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Keeping livestock healthy for sustainable growth

Controlling pests and diseases
in rubber plantations

Boosting feed efficiency
in poultry production

Equipment:
Efficient tillage to increase yields

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Poultry Buyers' Guide 2020

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Japan's Obayashi Corporation to build agritech park in Indonesia

SINGAPORE'S GALLANT VENTURE has partnered with Japanese Obayashi Corporation to pilot a technologically-advanced eco-tourism focused greenhouse on Bintan island, Indonesia.

The Gallant Obayashi Green Agritech Park aims to cultivate premium crops with improved sustainability and higher yields. Crops from this urban agri-technology showcase will be commercialised for export to Singapore and beyond. A visitor and education centre for tourists and students is in the works to promote agri-technology.

Most crops in the Southeast Asian region are grown on open farms. These use a high volume of water. Although current greenhouse technology can boost productivity, conventional structures require constant climate control in tropical climates, making their use costly and unsustainable. This new tropical agritech greenhouse merges Obayashi Corporation's construction expertise with strong agricultural know-how to address these challenges. Besides, the Gallant Obayashi Green Agritech Park will leverage on environmental controls to create optimal growth conditions for Japanese-grade cherry tomatoes and kale. With Obayashi's plant physiology technology, the high-tech greenhouse is set to utilise heat and airflow analysis. The greenhouse will be equipped with a complex environmental control system that regulates temperature, humidity and light intensity to maximise crop production and quality as well as reduce water usage.

Image credit: Gallant Venture Ltd and Obayashi Corporation

Gallant Venture and Obayashi Corporation are to build a greenhouse optimised for tropical climates on Bintan island.

Hamlet Protein targeting animal feed industry growth in Asia

HAMLET PROTEIN, GLOBAL provider of soy protein for young animals, announced the joining of Glenn Ferriol as area sales manager (for Philippines, Malaysia and Indonesia) and Le Minh Quang as area sales manager (for Vietnam and Cambodia).

Ferriol is based in Taguig City (Philippines) and has strong experience in the animal nutrition and animal health industry. He has worked at various multi-national companies during his career.

Quang resides in HoChiMinh City (Vietnam). He majored in animal husbandry and veterinary and completed an MBA degree. He has built a network in the industry during his career at leading multi-national companies in animal nutrition and feed additives.

Speaking about the industry, Ferriol stated that Hamlet Protein has positive growth potential in Asia.

Quang commented that the market is changing towards more sustainable production and antibiotic growth promoters (AGP)-free diets. Hamlet Protein is expected to make a big impact in Asia on this respect, he added.

Although several countries have been challenged by the African Swine Fever (ASF) in 2019, the future looks bright for the animal feed industry in Asia, with a CAGR of around five per cent growth in the next five years.

"In the past two years, we have invested in our own sales organisation in China, headquartered in Qingdao, and can clearly see the impact of being close to our customers with talented industry professionals that fully understand the challenges of the local market. We feel strongly about the potential for our solutions in Asia and will focus on swine and poultry," concluded Hamlet Protein CEO Erik Visser.

Image credit: Adobe Stock

The company's solutions in Asia will focus on swine and poultry.

Bühler and Givaudan to open plant-based food innovation centre in Singapore

BÜHLER AND GIVAUDAN have joined forces to open an innovation centre dedicated to plant-based food in Singapore.

The facility is expected to bringing together a pilot plant featuring Bühler extrusion and processing equipment and a kitchen and flavor laboratory by Givaudan. The plant will be supported by experts from the two companies.

"The projected population of 10 billion people by 2050 is a challenge too big to be solved alone," explained Ian Roberts, chief technical officer of Bühler.

"Companies are increasingly aware of the urgent need to collaborate to make an impact on the climate and nutrition challenges of this century. Universities, start-ups and companies need to come together to innovate and find more sustainable ways to produce food. This is what this innovation centre is all about."

"We see a lot of market potential for plant-based products in the coming years in Asia, in particular, the alternative meat sector. Our combined expertise in the development and manufacture of plant-based foods will allow for new ranges that cater to Asia tastes, texture expectations and cooking techniques," said Fabio Campanile, head of science and technology at Givaudan.

Image credit: *Bühler*

Ian Roberts is the chief technical office at Bühler Group.

New salmon RAS project in South-East Asia

The project focuses on providing sustainable salmon products free of antibiotics, pesticides, hormones and microplastics.

PURE SALMON AND 8F Asset Management have announced a new 10,000 tonnes per annum Recirculating Aquaculture System (RAS) facility in Brunei.

The US$180mn state-of-the-art Atlantic salmon farm will be developed in partnership with The Strategic Development Capital Fund, Brunei Darussalam. The Strategic Development Capital Fund is a Brunei Government Trust Sub-Fund established to provide long-term financial sustainability for the country, through diversification of investments that will generate economic growth.

The project focuses on providing sustainable salmon products free of antibiotics, pesticides, hormones and microplastics by bringing a new industry to the country as the first land-based salmon farm in South-East Asia.

Once complete, the project, which is due to commence in the Q3 2020, will generate up to 145 local jobs, serve as a model example for other countries to follow and also contribute effectively to the local economy. From a national perspective, the project will also attract significant foreign direct investment for Brunei, with numerous global investors having already expressed an intention to participate.

Karim Ghannam, board director of Pure Salmon and CEO and co-founder of 8F Asset Management, commented, "The project puts Brunei at the leading edge of innovation in sustainable food production, addressing the increasing demand from a continuously growing population while contributing to the food security of the country."

Satellite IoT collars deployed to track livestock and racehorses

GLOBALSTAR EUROPE SATELLITE Services Ltd, a wholly-owned subsidiary of Globalstar, Inc. has announced that collars based on SmartOne C and SPOT Trace are being deployed in Mongolia and elsewhere in Central Asia to track horses, including high-value competitive racehorses.

More than 30,000 horses are being safeguarded by 1,000 satellite-enabled IoT collars in Mongolia with deployments expanding widely into Kazakhstan, Kyrgyzstan and Tajikistan while trials are underway in neighbouring territories.

