31.Oct.2026 N º 103

Cultivar Semanal ®



Tracks reduce damage

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Amino acids determine the tomato plant's resistance to the tomato leafminer

Research identifies molecular mechanism that enhances the defensive action of glycoalkaloids against Phthorimaea absoluta

29.10.2026 | 05:14 (UTC -3)

Cultivar Magazine



Photo: José Maurício Simões Bento

Researchers have identified a molecular mechanism that can be exploited to increase tomato plant resistance to the tomato leafminer (Phthorimaea absoluta). The study demonstrated that replacing four amino acids in the GAME8 enzyme alters the enzyme's preference when processing a glycoalkaloid precursor, thereby modifying the three-dimensional configuration of the final compound. Applied to the enzyme in cultivated tomatoes, this alteration favors the formation of phyllotomatin, a compound with greater defensive activity against the pest. The discovery opens up prospects for the development of resistant cultivars through gene editing.

The study compared cultivated tomato plants with the wild species Solanum

pennellii. The researchers focused their analysis on steroidal glycoalkaloids, specialized metabolites involved in plant defense against herbivorous insects and pathogens.

In cultivated tomato leaves, alpha-tomatine predominates. In contrast, phyllotomatine predominates in the leaves of *Solanum pennellii*, although the total glycoalkaloid content of the wild species is about a quarter of that observed in cultivated tomatoes. The compounds have the same molecular composition and the same sugar structure, but differ in the spatial organization of part of the molecule.

This is a case of stereoisomerism: the two compounds have identical chemical composition and bonds, but differ in the

configuration of chiral centers – carbon atoms bonded to four distinct groups. These differences in three-dimensional configuration can modify the interaction of the compounds with biological structures and alter their activity.

Researchers confirmed the configuration of phyllotomatine using nuclear magnetic resonance imaging. The analysis identified differences in the chiral centers of the F ring of the steroidal structure. Phyllotomatine has a 22R,25R configuration, while alpha-tomatine has a 22S,25S configuration.

Enzyme controls molecular configuration

The group identified the GAME8 gene as responsible for the difference in the formation of the compounds. This gene encodes an enzyme involved in the biosynthesis of steroidal glycoalkaloids.

The wild tomato plant possesses two very similar GAME8 genes, GAME8a and GAME8b. The enzyme encoded by the first favors the formation of intermediates with an R configuration, associated with the production of phyllotomatine. The second directs the synthesis towards intermediates with an S configuration, associated with alpha-tomatine.

In cultivated tomato plants, the two copies of GAME8 have identical coding sequences. Both favor the S configuration and, consequently, the accumulation of

alpha-tomatine.

To understand the mechanism, the researchers combined genetic mapping, heterologous gene expression, directed mutagenesis, and molecular modeling.

The experiments identified four amino acid residues that are crucial for the enzyme's selectivity. These positions influence the fit of the precursor molecule into the catalytic cavity of GAME8.

The orientation of the substrate determines which hydrogen atom participates in the hydroxylation reaction. Therefore, the enzyme predominantly directs the formation of one of two spatial configurations.

The combined substitution of the four amino acids allowed for the modification of the enzyme's catalytic preference. The tests were performed using heterologous expression in Nicotiana benthamiana, a tobacco-related plant used as a production system. The results demonstrated the possibility of controlling the configuration of glycoalkaloids through specific alterations in the protein sequence.

Phyllotomatin increases defense against the silverfish

The researchers evaluated the effects of the compounds on Phthorimaea absoluta, an insect specialized in tomato plants, and

Spodoptera litura, a generalist species capable of using different host plants.

The bioassays involved plants with different glycoalkaloid profiles and artificial diets containing the isolated compounds. This approach made it possible to distinguish the effects of chemical structure from those associated with other plant characteristics.

Phyllotomatine showed greater defensive activity against Phthorimaea absoluta compared to alpha-tomatine. The results demonstrated the importance of molecular configuration for protection against this insect.

The comparison between lineages reinforced the role of chemical structure. The cultivated tomato M82 and the

BIL6676 lineage, derived from crossing with Solanum pennellii and carrying the GAME8a and GAME8b genes from the wild species, show similar total amounts of glycoalkaloids, but different proportions of each form. The larvae grew less in the BIL6676 lineage, which is rich in phyllotomatine.

The result indicates that the effectiveness of chemical defense does not depend exclusively on the total concentration of metabolites. The spatial configuration of the molecules also influences their biological activity.

However, experiments with Spodoptera litura did not identify relevant differences between the defensive effects of phyllotomatine and alpha-tomatine.

This response demonstrates the specificity of the interaction between plant compounds and insect species. The superiority of phyllotomatin against Phthorimaea absoluta does not necessarily represent greater protection against other herbivores.

Researchers have not yet identified the molecular target responsible for the difference in glycoalkaloid activity in the moth's organism.

Distribution of compounds varies between tissues

The investigation also found differences in the distribution of glycoalkaloids among

organs of Solanum pennellii.

Phyllotomatin predominated in the leaves, while roots, flowers, and fruits showed a greater accumulation of alpha-tomatin.

This distribution followed the relative expression of the GAME8 genes. In the leaves, the expression of GAME8a exceeded that of GAME8b. In the other tissues, the relationship was reversed.

