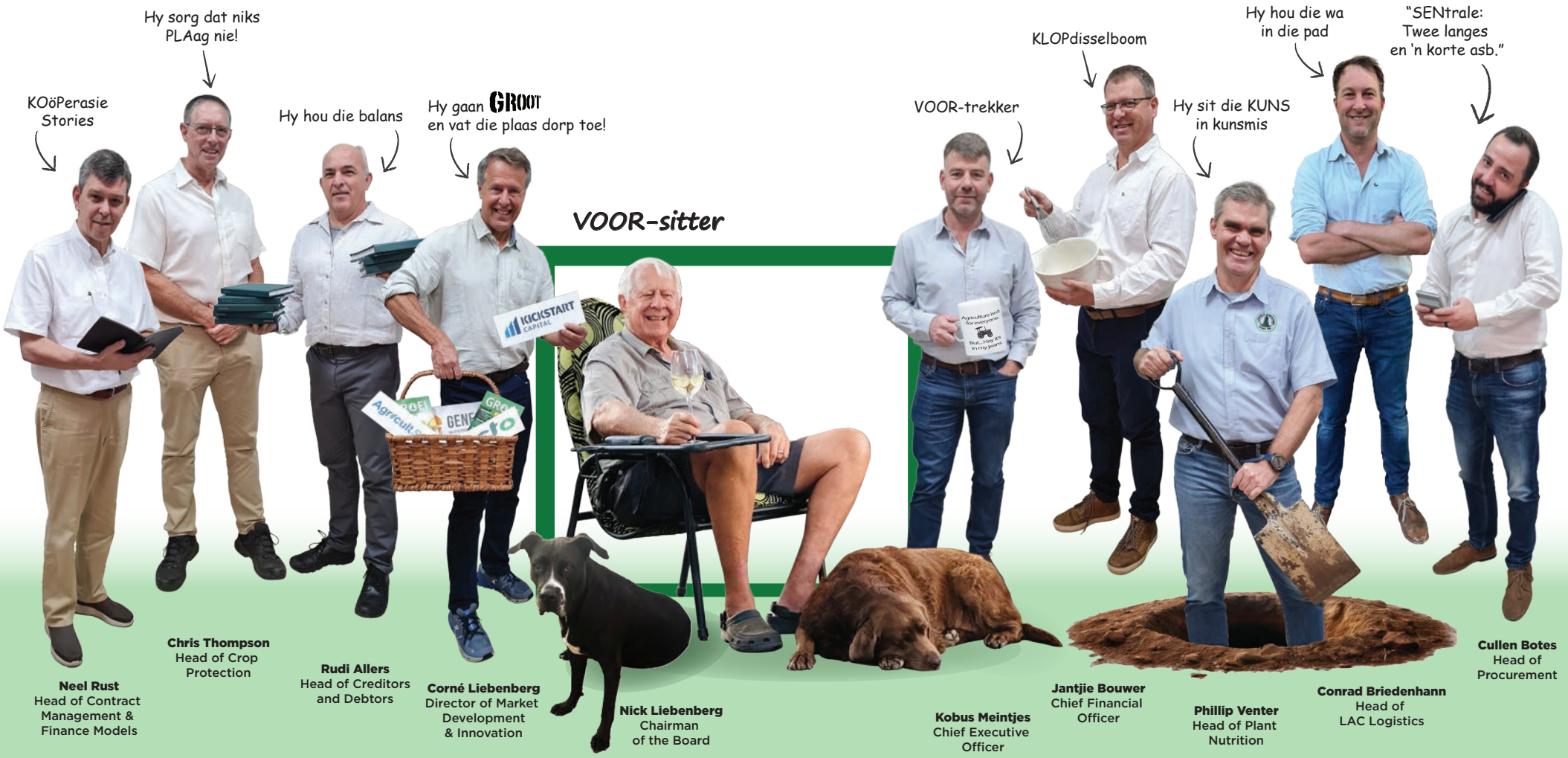
Liebenberg nalatenskap

Nick Liebenberg tree uit as hoof uitvoerende beampte van Laeveld Agrochem. Hy sal die voorsitter van die maatskappy se direksie word en steeds leiding gee aan die onderneming se strategiese visie. Kobus Meintjes, 'n gesoute leier in die landbouchemiebedryf is die nuwe uitvoerende hoof.

Dankie oom Nick vir die voorbeeld en toewyding die afgelope 34 jaar. Die LAC-span sal voortbou op die waardes wat oom gevestig het. Ons is opgewonde oor die nuwe seisoen vir die LAC-familie.

LAC - TEAM

TOGETHER CULTIVATING SUCCESS



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Hennie Stander – Besigheidsbestuurder
Hennie is ons nuwe Besigheidsbestuurder vir die Noord-Kaap en westelike Vrystaat. Hennie beskik oor 'n B.Agric.-graad en verskeie verdere kwalifikasies, waaronder CropLife, BASOS en SAFEX. Hennie het meer as 11 jaar se ondervinding in saad- en gewasbeskerming by Monsanto en Bayer opgedoen, asook jare in voeding, graanproduksie en landboubestuur by GWK, SA Brouery en ander.

Hennie gaan fokus op kleingraan, mielies, aartappels en pekanneute en sien uit daarna om 'n betekenisvolle verskil vir boere te maak.

Skandeer en vind jou naaste LAC-agent
www.laeveld.co.za/agente

The use of NutriCAST™ in row crops

Dr. Teunis Vahrmeijer, Director Business Development, Victus Bio
Dr. Stefan van Wyk, Head of Biological Research & Product Development, Victus Bio

NutriCAST™ for healthy soils

From the very birth of the concept Soil Health in 1909([1]), it was recognised that soil fertility not only refers to the nutrient status of soils, but also includes the carbon content and abundance and diversity of organisms in the soil.

NutriCAST™ is registered as a Group 2 fertiliser and therefore regulated by the Fertilizers, Farm Feeds, Seeds and Remedies Act, Act 36 of 1947. NutriCAST™ consists of a mixture of composted animal manure and earthworm casts and its manufacturing is also regulated by the National Environmental Management Act, Act 107 of 1998.

Nutrient content

The nutrient content of NutriCAST™ is typically in the range of 1,8% for nitrogen, 1,3% for phosphorus and 2,5% for potassium. The release of nitrogen (NH_4 and NO_3) and potassium (K) from NutriCAST™ over time is presented in Figure 1.

The measured nutrient (N and K) fraction released is presented cumulatively as a percentage of the total element released at the end of 240 days. Although N is present in both the nitrate (NO_3) and ammonium (NH_4) form, the nitrate fraction represents approximately 1% of the total N in NutriCAST™ (data not shown). Nitrogen is mostly in the ammonium (NH_4) form, and nearly all of the ammonium is available for plant use within 28 days (Figure 1).

However, the form of N (ammonium or nitrate) depends on a number of processes that happen during the composting process, including mineralisation, nitrification and denitrification, which again depends on the local environmental conditions, e.g. temperature, pH, oxygen, water content and the type of organic material.[3] On the other hand, 80% of the total K is plant available after 60 days, and the rest (20%) is slowly released over 180 days (Figure 1).

Proven results

On the Highveld, good results were obtained when NutriCAST™ was broadcast at 3 m³/ha on soybean fields before planting, where, over a three-year period, an increase in the soil potassium and phosphor levels was observed.

In the Northern Cape region, NutriCAST™-treated wheat fields (2,7 m³/ha) consistently had higher yields (12,3%) than the control.

A synergistic relationship also exists between NutriCAST™ and beneficial soil organisms, as illustrated in Figure 2, where the number of rhizobia colony-forming units increased with the NutriCAST™ application rate. It is due to this effect that one of the proven fertiliser strategies for soybeans is to apply NutriCAST™ as a base fertiliser. Not only does this provide the soybean with the necessary plant nutrients, but it also increases the nodulation potential of the soybean plants.

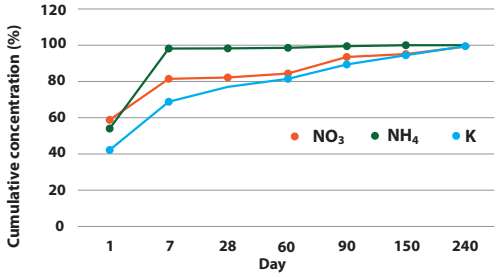

Figure 1: Nitrogen and potassium availability on NutriCAST™.[2]

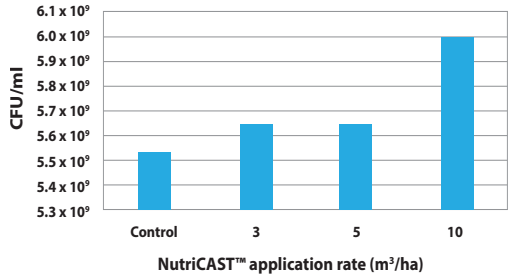

Figure 2: Relationship between NutriCAST™ application and the number of colony-forming units (CFU) per millilitre (ml) of rhizobia.

NutriCAST™: Fertiliser Group 2 | Reg. number B5145 | Act 36 of 1947

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Stronger by nature
Calcium and silicon technologies

Rochelle Thuynsma,
Head of Products: Technical

Calcium and silica are fundamental elements in plant and soil systems, each contributing uniquely to cell wall stability, stress mitigation and nutrient dynamics, making their combined role increasingly relevant in the development of sustainable agricultural practices.

CALCINATOR™

CALCINATOR™ is a pectin complexed foliar calcium (Ca) source formulated to enhance the uptake of Ca as well as target Ca to the cell wall. Calcium not only acts as a cell wall and membrane stabiliser, but also as a secondary messenger in a number of developmental and physiological processes. Selected organic compounds increase growth rates, photosynthesis and tolerance against abiotic stress conditions. Stronger cell walls are also associated with increased disease resistance, improved skin quality and a longer shelf life.

The role of Ca

Calcium plays a vital role in plant physiology, particularly in maintaining cell wall structure, membrane integrity and stress tolerance. In fruit crops, insufficient Ca during early fruit development can result in disorders such as bitter pit in apples, blossom-end rot in tomatoes and creasing in citrus.[1]

Despite sufficient soil Ca-levels, fruits, especially young fruitlets, often suffer from Ca-deficiency due to restricted translocation and uptake during early stages of development.

Calcium uptake in young fruitlets

Calcium is primarily transported via the xylem, driven by transpiration flow.[2] Young fruitlets, however, have low transpiration rates and weak xylem development, making direct uptake from the roots inefficient during early stages.[3] In fact, the xylem functionality in many fruits becomes progressively reduced as the fruit develops, with the phloem playing a dominant role for nutrient transport, though Ca, being relatively immobile in the phloem, is poorly supplied this way.[4]

Cuticular uptake through the fruit surface provides an alternative route. The fruit epidermis, though protected by a cuticle, is permeable to small ions under certain conditions. Foliar application of Ca has been shown to penetrate the fruit surface, especially when formulated with surfactants or organic ligands.[5] The uptake efficiency is significantly influenced by the molecular form of Ca applied.