Demand for the latest collar from Mongolia-based Globalstar Value Added Reseller Spotter, built around the small SmartOne C tracker, has been unprecedented, with the number of total deployed Spotter units doubling in the six months since the product's July 2019 launch.

Horses are part of daily life in Mongolia, and horse racing is a major sport nationwide. However, with the sparsely populated nation's 4.5 million semi-wild horses roaming fence-free, keeping tabs on the animals is a major challenge for owners. In response to market demand, Spotter was established to devise a tracking solution using Globalstar technology.

EVENTS 2020

MARCH

18-20
ILDEX Vietnam
Ho Chi Minh City, Vietnam
www.ildex-vietnam.com

24-26
VICTAM and Animal Health and Nutrition Asia
Bangkok, Thailand
www.victamasia.com

APRIL

7-9
Livestock Malaysia
Malacca, Malaysia
www.livestockmalaysia.com

MAY

7-9
AgriTechnica Asia
Bangkok, Thailand
www.agritechnica-asia.com

13-15
Agri Week Osaka
Osaka, Japan
www.agriexpo-osaka.jp/en-gb

JUNE

22-24
Hi & Fi Asia-China 2020
Shanghai, China
www.figlobal.com/china

AUGUST

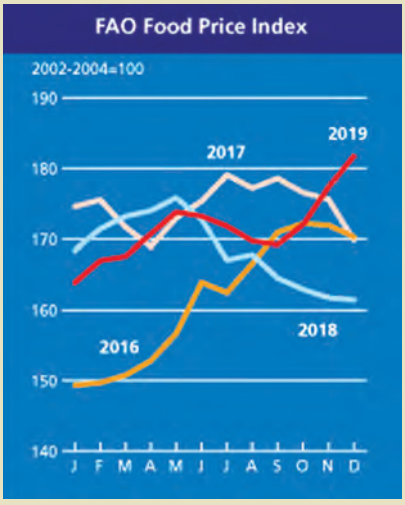
17-18
Agriculture & Organic Farming
Tokyo, Japan
www.agriculture.agriconferences.com

FOOD OUTLOOK

THE FAO FOOD Price Index (FFPI) averaged 181.7 points in December 2019, up 2.5 per cent from November, marking the third month of consecutive increase. Strong rallies in vegetable oils, sugar and dairy markets pushed up the overall value of the Index to its highest level since December 2014. However, for 2019 as a whole, the FFPI averaged 171.5 points, 1.8 per cent higher than in 2018 and still significantly (25 per cent) below its peak of 230 points registered in 2011.

The FAO Cereal Price Index averaged almost 164.3 points in December, representing a rebound of 1.4 per cent from November. The rise in December was largely led by higher international prices of wheat, as import demand from China accelerated while logistical problems in France, due to continued protests and worries over growing conditions in several important regions, also provided support.

The FAO Vegetable Oil Price Index averaged 164.7 points in December, up 9.4 per cent from November and reaching a 25-month high. The latest upturn was primarily driven by firming palm oil prices, while soy, sunflower and rapeseed oil values increased. International palm oil prices rose for the fifth consecutive month on solid demand, especially from the



biodiesel sector, coinciding with prospects of tightening supplies. Further to the positive effect from rising palm oil values, the prices of soy, sunflower and rapeseed oils also responded to, respectively, reduced crushing volumes in major producing countries, firm global import demand, and concerns over tightening world supplies.

The FAO Dairy Price Index averaged 198.9 points in December, up 3.3 per cent from November. Cheese price quotations surged the most, rising by eight per cent following three months of continuous decline, underpinned by strong global import demand amidst tighter export availabilities from the European Union and Oceania. For 2019 as a whole, the FAO Dairy Price Index averaged nearly 199 points, up three per cent from 2018, with SMP prices registering the sharpest year-on-year increase, followed by cheese and WMP, while butter values averaged lower.

The FAO Meat Price Index averaged 191.6 points in December, almost unchanged from its revised November value. At this level, the index is 18 per cent above its corresponding month in 2018, though still well below (by 20.0 points) its peak reached in August 2014. In December, price quotations for pig meat rose as global market tightness continued with some major suppliers, especially the European Union and Brazil.

The FAO Sugar Price Index averaged 190.3 points in December, up 4.8 per cent from November, marking the third consecutive monthly increase. The latest rally in international sugar price quotations was prompted by rising crude oil prices, a situation that encouraged Brazil's sugar mills to use more sugarcane supplies to produce ethanol instead of sugar, which resulted in reduced sugar availability in the global market.

Vietnamese rice exports up 4.2 per cent in 2019

RICE EXPORTS FROM Vietnam rose 4.2 per cent in 2019 from a year earlier to 6.4 million tonnes, according to customs data.

However, revenue from rice exports dropped by 8.3 per cent to US$2.8bn.

Image credit: Adobe Stock

The Philippines, Malaysia and West Africa were the top buyers by volume of Vietnamese rice.

As reported in *Reuters*, the Philippines, Malaysia and West Africa were the top buyers by volume of Vietnamese rice.

In December, Vietnam's exports increased 36.7 per cent from the previous month to around 500,000 tonnes, worth US$228mn, the source added.

Philippines lifts ban on meat, agriculture imports from Fukushima

PHILIPPINES HAS LIFTED the import ban on meat and other agricultural products from Japan's Fukushima, nine years after the Fukushima Daiichi Nuclear plant disaster in 2011.

This was announced by Japan's foreign minister Toshimitsu Motegi and Philippine's foreign secretary Teodoro "Teddyboy" Locsin Jr in a joint press brief.

As reported on the *Rappler.com,* Motegi welcomes Philippines' decision to lift the import ban of food products from Japan. Motegi said that the initiative will extend the reach of safe food from Fukushima as well as other parts of Japan to the people in the Philippines.

In May 2019, the Philippine's Department of Agriculture lifted the import ban on a number of fish species coming from Fukushima, with the aim of improving the market access of the Philippines' agriculture exports to Japan, added the source.