Scientists consider the possibility that this distribution reflects evolutionary processes associated with the pressure exerted by specialized herbivores. However, the results do not yet allow for establishing a causal evolutionary relationship.

Genetic editing can increase resistance

Identifying the four amino acids that determine GAME8 activity offers a possibility for the genetic improvement of tomato plants.

According to Jiancai Li, current gene-editing technologies make it possible to modify these positions in the enzyme of cultivated tomatoes. The alteration could favor the production of phyllotomatin without introducing genes from other species.

The strategy would seek to increase resistance to Phthorimaea absoluta by altering the configuration of the defensive compounds produced by the plant itself.

However, commercial application depends on further evaluations. It will be necessary to investigate the response against other pests, such as whiteflies.

Possible changes in fruit quality, flavor, and the antinutritional properties of glycoalkaloids also need to be examined.

The results presented so far demonstrate the functioning of the biochemical mechanism and its effects on the insects evaluated. The study does not present a commercial cultivar developed by gene editing with this characteristic (doi 10.1038/s41467-026-76200-4).

The research brought together scientists from institutions in China, Brazil, and Germany. The scientists involved in the work were: Jiancai Li, José Maurício

Simões Bento, and Ian T. Baldwin.

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Spider trails reduce insect damage to plants

Brazilian research identifies changes in the behavior and reproduction of aphids, as well as reduced leaf consumption by herbivores

27.10.2026 | 13:29 (UTC -3)

Cultivar Magazine



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Signs left by jumping spiders (Cotinusa aff. gemmea) reduce aphid movement, delay

their reproduction, and decrease leaf consumption by herbivorous insects. The discovery is the result of research conducted by Brazilian scientists. The results indicate that these predators can indirectly protect plants, even without capturing or consuming their prey.

The study, developed by Paloma Ceribelli, Carla Rodrigues Ribas, and Thiago Gechel Kloss, brought together researchers from the Federal Universities of Lavras (UFLA), Rural of Pernambuco (UFRPE), Pernambuco (UFPE), and Viçosa (UFV). The team investigated the effects of signals left by spiders on the behavior of sucking and chewing insects.

Spider tracks

In plants exposed to spider tracks, the average consumption of leaf area fell by about 48%, from 0,66% to 0,34% of the leaf area. In experiments with aphids, the insects remained immobile for periods 3,07 times longer in the presence of predator signs. The onset of reproduction was also delayed.

The research investigated the so-called non-consumptive effects of predation. This phenomenon occurs when the presence or signs of predators cause behavioral and physiological changes in prey, regardless of capture.

Jumping spiders belong to the Salticidae family. These arachnids exhibit high mobility in vegetation and capture their prey through active hunting. During their

movement, they leave traces that can indicate their presence to other organisms.

These signs can include chemical substances, fecal residue, silk threads, and marks associated with contact with surfaces. The perception of these traces can modify the feeding, movement, and reproduction of herbivorous insects.

Aphids reduce movement

The researchers used the green aphid Myzus persicae to assess behavioral responses to the spiders' signals.

The first experiment involved 39 Petri dishes. Adult female Cotinusa aff. gemmea remained in 19 of them for 24 hours. The

other 20 dishes comprised the control group, without prior contact with the predators.

Next, the scientists introduced an adult female Myzus persicae into each container. The insects' movements were recorded on video for five minutes.

In the presence of the tracks, the aphids remained motionless for an average of 105,2 seconds. In the control group, the average period reached 34,21 seconds.

The difference showed statistical significance, with a p-value of 0,007.

According to the researchers, immobility may represent a response to the perceived risk of predation. The decrease in movement possibly reduces the likelihood of detection by predators.

However, the experiments did not directly assess the aphids' food consumption, metabolic rate, or physiological stress. Therefore, the team considers the response consistent with a defense mechanism, but does not rule out other explanations.

Reproduction is delayed

The second stage investigated possible reproductive alterations in Myzus persicae. The researchers used 36 plates containing leaves of Nicandra physalodes, kept hydrated with hydrogel.

Half of the leaves were exposed to spiders for 24 hours. The remaining leaves were

kept free from contact with the predators.

After removing the spiders, the scientists introduced a standardized age adult female into each plate. The monitoring took place over 96 hours.

The results showed a 1,4-fold increase in the interval required for the birth of the first nymph on leaves with signs of predators. The difference was statistically significant, with a p-value of 0,03.

Despite the initial delay, the total number of nymphs produced during the four days did not show a statistically significant difference between the treatments.

Scientists suggest a possible link between reproductive delay and physiological changes associated with the perception of predation risk.

The study also considers differences between the types of predators. Ladybugs specialized in consuming aphids may elicit distinct reproductive responses. Jumping spiders exhibit a generalist diet, a characteristic possibly associated with a different perception of risk by their prey.

Leaf consumption decreases

The third stage evaluated the consumption of common bean (Phaseolus vulgaris) leaves by a community of herbivorous insects present in natural conditions.

The experiment took place between October 1st and 27th, 2023, in an experimental area of ??the Federal

University of Lavras, near a forest fragment that marks the transition between Cerrado and Atlantic Forest biomes.