CALCINATOR™ mode of action

Pectins are naturally occurring polysaccharides found in plant cell walls, particularly rich in galacturonic acid units that can bind divalent cations like Ca. When Ca is complexed with pectin, it forms a neutral or slightly anionic complex that improves leaf and fruit surface adhesion and facilitates transcuticular movement. [6] Additionally, pectin-Ca complexes are believed to enhance Ca-mobility within the apoplast and possibly the symplast, addressing the traditionally poor mobility of ionic Ca.

These formulations may also act as mimics of the natural Ca-binding processes in the cell wall, allowing for better integration into developing tissues. This is particularly advantageous in fruitlets, where cell division and wall expansion require constant Ca-availability to maintain pectin cross-linking and tissue firmness.[7]

Enhanced cell wall structure during development can improve post-harvest disease resistance when using CALCINATOR™ (Figure 1). >>

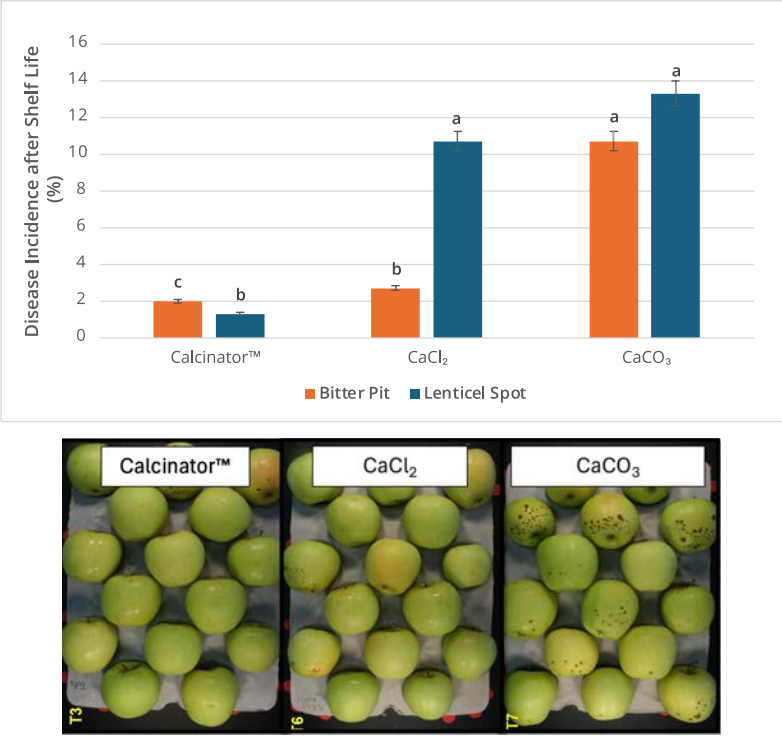

Figure 1: Comparison of post-harvest disease incidence on Golden Delicious apples after simulated shelf life, recorded after foliar applications of CALCINATOR™, $CaCl_2$ and $CaCO_3$ products.

Calcium and silicon technologies
from previous page

Benefits of CALCINATOR™

From the literature, field trials have shown that foliar applications of pectin-complexed Ca during early fruit development can significantly improve fruit quality parameters and reduce physiological disorders.

In apples, early-season sprays with Ca-pectate formulations reduced bitter pit incidence by up to 60% compared to untreated controls.[8] In citrus, foliar Ca improved peel strength and reduced creasing when applied during the cell division phase.[9] In tomato, blossom-end rot incidence was reduced with foliar Ca applied during fruit set, with improved uptake efficiency using pectin-based formulations. [4]

CALCINATOR™ and KELPURA™

Combining CALCINATOR™ with KELPURA™ further enhances the uptake of Ca and also results in the added benefits of enhancing cell division as well as alleviation of stress from environmental factors (Figure 2).

KELPURA™ is a pure kelp extract derived from *Ecklonia maxima* containing high levels of salicylic acid which are crucial to work against excessive ABA and ethylene production during flowering and fruit formation. Salicylic acid enhances the uptake of Ca. High levels of benzoic acid further support the plant's natural metabolism to produce cytokinins as well as salicylic acid, further reducing the influence of environmental conditions on flower and fruit set.

Characterised phytohormones in KELPURA™, such as auxins, cytokinins and brassinosteroids, aid the movement of Ca within the plant, targeting Ca to the cell wall and cell membrane, as well as enhancing uptake by influencing Ca transporter gene expression.

Amino acids in KELPURA™ support Ca-uptake due to their natural complexing properties and include glutamate, glycine, histidine and lysine. Several amino acids in KELPURA™ also aid in the assimilation of Ca. Glutamate and aspartate aid in the movement of Ca within the plant, while serine is involved in cell wall synthesis, directly targeting Ca to the cell wall.

Pectin-complexed Ca is particularly effective when applied at early stages (fruitlets are less than 15 mm in diameter) when cell division and wall construction are most active and demand for Ca is at its peak.[10] The complexed form enhances the Ca-gradient toward fruit epidermal cells, which often act as the first line of defence against Ca-related disorders.

STRENGTH™

STRENGTH™ is a unique source of Ca, boron (B) and orthosilicic acid, blended with natural chelating and organic compounds. STRENGTH™ is a source of orthosilicic acid, the only biologically available source of silicon for plants.

Silicon (Si) is an important, beneficial element required for the proper functioning of cultivated crops.

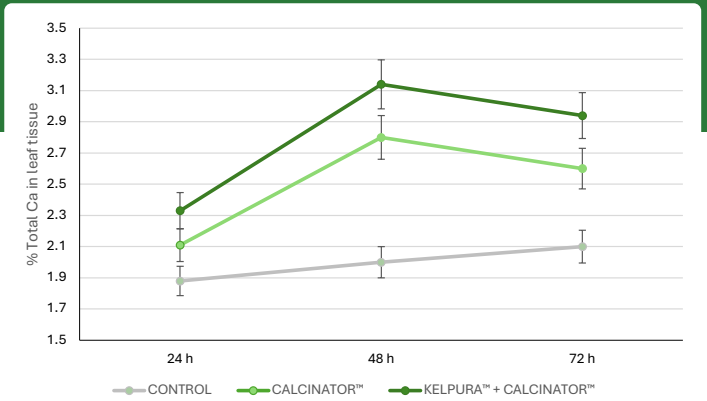

Figure 2: Total Ca in leaf tissue after application of CALCINATOR™ and a combined application of CALCINATOR™ and KELPURA™.

The orthosilicic acid present in STRENGTH™ is rapidly absorbed by the plant, making it an ideal carrier for other plant nutrients, stimulating development and cell growth.

Young fruitlets undergo intensive cell division, wall formation and vascular development, all of which require precise mineral nutrition. Boron is essential for pectin cross-linking and membrane stability, while Si, though not considered essential, plays a critical role in strengthening epidermal tissues and reducing abiotic and biotic stress. [11, 12]

However, the mobility and uptake of both elements, particularly Si, can be limited under field conditions, especially during early fruit stages when root uptake is compromised. Foliar application of orthosilicic acid, a soluble and plant-available form of Si, in combination with B, offers a promising approach to addressing these limitations.

STRENGTH™ mode of action

Silicon is primarily taken up from the soil in the form of orthosilicic acid (H_4SiO_4), but fruitlets, particularly in their early stages, often receive minimal Si via root-to-fruit translocation due to low transpiration and limited xylem activity.[13] Furthermore, Si is deposited primarily through the apoplastic pathway, and its phloem mobility is limited. [14]

Foliar-applied Si, particularly as orthosilicic acid, can be absorbed through the cuticle and stomata of leaves and fruit surfaces. Studies show that young fruitlet epidermal cells can absorb Si from foliar sprays, especially when formulated with stabilisers or complexing agents to keep orthosilicic acid in its monomeric, bioavailable form.[15] Once absorbed, Si is polymerised and deposited in the cell walls and subcuticular spaces, strengthening tissues and enhancing mechanical resistance.[16] >>

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Comparing orthosilicic acid and potassium silicate

Traditional foliar Si-formulations often use potassium silicate (K_4SiO_4), which is alkaline, and forms insoluble silica gels when the pH drops below 9 (Table 1). This limits its bioavailability, especially on the leaf or fruit surface.[17]

In contrast, orthosilicic acid (H_4SiO_4) is a neutral molecule (pKa ~9,5) and remains soluble at typical spray solution pH levels (5,5 to 7,0), allowing efficient penetration and assimilation (Table 1).

Orthosilicic acid is also less prone to polymerisation and precipitation on the leaf surface, allowing it to remain in a form plants can use.[12]

Boron and silicon synergy in fruitlets

Boron is crucial during early fruitlet development for cell wall cross-linking through the formation of borate diesters with rhamnogalacturonan-II (RG-II) pectins.[18] Boron deficiency during this stage can lead to fruit deformation, cracking and abortion.

The combination of B with Si provides synergistic benefits:

- Boron facilitates cell wall elasticity and plasma membrane integrity, key during rapid expansion.[2]
- Silicon enhances cell wall rigidity and reduces water loss, aiding fruitlet resilience under heat or drought stress.[19]
- Together, they optimise the cell wall matrix, balancing flexibility and strength.

Recent studies indicate that foliar applications of orthosilicic acid improve fruit set, reduce fruit drop and enhance skin quality in crops such as apple, citrus and tomato.[20]

Table 1: Comparing orthosilicic acid and potassium silicate.

ETER	ORTHOSILICIC ACID (H_4SiO_4)	POTASSIUM SILICATE (K_2SiO_3)
pH stability	Neutral (5,5 to 7,5)	Alkaline (>11)
Foliar uptake efficiency	High	Low to moderate
Risk of phytotoxicity	Low	High at high concentrations
Compatibility	Broad	Limited

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Benefits of STRENGTH™

Several trials from the literature have demonstrated the efficacy of orthosilicic acid, Ca and B in supporting young fruitlets. In citrus, the unique STRENGTH™ source of Ca, B and orthosilicic acid applications at fruit set, reduced microcracking and improved peel elasticity.[21] Apple fruitlets treated with STRENGTH™ showed higher Ca-retention and reduced bitter pit, possibly due to reduced epidermal transpiration and stronger cell wall binding.[22] In tomatoes, STRENGTH™ reduced fruitlet abortion under high temperature stress by 35% compared to untreated controls.[23]

These benefits are particularly pronounced when STRENGTH™ is applied in the first 3 to 4 weeks after fruit set.

CONCLUSION

CALCINATOR™ is a pectin complexed Ca-source that offers a promising solution to address Ca-deficiency in young fruitlets. By enhancing Ca-availability and uptake through the fruit surface, these formulations support early fruit development, improve structural integrity and reduce physiological disorders. Their mode of action aligns well with the unique challenges of Ca transport in fruitlets, making them an essential component of integrated fruit nutrition programs.

