



HYGROTECH

SUSTAINABLE SOLUTIONS

FORUM

SUMMER 2014

R19-75 VAT inclusive
BTW ingesluit

TORPEDO'S

HITTING THE TARGET

PEPPER DISEASES
IN SOUTH AFRICA

BROCCOLI GEM
THE NEW STAR

QUALITY OF IRRIGATION WATER - FACTORS TO CONSIDER (PART 1)

HYGROTECH

SUSTAINABLE SOLUTIONS

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onion
vonden*

4



tomato trials
isabel*, julia* & cameron*

10



irrigation Water
Factors to consider

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EDITORIAL

Theo Schoonraad
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COVER

BUTTERNUT: TORPEDO

Impressive yield/plant of variety
Torpedo on the farm of S.J. Otto in
the Musina area

Photo by: PJ Fourie

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Written by Theo Schoonraad

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Theo Schoonraad

SHARING IS CARING

Not so long ago, I waited in my car for my family to make their long-awaited appearance from the shopping centre. Like most men...and unlike most women, I despise walking around from shop to shop in the hope of seeing something I want to buy, so I usually rather stay in the car, read the paper and watch the people going by.

A big black mama with two small children caught my eye. She was pushing a pram with a small little boy sitting in it. His older brother, with a tin of cold drink in his hand, trotted along. They stopped in front of my car, to the right.

Mama bent over to the older sibling and said in a stern voice: "sharing is caring...listen to me now, sharing is caring". I could see on the boy's face that sharing the cold drink, was the last thing on his mind. Utter dismay, would have described his emotion perfectly. Mama mumbled something in her native language, but I could recognize the 'sharing is caring' bit clearly again. Junior handed over the tin and after mama and the little boy each had a good long sip, the cold drink and what was left of it, was handed back to the perplexed youngster. His face broke into a smile when he realized that a few mouthfuls of the cold drink were left in the tin.

The threesome continued on their route – happy, contented and a bit wiser. A small but important lesson has been learnt.

It struck me that this brief, live and fairly simple episode that played out in front of me, had a lesson to all of us. It's not only about material things or a cold drink for that matter, but also about deeper, emotional feelings like love, joy, sadness, heartache, success, failure, friendship, pain and suffering.

'SHARING IS CARING' !

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Stellenbosch 021 881 3830

Vredendal 027 213 5609

Ceres 023 316 209

Malmesbury 022 482 2570

This information is based on our observations and/or information from other sources. As crop performance depends on the interaction between the genetic potential of the seed and variety, its physiological characteristics, the environment including climate, disease pressure, water quality and quantity, management etc., we cannot give any warranty expressed or implied, for the accuracy, performance or applicability for the information, recommendations or products supplied, nor for the performance of crops or products relative to the information given, nor do we accept any liability for any loss, direct or consequential that may arise from whatsoever cause.

* These cultivars are not on the official cultivar list, but applications have been, or will be submitted.

HYGROTECH HITS THE "GOLD" MARKET

HYGROTECH HAS LAUNCHED
A NEW OVER WINTERING SHORT
DAY ONION VARIETY WITH THE
NAME **VONDEN***

Vonden's* name originates from the very first farm where we laid our eyes on this exceptional variety.



Below: Goedgevonden, farmed by Ross and Fourie Niemand in the Vryburg area planted Vonden*. (Standing by the first Megan crop of the season)



Results from the Northern Cape suggests that Vonden* falls 7-10 days earlier than Megan. Vonden's* size distribution is more towards the medium large to large sizes with less of the extra large bulbs other varieties will produce in this segment. Bulb quality is more round shaped and firmer than other over wintering short days.



Vonden* will give farmers an alternative variety to plant should Megan be scarce.

Please Contact Fanie Verwey (0829030066) Hein Markram (0827744781) and Jaco van Zyl (0836019697) for pre-booking of seed for next year.

Written by Leon Grundlingh
Product Manager:
Brassicas, Leaf crops, Legumes & Sweetcorn

GEM THE NEW STAR!!!



THE SUMMER SEASON BROCCOLI VARIETY GEM, HAS PROVEN ITS QUALITY AND YIELD YEAR ON YEAR, IN ALL REGIONS OF THE COUNTRY.

OVER THE PAST TWO YEARS, COMMERCIAL PLANTING HAVE BEEN DONE AND PRODUCTION PERIODS HAVE BEEN EXTENDED. THE LATEST INFORMATION INDICATED THAT GEM CAN BE GROWN OUT OF WINTER IN NATAL AND ALSO IN AUTUMN GROWING CONDITIONS IN THE SOUTHERN CAPE.



GEM matures 60+ days after transplant and produce heads of 380g – 750g. The dome-shaped heads with medium-fine beads make GEM ideal for the pre-pack and fresh market. GEM is also suited for processing and produces nice florets.



GEM (LEFT) WITH OPPOSITION VARIETIES IN THE MIDDLE AND RIGHT.

GEM can withstand temperatures of above 30°C and summer production in the Western Cape surprised everybody. Heads with weights of up to 1200g were picked in Stellenbosch trails.

IF YOU ARE SERIOUS ABOUT BROCCOLI, YOU NEED TO REACH FOR A STAR LIKE GEM.

“TORPEDO’S”

HITTING THE TARGET

THE FIRST HITS OF TORPEDO* HAVE COME IN FROM THE “BATTLE” FIELD. THERE IS A FIERCE BATTLE GOING ON IN THE F1 BUTTERNUT MARKET WITH OLD VARIETIES TENDING TO GROW TOO BIG IN SUMMER PRODUCTION. TORPEDO* HAS THE ABILITY TO SET A HIGHER NUMBER OF FEMALE FLOWERS THAT RESULT IN FRUIT SIZES BETTER SUITED FOR THE LOCAL MARKET.



PIETER (LEFT) AND THEUNS DUVENAGE

Like many Farmers say it's about how many 10 kg bags a variety can fill for the market. Torpedo* size distribution will fill the 10kg bags.

Atom*, the bigger brother of Torpedo*, will be better suited for winter productions in February/March and April plant slots. Place your order soon as this variety has limited availability for this up and coming winter production.



FRUIT WEIGHT (KG): 1.4-1.8

DAYS TO MATURITY: 95 DAYS

PLANT VIGOUR: VERY GOOD

DISEASE TOLERANCE: ZYMV, PM

FRUIT WEIGHT(KG): 1.4-1.8

PLANT SLOTS: CAPE AREAS OCT-NOV

Innovation OF ONION PACKAGING



PACKAGING IS AN INTEGRAL PART OF HYGROTECH'S CONTINUOUS PRODUCT DEVELOPMENT PROGRAM. ONION SEED IS EXTREMELY SENSITIVE TO HIGH TEMPERATURE; EXPOSURE TO TEMPERATURES ABOVE 35°C FOR ONLY A SHORT PERIOD OF TIME CAN RESULT IN DELAYED GERMINATION.

“ Normal germination of 12 days can be prolonged to as much as 21 days. ”

The longer the exposure, the bigger the delay, placing the seed in a state of dormancy.

The ever increasing demand to plant onions earlier and market from April to May has resulted in delivering seeds to the farmer in the heat of summer. Temperatures inside a car, bakkie or at the back of a closed truck can easily reach 35°C in a short span of time.

We have identified all these areas of concern and changed our onion packaging to deal with all the temperature fluctuation nature throw at us.

“ New platinum labeling to complete and round off the boxes. ”

Inside you will find graded seed, with all the very small seed removed from the batch.

The packaging consists of a sealed white polystyrene cooler box that will be able to keep the seed at a more comfortable temperature during transit to the farm.

THERE ARE TWO TYPES OF SIZES WE CAN PACK:

Small = 2 x 250m

Large = 10 x 250m

Note: We have decided to stop the seed coating and colouring for further research is needed to improve the technology. We did not feel comfortable with releasing it because of too many mixed results in germination vigour of the seed.



WESKAAP SE PROEWE LEWER NUWE WENNERS

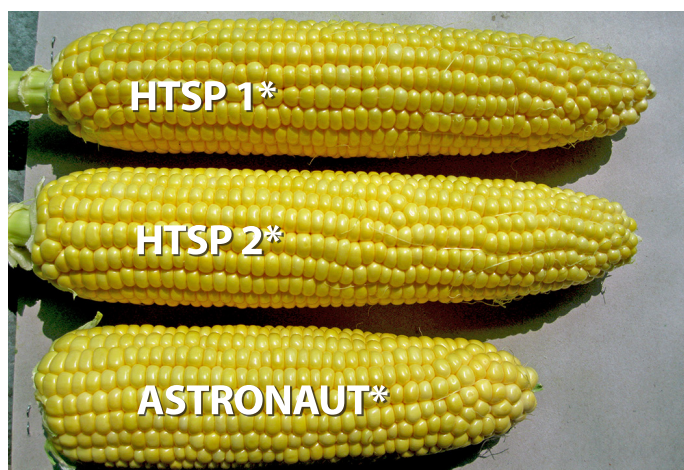
Written by: Henry van der Voort
(Business Unit Leader)

SUIKERMIELIES BLOMKOOL

DIE AFGELOPE JAAR IS DAAR INTENSIEWE PROEWE GEDOEN OP SUIKERMIELIES EN BLOMKOOL BY VERSKEIE LOKALITEITE. SOOS VERWAG IS, HET SEKERE KULTIVARS NIE DIE MAS OPGEKOM NIE, TERWYL ANDER GOED PRESTEER HET. HIERDIE NUWE KULTIVARS WAT UITGESTAAN HET BO DIE STANDAARD KOMMERSIËLE KULTIVARS, GAAN DIE MARK BETREE MET SUKSES.

SUIKERMIELIES

Die twee suikermielie kultivars wat die toets geslaag het, was HTSP 1* en HTSP 2*. Albei het 'n sterk groeiwyse met 'n planthoogte van 2.2m. Die kop lengtes is 22cm met deursnee van 5cm. Die kern stronk is 2.5cm in deursnee. Die rye is reguit met sagte, klein pitte wat die eet kwaliteit komplimenteer. Hierdie kultivars is veeldoelig omdat dit geskik is vir die vooraf verpakings - en varsmark. Met hierdie goeie agnomiese eienskappe is HTSP 1* en HTSP 2* uiters geskik vir vroeë aanplantings (September) en laat aanplantings (Februarie) in sekere gebiede in die Weskaap soos Sandveld en Clanwilliam omgewing. Die dae vanaf plant tot oes was 80 dae in beide gevalle met gunstige klimaatstoestande. Indien temperature laer gaan neig, kan die dae tot bekwaamheid verleng word. Daar word reeds kommersiële aanplantings gedoen in die Sandveld.



