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Dear readers,

The Andermatt Group is growing – not only in Switzerland. Important goals were also achieved in other countries: Andermatt France and Andermatt do Brasil have been founded and are already highly active. In South Africa, Andermatt Biocontrol is now the majority shareholder of Madumbi Sustainable Agriculture and was also able to secure the distribution rights for PHP’s innovative products outside of Africa by taking a minority stake in this company (see pages 14, 18–19, 21).

All companies that are already part of the Andermatt Group also present new findings and developments in this issue of the AG-Journal.

Every part of the group has included its presentation with details of the respective contact persons.

On behalf of the Andermatt Group, I wish you interesting reading.

Dr. Martin Andermatt
Chairman of the Board
Andermatt Holding AG

The Andermatt Group

Andermatt Holding is a family-owned company with consistently growing employee participation.

The Andermatt Group aims to find practical biological alternatives to conventional chemical-synthetic pesticides, insecticides, fertilisers and veterinary drugs and make them available – for healthy food and a healthy environment.

Andermatt Biocontrol aims to achieve this objective by establishing a network of similarly aligned producing and distributing companies.
Sustainable protein from insects: a major commitment of Entomos

The population of the Earth is expected to reach almost 9 billion by the year 2050. FAO calculations indicate that food production will need to be doubled to be able to feed all these people. Available agricultural area is limited; the fishing grounds are as good as exhausted. This means that there is a dire need for new means of food production. This is where insects offer a promising alternative.

URS FANGER, ENTOMOS

Edible insects have long been a part of human diet, but have not been accepted in certain societies to this day. More than 1900 insect species are considered to be edible (FAO, Edible Insects, 2013). Insects are often eaten whole, however they can easily be processed to an alimentary powder. Insect meal can be used in the production of bakery goods, energy bars or even energy drinks. Current regulations in both Switzerland and the EU prohibit the distribution of insects for food. Entomos, along with numerous other institutions, is actively committed to the authorisation of insects for human consumption. In addition, the company is also engaged in national research projects investigating the suitability of insects for human consumption.

Resources such as fish meal, fish oil and soya are becoming scarce and therefore increasing in price. Insects can thus be expected to soon play an increasingly important role as a substitute source of protein. However their use in livestock feeding is currently also banned in Switzerland and the EU. An exception to this regulation, albeit with certain limitations, foresees the feeding of fish with insects. Insects form a rational and sustainable alternative to current protein sources both as livestock fodder as well as for human consumption. The authorities have now recognized this potential and are joining expertise supporters, including Entomos, to leverage an adaptation of the legal basis, so that insects can be legally reared and sold for these purposes. The ultimate goal remains the dependability of insect-based food and fodder.

Picture 1: Mealworm muffins are not only pleasing to the eye but also to the palate.
Varroa control with OXUVAR: A study of dose-response and sugar substitute

Oxalic acid has become an indispensible component of an integrated winter treatment concept. Our oxalic acid product was launched under the brand OXUVAR© in the German market in 2006 and in the Swiss market in 2008. It is a two-component product.

ROMAN ERNI, ANDERMATT BIOVET

The application entails mixing oxalic acid and sugar immediately prior to application, which must take place within one month prior to the application. If the solution is stored at room temperature, it reacts to form HMF, which is toxic for bees. To address this situation, Andermatt BioVet has developed a new oxalic acid product, in which the final formulation offers long-term stability, allowing it to be stored for extended periods whilst retaining good efficacy. The solution containing the sugar substitute was applied to brood-free colonies in December at oxalic acid concentrations of 2.5%, 3.5% and 4.5% respectively. The group size was five colonies and included two reference groups with OXUVAR and a 0% solution respectively. Specialist literature (Charrière J.-D. et al., 2001) describes oxalic acid concentrations above 4.5% as less tolerable to bees, which explains the limitations stated above.

<table>
<thead>
<tr>
<th>Content of oxalic acid dihydrate</th>
<th>Thickening agent</th>
<th>Group size (colonies)</th>
<th>Efficacy [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>PM</td>
<td>6</td>
<td>Ø 20.23%</td>
</tr>
<tr>
<td>2.5%</td>
<td>PM</td>
<td>6</td>
<td>Ø 61.02%</td>
</tr>
<tr>
<td>3.5%</td>
<td>PM</td>
<td>7</td>
<td>Ø 83.30%</td>
</tr>
<tr>
<td>3.5% (OXUVAR)</td>
<td>Sugar</td>
<td>6</td>
<td>Ø 82.15%</td>
</tr>
<tr>
<td>4.5%</td>
<td>PM</td>
<td>5</td>
<td>Ø 74.78%</td>
</tr>
<tr>
<td>All groups</td>
<td></td>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>

Chart 1: Efficacy of various oxalic acid solutions (PM = Polymer).
The final treatment was carried out after an interval of four weeks, according to EMA recommendations for a synthetic varroacide with a different chemical substance. The bee mortality was recorded for each group. The actual load of the treatment product on the bees was also measured. No statistically significant difference in bee mortality was found among the various concentrations. Neither did bee mortality rates resulting from the application of the differing oxalic acid concentrations and the application of thickened water and OXUVAR show any statistically significant variation. The efficacy of the solution without active ingredient content is already relatively high at 20%. We explain this fact with the circumstance that wetting the bees in itself and the resulting unrest along with the cleaning reaction can already cause Varroa mites to be stripped off. As expected, the efficacy of the solutions increased with the concentration level, whereas concentrations above 3.5% displayed no statistically significant change in efficacy. The solution with an oxalic acid content of 3.5% achieved a similar effect to OXUVAR, which suggests that sugar and substitutes have a comparable effect on Varroa. The variance with the new solution, however, was lower than that of OXUVAR. To verify these results, further tests are planned. A chemically stable ready-for-use solution enabling simplified product application as well as storage ability for beekeepers is thus feasible and foreseeable without increasing the risk profile for the bees.

Control of the red fowl mite by predatory mites

The red fowl mite has been developing into an ever-expanding problem in poultry farming during recent years. This has been due in part to an increase in resistivity to treatment by certain specific agents. The red fowl mite is a nocturnal ecto-parasite which weakens its hosts by sucking blood. A high level of infestation leads to restlessness, anemia and a decrease in appetite; an excessive attack even to death. The restitution of a natural equilibrium by means of predatory mites is a relatively new method of control in henhouses.