STRENGTH™ is an orthosilicic acid, calcium and boron fertiliser that represents a scientifically validated strategy to enhance young fruitlet development. Compared to silicate salts, orthosilicic acid offers superior stability, foliar uptake and compatibility.

In synergy with B, it supports early structural development, improves fruit quality, and reduces abiotic stress susceptibility. Integration of orthosilicic acid foliar treatments into early-season fertility programmes offers a practical approach to improving yield and fruit resilience.

KELPURA™ is a concentrated liquid biostimulant made from Ecklonia maxima kelp using a proprietary extraction process to preserve its natural bioactives. KELPURA™ supports flowering and fruit set by reducing stress-related hormones and enhancing calcium uptake and movement within the plant. Rich in salicylic and benzoic acids, phytohormones, and amino acids, KELPURA™ improves calcium assimilation and targets it to the cell wall, supporting reproductive development and fruit quality.

CALCINATOR™: Reg. no. B5022. STRENGTH™: Reg. no. B6635. KELPURA™: Reg. no. M442
Fertiliser Group 2 | Act 36 of 1947

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Agri Skills Transfer
20 years of growing futures in agriculture

LAC is a proud partner of Agri Skills Transfer, and is committed to progress through agricultural education.

For more than 20 years, Agri Skills Transfer has been at the forefront of agricultural education and practical training in South Africa and beyond. With a commitment to excellence, accessibility, and relevance, we've empowered thousands of students to take their place in the agricultural sector as skilled, informed, and confident contributors.

What sets Agri Skills Transfer apart is our hands-on, real-world approach. We don't just teach agriculture – we live it. At our own dedicated practical training farm located just outside Cullinan near Pretoria, students receive critical hands-on exposure, bridging the gap between theory and the field.

Whether enrolled in short courses or full-time diploma programmes, every learner engages in practical application to reinforce their learning and boost job-readiness.

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Over the years, we have developed and secured accreditation for numerous practical short courses, including:

- Beef Cattle Production
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- Piggery Production
- Poultry Production
- Sheep Production
- Dairy Production
- Plant and Vegetable Production
- Aquaponics in collaboration with Klein Skuur Aquaponics
- Tractor Operation
- Dairy Production in collaboration with the MPO
- Biosecurity in Dairy farming in collaboration with the MPO
- Artificial Insemination in Dairy farming in collaboration with the MPO
- First Aid, Fire Fighting and SHE REP in collaboration with First Aid Training SA.

Our full-time academic offerings include the National Certificate in Plant and Animal Production (NQF Level 4) – ideal for students who may have interrupted school careers and need to progress to diploma-level studies. We proudly offer two accredited National Diplomas at NQF Level 5 in Plant Production and Animal Production – opening doors to both employment and further education.

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Our reach and results speak for themselves:

- Over 1 000 full-time students trained since 2019.
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Our student base includes individuals from Gauteng, KwaZulu-Natal, North West, Limpopo, Mpumalanga, Western Cape, Northern Cape, and the Eastern Cape, as well as from neighbouring countries and international locations such as the UK, USA, Canada, and Denmark, thanks to our user-friendly online learning platform.

At Agri Skills Transfer, we offer agricultural training with a difference – and the difference is in the doing. From practical farm experience to industry-aligned learning, we're proud to grow the future of farming – one student at a time. Here's to more than 20 years of impact – and many more to come.

Sign-up, or for more information, visit www.agriskills.net.

Die krag van biostimulante: Hoe verskillende biostimulante plante help groei

Janneman Cornelius
Senior Agronoom

In ons vorige artikel het ons gesels oor die "energiekrisis" wat plante ervaar wanneer hulle onder stres verkeer – daardie moeilike tye van droogte, hitte, koue of selfs te veel sout in die grond. Ons het gesien hoe plante dan hul kosbare energie weglei van groei (bruto) om eerder te probeer oorleef (netto). Maar daar is goeie nuus! Verskeie soorte biostimulante tree op as kragtige helpers in hierdie stryd. Hulle werk op slim, natuurlike maniere binne-in die plant om energie meer doeltreffend te gebruik en plante sterker te maak teen stres. Hier volg moontlike "regte gereedskap" wat ons kan gebruik om stres in ons gewasse te bestuur en 'n verduideliking oor hoe dié verskillende biostimulante werk.

Humusprodukte (humienprodukte, fulvien- en humiensure): Die grond se "energie-"boosters"

Dink aan humusprodukte as die "energie-aanvullers" vir jou grond en plantwortels. Hierdie stowwe, wat ontstaan uit die natuurlike afbreek van organiese materiaal, help plante op verskeie maniere. Veral die kleiner deeltjies, soos fulviensuur (FS), is baie aktief.

Hulle het 'n spesiale vermoë om belangrike voedingstowwe soos yster (Fe), sink (Zn), kalsium (Ca), fosfaat (P) en magnesium (Mg) te cheleer en beskikbaar te maak vir die plant. Dit is soos om die voedingstowwe in 'n maklik-opneembare pakkie te sit, wat die plant se wortels minder energie kos om dit op te neem *(Nardi et al., 2002)*.

FS kan ook die "pompe" in plantwortels (H^+-ATP-ases) stimuleer *(Zandonadi et al., 2007)*. Hierdie pompe help die plant om water en voedingstowwe meer effektief in te trek *(Zandonadi et al., 2007)*. Dit beteken dat die plant meer waarde vir die energie wat hy in sy wortels insit kry, wat lei tot beter water- en voedingstofgebruik *(Zandonadi et al., 2007)*.

Navorsing wys ook dat FS wortelgroei kan aanmoedig, amper soos natuurlike planthormone *(Canellas et al., 2015)*. 'n Sterker, gesonder wortelstelsel kan water en voedingstowwe beter benut, wat die plant help om 'n gesonde energiebalans te handhaaf en stres te oorkom.

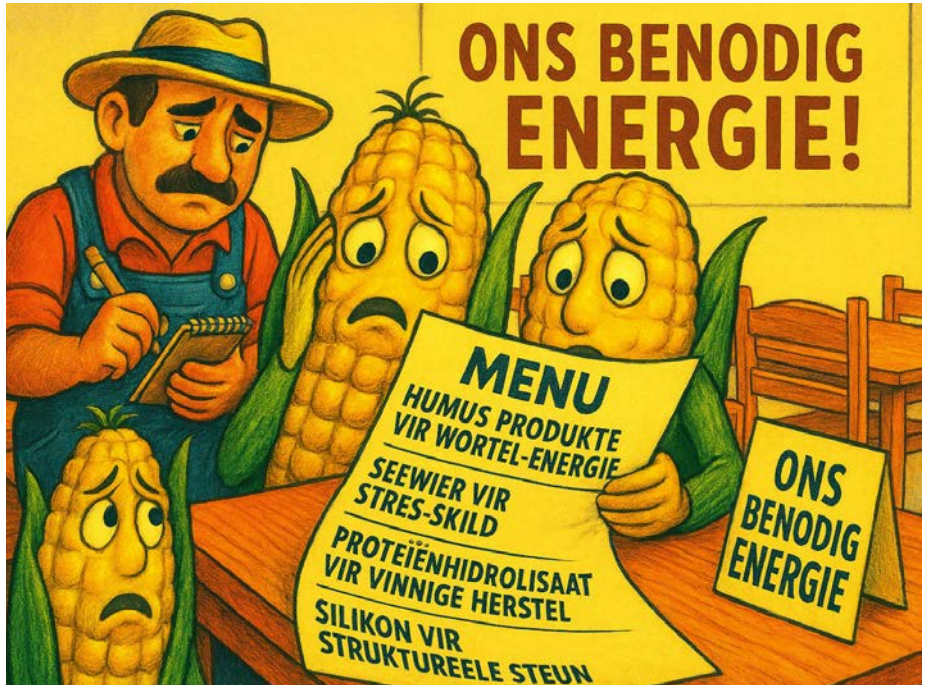
Seewier-ekstrakte: Die plant se stres-skild en groei-ondersteuner

Seewier-ekstrakte is soos 'n multivitamien vir plante, propvol nuttige stowwe *(Battacharyya et al., 2015; Craigie, 2011)*. Hierdie ekstrakte is komplekse biochemiese mengsels, ryk aan bioaktiewe verbindings. Hulle bevat endogene planthormone (soos ouksiene, sitokiniene, en gibberelliene) wat sleutelgroei- en ontwikkelingsprosesse moduleer, wat bron-sink-verhoudings beïnvloed en energieverdeling na ekonomies waardevolle opbrengskomponente rig *(Khan et al., 2009)*.

Boonop kan seewierprodukte die plant se eie verdediging teen siektes en plae versterk, wat beteken dat die plant minder energie hoef te gebruik om homself te beskerm *(Khan et al., 2009; Battacharyya et al., 2015)*.

'n Groot voordeel van seewier-ekstrakte is dat baie van hulle stowwe bevat wat die plant help om water binne-in sy selle te hou *(Turgor)*, selfs wanneer dit droog of sout is (*Battacharyya et al., 2015; Craigie, 2011)*. Dit is soos 'n interne waterreservoir wat selskade voorkom en die plant se metabolisme aan die gang hou *(Battacharyya et al., 2015; Craigie, 2011)*.

Hierdie beskerming verminder die groot hoeveelheid energie wat die plant andersins sou moes gebruik om van stres te herstel of aan te pas *(Battacharyya et al., 2015; Craigie, 2011)*. Deur die plant te help om sy water-balans te handhaaf, help seewier die plant om stres te oorleef en vinniger terug te keer na 'n groeifase. >>



Die krag van biostimulante
vanaf vorige bladsy

Proteïenhidrolisate (aminosure en peptiede): Kitsboublokke vir energiebesparing

Proteïenhidrolisate is soos vooraf-verteerde kos vir plante – hulle verskaf aminosure en klein proteïenstukkies (peptiede) wat die plant direk kan gebruik *(Colla et al., 2017; Du Jardin, 2015)*. Dit spaar die plant 'n enorme hoeveelheid energie wat andersins sou moes gebruik word om self hierdie boublokke te maak, veral wanneer stres energieproduksie (fotosintese) beperk *(Colla et al., 2017)*.

Hierdie eksogene aminosure en peptiede dien as geredelik beskikbare boustene vir die sintese van kernbelangrike proteïene en ensieme wat noodsaaklik is vir metaboliese funksies *(Colla et al., 2017)*.

Sekere aminosure dien ook as beskermers teen stres (bv. prolien) of as voorlopers vir stowwe wat die plant help om vrye radikale te neutraliseer en homself te verdedig *(Du Jardin, 2015)*. Dit verminder die energie wat nodig is vir streshantering *(Du Jardin, 2015)*. Aminosure kan ook help om mikro-elemente beter beskikbaar te maak vir opname *(Colla et al., 2017)*.