ILDEX Vietnam set to accelerate international investment for 2020

The eighth international livestock, dairy, meat processing and aquaculture exposition returns to Vietnam, creating plentiful business opportunities.

VIETNAM IS ONE of the leading investment destinations in Asia and is the main producer of livestock and aquaculture. The Ministry of Agriculture and Agriculture and Rural Development of Vietnam reported that the livestock and related sectors' exports were worth US$855.4mn and are expected to reach US$1.2bn in the next year.

International stakeholders are interested in expanding their markets throughout Asia, which is why VNU Exhibitions Asia Pacific and Minh Vi Exhibition & Advertisement Services will organise "ILDEX Vietnam 2020," an international business platform for the livestock and aquaculture industries.

This show will be presenting technology and innovation, machinery and IT systems from animal feed to farm processing from 18-20 March 2020 at Saigon Exhibition and Convention Centre, Ho Chi Minh City, Vietnam.

Exhibition highlights

Kevin Zhao, project manager of ILDEX Vietnam, said, "Lots of new companies will be exhibiting in Vietnam for the first time and are ready to share their latest products and innovations with the Vietnamese buyers, such as Huali, Texha, Brodrene Hartmann etc. We will host 250 leading companies from 30 countries plus seven international pavilions."

Commenting on the event, Zhao further added, "The exhibition hall will be divided into zones representing four main industrial sectors: animal health; feed ingredients/additives; farm production and meat processing/handling. A diverse mix of displays will bring leading stakeholders, manufacturers, importers and exporters under one roof."

Image credit: ILDEX

The event is set to gather international exhibitors and visitors.

A wide range of topics to be discussed

- Chris Keane, international technical sales representative, Promat, will demonstrate how a properly designed, comfort-engineered free stall system will allow cows the freedom to act naturally, as they would in an outdoor pasture.
- Peter Rønholt, global industry manager, Swine Munters Group, will provide an insight into several tasks that management faces daily. The presentation will focus on how modern technology can help to collect information for monitoring purposes and benchmarking, ultimately increasing performance in pig production.
- Thieu Nguyen Quang, lecturer at the Department of Animal Nutrition, Faculty of Animal Science and Veterinary Medicine, Nong Lam University, Hochiminh City, Vietnam, will discuss animal nutrition and mycotoxins in feed.

> **"The exhibition hall will represent four main industrial sectors: animal health; feed ingredients/additives; farm production and meat processing/handling."**

Formulation briefings for professionals

ILDEX will provide international and local conferences including more than 30 conference topics from 40 global speakers participating in the exhibition.

The event will have exclusive cooperation with Feedinfo, who will be hosting brand new formulation briefings at ILDEX Vietnam 2020. Feedinfo's formulation briefings have been created for Asian formulation professionals and nutritionists from feed mills and integrated farms and will focus on African Swine Fever (ASF), alternatives to antibiotics and cost-effective formulation.

Simon Duke, editor-in-chief of Feedinfo News Service, explained, "Feedback from our readers on the Vietnamese market is extremely positive. We know this is a fast-expanding, exciting market and we think the opportunities for companies operating in the region are vast."

The briefings will take place on 19 March and are free for ILDEX Vietnam 2020 attendees. ■

Scan to register

Registration open for VICTAM and Animal Health and Nutrition Asia 2020

The exhibition and conferences will take place from 24-26 March 2020 at BITEC in Bangkok.

VICTAM AND VIV made the headlines worldwide this summer for announcing that they are co-organising the much-awaited VICTAM and Animal Health and Nutrition Asia in Thailand.

At VICTAM and Animal Health and Nutrition Asia 2020, the visitor will find the latest technology, ingredients and additives to manufacture and process feed for animals, pets and aquatics. Furthermore, the visitor will find the latest in pharmaceutics and pharmaceutical ingredients, genetics and high-tech animal health solutions, making this event the total animal feed and health event organised by VICTAM and VIV.

More than 400 exhibitors from all over the world will be displaying the latest products and services within the industries of feed additives and ingredients, feed production technology, formulation programmes, high-tech animal health technology, packaging, pharmaceutical products and veterinary, laboratory equipment and supplies and much more.

High-quality visitor profiles and exclusive range of conference programmes

VICTAM and Animal Health and Nutrition Asia is the exhibition to find all the latest innovations from companies like DSM, Buhler, Biomin, Andritz, Kemin, Trouw, Impextraco, Van Aarsen, K-PRO, Famsun and many others.

Besides, VICTAM and Animal Health and Nutrition Asia offer a series of high-quality industry conferences and technical seminars:

Aquafeed Horizons: Current trends and future developments in aquaculture feeds. Experts will speak on a range of topics including:

- Current issues and challenges to aquafeed development and use within the Asian region
- Application of insect meals in aquaculture
- Standardised and documented botanicals to cope with customer demand and aquaculture challenges
- IoP: Leveraging people, process and platforms to maximise aquafeed production
- Use of process modelling as a tool to optimise aquafeed production
- Single and twin screw extruders – Pros and Cons
- Empowering the digestive process in aquafeeds

All About Feed seminar: Creating the best quality feed, increasing efficiency and staying innovative are major challenges facing nutritionists and formulators. Feed formulation is a complex task, determining volumes of raw materials and additives to create a feed that meets the nutrient requirements at an optimised cost. VICTAM and Animal Health and Nutrition Asia will organise a seminar dedicated to this topic. Speakers will delve deeper into new approaches and present them for feed processing and formulation professionals.

