January - February 2023

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The Leading Floriculture Magazine

Floriculture is published six times a year and circulated to personnel in the Horticulture Industry, foreign missions and Kenyan Embassies abroad, Flower Growers, Exporters and Consumers, extension officers in the Ministry of Agriculture and counties, research offices and suppliers of agricultural inputs in Kenya.

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Editorial

A learning 2023

It's become tradition to make resolutions with the New Year. These typically involve meeting a goal such as losing weight or saving a certain amount of money or changing a behaviour, like cutting back on air time.

Farmers could have an endless list or resolutions spanning the farm, family, and personal growth. Floriculture Magazine has a great list of resolutions for farmers from 2023. I'd like to add a few to that list.

2023 is time to learn about one part of agriculture you aren't directly involved in. You may be wondering why this shows up on the list. As growers, I think it's easy to stay in our lanes and only talk with farmers that grow or raise the same thing we do. Stepping into another lane of agriculture has many benefits.

I can talk about flowers and in specific roses all day long, but until I met several commercial potatoes and toured Avocado farms, I knew nothing about that industry other than what I read in the paper. Connecting with them opened my eyes to the challenges we share and those unique to each part of our industry.

Going back to #1 on my list, I now feel more comfortable having a conversation about horticulture with

readers because I've made connections and seen that part of our industry.
What's one part of the agriculture industry you aren't that familiar with? Find a farmer who grows, raises, or catches it and get to know them. To my readers, expect a new horticulture Magazine in 2023.
Have a learning 2023.

Masila Kanyingi
Editor

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Floriculture Team

Fresh, Fast & Forward

Sustainability & Market

Astronomical air freight rates and space constraints in air cargo post-pandemic continued to challenge the flower and perishables sector this year in Africa. Can infrastructure upgrades, collaboration, more air connections, cold storage facilities, government support, and new markets spell good tidings for the flower and fresh industry of Africa?

Kenya, Tanzania, South Africa, Ethiopia, and Ghana are some of the African nations that lead in both flowers, fruits and vegetables (perishables) supply to the world. The rapid development witnessed in these two sectors has driven domestic economic growth, grown investment and provided a plentitude of job opportunities to locals.

Even as the Coronavirus pandemic brought several challenges to the burgeoning flower and perishables industry, both these segments have been charting a revival in the backdrop of shifting economic developments in Europe, rising inflation, capacity constraints in air cargo, prohibitive air freight rates and travel restrictions in China.

Kenya and Ethiopia lead among other African nations like Zimbabwe, Rwanda, and Uganda in flower production and flower exports in Africa with Kenya contributing a lion's share of 62% and Ethiopia at 24% in flower exports. Roses in the cut flowers category are grown in several African countries with Ethiopia, and East African nations like Kenya and Tanzania which lead in cut roses production and export. Flowers transported as belly cargo in passenger flights reportedly make up 40 % of the total freight transported by air. Kenya is the beating heart of the flower trade, as it supplies one-third of all the roses that are sold in the EU.

"Space availability and freight costs are big pain points for us. In terms of space availability, it is still not back to pre-pandemic levels in air cargo. Though the fuel prices are coming down, we do not see any relenting in air freight costs". Shailesh Kumar.

A recent study titled 'Cut Flowers - Global Market Trajectory & Analytics' by leading market research company Global Industry Analysts Inc. (GIA) cites, "Amid the Covid-19 crisis, the global market for 'Cut Flowers' estimated at $33.2 billion in the year 2022, is projected to reach a revised size of $40.7 billion by 2026, growing at a CAGR of 4.8% over the analysis period. Rose, one of the segments analysed in the report, is

projected to grow at a 5.4% CAGR, while growth in the Chrysanthemum and Gerbera segment is readjusted to a revised 4.8% CAGR."

Weakening Europe, the flower industry on 'wait & watch' mode

Despite such a fortuitous outlook for the upcoming years and a 'peak season' up ahead, growers and flower exporters are in a 'wait and watch' mode when it comes to demand and availability of cargo legroom for the produce.

Data gleaned from the Kenya National Bureau of Statistics indicates that the country exported approximately 210,000 tonnes of flowers worth $ 952 million in 2021. In fact, Kenya's earnings from exports of cut flowers, fruits, and vegetables or horticulture reportedly rose 5% from 2021 from the previous year as per data from its statistics department. Ethiopian flower exports also accounted for 84 % of the total foreign currency the country generated from the horticulture sector over the last 10 months. It reportedly earned $421 million from flower exports in this period as per local news outlets.

While the EU and UK accounted for 70 % of all flower exports, demand also surged from new markets like Australia, Japan, Malaysia, and closer home from Ghana and Nigeria.

Flower exports to Russia however went on pause once the country was excluded from the Society for Worldwide Interbank Financial Telecommunication (SWIFT) payment platform, making payments a risky affair for Kenyan exporters and businesses.

Shailesh Kumar Rai, MD of Heritage Flowers Limited, a leading Kenyan producer of high-quality roses "Space availability and freight costs are big pain points for us. In terms of space availability, it is still not back to pre-pandemic levels in air cargo. Though the fuel prices are coming down, we do not see any relenting in air freight costs. So far this year there have not been any big orders from our buyers for the season as everyone is on a wait and watch mode. Europe is going through a challenging economic crisis and rising inflation, so the first priority is to buy essential commodities and not flowers which are a luxury. So buyers are waiting to see how the situation will pan out.

The peak season for the flower industry starts from 15th December until Christmas and then there is a low season until it picks up again from 15th January until May, with a big spike around Valentine's Day in February.

Rai adds, "Compared with 2021, 2020, generally the buyers book 30 to 40% of your orders by November. During Valentine's Day season in February, we get three times higher production as we plan our production for that window so that from February 1-10 we get three times higher production for the red varieties. This year, enquiries are coming but no a slower pace.

A significant development this year is that the Government of the Netherlands and Kenya Flower Council (KFC) signed a Framework of Cooperation on the adoption of sea freight for perishables in Kenya and strengthened the efforts in that direction for perishables in Kenya.

Another promising development is the partnership between The Institute of Export & International Trade and TradeMark East Africa (TMEA) to implement a 'digital trade corridor' between the UK and Kenya to help simplify trade. This has created the 'UK-Kenya Trade Logistics Information Pipeline' (TLIP) initiative which aims to eliminate documentation and introduce better visibility in the supply chains between the UK and Kenya and uses blockchain technology to link all those in a supply chain together.

As per the information given to the publication by Swissport, a leading aviation services company providing cargo handling services, higher freight prices have affected volumes of cargo and available capacity, especially from Ghana and Kenya to Europe due to high inflation and energy prices in Europe.

Perishables are not high-yielding cargo and therefore traditional perishable airfreight markets like Nairobi have faced stiff competition from other more profitable routes in its customers' networks, which has led to either cancellation or reduction in frequencies.

Flowers and perishables are also exported to Europe

> "Kenya's earnings from exports of cut flowers, fruits, and vegetables or horticulture reportedly rose 5% from 2021 from the previous year as per data from its statistics department. Ethiopian flower exports also accounted for 84 % of the total foreign currency the country generated from the horticulture sector over the last 10 months."

from South Africa and Tanzania but as flowers are a seasonal commodity mostly being shipped between the months of Oct–April months, no instability has been witnessed here owing to the situation in Europe. According to Swissport, higher air freight rates have impacted available capacity for flower exports out of Kenya. While the most active trade lanes for perishable cargo out of Jomo Kenyatta International Airport (NBO) in Nairobi are to mainland Europe and the flower hubs of Amsterdam, Brussels, and Liege, new trade lanes have emerged in the recent past including London Stansted, Maastricht, and Ostend. Word is that the political situation in Europe has not affected capacity but has reduced the volumes of flower exports.

The main perishables for exports in Nairobi, Kenya are flowers, fruits, and vegetables. As per Swissport, a breakdown of the volumes of the perishables handled in Kenya stood at 18393.43 tonnes in 2020, 24565.62 tonnes in 2021, and 13015.74 tonnes between Jan–Sep 2022 period.

These figures show that the volumes are not yet back to pre-pandemic levels, as a result of capacity constraints and a rebound is expected in 2023, with the resumption of some frequencies by air carriers.

Speaking about the significance of perishable commodities (flowers, fruits and vegetables) as an air cargo product for the airport and the need for more direct flights linking Brussels Airport's trade routes with airports in Africa, particularly Nairobi, Samuel Quintelier, Cargo Business Development Manager, Brussels Airport Company said, "Currently perishables as a whole already represents more than 20 per cent of total volumes handled. Africa in general and Kenya in particular have a huge potential and I believe that in the next year we will see this further developed, as will airlines. Currently, there is already a strong link but to further improve we believe more direct flights are key. So now is the time to include all stakeholders for a farm-to-plate approach, as this will be necessary to unlock the full potential."

Flower Logistics takes the sea route

Covid-19 exposed the limitations of air transport after flights were grounded leading to a drastic cut in air cargo capacity. With air freight prices on a high, flower exports in Kenya have been slowly but steadily taking the sea route. Rail is also used as flowers are transported in refrigerated railway containers to the Port of Mombasa

for onward export to Europe. However cold chain and transportation modes still need to be developed, aver flower growers.

A lot of logistics issues remain as the cool chain must be perfect and maintaining timelines is another challenge.

Tapping newer markets

Despite strong demand from European markets, the flower industry and the governments are looking to tap non-European markets like the Middle East, Asia, and Africa.

Earlier this February, Kenya began exploring direct linkages to the United Arab Emirates and other five Gulf Cooperation Council (GCC) member nations in a bid to diversify its exports as just one per cent of cut flowers goes into GCC. Bilateral talks to remove tariff constraints, figure out direct flights and cold chain facilities and iron out logistics roadblocks were done.

While most growers swear by the labour which is available in plenty in Kenya and East African nations, labour costs have been steadily rising as have input costs which are other major pain points for growers and exporters.

In Nairobi, Swissport is reportedly in the process of expanding the cold-room infrastructure to handle more perishable cargo. The company is creating a temperature-controlled fast lane (within the cold-room infrastructure) to be able to enhance the cool chain capabilities of the Swissport facility. This project will also include the installation of a vacuum cooler, which will be used to further reduce the temperatures of flower shipments before they are loaded onto the aircraft.

Many of these efforts are part of Swissport's 'Flower Corridor' initiative that aims to connect the flower hub of NBO with the European hubs of Amsterdam, Brussels, and Liège. The initiative has created a highly efficient and secure supply chain for fresh-cut flowers from the farms to the end customers by ensuring maximum handling efficiency, security, and prolonged shelf life for retailers.

Dirk Goovaerts, Head of Continental Europe, Middle East, and Africa; Global Cargo Chair at Swissport International told the publication, "Africa plays a vital role in exporting perishables such as flowers, fruit and vegetables, and meat. Our local presence in Ghana, Tanzania, Kenya, and South Africa and our state-of-the-art air cargo facilities allow Swissport to provide excellent services to our clients and partners looking for an effective and efficient cool chain solution."

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Water Quality and Flower Longevity

Are you doing everything right, but your flowers still don't last as long as they should? It could be your water. By Terril A. Nell, Ph.D., AAF Research Director, American Floral Endowment

Flowers live or die based on the availability of water to stems, leaves and blooms. Indeed, water stress may be the most significant factor affecting vase life in cut flowers. Flowers die prematurely when the amount of water being absorbed is lower than the amount lost from the leaves, stems and blooms. Research has shown that several factors can lead to reduced water absorption, including bacteria, air blockages and water quality, especially water pH. Poor water quality can reduce the amount of water absorbed. Without water, individual cells cannot function. This is particularly critical for cut flowers that must get water from a bucket or vase solution.

Flowers open by using water to enlarge the petal cells, just as air inflates a balloon. New petal cells are not produced after harvest, so a continuous flow of water is needed by the flower if it is to open fully and remain viable for seven days. Sugars from flower foods in bucket/vase water supply energy to supplement the flower's naturally occurring sugars.

Some people assume that all water is the same regardless of the source, but water quality varies by geographical location or even from one well to another. Four water quality parameters may affect the life of flowers: pH, alkalinity, hardness and total dissolved solids.

pH

pH is a measure of the acidity or alkalinity of the solution and may range from 0 to 14. A pH of one is extremely acid while a pH of 14 is extremely basic (also referred to as alkaline). A pH of seven is neutral. The pH of water affects the ability of flower stems to absorb water. Water with a pH between 3.5 and 5 are best for water absorption and vase life. Flower foods and hydration solutions are designed to lower water pH to these levels.

Research has demonstrated clearly and consistently that solution pH impacts water absorption. Flowers and stems that attained the greatest increase in fresh weight (pH 3) had the best keeping quality while flowers that had little increase in fresh weight (pH 7) had the poorest keeping quality. It is no wonder that the flowers at pH 3 lasted longer since they absorbed about 70 percent more water than

stems held in water at pH 6 and lasted longer. Additionally, blockage decreased nearly fourfold over the same pH range. All these positive impacts of low pH were due to ability of water to be absorbed easier at low pH. But, there is another factor: bacterial growth.

Bacterial growth in the vase or bucket solution lowers water absorption by blocking or partially blocking the base of the stem where water is absorbed. Bacteria in the vase water has been related to scape (leafless stem) bending of Gerbera and reduced longevity in many other crops.

One solution to controlling the growth of bacteria is reducing the pH; lowering solution pH strongly may inhibit bacterial growth. In other words, by lowering the pH, the growth of microbes is reduced, which helps to keep the stems clear so more water can be absorbed. Commercial hydration and flower food solutions contain a buffer to lower water pH to the desirable range.

One other factor that solution pH affects is the presence of minerals that become crystalized in the solution. For example, in water with a pH higher than 7, iron, if present, precipitates out of the solution and will clog the cut stems. In water with high amounts of iron and failure to reduce the solution pH to less than 7 will result in nearly complete blockage of the base of the stem by iron in three days. And, of course, the flower wilts due to lack of water absorption.

The following characteristics of water are related to water absorption or ability of the water to be buffered. To have the ideal pH for cut flower water absorption, it is necessary to lower water pH between 3.5 and 5. Most water sources have a pH above 6, so hydration solutions and flower foods contain an acidifying agent to lower the pH.

The ease or difficulty of buffering water pH depends on the amount of calcium carbonate (chalk) in the water. Calcium carbonate is measured in units of concentration, such as parts per million (ppm) or mg/liter. An alkalinity level between 60 and 180 ppm is best. Water with this level of alkalinity is easily buffered with the acidifier contained in commercial hydration and flower food solutions. As the level of calcium carbonate rises, the pH is more difficult to buffer.

Hardness

Water contains naturally dissolved calcium and magnesium. Hardness is a measure of the amount of calcium and magnesium (parts per million) in the water. Total hardness is the sum of the calcium and magnesium levels. Generally, hard water contains high alkalinity levels, thus making the water difficult to buffer.
Water with high levels of hardness will require special treatments to remove the calcium and magnesium. While water softening systems will remove these minerals, they should not be used in the flower industry. Water softeners replace the calcium and magnesium with sodium, and sodium can be toxic to flowers. The most effective methods for reducing hardness are either deionization or reverse osmosis.

Total Dissolved Solids (TDS)

Another measure of water quality is the level of total inorganic salts and organic matter present in water. Flowers do poorly in water containing high levels of salts.