Sommige peptiede tree selfs op as seinmolekules wat die plant se groei en verdediging aanpas, sodat die plant sy energie slim kan gebruik om stres te hanteer en weer te begin groei *(Colla et al., 2017; Du Jardin, 2015)*.

Anorganiese verbindings (voordelige elemente soos silikon): Die plant se strukturele versterking

Hoewel nie organies nie, speel voordelige elemente soos silikon (Si) 'n belangrike rol om plante te help *(Liang et al., 2015)*. Wanneer silikon in plantweefsels ingebou word, veral in selwande, maak dit die plant sterker en meer stewig *(Ma & Yamaji, 2006)*. Dit is soos om 'n beskermende laag te bou wat die plant help om fisiese skade te weerstaan en minder aantreklik te wees vir sekere plae en siektes *(Ma & Yamaji, 2006)*.

Hierdie versterking spaar energie wat die plant andersins sou moes gebruik om te herstel of te verdedig *(Ma & Yamaji, 2006)*.

Silikon is ook voordelig om die skadelike gevolge van abiotiese stres soos droogte, hitte en sout te verminder *(Liang et al., 2015)*.

Dit help die plant om water beter te bestuur, verminder skade deur oksidatiewe stres, en beïnvloed die plant se hormoonbalans om beter op stres te reageer *(Liang et al., 2015)*.

Deur die plant te buffer teen die impak van 'n moeilike omgewing, help silikon die plant om sy energie te fokus op groei eerder as net oorlewing *(Liang et al., 2015)*.

Ander belangrike helpers:

Daar is nog ander biostimulante wat plante help met hul energiebestuur. Mikrobiese inokulante, soos bakterieë en swamme in die grond, kan help om voedingstowwe vir die plant beskikbaar te maak *(Du Jardin, 2015; Nardi et al., 2002)*.

Dit verminder die energie wat die plant se wortels moet insit om self na kos te soek *(Du Jardin, 2015; Nardi et al., 2002)*. Hulle kan ook die plant se weerstand teen siektes verhoog, wat weer energie spaar *(Du Jardin, 2015)*. Sekere ander stowwe, soos chitosaan, kan ook die plant se verdediging aktiveer *(Battacharyya et al., 2015)*.

Hierdie diverse groep biostimulante wys hoe baie verskillende maniere daar is om die plant te ondersteun om sy energie-ekonomie slim te bestuur, veral onder druk.

Samevatting

Diverse biostimulantkategorieë oefen hul invloed uit deur 'n spektrum van kenmerkende biochemiese en fisiologiese strategieë. Dit sluit in die verbetering van die doeltreffendheid van hulpbronbenutting, die verhoging van kernmetaboliese prosesse, die verskaffing van essensiële boustene, die versterking van sellulêre en weefselstrukture, en die aktiewe beskerming teen die nadelige effekte van stres.

Gesamentlik is die doel van hierdie funksie om die plant se energie-balans te optimaliseer, en sodoende algehele plantprestasie en veerkragtigheid te verbeter. Dit lei tot beter algehele plantprestasie en 'n groter vermoë om die "energiekrisis", wat deur moeilike omgewingstoestande veroorsaak word, te oorkom – 'n ware verskuiwing van stres tot sukses!

In Artikel 3 sal ons kyk hoe spesifieke produkte, soos dié in die Bioco-reeks, hierdie beginsels toepas om jou gewasse te help floreer.

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Benefits of SF-RTK boundaries in broadacre farming

Gerald Smith
Head of Field Operations

Introduction

Precision agriculture has revolutionised broadacre farming, enabling producers to optimise crop yields, reduce waste and promote sustainability. One crucial aspect of precision agriculture is the use of Sub-Foot Real-Time Kinematic (SF-RTK) boundaries for variable rate applications.

Previous non-precision methods applied to determine block, field and zone boundaries on large open fields did not yield consistent or accurate results due to a number of factors, including varying technologies, the human factor and others. This resulted in inaccurate variable rate applications, which in turn adversely impacted yield. However, with the availability of precision technology it is now possible to determine highly accurate block, field and zone boundaries, resulting in accurate variable applications.

What are SF-RTK boundaries?

SF-RTK boundaries refer to the precise definition of management zones within a field, using precision (SF-RTK GPS) technology. This technology provides location accuracy down to a few centimetres, making it possible to create detailed boundary maps of blocks/fields and to define very specific management zones, presenting a variety of benefits.

The technology is to precisely define boundaries and then use data compiled by GIS based on precise data sets that are entered to perform zone allocations.

To obtain these accurate data sets to work in conjunction with the boundary service, there is a suite of other service offerings available, but not limited to: MYSOIL™ Classification, iTEST™ Soil, iTEST™ Farmers Samples, MYYIELD™ and for the pesticide application, there are PPM™ (Precision Pest Monitoring) services to establish application zones.

The benefits offered by SF-RTK boundaries apply to all types of farming operations. This article explores these benefits, with a particular focus on the beneficial impact in broadacre farming.

Figure 1: Example of a Precision Agricultural Management System used for the MYFIELD EDGE™ service. (Photo: www.deere.com 2025).

General benefits of SF-RTK boundaries

Improved accuracy

SF-RTK boundaries make it possible for producers to apply variable rates of inputs such as fertilisers and pesticides with unprecedented accuracy. This results in a reduction in waste, minimises any environmental impact and optimises crop yields.

Increased operational efficiency

By defining specific management zones, producers can tailor their applications to meet the unique requirements of each area. This streamlines operations, reduces costs and improves overall operational efficiency.

Enhanced crop management

SF-RTK boundaries allow producers to monitor and manage crop health, growth and development at a highly granular level, enabling targeted interventions. This in turn reduces the risk of crop failure, thereby improving overall yields.

Better decision-making

With SF-RTK boundaries producers can analyse detailed data per management zone regarding soil type, moisture levels and crop performance. This information is the key to better decision-making, making is possible for producers to optimise their strategies and ultimately improve profitability.

Reduced environmental impact

By applying measured (the correct quantity) inputs exactly where they are required, producers can minimise environmental harm, reduce chemical usage and promote sustainable practices.

Specific benefit to broadacre producers

Broadacre farming involves large scale farming operations conducted on wide open fields where boundary lines are not (as clearly) defined or visible as is the case in permanent crop farming.

To broadacre producers, the beneficial impact of SF-RTK boundaries will therefore be significant. Targeted variable rate applications can be done according to highly detailed and accurate boundary maps, ensuring optimal management of the different fields or zones.

SF-RTK boundaries can be applied in various precision management practices, including:

- Variable rate fertilisation: By applying fertilisers precisely where they are required, wasteful usage is reduced to an absolute minimum. The targeted application of fertiliser serves to optimise crop growth.
- Precision seeding: Due to the availability of zone-specific data, producers can plant seeds at optimal rates and depths in terms of soil type, moisture levels and crop requirements.
- Targeted pest control: Precise pesticide application in areas where required is possible, reducing unnecessary applications and the use of chemicals, thereby minimising any adverse environmental impact. >

Benefits of SF-RKT boundaries
from previous page

Precision boundary service offering

The MYFIELD EDGE™ service currently offered to producers by Laeveld Agrochem and supported by Agri Technovation is a precision boundary tracking service. It involves the actual tracking of field boundaries (driving the boundary lines) by an expert resource, using a vehicle specifically equipped with SF-RTK GPS technology (Figure 1).

Data collected is used to draw up highly accurate boundary maps, which are made available to producers in electronic format. These maps are loaded onto farming machinery such as planters, tractors or spreaders equipped with compatible AMS technology, making accurate targeted applications possible (Figure 2).

Figure 2: Example of a screenshot on a monitor showing variable rate application based on precision boundary map. (Photo: www.deere.com, 2025).

Conclusion

SF-RTK boundaries offer numerous benefits to broadacre producers, from improved accuracy and efficiency in terms of applications, to enhanced crop management and reduced environmental impact. By leveraging this technology, producers can optimise their operations, improve profitability and promote sustainability. As precision agriculture continues to evolve, SF-RTK boundaries will continue to play an increasingly important role in shaping the future of broadacre farming.

The MYFIELD EDGE™ precision service is available to assist producers, in particular broadacre producers, to accurately define and map the field boundaries, making it possible for them to reap the multiple benefits of SF-RTK boundaries.

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The Laeveld Agrochem story is one of hard work, faith, and favour!
In June 2025, we held our LAC family conference in Pretoria. Nick and Corné Liebenberg took us on a journey back to 1991, sharing precious stories of humble beginnings, perseverance, and incredible growth.

With discussions around planning and vision for the years ahead, our focus is now on innovation, moving forward and making a meaningful impact in our clients' lives and in our communities.




















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Enhancing tortricid moth management through IPM integration of TrichoMax™

www.riverbioscience.co.za

The development and commercial registration of TrichoMax™ (L11627) by River Bioscience marks a significant advancement in the biological management of tortricid pests in South African agriculture. TrichoMax™ contains the egg parasitoid *Trichogrammatoidea cryptophlebiae*, a micro-hymenopteran species indigenous to Southern Africa, which is highly specialised in parasitising the eggs of tortricid moths, most notably *Thaumatotibia leucotreta* (False Codling Moth, or FCM).

Host specificity research has indicated that *T. cryptophlebiae* only targets tortricid hosts. Therefore, application of this macrobial biological control agent will not impact other non-target species, including beneficial or neutral insects. Thus, TrichoMax™ provides farmers with a targeted, residue-free pest management option that complements the growing trend towards sustainable and residue-conscious pest management strategies.

Species profile: *Trichogrammatoidea cryptophlebiae*

Trichogrammatoidea cryptophlebiae is a tiny endoparasitic wasp that measures approximately 0,7 to 1,0 mm in length. Once they emerge, female and male wasps mate. The females then use chemosensory cues to locate and oviposit into freshly laid host eggs. Sex determination in *T. cryptophlebiae* offspring follows the haplodiploid system that is typical of many hymenopteran parasitoids, with females developing from fertilised eggs (diploid) and males from unfertilised eggs (haploid).

The eggs that females lay during oviposition hatch into wasp larvae, which consume the contents of the moth eggs, preventing the caterpillars from surviving and infesting the targeted crop. After 4 to 5 days the wasp larvae pupate, and the moth eggs turns black. After pupation, adult wasps will eventually emerge by chewing through the chorion of parasitised eggs, creating a small exit hole that can be readily seen with a handheld magnifying glass. The life cycle of the wasp from egg to adult is typically completed in approximately 10 days, although development can be faster or slower depending on environmental conditions.