HTSP 1* & HTSP 2* & ASTRONAUT

BLOMKOOL

Die blomkool kultivars is getoets by Johan Bock in Philippi, Preiss Visser naby Kuilsrivier en Donnie Rix by Bottelary met gemengde welslae. By Johan Bock en Preiss Visser het die proefpersele versuip toestande ervaar a.g.v 'n baie nat winter. Die aanplanting in die Bottelary omgewing het goeie resultate gelewer met 2 kultivars, Crenique* en Bonique*, wat goed vergelyk het met 'n kommersiële kultivar. Crenique* was binne 98 dae van uitplant oes gereed terwyl Bonique* 106 dae geneem het. Albei kultivars het goeie skudblaar bedekking met room tot wit kleurige koppe.



BONIQUE*

Crenique* se kop gewig was 620g en Bonique* 994g. Bonique* toon ook baie goeie swartvrot toleransie vergeleke met ander in die proef. Opvolg proewe gaan gedoen word by dieselfde kliënte om hitte toleransie te bepaal van hierdie kultivars.



CRENIQUE*



incotec
involved in seeds

INCOTEC UPGRADES

their seed laboratory and staff



A visit from INCOTEC USA's laboratory, attested to the ongoing knowledge transfer, updating of equipment and the gaining of further experience in the world of understanding seeds.

Jane and Liza both from INCOTEC's facility in Salinas, California, USA, made the long trip over to South Africa to spend a week with Shiksha Jadoo, junior seed analyst at the laboratory in Pietermaritzburg.

The purpose of the visit was to assist INCOTEC SA on the road to acquiring ISTA accreditation (International Seed Testing Association). The USA facility has the AOSA accreditation (Association of Official Seed Analysts Inc.) which applies in Canada and the USA. Both ISTA and AOSA set the international standards for seed protocols to be used by seed analysts.

One of the main criteria looked at was the correct procedures on doing the Tetrazolium tests which tests for seed viability. This is important; as when pelleting, encrusting or priming seed one has to understand the full background of the seed, its history and if it is worthwhile adding value to the seed. Part of this training was how to do proper evaluation with the incorporation of intermediate and final counts, as well as constructing your results and recording all information on the seed.

Training was also done to identify the vigour of the seed, which is the speed of the emergence of the radicle and then the

germination percentage being how many will emerge. This is critical in determining how healthy the seed is before proceeding with other technologies.

Both Jane and Liza are lettuce experts and so the information transferred to Shiksha was absolutely invaluable to her and will now be used here. One aspect that did come through was lettuce seed older than 3 years may not be pelleted without the customers consent due to the age, reduced vigour and necrotic spots which are high risk factors in seeds. Remembering that as

soon as seed departs from the parent plant it starts to deteriorate, and INCOTEC's technologies and knowledge is there to make sure that the seed quality is at an acceptable level and that a farmer is able to obtain the maximum benefits from the seed.

To summarize, the visit has heightened the awareness of seed knowledge and has definitely assisted us on our road to ISTA accreditation, that hopefully, with everything in place INCOTEC could have accreditation by March 2015.



JANE (INCOTEC USA), LIZA (INCOTEC USA) AND SHIKSHA (INCOTEC SOUTH AFRICA)

Written by: Jany Venter (Junior Product Manager Tomatoes)
and Michael Luttig
(Area Manager,
Nelspruit)

TRIALS WITH ISABEL*, JULIA* & CAMERON*

HYGROTECH'S NEW DETERMINATE SALADETTE TOMATO RANGE WAS PLANTED ON THE 4TH OF JULY 2013 AT STRYDOMSBLOK IN KOMATIPOORT. THE HIGH DISEASE PRESSURES IN THE AREA MADE IT THE IDEAL TESTING GROUND TO SEE HOW OUR RANGE WILL STAND AGAINST THE ELEMENTS GOING INTO SUMMER.



ISABEL*:

The plants were completely virus free due to the variety's resistance to both TYLCV and TSWV, it was a bit more susceptible to leaf diseases and therefore need to receive a bit more attention when it comes to the spraying program.



Furthermore the variety showed to have a very good flower set and one can expect around 4-6 fruit per truss. An interesting phenomenon of Isabel* was that it started out with a very large pointed blossom end but later as expected the sharp end filled out and formed the lovely oval shape with small blossom end.

JULIA*:

A vigorous grower which covers its fruit spectacularly; this is an added bonus when growing in high temperature areas. The variety had some problems with poor fruit attachment and might be a challenge growing in areas with high wind speeds. Precautions can of course be taken.



DIP Bdy at Strydomsblok in Komatipoort with rows of Julia*

CAMERON*:

A great variety in its element when grown in Komatipoort. This variety showed little to no leaf diseases. A shorter determinate compared to Isabel* and Julia*. Cameron* set fruit right through the growing period. The fruit shape was

not as smooth as Isabel* and Julia's* but a high fruit load with 4-5 fruit per truss makes it very well-liked.



VARIETY	DISEASE PACKAGE
ISABEL*	V, F3, TYLCV, N(HR), TSWV(IR)
JULIA*	V, F3, TYLCV, Pst (HR), N(IR)
CAMERON*	V, F2, TSWV, Pst(HR)

V = Verticillium Wilt (Verticillium sp.)
F3 = Fusarium Wilt Race 1, 2 and 3
TYLCV = Tomato Yellow Leaf Curl Virus
N = Nematodes
TSWV = Tomato Spotted Wilt Virus
Pst = Bacterial Speck (Pseudomonas syringae pv. Tomato)
HR = High Resistance
IR = Intermediate resistance
F2 = Fusarium Wilt Race 1, 2

*This variety is not on the official varietal list yet, but an application will be or has been lodged.

BEETROOT

Hygrotech has been focusing on Beetroot Hybrid development the last couple of years and are proud to announce a new F1 Hybrid: HTB001*. This variety will become full commercial in 2014.



A Corporate decision was made by the original suppliers of hybrid beetroot Red Ace that the variety will revert back to their own distributor on 1 December 2013 and will therefore not be available for Hygrotech to sell in South Africa. After 20 years and selling more than 400 million seed annually it is obviously very disappointing to Hygrotech. With an ongoing Research and Development plan in place there is however a new and more advanced variety available, ready to take its place. The launch of this new variety could not have happened at a better time!

and moderately tolerant to Downy and Powdery Mildew. It is moderately tolerant to *Rhizoctonia* and can withstand short periods of drought.



HTB001* can be used in the bunching, pre-pack, processing and pigment extraction market accounting to this variety's versatility.

Maturity can be expected to be around 60 days depending on the season and area of production. Top length will be around 30-33cm with a dark red internal colour.

Timely seed production in the Northern Hemisphere (Washington State) and Southern Hemisphere (Northern Cape) will result in fresh seed supply twice a year as well as the cost benefits of continuous production of locally produced seed that will result in seed being more cost effective to any farmer or processing company.

Hygrotech have also started a breeding program specifically on Hybrid Beetroot in South Africa so you can expect new and very well priced hybrids to come from this program in the years to come.

ASK YOUR LOCAL SALES REPRESENTATIVE FOR SAMPLE SEED AND SEE FOR YOURSELF THE SUPERIOR QUALITIES OF HTB001*.

MORE ABOUT HTB001*

HTB001* is an improved Red Ace type beetroot that is more uniform in shape with a higher sugar content (% Brix) than the older hybrids. HTB001* is highly tolerant to *Cercospora* Leaf spot



FIRST FOR AFRICA & FIRST FOR PIETERMARITZBURG!!!

incotec
involved in seeds

INCOTEC,

the Dutch based seed enhancement company, based right here in Pietermaritzburg, has achieved a first. They have just completed the installation of a dryer at their production facility in Pietermaritzburg.

The dryer valued at R1,3 Million is a state of the art dryer capable of drying up to 4 million pelleted seeds in one batch, doing this over an average period of two hours.



Dr. Tertia Erasmus, General Manager of INCOTEC Africa on the left and Alex Koster the engineer who installed the dryer.

The main advantage this machine has is that in the many stages of drying it is fully automated and irrespective of the outside climate conditions continues unaffected.

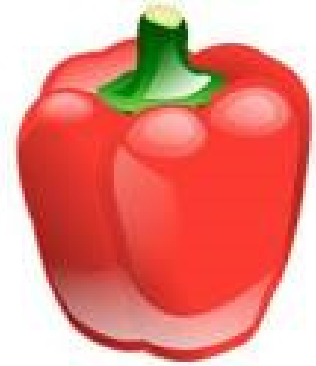
As opposed to other dryers in the marketplace, the relative humidity and temperature can be controlled by computer for different crops and it also has the ability to be controlled remotely by the engineer in the Netherlands. There are only two of these new dryers currently installed in the world, one in China and now here in Pietermaritzburg.

When working with a living organism like seed, you have to make sure that your equipment is up there with the best ensuring that no damage is done to the seed and once dried, allowing the customer to enjoy world class quality.

The dryer designed by Cees Boukens from the company Seed Conditioning Enkhuizen and installed by engineer Alex Koster is one of the many high tech machines used by INCOTEC in their quest to make sure their technologies enhance the value of seed.

Written by: Michael Luttig
Branch Manager
Nelspruit

SOETRISIE REVELATION



STEEDS ONDERBERG BOERE SE EERSTE KEUSE

Die afgelope twee jaar was nie maklik vir soetrissie boere nie. Gemiddelde soetrissie pryse was onder druk. Onderberg soetrissie boere wat Revelation geplant het, het plante gehad wat aanhou produseer, lank nadat meeste variëteite al uitgesak of uitgevrek het. Wanneer pryse teen die einde van 'n lang seisoen optel, is daar steeds hoë gehalte vrugte met 'n goeie grootte om te oes.