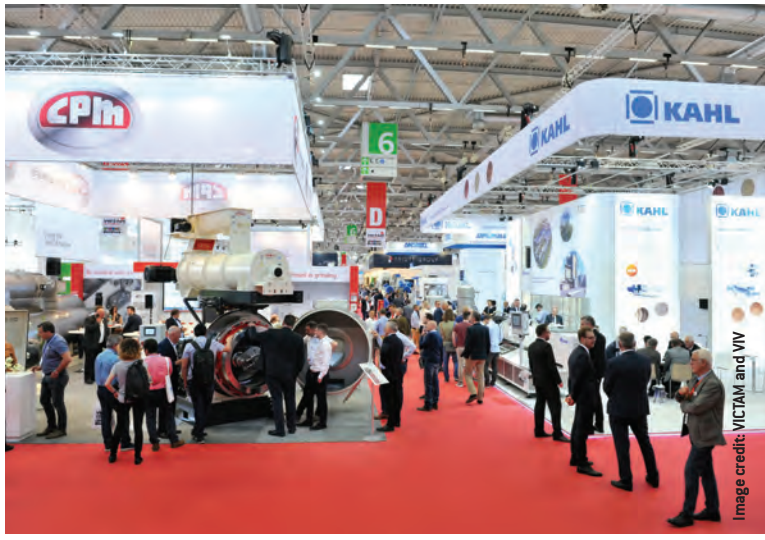


Image credit: VICTAM and VIV

The visitors will find the latest technology, ingredients and additives to manufacture and process feed for animals, pets and aquatics.

International Feed Technology Conference (IFTC): Presentations within the themes of raw material valorisation, formulation and technology and process developments. Experts will focus on a variety of topics including

- The interactive effect of nutrient density and feed form on the growth performance and feed efficiency in broilers
- Fundamental factors in feed manufacturing: Towards a unifying processing framework
- Interactions between fish feed recipe formulation and extrusion process variables in new feed recipe development
- Feed technology under industrial research conditions in Asia
- Future directions of feed technology

Feed Strategy Conference – African Swine Fever (ASF) update: Feed additive solutions for pig disease treatment and prevention.

GMP+ seminar – Feed Safety Culture in Asia: From control towards a responsible feed chain.

Petfood Forum Europe: Updates and insights on the market, sustainability, branding, palatability, proteins in pet food and pet food safety management.

Exhibitors will present a series of technical seminars. HealthTech Bioactives SLU will present on the topics of gut health and the strategy to prevent oxidative stress and inflammation and NCH (Thailand) Co, LTD will speak on probiotics.

Visitor profiles include CEOs, feed formulators, mill managers, nutritionists, operations directors, transportation managers, veterinarians and others within these industries. ■

For more information and registration, please visit www.victam-asia.com or www.vivhealthandnutrition.nl.

Elevating agronomics at Livestock Malaysia 2020

THE MALAYSIAN GOVERNMENT has enforced policies to support and develop the livestock industry while addressing issues and challenges. These include increasing the production of animal feeds; elevating the efficiency of the ruminants sector; moving towards a disease-free nation and more.

The Third National Agriculture Policy (1984-2010) and National Agro-Food Policy (2011-2020) were designed to ensure the livestock industry remains significant as one of the most important sectors in the nation's economic growth.

In line with the government's initiatives to bolster the nation's livestock farming sector, the 10th edition of Livestock Malaysia will be held at the Melaka International Trade Centre (MITC) from 7-9 April 2020.

Organised by Informa Markets and UBM Malaysia and supported by the Department of Veterinary Services, the Ministry for Agriculture and Agro-Based Industries, the event is expected to attract more than 9,000 local, regional and international trade visitors and delegates, representing integrator, veterinarians, livestock farmers, feed millers, wholesaler, retailers, food processors, importers and distributors.

Livestock Malaysia will be featuring more than 200 exhibitors from 30 countries, led by international pavilions. A major international conference and technical seminar programme will feature speakers from around Asia and the world. They will share their experiences and knowledge and take a regional and whole value chain analysis to meet the challenges in the livestock market.

Image credit: Adobe Stock

The event aligns with the government's strategy to boost the country's economy.

In addition, the 10th Malaysian Livestock Industry Awards will recognise the success of individuals and companies that have made an impact on Malaysia's livestock and meat processing sectors.

Pest and disease control in rubber from nursery to plantation

Image credit: Adobe Stock

A mature and well-kept stand of rubber trees currently in tapping

Pest and disease control in rubber is all about regular inspections and corrective treatment where necessary. Dr Terry Mabbett reports.

PEST AND DISEASE control in rubber (*Hevea brasiliensis*) requires proper planning and execution to ensure that costs incurred early in the tree crop cycle do not 'drown out' profits as the latex starts to flow. Rubber has a long lag phase which is the time between planting and opening up of the bark for tapping and which is governed by tree girth. Growing conditions have a marked effect on the time taken to achieve the minimum tree girth (circumference) required for tapping.

With ideal growing conditions, budded clones can reach the required 50 cm girth in 4.5 to five years, but poor soil and other conditions may delay this for a further four years. Pest and disease control should be sufficiently rigorous so that trees can provide at least two decades of latex production.

Logistical considerations and constraints make pest and disease control in rubber unique. The sheer size of rubber plantations and height of mature rubber trees mean that conventional ground-based spray application techniques and machinery for foliar treatment are essentially confined to the rubber nursery. As diseases such as powdery mildew and abnormal (Phytophthora) leaf-fall affecting the foliage of mature trees can only be controlled by thermal (hot) fogging from the ground or aerial spraying by helicopter or fixed-wing aircraft.

> **"Rubber is the only mainstream tree crop for which yield (latex) is sourced and issues from the living bark."**

Rubber tree biology and rubber crop agronomy compound these difficulties. Rubber is the only mainstream tree crop for which yield (latex) is sourced and issues from the living bark, thus making control of diseases affecting the bark and wood more in focus and important than for any other tree crop.

In the nursery

Seedling beds and bud wood gardens are the two main components of a rubber estate nursery. Seedling trees generated from seed are used as the rootstocks (stumps) for grafting (budding) using bud wood from selected clones and taken from pollarded trees in the bud-wood garden.

Bud-wood foliage is prone to infestation by the yellow tea mite (*Polyphagotarsonemus latus*) and infection by anthracnose disease caused by the fungus *Colletotrichum gloeosporioides.* Seedling rubber trees are initially prone to infection by birds-eye leaf

spot (*Heliminthosporium heveae*) although most will assume a degree of resistance once they have become budded stumps.