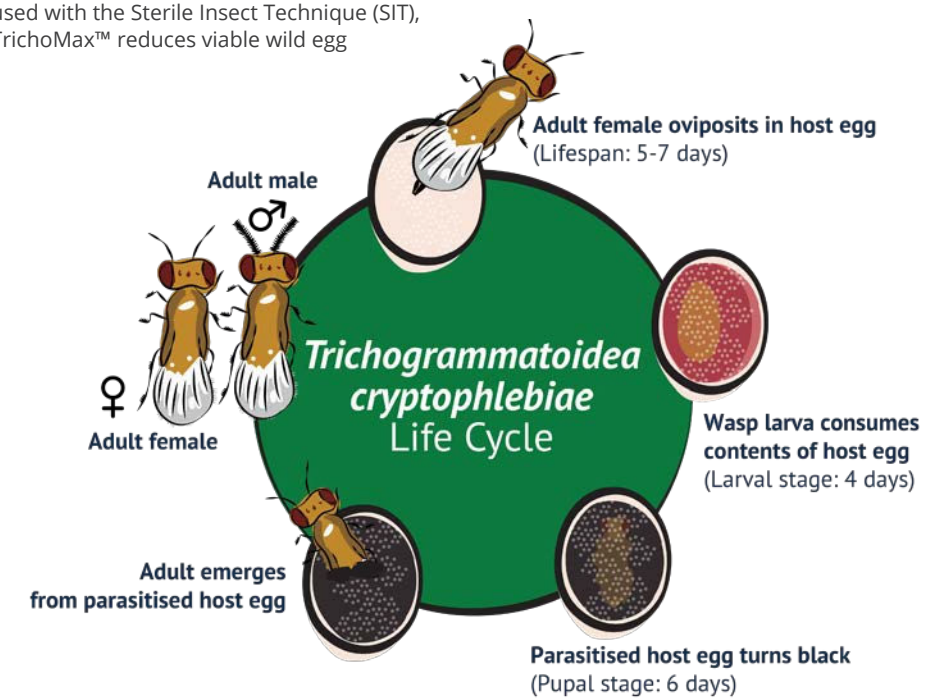
Adult wasps are extremely difficult to find in the field because they are so small. However, the presence of black eggs on the surface of nuts or fruit is a good indicator of parasitoid presence and successful parasitism.

Application guidelines & integration into IPM

To achieve effective suppression of FCM and other targeted tortricid populations, River Bioscience recommends a standard TrichoMax™ application protocol consisting of 25,000 wasps per hectare, applied 4 to 5 times per season. Releases should begin at the onset of tortricid moth oviposition and continue every 4 weeks, depending on pest pressure, environmental conditions and crop phenology. The parasitoids are deployed using egg cards containing parasitised host eggs, which should be evenly, and strategically placed in the orchard canopy to ensure good coverage and spread of the wasps once they emerge.

Trichogrammatoidea cryptophlebiae can be used in Integrated Pest Management (IPM) programmes to enhance the performance of complementary pest control tools. When used with the Sterile Insect Technique (SIT), TrichoMax™ reduces viable wild egg populations, while SIT suppresses adult reproduction. TrichoMax™ works well with other area-wide pest management strategies such as pheromone-based mating disruption (MD) and mass trapping, which target the adult stages of tortricid moths and limits egg-laying, while *T. cryptophlebiae* prevents the next generation from emerging.

TrichoMax™ is also compatible with reduced-risk agents such as microbial products and some insect growth regulators, which can offer complementary modes of action without disrupting parasitoid activity. For optimal results, the use and timing of broad-spectrum synthetic insecticides should be carefully considered during parasitoid release windows to protect both the introduced wasps and other naturally present beneficial insects. >>



Enhancing tortricid moth management
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River Bioscience remains committed to advancing precision biocontrol tools, strengthening the resilience of agricultural systems, and ensuring that growers have access to solutions that meet progressive production, market, and environmental demands.

Understanding and expanding the efficacy of *Trichogrammatoidea cryptophlebiae* in IPM programmes

As part of River Bioscience's commitment to advancing integrated pest management (IPM) strategies, we have supported research efforts that have focused on improving the efficacy and deployment of *T. cryptophlebiae*. Emma Thompson, a Research Technician and Field Representative at River Bioscience, recently completed her M.Sc. research on the species, aimed at enhancing its suitability for broader IPM applications.

Her research encompassed 3 key areas:

- ***Mass rearing optimisation:*** Refinement of rearing protocols to improve host egg availability, maximise parasitism efficiency, and enhance adult parasitoid fitness.
- ***Host range confirmation:*** Laboratory-based host specificity trials assessing the parasitism potential of *T. cryptophlebiae* on key lepidopteran pests, including *Cryptophlebia peltastica* (Litchi Moth), *Cydia pomonella* (Codling Moth), *Lobesia vanillana*, and *T. leucotreta* (FCM). Field work was also completed in macadamia orchards to assess the parasitoids efficacy against *Thaumatotibia batrachopa* (Macadamia Nut Borer, or MNB) as no laboratory culture was available for specificity trials.
- ***Non-target chemical risk assessments:*** Evaluation of the acute and sublethal effects of agrochemical residues on *T. cryptophlebiae* performance.

Chemical compatibility of *T. cryptophlebiae* with surface residues

A primary limitation to the field establishment of *T. cryptophlebiae* is its interaction with non-target agrochemical applications used in tree cropping systems.

In response, Emma Thompson's research systematically assessed the impact of 15

Parasitised egg on macadamia nut.

commonly used active ingredients on both adult mortality and reproductive efficacy of the parasitoid under laboratory conditions.

Freshly treated *T. leucotreta* eggs were exposed to individual *T. cryptophlebiae* females for 24 hours. During this period adult survival and parasitism levels were recorded, providing insight into both acute (direct) toxicity and sublethal behavioural or physiological effects.

The results highlight several important implications for IPM compatibility:

- ***IOBC classification outcomes:*** While many active ingredients were classified as "harmless" based on adult survival (e.g., chloranthraniliprole, cyprodinil, CrpeNPV), sublethal impacts were observed for others.
- ***Sublethal sensitivity:*** Although chemicals such as alpha-cypermethrin, beta-cyfluthrin, lambda-cyhalothrin, methoxyfenozide, and pymetrozine were harmless in terms of adult survival, they significantly reduced parasitism levels. These findings suggest potential repellent properties or impaired host-seeking behaviour when wasps are exposed to these chemicals.
- ***High acute toxicity complications:*** Compounds including abamectin, acephate, and tau-fluvalinate caused > 99% adult mortality, with only marginal parasitism recorded, likely due to pre-lethal oviposition events. Such outcomes indicate these compounds are incompatible with concurrent parasitoid release. Therefore, IPM programmes that include these chemicals should consider the timing of TrichoMax™ carefully to ensure limited impacts to the wasps.

Importantly, trials involved indirect exposure to dry residues, not direct spray application to the insects. Therefore, further work is warranted to assess the safety of specific products when applied at or near the time of parasitoid release in field conditions.

This research provides an evidence-based framework for guiding chemical compatibility in programmes incorporating *T. cryptophlebiae*.

The assessment of acute and sublethal effects highlights the need for careful selection of agrochemicals in orchards where parasitoid releases are implemented. Moving forward, further semi-field and field trials that consider the persistence of various chemicals under natural environmental conditions should be conducted.

This will strengthen guidelines for ensuring optimal timing and safety of parasitoid releases in commercial production systems.

Long-term outlook and sector relevance

As pressure increases on growers to meet export market MRLs (Maximum Residue Limits) and environmental certification standards (e.g. GlobalG.A.P., SIZA, EU Green Deal compliance), biological solutions like TrichoMax™ become essential tools for compliance and competitiveness.

River Bioscience's development of TrichoMax™ reflects a broader commitment to:

- Reducing synthetic pesticide reliance;
- Enhancing biodiversity in production systems;
- Improving biological compatibility in multi-tactic IPM systems;
- Supporting growers in maintaining market access.

Trichogramma

TrichoMax™ offers a scientifically validated, field-ready solution for biological control of tortricid pests in high-value crops.

The launch of this product helps support South Africa's ability to meet international phytosanitary and residue-free export standards, while reducing resistance risks associated with chemical-only control strategies.

Bt-tegnologie: 'n biologiese benadering

Jaco Marais
Kommersiële en Bemarkingsbestuurder - Noorde

Bacillus thuringiensis **is 'n bakterie wat in die grond voorkom en produseer proteïene met insekdodende eienskappe.**

Bacillus thuringiensis (Bt) produseer Cry-proteïene wat lei tot die beheer van plaagspesies van sekere tipes insekte. Hierdie Cry-proteïene bind met spesifieke reseptore binne die ingewande van larwes vanuit teikeninsekspesies. Na binding word die selwande van die ingewande beskadig wat lei tot bakteriële sepsis, verlies in nutriëntabsorpsie en staking in vreet-aktiwiteit van geïnfekteerde larwes. Endospore, die oorlewingstrukture van Bt, wat binne die Bt-produk mag voorkom, lei tot sekondêre infeksie sodra dit binne larwes ontkiem.

Die bydrae wat subspesies lewer

Verskillende subspesies van Bt bevat hul eie unieke Cry-proteïene wat op verskillende plekke binne larwes se ingewande kan bind. Hierdie eienskap van Bt dra by tot insekweerstandsbestuur asook verbeterde beheer van spesies wat verhoogde sensitiwiteit teen spesifieke proteïene toon. Weerstand teen plaagbeheermiddels kan in 'n plaagpopulasie ontwikkel indien die populasie reeds oor weerstandsgene teen die aktiewe bestanddeel beskik en hierdie gene aan die nageslag oorgedra word. Dit is daarom belangrik dat plaagindividue genoeg van 'n plaagbeheermiddel inneem en nie aan sub-letale lae dosisse blootgestel word nie. In die geval van Bt is dit belangrik dat larwes genoegsame konsentrasies van Cry-proteïene inneem en verkieslik ook 'n wye verskeidenheid van proteïene. Dit dra daartoe by dat individue binne die populasie met moontlike weerstandsgene beheer word en nie volwassenheid bereik om hierdie gene na die volgende generasie toe oor te dra nie.

Natuurlike Bt's

Vandat Bt se plaagbeheervermoë ontdek is, het dekades se navorsing gelei tot verskeie deurbrake in tegnologie om hierdie bakterie se insekdodende komponente in kommersiële landbou aan te wend. Een van die tegnieke is om die Cry-proteïene en -spore, na 'n vervaardigingsproses deur middel van fermentasie, in 'n produk te formuleer om op gewasse as 'n biologiese insekdoder aan te wend. Afhangende van die formulasie wat benut word, word meeste geregistreerde Bt's as 'n loofbespuiting toegedien. Sodra peslarwes op die plant se oppervlakte beweeg en vreet, neem hulle die Cry-proteïene en -spore in, waarna die insekdodende werking plaasvind.