The researchers used 73 plants grown in pots. Of these, 36 received spiders and 37 formed the control group.

Initially, the plants remained protected by fabric for two days. During this period, the spiders circulated through the vegetation and left their tracks.

After the predators and protective coverings were removed, the plants were exposed to the natural community of herbivorous insects for another two days.

The procedure was performed three times, with the spiders' signals being renewed each cycle. Each plant accumulated six days of exposure to herbivores.

Finally, the scientists collected the leaves and quantified the area removed by the chewing insects.

In plants without signs of spiders, the average consumption reached 0,66% of the leaf area. In plants previously exposed to predators, the average percentage dropped to 0,34%. The values ??varied considerably between plants: from 0% to 3,92% in the control group and from 0% to 3,51% in the group with signs of spiders.

The difference showed statistical significance, with a p-value of 0,048.

The researchers interpret the result as evidence of an indirect effect of the presence of predators on herbivory. The chewing insects possibly recognized signals associated with the risk of

predation and reduced feeding on the marked plants.

The experiment did not identify which insect species responded to the signals, nor did it isolate the chemical and physical components responsible for the changes.

Indirect effects on herbivore control

The results broaden our understanding of the influence of hunting spiders on interactions between plants and herbivorous insects.

Studies on the non-consumptive effects of spiders often focus on species that build fixed webs and wait for prey in a single location. This research expands that

approach to active hunters, such as jumping spiders, and indicates effects associated with the traces left during their movements.

The influence can reach different levels of the food chain. The signals modify the behavior of herbivores and, consequently, can reduce the pressure of consumption on plants.

The high mobility of jumping spiders facilitates the distribution of these traces throughout the vegetation. Their generalist diet also expands the possibilities of interaction with different groups of insects.

Scientists highlight the potential of these mechanisms for understanding the ecological relationships involved in the natural regulation of herbivores.

The results, however, do not demonstrate the effectiveness of a biological control strategy in commercial crops. The effects on aphids were evaluated in the laboratory, while the reduction of herbivory was observed in bean plants grown in pots and subjected to experimental exposure to predators (doi 10.1111/een.70154).

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FMC appoints global Marketing and Intelligence manager

Rodrigo Degelo Lorenzon takes over the position and will work from Campinas (SP)

26.10.2026 | 08:18 (UTC -3)

Cultivar Magazine



FMC has appointed Rodrigo Degelo Lorenzon (pictured) as its new Global Marketing and Business Intelligence Manager. He will be based in Campinas,

São Paulo.

Lorenzon has been with the company for over five years and began his career in Business Intelligence as an analyst. Before taking on his new role, he served as Business Intelligence Manager.

"I am very excited to bring these experiences to Global Marketing, learn from colleagues and markets around the world, and contribute from a new perspective," he said in a statement.

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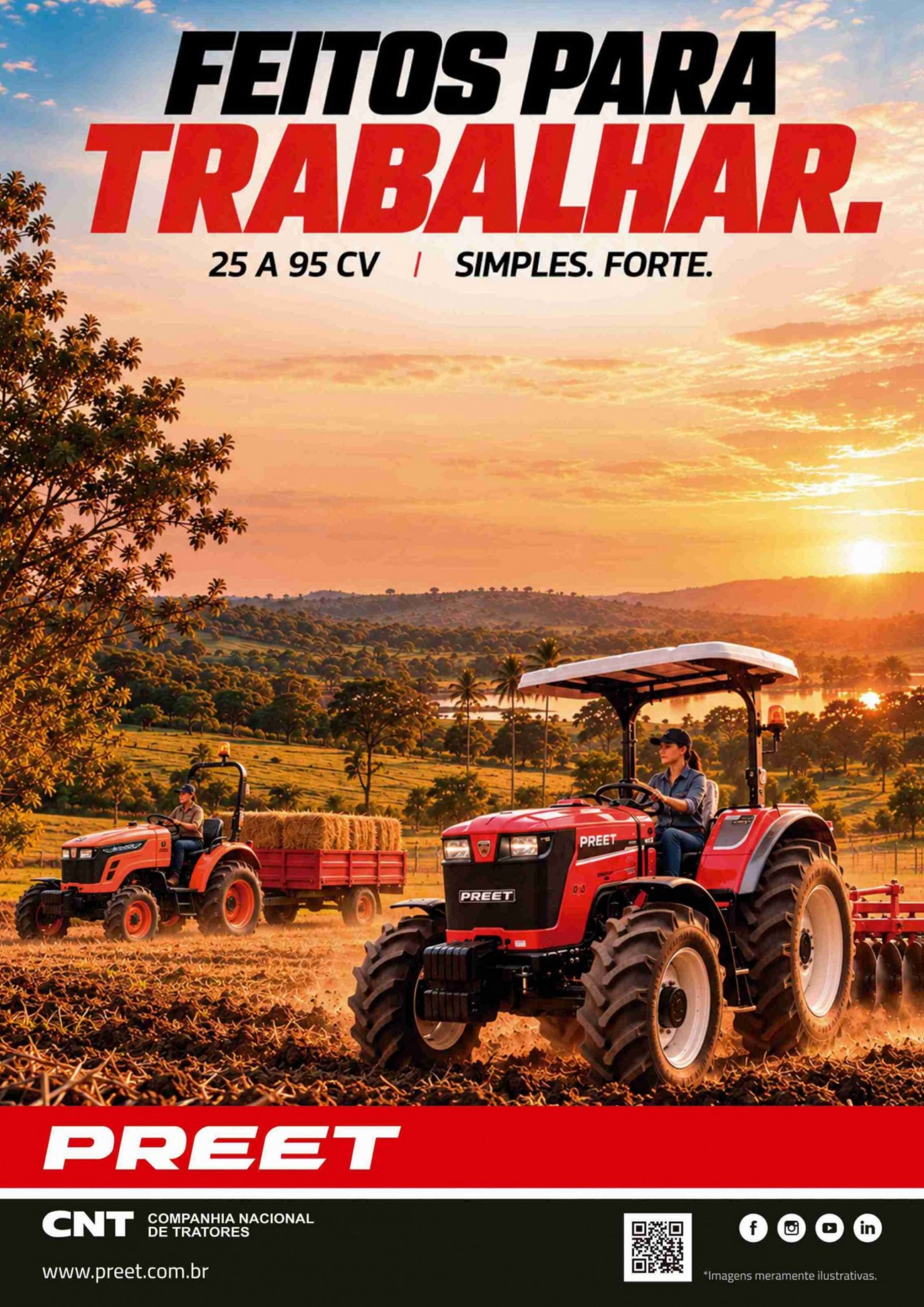