Yellow tea mite and rubber anthracnose disease appear to invade in tandem. Evidence suggests that each increases leaf susceptibility to the other. Both are debilitating to trees, but more specifically and seriously, cause premature leaf fall and tip dieback. This, in turn, promotes the growth of the axillary buds, thus ruining the wood as a source of buds for grafting.

Bud-wood gardens should be treated with a prophylactic combination of acaricide (miticide) such as dicofol and fungicide (e.g. chlorothalonil) to preserve bud wood quality. In addition to birds-eye leaf spot, caused by the fungus *Helminthosporium heveae,* another disease called Corynespora (*Cornespora cassiicola*) may also affect the foliage. Both require trees to be treated prophylactically using an appropriate broad-spectrum protectant fungicide such as cuprous oxide, chlorothalonil or mancozeb.

New extension growth on bud-wood trees can attain three metres or more, meaning they are more comfortable and appropriately sprayed using the extra reach of a shoulder-mounted mistblower.

Conventional lever-operated knapsack (LOK) sprayers will usually suffice for seedling beds. A large expanse of seedling trees can be treated by thermal fogging during periods of temperature inversion (early morning and late evening) which keeps the fungicide or insecticide fog close to the ground.

"As the young trees grow and begin to the branch, they become prone to infection with 'pink disease' caused by the fungus Erythricum (Corticium) salmonicolor."

New stand protection

Once planted out, young rubber trees should remain relatively free of pests and diseases of the foliage. However, they are still susceptible to infestation with yellow tea mite and infection by anthracnose although still sufficiently small enough in stature to spray with a LOK, and later with a mistblower using the same acaricide/fungicide combination used in the nursery.

As the young trees grow and begin to the branch, they become prone to infection with 'pink disease' caused by the fungus *Erythricum (Corticium) salmonicolor*. Some clones are very susceptible to this disease. Evidence strongly suggests that susceptibility is related to fissures or weakness in the bark occurring at the time of first major branching.

Copper fungicide is traditionally used to control this disease which is caused by a Basidiomycete fungus. Cuprous oxide is preferred for its excellent activity against the pathogen, but also an inherently high tenacity which makes the deposit resistant to weathering and wash-off in the very high rainfall conditions under which rubber is traditionally grown. Sprays of cuprous oxide can be applied prophylactically to vulnerable areas of bark or sprayed directly onto the affected areas. Alternatively, cuprous oxide can be used as 'canker paint' applied to the bare, healthy wood after diseased areas of bark and wood have been excised and cut away.

Image credit: Adobe Stock

Close up view of a rubber tree in tapping and collection cup brimming with latex.

Protecting the tapping panel

Once the tree comes into production, diseases of the tapping panel which come into play can make or break a rubber plantation. It should come as no surprise that trees are susceptible to these diseases because by its very nature rubber latex tapping injures and damages the bark and tree. The latex-containing tissue is ruptured by removing a sliver of bark, allowing the latex to flow along and down the cut, over the spout and into the collection cup. Tapping is a skilled task, and when carried out correctly allows the bark to regenerate, but it still causes a wound liable to infection by wound parasites. These include several species of the fungus-like Phytophthora pathogen causing black stripe or black thread disease, mouldy rot caused by *Ceratocystis fimbriata* and panel necrosis caused by a combination of *Fusarium* species and *Botryodiplodia* species.

Black stripe/thread and mouldy rot are most important, with evidence of clonal differences in susceptibility to black stripe/thread. Both diseases are controlled by routine panel protection where the tapper, as part of his/her weekly work schedule, paints the exposed tissue along with the tapping cut with a panel protectant containing an appropriate fungicide. The paint will also contain a sticker and ideally a coloured compound, such as panel red or yellow iron oxide so that the work can be monitored.

Fungicides used specifically to control black stripe/thread include systemically acting fungicides such as metalaxyl and fosetyl-aluminium. These fungicides act specifically against pathogens in the Class Oomycetes of which *Phytophthora* is a member. Mouldy rot control has been achieved using a range of broad spectrum-acting fungicides such as mancozeb, tridemorph and propiconazole.

Panel diseases are aggravated by wet conditions which erode the panel protection

fungicide paint. The black stripe is most severe on low tapping panels because *Phytophthora* spores are splashed up from the soil. Failure to control weeds around the base of the tree maintains high humidity for longer, thereby encouraging the disease. Failure to control panel disease means that regenerative tissue under the tapping cut is destroyed, the bark is not renewed and the tree cannot be re-tapped in later years.

Treating tall trees from the ground

Several diseases including Abnormal (*Phytophthora*) leaf fall and Oidium mildew disease infect leaves on mature rubber trees now tens of metres tall and out of reach of classical ground-based spray machines. Unless the rubber estate has access to aerial spraying, the only realistic option is to use a thermal fogging machine to apply fungicide in an oil-based carrier liquid.

Thermal foggers operate at very high temperatures to vaporise the fungicide-in-oil formulation/delivery system which condenses into a fog of extremely fine droplets when released from the fogging pipe and into the 'cold' air. This dense fog of fine droplets drifts up between the trees via the so-called 'chimney' effect to cover and protect the foliar crowns of trees with a fungicide formulated in oil. Thermal foggers applying 'copper fungicide-in-oil' formulations are traditionally used to protect mature rubber tree foliage against abnormal leaf fall caused by the fungus-like *Phytophthora* pathogen called *Phytophthora meadii.*

Root disease control

Root disease can rear its head in young rubber trees, especially if planted on land previously down to rubber. However, root disease does not usually appear in heavy concentrations until the trees are about 10 years old and recently into tapping. Root disease in rubber is caused by a group of wood-infecting fungi belonging to the Class Basidiomycetes with mushroom-like fruiting bodies.

> **"Trees infected with root disease exhibit slight but discernible changes in the colour of the foliage, with gradual but perceptible chlorosis (yellowing)."**

The most widespread and frequently occurring fungal pathogens attacking rubber trees in this way include *Phellinus noxious* (brown root disease), *Ganoderma pseudoferreum* (red root disease), *Rigidoporus lignosus* (white root disease) and *Armillaria mellea* (Armillaria root disease). They originate in the stumps of old rubber trees left in situ to rot after killing using an arboricide, felling and sealing of the cut stump surface.