Die winter produksie area van Malalane tot in die Strydomsblok area in die Onderberg is nog nie gepla deur "Kromnek virus" (TSWV) in soetrissie aanplantings nie. Daarom kon Revelation met BLS 1-3(X3R), PVY, TEV, PepMoV en TMV as siekte pakket in hierdie area die toets van die tyd deurstaan.

Die unieke Revelation groeiwyse van 'n sterkgroeiende plant kom tot sy volste reg in die humiede Onderberg klimaat. Twee plant eienskappe maak van Revelation 'n wenner: (1) 'n baie sterk wortelstelsel en (2) stewige takraamwerk wat eindig in 'n welige blaarbedekking. Die Revelation plante staan met 'n sterk regop groeiwyse wat nie geboks hoef te word nie. Dus kan Revelation sy man staan in die Onderberg wind en son.



Met 'n uitstekende vrugset, het Revelation 'n bewese hoë opbrengs potensiaal met 'n groot blokkige vruggroote met sterk wande wat langafstand vervoer vergemaklik as 'n groen of rooi boks soetrissie.

Saam met Revelation sal ook opwindende nuwe Seminis varieteite getoets word in die Onderberg toestande die komende jaar.

Robert Young, Business Unit Leader,
Southern Cape

OUTENIQUA

RESEARCH FARM

THE FUTURE OF RESEARCH SUPPORT FROM OUTENIQUA RESEARCH FARM AND ITS EXPERTISE IN DAIRY AND PASTURE RESEARCH IS BASED ON ITS COLOURFUL HISTORY OF 60 YEARS OF SUPPORT TO FARMERS IN THE SOUTHERN CAPE.

New and adapted technology generated from cutting –edge research will secure the base to increase agricultural production by 10% over the next 10 years.

Science and technology forms the basis of the economy and continue to provide new production methods.

The Minister of Agriculture and Rural Development, Mr Gerrit van Rensburg of the Western Cape, delivered the inaugural address during their 60th anniversary.

During the past years many of our grazing cultivars have been planted on their farm and the trial results were excellent. Hygrotech is very proud to have this union with them.

Prof Leopoldt van Huysteen, Provost and Chief Operating Officer of the University of Stellenbosch emphasised the importance of the existence of the research facilities.

Congratulations again to Dr Ilse Trautmann (Chief Director: Research and Technology Development Services) Dr Phillip Botha and Prof Robin Meeske of Outeniqua research farm on their 60th.



MINISTER GERRIT VAN RENSBURG



THE HYGROTECH DISPLAY AT THE 60TH CELEBRATION OF OUTENIQUA RESEARCH FARM. FLTR: RENIER VAN ROOYEN, SØREN BUSK AND DEON CROUSE



High Yields From

Written by : PJ Fourie
National Product Development Manager

HY-GREEN*

Positive Hy-Green trial results have been coming in from various regions around South Africa.*

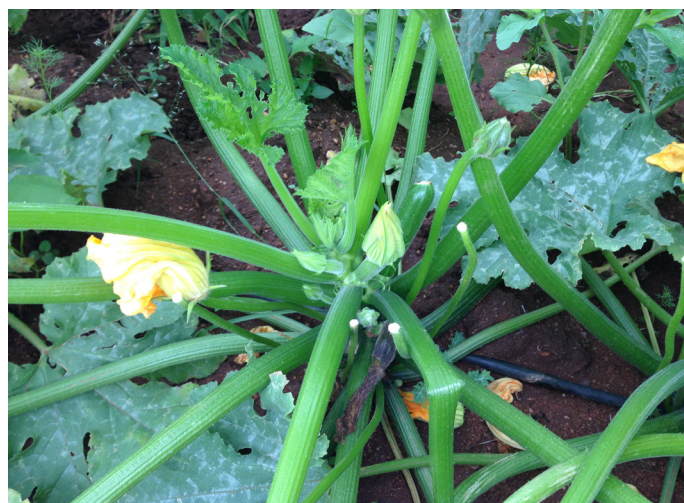
High Prices for Baby marrow varieties with impressive virus resistance packages are getting too rich for the average farmer's taste.

Farmers are looking at more cost effective varieties that they can harvest quicker and re-plant again, rather than having to plant expensive varieties that they need to harvest for longer periods, to compensate for the higher seed price.

A new strain of Moroccan watermelon mosaic virus has been identified in the Lowveld regions for which no known resistance can be confirmed yet.

All baby marrow varieties will be screened by marker technology to determine if they show the resistant DNA sequence needed for Moroccan Strain Watermelon Mosaic virus.

Hy-Green* is one of the main varieties planted in Dakar, Senegal. In recent trials where Hy-Green* was compared to commercial varieties from around the world it showed very good resistance and uniformity in high humid conditions with high virus pressure.



BELOW: RESULTS FROM TRIALS PLANTED IN DAKAR.

	Total kg	Number of plants	kg/plant	Possible yields per ha	% mishapes	% scarring	% discoloration	% average defects	Export yield per ha
A	152,25	100	1,52	15225,00	11,00%	20,00%	0,00%	10,33%	13651,75
HY-GREEN	182,74	100	1,83	18274,00	9,00%	24,00%	0,00%	11,00%	16263,86
B	159,57	100	1,60	15957,00	15,00%	15,00%	25,00%	18,33%	13031,55
C	114,22	100	1,14	11422,00	11,50%	11,50%	16,00%	13,00%	9937,14
D	18,99	20	0,95	9495,00	24,50%	16,00%	0,00%	13,50%	8213,17
E	42,51	20	2,13	21255,00	18,00%	33,00%	16,00%	22,33%	16508,05
F	34,81	20	1,74	17405,00	12,00%	38,00%	12,00%	20,67%	13807,97
G	129,77	100	1,30	12977,00	8,00%	17,00%	25,00%	16,67%	10814,17



GENETICALLY MODIFIED WHEAT BEAUTY OR THE BEAST?



GENETICALLY MODIFIED CROPS HAS ALWAYS BEEN A CONTENTIOUS ISSUE AND YOU ARE EITHER FOR OR AGAINST IT. SINCE IT CAN IMPACT ON HUMAN HEALTH, EVERYBODY HAS THEIR OWN OPINION ON IT! HOW YOU FEEL ABOUT IT OFTEN HAS A LOT TO DO ABOUT HOW KNOWLEDGEABLE YOU ARE ABOUT IT.

RECENTLY THE FOLLOWING WERE HEADLINES:

" Scientists say new Genetically Modified Wheat silences DNA sequences in the body, can cause fatalities in children "

Can you get a more dramatic headline causing mass hysteria amongst the average man on the street to whom the concept of GMO's is foreign but who grabs onto the easily digestible idea of "Frankenstein Food"?



IN SHORT, TO CALM DOWN ALL THE RESTLESS SOULS OUT THERE:

Recent research has proved this worrying claim to be false. There is a huge amount of scientific evidence showing that RNA eaten in food in the diet is very unlikely to ever reach a human gene and bring about gene silencing in the human body.

BACKGROUND ON THE CONTENTIOUS WHEAT:

The genetically engineered wheat variety was developed by scientists at an Australian government crop-science institute called CSIRO. These scientists used precise modern genetic methods to increase the fibre content of wheat. Food fibre is vital for good health, and adequate intake of food fibre may prevent colon cancer.



CSIRO's new wheat is bred to contain high levels of a common form of food fibre called "invisible fibre". Invisible fibre, also known as "resistant starch", is a slowly digested natural variety of food starch that is present in many different plant foods. Slow digestion properties of this nutrient enable it to resist complete digestion while it is passing through the early stages of the digestive canal.

of these reassuring characteristics about the harmlessness of RNA in our diet – a normal component of every human diet – are very well known to biologists and extensively documented.

Heineman's main speculative argument about the possible health risks of the CSIRO wheat rested almost exclusively on one highly controversial and disputed

report published in 2012 by Chinese researchers. In the last 6 months these claims have been heavily refuted in follow-up investigations by several different, independent laboratories.

These reports all confirm the conclusion that RNA molecules in foods (which have always been present in human diets) are unable to affect human genes inside the body because there are multiple hurdles that completely prevent their successful passage from the gut to sites of action within the body. This inability of plant RNA to cross the gut barrier has been repeatedly verified by recent scientific studies which conclusively demonstrate that plant RNA's in question are absent from the bloodstream.



THE RUMOUR MONGERING ARTICLE HAD THIS TO SAY:

"Heineman discovered that the molecules developed in this wheat, intended to silence wheat genes and can match human genes. With consumption, these molecules can enter the human body and potentially silence our genes, he explained"

THE SCIENTIFIC TRUTH:

The relevant wheat RNA molecules will be rapidly digested in the gut to harmless simple nutrients. Because of their size, they cannot easily enter the body, and in any case they will be destroyed or eliminated from the bloodstream very rapidly, and they would require specialised mechanisms to be able to have any effect on human body functions. All

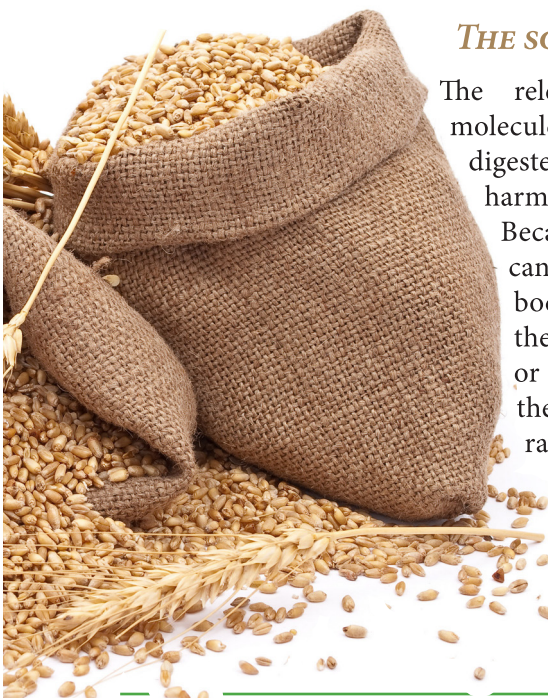
SO WHAT CAUSED THE STORM IN A TEACUP?