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Syngenta Group announces results for the third quarter of 2026

The accumulated EBITDA margin reached 18,4%, an increase of one percentage point over the 17,4% recorded between January and September 2025

30.10.2026 | 06:25 (UTC -3)

Cultivar Magazine



Syngenta Group reported revenue of US$5,2 billion in the third quarter of 2026, a 10% decrease compared to the same period of the previous year. EBITDA fell 2% to US$800 million. In the first nine months of the year, sales totaled US$17,3 billion, a 5% reduction, while EBITDA increased 1% to US$3,2 billion. The company released the results this Friday (October 30).

The accumulated EBITDA margin reached 18,4%, an increase of one percentage point over the 17,4% recorded between January and September 2025. According to the company, the improvement resulted from a portfolio review, prioritization of businesses with higher margins, and cost control.

At constant exchange rates, accumulated revenue fell 8%. In the third quarter, the decline reached 12%. The planned reduction in grain trading operations and other businesses with lower margins contributed to the result. Without these effects, the group's underlying sales grew 1% in the nine months.

The company also pointed to pressure on prices of products with expired patents, especially in Brazil and other Latin American markets. Reduced agricultural income led to greater caution in producers' purchases. The postponement of orders also affected quarterly performance.

Pesticides

Syngenta Crop Protection reported revenue of US$9,8 billion between January and September, virtually unchanged from the previous year. In constant currency terms, sales decreased by 4%.

In Brazil, the division's revenue fell by 6%. In Latin America, the decline reached 14%. The company attributed the regional performance to competitive pressure on the prices of off-patent products. The appreciation of the real against the dollar amplified the effects of this dynamic.

Despite the reduction in sales, the company recorded growth in the commercialization of newly introduced technologies, with higher margins. The change in the portfolio composition contributed to improving gross margins.

High financing costs and adverse weather conditions also led to the postponement of purchases to the fourth quarter in Latin America.

In other regions, the breakdown showed different results. Sales grew 20% in China, 6% in Europe, and 1% in Asia, the Middle East, and Africa, excluding China. In North America, there was a 1% decrease.

The biological products segment maintained double-digit growth in the third quarter, with Brazil and China standing out. The company also reported obtaining more than 1.400 regulatory approvals in the nine months, including new registrations, renewals, and expansions of use.

Among the expanding technologies, Syngenta highlighted Tymirium, designed for protection against nematodes and fungal diseases. The solution showed positive commercial performance in Brazil, China, and the United States. The Plinazolin insecticide technology also advanced in Latin American markets and in the Asia, Middle East, and Africa region.

In September, the company announced three innovations in the biologicals segment. These include the Exort biostimulant technology, the Eqibre solution to improve nutrient absorption and utilization, and a microbial fungicide aimed at biological control.

Seeds

Syngenta Seeds' revenue reached US$3,3 billion in the first nine months of 2026, a stable result compared to the equivalent period in 2025. In constant currency terms, there was a 2% decrease.

Brazil saw a 13% growth in seed sales for major crops. In Latin America, the increase reached 5%. The Brazilian performance was driven by the launch of seven corn hybrids intended for the second crop season. This initiative expanded the company's portfolio in this segment.

In Europe, sales of seeds for major crops grew by 3%. North America registered an 11% decline, attributed to trade restructuring and a reduction in the area planted with corn in the United States.

Global sales of vegetable seeds increased by 2%. The flower segment showed growth of 4%. In Latin America, the company recorded a record volume in the sale of sunflower seeds.

Adama and operations in China

Adama, controlled by the group, recorded sales of US$3 billion between January and September, a 1% decrease compared to the same period in 2025. At constant exchange rates, the reduction reached 4%.

In Latin America, the company's revenue fell by 5%. China showed a 16% decline, influenced by reduced sales of chemicals not used in agriculture.