ELENA DISCH, ANDERMATT BIOVET

Andermatt BioVet has been booking success by deploying the predatory mite Hypoaspis miles against the red fowl mite for several years. Predatory mites belong to the arachnid group and thrive in a species-specific microclimate. In henhouses the main nutritional basis of the predatory mite is the red fowl mite. As predator and prey are approximately the same size, it pursues its prey into the smallest nooks and crannies. In this way a natural equilibrium can be reestablished and the infestation pressure by the red fowl mite reduced to a low threshold within a reasonable time-frame. Development of resistance is naturally inhibited by the deployment of predatory mites.

The Andermatt BioVet assortment now includes two additional species of predatory mite: Taurrus and Androlis. These complement each other ideally in their differing microclimate preferences in the henhouse. They are ideally suited to deployment throughout the year. Taurrus is rather small having a diameter of 0.8 mm. It thrives on all stadia of the red fowl mite. As Taurrus also quenches its thirst by means of the red fowl mite, it is also ideally suited to protect the dryer areas of the henhouse. Androlis is an active hunter characterised by its swift movements in pursuit of the red fowl mite. This predatory mite prefers to devour the red fowl mite in its juvenile stadium. Its preferred habitat is in the humid areas such as under the drinking trough or close to the droppings of the fowl.

Predatory mites should always be released at an early stage, before a large population of red fowl mites can emerge. The balance can be readjusted to a natural level by deploying them before the first red fowl mite is detected in the spring. Predatory mites should have preference over acaricides as long as the infestation level is low to medium. Our consultants will be pleased to help develop a custom deployment plan in dialog with the poultry farmer, taking the specific situation including size, type and infestation level of the flock into consideration. The aim is a long-term decimation of the red fowl mite population.

Picture 1: Androlis, actual size up to 1 mm
Fruit plants for balcony and terrace

A tasty snack of freshly plucked fruit or sweet berries is always tempting. But what if there is no space available for one’s own orchard? No problem, because dwarf fruit plants can be cultivated in tubs and pots on the balcony or terrace.

SANDRA PABST, ANDERMATT BIOGARTEN

Limited space does not necessarily preclude freshly plucked fruit and sweet berries. Dwarf fruit plants, also known as mini fruit, have been specifically selected by plant breeders for pot culture. In addition to the already popular sorts such as nectarines and apricots, others such as apples, pears, cherries and almonds have now become available as dwarf fruit trees.

Space-saving pillars

Fruit trees in pillar form are also well suited for culture in pots. Trees in pillar form only have a few short side branches. Their slim stature enables them to thrive in a limited space making them particularly well suited to cultivation on a balcony or terrace. Further options include small gardens or as an original type of hedge. Despite their slight width, they tend to be very fruitful. In addition to various apple and pear varieties, dwarf plum and cherry trees are now available in pillar form.

Numerous further plants for one’s delicacy garden on the balcony are available from Andermatt Biogarten. These include kiwis, figs, strawberries, blueberries and more – all in organic quality.

Picture 1: Blossoming almond tree
Well networked

Hardly any other means for plant protection has such a broad impact as a culture net – and this is equally effective whilst protecting beneficial insects and remaining residue-free and harmless to health – for years on end. Nevertheless, such nets are still rarely seen in garden plots. Reason enough for a small plea in favour of more “networking”.

JUDITH LADNER CALLIPARI, ANDERMATT BIOGARTEN

Loosely applied over the bed immediately after sowing or planting and thoroughly secured with stones or pegs, a culture net keeps many a pest away. It is most commonly used against vegetable pests. Nets hold many species of vegetable flies at bay, as well as harmful caterpillars but also fleas, beetles, aphids and white flies.

A light, handy and fine-mesh net (with 0.85 mm mesh) is the FILBIO culture protection net from Andermatt Biogarten. Its size of 5 m × 2.2 m (16 × 7 ft) is ideal for garden beds. The soft tissue made of elastic polyamide adapts to the plants as they grow. The net is permeable to air, light but also rain and watering. The impact of falling drops is automatically retarded thereby reducing silting. FILIBO even provides a certain degree of protection against hail damage. Wherever a suitable attachment is possible, nets also protect berry bushes and vines.

To make sure that birds and hedgehogs cannot become entangled in the net, the mesh should be fine, soft and well tensioned and affixed all the way down to the ground without leaving any openings. Any remaining ends should be tied into the inside as a roll. In the home garden, where usually only very few vines are to be found, individual bunches of grapes can be protected by means of the practical grape protection bags. Even the spotted-wing drosophila, a recent and problematic pest, is retained “out of the way” by either a well-closed FILBIO net or by grape protection bags.

Biological products for the retail market

An ideal assortment for all garden centres.

RALPH SCHWARZ, ANDERMATT BIOGARTEN

The extermination of bees, water pollution by pesticides, etc. have become omnipresent topics in today’s media. For that reason, it is ever more important for retailers to differentiate themselves from their competitors by offering their customers solutions which do not burden the environment. The range of plant protection products provided by Andermatt Biogarten enables retailers to offer a comprehensive assortment of suitable products.

Andermatt Biogarten’s retail assortment has been expanded in recent years. The latest products include, for example, the winter spray fluid Rappol, or the practical grape protection bags to keep wasps and birds at bay as well as protecting the grapes from the spotted-wing drosophila (Drosophila suzukii).

In addition to actual plant protection products, a unique range of beneficial insects is on offer. Beneficial insects are considered to be the most natural and environmentally friendly solution for biological plant protection in the garden. But it is not only in the garden that biological solutions are appropriate. Andermatt Biogarten’s “household range” Linea Casa also facilitates a natural way of combatting pests in the home.

In 2014, Andermatt Biogarten developed a consultancy position in order to better assist the growing needs of our retail clients. Manuel Weber, is now at the disposal of our clients for product consultation, including on-site product training sessions, as well as product problem resolution. Through these services provided by Andermatt Biogarten, retailers are now provided optimal assistance and support while searching for the most effective and environmentally friendly way to combat garden pests, both inside and outside the home.
The cyclic mass occurrence of the vole (*Arvicola terrestris*) and its importance for the control strategy

Cyclic proliferation of vole regularly causes major losses in forage production and severe damage in specialty crops such as orchards. The phenomenon has been known for decades. This knowledge needs to be incorporated in a successful strategy for mouse control.