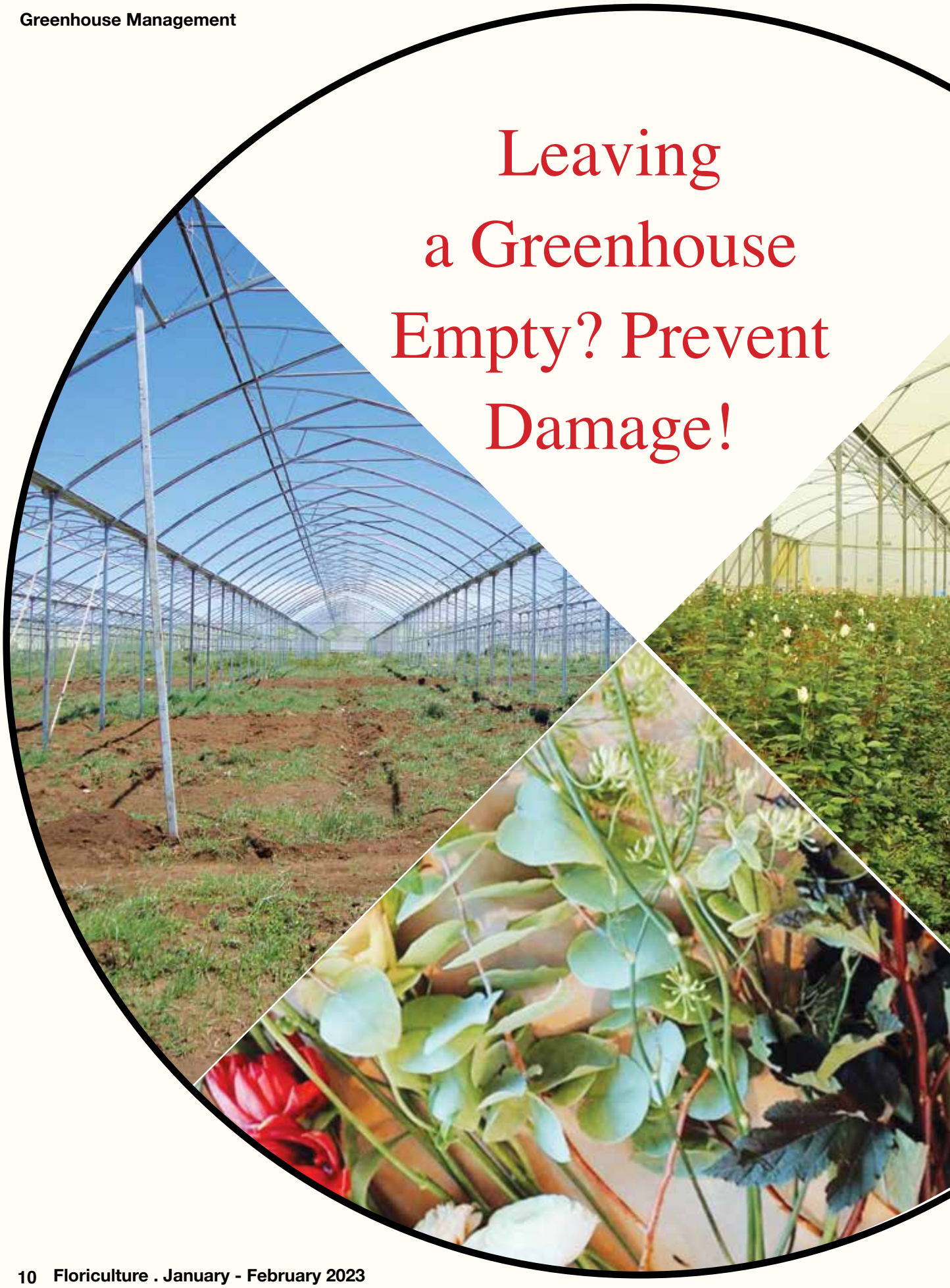
Also, be aware that a couple of salts, such as fluoride, can be harmful to flowers.

Have Your Water Tested

The only way to determine the quality of the water in your store or other facility is to have it professionally analyzed. The results of your water test will guide decisions about treating the water to achieve optimal outcomes. In most locations, use of commercial flower hydration and flower food solutions will provide positive results and excellent vase life without additional modifications. Testing does provide you with peace of mind that your water, with the correct solutions and handling practices, will provide your customers with high-quality, long-lasting flowers.

Water source

Leaving a Greenhouse Empty? Prevent Damage!



One in five growers say they're thinking of just leaving their greenhouse completely empty this winter, according to a survey conducted by the Dutch sector organisations Glastuinbouw Nederland and Plantum. Skipping a crop or starting later obviously has serious financial consequences. What many growers don't realise, however, is that 'just' switching off their systems can also have consequences. Next time the pumps, pipes and drippers are put to work, there's a risk that they could malfunction. A few tips can help to prevent an extra financial damper due to unexpected repair costs.

If a pump system lies idle for several months, this can have unfortunate consequences. In the normal circulation process, no sediment collects at the bottom of the pump or in the pipes. This is not the case if the system is shut down: the sediment becomes encrusted and when the pump is finally switched on, these hard chunks can cause blockage. The risk of accumulated sediment is slightly lower in pumps used for irrigation purposes, because they work with clean water.

Corrosion is another threat, although it depends on the water quality. It can result in the impeller becoming stuck to the pump body. And the seals that form the barrier between the wet and dry parts can also stick together. If the two seal faces that make contact aren't moved at all for a prolonged period, it will ultimately be impossible to separate them.

Beware of frozen pipes

Without heating in the greenhouse, there's a very real risk of frozen pipes. When the water remaining in the pipes freezes, it expands. The pipes directly next to the exterior walls are the most likely to be damaged in the event of frost, possibly resulting in many metres of burst pipes. This risk is particularly great in older greenhouses with less insulation. The frost doesn't even need to be very severe: just a couple of nights at minus two or three can be enough to cause damage.

High repair costs and consequential damage to the crop

Van der Ende Groep warns growers about the high repair costs that damage can involve. To remove sediment, the pump will have to be opened up and repaired. If the pump body has cracked due to freezing, the repair costs can even be so high that it makes more financial sense to simply buy a whole new pump.

We also know from experience that growers usually only discover that something isn't working when the new crop has already been planted in the greenhouse. Then it's a matter of making urgent repairs to limit consequential damage to the crop.

Prevention is better than repair

We suggest that you take preventive measures in order to avoid problems at a later stage. A few simple tips can make all the difference:

- Switch irrigations systems on for a few minutes every week, creating demand for a short time and flushing out the pipes.
- Don't switch the heating boiler off completely, and instead leave the pump running at low speed.
- Carefully monitor the climate computer in terms of the greenhouse and water temperature during a low temperature, so that you can turn up the heating in good time and protect the greenhouse from freezing.
- If submersible pump systems for drainage or sewage, for example, are shut down for a long time, they should be switched on for two or three seconds every week. This not only lets water flow through the system but also keeps corrosion down to a minimum.
- Run the pumps of the substrate system for a couple of minutes once every week or two weeks, to keep the flushing function intact.

A fresh Future: Reimagining Africa's Perishables Logistics

From airports playing a key role in building perishable hubs for the future to exploring new markets and opportunities to investments into upgrading cold chain and transport infrastructure for the perishables sector and the importance of adapting data and digitalisation into supply chains, the fourth edition of the 'Perishables Logistics Africa' held reimagined the perishable supply chain of Africa and focussed on its natural strengths and advantages. 'Fresh Future- Logistics can make it happen' was the overriding theme of the discussions that were held during the fourth edition of the day-long 'Perishable Logistics Africa' event organized by Logistics Update Africa.

The presenting partner for the event was Brussels Airport, Kenya Airports Authority was the platinum sponsor and Saudia Cargo was the airline partner for the event. The event was also supported by Frankfurt Airport and Perishable Center Frankfurt, while the associate partner of the event was Astral Aviation.

The event also got support from local industry partners and associations like the Avocado Society of Kenya, Fresh Produce Consortium of Kenya (FPC Kenya), and Fresh Produce Exporters Association of Kenya(FPEAK) respectively.

Roland Weil, VP, of Sales Cargo at Frankfurt Airport, and Sam Quintelier, Cargo Business Development Manager at Brussels Airport spoke about the future facing cargo strategies employed by their respective airports and about tailwinds in store for the cargo industry amidst current economic and geopolitical conditions and challenges.

The first panel discussion was on the topic, 'Cool ports and cold storages - building perishable hubs of the future', where panelists deliberated on how airports close to production centers could become centers of excellence in building cold chain infrastructure to support and import time-critical perishable products.

The panel discussion was followed by a presentation by Rainer Wittenfeld, MD of the Perishable Center Frankfurt about the opportunities and infrastructure existing at the company facility at Frankfurt International Airport which incidentally happens to be Europe's largest perishable center.

The second-panel discussion centered around the topic, 'Future is end-to-end cold chain logistics, underpinned by data and digitalisation', and discussed ways in which supply chains could now elevate their operations with network visibility, real-time data, and operate remotely. It also put forth the array of technology present to better predict and respond to change, improve cargo care and ensure maximum utilization of infrastructure and transport assets.

The second half of the day began with Brian Vander Mey, Director of Business Development and Partnerships at Aergility, exploring the advantages of using large-scale VTOL cargo drones and their use case in day-to-day logistics operations for the perishable logistics industry in Africa.

The third panel of the day highlighted the need for significant investments in cold chain infrastructure and transport assets in Africa. Through the topic, 'Investing to build infrastructure for perishable logistics of the future- sustainable and profitable', panelists discussed topics like automation, clean energy, refrigeration, and climate control technology, and how reliable reefer logistics and multimodal logistics network can be developed.

The final panel discussion of the day essentially deliberated on how the logistics industry can help the African fresh produce community to identify and discover new markets for their products and reduce wastage.

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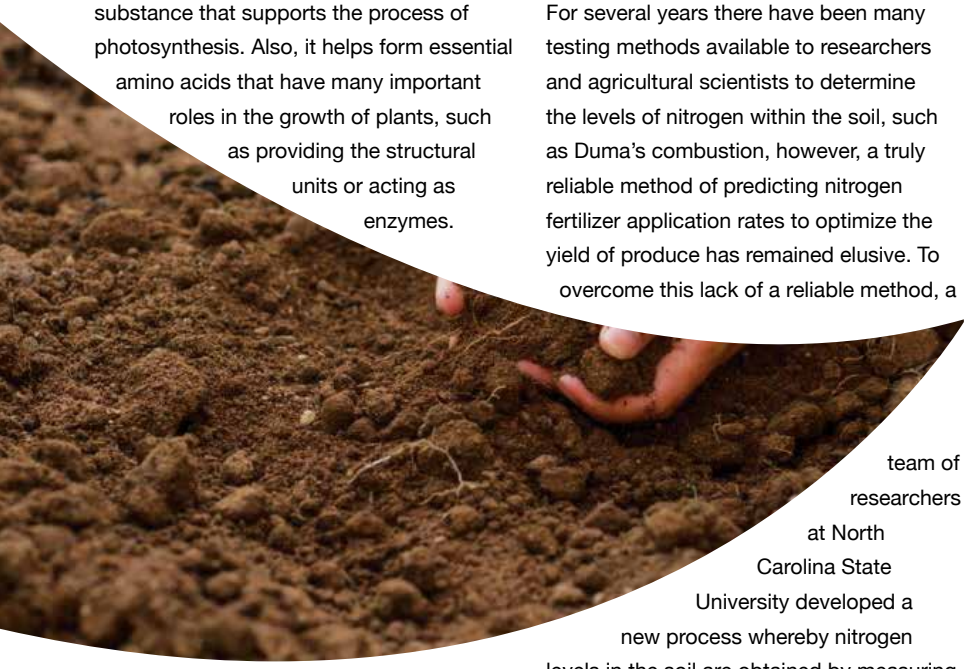
™

Determining Nitrogen Levels in Soil

Nitrogen is essential to support the development of healthy crops. On average, plant tissues exposed above ground contain around 3-4% nitrogen, which is a significantly higher concentration than levels of other nutrients.

Carbon, oxygen, and hydrogen are present in higher concentrations; however, these elements do not usually influence soil fertility management programs. The reason that nitrogen is so important to crop growth is that it helps form chlorophyll, the substance that supports the process of photosynthesis. Also, it helps form essential amino acids that have many important roles in the growth of plants, such as providing the structural units or acting as enzymes.



Soil

In addition, nitrogen is also a vital component of ATP which allows cells to conserve energy, as well as a vital component of nucleic acids such as DNA. Therefore, nitrogen content in soil is fundamentally important for ensuring the growth of healthy crops. However, not all crops need the same amount, and providing enough nitrogen is also just as important as ensuring nitrogen concentrations in soil are not superfluous. This can lead to contamination of groundwater through leaching of nitrogen in the soil, or via rainwater runoff.

A robust, cost-effective, and reliable test is therefore needed to allow those working with crops to obtain levels of nitrogen in their soil, allowing them to both grow healthy crops, and prevent the detrimental impact on the environment related to excessive nitrogen content.

How to measure nitrogen in soil

For several years there have been many testing methods available to researchers and agricultural scientists to determine the levels of nitrogen within the soil, such as Duma's combustion, however, a truly reliable method of predicting nitrogen fertilizer application rates to optimize the yield of produce has remained elusive. To overcome this lack of a reliable method, a team of researchers at North Carolina State University developed a new process whereby nitrogen levels in the soil are obtained by measuring biological activity within the soil.

The team had been inspired by the problem facing corn grain farmers. Around 1.2 pounds of nitrogen is required for each healthy bushel grown, but just applying this amount of nitrogen to the soil is not an accurate method, as it does not take into account the soil's ability to mineralize nitrogen from organic matter, which varies between soil types. A series of experiments were conducted to establish a new method of nitrogen measurement. First, it was demonstrated that nitrogen mineralization in the soil could reliably be determined with a three-day analysis of soil-test biological activity (STBA).

This test is useful because it measures the fauna, such as bacteria, insects, and fungi, that live in the soil and affect its nitrogen content. Next, tests were conducted to establish whether higher levels of STBA did correlate with levels of nitrogen uptake in plants. The results showed that greater STBA was a reliable indicator of this activity.

Finally, a total of 47 farmer's fields were tested for STBA. The researchers applied different levels of nitrogen fertilizer to these fields and found that those fields with higher STBA levels required lower levels of additional nitrogen to produce healthy crops.

Summary

The team was able to develop a simple and cost-effective method of measuring nitrogen levels within the soil through measuring levels of STBA. These levels were then shown to be indicative of how much additional nitrogen, through nitrogen fertilizer, was optimal to ensure the growth of healthy crops, while protecting the environment for the harmful effects of excessive nitrogen.

The process that has been described here will likely be widely adopted to optimize crop-yield and reduce the environmental damage caused by agriculture, once the variations of N acquisitions due to edaphic and environmental factors have been extensively studied.

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Augusto Solano, President of Union Fleurs

Europe's Energy Crisis Threatens Flower Production

Double-digit inflation and skyrocketing energy prices and rations are threatening Europe's production of flowers, including chrysanthemums, which are grown in greenhouses with heat and lights.

With double-digit inflation and crippling energy costs and rations throughout Europe due to the conflict in Ukraine, flower producers are switching crops, reducing production or shutting down, putting into question the future availability of crops grown there using heat and lights.

Flower farms, particularly in the Netherlands — the largest producer of cut flowers in the world with $4.01 billion in exports in 2020, according to the Observatory of Economic Complexity — have been especially hard hit by the energy crisis. "Production is going to be hurting very significantly, especially in the Netherlands," says Augusto Solano, president of the board of Union Fleurs, the International Flower Trade Association. Solano, president of Asocolflores, the Association of Colombian Flower Exporters, estimates there will be a 25 to 40 percent reduction in production.