In contrast, Adama recorded growth of 5% in North America, 3% in Europe, Africa and the Middle East, and 2% in the Asia-Pacific region, excluding China.

Syngenta Group China reported revenue of US$3,1 billion in the first nine months of the year, a decrease of 18%. The reduction mainly reflected the planned discontinuation of businesses with lower margins. The branded formulations division grew by 16%, while seed sales advanced 12% after excluding the effects of grain sales.

The consolidated figures take into account the exit of Sinofert, a fertilizer company whose 52,65% stake was transferred to Sinochem Hong Kong in December 2025. The group ceased consolidating this

business in January 2026 and adjusted the comparative data from the previous year.

Changes in administration

The group also announced changes in the leadership of two divisions. Gaël Hili will assume the presidency of Syngenta Seeds on November 1, 2026. The executive previously held the positions of president and CEO of Adama and has 25 years of leadership experience in the agricultural sector.

Zhigang Hao, the current CEO of Adisseo, will succeed Hili as president and CEO of ADAMA. The executive led the transformation of the animal nutrition and

health company's business.

	Q3 2026	Q3 2025	Q3 2026	Q3 2025
Sales	$bn	$bn	¥bn	¥bn
Syngenta Group	5.2	5.7	35.1	40.9
Syngenta Crop Protection	3.1	3.4	21.2	24.2
ADAMA	0.9	0.9	6.1	6.7
Syngenta Seeds	0.8	0.8	5.4	5.7
Syngenta Group China	0.7	0.9	4.5	6.6
Eliminations	-0.3	-0.3	-2.1	-2.3
EBITDA	0.8	0.8	5.6	6.0

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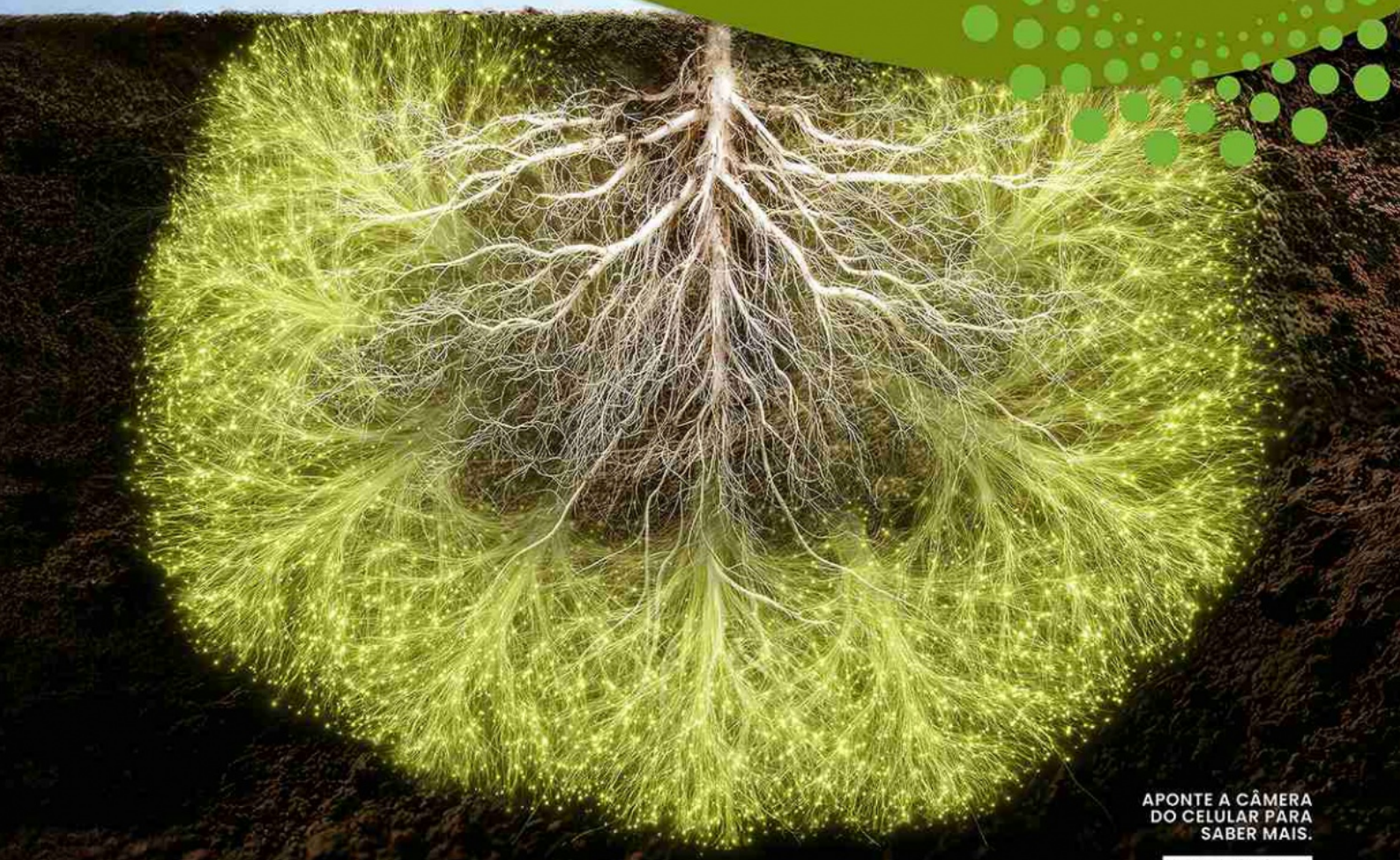
syngenta
Biologicals