ESTHER MANSER, ANDERMATT BIOCONTROL

The biological data on vole (*Arvicola terrestris*), illustrates the enormous increase potential: sexually mature at 8 weeks, 4–5 pups per litter, up to 5 litters per year, even more with mild autumn weather. If ample nourishment is available, the weather warm and dry and the habitat provides sufficient protection from predators, a single pair of voles can procreate massively within only a few months. Ideal habitats are permanent meadows; farmland is less attractive. Furthermore, the cleared Swiss cultural landscape is typically lacking in linked structural elements such as hedges, herbaceous vegetation, coppices, groups of trees etc. Little shelter is available to the natural predators of the vole (weasel, ermine). The same can be said about the lack of perches for birds of prey, owls etc. The combination of these factors can lead to an explosive growth in the population. This is evident in the chart 1 as an extremely steep and rapid rise (a peak shaped development). Above a level of 300 mice per hectare (120 per acre) there is a real risk of complete failure of the useable farming area. However, if a vole population can steadily be kept at a lower level by means of such countermeasures as the TOPCAT vole trap, the rise of damage to such an extent can be prevented. The population develops along a bell-shaped curve. The cause of collapse on reaching a peak value is currently not well understood. The assumption is that multiple influences lead to this effect; possible factors include a lack of available nourishment, increasing incidence of parasites and/or disease, a crowding effect, climatic influences etc.

The AGFF takes an annual census of the degree of vole infestation in selected plots. This clearly shows regional stagnation, increase or decrease of the population. It is important to note that the infestation can vary greatly at the plot level. Fundamental to all reduction strategies is the combination of measures taken. Management as mowing pasture, keeping the grass short, erection of perches for birds of prey and niches for small predators etc. have all proved to be valuable contributions. In the case of particularly valuable cultures, immigration of mice can be limited by the erection of a STANDBY vole fence. A general collapse of the population was observed in most areas during the 2013/2014 season but the next mass occurrence is sure to be “just around the corner”. In order to preclude the peak-shaped development described above, it is of prime importance that available countermeasures be assessed in advance. At the first signs of vole infestation, it becomes imperative to begin immediate and systematic implementation of direct countermeasures using traps (TOPCAT).

**Chart 1:** Peak- and bell-shaped development cycles of the vole. Source: Information sheet U6 and website of AGFF (Arbeitsgemeinschaft zur Förderung des Futterbaues, Schweiz/Swiss association for the promotion of fodder cultivation)
Drosophila suzukii – Experience with biological control

Andermatt Biocontrol has been working on biological solutions to control the Spotted Wing Drosophila (SWD) since its first appearance in Switzerland in 2011. Recent experience and insights (as of mid October 2014) are summarized below.

Crop protection nets – an option for soft fruit

In recent years it has become common practice to drench young cherry plants in order to prevent intrusion by the European Cherry Fruit Fly. This approach is also being pursued against the SWD. We have gained preliminary experience in this respect at a blueberry plantation in Ticino. The following points should be noted:

- Mesh size: Primarily as small a mesh size as possible should be selected (0.8 mm). This would, however, entail a strong influence on the internal microclimate (by reduction of air exchange along with an increase in both temperature and humidity) favouring an increase in fungal infection among other problems. We consider 0.8 × 1.7 mm to be a reasonable compromise.

- Net type: Knitted nets (e.g. FILBIO) are a little more expensive than their woven counterparts but do have the advantage that changes in mesh size are prevented. Such changes would present undesirable openings for the SWD.

- Installation: The SWD is highly mobile. Entry points for equipment and personnel must be arranged with very careful consideration. It remains to be seen whether the use of double door sluices can be recommendable.

Mass trapping has its limits

An assessment of the trap efficiency showed no significant changes since the previous year. Apart from the attractiveness of the lure, the amount evaporated is the major contributor to the efficiency of a trap. Large trap cases (e.g. DROSOTRAP®) catch up to five times more SWD than small traps. In our experience, gained during the past year, traps alone would be inadequate to control SWD in cases of heavy infestation.

Direct control with insecticides

The extraordinary situation encountered this year led many producers (especially during the autumn vintage) to deploy insecticides in such an emergency situation. Very little was yet known about the efficacy of the various active ingredients against the SWD. Spinosad and pyrethrum proved able to diminish the populations of SWD. In the case of natural pyrethrum this was not necessarily to be expected, owing to its very short action period. The first experiences did however show that systematic deployment in the evening hours (preferably followed by a repeat application four to five days later) produces good results. Due to the risk of residue (spinosad) and undesirable side effects on beneficial organisms (both spino-sad and pyrethrum), the deployment of insecticides is generally to be assessed with reservation.

“Attract and kill” – a feasible and elegant solution

“Attract and kill” methods, whereby the amount of insecticide per unit area is greatly reduced and it is applied alongside the actual plantation, represents an elegant solution. Andermatt Biocontrol is pursuing this approach with the lure product COMBI-PROTEC®. A test application was undertaken on vines in Riehen (Basel). Starting early in August with intervals of one week, the vines were treated seven times using a concentration of one litre of COMBI-PROTEC per hectare as a lure plus 5 ml/ha of SPINTOR® (Spray mixture: 20 l/ha). The trials resulted in reductions of fruit fly larvae in grapes from the treated area. In the final analysis, the SWD infestation on the non-treated area amounted to 32 clearly identified SWDs per 500 grape berries compared to only one SWD per 500 berries in the treated areas. An early start with the first application and then repeats each week seem to be crucial. COMBI-PROTEC’s clear advantages with respect to residues and side effects in addition to its proven efficacy make it a solution option to be taken seriously. General application will probably require further assessment of strategies suited to different cultures.
Current topics in the Swiss market

VITISAN in comparison with ARMICARB against apple scab and sooty blotch

BERTRAND GENTIZON, ANDERMATT BIOCONTROL

In time for the 2014 season, VITISAN® (99.6% potassium bicarbonate) received Swiss approval as a pesticide for use in orchards. In Germany, VITISAN has been successfully incorporated in disease management for a number of years. In contrast to Switzerland, however, ARMICARB® (85% potassium bicarbonate and 15% formulation substances) had not yet been approved there. Questions on possible differences in efficacy between the two products soon arose among Swiss fruit growers and consultants. On the one hand, the economical, pure potassium bicarbonate product VITISAN and on the other the formulated product ARMICARB. This first season, with a very rainy summer, enabled first comparative data to be collected and evaluated under Swiss conditions, thus providing a preliminary indication of the two products’ respective properties.

Scab

Good results against scurf were attained at sites where VITISAN was used alone or in comparison with ARMICARB. VITISAN and ARMICARB, both used in conjunction with Stulln wettable sulphur, display comparably good properties against fruit scab. Success in the control of fruit scab by the use of bicarbonates depends to a great extent on the degree of the primary infection as well as the timing and frequency of treatment.