The energy crisis comes as Russia, which typically supplies about 40 percent of Europe's natural gas according to a U.S. News report, cut off the flow of gas from its main pipeline in retaliation for sanctions stemming out of the conflict in Ukraine.

Producers Hurt

A survey of its members by Greenhouse Horticulture & the Netherlands found that one third of greenhouse producers don't have or are at risk of not having enough assets to meet their short-term financial obligations because of high gas and electricity prices, and 8 percent expect to file for bankruptcy. The survey also found that 25 percent of the cultivated area in the Netherlands is out of production; 75 percent are adjusting their cultivation strategy because of liquidity problems.

The European Union has developed a plan to provide assistance to businesses. It is set to go into effect in April and is retroactive to Nov. 1. In the meantime, Dutch flower farms — which in addition to many types of bulb flowers grown in fields produces roses, carnations, orchids, chrysanthemums and lilies, to name a few, in greenhouses — are reacting in a number of ways that will greatly affect production, says Danny Van Bergen Henegouwen, director of buying in Holland for Fleurametz, a supplier of fresh product and hard goods.

"Some growers bought cheap energy in advance and sold it for higher prices and chose to close this winter," he says. "Some growers are trying to put less energy in the crop — sometimes this works, sometimes not. Some are closing a part of the greenhouse. Some growers don't see a future in producing in Holland and quit the company. Some growers [are] switching to a less energy [intensive] crop."

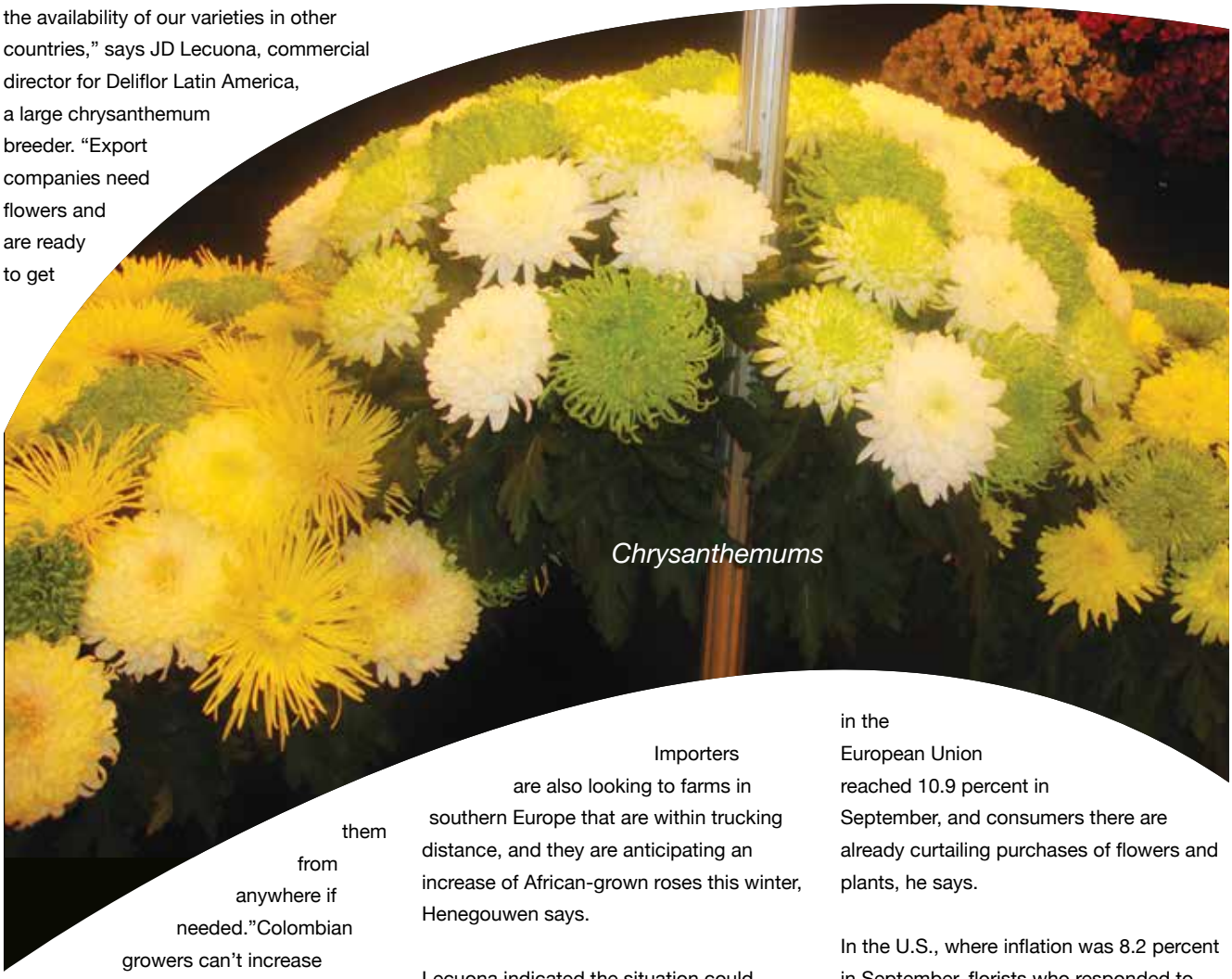
Availability in Question

Many European importers are looking for other sources of flowers, such as chrysanthemums, which are expected to be among the flowers in short supply.

"I don't see huge numbers [of chrysanthemum exports to Europe] yet, but we have had questions about the availability of our varieties in other countries," says JD Lecuona, commercial director for Deliflor Latin America, a large chrysanthemum breeder. "Export companies need flowers and are ready to get them from anywhere if needed."Colombian growers can't increase production overnight, but they will try to help, Solano says.

"What we can do [for the European market] will depend on the demand of the U.S.," he says. "The U.S. is [our] main market, and our priority will be to supply that market. But if consumption in the U.S. decreases, we can balance the need in Europe."

> "Dutch flower farms — which in addition to many types of bulb flowers grown in fields produces roses, carnations, orchids, chrysanthemums and lilies, to name a few, in greenhouses — are reacting in a number of ways that will greatly affect production". **Danny Van Bergen Henegouwen**



Chrysanthemums

Importers are also looking to farms in southern Europe that are within trucking distance, and they are anticipating an increase of African-grown roses this winter, Henegouwen says.

Lecuona indicated the situation could present opportunities for growers in other countries, such as Kenya, from which the Netherlands in 2020 imported about 32 percent of its flowers, according to OEC.

"We have noticed that African farms are interested in growing more chrysanthemums, so they can jump on the opportunity that has been presented to them and sell more product," he says.

Inflation Impact

Ultimately, consumer demand could have a large influence on availability during the next several months, Solano says. Henegouwen agrees. The rate of inflation in the European Union reached 10.9 percent in September, and consumers there are already curtailing purchases of flowers and plants, he says.

In the U.S., where inflation was 8.2 percent in September, florists who responded to the Society of American Florists' economic outlook survey last summer also reported a slowdown in sales.

"[Inflation] is going to hurt the pockets of consumers, so the big questions is, what is going to decrease more, production or consumption?" Solano says.

From Farm to Fork

While cold chain facilities have been a key driver for the flower industry in many African nations, especially in Kenya and Ethiopia, it has also laid the foundation for the perishables sector that includes fruits and vegetables.

The European Union accounts for getting the largest portion of Kenyan horticultural exports with 45% comprising cut flowers, French beans, snow peas, and other Asian vegetables. In a bid to diversify its exports, Kenya has held bilateral talks with gulf nations this year and is keen to export fruits, spices, and plants as well apart from flowers to eliminate trade barriers and logistical logjams. Patrice Ngenga, Technical & Standards Officer at the Fresh Produce Exporters Association of Kenya (FPEAK) which has 210 members, told the publication, "Kenya's major market

destination is EU, UK, UAE, Australia, China, and South Africa. Most of the fruits and flowers are shipped through air freight with fruits mainly going through sea freight. Kenya mainly exports french beans, snow peas, sugar snaps, broccoli, chilli, roses, carnations, avocado, passion fruits, and mangoes. Kenya earned $1.39 billion in 2021 and the figure is expected to surpass 2021 earnings for the year 2022 since the volumes have returned to pre-pandemic levels and surpassed. The demand for fruits and herbs is growing widely; bananas, avocados and passion fruits, basil, rosemary, thyme." Kenya is also looking to get into other markets like China, South Korea, India, and Jordan among others. However, Ngenga says that a major shift to the sea route is also being witnessed for the fruits and vegetable sector post-pandemic. "The Covid-19 pandemic saw the cost of airfreight increase by 40%. Ocean freight is increasingly becoming a viable option since it is both carbon and cost-efficient as compared to air freight. About 55% of fruits and 1% of flowers are exported by sea from Kenya."

Kenya has also opened an alternative air freight route from the Kisumu International Airport this year, which saw expansions that included cargo handling and cold storage facility creation via public-private partnership mode.

However, challenges abound for the fresh produce sector in Kenya. While labour is readily available in Kenya, the cost of labour has increased by around 40% in the major towns. Other challenges facing the horticulture sector are; high-cost production due to increased cost of inputs, increased pests, and disease pressure, inadequate compliance to market requirements on food safety and plant health, weak traceability system, and less equipped regulatory authorities to enhance compliance to market requirements.

Maintaining cold chain efficacy is paramount to getting the best price for fresh produce manufacturers and exporters and this is where most entrepreneurs believe that there is ample room for improvement.

"Major players, entrepreneurs, and the government need to establish consolidation and storage centers around the existing production areas. This would ensure that the produce is kept in the cold chain as soon as it is harvested." Patrice Ngenga, Fresh Produce Exporters Association of Kenya (FPEAK)

Lucy Njeri Kuria, Managing Director at Saipei Foods in Kenya, who exports fresh fruits and vegetables to Spain, Netherlands, France, Turkey, Dubai, Hongkong, and Malaysia by sea, says air freight has become very expensive post-Covid.

She says, "Yield was good this year and volumes have returned. Next year more yield is anticipated because of newer orchards. We majorly export avocados and the demand is good. China's opening up will definitely increase demand for Kenyan avocados. Logistics costs remain very high in Kenya. Perhaps the inland logistics for avocados can be done via train and not road. The government can invest in plug-in points on the train to maintain the cold chain."

Ngenga of FPEAK adds, "Major players, entrepreneurs, and the government need to establish consolidation and storage centres around the existing production areas. This would ensure that the produce is kept in the cold chain as soon as it is harvested.

The standard gauge railway should be fitted with gensets to provide power for refrigeration units during transit. The fresh produce sector has been engaging with the government and other sector players to create capacity for other airports in the country to handle fresh produce. As a result of this, there have been direct cargo flights from Moi International Airport, Mombasa to Sharjah International Airport, UAE which had on board 20 tonnes of fresh produce and 23 tonnes of seafood on board. We also had a cargo flight from Kisumu International Airport to the EU, which had five tonnes of chilli on board."

Kenyan grower receives own fragrant rose

The baptism of Rosa Loves Me Paula's Champagne Delight

Paula Koross and Rosa Baptizing of Rosa Loves Me Paula's Champagne Delight with Inger Kristine on the right.

"A productive, healthy, fragrant rose with the right length and a vase life of more than two weeks." The rose in question is Rosa Loves Me Paula's Champagne Delight' of Viking Roses, a new rose that has been baptized at the IFTF in Vijfhuizen, the Netherlands, earlier this month. The rose is named after Paula Koross, General Manager at Molo River Roses in Kenya.

Viking Roses and Molo River Roses

Viking Roses and Molo River Roses have known each other for more than seven years, and Viking Roses' John Pouw has seen the farm growing, improving, and developing year by year. "When I visited the farm for the first time in 2015, I was not impressed. However, at that time, I didn't know that they had just started. I was in the office with the General Manager, Andrew Wambua, and the Production Manager was in the background, quietly listening all the time. Every visit since then, I noticed improvements, first big and later, they were getting the details right, all under the guidance of the Production Manager. That was Paula Koross, who recently became the General Manager, still quietly listening and always working with her team."

Why a rose named after Paula?

Normally, the roses of Rosa Eskelund, the breeder of Roses Forever and Viking Roses, are baptized and/or named after celebrities. "In Denmark, Rosa Eskelund has her garden and pot roses baptized by famous artists and even the Danish royal family." So why name this rose after a grower? "For several years now, Molo has been selecting the Viking Roses at their farm. For breeders, varieties are like their babies, and just like how mothers hardly ever trust their babies to others, it is very telling that Rosa is entrusting her babies to the Viking selection area at Molo River, in the motherly care of Paula (and her team, of course)."

"So this time, Viking Roses wanted to honor a modest professional and team player and asked Paula to baptize the variety they selected and are planting at the farm."

Productive, healthy, fragrant, and 'foolproof'

"Code 18-075-P was selected in the Dutch trials because of its productivity, health, stem length, and vase life, which is more than two weeks. On top of that, it is fragrant!" says Pouw. "The genes of longevity and scent normally are not the biggest friends, but Rosa Eskelund is continuously working on Paula's Champagne Delight as the first result.

Close-up of Paula's Champagne Delight at the IFTF.

Rosa with the team of Molo River Roses.

that have introduced a variety, rather than deciding on exclusive arrangements."

0.25ha at Molo River Roses

Molo River Roses started with their trial over a year ago and now have a few beds, from which they send some flowers directly to customers. "They use the rest of the material for propagation to fill the 0.25 ha."

More varieties in the pipeline

In the corona years, Viking Roses has not sat still. On the contrary, there has been intensified breeding and selection, resulting in a high number of varieties that are currently propagated by various rose farms internationally. Molo River Roses has also selected no less than four in their trials, which are moved to the next stage, which means pre-commercial.

'Champagne' refers to the color, and 'Delight' to the fragrance.
It also appeared to be a foolproof variety as it showed another unexpected characteristic at the IFTF. "When we shipped the flowers to the IFTF exhibition, the box with flowers was retrieved after 6 (!) days without water. The flowers were cut off and directly put in the vase in the stand. They opened beautifully, and afterwards, Rosa took them back home to Denmark to enjoy them for another week."

Developing a market instead of dumping

Both Molo River and Viking Roses believe in developing a market for a variety rather than dumping, explains Pouw. "This is how we introduced Rosa Loves Me. Inger Kristine, starting with 0.25ha and expanding every year. In Viking's introduction policy, expansion is discussed with the farm(s)

Rosa with Andrew Wambua and Inger Kristine. Andrew is holding the variety Inger Kristine, which is bred by Rosa, grown by Molo River Roses, named after Inger Kristine.

Mealybugs in Roses

Mealy bugs suck the life sap from crops, and in the process, they will ooze a sticky solution over the upper surfaces of leaves below their feeding sites. This soon becomes a black sooty mess, as fungi grow on the sugary solution.

They cause considerable reductions in yield as well as quality, if they are not controlled. Once out of control – it is very costly and difficult to get rid of them. They are difficult to contact with pesticides because they feed in crevices low down in the plant. Their waxy skin makes penetration of contact insecticides difficult.

However, the excessive use of systemic pesticides can lead to resistance developing. Careful planning, using the information on the Insecticide Resistance management website is critical – to avoid not only wasting money but also making good pesticides – useless through lack of a resistance management programme.

In the effort to reduce pesticide inputs in roses, many growers are limiting the amount of broad spectrum pesticides applied to crops to enable them to provide a safer environment in which to use biological control agents such as the predatory mite, Phytoseiulus, for the control of mites. A bio-control programme for mites has been 'blamed' for the developing problem of mealy bugs in roses in countries as far apart as Holland and Kenya. What can be done to reduce the risk of this happening?