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Rogério Aguiar assumes new global role at John Deere

The executive will now be responsible for strategic planning, operational performance, and profitability of global businesses

30.10.2026 | 06:13 (UTC -3)

Cultivar Magazine



Rogério Aguiar has assumed the position of Business & Operations Manager – Global Small Grains at John Deere. The executive will now be responsible for the strategic management of global grain harvesting, pneumatic seeding, and soil preparation operations. With over 15 years of experience at the company, Aguiar will be based in Silvis, Illinois, in the United States.

Their responsibilities include strategic planning, business performance management, pricing governance, and profitability improvement. The executive also works on aligning different areas of the company and monitoring operating return on sales (OROS) and operating return on assets (OROA) indicators.

His career at John Deere began in June 2011 in Horizontina (RS), managing global training projects. Subsequently, he held positions in training, sales, and marketing in Brazil. Between 2017 and 2020, he was responsible for commercial operations in states in the North and Northeast regions of Brazil.

Aguiar holds a degree in agricultural engineering from the Federal University of Lavras (UFLA). His education includes an MBA in marketing from the Getulio Vargas Foundation, an MBA in strategic planning and management from Uninter, and a specialization in agribusiness from the Dom Cabral Foundation. He also completed executive training programs at Kellogg and a design and systems management program at the

Massachusetts Institute of Technology (MIT).

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Agricultural Market - October 30, 2026

Brazilian planting progresses, exports reach record levels, and the market is monitoring the final stages of the American harvest

30.10.2026 | 05:30 (UTC -3)

Vlamir Brandalizze - @brandalizzeconsulting



The strengthening of the dollar against the real has given new impetus to agricultural

prices at Brazilian ports. Soybeans reached indicative prices of R$ 158 to R$ 160 per sack for November and December, while the 2026/27 crop registered opportunities of up to R$ 150 per sack. In the international market, the progress of the American harvest is putting pressure on Chicago. The reduced presence of Chinese buyers is also limiting reactions.

Soybean situation

Soybeans in Chicago are finding support near $12, after falling below $12,50 in most contracts. The US harvest has surpassed 85% of the area, compared to an average of 80%. In Illinois, harvesting has reached 87%, compared to the

historical average of 82%. US production is on track to exceed 124 million tons.

In Brazil, sales of the current harvest have reached 82,5%, down from 84,4% last year and the average of 84,3%. Producers still have approximately 31,6 million tons available for sale.

The 2026/27 crop has 39,8% of its production already sold, compared to 40,1% in the previous year. The volume traded reached 73,6 million tons, a record for the period. Production projections range between 185 million and 190 million tons.

Planting has progressed to 62% of the national area, compared to 50% last year. Mato Grosso reached 80%, Paraná and

Rondônia reached 72%, Mato Grosso do Sul hit 67%, and Goiás registered 62%. Rio Grande do Sul may end the week with 15%.

Corn situation

Corn is facing pressure from the US harvest. Chicago lost support at $4,50 in near-term positions, although more distant contracts remain above $5. The prospect of global consumption exceeding production supports positive fundamentals for 2027.

In the United States, the harvest has surpassed 70%, down from 73% last year. In Europe, work has progressed and confirms production losses in some

regions, increasing the prospect of imports.

In Brazil, exports in October could reach between 5,6 million and 5,7 million tons, below the 6,5 million tons shipped in the same month of 2025.

The planting of summer corn has reached 93%, compared to 87% the previous year and an average of 85%. The area is expected to exceed 4,5 million hectares.

Producers still have approximately 66 million tons of corn available for trading, compared to 52 million tons during the same period last year. Record demand for animal feed and ethanol, coupled with exports, is supporting the market.

Sorghum situation

The American sorghum harvest has reached 65%, down from 75% last year. Delays are also seen in Kansas, with approximately 50% of the area harvested, compared to 70% at the corresponding time in 2025.

In Brazil, there is growing interest in sorghum seeds for the second crop. The crop represents a lower-investment alternative after soybeans, especially given the high financial costs and rising input prices.

Wheat situation

Winter wheat planting in the United States is nearing 80%, practically in line with the average of 81%. In Eastern Europe, producers are accelerating their work before the arrival of the first snowfalls.

In Brazil, the harvest has surpassed 90% in Paraná and reached approximately 40% in Rio Grande do Sul.

Wheat prices are rising in the domestic market. Reference prices reach R$ 1.500 per ton in Rio Grande do Sul and R$ 1.570 in Paraná. At the farm gate, prices range between R$ 79 and R$ 88 per sack.

With the dollar near R$ 5,40, imported wheat could cost between R$ 1.750 and R$ 1.800 per ton. This movement increases the potential for appreciation of

the Brazilian product.