Young rubber trees are planted in between rows of old rubber-tree stumps. This is traditionally considered to be the most cost-effective way to re-plant. If the old stand has been monitored and cleared of root disease during its lifetime, and the old trees killed rapidly with arboricide to thwart any root disease problem, there should be little problem. Sealing of cut stumps after felling will prevent fungal spores from gaining entry into the stump.

However, there is invariably some residual disease, and as the young tree grows its roots make contact with the roots of the old stump, thus allowing the disease to 'jump' across. Infection subsequently progresses along with the lateral roots until it reaches the collar of the young tree. Once established and infecting the taproot the disease will effectively girdle the collar and 'finish off' the young tree.

Controlling root disease is all about regular inspections and corrective treatment where necessary. Trees infected with root disease exhibit slight but discernible changes in the colour of the foliage with gradual but perceptible chlorosis (yellowing). When such trees are spotted during regular three-monthly foliar inspections their collars and root systems should be inspected and dealt with as follows.

The leguminous cover crop is pulled away from the collar and careful soil excavation made around the collar and further down to expose the 'tap root' and proximal ends of the lateral roots. The inspection will invariably reveal root disease along one of the laterals and up to the taproot.

If just one or possibly two lateral roots is affected, they should be traced out back to the distal end, excised, pulled up and burnt. Any disease around the taproot or collar is removed by cutting down to the clean white wood using a wood chisel. All cut surfaces should be sealed with a petrolatum grease preferably containing fungicide such as tridemorph which should also be applied as a collar protectant to the two adjacent healthy trees.

Many factors come into play when deciding whether or not to try and save a root-diseased tree. Most trees can survive the loss of one lateral, but such trees may become destabilised and thus prone to wind damage. In the longer-term growth and development may be slowed down so that the tree does not come into tapping at the same time as unaffected trees.

By taking out diseased trees, the planter risks opening up the canopy to strong winds which funnel into the stand to cause extensive physical damage. Root surgery and fungicide application are rarely worthwhile on mature trees. Felling big trees in closely planted stands is tricky because it will invariably bring down several healthy trees as collateral damage. ■

As a deciduous tree species, rubber has a period of natural defoliation as seen here from the 'carpet' of brown, dead leaves on the ground. During this period, which is usually short, tapping for latex is stopped and hence the down-turned position of the latex collection cups.

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The art of sustainable feed formulation

The availability of high-quality and low-cost poultry feed is critical for producers to remain competitive and to meet increasing animal protein demand.

Feed is the most important input for poultry production.

Image credit: Adobe Stock

CURRENT LIVESTOCK FARMING practices contribute to serious global challenges, including climate change, land degradation and pollution. Therefore, more sustainable methods are urgently required to meet the increasing demand for meat, fish, milk and eggs.

With the livestock industry under increasing scrutiny for its environmental and social impacts, changing the composition of conventional animal feed can help farmers to trigger production, thus creating significant environmental benefits. The nutrition or feed requirement of poultry birds depends on various factors such as age, weight, rate of egg production, growth rate and climatic condition.

According to the UN Food and Agriculture Organization (FAO), feed is the most important input for poultry production in terms of cost. The availability of high-quality and low-cost poultry feed is critical for producers to remain competitive and to meet increasing animal protein demand.

FAO: Nutrition requirements in developing nations

For maximum growth and good health, intensively reared poultry need a balanced array of nutrients in their diet. The nutrients required by birds vary according to species, age and the purpose of production – whether the birds are kept for meat or egg production.

"Birds need a steady supply of energy, protein, essential amino acids, essential fatty acids, minerals, vitamins and water. Poultry obtain energy and required nutrients through the digestion of natural feedstuffs, but minerals, vitamins and some major essential amino acids (lysine, methionine, threonine and tryptophan) are often offered as synthetic supplements," FAO stated.

The energy level in the poultry diet is a major determinant of poultry's feed intake. With the changes in dietary energy level, the feed intake will change, and the specifications for other nutrients need to be modified to maintain the required intake. The function of dietary protein is to supply amino acids for maintenance, muscle growth and synthesis of egg protein. Amino acid requirements are influenced by factors such as production level, genotype, sex, physiological status, environment and health status.

Minerals are needed for the formation of the skeletal system, for general health, as components of general metabolic activity, and maintenance of the body's acid-base balance. Calcium and phosphorus are the most abundant mineral elements in the body and are classified as macro-minerals, along with sodium, potassium, chloride, sulphur and magnesium.

Water is the most important nutrient in poultry nutrition. A constant supply of water is important for food digestion, absorption of nutrients, excretion of waste products and regulation of body temperature. Maintaining water quality is equally important, as poor water supply can lead to poor productivity and extensive economic losses.

Societal impacts of using innovative animal feed vs conventional feed

Evonik and KPMG examined the impacts of poultry and swine production and outline the potential societal benefits of using feed additives which reduce protein intake. The analysis, using the KPMG True Value methodology, compared the societal impacts of using innovative animal feed versus conventional feed. It covered the economic, environmental and social impacts of meat production across the value chain, from the cultivation of crops for animal feed through to animal husbandry.

The analysis valued the environmental and social impacts of poultry production in Brazil at US$1483.29 per tonne of live weight (t/lw) when conventional animal feed is used. The most significant impacts are land use to produce crops for animal feed and air pollution from the chickens' waste.

However, when innovative animal feed is used, the negative environmental and social impacts of chicken production are reduced by one third. The biggest reductions are in land use and its effect on biodiversity, air pollution and the potential for soil acidification and pollution of waterways. If innovative animal feed replaced conventional feed, the industry would create a net benefit of US$93.74 per t/lw for Brazilian society compared to a net cost of US$198.51 per t/lw when using the conventional feed.■

Best feed requires specialised processing technology

As aquaculture has provided more than a half of all aquatic products for human consumption, innovations in aquafeed processing are crucial to ensure healthy and higher productivity.