Pesticides alone are not the solution, as regular systemic insecticides are the most effective pesticides, but this also creates problems of potential resistance to intensive use of the same pesticide.

Know your mealy bugs species

It is important to be able to identify the species of mealy bug present in the crop because some have egg sacs (citrus mealy bugs, obscure mealy bugs and Mexican mealy bugs) and others (long-tailed mealy bugs) do not have egg sacs but are able to lay live young.

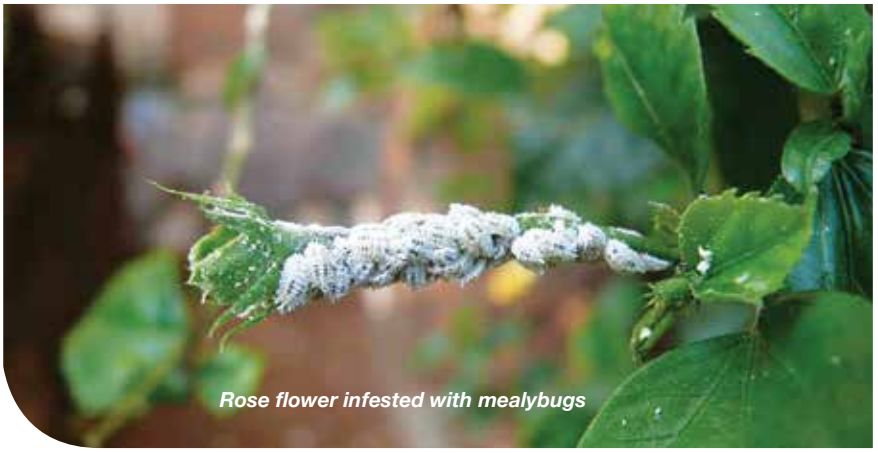
An important predator for mealy bugs, *Cryptolaemus montrouzieri*, lays her eggs only in mealy bugs egg sacs – so if the mealy bugs species does not produce an egg sac, it is not possible for the *Cryptolaemus* to reproduce in the rose crop. However, if *Cryptolaemus* larvae are used instead of *Cryptolaemus* adults in the IPM programme – the lack of egg sacs is not such a problem as the young *Cryptolaemus* larvae are voracious feeders and will clean up mealy bug hotspots of any type of mealy bug that gets in the way, if applied directly to these mealy bugs hotspot areas. *Cryptolaemus* larvae do not fly, so mealy bug hotspots needed to be clearly marked and the delicate *Cryptolaemus* larvae applied directly to these areas.

In addition, the citrus mealy bugs *(Planococcus citri*) is a common pest of roses and gerbera as well as many ornamental pot plants. The females are oval with a circumference of short waxy filaments

around the edge of the body and a central depression along the middle of the back. They are not as waxy as other species of mealybugs and the yellow/pink flesh is more easily seen between the white waxy lines running cross ways over the body. It might be described as a 'woolly woodlouse' in appearance. The female secretes a waxy wool 'nest' into which she lays between 100 to 600 eggs depending on how well fed she is herself, which in turn depends on the crop in which she is feeding.

citrus mealybug

The hotter it is, the more eggs are laid and no egg-laying can occur at temperatures below 13 degrees centigrade. Egg-laying marks the end of her short life, when she will shrivel up and die. Females will live only 4 to 4.5 weeks at temperatures of around 26 to 29 deg centigrade. At lower temperatures of 18 to 22 degrees, they will live 7 to 12 weeks respectively.



Rose flower infested with mealybugs

The other common mealy bug, which has an egg sac, is the obscure mealybug, *Pseudococcus affinis*. This is however, more of a problem in tomato and passion fruit crops, than in roses and other flower crops. This species produces a lot more wax than other species making them more 'woolly' in appearance. The obscure mealy bug is very similar in appearance to citrus mealybug but has slightly longer filaments at the rear end, although not as long as the long-tailed mealybug.

Long-tailed mealybug is easily distinguished by its double pair of long waxy filaments or 'tails'. The female protects its young, which are born live (not from eggs or in an egg sac) by carrying them beneath her body for a couple of weeks after birth. Long-tailed mealy bugs lay less eggs than the citrus mealybugs, producing about 200 crawlers over a 2-3 week period.

Male mealybugs

It is thought that unfertilized females do not lay eggs, so any action, which reduces the amount of male mealybugs, will reduce the overall number of mealybugs. About half of the eggs laid will turn into males, which only live for a few days. The males do not actually feed themselves, but have only evolved solely for mating with female mealybugs. The males look completely different from females – they are small winged 'wasps' that live only for a few days, as mating requires a lot of energy, if done correctly, and there is a limit to what can be achieved on an empty stomach! As their lives are so short, they must find female mealybugs quickly. This is made possible due their ability to sense the pheromones given off by female mealybugs within the dense canopy.

The pheromones of some mealybugs, such as pink hibiscus mealy bugs and the common citrus mealy bugs, have been synthesized and are available as artificial lures for the flying male mealy bugs. When combined with a sticky trap, this is a means of luring and killing the males thereby reducing their ability to mate and build the local mealybugs population. Sticky traps are useful but still need to be used with care when other flying parasitoids are also used for biological control for both mealybugs and other pests.

The first step is to identify the species or range of species of mealybugs, which have infected the crop, before ordering the pheromones as these are very species specific. Some insects continue to release pheromones after they have died and it is worth investigating if female mealybugs themselves, if stuck onto sticky traps will attract male mealybugs to one place.

Effective scouting and hotspot management

Fast, accurate and detailed scouting is the most essential element of an IPM programme. If hotspots of any pests are not found and marked very quickly, when they are actually still 'spots' of one or two plants – they can quickly spread to be a whole bay of plants, or even a whole house full of aphids, whitefly or mealy bugs.

People working in crops are actively involved in the spread of mealybugs, as the waxy filaments on egg sacs enable them to stick

to hands and clothes of workers during routine harvesting or pruning operations. If hotspots are properly marked and access to these areas restricted, to certain teams of people, or work here is undertaken at the end of the working day, this will help to reduce the spread of the problem.

Pesticides For Mealy Bugs

Insect Growth Regulators: The mealybug has 3 or 4 nymphal stages and also completes a metamorphosis into a pupae, therefore it's life cycle is susceptible to disruption by insect growth regulators. They are only contact insecticides though, have no residual activity, and are only effective on immature phases – insect growth regulators do not kill adults.

Neonicotinoids: The neonicotinoid group of pesticides is very susceptible to resistance and should not be used more than three times per year. Cross-resistance is also possible to this group and the IRAC website should be consulted when devising a programme, which includes this group.

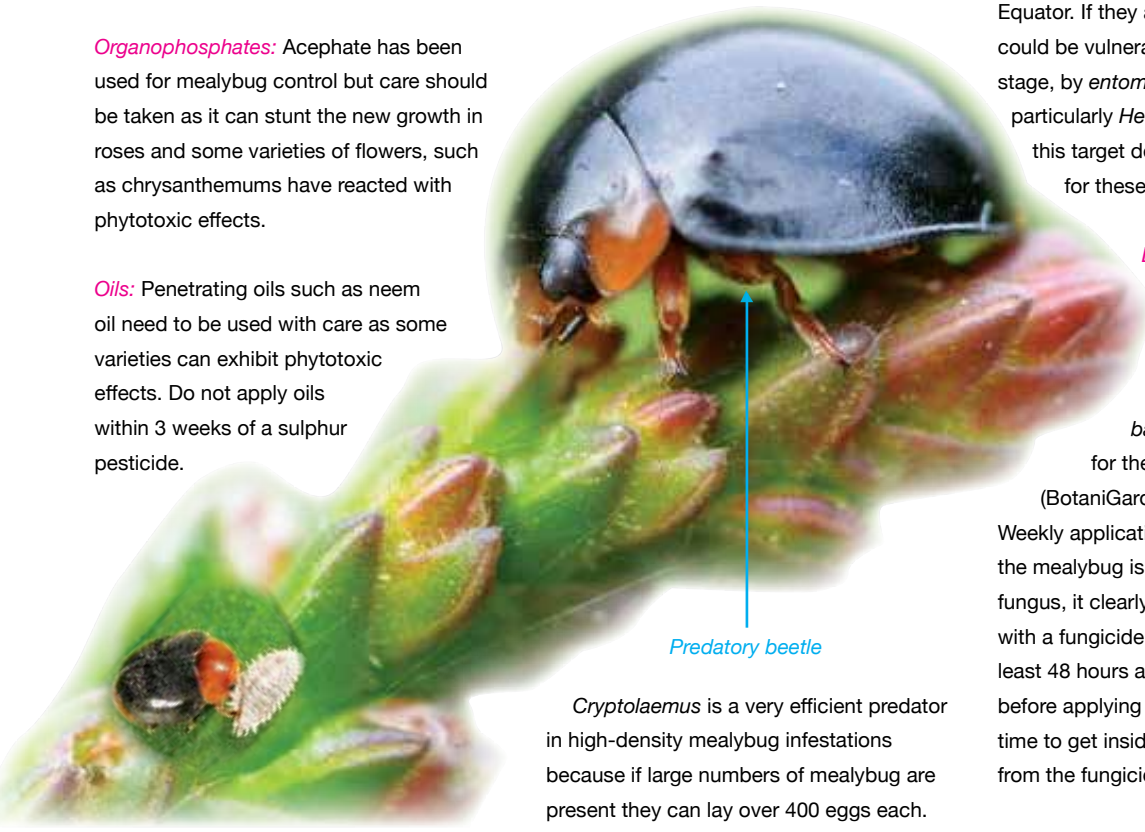
Organophosphates: Acephate has been used for mealybug control but care should be taken as it can stunt the new growth in roses and some varieties of flowers, such as chrysanthemums have reacted with phytotoxic effects.

Oils: Penetrating oils such as neem oil need to be used with care as some varieties can exhibit phytotoxic effects. Do not apply oils within 3 weeks of a sulphur pesticide.

Botanical pesticides: Pyrethrum if applied with a synergist such PBO, has some effect on mealybugs, particularly if formulated with a detergent, which will help provide contact through the waxy surface of the mealybug. It is however, only a contact insecticide and is broken down by UV light. It is likely to have a detrimental effect on parasitoids and predators present at the time of spraying, but its harmful residue will not be as long as a synthetic pyrethroid.

Mealybugs Predators

The predatory beetle: Cryptolaemus montrouzieri has a very long history of decades of use as a biological control weapon against citrus mealybug and a number of other species, which lay, eggs in eggs sacs. It is the bio-control of choice if mealybug infestations are very high – but it gets bored if there are not many mealybugs present and tends to fly away! Other parasitoids are better if mealybug infestations are too low for *Cryptolaemus* adults.



Cryptolaemus is a very efficient predator in high-density mealybug infestations because if large numbers of mealybug are present they can lay over 400 eggs each.

A single *Cryptolaemus* egg is laid in each mealybug egg sac. When the *Cryptolaemus* hatches, it begins feeding first on mealybug eggs and then young mealybug crawlers in the vicinity. *Cryptolaemus* completely eats the whole mealybug leaving no trace of them.

Parasitic wasps: There are three other parasitic wasps commonly used for control of mealybug, *Leptomastix dactylopii, Anagryus pseudococci* and *Coccidoxenoides perminutus*. Some companies supply these as adult wasps; others may provide them as the parasitized pupae of a dead mealybug, from which the adult *parasitoid* will later hatch.

Entomopathogenic nematodes: Part of the life cycle of mealybugs may include an over wintering phase, as temperatures drop in growing regions with a distinct winter period. If this happens, they may hide in crevices and in the soil, emerging later when temperatures rise in the spring. It is unlikely that this happens in crops grown on the Equator. If they are present in the soil, they could be vulnerable to attack in the nymphal stage, by *entomopathogenic* nematodes, particularly *Heterorhabditis spp*, although this target does not appear on the labels for these bio-controls.

Entomopathogenic fungi (EPF): These are naturally occurring, insect-killing fungi, which act as bio-pesticides. *Beauveria bassiana* has been registered for the control of mealybug (BotaniGard 22 WP and BotaniGard ES). Weekly applications are recommended whilst the mealybug is active. Since the EPF is a fungus, it clearly should not be tank-mixed with a fungicide and it is advisable to wait at least 48 hours after applying the *Beauveria*, before applying a fungicide, giving the EPF time to get inside the hosts body and away from the fungicide.

“Together we are stronger”

United Selections and Könst Alstroemeria looking back on first year of fruitful collaboration

The Könst Alstroemeria and United Selections teams at their shared booth at the IFTF in Vijfhuizen, the Netherlands, earlier this month.

United Selections and Könst Alstroemeria are collaborating for a bit over a year now and are very pleased so far. But what do roses and alstroemerias and zantedeschias have in common, you may think? In this article, Paco van der Louw of Könst Alstroemeria and Edwin Kirwa of United Selections explain why they entered into this strategic collaboration, how they remain independent and why it has proven fruitful.

Expanding markets and staying independent

United Selections and Könst Alstroemeria are both medium size family-owned companies. The top management of both companies have known each other for some years, and after many talks, they noticed that they could help each other to expand their markets.

“United Selections is Kenyan based and therefore has a large network in Kenya whereas Könst is well established in Latin America. Könst wants to grow in Kenya and United Selections in Latin America, so why not help each other?”

In September 2021, they decided to start a strategic collaboration where both companies cooperate on production and breeding activities and share a booth at different fairs. At the IFTEX in Kenya earlier this year, for example, they had a shared booth, as well as at the Expo Flor Ecuador in October and the IFTF earlier this month. However, they stay independent with their own sales and commercial activities.

Bart Tesselaar, together with the United Selections team planting alstroemeria plants for the first time at United Selections in Nakuru.

United Selections in Colombia

United Selections assortment is gaining a lot of

traction in Latin America. However, keeping up with the demand for budwood has been a constant challenge. “Budwood from our mini-showrooms in Innovacion and Denmar was not enough, but Könst giving us a space to produce more budwood for United Selections in Colombia has enabled us to meet the increasing demand,” says Kirwa, who sees the demand increasing since the pandemic.

Könst in Kenya

Kenya, the home base of United Selections, is an expanding market for Könst and they are therefore happy that they can now supply growers from the United Selections location, where they also have their showcase. “We used to ship our plants directly from the Netherlands to our Kenyan growers, where they needed to harden before they could plant. Now, we ship them to the United Selections facility first, where they keep them for a few weeks to harden. Here, we can monitor the quality of the plants as long as possible, in turn delivering a better quality product to the grower”, van der Louw says.

Advantages

Besides meeting the demand and delivering a better quality product, the collaboration brings more advantages, Kirwa and van der Louw explain. “As our products are so different, so we are no direct competitors, but we can actively help each other find new clients and meet our different companies’ commercial objectives. In Kenya, for example, we see increasingly more rose growers adding new crops like alstroemerias. And as we both have experience and a passion for plants, we can help each other in informing or giving advice in the cultivation of the Roses of United Selections or Alstroemeria of Könst.”

Also, the partnership enables growers to see the roses of United Selections and the Könst Alstroemerias at more locations. During the IFTF week, earlier this month, for example, United Selections Roses were on display at the Könst facility in the Netherlands. And in January, during the annual Open House event of United Selections, also alstroemerias will be showcased.