Rice situation

Brazilian rice planting has reached approximately 70%, above last year's 65% and the historical average. In Rio Grande do Sul, planting has reached 60%, with progress exceeding 80% in the Western Border region.

The area planted in Rio Grande do Sul could decrease from 890 to approximately 860 hectares. The projected reduction has lost momentum following the recovery in prices.

In Tocantins, the planted area could reach 95 hectares, compared to 110 in the previous harvest. Local prices exceed R$

110 per sack, with some isolated deals recorded at R$ 120. Santa Catarina is nearing the completion of planting on 140 hectares.

Bean situation

The bean market maintains firm prices despite limited supply. The harvest is progressing in western São Paulo state, but the reduction in cultivated area is restricting national availability.

In São Paulo, premium carioca beans are priced between R$325 and R$350 per sack. Between Minas Gerais and Goiás, prices range from R$305 to R$320. Commercial carioca beans are priced between R$290 and R$300 in these

regions and between R$315 and R$330 in the São Paulo market.

Black beans are starting to react, with an average price increase of R$ 5 per sack. Reference prices range between R$ 275 and R$ 290, while sellers are aiming for R$ 300.

The prospect of a further reduction in supply in early 2027 opens up room for additional price increases.

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FMC reports a loss of US$2,07 billion in the third quarter

The result reflects trade adjustments of US$672 million, a drop in sales, and weakening demand for agricultural pesticides

29.10.2026 | 17:54 (UTC -3)

Cultivar Magazine



FMC Corporation reported a net loss of US$2,07 billion in the third quarter of 2026, compared to losses of US$569 million in the same period of 2025. Revenue fell 80%, from US$542 million to US$106 million. The revenue decline reflected commercial adjustments and reduced sales volumes. The loss stemmed primarily from non-cash accounting adjustments related to deferred tax assets and intangible assets, in addition to commercial measures. The company released the results on Thursday (October 29).

The trade measures had a negative impact of US$639 million on revenue and US$672 million on adjusted EBITDA. The indicator went from a positive US$236 million in the third quarter of 2025 to a negative US$559

million in 2026.

Without the effects of these measures and disregarding operations in India, revenue reached US$745 million, a 22% decrease year-on-year. Sales volume decreased by 21%, while prices fell by 2%. Exchange rate fluctuations contributed positively with 1%.

Adjusted EBITDA, excluding the effects of commercial actions, reached US$113 million. The reduction reflected lower sales and currency impacts, partially offset by lower costs.

The loss per share reached US$15,54, compared to a negative US$4,52 in the third quarter of 2025. On an adjusted basis, the company recorded a loss of US$4,41 per share, compared to a profit of

US$0,89 a year earlier.

Trade adjustments affect the Americas

On October 15, FMC announced two measures to reduce the value of inventories held by distributors and improve the flow of products to farmers.

The first involves changes to the pricing and trade discount model in North America. This initiative accounts for approximately US$500 million of the impact on adjusted EBITDA.

The new model aims to reduce the difference between the gross and net prices of agricultural pesticides. The company intends to reduce the volatility of

discount payments and simplify commercial terms.

The second measure involves adjustments of approximately US$175 million in the prices of products already stored by distributors in Brazil, Argentina, the United States, and Canada.

These products had prices higher than those currently practiced in the market. FMC intends to facilitate their sale and stimulate new orders. The adjustments do not alter the manufacturer's current selling prices, but will reduce future receipts.

The implementation of the changes is ongoing. The company expects to complete the transition over the next three quarters.

Latin America shrinks by 21%

Latin America reported revenue of US$368 million, excluding trade adjustments. This result represents a 21% decrease compared to the third quarter of 2025. Without the exchange rate effect, the decline reached 23%.

FMC attributed part of the performance to lower-than-expected Brazilian demand. Uncertainty associated with the potential effects of El Niño increased caution in purchasing. The company also noted pressure on the prices of branded products.

Conversely, new formulations based on Rynaxypyr have shown growth in sales.

In North America, revenue, before trade adjustments, totaled US$164 million, a 33% decrease. Volumes fell across all product classes. Distributors maintained low inventories at the end of the agricultural season.

In Asia, excluding India, revenue reached US$91 million, a decrease of 8%. Growth in Isoflex sales in Australia contributed to the regional performance.

In Europe, the Middle East, and Africa, revenue fell 22% to US$121 million. FMC attributed the drop in volumes primarily to the planned loss of product registrations.

Company lowers projections for 2026

FMC revised its estimates for the fourth quarter and for the full year 2026.

For the last three months of the year, the company projects revenue between US$1,04 billion and US$1,14 billion, excluding Indian operations. The midpoint represents stability compared to the same period in 2025.

Adjusted EBITDA is expected to reach between US$210 million and US$230 million, a 22% decrease from the midpoint. Adjusted earnings per share are expected to range between US$0,56 and US$0,70.

The manufacturer expects to increase volumes through direct sales to Brazilian producers, growth in new products, and more competitive pricing. This growth should offset the price drop, estimated to

be in the high single digits in percentage terms.

For 2026, the revenue forecast, excluding India, ranges between US$2,75 billion and US$2,85 billion, a 28% decrease at the midpoint. The estimate for adjusted EBITDA indicates a negative result between US$124 million and US$104 million.