Die *kurstaki*-subspesie (bv. DiPel® DF) van Bt beskik oor hul eie unieke seleksie van Cry-proteïene teenoor die *aizawai*-subspesie (bv. Florbac® WG). Deur beide subspesies in 'n spuitprogram te posisioneer, word 'n uitstekende weerstandstrategie geïmplementeer.

Bt-tegnologie as deel van GGO

'n Tweede tegniek waarop die insekdodende vermoë van Bt benut word, is die gebruik van GGO (Geneties Gemodifiseerde Organismes)-gewasse. Verskeie gewasse is wêreldwyd reeds ontwikkel en geneties gemodifiseer om Cry-proteïene te vervaardig sodat sleutelinsekplae beheer word sonder om slegs op chemiese insekdoders te steun.

'n Voorbeeld hiervan is Bt-mielies in Suid-Afrika wat sedert die laat-90's reeds aangeplant word. Vandag is 70% tot 85% van alle mielieproduksie in Suid-Afrika, Bt-mielies. Die doel van Bt-mielies in Suid-Afrika is om gewasse teen stamruspers (bv. die Afrika-stamboorder) te beskerm-, dit is motlarwes wat uitdagend is om deur konvensionele metodes te beheer.

Met GGO-gewasse word die spesifieke geen uit die Bt-bakterie wat vir 'n Cry-toksien omskryf geïsoleer en via genetiese manipulasie in 'n saadvariëteit ingewerk.

Die resultaat is 'n plant wat hierdie spesifieke Cry-proteïene kan vervaardig en dus beskerming teen spesifieke insekplae bied. Watter tegniek ook al aangewend word, Bt is nie 'n breëspektrum-insekdoder-tegnologie nie en teiken slegs spesifieke spesies.

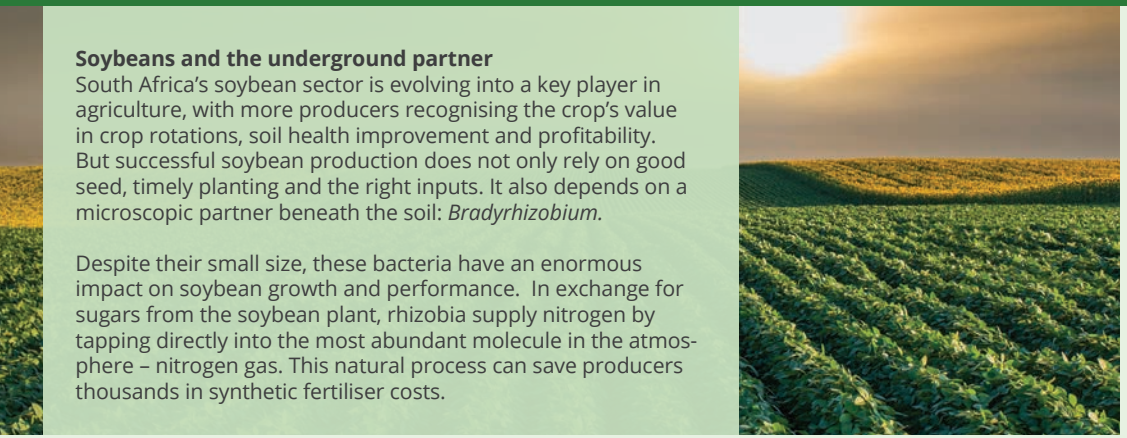
Philagro SA bied toegang tot DiPel® DF en Florbac® WG wat effektiwiteit en weerstandsbestuur promoveer. Opsommend sluit die gebruik van DiPel® DF en Florbac® WG die volgende sleutelvoordele in:

- Voorkoming van bykomende gewasskade omdat larwes wat Bt ingeneem het, staak om te vreet.
- Uitstekende weerstandsbestuur as deel van 'n spuitprogram as gevolg van 'n wye spektrum van Cry-proteïene.
- Beide produkte speel 'n sleutelrol as biologiese komponente in 'n geïntegreerde plaagbestuurstrategie.
- 'n Lae toksisiteitresultaat vir DiPel® DF omdat dit volgens die GHS ("Global Harmonised System")-stelsel as nie-gevaarlik geklassifiseer word.
- Die gebruik van DiPel® DF en Florbac® WG het nie 'n negatiewe uitwerking op die natuurlike vyande van teikenlarwes asook bestuiwers (soos bye) nie.
- Gemoedsrus in die gehalte en effektiwiteit van DiPel® DF en Florbac® WG word verkry omdat beide in Suid-Afrika vir die gebruik op vele gewasse geregistreer is en deurdat elke lot wat vervaardig word deur die strengste gehalte-beheerprosesse goedgekeur word.

Maak DiPel® DF en Florbac® WG deel van jou insek-plaagbeheerspuitprogram om die voordele van hierdie merkwaardige biologiese insekdoders te ontsluit.

Survival to symbiosis: Improved soybean nodulation in adverse in-field conditions

Claire Randolph (MSc), Victus Bio
Co-author: Dr Stefan van Wyk, Victus Bio



Soybeans and the underground partner
South Africa's soybean sector is evolving into a key player in agriculture, with more producers recognising the crop's value in crop rotations, soil health improvement and profitability. But successful soybean production does not only rely on good seed, timely planting and the right inputs. It also depends on a microscopic partner beneath the soil: *Bradyrhizobium.*

Despite their small size, these bacteria have an enormous impact on soybean growth and performance. In exchange for sugars from the soybean plant, rhizobia supply nitrogen by tapping directly into the most abundant molecule in the atmosphere – nitrogen gas. This natural process can save producers thousands in synthetic fertiliser costs.

For this partnership to work, the rhizobia need to stay alive and healthy and protected from abiotic and biotic stress factors to colonise the soybean roots and form nodules. This is easier said than done, especially when considering the tough, unpredictable growing conditions often faced by South African producers.

The power of the partnership
Soybeans are legumes and, like all plants, they are not able to utilise nitrogen provided by the atmosphere. Fortunately nature offers a solution to this challenge through a nitrogen-fixing bacterium called *Bradyrhizobium japonicum*, a species of rhizobia that can form a symbiotic relationship with soybeans (Botha et al., 2004). When soil nitrogen levels are low, flavonoids are secreted by germinating soybean roots to trigger the onset of molecular signalling. Rhizobia close to the roots sense flavonoids and respond by releasing their own signals in the form of Nod (nodulation) factors. These two signals create a cross-talk of molecular signalling between the rhizobia and the soybean, which is a very important step to initiate the symbiosis that would solve the problem of low nitrogen stress.

Strong molecular signalling between the rhizobia and soybean culminates in nodule formation, whereby the root hairs of the soybean grow around the rhizobia forming nodules that are visible on the outside of the root. Rhizobia are encapsulated in the centre of the nodule, with a pink centre being a good indicator for active nitrogen fixation (Figure 1).

Figure 1: Nodules visible on the outside of a soybean root, 14 days after germination. The pink colour visualised in the centre (right) of the nodules indicates the onset of active nitrogen fixation by the rhizobia.
Photo: Victus Bio Research Laboratory.

A true win-win
Think of the nodule and the root as two engines that need to work together for nitrogen to fixate. The soybean provides nutrition to the rhizobia in the form of sugars, such as sucrose.

In return, rhizobia deliver nitrogen in the form of ammonia, which is converted by the soybean into ureides to fuel photosynthesis. Thus, a true win-win partnership (Liu et al., 2018).

When the nodule and root engines work together efficiently throughout the symbiosis, soybean can fix about 85 to 150 kg of nitrogen per hectare per year. The result of this partnership is healthier plants, better yields and a significantly reduced need for synthetic nitrogen fertilisers.

The challenge to protect the rhizobia
There is a challenge though: the success of this whole process depends on the viability and performance of the rhizobia. While field conditions often place them under considerable stress, the challenge can be managed effectively with the right tools and techniques.

Soybean producers in South Africa are familiar with the unpredictable challenges and risks associated with soybean production. Variable rainfall, high temperatures, drought and fluctuating soil pH levels are often encountered, combined with the physical demands of seed handling and storage (Hassen et al., 2014). All these factors threaten the viability of rhizobia in the field, making it hard for these tiny microbes to remain viable, let alone perform at their best.

Main stress factors that threaten rhizobia in the field

1. Drought and desiccation
Dry soil conditions can be devastating for rhizobia (Vriezen et al., 2007). These bacteria need a moist environment to survive and move through the soil to the soybean roots. When planting into dry conditions, a common occurrence in parts of the Free State, North West and KwaZulu-Natal, many rhizobia fail to survive long enough to establish a relationship with their host plant.

2. High temperatures
Prolonged exposure to soil temperatures above 35°C can be lethal to many rhizobia strains, especially when combined with dryness (Zahran, 1999). Inoculated seeds exposed to direct sunlight on hot days during planting are particularly vulnerable. Short exposure to extreme heat can also drastically reduce rhizobial survival.

3. Chemical stresses
Fungicide and insecticide seed treatments, while important for protecting the seed, can be toxic to rhizobia (Ramos & Junior, 1993). Compatibility between treatments and inoculants is not always guaranteed and in some cases, rhizobia viability can be significantly affected within hours of application if chemicals are used in high concentrations or incorrectly.

4. UV light exposure
It is not only heat that poses a risk. Sunlight can also cause damage (Daniel et al., 2001). Ultraviolet (UV) radiation can harm the bacterial cells, particularly during seed handling if seeds are left exposed for long periods during planting operations.

5. Soil acidity and salinity
Many South African soils can be either too acidic or have elevated salt levels, especially in areas with a history of over-fertilisation and/or poor drainage (Hassen et al., 2014). These conditions can reduce rhizobial survival in the soil and impair nodulation, even if infection occurs.

The collective consideration of the above challenges indicates that even a premium quality inoculant, whether applied on the seed or in-furrow, may not be enough - unless additional steps are taken to protect the rhizobia. >>

Survival to symbiosis

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OsmoGUARD™: Protecting rhizobia on the seed and in the soil

Victus Bio offers a range of biotechnologically advanced inoculants for legumes, including soybeans, namely RX-N™ Soybean, supported by Agri Technovation's agricultural agronomists and distributed by Laeveld Agrochem. RX-N™ Soybean contains the widely adapted strain Bradyrhizobium japonicum suited for soybeans. RX-N™ seed treatment offerings are supplied together with OsmoGUARD™ - a specially developed stress-protection formulation to shield rhizobia from environmental and osmotic stress. OsmoGUARD™ increases the viability of rhizobia at varying salt concentrations within the ideal and acceptable ranges of root zone salinity (Figure 2).

Optimal salt concentrations (EC = 2 – 4 mS/cm) can increase the availability of nutrients for the rhizobia (Singleton et al., 1982), increasing their viability when protected with OsmoGUARD™.