Sooty blotch

The following three treatment procedures were compared in two field trials, one each in the cantons of Berne and Thurgau: VITISAN, VITISAN with BIOFA COCANA® and ARMICARB as well as an untreated control. In all three cases, Stulln wettable sulphur was added to the bicarbonate compounds. There was strong sooty blotch infestation at the Berne site and moderate infestation at the Thurgau site. The assessments revealed that no significant differences were discernable in the case of high sooty blotch infestation (Berne), whereby ARMICARB did tend to have slightly better performance than VITISAN and VITISAN with BIOFA COCANA respectively. Measurements in Germany suggested that the addition of wetting and/or adhesive agents increases the effect of VITISAN against sooty blotch infestation. Where the infestation level was lower (Thurgau), all three treatment methods were equally efficient. Here a BIOFA COCANA additive hardly augments the effect at all. Under these circumstances, bicarbonate alone (VITISAN) is able to keep the disease in check just as well as ARMICARB.

Phytotoxicity

One advantage of VITISAN is its inherently low risk of causing phytotoxicity on leaves or fruits. A mixture additive, wetting sulphur, is already common in fruit growing circles. The options of a targeted combination using surfactant additives, such as soaps, or other active agents against the sooty blotch pathogen prove to be greater with VITISAN than with products which are already enhanced with wetting or adhesive agents, such as ARMICARB. In the case of a strategy stipulating frequent application of potassium bicarbonate, this should not be applied to dry leaves, if at all possible. The risk of phytotoxicity would thereby be augmented for both products.

Mating Disruption advancing further

MARTIN GÜNTER, ANDERMATT BIOCONTROL

The use of Mating Disruption (MD) to control the grape berry moth became well established as a standard procedure in suitable wine producing areas during the last 15 years. There are now only a few areas in the cantons of Valais and Vaud where MD is not yet widespread. Various regions in the canton of Geneva were added within the last two years (Soral, Jussy, Meinerd, Dardagny and Malval). The two large contiguous wine growing areas in the canton of Grisons and along extensive stretches of the Lake of Biel shoreline – both highly suited to the use of MD – were the main areas of expansion in the German speaking part of the country. It is planned to re-introduce this method into a further expansive area – Klettgauregion canton Schaffhausen – during 2015. We estimate the portion of the Swiss wine producing area then covered by MD to reach about 65% or 9700 ha (24 000 ac). This confirms MD as by far the most successful biological method currently deployed in Switzerland.

Picture 1: Confusion techniques have been in use along the Lake of Biel shoreline since 2014.
Biological Botrytis Control

MARTIN GÜNTER, ANDERMATT BIOCONTROL

Andermatt Biocontrol has been concentrating on biological means of controlling botrytis in viticulture for a number of years and investing relatively great outlay in this project. Various antagonists have been tested in a number of both internal tests as well as externally commissioned ones. The battle against the vine botrytis is complex in nature because the cause of the final damage may have occurred at any stage between blossoming and full maturity of the fruit, therefore taking on any of a whole range of appearances depending on the weather conditions in the specific year. For this reason, the generation of consistent data has hitherto been a challenge. In addition there has rarely been sufficient botrytis infestation in recent years to facilitate an evaluation. Promising results were partly followed by results which were difficult to interpret. The amount of data gathered, not only from Switzerland but also from regions just across the border, did however prove to be sufficient to enable a permit with partial effect to be issued last winter for the product BOTECTOR® on the basis of the yeast strain Aureobasidium pullulans. The typical Swiss practice of refraining from crop protection in viticulture after August 15th prevented any additional benefit from such a residue-free antagonist during the ripening phase. For this reason, Andermatt Biocontrol has not yet included this product in its assortment. We are still endeavouring to demonstrate such benefits during the ripening phase by further experiments, be it for biological or conventional strategies, for example during persistently humid conditions. This evidence will be a prerequisite to enable restrictions inherent in the current permit process to be eased.

Benefits of TOPSNAP indoor mousetrap from the users’ perspective

ESTHER MANSER, ANDERMATT BIOCONTROL

The TOPSNAP indoor mousetrap entered the Swiss market in autumn 2012. A summary of customer feedback over the past two years provides insight into the trap’s benefits which are perceived to be of particular importance by customers.

Not surprisingly, the number of mice caught and the operation time-frame for successful capture are the primary considerations, followed closely by the safety aspects. The TOPSNAP proved to be convincing by virtue of its safety for children and pets as well as its application without poisonous bait. Among other things, the option of safe use in small animal enclosures, e.g. in chicken coops, was high on the list. Further aspects perceived to be worthy of mention included the display system showing a successful capture, the simple operation of the trap, the very good catch quota without the use of bait, the lack of visual or physical contact with the dead mouse as well as the reduced inhibition threshold for use of the trap within living quarters. The latter was also encouraged by the subtle design of the housing. A pleasing extended application on the initiative of various customers was its use against field mice. These results are promising both regarding the elimination of pests and additional appreciation that crows or birds of prey are not able to abduct the trap.

The high quality materials and Swiss manufacture were reported as additional criteria for certain clients’ selection of this trap. Likewise, the company Andermatt Biocontrol is perceived to be a reliable provider of proven solutions, therefore laying a basis for trust in the product.

Picture 1: Curiosity, the need for shelter as well as bait entice mice to venture inside a TOPSNAP. Inside the case, their stepping on the trigger plate releases the mechanical striker bar.

Consulting services for ornamental plant production

MARTIN GÜNTER, ANDERMATT BIOCONTROL

As of 2015, Andermatt Biocontrol will offer an integrated production consulting service for ornamental plant cultivators. To this end, a new position was created, which has been served by Toni Ruprecht since August 2014. Toni Ruprecht is a certified Gardner specialised in ornamental plants and carries a degree in horticulture from ZHAW (Zurich University of Applied Sciences) in Wädenswil. This furnishes him with the necessary skill-set for such consultation services. For any additional know-how and experience as it may be needed, he is equipped to access the network of specialists in Northern Baden, Germany, which has been offering a consulting service for a number of years. This enables us to provide a broad-based in-depth integrated consulting service right from the start. Interested persons are kindly invited to contact us.
Harmful bugs in greenhouse crops

SAMUEL STÜSSI, ANDERMATT BIOCONTROL

Bug damage has been increasing significantly in recent years. The most vulnerable greenhouse crops are eggplants, cucumbers, peppers and strawberries. New pheromone traps facilitate early detection. The sexual attractants lure males of *Lygus rugulipennis* and *Lygocoris pabulinus*. We are currently testing their efficacy and possible response strategies to early catches. The range of available curative plant protection measures is however limited. Possible biological agents for controlling the bugs include NEEMAZAL®-T/S, SPINTOR® and PYRETHRUM FS. These products are difficult to include as components of a multiple dosage strategy, because repeated application involves limited tolerance for beneficial organisms. Synthetic ingredients offer no advantage as long intermediate periods are required following the application of neonicotinoids or pyrethroids before useful organisms can be redeployed.