The Chinese saw liver disturbances seemingly caused by rice dietary RNA in the levels of a liver protein. These, incidentally were caused by a NON GM rice, and did not indicate any harm had occurred. Recent reports show these are readily explainable as a nutritional imbalance simply caused by feeding experimental animals a diet with too much rice!



REFERENCE:

GMO Pundit a.k.a. David Tribe: Will a GMO wheat silence human genes?



Written by Jany Venter
Junior Product Manager:
Tomatoes, Peppers and Brinjals

PEPPER DISEASES



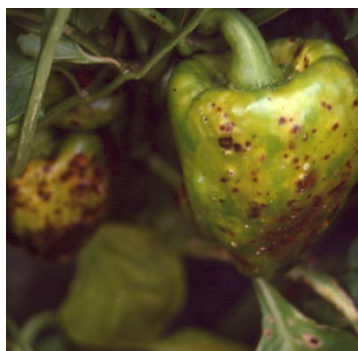
A QUICK OVERVIEW OF THE MOST IMPORTANT SWEET PEPPER DISEASES OCCURRING IN SOUTH AFRICA

VIRAL DISEASES:

TOMATO SPOTTED WILT VIRUS

Tomato Spotted Wilt Virus (TSWV) is the most economically destructive plant virus of recent times due to its very high infection rates of 50-90%. The virus is only spread between plants by its insect vector, thrips. Only larval thrips can acquire TSWV but both larval and adult stage can transmit the virus. TSWV replicates in both insect as vector and plant host.

Symptoms of TSWV are chlorotic and necrotic rings, lines or spots on leaves, stems and fruit. A mosaic pattern is sometimes found on fruit.



SPOTS ON SWEET PEPPER FRUIT FROM TSWV
WWW.LONGISLANDHORT.CORNELL.EDU

MILDRED* AND CLAIR ARE OUR TWO OPEN-FIELD PEPPERS WITH RESISTANCE TO TSWV.



AN ADULT THRIP, VECTOR FOR TSWV
WWW.AGE.GOV.BC.CA

POTATO VIRUS Y (PVY)

More commonly found in open-field cultivation of Sweet Peppers and in warm climates. Aphids are the only known way of transmission of PVY. Virus reservoirs such as weeds or tomato plants grown close to pepper fields may serve as a source for primary infection.

A mosaic pattern developing along the veins of leaves called vein banding are the most useful symptom to diagnose PVY.



VEIN BANDING AND DISTORTION ON EGGPLANT LEAF CAUSED BY PVY
WWW.SEMENA.ORG

ALL OUR HYBRID OPEN-FIELD PEPPERS (MILDRED*, CLAIR, BUNKER*, KING ARTHUR AND REVELATION) HAVE PVY RESISTANCE.

TOBACCO ETCH VIRUS

Tobacco Etch Virus (TEV) infects mostly Solanaceous crops such as pepper, tobacco and tomato. These crops can now also serve as a virus reservoir when planted close to Sweet Pepper fields. The spread of TEV is almost exclusively through aphids. Plants that are infected at an early stage are severely stunted. Leaves are mottled and wrinkled. Fruits of infected plants are mottled and never reach a marketable size.

**CLAIR, KING ARTHUR AND REVELATION
HAS TEV RESISTANCE.**

BACTERIAL DISEASES:

BACTERIAL SPOT

Bacterial Spot (*Xanthomonas campestris* pv. *vesicatoria*) is present in most pepper growing regions but is more severe in tropical and subtropical regions that have substantial rainfall. Temperatures between 24-30°C, high precipitation and high relative humidity favours disease development.

Crop losses result from yield reduction due to the defoliation and from unmarketable fruit as a result of spotting. The disease can infect all above-ground parts. Small brown lesions form on fruit, leaves and stems. Lesions found on leaves are sunken on upper surface and raised on the lower surface.



BACTERIAL SPOT ON SWEET PEPPER
WWW.FORESTRYIMAGES.ORG

**RESISTANT VARIETIES INCLUDE MILDRED*, CLAIR,
BUNKER*, REVELATION AND KING ARTHUR.**

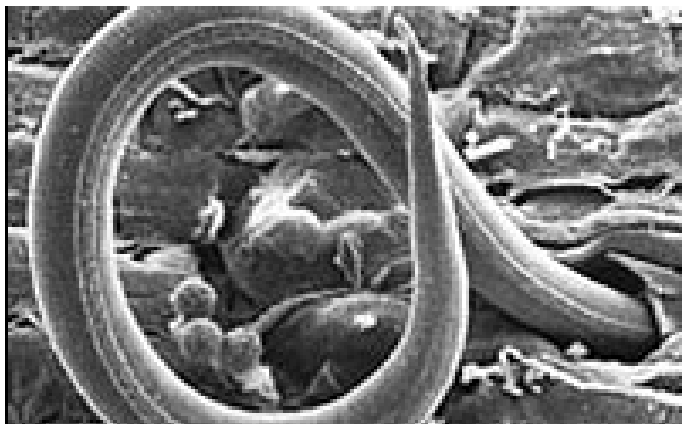
NEMATODES

Many different kinds of nematodes inhabit soil and not all species are plant-parasitic, most feed on bacteria and fungi and are responsible for the recycling of nutrients. Root-knot nematodes (*Meloidogyne* spp.) are the most serious nematode pest of pepper. Above-ground symptoms typical of plants with damaged roots are stunting, wilting and nutrient deficiency. Galls or knots in roots can be seen as nematodes are endoparasites and live within the root inducing the formation of giant cells.



WWW.NEMATOLOGY.UMD.EDU

**NEMALITE AND CELAYA* HAVE RESISTANCE
TO NEMATODES AND ARE IDEAL FOR USE
UNDER SHADE STRUCTURES.**



JUVENILE ROOT KNOT NEMATODE ENTERING A PLANT
WWW.EXTENSION.MISSOURI.EDU

PHYSIOLOGICAL DISORDERS

ABNORMAL FRUIT SHAPE

Abnormal fruit shape such as severely flattened fruit which are much broader than long are primarily caused by adverse temperatures resulting in inadequate pollination. A low night and day temperature during the pre-flowering period or when flower buds start forming results in abnormally flat fruit.



FLAT, BROAD FRUIT SHAPE
WWW.GREENLIFEINSOCAL.COM

BLOSSOM END ROT

Blossom end rot (BER) is a non-infectious disorder that is caused by calcium deficiency in the blossom end of fruit. Fast growing plants are highly susceptible to BER as calcium is a relatively immobile element, and requirements for water and calcium increases, with the high growth rate of plants. BER manifests as water-soaked brown spots at the distal end of developing fruit.



WATER-SOAKED SPOT AT BLOSSOM END
WWW.RUARKLAB.SOILS.WISC.EDU

* THIS VARIETY IS NOT ON THE OFFICIAL VARIETAL LIST YET,
BUT AN APPLICATION WILL BE OR HAS BEEN LODGED.

REFERENCES:

Compendium of Pepper
Diseases. Pernezny et
al. 2009

Plant Pathology. G.N.
Agrios. 5th ed. 2005





DIPLOID TETRAPLOID DORMANCY

...LINGO EVERY FARMER SHOULD KNOW

THREE WORDS THAT WE ALL KNOW AND HAVE A FAIR UNDERSTANDING OF. BUT WHAT ARE OUR FARMERS REALLY GETTING WHEN THEY BUY SEED EARMARKED WITH ONE OF THESE TRAITS? IS IT JUST CLEVER SEED MARKETING LINGO, OR ARE OUR FARMERS BUYING SILVER BULLETS IN A SEED BAG? HYGROTECH HAS THE ANSWER!

DORMANCY:

NOT TAKING A KNIFE TO A GUN FIGHT!

Dormancy can be defined as the reaction and resulting growth tempo of Lucerne to shorter days and lower temperatures. In layman's terms dormancy is the ability of Lucerne to regrow in cooler and shorter days. Thus the higher the dormancy, the higher the regrowth tempo a variety will have in the cooler months of the year.

The following dormancy classes are currently being distributed in South Africa:

WINTER SEMI DORMANT (CLASS 3-6):

These varieties grow significantly slower in winter than in summer, and can in some cases stop growing in winter altogether. These varieties are suited to areas with warm winters and heat units above 3500. Varieties such as SA standard and HL 6 fall into this class. These varieties are also characterised as being more leafy and have broader crowns and are generally better adapted to grazing practices.

WINTER ACTIVE (CLASS 7 AND 8):

Growth by these cultivars slow-down in mid winter but never stops. Properly managed, yields are higher than those of semi dormant varieties and the recovery after cutting is much faster. Generally, the group is not affected by day length and cultivars continue to grow provided the temperatures are cool to warm. Varieties such as HL 7 fall into this group and are characterised as having narrower crowns and lower leaf density because of longer internodes, and have bigger leaves, making them well suited as a dual purpose crop for grazing and hay.

HIGHLY WINTER ACTIVE (CLASS 9 AND HIGHER):

These classes recover the quickest after cutting and are the most productive classes in winter. Areas with cool winters and heat units lower than 3500 should cultivate these varieties. HL 9 is an ideal variety for such conditions. These varieties are usually characterised by very narrow crowns and very large leaves making them ideally suited to hay production.

Pairing the correct dormancy class with your farms conditions

will ensure optimal production, lower input costs and a higher quality feed. Miss matches will surely lead to early stand burnout, exuberant costs, poor yield and quality. Consult your local Hygrotech representative to assist you in selecting the right Hygrotech varieties to suit your farm and its specific set of demands.

DIPLOID VS TETRAPLOID: FACE OFF OR TRADE OFF?

Depending on each farms' specific demands farmers can opt for either a pure stand of either diploid or tetraploid or in some cases a mixture will be the best option. Without giving a lecture in plant breeding and genetics, here are the main differences between the two types.

Tetraploid grasses have higher animal performance benefits due to the higher ratio of cell contents to the cell wall. The cell contents are also more readily available, and it is these starches and sugars that ensure more efficient rumen function and better animal production figures. However it is important to remember that tetraploids

have a higher water content which results in animals filling the stomach without adequate dry matter intake to maintain condition. The trade off here is that Tetraploids produce a much more palatable and digestible crop which compensates for the lower volume intake compared to that of diploid grasses. A mix of tetraploid and diploid ryegrass could achieve a more balanced pasture retaining a good level of dry matter production, an improved balance of quality feed and if used for silage will be more easily cured than a pure tetraploid pasture.