With advanced protective polymers, OsmoGUARD™ shields against osmotic and environmental stresses. It also contains molybdenum, an essential micronutrient that stimulates early nitrogen fixation. OsmoGUARD™ ensures that rhizobia attach to the seed surface to keep them close to the emerging roots. It provides specific starter sugars to nourish and sustain the rhizobia from inoculation to germination.

How does OsmoGUARD™ work?

OsmoGUARD™ works by helping rhizobia maintain their internal balance of water and ions under stress, especially in dry, hot, or salty conditions. It functions as a stabiliser to support the rhizobia and help them remain resilient under adverse conditions.

In dry conditions, cells without protection quickly lose moisture, shrink and die. However, rhizobia treated with OsmoGUARD™ are better able to retain water, stabilise their membranes

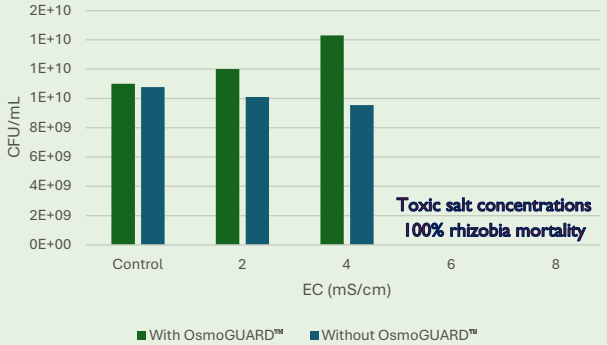

Figure 2: OsmoGUARD™ increases the viability of rhizobia at varying salt concentrations within the ideal and acceptable ranges of root zone salinity. Optimal salt concentrations (EC = 2 – 4 mS/cm) can increase the availability of nutrients for the rhizobia, increasing their viability when protected with OsmoGUARD™. High salt concentrations (EC = > 6 mS/cm) were toxic to the rhizobia treated with and without OsmoGUARD™.

Contact Agri Technovation or or Laeveld Agrochemfor more information.

and keep vital proteins functioning. A major concern in the field is how long rhizobia can survive once applied to the seed. OsmoGUARD™ also helps to extend rhizobial survival time on the seed, thereby increasing this survival window, making it possible for producers to better manage the time between inoculation and planting.

Victus products that form part of the RX-N™ offering

RhizoGUARD™ is an advanced blend of beneficial *Bacillus* species formulated with BioProtect™ to support a thriving root zone, enhancing crop performance and improving overall soil health. These *Bacillus spp*. produce enzymes that degrade compounds in the soil contributing to the release of nutrients normally inaccessible to plants, inadvertently promoting plant growth. The competitive interaction of these *Bacillus spp.* improves their plant growth promoting effectiveness. These bacteria can act as biofertilizers and/or antagonists (biopesticides) or simultaneously as both.

SoluPHOS™ is a premium liquid preparation of growth promoting Pseudomonas species, formulated with BioPromote™ technology to enhance plant growth and improve soil health, supporting crops for peak productivity.

The *Pseudomonas spp.* in SoluPHOS™ produce hydrolysing enzymes which degrade carbohydrates, fat and proteins. These bacteria associate with the plant's roots and converts glucose to gluconic acid.

Gluconic acid is an organic acid which reduces the pH of the surrounding soil. The reduced pH leads to solubilisation of phosphates bound to metal ion chelates (such as calcium phosphate) and solubilisation of structurally bound potassium in minerals, such as mica, muscovite and biotite. The released phosphate and potassium are plant available. The close localisation to the plant's roots ensures easy uptake, reducing the need for fertilizer application.

The RX-N™ Soybean range of products

RX-N™ Soybean ULTRA
4 L RX-N™ Soybean, 1 L RhizoGUARD™,
1 L SoluPHOS, 1 L OsmoGUARD™
The elite variant of RX-N™. It is a seed treatment that offers the benefits of OsmoGUARD™ and the biofertilisers RhizoGUARD™ and SoluPHOS™.

RX-N™ Soybean STANDARD
4 L RX-N™ Soybean, 1 L OsmoGUARD™
The most cost-effective option for use as a eed treatment, with the added benefits of OsmoGUARD™.

RX-N™ Soybean IN-FURROW
2 x 4 L RX-N™ Soybean
A soil application to treat up to 20 hectares of land.

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Reg no: RX-N™ Soybean (L10868, Act 36 of 1947) / OsmoGUARD™ (L11024, Act 36 of 1947)

TIP PLUS® – Vroeë lentetoediening wat jou sitrusboord transformeer

Gerhard Heyns
Harvest Chemicals
T: 063 357 1609

Met die delikate balans tussen vegetatiewe groei en vrugset in sitrusproduksie, is daar min stadiums van so 'n kritieke belang soos die lente. Dit is tydens hierdie venster, wat afhangende van die produksie-area vanaf middel Julie tot middel September kan wees, waar die grondslag gelê word vir opbrengs, vrugkwaliteit en boomstruktuur. Die lentetoediening moet plaasvind met die aanvang van die lentegroeistuwing of selfs net voor ogiebars. Indien dit te laat in blomfenologie toegedien word, kan dit 'n negatiewe effek veroorsaak t.o.v. vrugset en vruggrootte.

Met TIP PLUS® (unikonasool 50 g/L), 'n innoverende plantgroeireguleerder, kry produsente 'n beproefde hulpmiddel in die hand om hierdie fenologiese stadium optimaal te manipuleer. Die lentetoediening van TIP PLUS® is spesifiek ontwikkel om vegetatiewe groei te beperk en die boom se energie na blom en vrugset te kanaliseer. Dit stel 'n nuwe standaard in die bestuur van sitrusboorde en lewer uitsonderlike resultate in lemoene, pomelo's, suurlemoene en mandaryne.

Waarom is die lentetoediening met TIP PLUS® so belangrik?
Die tydsberekening van toediening om die boomfenologie te manipuleer is van kritieke belang. Wanneer TIP PLUS® in die lente toegedien word met ogiebars, maar vóór blom en vrugset, beïnvloed dit die boom se planthormone op presiese wyse deur:

- Vermindering van gibberelliene (GA) en ouksiene (IAA);
- Korter internodes en meer kompakte groei;
- Minder interkompetisie tussen vegetatiewe groei, vrugset en vrugontwikkeling vir koolhidrate.

Hierdie manipulering lê die basis vir 'n volhoubare hoë opbrengs en winsgewendheid oor tyd.

Spesifieke voordele van lentetoediening met TIP PLUS®

- Beperk vegetatiewe groei wanneer dit die meeste saak maak.
- Korter lote en beter boomstruktuur verg minder snoei-arbeid na blom.
- Ondersteun droogtetoleransie, fotosintese en blaarretensie.
- Aanpasbaar volgens kultivar, onderstam en groeikragtigheid.
- Verlig alternerende dragpatrone.
- Volhoubare hoë produksie oor seisoene.

Residuveiligheid en grondgesondheid
Nog 'n belangrike voordeel van TIP PLUS® is die afwesigheid van residue. Oor 'n tydperk van meer as 10 jaar is geen vrugresidue gevind na die korrekte TIP PLUS®-toedienings nie, selfs met herhaaldelike seisoenale gebruik.

Ook is daar geen opbou van unikonasool in die grond gevind nie, wat dit veilig maak vir volhoubare langtermyngebruik.

Strategiese aanbevelings vir lentetoedienings met TIP PLUS®
Lentetoediening is uiters geskik vir:

- Groeikragtige kultivars wat geneig is tot oormatige lootontwikkeling;
- Boorde wat swak vrugset of alternatiewe drag toon;
- Situasies waar snoeibestuur of arbeid 'n koste-implikasie inhou; en
- Volhoubare oesopbrengs oor seisoene.

Let wel: TIP PLUS® moet nie tydens blom of vrugset toegedien word nie, aangesien dit 'n negatiewe impak op vrugretensie en vruggrootte kan hê.

Resultate van lentetoediening met TIP PLUS® uit die veld
Op plekke soos Hoedspruit, Addo en Citrusdal toon die lentetoediening van TIP PLUS® indrukwekkende resultate:

- Meer kompak groeiende bome met duidelik minder snoeibehoeftes;
- Hoër opbrengste en meer konsekwente drag oor jare;
- Verbeterde vrugset en vruggrootte, veral met suurlemoene en mandaryne; en
- Geen opbou van unikonasoolresidue, bewys deur jarelange veldproewe en laboratoriumontledings.

Gevolgtrekking
TIP PLUS® is meer as net 'n plantgroeireguleerder, dit is 'n strategiese hulpmiddel vir die produsent wat na volhoubare opbrengs, gehalte en effektiwiteit streef. Met positiewe terugvoer uit die veld, en 'n bewese rekord van residuveiligheid, is dit duidelik waarom TIP PLUS® beskou word as 'n hoeksteen in moderne sitrusboordbestuur.

Die lente is 'n kragtige spilpunt in die sukses van sitrusproduksie en bied 'n geleentheid vir produsente om hul boorde doelgerig te bestuur. TIP PLUS® se lentebespuiting is nie bloot 'n hulpmiddel nie, dit is 'n presiese, wetenskaplik-ondersteunde belegging in opbrengs, blomkwaliteit en boomstruktuur vir die res van die seisoen en 'n belegging in die toekomstige winsgewendheid van jou boord.

Laat TIP PLUS® deel wees van jou lentestrategie vir sterker bome, beter vrugset en volhoubare produksie

Wintervoeding wat produksie & wins verhoog

www.westburysa.co.za

In die hartjie van die winter kan Westbury Supplement Feeds jou produksie en winsgewendheid verhoog.

Julie is nie net die middel van die winter nie, maar ook 'n kritieke tyd vir boere regoor Suid-Afrika om hul veevoedingstrategieë te heroorweeg. In die koue maande, wanneer weiding dikwels beperk is en voedingswaardes afneem, is dit noodsaaklik dat jou kudde die regte proteïen- en vitamiene minerale-aanvullings ontvang om gesondheid, gewigstoename, reproduksie en melkproduksie te verseker.

Westbury Supplement Feeds bied 'n reeks winteraanvullings wat ontwerp is om in hierdie behoefte te voorsien – of jy nou met koeie en kalwers werk, of 'n "backgrounding-" program vir speenkalwers bestuur en of jy self met skaap- en bokkuddes boer, Westbury het die antwoord vir jou en wildsboere.

As vee die regte aanvullings ontvang, en hul innamevlakke behoorlik bestuur word, kan Westbury se produkte beduidende én ekonomiese waarde tot jou produksie-eenheid toevoeg. Hier onder kyk ons na vier sleutelprodukte in Westbury se winterreeks, en bespreek hoekom goeie produksielekke 'n integrale rol speel in enige suksesvolle wintervoedingsprogram. Westbury spesialiseer in aanvullingsvoer vir beeste, skape, bokke, wild, lakterende en melkkoeie.