Feeding predatory mite populations with pollen

SAMUEL STÜSSI, ANDERMATT BIOCONTROL

Predatory mites are an important component of integrated biological pest control in the covered cultivation of berries, vegetables and ornamental plants. Some species are known to breed better if they have access to an additional supply of pollen. In the case of hot peppers, the constant supply of pollen in the blossoms is sufficient to enable one or two releases of *Amblyseius swirskii* to establish a stable population. In cultures with no or only a limited pollen supply (e.g. cucumbers) the release of predatory mites needs to be repeated at regular intervals. Preliminary tests with augmented pollen feeding were undertaken in conjunction with Agroscope Conthey five years ago. At the time, the results were inconclusive and the cost of the additional pollen was considered to be prohibitive. Our partner Biobest introduced the “Nutrimate” system this spring. A specifically designed nebuliser is used to spread typha-pollen over a culture in a fortnightly cycle. This is an ideal pollen type because it promotes Amblyseius species whilst simultaneously proving unattractive for pests (thrips). Preliminary experience gained with strawberry, cucumber and rose cultures turned out to be promising. We registered a significant increase in the population of predatory mites due to the feeding with pollen compared with the standard method.

European Corn Borer – large-scale application of Trichogramma

MARTIN GÜNTER, ANDERMATT BIOCONTROL

The European Corn Borer (ECB) has spread further than ever before owing to the mild climatic conditions of recent years along with an increase in ploughless farming, and now is causing increasingly serious damage. The strong growth in populations affecting western Switzerland, partly influenced by farmers questioning the efficacy of biological control by trichogramma wasps, led to the first exceptional permits for insecticide deployment being issued.

Countless official and in-house tests demonstrated and confirmed an efficacy of around 70% in the use of this beneficial insect. On the other hand, infestation by ECB was often underestimated and the initiation of countermeasures were therefore delayed. In the case of a large initial population, more than one larva per stalk can be observed. An efficacy of 70% on the larva infestation in such a case has a smaller effect on the stalk infestation so that the efficiency observed solely on the percentage on the stalks can turn out to be much lower. The effect with chemical agents is no better.

Control of the ECB with parasitic wasps should be addressed in as wide an area as possible to ensure a sustainable reduction of the pest population. With the aim of testing this strategy, a group was formed in 2012 uniting specialists from the Vaud Plant Protection Service, Agroscope Changins, the Federal Office for Agriculture (BLW) along with the companies Omya and Andermatt Biocontrol to conduct a joint large-scale experiment lasting for at least three to four years. During the past three years, all maize plantations in the vicinity of Mathod (canton Vaud) were treated using parasitic wasps (25–30 hectares or 60–75 acres of maize). These areas were scored for infestation each autumn and compared with untreated fields in the neighbouring community Valleys-sous-Rances. A preliminary assessment is encouraging and seems to confirm that a large-scale coordinated deployment of trichogramma is able to reduce the population of ECB within two to four years and keep it in check. The trial is to be continued in order to monitor further developments in the population.

At this juncture we would like to express our gratitude to all participants for the highly constructive cooperation among companies, consultants, authorities and researchers.
Andermatt Biocontrol – Plant Protection for Professionals

Allocation of the individual countries:
Andermatt Biocontrol expands its portfolio with Plant Health Products (PHP), microbial biocontrol and probiotic products

The South African company, Plant Health Products (Pty) Ltd (PHP), researches and manufactures microbes (fungi, bacteria or viruses) for crop production. All products are based on sound science, aiming to produce effective and easy-to-use solutions, suitable for conventional and organic farming. Andermatt Biocontrol is happy to be the new and exclusive world-wide distributor (excluding the Sub-Saharan region) of PHP products.

RETO FLÜCKIGER, ANDERMATT BIOCONTROL

The History of Plant Health Products
The concept of Plant Health Products (Pty) Ltd (PHP) was initiated in 1998 by Professor Mark Laing and Dr. Mike Morris. Mark Laing had developed, in 10 years of research at the University of KwaZulu-Natal, a ready-to-be commercialized Trichoderma harzianum fungus for the control of crop diseases. Mike Morris had worked for 25 years leading a governmental biocontrol research programme. Thus the formation of PHP was a union of the knowledge and expertise of these two experienced scientists.

ECO-T and ECO-77, based on two different Trichoderma harzianum strains, were the first two products registered by PHP for plant disease control. After the development of two insect control products, PHP succeeded, in recent years, in the development and production of efficient nitrogen-fixing rhizobium products for the use in legume crops like soya. In the South African market all products are successfully marketed by Andermatt Biocontrol’s strong partner Madumbi Sustainable Agriculture. PHP, in collaboration with the University of KwaZulu-Natal and other research partners, has a strong research programme and pipeline of potential new products.

Trichoderma and Rhizobium Products
So far ECO-T and ECO-RHIZ SOYA are the most successfully marketed products. ECO-T contains a potent Trichoderma strain, which grows on roots, enhancing plant growth and inhibiting harmful soilborne diseases (Picture 1). In recent years very promising results have been recorded on numerous crops including maize, wheat, soybeans, potatoes, vegetables, turf and nursery crops. The application method depends on the crop type. Generally, seed treatment is recommended for field crops, while drenching is the best method to use in nurseries. ECO-RHIZ SOYA utilises a very strong nitrogen-fixing Bradyrhizobium japonicum strain. ECO-RHIZ SOYA replaces N fertilizer applications as well as significantly increasing yields and improving crop uniformity. The combination of both products as a seed dressing has become, a very favourable strategy to increase soya yield in South Africa (Chart 1).

Chart 1: Effect of microbial treatments on Soybean yield.

ANDERMATT BIOCONTROL ACQUIRED 20% OF PLANT HEALTH PRODUCTS LTD (PHP)

Based in KwaZulu-Natal, South Africa, PHP is a specialist in the development and production of microbial biocontrol agents and probiotics. With the acquisition of the shares, Andermatt Biocontrol took over the exclusive worldwide distribution of PHP products with exception of the Sub-Saharan market. This opportunity allows Andermatt Biocontrol together with the already established RHIZOVITAL® 42 to create and market a new segment of high quality biostimulants and bioinoculants.