Tetraploids grow faster, mature earlier but in turn are much shorter lived. With increased yield at specific times of the year (typically winter) and increased stock utilization tetraploid hybrid, Italian and perennial ryegrasses are often direct drilled into existing pastures as a method of boosting productivity during late autumn to mid-spring. Tetraploids are best suited to conditions of high fertility, moist or irrigated conditions and lax grazing management. In contrast diploid ryegrass is suitable for hay production over multiple years and is better suited to drier conditions and close grazing.



**FOR MORE ON SELECTING THE CORRECT RYEGRASS CONTACT
YOUR NEAREST HYGROTECH BRANCH OR DROP US A MAIL AT
VOERENWEIDING@HYGROTECH.CO.ZA**

"Happy farming!"

REFERENCES:

The Lucerne management handbook. 4th edition. Ken Bullen. Department of Primary Industries. Queensland. 2002
http://www.seeddistributors.com.au/html/products/ryegrass/ryegrass_overview.html
<http://seedforce.co.nz/products/category.php?category=1>

SALT AFFECTED SOILS

SOIL CHEMISTRY IS THE THIRD LEG OF SOIL QUALITY AND THUS SOIL HEALTH. SOIL CHEMISTRY IS THE FERTILITY WITH WHICH CROPS HAVE TO GROW. CHEMICAL BALANCES OR IMBALANCES HAVE A MARKED INFLUENCE ON THE AVAILABILITY OF PLANT NUTRIENTS. SOIL CHEMISTRY THUS HAS A DETERMINING INFLUENCE ON SOIL PRODUCTIVITY AND HENCE ON CROP PERFORMANCE WHICH IN TURN IS EXPRESSED AS HARVESTABLE (MARKETABLE) YIELD.

This discussion is about one of the chemical imbalances in soils, namely soils that been affected by high salt concentrations (brak). Some refer to these soils as alkaline soils because it normally has a high pH value. There are four types of alkaline soils. Each has actual or potential problems.

ALKALINE SOILS can form because of one or more of the following:

All soils and natural waters contain soluble salts. Accumulations of salts occur when the potential evapotranspiration is higher than the rainfall. Water is removed by evaporation from soil surfaces and transpiration from plants, before the soluble salts could be leached down and out of the root zone.

Groundwater carries soluble salts to low lying areas where it accumulate due to evaporation.

Runoff from hillsides carries soluble salts to valley floors where it accumulates due to evaporation.

Certain parent materials naturally contain high concentrations of base minerals that maintains a high base status in young soils.

Soils that are from parent material that previously was sea bed.



HIGH-LIME SOILS occur mostly as spots in humid regions, are young, low lying soils with shallow water tables, containing high concentrations of calcium. The calcium usually occurs as calcium carbonate in high concentrations. The soluble portions are leached out and seldom accumulate in the humid regions. The problem is high pH values of between 7.5 and 8.0, continuous wetness and plant nutrient deficiencies. These problems, however, are much less serious than alkaline soils in arid and semi-arid regions.

SALINE SOILS (witbrak) have exceptionally high concentrations of soluble salts and occur in arid and semi-arid regions and results from the accumulation of soluble salts due to inadequate drainage and high evapo-



transpiration rates. The concentrations of soluble salts in saline soils are higher than 0.1%. These water soluble salts are usually the chlorides, sulphates, hydroxides and carbonates of sodium (Na), calcium (Ca) and magnesium (Mg). The soluble salt concentrations can be measured by electrical conductivity (EC). Soils with an EC of above 400 milliSiemens per meter (mS/m) at 25 °C are considered to be saline.

Saline soils can be defined as soils with an EC above 400 mS/m, sodium exchange percentage lower than 15% and pH value below 8.5.

Table 1 Plant reaction to salt affected soils (FSSA, 2007, p. 55)

SPECIFIC CONDUCTIVITY		ELECTRIC RESISTANCE	PLANT REACTION
MMHO/CM	MS/M	OHM	
0 - 2	0 - 200	> 1000	Salinity has no effect on plant growth
2 - 4	201 - 400	500 - 250	Growth of sensitive crops is affected
4 - 8	401 - 800	250 - 125	Growth and yield of most crops affected
8 - 16	801 - 1600	125 - 63	Only resistant crops have reasonable growth
> 16	> 1600	< 63	Only few resistant plants can still grow



Sodic soils (swartbrak) is associated with a high sodium (Na) content and high pH, but not with excessive soluble salts. More than 15% of the cation exchange sites on the colloids (clay and humus) are occupied by sodium, meaning that the sodium concentration in the soil solution is much higher than 15%, because the three major cations (Ca, Mg & K) are adsorbed on the colloids in preference to sodium (in normal soils the Na adsorbed on the colloids is less than 2% of CEC). Some of the sodium salts alkalize soils to such an extent that sodic soils are considered the most alkaline of all soils, making it the most difficult to reclaim. Sodic soils are characterised by strongly developed prismatic structure and very low permeability. Infiltration rate of water is usually less than 10 mm per hour. The soil forms a dense crust because the clay is dispersed. Some of the soil organic matter dissolve at high pH and accumulates as a thin dark coloured layer of Na-humate compounds on the surface.

Crop production on sodic soils is limited by the high pH and high exchangeable sodium percentage; poor root development due to the strongly developed soil structure and poor water infiltration.

Saline soils can be defined as soils with the exchangeable sodium percentage higher than 15, pH (water) higher than 8.5, but with EC of less than 400 mS/m.

SALINE-SODIC SOILS are characterised by a combination of the traits of saline and sodic soils. The exception is that water infiltration rate is not a problem, because of the presence of soluble salts, especially calcium, which prevents the dispersion of clay.

Saline-sodic soils can be defined as soils with EC values higher than 400 mS/m and the exchangeable sodium percentage above 15%, but pH values are usually less than 8.5

Table 2 Summary of the definitions of different salt affected soils (FSSA, 2007, p. 58).

DEFINITION	CONDUCTIVITY SATURATED EXTRACT (25°C)	EXCHANGEABLE Na % (ESP)	pH (H ₂ O)
Saline soils (witbrak)	> 400 mS/m	< 15%	< 8.5
Sodic soils (swartbrak)	< 400 mS/m	> 15 %	> 8.5
Saline-sodic soils	> 400 mS/m	> 15%	< 8.5

All the values should be on the soil analyses report. If not, ask the laboratory to do it.

Calculating ESP (if not given): All the values referred to should be in cmol(+)/kg [cmolc/kg]. If the values for the cations are only given in mg/kg, use the following conversion ratios:

Table 3 Conversion ratios to convert values from mg/kg to cmol(+)/kg (FSSA, 2007, p. 165)

CATION	POTASSIUM (K)	CALCIUM (Ca)	MAGNESIUM (Mg)	SODIUM (Na)	ALUMINIUM (Al)
Mg/kg ÷ by	391	200	122	230	90

FORMULAS: $S = K + Ca + Mg + Na$ in cmol(+)/kg
 $T = S + Al + H = CEC$ in cmol(+)/kg

$$ESP = \frac{(Na \text{ cmol}(+)/kg \times 100)}{(CEC (T) \text{ cmol}(+)/kg) \%}$$

$$\text{Base saturation: } \frac{(100 S)}{T} \quad (70 - 95 \text{ is deemed normal})$$

$$\text{Acid saturation: } 100 - BS \quad \text{or} \quad \frac{(100 (H+Al))}{T}$$

RECLAIMING ALKALINE SOILS

To reclaim alkaline soils is one of the most difficult (and expensive) procedures in agriculture. Most of the problems were caused by a lack of drainage and/or low rainfall coupled with high evaporation. To reclaim alkaline soils, good drainage and excess water is needed.

Saline soils can be reclaimed by washing the soluble salts out of the root zone with a program of over irrigation. It is important to have good drainage to remove the excess water. Without

proper drainage the water table will rise, bringing more salt to the surface and increase the problem. The key is to have a program to prevent re-occurrence of the salt problem.



Saline sodic soils can be reclaimed by first substituting the sodium from the exchange sites (colloids) before the salts are leached by over irrigation. If the salts are leached first, sodic soils are created and permeability decrease dramatically, making it much more difficult to reclaim the land.

Sodic soils can be reclaimed by substituting or replacing sodium with calcium, acidify the soil with sulphur and leaching the sodium from the root zone with a program of over irrigation. As with saline soils, the key is proper drainage.

Sodium can be substituted by applying gypsum ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$). If free lime (CaCO_3) is present in the soil, acidifying agents such as sulphur (S), sulphuric acid (H_2SO_4), iron sulphate or aluminium sulphate can be applied. Gypsum should be applied in dry weather as it is hygroscopic and will clog the apparatus on days with high humidity. Table 4 give an indication of gypsum and dry sulphur required to substitute sodium. If sulphuric acid is used, the quantities can be calculated from the sulphur requirement. For practical purposes the quantities should be multiplied by 1.25 (add 25%).

Table 4 Gypsum or sulphur required to substitute sodium (FSSA, 2007, p. 57).