A GROWING AQUACULTURE INDUSTRY and increasing seafood trade are driving the global aquafeed market growth. Fish, being the cheapest and most easily digestible animal protein, accounted for the largest share in 2018 in terms of value, according to the global market research firm ResearchAndMarkets.

The global aquafeed market size is projected to grow from US$47.3bn in 2019 to US$71.7bn by 2025, at a CAGR of 7.2 per cent during the forecast period, the report stated.

Many Asian nations, such as India, have focused on the adoption of freshwater aquaculture as their major activity, which has contributed to its market dominance. Additionally, consumer demand for convenience and processed seafood offers profitable growth prospects and diversification in the region's food sector. These factors are projected to significantly drive the market growth for aquafeed during the forecast period.

However, due to excessive exploitation of resources and pollution, the availability of fish in natural waters has declined considerably. This has resulted in the adoption of various methods and innovations in feed processing technologies to increase production.

Aquafeed crushing/grinding technologies

Reduction of particle size is a major function of aquafeed processing. The reasons for crushing methods include reducing the clump size and large fragments, removing the moisture content and mixing the antioxidants. The choice of grinding equipment depends on the aquatic animal species. Some of the common crushing equipment are hammer mills, roller mills, screening etc.

Image credit: Adobe Stock

Many Asian nations, such as India, have focused on the adoption of freshwater aquaculture as their major activity.

The fish feed hammer mills are used for grinding raw materials such as soybean straw, peanut vines, Ipomoea batatas and other coarse materials. In this process, the raw material is held in the grinding chamber until it is reduced to the size of the openings in the screen.

A combination of cutting, attrition and crushing occurs in roller mills. Although the roll grinding is economical, it is limited to materials which are fairly dry and low in fat. In the screening process, a sieving system is required to classify materials to the desired particle size.

Mixing technologies

The mixing process is an integral part of aquafeed processing. This ensures that fish get high-quality nutritional content from the uniform feed ingredients that are evenly mixed with all possible combinations of solids and liquids.

> **"Innovations in feed processing technologies will significantly increase production, meeting the nutritional requirements of the aquatic animals."**

The most common types of feed mixers are horizontal and vertical mixers. The third type of mixer is the horizontal revolving drum to blend smooth and dry materials of uniform physical properties. Liquid blenders are used for liquids containing nutrients such as oils and in water-miscible oil preparations.

Pelleting technologies

As defined by the UN Food and Agriculture Organization (FAO), pelleting involves forcing a soft feed through holes in a metal ring-type die. These holes may be round or square, tapered or non-tapered. The feed is forced through the die holes in increments so that dissection of a finished pellet shows tight layers of feed mixture. The aim is to produce a nutrition-enriched fish feed by high heat, moisture and pressing, replacing the unpalatable and dusty feed material. After the process, the feed pallet is more durable and less impacted by external factors such as moisture and oxidation.

Cooling/drying technologies

Hard pellets should be cooled after drying to ambient temperature and brought to moisture content slightly above that of the entering soft feed. This process is done by vertical cooler and dryer (blower fan and horizontal cooler and dryer (centrifugal fan). ■

Efficient tillage for increased crop yields

Image credit: Adobe Stock

Tillage is crucial for seedbed preparation, soil and water conservation, erosion control and weed management.

Tillage is one of the most important factors influencing crop production, and it affects the sustainable use of soil resources through its influence on soil properties.

ONE OF THE basic and important factors of agriculture is soil tillage. Several forms of tillage are practised throughout the world, ranging from the simple stick to the sophisticated para plough. Tillage practices are crucial for holistic management of arable soil, including seedbed preparation, soil and water conservation, erosion control, weed management and others.

According to the Food and Agriculture Organization (FAO) of the United Nations (UN), tillage affects soil physical, chemical and biological properties. "Tillage affects aeration and thus the rate of organic matter decomposition. Biological activities in the soil are vital to soil productivity through the activities of earthworms, termites and the many other living creatures in the soil. These influence water infiltration rates by their burrowing in the soil, and their mucilage promotes soil aggregation," noted FAO.

An article titled *"Effect of Tillage Practices on Soil Properties and Crop Productivity in Wheat-Mungbean-Rice Cropping System under Subtropical Climatic Conditions"* noted that soil tillage contributes up to 20 per cent among the crop production factors and affects the sustainable use of soil resources through its influence on soil properties.

Efficient tillage overcomes edaphic constraints

The paper explained, "The judicious use of tillage practices overcomes edaphic constraints, whereas inopportune tillage may cause a variety of undesirable outcomes, for example, soil structure destruction, accelerated erosion, loss of organic matter and fertility and disruption in cycles of water, organic carbon and plant nutrient."

"Reducing tillage positively influences several aspects of the soil whereas excessive and unnecessary tillage operations give rise to opposite phenomena that are harmful to the soil. Therefore, there is a significant interest and emphasis on the shift from extreme tillage to conservation and no-tillage methods to control the erosion process," the paper added.

Companies unveiling cutting-edge tools

Global agricultural mechanisation providers have upgraded and unveiled a wide range of tillage equipment to maximise crop yield potential and productivity.

Case IH Agriculture has launched a range of tillage equipment that includes Heavy-Offset Disk Harrows, True-Tandem Disk Harrows, Disk Rippers, In-Line Rippers and Field Cultivators. Great Plains Ag, one of the leading manufacturers of vertical tillage and conventional tillage equipment, has products such as Turbo-Max, Velocity etc.

KUHN's range of cultivation equipment is designed to provide proper seedbed preparation. The company's primary tillage tools are Plows, Landsaver 4810, Dominator 4855, 4830 In-Line Ripper and others. KUHN's secondary tillage equipment portfolio includes 5635 Field Cultivator, HR 1004 Series, HRB 102 Series, EL 23/43/53 Series, EL 282 Series, Landsman 6205 etc.

Landoll Farm Equipment's primary tillage ranges include 2100 Coulter Chisel, 2211 Ripoll, 2410/2430 Weatherproofer (WP1) and 2511 In-Row Ripper. The company's secondary tillage and seedbed solutions are 6200 Tandem Disc Harrow, 7400 VT Plus, 7500 VT Plus – Adjustable, 7800 High-Speed Landoll (HSL), 850 Finisholl, 9600 Field Cultivator and others.