PHPs most promising products:
- ECO-T: Trichoderma harzianum strain kd; plant growth stimulation and root disease control
- ECO-77: Trichoderma harzianum strain B77; Botrytis control, pruning wound protection and protection against Eutypa on grapevines
- ECO-RHIZ SOYA: N₂-fixing rhizobium; bioinoculant for Soya production
- ECO-RHIZ LUCERNE: N₂-fixing rhizobium; bioinoculant for Lucerne production
- ECO-BB: Beauveria bassiana; whitefly and red spider mite control

Picture 1: Chrysanthemum cuttings 24 hours after cutting and planting out. ECO-T treated plant tissues show obvious increased plant vigour.
Andermatt Biocontrol intends to develop three new biocontrol products within an EU project BIOCOMES

The objective of BIOCOMES is to develop new biological control agents (BCAs) for key markets in European agriculture and forestry.

DANIEL ZINGG / FRANZ BOLLHALDER, ANDERMATT BIOCONTROL

Andermatt Biocontrol intends to develop three BCAs within this four year project: A baculovirus product for the control of the two pest species tomato, pinworm (*Tuta absoluta*) and potato tuber moth (*Phthorimaea operculella*); an in-vitro produced baculovirus product for the control of gypsy moth (*Lymantria dispar*); and a beneficial insect for the control of cabbage moth (*Mamestra brassicae*). Early progress is promising.

**Background**

BIOCOMES combines the expertise of 10 industrial SME partners, three larger industrial partners and 14 research partners. The consortium has the goal to develop 11 new BCAs by 2017, three of them developed by Andermatt Biocontrol in collaboration with various research partners. This is a challenging task as formulation development and registration preparation are to be included.

**Tuta absoluta baculovirus development**

Effective baculoviruses against tomato pinworm are not yet known, but a certain virulence of *Phthorimaea operculella* granulovirus (PhopGV) has already been reported in the literature. It is the task of Andermatt Biocontrol in partnership with Julius Kühn-Institut (Germany), Public University of Navarre (Spain), CBC (Italy) and Hellafarm (Greece) to develop a baculovirus with proven efficacy against *Tuta absoluta*. To this end, viruses from soil samples of tomato and potato fields are isolated and then selected for virulence. Preliminary successful isolation of virus strains has already been achieved. But further selection for virulence will be needed to develop an economically interesting product.

**In-vitro production of Lymantria dispar nucleopolyhedrovirus (LdMNPV)**

Although pharmaceutical use of genetically modified baculoviruses from cell culture (in-vitro) production is well established, all commercially available baculovirus products for pest control are still produced on living host insects (in-vivo production). The main challenges of in-vitro production are high costs as well as the difficulty of consistent virulence of the baculovirus produced. However, a test system with a *Lymantria dispar* cell line by the project partner Zurich University of Applied Sciences (Switzerland), showed promising preliminary results related to cell density. The next step will be a test production of baculoviruses and corresponding virulence lab testing. In parallel LdMNPV virus isolates produced in-vivo are being tested in the field by Instytut Badawczy Lesnictwa (Poland) to determine the isolate with highest virulence and the required dose rate.

**Telenomus sp. for the control of Mamestra brassicae**

The Research Institute of Organic Agriculture (FiBL, Switzerland) found a parasitic wasp *Telenomus sp.* which showed a good parasitism of *Mamestra brassicae* in preliminary field trials. Andermatt Biocontrol is to develop mass rearing of the parasitic wasp, whereas FiBL will evaluate the application timing, intervals and appropriate quantities of *Telenomus sp.* to be released. The rearing of various potential hosts for mass rearing has already been successfully established.

**Acknowledgement**

We would like to thank all our partners for the good collaboration during the first project year.

![Picture 1: Larva of the gypsy moth lymantria dispar.](Image)
Helicoverpa armigera NPV – product in demand against invasive pest

Brazilian soybean growers are upset: The recently introduced pest Helicoverpa armigera caused severe losses in several soybean production areas. Andermatt Biocontrol’s Helicoverpa armigera Nucleopolyhedrovirus (HaNPV) became a product in demand for the sustainable control of this devastating pest.

GISELA BRAND, ANDERMATT BIOCONTROL

Alien caterpillar on its way to the Americas

In 2013, the cotton bollworm Helicoverpa armigera was officially reported in Brazil for the first time. The pest has been of great importance in many crops throughout Asia, Europe, Africa and Australia, but, until now, has been regarded as a quarantine pest in the New World. Native Helicoverpa species such as Helicoverpa zea and Helicoverpa virescens show a great similarity to Helicoverpa armigera but have never been associated with such extensive agricultural damage.

HaNPV as a selective product for integrated strategies

Helicoverpa has caused economic losses of several billion dollars in Brazil. Large-scale, often homogeneous structures of agricultural landscapes enhance the risk of further spread. Not surprisingly, neighboring countries have also reported first incidences of Helicoverpa armigera. High mobility and fecundity, extremely polyphagous behavior and the year-round presence in tropical climates contribute to the enormous damaging potential of this pest. In Brazil, the efficacy of several conventional insecticides has proved to be insufficient against Helicoverpa armigera. The development of resistance has already been constraining the control of the cotton bollworm in the Old World. Its uncontrollable spread in the Americas can only be hindered by consistent and integrated management of this pest. Brazilian authorities approved temporal emergency registration of Andermatt Biocontrol’s Helicoverpa product. Since then, Andermatt Biocontrol is in close contact with several distribution companies in order to achieve maximum market coverage.

Restructuring and Upscaling in Grossdietwil

Due to the huge demand from Brazil, Andermatt Biocontrol decided to upscale HaNPV production. In the course of few months around 60 additional people were employed, infrastructure was expanded and production was scaled-up one hundred-fold. Now, HaNPV is the product with the highest production volume in the company. In order to secure long term sales of the product, negotiations with potential partners outside Brazil are under way and Andermatt Biocontrol is facing the future with confidence.

HELICOVEX = BOLLDEX = VERPAVEX = DIPLOMATA

The larvicide is based on a naturally occurring Helicoverpa armigera nucleopolyhedrovirus (HaNPV). Its alternative mode of action, the effect of sustainable population reduction and the preservation of natural antagonists make HaNPV an efficient and selective control and resistance management tool against Helicoverpa spp. Due to the high demand and specific market requirements, different trademarks have been registered for the same product: HELICOVEX® (div. countries), BOLLDEX® (South Africa), VERPAVEX® (Brazil), and DIPLOMATA® (Brazil, trademark owner Koppert do Brazil).
Bring Low Risk Products faster on the EU Market

Microbial plant protection products often have a limited market potential. Although they are often low risk products, the registration processes are still too long and too expensive. A green track procedure is proposed.