Challenges

With change comes new opportunities but also challenges. “For us, the main challenge was to get to know each other’s crops, so they mainly were on the technical side. Fortunately, we both have great teams, and they both invested quite some time in educating each other about the crops. And are continuedly monitoring, to ensure the best quality.”

Future of growth

When looking ahead, Kirwa and van der Louw are certain about growth. “We are now able to supply our growers and potential new growers with our products, and because of the energy crisis in Europe, we expect more demand for flowers grown in Africa and Latin America. In turn, higher demand for our products”, they say. In terms of Alstroemerias, van der Louw sees increasingly more rose growers adding this crop to their assortment. “Due to the partnership, United Selections can help us with finding new growers and connect us with them.” When looking at the roses, Kirwa sees an increase in demand for spray roses, and as their assortment is increasing, they expect to grow further as well.

The outlook of the alstroemeria plants today at United Selections in Nakuru.

Expanding markets together

Together, they are also looking at new markets to expand in, like Asia. “We aim to grow in Asia and sell more together because together we are stronger,” says van der Louw. Also, in Europe, they see opportunities to expand, but then for their pot plant lines. “We are known for our cut flowers, but we also have pot plants, and we have high hopes for these lines in the European market.”

African Flower Logistics Checks into 'Future Mode'

The fifth edition of the 'Flower Logistics Africa' chalked out the new, post-pandemic normal for the flower logistics industry of Africa with day-long deliebrations on the ever-evolving nature of air cargo, the feasibility and emergence of sea route and African industry's response to the two megatrends of sustainability and digitalisation

The fifth edition of the 'Flower Logistics Africa' got off to a smashing start with over 25 speakers holding forth on all things flower logistics and Africa, at the heart of the flower logistics industry, in the Kenyan capital of Nairobi.

The event was followed by Perishable Logistics Africa (PLA) conference on November at the same venue. This year, Brussels Airport, one of the most important centres of economic growth in Belgium and a key air cargo gateway to Europe, presented the two-day conference. The two-day shipper-centric event, organized by Logistics Update Africa, a STAT Media Group publication, was being held after a gap of three years because of the global lockdowns owing to the Coronavirus pandemic.

The FLA event themed 'Fast Logistics for Fleeting Beauties: Deliver Freshness on time, every time' saw a smattering of growers, shippers, freight forwarders, airlines, airports and flower authorities, and local industry bodies and associations in attendance. The industry association Kenya Flower Council (KFC) has been the industry partner for FLA since its first edition in 2016. Kenya Airports Authority was the platinum partner for the event and Saudia Cargo was the airline partner, and Frankfurt Airport and Perishable Center Frankfurt were the supporting partners for the event.

The first panel titled 'The new normal for

flower shippers of Africa after the pandemic' deliberated on the changes and challenges facing the flower shippers of Africa after the pandemic and how the air freight capacity constraints and volatile freight rates affected the shippers and the industry in general.

The panel was followed by a presentation by Lina Jamwa, Membership, Advocacy, and Communications Manager, Kenya Flower Council, where she gave an overview of the Kenya floriculture industry and The Kenya Flower Council; bottlenecks affecting the competitiveness of the industry, sea freight as a solution to logistics issues in the industry and KFC's role in the promotion of sea freight and the future of sea freight.

The event saw an interactive session followed by a slew of presentations by Johan Leunen, Senior Route Development Manager, Brussels Airport, Josiah M Syanda, Deputy Director, Phytosanitary Services, KEPHIS (Kenya Plant Health Inspectorate Service), and Sam Quintelier, Cargo Business Development Manager, Brussels Airport.

The second panel deliberated on the topic, "Can airport community collaboration eliminate weak links, resort in a more efficient fresh corridor with digitization as the ultra-enabler?' and highlighted how airports can anchor and create cargo communities that will enable collaboration across the value chain and offer value additions to shippers.

The second part of the event began with Jeroen van der Hulst, Owner and Founder, FlowerWatch giving a presentation on 'Air cargo as a premium mode of flower logistic: value and footprint reduction to be unlocked'.

This was followed by the third panel, which was on 'Delivering freshness on time, every time – the digital dynamics of flower logistics' and led deliberations on how digital transformation is key to visibility in the flower industry and how it can thrive in the digital era, which is being called 'Logistics 4.0'.

Parit Shah, the owner of Silpack Industries Limited presented his observations in his presentations on 'The 3Rs – reduce (weight), reuse and recycle – of packaging to build sustainability in flower logistics ' followed by another presentation by Daniel Sepetu, DGM, East Africa Cluster, CMA CGM which gave the attendees 'Insights on the development of sea freight of flowers from Kenya'.

The fourth and final panel of the day deliberated on the subject 'Is ocean freight a reliable alternative mode to air for African flower exporters?'. With air freight prices on a high, flower exports in Kenya have been slowly but steadily taking the sea route.

The two conferences in Nairobi are slated to act as a global networking platform for regional and international service providers involved in the cold chain, logistics and packaging solutions, shippers, producers, and transport providers to connect the gap between the supply chain and logistics business.

How Data Can Help Flower Retailers Meet The Quality Challenge

Across the floriculture industry, retailers are facing a quality challenge, with exciting opportunities in its wake. With the flower market growing rapidly, flower sellers will flourish with stable supply chains and dependable quality levels; however, today's retailers, from independent family stores to national supermarket chains, too often receive flowers of inconsistent quality: regularly, batches are unacceptable, with a short vase life, damaged stems, and flowers that are not worth selling due to poor quality on arrival. This leads to unhappy customers and loss of reputation and revenues. Alongside broader industry concerns, like reduced air freight capacity, this problem can significantly limit growth. So where's the opportunity? It's right here, and it centers on implementing data-driven quality standards throughout the flower supply chain.

In this article, we explore how this answer provides a guarantee of high-quality flowers, supporting our claim by revealing statistics about today's quality leaks in the floriculture industry.

The Price Of Poor Quality: Unpredictable Flower Supply Chains Are Costing Retailers Customers And Money

Compared with other supermarket product groups, flowers often have the highest complaints per million units (CPMU) in retail – a clear sign of underperformance across the floriculture industry. In our own extensive research on four European retailers from Germany and the Benelux region (Belgium, the Netherlands, Luxemburg), we found that flower quality is often poor and usually inconsistent. In fact, the data shows that close to one-quarter of flowers are not worth selling on arrival.

FIG 1: Average proportion of flowers suitable for sale on arrival for three European retailers

This lack of quality has significant implications for retailers, including:

- Losing money on unsold flowers, struggling to make a profit or break even
- Excess waste, harming your business and the environment
- Unhappy consumers, leaving your business and spreading negative messages online

Why is quality so inconsistent in floriculture?

The fact that quality is always under pressure in this business is not surprising: flowers are a highly sensitive, fragile product, especially when shipped around the world on aeroplanes, ships, and trucks. The smallest misstep somewhere in the supply chain linking farmer to florist can hugely impact a flower's vase life and quality. There are numerous areas in which these missteps are easily made. Two important areas are packaging and cold chain management. While there are excellent growers and exporters in the industry, there are also many whose practices, often carried out without clear and effective quality standards, reduce flower quality.

Testing offers clear evidence of all this. While traders may perform free vase life tests for their retailers, the outcomes are not followed up by improvement measures. One solution we recommend is testing by a third party. An independent expert can test farms at a higher frequency, allowing retailers clear insight into performance levels. And, with organized databases, a third party can offer data-driven decision-making and insight at the lowest possible cost.

The numbers behind the quality challenge

Our own, independent tests show that flower quality is often poor, and wildly inconsistent. Below, figure 2

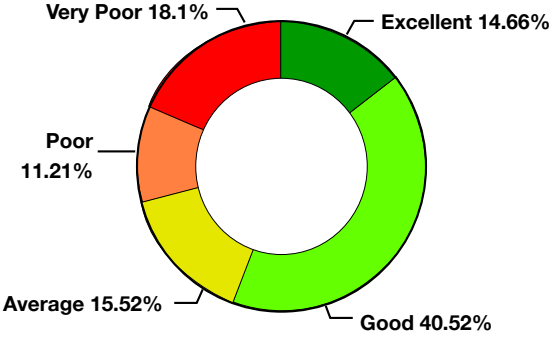


FIG 2: Overall quality breakdown across batches on arrival, from excellent to very poor, for three European retailers

shows the average flower quality breakdown across the four retailers we inspected: as you can see, very

poor to poor batches make up close to 30%, while excellent quality flowers remain a rarity.

As for quality inconsistency, figure 3 shows how flower quality for these retailers greatly varies across the year, with the busiest months seeing high levels of poor to very poor flowers.

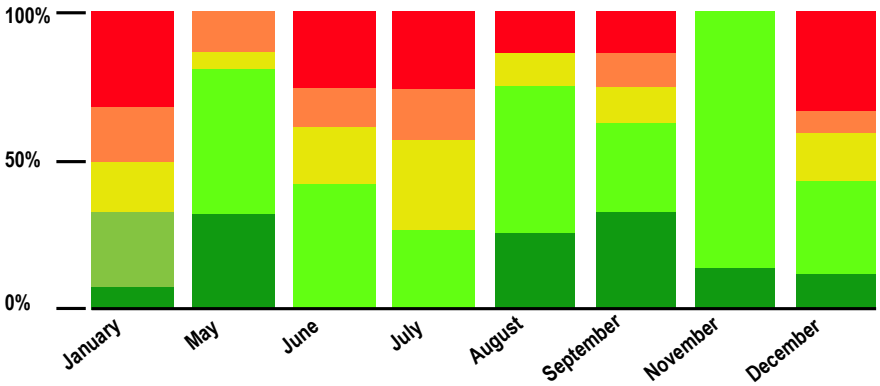


FIG 3: Flower quality variation across an eight-month period for three European retailers

For today's flower sellers, this poses a significant question: how can retailers manage this level of quality inconsistency and underperformance?

Any 25% loss is worth tackling

While flowers represent a relatively small share of a retailer's turnover, poor flower quality clearly harms business. Any 25% loss is worth tackling. So what real solutions are there for this quality challenge? How can you make sure the flowers in your supermarkets come to represent the kind of premium, consistent quality that will encourage consumers to talk favorably about your brand?

Our answer: data and standardization.

Through this, retailers can guarantee higher quality flowers, saving money and ensuring happier customers.

There are numerous areas in which these missteps are easily made. Two important areas are packaging and cold chain management. While there are excellent growers and exporters in the industry, there are also many whose practices, often carried out without clear and effective quality standards, reduce flower quality.

Euro Zone Cuts Spend on Kenya Flowers as Inflation Bites

Consumers in Europe have cut spending on Kenyan flowers amid a cost of living spike in the western world that has forced households to drop essential purchases such as food and drinks, threatening thousands of jobs locally.

Inflation in the Eurozone — a group of 19 countries which use the euro as a common currency — rose to a fresh record of 10 percent in September from 9.2 percent in the prior month.

The runaway inflation is eroding the consumer purchasing power in those markets, the Kenya Flower Council says, with households and businesses cutting down on less essential buys such as cut flowers. The decline in exports is a blow to Kenya as the industry faces the sharpest earnings fall in a decade.

Horticulture is a major source of foreign exchange for Kenya alongside tea, tourism and remittances and the industry employs over 150,000 workers. KFC, a lobby representing large-sized growers, fears that the surging cost of living in Europe together with weakening euro and sterling pound has dashed hopes of full recovery of the sector from effects of Covid-19 restrictions.

Related Stories

"We were optimistic at the beginning of the year and we were looking at full recovery in 2022 because we had seen good signs in 2021 in terms of sales," KFC chief executive Clement Tulezi says.

"But when the Russian war came, we were subjected to high prices of fuel and other inputs coupled with inflation in Europe and weakening of the currency we use for international trade."

Kenya's floriculture industry enjoys a relatively long high-season, which runs from September through May, peaking in February as flower farmers maximise on the festive

season, Valentine's Day and Mother's Day.

Europe is the largest market for Kenya's fresh farm produce, accounting for 70 percent of the country's cut flower exports.

Most of Kenya's roses go to an auction in the Netherlands to be sold throughout Europe to decorate weddings and funerals, given by courting couples or old married folks.
The surging inflation in Europe has seen consumers deepen cuts on non-essential purchases like flowers.

"In response, household budgets are continuing to evolve, with basic needs like food, transport, and energy accounting for a higher share," says a report from consultants McKinsey.

9.7 percent. Some Eurozone countries are experiencing the fastest growth in 70 years. Inflation in Europe has largely been driven by soaring energy and food costs on the back of Russia's brutal war in Ukraine which disrupted supply chains.

The price surges have, however, broadened to other categories of goods and services in recent months.

"With [inflationary] pressure that people in Europe have, especially on energy costs, they are cutting expenditure on things like ornaments where cut flowers fall. We are also incurring a lot of production costs on the shilling which we cannot recover on the euro and pound when you are selling," Mr Tulezi said.

"This year the market has been horrible. It is not working in favour of the growers. A lot of farms are struggling with liquidity challenges because money is not coming in as they had expected."

Latest data collated by the Central Bank of Kenya show earnings from horticultural exports fell 11.94 percent in eight months through

Roses

Clement Tulezi, KFC CEO

"In ongoing trends, spending on discretionary items has been cut, as has money put toward savings. Consumers are buying smaller quantities or delaying purchases."

Data released by the European Statistical Office (Eurostat) Friday showed price growth in the Eurozone — including the Netherlands, which is the largest buyer of Kenya's cut flowers — exceeded market expectations of

August to $1.003 billion (Sh120.36 billion) from $1.139 billion (Sh136.68 billion) in the same period last year.

Earlier, official statistics for the half-year period ended June also showed income from horticultural exports dropped 11.27 percent year-over-year to Sh64.84 billion, the sharpest fall since 2012.

CBK governor Patrick Njoroge has warned that the double-digit inflation in Europe will have a considerable spillover effect on emerging markets like Kenya.