EXCHANGEABLE SODIUM (Na)	GYPSUM	SULPHUR
cmol(+)/kg	t/ha	t/ha
1	2.9	0.54
2	5.8	1.08
3	8.7	1.62
10	29	5.40

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OTHER REFERENCES:

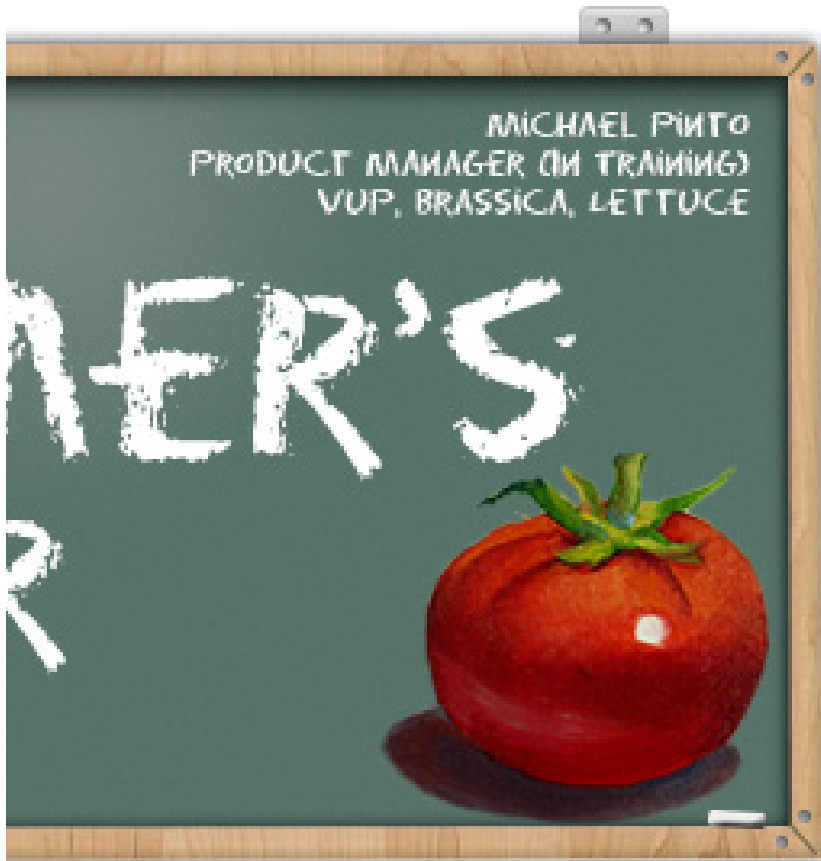
Troeh, F.R. and Thompson, L.M. (1993). Soils and soil fertility (5e). New York: Oxford University Press, Inc.



SO YOU HAVE ACQUIRED SOME ARABLE LAND AND/OR TUNNEL STRUCTURES. YOU EXPERIENCE A FAVOURABLE CLIMATE. YOU HAVE SOME AGRICULTURAL EQUIPMENT, A MARKET TO SELL YOUR PRODUCE, KNOWLEDGE OF VEGETABLE PRODUCTION AND YOU WOULD LIKE TO START FARMING TOMATOES. THE IDEA IS TO DEVELOP A SUCCESSFUL BUSINESS, BUT YOU ARE ON A TIGHT BUDGET. SO WHERE DO YOU START?

Firstly, do an inventory of what you have. Ask yourself what you can still utilize and what you can't do without for now. Make use of those older tunnel structures and equipment where you can. Make sure you get the soil and water analysed, if you are planning to grow





hydroponically or in open fields. A soil and water analysis is crucial if you want to be as efficient as possible when it comes to your fertigation plans.

Secondly, realise that you are entering into a relationship with your plants and all the other facets of your business. Agriculture is a journey. Take the time to learn from every situation you are challenged with. Realise that mistakes along the way are there for you to acquire knowledge and wisdom from. So learn from them! As they say, "Rome was not built in a day!"

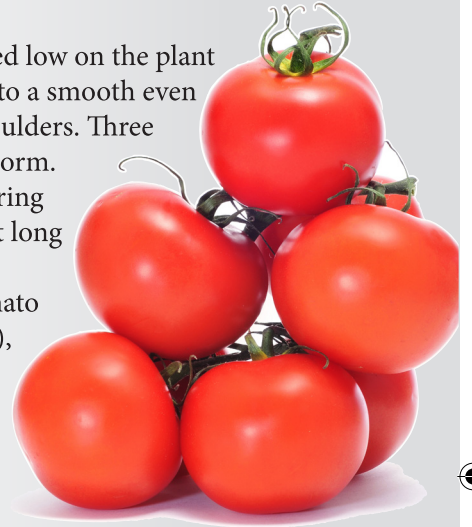
It is also important to develop relationships with people that can and will "walk the road" with you. People that have gone before you, who have the experience to answer your toughest questions. An organisation that can provide you with quality information and products you can trust.

Thirdly, make sure you use the right varieties for your situation. Use good, producing "starter" varieties that are easy to manage and learn from, while still being great value for money. The following are great varieties adapted for either production in open field or under protection.



CROMEX*

Great value for money
Good producer, medium-leafy, early and with a semi-compact growth habit.
85 days to maturity (climate and season dependant)
120-150g average fruit mass (140-150g if pruned).
Ideal for supermarket pre-packing.
Slightly flattened globe fruit shape
Plant throughout the year (frost free areas).
Good adaptability. Growth, fruit-set, and production are good into the cooler and warmer periods
First trusses are carried low on the plant
Firm, fruit colouring to a smooth even red with no green shoulders. Three loculed fruit are the norm.
Good shelf life, colouring more easily than most long shelf life varieties.
Disease Package: Tomato Mosaic Virus (ToMV), *Fusarium oxysporum* (Fol:1), Tomato Spotted Wilt Virus (TSWV) (Po, IR)



SISLEY

A gourmet tomato with easy setting, ideal for supermarket pre-packing.
120-140g average fruit mass (larger if pruned)
Flat, round fruit shape
Long shelf life
Intermediate type, vigorous growth with good leaf cover
5 – 6 Fruit per truss under normal conditions
Fruit colour is red with good internal colour
Mostly 2 nodes between trusses
Small blossom-end mark
Jointed pedicel and thick fruit walls
Full Disease Package: Tomato Mosaic Virus (ToMV), *Verticillium* (V), *Fusarium oxysporum* (Fol:0-1), Root Knot Nematodes (M) (IR). As an added benefit, Sisley was also found to be extremely strong against Bacterial Wilt (Rs) in commercial fields.



QUALITY OF IRRIGATION WATER

Written by: DC Coetzee
Technical Marketing Advisor



PART 1 OF 2

In irrigation farming systems the aim is to supply water which is lacking from natural rainfall in order to achieve the full potential of the crop-soil-climate production system. Irrigation usually happen when rainfall is either less than the demand of the crop or rainfall is deemed to be too unreliable to farm with high value crops. Irrigation can be considered as a farming strategy to limit production risks. The income from the crop(s) produced needs to justify the (usually high) investment made in the irrigation system.

SEVERAL FACTORS NEED TO BE CONSIDERED BEFORE THE FINAL INVESTMENT DECISION IS MADE:

Soil suitability being its texture, structure, drainage and effective rooting depth,
Climate being the rainfall, humidity, hours sunlight and temperature,
Capital available for the investment in irrigation systems, soil preparation and seedlings,
Slope. Is there a danger of erosion or overturning of farm equipment *et cetera*,
Terrain. Is the soil even enough for example for a centre pivot system,
Aspect. Is the field on the northern, southern, eastern or western slope
Water. The volume available, the cost and the quality or suitability of water.

Three facets should be considered to classify water as suitable (fit) for use. The physical dimension of water refers to particles not dissolved such as mud and debris. Suitable filters should always be fitted in the irrigation system to remove unwanted stuff. The biological dimension refers to unwanted organisms' presence in the water. Some of

the bigger ones could be removed by the filtration system, but on the microscopic level chemical treatments might be necessary to kill undesirable bacteria, fungi and other organisms. The chemical dimension refers to the dissolved ions in the water. Some of the ions might be beneficial, others might be neutral, but most are deemed to be undesirable. Dissolved salts are mostly unwanted and in high concentrations could be damaging to the crop or have such an influence on the soil that it become unfit to grow crops. We discussed salt affected soils in the previous article.

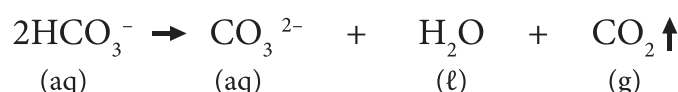


Salts dissolved in water are usually a combination of the cations sodium (Na^+), calcium (Ca^{2+}) and magnesium (Mg^{2+}) with chloride (Cl^-), sulphates (SO_4^{2-}), bicarbonates (HCO_3^{3-}) and sometime carbonates (CO_3^{2-}). When these ions are applied with irrigation water, a build-up of their salts will take place in the soil as water is removed by evapotranspiration. Some of the ions could be absorbed by the plant roots, but the balance could accumulate to toxic levels.

TABLE 1. SOLUBILITY OF SOME COMMON SALTS FOUND IN WATER AND SOIL. (HAUSENBULLER, 1985, P. 469)

ANIONS	CATIONS			
		Sodium (Na^+)	Magnesium (Mg^{2+})	Calcium (Ca^{2+})
Chlorides (Cl^-)		NaCl (35.7 g/l)	MgCl_2 (52.8 g/l)	CaCl_2 (59.5 g/l)
Sulphates (SO_4^{2-})		Na_2SO_4 (19.4 g/l)	MgSO_4 (26.9 g/l)	$\text{CaSO}_4 \cdot \text{H}_2\text{O}$ (0.22 g/l)
Carbonates (CO_3^{2-})		Na_2CO_3 (7.1 g/l)	MgCO_3 (0.01 g/l)	CaCO_3 (0.001 g/l)
Bicarbonates (HCO_3^{3-})		NaHCO_3 (6.9 g/l)		

While accumulating chlorides and sulphates add mainly to soil salinity, bicarbonates and carbonates aid in the build-up of exchangeable sodium in soil - causing alkalinity (brak). As soil is drying, carbonate readily binds with magnesium and calcium to form relatively insoluble carbonate salts. Bicarbonates, however, readily converts to carbonates when drying, as illustrated by the reaction:



Carbonates bind with Ca and Mg to form relative insoluble salts upon drying, neutralising the base metals as CaCO_3 and MgCO_3 salts. This gives the accumulated sodium the opportunity to become the dominant cation in the soil and hence the soil becomes alkaline – with its negative influence on soil quality and plant growth (see previous article).