PHILIP KESSLER, ANDERMATT BIOCONTROL

Public interest and need by the farmer
There is a common consensus to make plant protection safer within the European Union, by excluding old highly toxic products from the market and substitute them with less or non-toxic products. In addition, the consumers demand for a low or non-residue food. Low risk products, particularly microbial plant protection products, offer good and safe alternatives and give the possibility that plant protection measures can comply with the requirements of the Sustainable Use Directive. Therefore, farmers should get quick access to such products.

Needs by the Industry
Microbial plant protection products often have a smaller host range which makes them safer in terms of toxicology and ecotoxicology. On the other hand, a small host range may limit the market potential. The investment to compile a complete data package is high and the registration process is long and often unpredictable. These facts, combined with the reduced return of investment due to a restricted market potential, will make it impossible for companies to re-invest in new products, and might even endanger the survival of SMEs. A faster market access for these products could mitigate this situation to some extent.

Low risk category under 1107/2009
The new EU Regulation 1107/2009 includes a particular procedure for the evaluation of plant protection products containing active substances of low risk. Unfortunately, low risk criteria have not been defined for microbial active substances and are still under discussion. 1107/2009 includes a longer authorisation of the active substance (up to 15 years) as well as a faster evaluation for low risk products (within 120 days). However, these incentives will only be granted after the full assessment of the active substance. Especially this period of the registration procedure was heavily delayed in the past. Furthermore, authorities often are unable to complete the evaluation within the forecasted 120 days.

Proposal for a green track
Plant protection products that fulfil the criteria for low risk according to 1107/2009 should be granted an immediate conditional product authorisation based on the conclusion of an initial evaluation of the active substance (“green track”, see Chart 1). A conditional product authorisation allows that these products can be made available to the growers to a limited extent, until the full risk assessment has been completed. Such a procedure, which has been actually implemented to a certain extent previously under the old EU Directive, shall be proposed by IBMA (International Biocontrol Manufacturers’ Association) to the EU Commission for its review programme of 1107/2009 in 2015. The implementation of an early conditional product authorisation for low risk products should also be discussed for other markets than the EU.

Chart 1: Proposed Green Track: Plant protection products that fulfil the criteria for low risk should be granted an immediate conditional product authorisation based on the conclusion of an initial evaluation of the active substance by the Rapporteur Member State (RMS) at completeness check (CC). A full evaluation process will be continued including the risk assessment and management of the active substance (by the RMS, European Food Safety Agency EFSA and the EU Commission COM) and the zonal assessment of the product (by the zonal RMS and the MS), whereas the product can be on the market for a limited use.
Andermatt France: naturally innovative

The demand for biocontrol products is on the increase in France, the largest market for crop protection products in Europe. It is in this favourable context that Andermatt France was established in January 2014. Alain Querrioux, co-shareholder with Andermatt Biocontrol, assures proficient general management of the company. He enjoys the support of a staff of five engaged in its further development. Andermatt France currently markets 25 products.

ALAIN QUERRIOUX, ANDERMATT FRANCE

With its annual sales volume of 2 billion euro, the French agricultural market for crop protection is the largest in Europe. The introduction of the “Ecophyto” plan by the French authorities in 2008 provoked a hitherto unprecedented turnaround in the regulations, attitudes and practices in agriculture. The interest and demand for biocontrol products is intensifying by the day, driven in particular by the requirement of cooperatives and wholesalers to offer farmers alternatives to conventional chemical products. Andermatt Biocontrol selected this favourable point in time to sustain and expand its presence in the French market. The company Andermatt France was established on January 13th 2014, fruit of an alliance between Andermatt Biocontrol and Alain Querrioux, who became the CEO.

Andermatt France is realising its ambition to become the SME reference in the field of biocontrol, with a wide range of solutions and an established presence in key markets. The company is one of the few “pure players” and already has no less than 25 products on offer. The German companies Abitep, Biofa, Trifolio already place their trust in Andermatt France along with Andermatt Biocontrol and Andermatt Biogarten. Andermatt France already offers viruses, the RHIZOVITAL® 42, PHERONORM®, REBELL® and Riga traps as well as the TOPCAT, TOPSNAP and STANDBY mouse trap ranges. CURATIO fungicide, insecticide NEEMAZAL®-T/S and biostimulating ALGOVITAL® complete the range. Other projects are under development and may soon see the light of day! Andermatt France has made a clear commitment to implement a long-term strategy based on the following three pillars: obtaining approvals, technical approach and distribution to cooperatives and wholesalers. During the first few months of operation, Andermatt France has already filed and received official approval for two major products: CURATIO and NEEMAZAL-T/S. This success has undoubtedly helped position the company in the French market. After only eight months of operation, the company is in contact with the main technical agencies and is referenced by the main distributors. These steps are just the beginning. It is well known that business development in France is long, complex and requires perseverance. Under these circumstances, success depends on men and women. Thus, Andermatt France is investing in skilled personnel, well equipped to meet the challenge. Five people currently bear responsibility for the project, infusing dynamism in their various technical, marketing, commercial and administrative missions. Others will be joining us to support further development.

It is both a challenge and a privilege to set up a new business – a time of great excitement. Product quality backed by the support of our colleagues in Switzerland are a source of encouragement to us. They will remain, I am sure, crucial in determining the continued success of the Andermatt Group in France.
Soybean, with its 30 million ha, is the most important crop (in Brazil) and accounts for about 50% of the Aginput businesses. Due to a severe outbreak of *Helicoverpa armigera*, mainly attacking soybeans, the Brazilian ministry of agriculture opened the possibility of emergency registration of products to combat this pest. Andermatt Biocontrol distributors Koppert and FMC have obtained emergency registration for Andermatt Biocontrol’s *Helicoverpa* virus. Furthermore, Andermatt Biocontrol decided to establish its own subsidiary Andermatt do Brasil for on-site support.