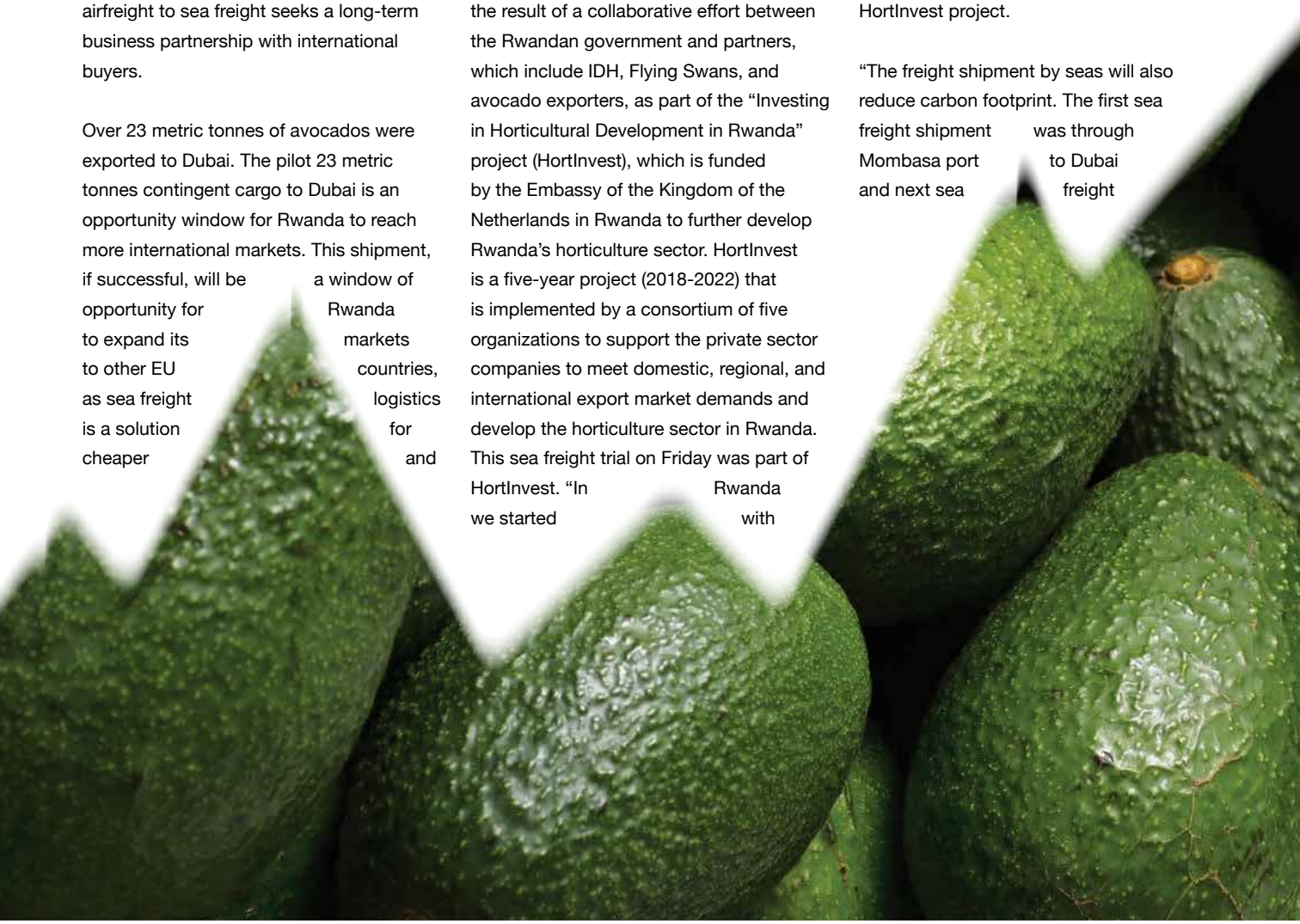
IDH Facilitates Rwanda to Ex

The National Agricultural Export Development Board (NAEB) in collaboration with IDH project, flagged off the first reefer container shipment of avocados by sea. IDH, The Sustainable Trade Initiative, is an organisation (Foundation) that works with businesses, financiers, governments and civil society to realise sustainable trade in global value chains and facilitates private sector access to international markets. The shipment alternative, diverting from airfreight to sea freight seeks a long-term business partnership with international buyers.

Over 23 metric tonnes of avocados were exported to Dubai. The pilot 23 metric tonnes contingent cargo to Dubai is an opportunity window for Rwanda to reach more international markets. This shipment, if successful, will be a window of opportunity for Rwanda to expand its markets to other EU countries, as sea freight logistics is a solution for cheaper and sufficient competitive transport. This historic horticulture shipment from Kigali to a customer in Dubai contained avocados from eight Rwandan avocado export companies.

Transitioning from airfreight export to sea route is expected to be one of the solutions to constantly rising transport logistics costs, which is one of the major concerns for horticulture exporters, limiting access to global markets. The pilot shipment is the result of a collaborative effort between the Rwandan government and partners, which include IDH, Flying Swans, and avocado exporters, as part of the "Investing in Horticultural Development in Rwanda" project (HortInvest), which is funded by the Embassy of the Kingdom of the Netherlands in Rwanda to further develop Rwanda's horticulture sector. HortInvest is a five-year project (2018-2022) that is implemented by a consortium of five organizations to support the private sector companies to meet domestic, regional, and international export market demands and develop the horticulture sector in Rwanda. This sea freight trial on Friday was part of HortInvest. "In Rwanda we started with supporting exporters of fruits and vegetables. We help farmers and exporters to meet standards needed by international markets. That is how we facilitated Rwandan first avocado exporting by sea freight shipment," Said Sylvie, the IDH country manager. Over the past five years IDH supported the Rwandan private sector with standard fresh produce to leverage international markets and helped to build storage facilities for horticulture exporters at the Special Economic zone through the HortInvest project.

"The freight shipment by seas will also reduce carbon footprint. The first sea freight shipment was through Mombasa port to Dubai and next sea freight



xport Avocado by Sea Freight

shipmpment will go to the Netherlands. We helped in financial cost and preparation of needed quality avocado produce to be exported, she said. The shipment is part of efforts to diversify export logistics routes in order to increase Rwandan benefits from international markets. This pilot shipment is in line with Rwanda's Agriculture Transformation Strategic Plan, NAEB said.

It is part of a larger project aimed at increasing the competitiveness of Rwanda's horticulture products through the use of sea freight transport, allowing the sector to remain relevant in the international market by supplying larger volumes of high-quality product.

Dr Martin Koper Deputy Head of Mission of the Embassy of the Kingdom of the Netherlands underscored: "The trial shipment is the beginning of a revolutionary journey in the history of horticulture export in Rwanda. As such, this fits within the Netherlands policy to promote Sustainable Trade and Investment with Rwanda. It marks the beginning of a long term journey, which will require a joint effort from both the public and private sector".

"Flying Swans aims to develop cool logistics corridors in multiple countries to unlock the potential of the local horticulture sector.

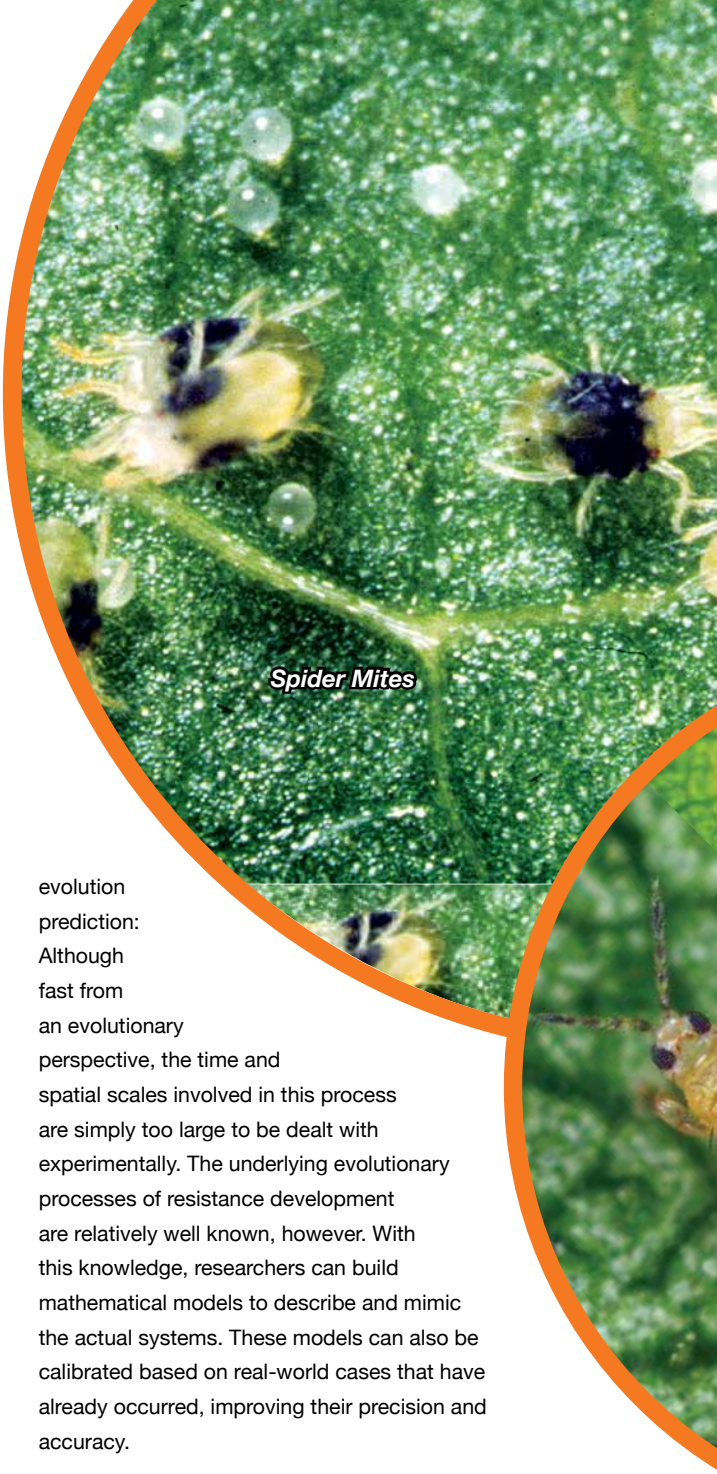
We're delighted that we can serve the sector in Rwanda as well. We will continue to seek opportunities to improve the efficiency and (cost-) effectiveness of sea freight export shipments from Rwanda," said Marcel Biemond, Program Director Flying Swans which also partnered in the avocado shipment activity. Flying Swans is a cross-industry coalition that develops agro-logistics projects in emerging economies with the aim of fostering SGD-impact while supporting the Dutch main port/green port sector.

In the sea freight trial Flying Swans coordinates all cool logistics activities after stuffing the container until its final destination.

Exporters welcome the initiative

"We welcome the support in sea freight shipment. It was really needed. It is a solution because airplanes carry few quantities of exports while ships transport more than that. The freight cost is also going to decrease by half, "said Latifah Mugwaneza, who exported avocados.

Insecticide Resistance Modelling



What is insecticide resistance modelling and who uses it?

One of the most common questions asked of insecticide resistance researchers is “How long will it take for insecticide resistance to occur?” One way to answer this questions is to look at past events and identify trends that may repeat. This can be informative, but limited to general trends. For example in the crop protection market, it is often predicted that a pest insect that feeds on diverse hosts and is treated with multiple insecticides is much more likely to develop resistance than an insect pest found on a single host plant and has limited exposure to insecticides. These kinds of basic predictions or trends are regularly used by researchers and insecticide manufacturers to prioritise their resistance management activities, focusing on where the risks of resistance development are highest or have most economic or social impact. Predicting resistance development with more accuracy and reliability beyond these trends becomes considerably more difficult.

A second frequently asked question is “What are the best ways to delay or prevent the development of insecticide resistance?” The most common and often default answer is to rotate different insecticide modes of action, so that the insects do not build up resistance to one group of insecticide. Despite this being a valid approach, pest management is often a complex system, which is influenced by multiple factors (e.g. biological, geographical, meteorological, economical and sociological) and often requires more detailed or alternative resistance management guidance. Predicting insecticide resistance development and designing methods to slow or prevent its appearance is therefore a necessary and challenging task for those who have an interest in providing sustainable insect control. It requires an understanding of the inter-dependant factors involved in insect pest management and how they are influenced by the surrounding environment. These interactions occur on a large scale and over a multi-year time frame, making it difficult to replicate effectively at laboratory or even individual field scale. The challenges faced by trying to understand how these multiple interactions can affect resistance management have resulted in the increasing utilisation of simulation models.

In a situation in which running real-world experiments is impractical (or even impossible), computer simulations offer a powerful solution to understand complex problems. This is exactly the case of resistance-evolution prediction: Although fast from an evolutionary perspective, the time and spatial scales involved in this process are simply too large to be dealt with experimentally. The underlying evolutionary processes of resistance development are relatively well known, however. With this knowledge, researchers can build mathematical models to describe and mimic the actual systems. These models can also be calibrated based on real-world cases that have already occurred, improving their precision and accuracy.

In the case of insecticide resistance simulation, researchers will construct a model that simulates the environment and its interconnecting factors in which they want to investigate resistance development. The model components will include parameters related to pest biology, pesticide dynamics, applicator behaviour and environmental conditions, which are either based on measured data or on assumptions made by the designer. Once the researchers have validated that their simulation successfully mimics an approximation of the real life scenario they wish to model, they can change the parameters to see how individual or multiple factors can change the outcome of a model and ask “What would happen if…?”.

What can we expect from a resistance simulation model? Can it really predict the development of insecticide resistance?

It is clear that insecticide resistance simulation models cannot entirely replicate real-life situations. Models are only approximations of the real system. Good models, however, are good such approximations. There are many known and unknown interacting factors and chance events in a real life environment that make it impossible to fully simulate. Therefore the purpose of an insecticide resistance simulation model is to create a simulation of an environment with all the parameters or factors that are believed to be critical influences on insecticide resistance development. Any insecticide resistance simulation model is unlikely to be a perfect replication of any given rural or urban pest management environment, but it does provide a tool in which comparative resistance management strategies can be explored in a proactive and timely way.

In general insecticide resistance models should be seen as a tool to provide an informed best guess at how insecticide resistance may develop under different insect control scenarios to the best of the modeller and analysists knowledge.

Resistance-evolution models have a limited prediction power, but within the boundaries defined in the model itself, researchers can take advantage of a large number of simulations to provide probabilistic predictions (e.g. “within the limits of this model, we can predict that resistance frequency can reach 50% in 5 to 10 years, with 95% confidence”). Just as weather forecast, there is a chance that the prediction will not realise. Still weather forecasts are an incredibly useful tool used everywhere in the world.

The main advantage of predictive models in this context, however, is the possibility of comparing alternative scenarios (strategies) and evaluate their relative performance. Even if the absolute numbers are not necessarily spot on, the comparison of alternative scenarios tends to be very reliable in determining the better resistance-management strategy to be implemented in real life.

Are all insecticide resistance simulation models the same? If not, what are the differences?

Computational models differ in several aspects; and models for insecticide resistance evolution are no exception. The first aspect in which models can vary is the level of granularity in which they are built (in other words, how many parameters/variables are required to regulate the process under scrutiny): A model can set about describing high-level general patterns of population density, for instance. To investigate phenomena at this level, simple models including a handful of variables are probably enough. Models which would involve population density plus interaction with the environment would need additional parameters, including interaction parameters.

There are also different schools of modelling and they have a

relation with the level of granularity in which researchers are interested in exploring: Some models, in fact, don't even require simulations to be run as their components can be sufficiently well described by a series of equations, which in turn can be solved analytically. Slightly more complex models still involve a series of equations, but they can be tricky enough to require computational methods to be solved. These are the equation-based models, which tend to investigate a problem in top-down manner.

Agent- or individual-based models (IBMs) come from a different school of thought: They are built bottom-up, where their more fundamental parts are the individual agents in the system (e.g. insects in the pest population). The complexity of a model like this depends on how many levels the model contains (e.g. individuals (1) that form a population (2), possibly part of meta-population (3 levels)) and the number of variables each individual contains (e.g. sex, age, feeding behaviour, number of populations, population size, etc.). This kind of model almost always requires computer simulations to come to life and has only been used to extent in which computers can handle them, of course.

Regardless of the school of modelling used, simplicity is always the order of the day. A good model is only as complex as necessary (not a single parameter more).

Different questions in insecticide resistance evolution can be better tackled in either one or other approach. If simple and well-known high-level phenomena are the focus, equation-based models are generally all that is needed; if there are more low-level nuances to the question and emergent properties of the system could be expected, then IBMs tend to provide more robust depictions of the real-world system.

What kind of information do I need to build an insecticide resistance simulation model?

This depends heavily on the kind of model chosen (like the question above), but a typical resistance evolution model would incorporate the following information:

Fundamental pest-biology parameters

Population dynamics

Population size - This is a key number defining the kind of evolutionary processes a population will undergo. The lower the population size, the higher the odds of stochastic events to happen (genetic drift). Larger population sizes, in turn, lead to more deterministic processes involving natural selection.