The US-based heavy equipment manufacturer John Deere has a vast range of tillage solutions. The company's a range of field cultivators include 2330Mulch Finisher, 2230FHFloating Hitch Field Cultivator, 200Seedbed Finisher. The vertical tillage equipment are 2660VTVariable Intensity Tillage and 2633VT2633VT Vertical Tillage. The rippers include 2100Minimum Till Ripper, 2730Combination Ripper, 915V-Ripper, 913V-Ripper.

Salford Group's tillage solutions include 5200 ENFORCER, AerWay vertical tillage, 6200 moldboard plow, 8200 Tandem-Flex Trail plows, 450 S-Tine, two-piece S-Tine, and C-Shank cultivators; 550 S-Tine, two-piece S-Tine, and C-Shank cultivators; 700 S-Tine, two-piece S-Tine, and C-Shank cultivators and others. ■

Animal health – next big growth area

The world animal health and nutrition market encompass a broad spectrum of products – mechanical, electrical, chemical, biological, software and veterinary – used to prevent, diagnose, treat or cure animal diseases.

THE GLOBAL ANIMAL health market has shown consistent growth over the past several years and is expected to be influenced by significant market forces. The livestock sector has faced mounting pressure to meet the rising demand for high-value animal protein, particularly in the developing world.

China and India are expected to be the largest growth markets for livestock products such as meat and milk. In India, chiefly because of increases in dairy product consumption, the relative contribution of animal products to diets is predicted to rise between 1999 and 2030. In China, growth is projected to be faster during the same period. Chinese diets are expected to experience 15-20 per cent growth in consumption of animal products – largely pork and poultry – over the period from 1999 to 2030.

The emerging and future technologies and products that are expected to shape the animal health industry include:

Nutraceuticals

Nutraceuticals are non-drug substances derived from food that are intended to improve health or prevent disease. Nutraceutical products include vitamins, minerals, amino acids, antioxidants, herbs and probiotics. The most financially successful products in recent years are those containing joint health compounds or essential fatty acids (EFAs).

The future of nutraceuticals appears to be bright and is likely to form a substantial proportion of the animal health market. Research and development in nutraceuticals for animal markets are likely to focus on the use of synchrotron technology to study the structure of feed and its effect on animal biological function.

Pre-slaughter intervention

The meat industry has continually sought to improve the safety of its products through post-slaughter strategies, such as controlling pH and temperature or maximising the meat's ageing potential. Recently, pre-slaughter intervention has been gaining momentum. Research has focused on developing specific vaccines against disease-causing bacteria among food animals.

Plant-derived vaccines

Research has validated the idea that plants can be engineered to create oral vaccines using a straightforward genetic modification. Developing countries are likely to gain significantly from this technology. Plant-derived vaccines could be manufactured quickly, allowing considerably less time before the vaccine could be sold at a price close to its marginal production cost.

Efficient vaccine delivery

As new vaccine antigens and adjuvants become available, livestock producers and pet owners want more efficient alternatives to administer those vaccines. Consumers are demanding products that can be given only once during an animal's lifetime, or at least less often than once a year. Livestock producers would like to avoid injections, which can cause reactions that damage carcasses.

Image credit: Adobe Stock

The growing demand for organic, hormone-free and antibiotic-free animal products is likely to continue.

Therapeutics: natural, herbal route

Increasingly, crops are being cultivated for health-related products instead of food or fibre, a trend that is slowly changing plant biotechnology and medicine. This is leading to a new generation of marketed botanical therapeutics including plant-derived pharmaceuticals, multi-component botanical drugs, dietary supplements, functional foods, and plant-produced recombinant proteins.

Many herbs and spices are known to contain compounds that have antibacterial effects and can improve feed taste and, consequently, intake. Plants are by far the most abundant and cost-effective renewable resource uniquely adapted to complex biochemical synthesis.

Metabolic modifiers

Metabolic modifiers are compounds fed, injected or implanted in animals to improve the growth and quality of the final product. In the food-animal industry, metabolic modifiers have been used to improve rates of gain, feed efficiency, dressing percentage, carcass meat yield percentage, and the meat's visual appearance, shelf-life, nutritional profile and taste. In cattle production, adding metabolic modifiers to feed has the potential of improving the fatty acid profile of lipids and increasing conjugated linoleic acid content.

Although not all metabolic modifiers are allowed in all countries, proper use of approved ones can improve production efficiency.

Molecular approaches to animal health

Over the past 25 years, molecular biology has transformed agricultural animal research, primarily in genomics. Developments in genomics are likely to continue along with relatively new offshoot areas of functional genomics, proteomics, transcriptomics, metabolomics and metagenomics. RNA-based biotechnologies, are set to impact the animal health market within the next 10 years. ■

Source: Malik, R. M., Yawson, R. M., & Hensel, D. (2009). Destination 2025: Focus on the Future of the Animal Health Industry. St. Louis Park, Minnesota: Deloitte LLC & BioBusiness Alliance of Minnesota.

POULTRY BUYERS'GUIDE

2020

Section One - Supplier listings by categories
Section Two - List of suppliers
Section Three - Contact details of agents in Asia

PLEASE MENTION FAR EASTERN AGRICULTURE WHEN CONTACTING YOUR SUPPLIERS

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Jamesway launches response team for better hatchery management

JAMESWAY, THE REFERENCE incubator company for the global poultry industry, has launched a customer-focused response team designed to provide 24/7 technical phone support to all customers, aiming to develop 'worry-free hatcheries.'

The 'Platinum Response Team' service, launched in tandem with a new programme of training and customer-centric initiatives, is designed to give hatchery managers the tools to run their hatcheries with maximum efficiency and effectiveness.

According to Jamesway, forecasts indicate that the Asian market will be the most significant growth area for poultry in the coming months. To accommodate the recent upswing in the industry, Jamesway has appointed Jerry Yap as regional sales manager for the APAC region.

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