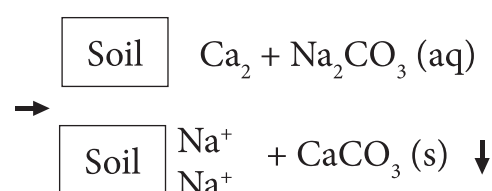
If there is any carbonate not consumed in precipitating magnesium and calcium, it is associated with sodium. This combination is referred to as residual sodium carbonate (RSC), which can be calculated from the concentrations as set out in your water analysis:

$$\text{RSC} = [\text{HCO}_3^- + \text{CO}_3^{2-}] - [\text{Ca}^{2+} + \text{Mg}^{2+}] \text{ me/l}$$



The formula read as: “residual sodium carbonate equals the sum of the concentrations of bicarbonate and carbonate ions minus the sum of the concentrations of calcium and magnesium ions expressed in me/l”. For RSC values below 1.25, the water is deemed safe for irrigation. RSC values between 1.25 and 2.50 are doubtful and above 2.50 are not suitable for irrigation. RSC can be neutralised by adding 1 mg nitric acid (adjust for concentration) for every mg/l HCO_3^{3-} plus CO_3^{2-} concentration.

The potential of residual sodium carbonates to precipitate calcium and magnesium and therefore allow the build-up of sodium, is explained by the reaction:



The second indicator of the suitability of water for irrigation purposes is the sodium content. To determine a suitability index, we have to calculate the sodium adsorption ratio with the formula:

$$\text{SAR} = \frac{[\text{Na}]}{\sqrt{([\text{Ca}] + [\text{Mg}])}} \text{ mmol/l}$$

The SAR gives an indication of the expected exchangeable sodium percentage of the soil after equilibrium has been reached. The SAR values can be classified to indicate the potential sodium hazard. For further information refer to figure 1 of the next article (Forum, Autumn 2014)

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incotec

involved in seeds

Special report by Derick Jones

SEED ENCRUSTING AND PELLETING DELIVERS MULTIPLE BENEFITS

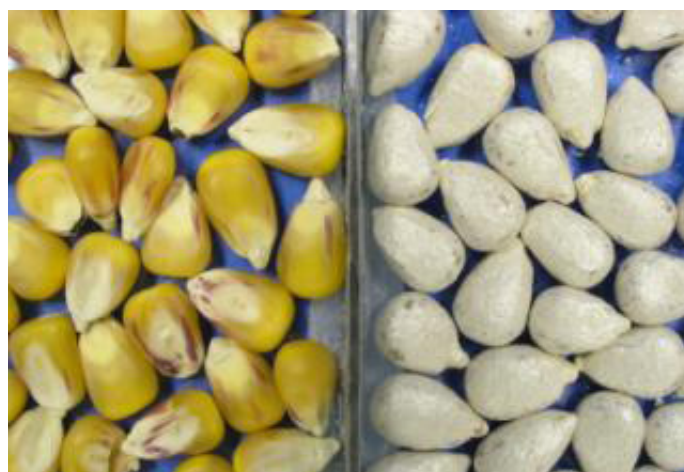
AS A MODERN DAY FARMER YOU KNOW THE CHALLENGES IN PRODUCING A HEALTHY AND ABUNDANT CROP. IN ORDER TO MEET MARKET DEMANDS AND GET THE MOST OUT OF YOUR CROP YOU HAVE TO STAY ON THE CUTTING EDGE OF TECHNOLOGY. INCOTEC SPECIALIZES IN SEED ENHANCEMENT TECHNOLOGIES, SUCH AS ENCRUSTING AND PELLETING THAT CAN SUPPORT YOUR EFFORTS.

The seed is the basis of your crop so you need to get the best out of each and every seed you sow. Encrusting and pelleting are coating techniques that can change the size, shape, weight and appearance of the seeds. This reduces the risk of doubles in planters and makes mechanical planting easy by improving the flow of treated seed through the machinery. The coating is also a suitable carrier for plant protection products and additives that can nourish and protect the seeds and plants and stimulate growth as well as protecting them from threats.

One of the key factors in any seed coating process is the coating material. The coating material must suit the seed and the conditions in which it will be planted and must not affect the seed's germination capacity. Characteristics like density, particle size, flow, absorption capacity and adhesion can greatly affect the process to the extent that many materials are totally unsuitable. Also the specific traits of each seed species and the sowing methods further limit the choice of materials. The behavior of coating materials and the potential interaction with process variables that may alter the final product properties are defined (e.g. density, hardness, moisture uptake, splitting characteristics). Case by case the most suitable coating formulation is selected, or, if necessary, developed.

Encrusting is ideal for seeds that naturally have a rough uneven surface or size that is far from uniform. The encrusting material fills the indentations of the seed creating a smoother surface and improves the size and shape. Pelleted seeds have a smooth uniform size and shape. Both techniques are beneficial for mechanical planting (more regular spacing of plants resulting in a higher yield per ha) and facilitates seed singulation (minimizing

skips and doubles in the planting equipment). Both of these techniques have the added advantage of adding weight to the seed which may be necessary to stop fine seed blowing away in the wind. An encrusted seed can weigh 1-5 times its original weight and for a pelleted seed 10-100 times.

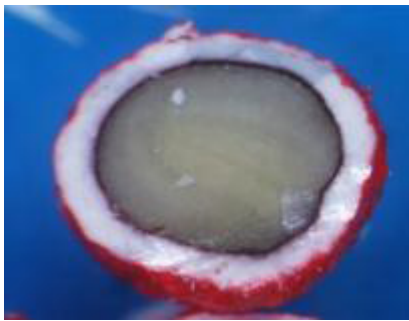


ENCrustMENT OF MAIZE

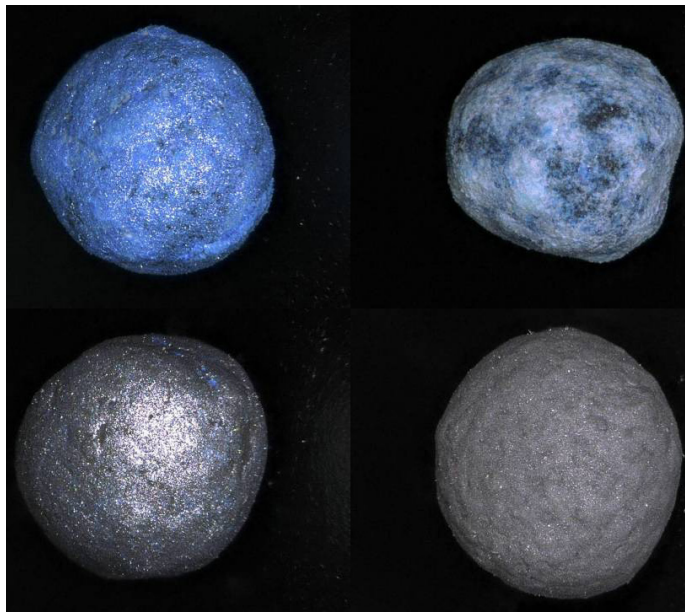
Good examples of the implementation of the encrusting technique are INCOTEC's OnX Carrot and OnX Onion. These products provide the solution to the challenges caused by the naturally rough exterior of carrot and onion seeds.

Split Pill is a unique pellet originally developed for lettuce. The coating material allows quick and easy access of both moisture and oxygen to the seed. The pellet splits open and therefore allows the seed to develop quickly.

The coating material is the optimal carrier for plant protection products and additives that can stimulate growth and nourish the seedlings and plants. Through this direct seed application, the amount of PPPs needs to be effective, as compared to foliar application, that can be reduced by as much as 80-90%! Stacking of additives becomes possible, as does multi-layering of PPPs to ensure optimal protection of seeds and seedlings. Our researchers are in close collaboration with developers of seed applied PPPs and additives so that we can continue to provide you with the best formulations for your crop.



PELLETING



ENCRUSTMENT OF CANOLA

Most encrusted or pelleted seed is also given a colour which can be useful for identification purposes and has the added advantage that seeds are visible on the ground after sowing.

“ Whatever your particular challenges are, INCOTEC can lend a hand in supporting your crop production ”

Whatever your particular challenges are, INCOTEC can lend a hand in supporting your crop production. Encrusting and pelleting are only two of the seed improvement technologies we have available and these can be easily combined with other steps in a total package of seed enhancements available from INCOTEC South Africa. The technologies we have on offer include grading through seed selection, priming (to be offered by Dec 2013), quality inspection and a range of analytical services.

For more information on encrusting, pelleting or any other seed enhancement techniques please contact us. www.incotec.com



IRON LADY* & WINSTON RULE IN THE BOSVELD

Iron Lady* and Winston pumpkin are two varieties which are widely planted in the Bosveld with great success.

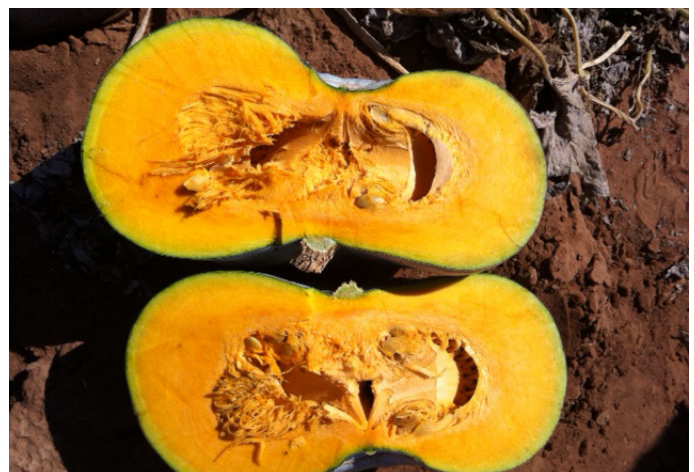
Both these varieties are semi-bush types which mature between 95 – 105 days. The fruit are medium ribbed with thick orange flesh and are deep flat.



“ An outstanding characteristic of the fruit is the small seed cavity. ”



The varieties have a disease resistance package of Papaya ring spot virus, Watermelon mosaic virus and Zucchini yellow mosaic virus.



The photos herewith were taken on a farm in Musina. Between 6 600 – 7 000 plants per hectare were planted.

Iron Lady* and Winston are two pumpkin varieties that can be trusted for good yield and excellent product.