Reproductive biology – The way insects go through their life cycles varies dramatically. These differences need to be accounted for with parameters defining their life stages, their mode of reproduction and their reproductive potential.

Insecticide bottle

Natural mortality – The majority of insect species have their populations naturally controlled by biotic and environmental phenomena (e.g. resource availability, predation, seasonal temperature variations, etc.). Pest insects are also subject to these phenomena, but to different extents in different situations.

Migration rate – The ability of genes to spread across populations is regulated by the migration rate in the meta-population. The higher its value, the more rapidly a resistant mutation will spread in space.

Genetics

Resistance factor – This parameter works as a summary of complex underlying biochemical processes that determine how much more successful resistant individuals are when compared to susceptible ones.

Rose flower bud infested with Aphids

The more relatively successful a resistant form is, the more quickly it will tend to dominate the population.

Standing resistance-allele frequency – This determines how common resistant forms are before the population is exposed to the treatment (either by standing genetic variation or mutation). If resistant forms are common, pest resistance will emerge more rapidly.

Other genetic factors – The genetics of adaptation can be very complex, involving multiple genes, modes of inheritance, degrees of expression, and dominance within and between loci. Models for resistance evolution normally assume the simplest case (one gene with two forms), but researchers are investigating what consequences deviations from this case can have in the final outcome (i.e. time to resistance).

Fundamental crop-protection parameters

Baseline efficacy of the product(s) against different pest life stages – The efficacy (strength) of an insecticide combined with the resistance factor (above) determines the selective force applied to the population. An insect that is resistant to a strong product will have relatively more reproductive success than an insect resistant to a weaker insecticide, when compared to the respective susceptible forms.

Crop protection strategy (e.g. product alternations and mixtures, crop(s) – This characteristic of a model aggregates as series of parameters related to how the pest control is carried out. It is precisely at this point that different scenarios can be devised and compared to find the more adequate solutions to keep resistance at bay.

Additional parameters

Weather – Weather has direct effects on the biology of both pest and crop. It is important to account for weather variation when providing resistance-evolution predictions.

Crop-pest interactions – A crop may provide different levels of support to a pest population depending on its development stage and variety. This translates into different maximum population sizes for the pest, which affects directly the first parameter discussed in this list (above).

Landscape parameters (e.g. proportion of crop fields, nature and other areas) – Evolution of resistance happens in time and space. The time frame to be investigated is generally clear and straightforward (e.g. 25 or 50 years); the space can vary dramatically in size and composition. Models often include different scenarios for the latter (e.g. field mosaics), whereas the total area is generally as large as what can be treated with current computational power, especially with individual-based models.

Modelling evolutionary processes is a complex undertaking and doing that for evolution of pesticide resistance is no exception. Therefore a good deal of modelling expertise combined with a deep understanding of evolution and agronomy is required to build sensible models and to make sense of their results. The effort is worthwhile, though: Modelling can provide much more precise and potentially accurate results, which can be directly translated into resistance management recommendations tailor-made for every situation.

Why it's Vitally Important
For You to Know Your End Consumer

"We're embracing an opportunity to build relationships with the plant community and putting more effort into connecting with the end consumer," said Costa Farms CEO Joche Smith in August.

It wasn't too many years ago there was a huge disconnect between consumers and producers. There were people in the world who didn't know milk came from a cow, much less that the cow lived on a farm. Some thought tomatoes grew underground or that cheese came from a plant, and they knew next to nothing about farming and ranching. Those types of consumers may still exist today, but the numbers are dwindling. Today's consumers are better informed; they're more tuned in to how and where their flowers are produced. The days of a producer remaining in obscurity, far removed from interacting with the end-consumer, are coming to a swift close. I would argue the same is true for ornamental plant producers, or at the very least, it is on the horizon.

I'm starting to hear more about an increasing disconnect between plant producers and the end consumer. You're probably familiar with how the discussions go. Growers have an out-of-sight, out-of-mind mentality with end consumers because they don't have to interact with them or answer to them when things go wrong.

I'm not here to point the accusing finger. Rather, it is a good time to reemphasize that we all have a responsibility toward ensuring

Flower farm

end consumers have a good experience with the plants they buy. We all sooner or later will answer to the end consumer because they vote with their dollars. Without their purchases, there is no product to sell, no product to grow.

When Costa Farms announced in August a shift in its commercial strategy to put increased focus on the end consumer (learn more here), I was intrigued by the following statement in the press release from CEO Joche Smith.

"With changing demographics and the continued enthusiasm with gardening, we're seeing that more consumers than ever want to communicate with the team that grew their plants," Smith said. "We're embracing this opportunity to build relationships with the plant community and putting more effort into connecting with the new consumer."

Costa has the right idea in seizing the opportunity to interact with its consumers and develop better relationships, particularly by positioning itself as a sought-after consumer brand. Say what you want about branding, but it is a differentiator and an educator of sorts because as consumers, we associate the various brands we see on retail shelves, either positively or negatively, with different things, such as quality, information, price points, concepts, experiences, people, or emotions.

I don't know about you, but I'm tired of seeing a tangled mass of indistinguishable six-packs of plants on garden center benches. Growers deserve better than that. It's about time they received some credit for their efforts to produce top-notch, quality plants by having consumers who seek after them. Consumers also ought to have better. They deserve the right to make educated choices about the plants they buy based on who grew them and who bred them.

Many greenhouse producers already have their personal brands and include their names on the packaging. Why can't other growers do the same? It's a great opportunity to connect with the end consumer. It's the equivalent of putting a name to a face. We're all asking ourselves how we can retain existing gardeners and attract new ones. With e-commerce and social media readily available to reach the end consumer, I think a new era has arrived where growers are even more involved with the end consumer than ever before, where increased attention is paid to the needs of the end consumer. And it is all good for the industry. We know we are dealing with a new breed of consumer.

Customer engagement is changing. They crave interaction. The businesses that grow and find continued success will be those that do more to build their business around their customers. Happy growing!

CHRYSAL CARES

Fresh flowers by sea

Chrysal Sea Freight Service

CHRYSAL

FLOWER & VEGETABLE FARMS IN KENYA

FARM NAME	PRODUCT	LOCATION	CONTACT PERSON	TELEPHONE	E-MAIL
AAA- Flowers-Simba	Roses	Rumuruti	Anil	0758349471	anil@aaagrowers.co.ke
AAA- Flowers -Chui Farm	Roses	Timau	Phanuel Ochunga	07522506026	fanuel.ochunga@aaagrowers.co.ke
AAA-Simba Farm	Roses	Rumuruti	Anil	0758349471	anil@aaagrowers.co.ke
Across Agriculture Ltd	Herbs	-	Emily Chepkemoi	0729080186	chep28@gmail.com
Africalla Kenya Ltd	Cuttings	Eldoret	Meindert	-	meindert@africalla.com
Africa Blooms	Roses	Salgaa	Ramnath Sarbande	0798190511	ramnath.sarbande@xflora.net
Afriscan Kenya Ltd	Hypericum	Naivasha	Charles Mwangi	-	-
Agriflora (K) Ltd		Nakuru, Njoro	Charles Mulemba	0721311279	cmulemba@sianflowers.co.ke
Aquila Development Co	Roses	Naivasha	Prashant Takate	0799356002	gm@aquilaflowers.com
Baraka Roses/ Mumi Flora	Roses	Ngorika	Simon Blinco	0723234927	simon@barakaroses.com
Batian Flowers	Roses	Nanyuki	Rakesh	0724631299	
Beautyline	Flowers	Naivasha	Peter Gathiaka	0721392559	peter@beautyli.com
Big Flowers	Roses	Timau	Gideon Waweru	0721178974	gideon@fontana.co.ke
Bigot Flowers	Flowers	Naivasha	Kakasaheb Jagtap	0722205271	jagtap.kt@bigotflowers.co.ke
Bila Shaka Flowers	Roses	Naivasha	Joost Zuurbier	0722204489	bilashaka.flowers@zuurbier.com
Black Petals	Roses	Limuru	Nirzar Jundre	0722848560	nj@blackpetals.co.ke
Bliss Flora Ltd	Roses	Njoro	Appachu Sachin	0789101060	appachu7@yahoo.com
Bloom Valley	Roses	Salgaa	Ramnath Sarbande	0798190511	ramnath.sarbande@xflora.net
Blooming Dale Roses Kenya Ltd	Roses	Nanyuki	Sunil	0718991182	info@bloomingdaleroses.com
Blooming Africa	-	Gilgil	Bert	0722204309	bert@blooming-innovations.com
Buds and Blooms	Roses	Nakuru	Shivaji Wagh	0720895911	shivaniket@yahoo.com
Carzan (K) Ltd KS	Summer flowers	Salgaa	Stanley Rotich	0721931710	stanley.rotich@marginpar.biz
Carzan (K) Ltd ST	Hypericum, solidago	Sobea	Thaddeus Adung'o	0716019094	thaddeus.adung'o@marginpar.biz
Carzan - Molo	Carnations	Molo	Charles Chelule	0728784081	charles.chelule@marginpar.biz
Charm Flowers	Flowers	Athiriver	Ashok Patel	020 352583	ashki@charnflowers.com
Chestnut	Vegetables	Naromoru	Gabriel Kiai	-	gabriel.kiai@aaagrowers.co.ke
Colour Crops	Hypericum	Nanyuki	Kennedy Wanyama	0716389472	colourcrops@tmu.com
Colour crops	Summer Flowers-	Bahati	Patrick Kipkurui	0727806184	bahati@colourcrops.com
Colour crops	Flowers	Naivasha	Geoffrey Mwaura	0722200972	nva@colourcrops.com
Credible Blooms	Flowers	Rumuruti	Eliud Njenga	0722382859	eliud@pigeonblooms.com
Dale Flora	Roses	Mogotio	Ajay Sutar	0711102266	ajay.sutar24@gmail.com
Desire Flowers	Flowers	Isinya	Rajat Chaohan	0724264653	rajatchaohan@hotmail.com
De ruiters	Breeder Roses	Naivasha	Fred Okinda	0722579204	Fred.okinda@deruiter.com
Double Dutch	Cuttings	-	Pharis Wainaina	0728207661	
Dummen Orange	Flowers Breeders	Naivasha	Bart Engels	0759069896	b.engels@dummenorange.com
Eco Roses	Roses	Salgaa	Madhukar Bhalerao	0799555440	Mbhalerao.eco@btfgroup.com
Elbur flora- kimman	Roses	Nakuru	Daniel Moge	0721734104	kimmanexp@gmail.com
Enkasiti Thika	Flowers	Thika	Tambe Sabaji	0734740202	enkasiti@gmail.com
Equinox	Flowers	Nanyuki	Harry Kruger	0707266956	harry@equinoxflowers.com
Everest Flowers Ltd	Flowers	Mt. Kenya	Victor Kibore	0700416334	-
Everflora Ltd.	Flowers	Thika	Ghanshyam Dusang	0721638005	manager1@everflora.co.ke
Evergreen Crops		Nairobi	Arun Singh	0721941009	arun@evergreencrops.com
Exotic Peninah	Roses/ Carnations	Athiriver	Dan	0734626942	dan@exoticfields.com
Fairy Flowers	Flowers	Limuru	Sylivester	0753444237	sylvesterkahoro@yahoo.com
Fairy Flowers	cutings	Limuru	Kennedy Kamau	0712204894	kenreal07@gmail.com
Fides Kenya Ltd	Cuttings	Embu	Bernard Marindany	0726 366 752	B.Marindany@DummenOrange.com
Finlays- Lemotit	Flowers	Kericho	Japhet Langat	0722 863527	japhet.Langat@finlays.co.ke
Fontana Ltd - Akina farm	Roses	Njoro	Mahendra Patil	0798254199	mahendra@fontana.co.ke
Fontana Ltd - Ayana Farm	Roses	Mau Narok	Osman	0712933710	osman@fontana.co.ke
Flamingo Horticulture Farm	Flowers	Naivasha	Peter Mwangi	0722204505	peter.mwangi@flamingo.net
Flamingo -Kingfisher Farm	Flowers	Naivasha	Elijah Getiro	0722873539	elijah.getiro@dudutech.com
Flamingo - Osprey		Naivasha	Jacob Wanyonyi	0722773560	jacob.wanyonyi@flamingo.net
Flamingo -Siraji Farm	Carnations, Roses	Nanyuki	Peris Muturi	0729050116	Peris.Ndegwa@flamingo.net
Flamingo -Ibis	summer, vegetables	Nanyuki	Margaret Mumbi	-	-
Flamingo Flora	Roses	Njoro	Sam Nyoro	0721993857	s.ivor@flamingoflora.co.ke
Flora ola	Roses	Solai-Nakuru	Lucas Choi	0721832710	lucas.choi@floraola.co.ke
Flora Delight	Summer flowers	Kiambu/ Limuru	Marco	0710802065	marcovansandijk@yahoo.com
Florensis Ltd	Cuttings	Naivasha	Simon Mwangi	0721519470	simon.mwangi@florensis.com
Florenza Ltd	Roses	Solai	Yogeesh	0737453768	farm.florenza@megaspingroup.com