MARKUS R. RITTER, ANDERMATT DO BRASIL

The tropical and subtropical conditions and the prevailing extensive farming practice require considerable attention to disease, pest and weed control. The Brazilian crop protection market has become the biggest market worldwide with a value of 11.5 billion US dollars. The intensive spraying of chemical pesticides is constantly causing imbalances between pests and beneficial insects and microorganisms. A recent example is the epidemic of *Helicoverpa armigera*, a lepidopteran pest, which went out of control in soybeans and cotton. The situation has become so dramatic that the Agricultural Ministry, in an emergency decree, allowed Baculovirus, *Bacillus thuringensis* and some chemical insecticides to be registered through an emergency registration process instead of the usual registration process which could take upwards of five years.

The outbreak of *Helicoverpa armigera*, coupled with the emergency registration opportunity allowing faster commercialization, motivated Andermatt Biocontrol to enter the enormous but also complex and highly regulated Brazilian market. For some time, Andermatt Biocontrol attempted to identify suitable distribution partners, however the new scenario demanded fast action. The decision was taken to distribute the baculovirus for *Helicoverpa armigera* control through two established companies, namely Koppert and FMC. Nevertheless, to ensure a long term sustainable business engagement for Andermatt Biocontrol, the company decided to establish Andermatt do Brasil, its own subsidiary, which, after obtaining the registration permits, will also distribute baculovirus products through additional channels as well as introducing other products.

In addition to baculovirus products, there is also a considerable opportunity for a bacteria based product line. Soybean and bean farmers are widely familiar with and highly appreciate the benefits of bacterial inoculants and recently also started to treat corn and small grain cereals with nitrogen fixing and root growth stimulating bacterial inoculants. However, bacterial products are not yet available for seed and root treatment for the intensive crops.

Andermatt is bringing products of very high manufacturing standard and formulations of superior quality to a highly competitive market. We will take all efforts to attain wide Andermatt brand recognition, associated with innovation and quality.

**Picture 1:** In Brazil, soy is cultivated on about 30 million hectares of agricultural land.
Sylvar Technologies Inc. continues to grow its product portfolio in 2015

Sylvar anticipates the release of a new biological control product (LOOPEX) for the cabbage looper, *Trichoplusia ni* and multiple new pheromone base products.

**LOOPEX™**
Sylvar’s new biological control product (LOOPEX) for use against the cabbage looper, *Trichoplusia ni* is expected to enter the Canadian market in time for the 2015 greenhouse production season. It is based upon the active ingredient *Autographa california* nucleopolyhedrovirus, AcMNPV. The cabbage looper is a highly migratory and destructive pest of a variety of crops (including most cruciferous vegetables) throughout North America. It is also widely distributed in the tropics and subtropics. In Canada, it is a major pest of greenhouse vegetables. This pest can cause losses in crop yields due to plant defoliation and by feeding directly on the crop’s fruit. LOOPEX will offer a highly effective biological control tool for cabbage looper larvae while being compatible with any pest control program, including those focused on resistance management.

**APHINITY™**
Sylvar’s pheromone based monitoring technologies product lines (the APHINITY Series) continue to grow with eight products available and six more expected in 2015. This past year has seen the successful expansion of APHINITY<sub>CAB</sub> and APHINITY<sub>BSLB</sub> into monitoring programs throughout North America.

Sylvar’s parent company, Andermatt Biocontrol, and its partners are anticipating bringing LOOPEX and the APHINITY Series to markets worldwide.

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**Sylvar Technologies Inc.** – Sylvar provides effective biorational pest management products for Canada (forestry and agriculture) and the USA (forestry)

*Stefan Richard*  
Managing Director  
*John Morrison*  
Marketing and Sales Manager

**Your contact persons:**

*Sylvar Technologies Inc.*

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**SYLVAR TECHNOLOGIES**

Sylvar Technologies Inc. is Andermatt Biocontrol’s Canadian subsidiary. Sylvar offers several product lines including:

**Baculovirus based biological control products for:**
- *Lymantria dispar*
- *Neodiprion abietis*
- *Orgyia leucostigma*
- *Orgyia pseudotsugata*
- *Trichoplusia ni*

**Pheromone based monitoring technologies for:**
- *Acantholyda erythrocephala*
- *Agrilus planipennis*
- *Heterocampa guttivitta*
- *Itame argillacearia*
- *Tetropium fuscum*
- *Acleris variana*
- *Macaria argillacearia*
- *Lambdina fiscellaria*

**Picture 1:** Cabbage looper *Trichoplusia ni*
Madumbi Sustainable Agriculture – The Driving Force in Sustainable Agriculture in South Africa

Breaking News

September 2014 – Madumbi Sustainable Agriculture (MSA) welcomes Andermatt Biocontrol as the majority shareholder of MSA. South Africa is considered, in the agriculture sector, as the stepping stone to the rest of Africa. The majority share is a strategic acquisition for Andermatt Biocontrol in developing their global plan.

ANDRE FOX, MADUMBI SUSTAINABLE AGRICULTURE

Madumbi Sustainable Agriculture was founded in August 2005, and has successfully focused on selling Bio Pesticides into a heavily dominated Agro-chemical market. Andermatt Biocontrol took a minority share in August 2010 and, together with Madumbi, have built a solid platform recognised locally for its product integrity and knowledge. Madumbi Sustainable Agriculture’s product portfolio consists of viruses, bacteria, fungi, plant extracts and niche nutrition. All products sold are supported by the necessary country registrations, solid science and backed by a highly competent technical team. See Team Below.

MADUMBI SUSTAINABLE AGRICULTURE’S GROWTH STRATEGY:

- Develop effective business partnerships with key local and international suppliers who consistently deliver excellence in terms of new products, technology and registrations.
- Grow sales in bio-rational products to informed, well trained and technically sound distribution networks.
- Continually evaluate business structures and business opportunities in order to bring products to the market more effectively.

Madumbi Sustainable Agriculture’s team

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<tr>
<th>Name</th>
<th>Role</th>
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<tbody>
<tr>
<td>Andre Fox</td>
<td>CEO and Founder</td>
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<tr>
<td>Brendon Neumann</td>
<td>Key Account Manager, South</td>
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<tr>
<td>Clint Lawson</td>
<td>National Marketing Manager</td>
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<tr>
<td>Karen Moig</td>
<td>Office Administrator</td>
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<tr>
<td>Megan Tarr</td>
<td>Marketing, Customer Service and Sales Support</td>
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<tr>
<td>Michelle Lesur</td>
<td>Financial Manager</td>
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<td>Rob Hellig</td>
<td>Key Account Manager, East and Rest of Africa</td>
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<tr>
<td>Robyn Rowe</td>
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<tr>
<td>Rosan Jansen van Vuuren</td>
<td>Technical Advisor, National</td>
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<td>Sias Leipoldt</td>
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