Waarom winteraanvullings belangrik is
Tydens winter ervaar ons 'n natuurlike afname in die beskikbaarheid en kwaliteit van natuurlike weiding. Energie-, proteïen- en mineraalvlakke in gras daal, wat direk beeste se kondisie, melkproduksie, reproduksievermoë en groei beïnvloed.

Sonder behoorlike aanvullings loop produsente die risiko van gewigsverlies, laer fertiliteit en verhoogde vatbaarheid vir siektes. Dit is hier waar Westbury Supplement Feeds se navorsing en ontwikkeling die verskil maak. Hul produkte is nie net wetenskaplik geformuleer nie, maar word ook prakties getoets in verskeie weidingstoestande. Die gevolg: hoëprestasielekke wat koste-effektief en doeltreffend is.

Westbury Winter Onderhoudslek 45
Hierdie produk is ideaal vir diere wat op veld of lae-kwaliteitweiding oorwinter. Dit is 'n fosfaat- en proteïenaanvulling wat spesifiek ontwikkel is om aan die basiese onderhoubare voedingsbehoeftes van droë koeie en ander herkouers te voldoen.

Die 45%-proteïeninhoud help om rumenmikrobes aan die gang te hou, selfs op arm winterveld. Die aanvulling van ureum en ander stikstofbronne stimuleer verrykte grasverbruik, sodat diere meer energie uit die beperkte beskikbare voer kan onttrek.
Voordeel: Behou kondisie en onderhou gesondheid teen 'n ekonomiese koste.

Westbury Winterlek Prima 45
Hierdie lek bou voort op die basis van die Onderhoudslek, maar is meer gebalanseerd vir reproduktiewe diere, soos dragtige koeie en verse. Dit sluit 'n hoër vlak van spoorminerale en vitamiene in, wat belangrik is vir embrio-ontwikkeling en uiergesondheid.
Voordeel: Help met kondisiebehoud van dragtige koeie en optimaliseer die gesondheid van kalwers in utero.

Westbury Multimix 90 – Winter en Winter Produksielek vir die selfmengboer
Wanneer produksievee op hoër vlakke van energie en proteïene aangewese is – soos lakterende koeie of jong diere in groeifase – bied die Multimix 90 'n intensiewe voedingsoplossing. Hierdie lek is proteïenryk (90% as isoproteïen), met hoë energievlakke, en is ideaal vir gebruik in veld- of voerkraaltoestande waar produksie die fokus is.
Voordeel: Bevorder melkproduksie, vinnige gewigstoename en ondersteun hoëproduksievereistes.

Westbury Backgrounding Winter
Hierdie produk is ontwerp vir speenkalwers wat voorberei word vir verdere groei of afronding vir die voerkraal. Die oorgangsfase is delikaat en vereis 'n gebalanseerde benadering tot voeding.

Die Backgrounding Winter aanvullingsmengsel bevat spesifieke vlakke van energie, proteïene, aminosure en spoorminerale om groeipotensiaal te maksimeer tydens wintermaande wanneer weiding minder is.
Voordeel: Verseker 'n egalige, gesonde groei in speenkalwers wat later vir die mark of voerkraal bestem is.

Maak aanpassings volgens jou streek en weidingstoestand
Wat Westbury se benadering uniek maak, is aanpasbaarheid. Ons voedingkundiges verstaan dat nie alle boerderye dieselfde is nie. Weidingstoestande, klimaat en spesies lei tot verskillende voedingsbehoeftes. Daarom word produsente aangemoedig om kontak te maak met 'n Westbury voedingskundige om 'n pasgemaakte aanvullingstrategie op te stel vir hul unieke omstandighede.

Hierdie kundiges help produsente nie net met produkkeuse nie, maar ook met:
- Berekening van koste per eenheid gewigstoename;
- Evaluering van weidingskwaliteit;
- Aanbevelings oor innamevlakke en frekwensie van verskaffing; en
- Monitering van resultate en aanpassing van planne indien nodig.

Ons reeks produkte sluit voerkorrels, voermeel en lekaanvullings in lek- en blokvorm in – verryk met verbyvloeiproteïene en die nuutste nanotegnologie. Ons verskaf ook melassestroop met sitrus wat smaaklikheid, voeding en voerinname bevorder.

Die regte aanvulling is 'n belegging
In tye van ekonomiese druk is dit dalk aanloklik om op aanvullende voeding te bespaar, maar die koste van swak voeding is veel hoër. Verlies aan kondisie, laer speenmassas, en verhoogde veeartsrekeninge kan 'n groter hap uit jou begroting neem.

Met Westbury Supplement Feeds se wetenskaplik geformuleerde winteraanvullings, ondersteun deur praktiese kundigheid, kry produsente nie net 'n produk nie – hulle kry 'n vennoot in produksie.

Kontak vandag nog jou naaste Westbury-voedingskundige, en bou 'n winterstrategie wat werk vir jou grond, jou beeste en jou sak. Kontak ons by 082 450 6196 of besoek ons webwerf by www.westburysa.co.za.

U naaste Laeveld Agrochem-tak sal kan help met die nodige inligting en lewering.

Westbury Supplement Feeds riglyne, video's en meer inligting by:

www.laeveld.co.za/fuel-your-flock

Next-Gen weed management: RIMSULF powers potato & tomato yields

In the evolving crop protection landscape, herbicides that deliver precision, flexibility, and crop safety are increasingly valuable. RIMSULF (Reg. no. L11673 Act no. 36 of 1947), a post-emergence sulfonylurea herbicide, is now available to South African farmers, specifically registered for use on potatoes and tomatoes. Its active ingredient, rimsulfuron, directly addresses a critical challenge in vegetable production: early weed competition.

What is rimsulfuron?

Rimsulfuron is a selective herbicide from the sulfonylurea class (HRAC Group 2), known for low application rates and high activity. It works by inhibiting the enzyme acetolactate synthase (ALS), essential for amino acid synthesis in plants. Once absorbed through foliage and translocated, rimsulfuron disrupts protein synthesis, halting cell division and leading to weed death. This biochemical precision ensures RIMSULF is highly effective against a broad spectrum of broadleaf weeds and some grasses, even at low doses of 90 g/ha, while maintaining excellent crop selectivity when applied as directed.

Why rimsulfuron is so effective for potatoes and tomatoes

Potatoes and tomatoes are highly susceptible to weed pressure during early growth. Weeds aggressively compete for vital nutrients, light, and water, and can also host pests and diseases, jeopardising crop health and yield. Traditional mechanical weeding is often limited by their shallow root systems and dense foliage, making manual intervention risky.

RIMSULF offers a clean, chemical solution critical for protecting yield potential and maintaining crop quality.

RIMSULF's efficacy and suitability for these crops stem from several key attributes:

- **Targeted action:** Rimsulfuron specifically targets the ALS enzyme, vital for weed survival, yet selectively tolerated by potatoes and tomatoes when correctly applied. This ensures effective weed control without harming the cultivated crop.
- **Systemic activity:** Absorbed by weed foliage, rimsulfuron moves throughout the entire plant. This systemic action ensures complete control of both above-ground and underground weed parts, preventing regrowth.
- **Low application rates:** Rimsulfuron's high potency means it's effective at very low application rates (e.g. 90 g/ha). This reduces the chemical load, minimises off-target movement, and makes it an economically viable option.
- **Excellent crop selectivity:** When applied according to label instructions, RIMSULF exhibits high selectivity for potatoes and tomatoes. This means the herbicide effectively controls weeds while the crops remain unaffected, crucial for maximising crop growth without herbicide stress.
- **Residual activity:** RIMSULF provides a period of residual activity, suppressing subsequent weed emergence for a limited time. This "carry-over" effect, dependent on soil and weather, reduces the need for immediate follow-up interventions during the critical early establishment phase, saving labour and resources.
- **Broad-spectrum weed control:** RIMSULF effectively controls a wide range of problematic weeds common in potato and tomato fields. This includes:
  Broadleaf weeds: Such as pigweed *(Amaranthus spp.)*, wild radish *(Raphanus raphanistrum)*, spiny emex *(Emex australis)*, and common dubbeltjie *(Tribulus terrestris)*. These aggressive competitors rapidly emerge, interfere with early crop establishment and act as hosts for pests and diseases, which can severely impact yield and quality.
  Grasses: Like wild oats *(Avena fatua)* and buffalo grass *(Panicum maximum)*. These grass weeds aggressively compete for soil moisture and nutrients. Prolific seed production ensures continuous re-infestation, making effective control vital.

Practical considerations & stewardship

For best results, apply RIMSULF to actively growing young weeds (ideally 3 to 6 leaf stage) under warm, moist conditions. A non-ionic surfactant is required to enhance leaf uptake.

Responsible use is essential to avoid resistance build-up. Farmers should rotate RIMSULF with herbicides from different modes of action and avoid repeated annual use on the same field.

The product is not recommended for seed potato production or use on stressed crops (e.g., waterlogging or drought) as crop safety can be compromised. These stewardship guidelines ensure the product's long-term effectiveness and contribute to sustainable agricultural practices.

Conclusion

Secure your yields with Enviro Bio-Chem's RIMSULF

In the face of relentless weed pressure, South African potato and tomato producers can no longer afford to compromise. RIMSULF is not just another herbicide; it's the strategic advantage you need to secure a profitable harvest. It delivers efficacy through its low dosage, precision-targeted control, and exceptional crop selectivity.

Forget the traditional battles against competition; RIMSULF provides the clean start your potatoes and tomatoes demand, fostering healthier plants from the outset and enabling them to channel every ounce of energy into robust growth and superior yields.

By integrating RIMSULF into your weed management strategy, you're not just tackling weeds; you're investing directly in the profitability and resilience of your operation. Don't let weeds steal your hard-earned revenue.

Choose Enviro Bio-Chem's RIMSULF – the critical innovation that transforms weed-ridden fields into thriving, high-yielding success stories.

For expert guidance and to ensure your crops thrive, contact your local Laeveld Agrochem agent today or visit www.envirobiochem.co.za. Your future yield depends on it.

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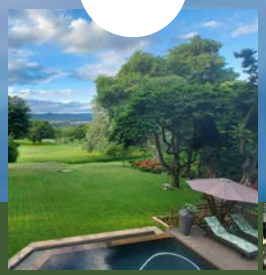
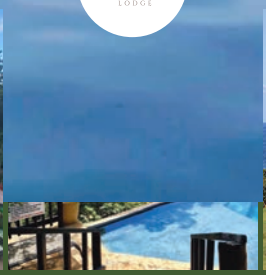


Matumi Golf Lodge
A stunning golf estate offering safety, open views & golf, located close to the Kruger National Park.



Oluchi Lodge
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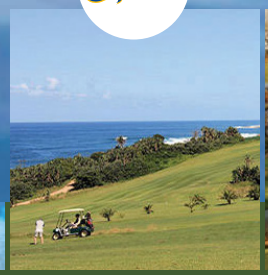

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