FLOWER & VEGETABLE FARMS IN KENYA

FARM NAME	PRODUCT	LOCATION	CONTACT PERSON	TELEPHONE	E-MAIL
Fresh Gold Flowers Ltd	Flowers	Mt. Kenya	John Karimi	0721622294	karimi@freshgolgkenya.co.ke
Gatoka Roses	Roses	Thika	Herman Njuguna	0728 854 844	info@gatokaflowers.com
Golden Tulip	Roses	Olkalao	Umesh Choudhery	0739729658	umesh.gftl@btfgroup.com
Groove	Flowers	Naivasha	John Ngoni	0724448601	groovekenya@gmail.com
Hanna Roses Ltd	Roses	Thika	Kadlag Palaji	0723149968	kadlag.paraji@hannaroses.com
Harvest Ltd	Roses	Murungaru	Julius Oloo	0721465853	oloo@harvestflowers.com
Harvest Ltd	Roses	Athiriver	Julius Oloo	0721465853	oloo@harvestflowers.com
Harvest Ltd	Roses	Olkalou	Julius Oloo	0721465853	oloo@harvestflowers.com
Heritage Flowers Ltd	Roses	Rumuruti	Sailesh Kumar	0722203750	hfl.srk@gmail.com
Highland plantations	Cuttings & Herbs	Olkalau			production@highlandplants.co.ke
Imani Flowers	Summer Flowers	Kabarak, Nakuru	Raphael Otieno	0792302466	raphael@imaniflowers.co.ke
Interplant Roses	Roses	Naivasha	Gavin Mourittzen	0733220333	info@interplantea.co.ke
Isinya	Flowers	Isinya	Rajesh	-	pm@isinyaroses.com
Karen Roses	Flowers	Nairobi	Peter Mutinda	0723353414	pmutinda@karenroses.com
Kariki Ltd- Thika	Flowers	Thika	Miriam	0720674307	kariki.production@kariki.biz
Kariki Ltd - Nanyuki	Eryngiums	Nanyuki	Richard Fernandes	062-31023/6	bondet.production@karik.biz
Kariki Ltd - Naivasha	Summer	Naivasha	Esau Onyango	0728606878	hamwe.production@kariki.biz
Kariki Ltd - Molo	Fowers	Molo	James Oluoch	0716333717	jame.oluoch@kariki.biz
Kenflora Limited		Kiambu/ Limuru	Abdul Aleem	0722311468	info@kenfloraa.com
Kentalya	Cuttings	Naivasha	Lynette	0733549773	lynette@kentalya.com
Kikwetu Flowers	Roses	Mt. Kenya	Rathan	0787266007	
Kisima Farm Ltd	Roses	Timau	Craig Oulton	0722205828	craig@kisima.co.ke
Kreative	Roses- Breeders	Naivasha	Bas Smit	0733607755	info@kordes-ea.com
Kongoni River Farm - Gorge Farm	Roses	Naivasha	Anand Patil	0728608785	anand.patil@vegpro-group.com
Kongoni River Farm - Liki River	Flowers	Nanyuki	Madhav Lengare	0722202342	madhav@vegpro-group.com
Kongoni River Farm - Star Flowers	Roses	Naivasha	Jagtap Shahaji	0792547633	japtag@vegpro-group.com
Kongoni River Farm - Kongoni	Flowers	Timau	Kadam	0721274413	--
Kongoni River Farm -Bemack	Flowers	Timau	Balasaheb Ingwale	0717181102	balasaheb@vegpro-group.com
Kongoni River Farm - Galaxy	Roses	Naivasha	Chandrakant Bachche	0724639898	chandrakant.bachche@vegpro-group.com
Kongoni River Farm- Longonot	Roses	Naivasha	Ravi Sathe	0715173603	ravi.sathe@vegpro-group.com
Lamorna Ltd	Roses	Naivasha	Mureithi	0722238474	admin@lamornaflowers.com
Lathy Flora & Fairy	-	Kiambu	John Mbaoni	0753888126	info@lathyflora.com
Lauren International	Flowers	Thika	Dilip	0720796629	laurenflowers@accesskenya.co.ke
Laurel Investment	Roses	Olkalou	Ravindra Palshikar	0740569286	ravi.lil@btfgroup.com
Livewire	Hypericum	Naivasha	Esau Onyango	0728606878	management@livewire.co.ke
Lolomarik	Roses	Nanyuki	Topper Murry	0715 727991	topper@lolomarik.com
Lobelia	Roses	Timau	Ken Mwiti	0722475785	info@lobelia.co.ke
Maridadi Flowers	Flowers	Naivasha	Jack Kneppers	0733333289	jack@maridadiflowers.com
Maua Agritech	Flowers	Isinya	Kori	115355251	kori@mauaagritech.com
Mau Flora	Roses	Nakuru, Turi	Manju	0748254171	manju@mauflora.co.ke
Milenium Growers	Summer Flowers	-	Sushant Wankara	0731316000	sushant@marvelgreens.com
Molo Greens	Solidago, carnations	-			
Mt. Elgon Orchards	Roses	Tran Nzoia	Bob Anderson	0735329395,	bob@mtelgon.com
Mt. Kenya Alstromeria	Alstromeria	Meru	Miriam	0716162671	miriam@mountkenyaalstromerialtd
Mzuurie Group	Roses		Andrew Wambua	0724256592	awambua@moloriverroses.co.ke
Mzuurie Flowers - Maji Mazuri	Roses	Moi's Bridge, Eldoret	Mark Juma	0727471034	mjuma@majimazuri.co.ke
Mzuurie Flowers - Molo River Roses	Flowers	Kilelwa	Paula Koros	072241436	pkoross@moloriverroses.co.ke
Mzuurie Flowers - Winchester Farm	Roses	Karen		-	-
Mzuurie Flowers - Winchester Farm	Flowers	Bahati	Joseph Kasoso	0725696509	jkasoso@winchester.co.ke
Nini Farms	Roses	Naivasha	Vijay Bhosale	0702662297	vijay.bhosale@herburgroses.nl
Nirp East Africa	Roses	Naivasha	Danielle Spinks	0702685581	danielles@nirpinternational.com
Ol Njorowa	Roses	Naivasha	Charles Kinyanjui	0723986467	mbegu@olnjorowa.com
Oserian-Bohemian	Flowers	Nakuru	Chakravarthi Yashmith	0786143515	chakra.kuppusamy@oserian.com
Panda Flowers	Roses	Naivasha	-	-	gm@pandaflowers.co.ke
Panocol International	Roses	Eldoret	Mr. Paul Wekesa	0722748298	paul.wekesa@panocal.co.ke
Penta	Flowers	Thika	Tom Ochieng	0723904006	tom@pentaflowers.co.ke
Pendekeza	Roses	Nanyuki	James Kiiru	0708124381	tambuzi.sales@tambuzi.co.ke
PJ Dave Flowers	Flowers	Isinya	Pravin Yadav	0708020202	gm@pjdave.com

FLOWER & VEGETABLE FARMS IN KENYA

FARM NAME	PRODUCT	LOCATION	CONTACT PERSON	TELEPHONE	E-MAIL
Pj Dave	Roses	Timau	Ashok Everlyn Ladkat	0702000341	fmrisingsun@pjdave.com
PJ Flora	Roses	Isinya	Santos Kulkarni	0738990521	santosh@pjdaveflora.com
Plantech Kenya Ltd	Propagators	Naivasha	Idan Salvy	0702187105	idan@plantechkenya.com
Porini Flowers	Roses	Molo	Shakti Vanjimuthu	0739676998	shakti@poriniflowers.com
Primarosa Flowers Ltd	Roses	Ol njororok, Nyandarua	Peter G. Njagi	0723575461	opm@primarosaflowers.com
Rain Forest Farmlands Ltd	Roses	Naivasha	Boniface Kiama	0722780811	bkiama@fleurafrica.com
Ravine Roses Flowers	Flowers	Eldama Ravin	Peter Kamuren	0722205657	pkamuren@karenroses.com
Redland Roses	Flowers	Thika	Aldric Spindler	0733609795	aldric@redlandsroses.co.ke
Redwing Flowers	Flowers	Nakuru	Simon Sayer	0722227278	sayer@redwingltd.co.ke
Rift Valley Roses (K) Ltd	Flowers	Naivasha	Peterson Muchiri	0721216026	fm@riftvalleyroses.co.ke
Rimi Flora Ltd	Hypericum	Njoro	Richard Mutua	0722357678	richard@rimiflora.com
Riverdale Blooms Ltd	Flowers	Thika	Antony Mutugi	0202095901	rdale@swiftkenya.com
Roseto	Roses	Salgaa	Aravindra Hirario	07417791483	gm.roseto@megaspingroup.com
Sandpro Growers	Gypsophylla	Meru	Elly Okech	0727580266	elly.okech@sandprogrowers.com
Savannah international	Geranium	Naivasha	Ignatius lukulu	0728424902	i.lukulu@savanna-international.com
Selecta Kenya		Thika	Robert Khamala	0727 467 464	r.khamala@selectakenya.com
Sojanmi Spring Fields	Roses	Njoro	Senthil	0791184851	senthil.adhikesavan@bidcoafrica.com
Sunripe Farm		Naivasha	Antony	0711827785	naivasha@sunripe.co.ke
Schreus	Roses	Naivasha	Haiko Backer	-	-
Shades Horticulture	Flowers	Isinya	Ashutosh Mishra	0722972018	info@shadeshorticulture.com
Shalima Group (k) Ltd	Flowers	Nairobi	Natarajan	0738 999149	natarajan@eaga.co.ke
Shalimar Shalimar	Flowers	Naivasha	Dinkar Wandhekar	0702418174	dinkar@eaga.co.ke
Shalimar- Kabuku Farm	Flowers	Thika	Mohan Raj	0724265777	kabukufm@eaga.co.ke
shalimar- Mahee Farm	Roses	Olkalou	Natarajan	0738999149	natarajan@eaga.co.ke
Shalimar- Mwanzi Farm	Flowers	Rumuruti	Ram	0797185821	mwanziflowersfm@eaga.co.ke
Sian Flowers - Maasai Flowers	Flowers	Isinya	Nancy Kurgat	0720780322	nkurgat@sianflowers.co.ke
Sian Flowers - Agriflora (K) Ltd	Roses	Nakuru	Charles Mulemba	-	cmulemba@sianroses.co.ke
Sian Flowers - Equator Roses	Roses	Eldoret	Nehemiah Kangogo	0725848910	nkangogo@sianflowers.co.ke
Sierra flora	Roses	Njoro	Oppaso Bandgar	720070053	farm.sierra@megaspingroup.com
Simbi Roses	Roses	Thika	Karue Jefferson	0733771652	simbi@sansora.co.ke
Sirgoek Flowers	Flowers	Eldoret	Andrew Keittany	0725 946429	sirgoek@africaonline.co.ke
Solai Milmet/Tindress	Flowers	Solai, Nakuru	Vinoj J. Kumar	0737801646	solairoses@gmail.com
Sololo Agriculture	-	Eldoret	Andrew Tubei	0722728364	atubei@sianflowers.co.ke
Subati Flowers	Roses	Subukia	Naren Patel	0712 584124	naren@subatiflowers.com
Subati Flowers	Roses	Naivasha	Naren Patel	0712 584124	naren@subatiflowers.com
Subati Flowers (Suera)	Roses	Nyandarua	George Kimathi	0724622638	gkbuuri@gmail.com
Sunfloritech-Blue Sky	Gypsophilla	Naivasha	Patel Sushant	0725622333	info@blueskykenya.com
Sunfloritech -Tulaga	Roses	Naivasha	A Duzai Rajan	0794572232	farmmgr.tulaga@btfgroup.com
Stockman rozen	Roses	Naivasha	Julius Muchiri	0722200890	julius@srk.co.ke
Syngenta Flowers - Kenya Cuttings	Flowers	Thika	Kavosi Philip	0721225540	philip.munyoki@syngenta.com
Syngenta Flowers - Pollen	Flowers	Thika	Joseph Ayieko	0733552500	joseph.ayieko@syngenta.com
Tambuzi	Roses	Nanyuki	Benard Maina	0721860080	tambuzi.sales@tambuzi.co.ke
Terrasol	Cuttings	Limuru	Benard Adwarh	0753444230	adwarh@terrasolkenya.com
Timaflor Ltd	Flowers	Nanyuki	Simon van de Berg	0724443262	info@timaflor.com
Transebel	Flowers	Thika	David Muchiri	0724646810	davidmuchiri@transebel.co.ke
Uhuru Flowers	Flowers	Nanyuki	Ivan Freeman	0713889574	ivan@uhuruflowers.co.ke
Utee Estate	Chrysanthemums	Nairobi	Appaso Mane	0737 513 844	mane.uel@btfgroup.com
United Selections	Roses -Breeder	Ngata, Nakuru	Jeroen Van Marrewijk	700176556	jvanmarrewijk@united-selections.com
V.D.Berg Roses	Flowers	Naivasha	Johan Remeeus	0721868312	johan@roseskenya.com
Valentine Ltd	Roses	Kiambu/Limuru	Joseph Kariuki	0728 093 379	joseph.kariuki@valentinegrowers.com
Van Kleef Kenya Ltd	Roses	Njoro	Judith Zuurbier		roses@vankleef.nl
WAC International	Breeder	Naivasha	Richard Mc Gonnell	0722810968	richard@wac-international.com
Waridi Ltd	Roses	Athi River	-	-	farmmanager@waridi.com
Wildfire	Roses/summer	Naivasha	Patrick Mbugua	0721639306	patrickmbugua@wildfire-flowers.com
Wilfey	Gypsophila/hypericum	Subukia	Sammy Ndung'u	0720467551	-
Wilmar Agro Ltd	Summer Flowers	Thika	Alice Muiruri	0722 321203	alice.muiruri@wilmar.co.ke
Windsor	Roses	Thika	Pradeep Bodumalla	0736 586 059	farm@windsor-flowers.com
Xpressions Flora	Roses	Njoro	Brijesh Patel	0715469732	brijesh.patel@xflora.net
Zena - Asai Farm	Roses	Eldoret	Japhet Chelal	0721770597	japhet.zenaroses@gmail.com
Zena Roses - Sosiani Farm	Roses	Eldoret	Francis Kariuki	0725444515	fkariuki@zenaroses.com

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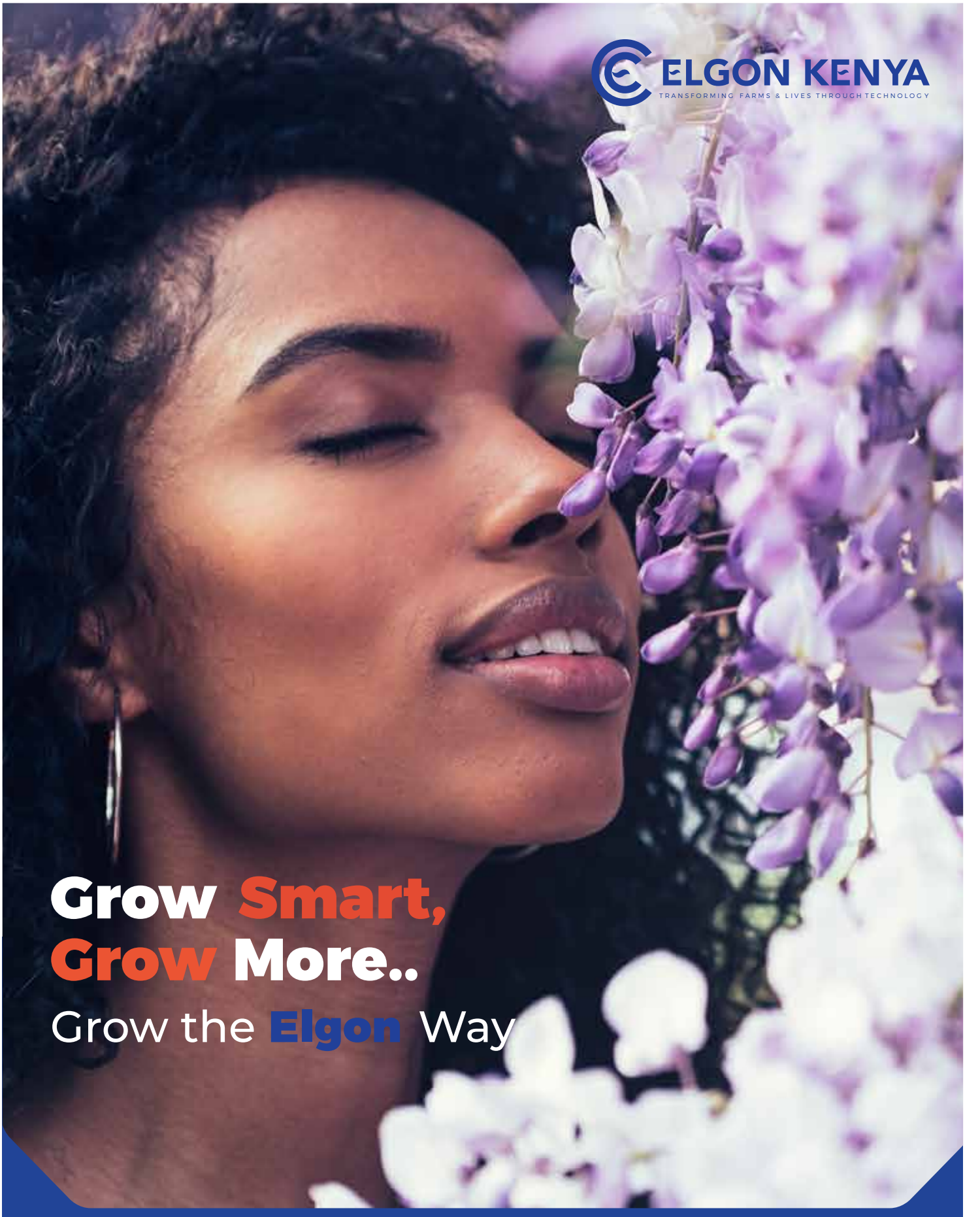

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