STRESS LESS



WHEN DO WE GET ILL? THERE ARE MANY ANSWERS, BUT SOME OF THEM WOULD INCLUDE: EATING INCORRECTLY I.E. NOT THE RIGHT FOOD, TOO MUCH OR TOO LITTLE. NOT PROTECTING (DRESSING) OURSELVES AGAINST ENVIRONMENTAL DISCOMFORTS LIKE THE SUN, HEAT, COLD, WET CONDITIONS ETC. IF EVERYONE AROUND US IS SNEEZING, COUGHING AND SPLUTTERING LIKE AN OLD LISTER DIESEL, AND WE DON'T WASH HANDS, TRY TO GET AWAY FROM THE HIGH INFECTION PRESSURE AND DRINK A TONIC, WE'LL PROBABLY STAND A GOOD CHANCE OF CONTRACTING THE SAME MALADY!



Plants have the same kind of problems, except they can't run off to get a jersey, not eat fast foods or get to the GP for a preventative tonic "jab"! Plant-production in itself is a stressful job and it is the farmer's job to intervene and try to keep conditions conducive to plant health and happy growing.

There are critical points (rather time-frames) in a growing plant's life that may be more or less stress-attracting than others. Unfortunately, most vegetable crops' growth patterns have never been placed into nicely categorised growth stages. Agronomic crops (Afr. "Akkebbougewasse") have for long been studied, categorised and we know to within a fairly good measure of certainty that at growth stage "X" or leaf number "Y", a certain physiological change is taking place and specific actions should be taken to induce good growth or prevent a production decrease.

There are therefore two distinct factors to consider:

External Pressure like climate, disease or insect pressure and nutrition play a role in the way plants will grow and react. The plants may express the results of these stresses in various ways and we must react timeously to prevent problems. Manipulation products may be used to decrease the negative effects or in fact effect a positive outcome!

There are identifiable growth stages at which preventative positive manipulation can be applied to help plants cope with stresses and optimise growth within the constraints of agricultural variables.

We therefore target these critical points and sensitive phases in the crop's growth, development and production with specific actions or products.

A good even plant stand can be improved by using **One Spray (K6896)** as seed treatment or in row treatment at sowing.



At transplant: It is important to stimulate strong roots and vigorous vegetative get-up-and-go for strong seedling growth that jump out of the starting blocks with vitality: Apply the soil and plant bio-stimulant **Vitazyme** or **Kic-Start (K5442)** root and vegetative booster through the irrigation. To continue strong root development, **Kic-Start** should be re-applied within 7 days of transplant or emergence.

Early Vegetative Development: Early problems (e.g. transplant shock or climatic problems) can push plants into a stress phase that can e.g. stimulate flowering at a too early stage. Keep plants vegetative by applying **Nitrospray Plus** during the vegetative phase but just not prior to flowering.



Potatoes have a special requirement in that we want compact balanced plants without too much vegetation but strong roots with even and good tuber initiation. The application of **Millerplex** at specific stages (week 3 to 4 and last application weeks 6 – 7) will help strong tuber initiation and a balanced plant. Only for seed potato production, follow-up application may be made.



Flowering & Fruit development: Strong healthy flowers that open over a short period are needed. The use of **Fosfaspray** and **Grotonic** will manipulate the plant to continue good root development and flower initiation, while also activating nutrient induced resistance during a critical phase. During the flowering process, metabolites need to go to the right metabolic sinks. The foliar application of **Asco-Gro** will help strengthen plants' resistance system and help distribute growth factors within

the plants. **Hyperfeed**, a 3:1:5 plus trace elements, mixed with **Calmabon Plus** will sustain the plant in a period of sustained flowering, set, fruit filling and continued vegetative phase of development. (E.g. Peppers, Tomatoes, Cucurbits). It's therefore important to keep momentum and the plants in a reproductive 'frame of mind', while at the same time sustaining good healthy leaf and stem growth. **Grotonic** will keep growth sustained and help fight off infections due to the nutrient induced resistance it affords the plant as well as metabolite distribution.



The products above (and others not noted here) cannot be seen as the saviours of plants during stress periods. These manipulation products and techniques are there to help a crop in a particular physiological direction but not replace normal good agricultural practices (*sustaining vegetative or reproductive growth, "waking up" the plants own inherent resistance systems or even stimulating specific processes like cell division etc.*). The roots are where plants should harvest their nutrition and where correctly balanced fertigation and nutrition must play the major role.

Soil and root health and a well-balanced nutritional program must be seen in conjunction with manipulation at the correct stage of plant development. In the final analysis, the correct cultivar choice, nutrition based on the crop, soil and climate as well as manipulation with scientifically based products PLUS the farmer's eyes and actions will dictate the crop's success!

At Hygrotech, we pride ourselves on scientifically designed fertilizers, foliar and root-applied products and other additives that can manipulate plants to manage production in a direction of our choosing (within the constraints of what mother-nature throws at us).

CONTACT YOUR HYGROTECH REPRESENTATIVE FOR SPECIFIC PRODUCTS AND CULTIVARS, BASED ON YOUR CROP AND REQUIREMENTS.

Sporekill

SALES REWARDED



SALES OF SPOREKILL® BY HYGROTECH SALES PERSONNEL AND THEIR VARIOUS CHEMICAL DISTRIBUTORS WERE EXCEPTIONALLY SUCCESSFUL DURING THE 2012/2013 HYGROTECH FINANCIAL YEAR.

Sporekill® use as registered agricultural disinfectant (Reg. No. ACT29GNR529/27555/070/210 according to the Compulsory Specification of Disinfectants and Detergent-Disinfectants) and as registered fungicide (Reg. No. L7115 according to Act 36 of 1947) on locally consumed crops and particularly vegetable crops was very popular.

During two separate occasions the two top Sporekill® salesmen of Hygrotech were rewarded for their efforts with a diploma and an i-Pad each. They are Dirk le Roux with the most sales (from the Tzaneen branch) and Stef Martinuzzi with the second-most sales (from the Pietermaritzburg branch). The Laeveld Business Unit was also recognised for having the top Sporekill® sales as a regional area.

Fielies Nieuwoudt (left), Laeveld Business Unit Leader and Dirk le Roux (right), top Sporekill® salesman, together with Johann van der Vyver (from ICA) during an award giving ceremony.



Stef Martinuzzi (right) congratulated by Johann van der Vyver for having sold the second-most Sporekill® volume.

DLF VISIT

DLF
TRIFOLIUM
SEEDS & SCIENCE

MR LOUIS BLAAUW (HUMANSDORP CO-OP),
TOLLA GELDENHUYS AND MYSELF VISITED
DLF IN DENMARK DURING OCTOBER 2013.



FLTR: LOUIS BLAAUW, SØREN BUSK AND TOLLA GELDENHUYS IN THE DLF WAREHOUSE

We only realised how big the facilities were when we went to DLF's premises. It was a privilege to follow the whole process from seed production on the farms up to the world class distribution centers.



SEED CLEANED AND READY FOR DESPATCH



Louis Blaauw in a seed warehouse on one of the production farms.

To develop a new cultivar takes up to 5 years and their DNA are available to the clients to plant with confidence.



It is thus no wonder that DLF is well deserved one of the biggest companies in the world.

Thanks again to Søren Busk and Ole Gronbaek for this wonderful experience.

IPROFLO



FOR DISEASE CONTROL OF ONION AND TOMATO

Iproflo is a suspension concentrate contact fungicide for the control of:

Alternaria purple blotch and *Botrytis* neck rot in onions, as well as
Botrytis grey rot in tomatoes.

Iproflo is also registered for the control of:

Botrytis in table and wine grapes
Post-harvest decay in apples and pears
Post-harvest decay in apricots, nectarines, plums and peaches
Turf diseases

PLEASE NOTE: ALWAYS REFER TO LABEL AND DIRECTIONS FOR USE, ACCOMPANYING CONTAINER, FOR DETAILED INFORMATION BEFORE USING THE PRODUCT

Iproflo is a product of ICA International Chemicals (PTY) LTD (Reg. No. 2001/013319/07)
Iproflo contains 500 g/ L Iprodione (Dicarboximide). Reg. No. L8213 of Act 36 of 1947
ICA International Chemicals Telephone: 021-886-9812

ICA
INTERNATIONAL
CHEMICALS
(PTY) LTD

ADDITIONS FOR A SUMMER BRAAI

It is summer and we like to spend as much of the holiday season beside the braai in the sun. Here is two easy fuss-free and **HEALTHY** recipes to add to that perfect piece of steak!



JALAPENO POPPERS...

INGREDIENTS:

Variety: Jargon* Jalapeno
Cream cheese
Streaky bacon



METHOD:

Make a slit on the side of the Jalapeno

Remove the seed

Chop a Jalapeno fine and blend with the cream cheese (the amount of Jalapeno will vary to taste – the hotter you want it the more Jalapeno you can add. For an even more fiery taste experience chop an Ascent* birdseye chilli!)

Stuff the Jalapeno with the chilli/cream cheese mix

Wrap stuffed Jalapeno with strip of bacon and pin down with toothpick

Make sure there is no open spaces where cheese can escape!

Braai the Jalapeno poppers until the bacon is crispy and enjoy as starter or side dish to your braai.

VEGETABLE SOSATIE ...

INGREDIENTS:

200g Rudolph* Beetroot, fresh, peeled, cut into wedges, boiled
300g Canesi Butternut, cubed, blanched
200g Aretusa Baby Marrows, cut into chunks
2 Charlize onions, cut into wedges
200g sweet potato, cut into 2cm slices, blanched
2 tablespoon Olive oil
1 tablespoon coarse salt
1 tablespoon mixed herbs



METHOD:

Skewer the vegetables onto a sosatie stick until there is two layers (or the stick is full – remember to leave some space for your fingers!)

Brush vegetables with olive oil and sprinkle with coarse salt and herb mix

Braai on a medium heat fire, rotating often to ensure even grilling

Remove and serve as a side dish

HYGROTECH

SUSTAINABLE SOLUTIONS

GARDEN PACKS

HYGROTECH HAS LAUNCHED THEIR
NEW GARDEN PACK RANGE...

FOR OPPORTUNITIES TO ACT AS A
DISTRIBUTOR PLEASE CONTACT:
MARIE BOTHA OR MARI FURTER
AT 012 545 8000



HYGROTECH

SUSTAINABLE SOLUTIONS

Contact your nearest Hygrotech office for more information

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