The company also forecasts negative free cash flow of between US$350 million and US$150 million. The projection includes approximately US$180 million in restructuring expenses.

New active ingredients

The operational strategy includes gaining competitiveness in the core portfolio, reducing industrial costs and adjusting the cost structure in Asia after the sale of the operation in India, as well as expanding sales of new active ingredients.

The company projects revenues between US$300 million and US$400 million from new active ingredients in 2026. It also intends to expand commercial licensing agreements and direct sales to Brazilian farmers.

Another priority involves the strategy for the period after the expiration of the Rynaxypyr patents. FMC intends to reduce manufacturing costs, increase volumes with more competitive prices, and develop mixtures and formulations to address insecticide resistance problems.

The manufacturer also seeks to generate approximately US$1 billion for debt amortization. Initiatives include the sale of its commercial operations in India, licensing of active ingredients, sale and leaseback operations of real estate and other asset sales, as well as investment from the Tessenderlo Group.

Preliminary estimates point to adjusted EBITDA between approximately US$650 million and US$730 million in 2027. For 2028, the company is working with a range of US$760 million to US$840 million.

Q3 2026 Results

	Q3 2026	Q3 2025	2026 VS. 2025
GAAP Revenue	$106	$542	$(436)
Commercial Actions Adjustment	*$639*		
GAAP Net Income	$(2,067)	$(569)	$(1,498)
Adjusted EBITDA[1]	$(559)	$236	$(795)
Commercial Actions Adjustment	*$672*		
GAAP EPS	$(15.54)	$(4.52)	$(11.02)
Adjusted EPS[1]	$(4.41)	$0.89	$(5.30)

Note: Amounts in millions of USD except for EPS



Q3 2026 KEY POINTS

- Commercial actions result in $639 million of negative impact to revenue and $672 million of negative impact to Adj. EBITDA[1]
- Excluding commercial actions, lower sales and Adj. EBITDA[1] driven mainly by reduction in volumes

1. Denotes non-GAAP financial term. Refer to "Non-GAAP Financial Terms" at the beginning of this presentation.

Q3 2026 Regional Revenue Drivers

REGIONAL REVENUE BRIDGE (Excluding India)[1]



Note: Amounts in millions of USD; "Asia" column excludes India

Q3 2026 REVENUE DRIVERS (Excluding India)[2]

	VOLUME	PRICE	FX	Comm. Adj.
Total: -89%	-21%	-2%	1%	-67%
Organic[1]: -90%				

North America — **$164 million** *(-33% YOY)*

- Lower volumes across all product classes
- Channel customers carefully managed inventory for end of growing season
- Branded price decline limited by lack of quarter-end negotiations with channel customers

Latin America — **$368 million** *(-21% YOY, -23% ex-FX)*

- Weaker than expected demand in Brazil amplified by uncertainty of El Nino impacts
- Solid growth in new Rynaxypyr® formulations
- Branded price headwind

Asia — **$91 million** *(-8% YOY, -8% ex-FX)*

- Higher volumes
- Strong Isoflex® growth driven by Australia
- Branded price headwind

EMEA — **$121 million** *(-22% YOY, -21% ex-FX)*

- Lower volumes almost entirely driven by planned registration losses
- Poor weather leading to lower demand in many countries
- Branded price essentially flat

Regional Results Exclude Commercial Action Adjustments[2]

1. Denotes non-GAAP financial term. Refer to "Non-GAAP Financial Terms" at the beginning of this presentation.
2. Variance components do not sum due to rounding

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Adama reports a loss of US$115 million in the third quarter of 2026

Revenue falls 4% to US$897 million; sales in Latin America drop 8%, with pressure on prices and demand in Brazil

29.10.2026 | 15:32 (UTC -3)

Cultivar Magazine



Adama reported a net loss of US$115 million in the third quarter of 2026, compared to losses of US$48 million in the same period of 2025. Global revenue fell 4% to US$897 million. The company attributed the drop in sales to reduced sales volumes, pressure on agricultural pesticide prices, and weakening demand in various markets. In Latin America, sales decreased by 8%, due to commercial difficulties in Brazil.

The adjusted net loss reached US$74 million, compared to US$20 million in the third quarter of 2025. Adjusted gross profit fell 11%, from US$257 million to US$228 million. The adjusted gross margin decreased from 27,6% to 25,4%.

Adjusted EBITDA totaled US$93 million, a 22% decrease compared to the US$120

million recorded a year earlier. The corresponding margin decreased from 12,9% to 10,4%.

Most of the decline in net income, however, came from taxes. Adjusted income tax expense rose to US$48 million, compared to US$8 million a year earlier, and included the adjustment of the tax asset in Brazil based on projected taxable income. Adjusted financial expenses, on the other hand, fell from US$68 million to US$57 million.

The decline in revenue reflected a 4% drop in sales volume and a 2% reduction in prices. The positive exchange rate variation partially offset these effects.

According to the company, volumes in the agricultural pesticide market grew less

than expected in the first nine months of 2026. High costs for farmers and purchases made close to the time of application limited consumption. Low inventories in distribution channels, on the other hand, sustained underlying demand.

Prices remained under pressure, particularly in the segment of products with expired patents. The company pointed to lower profitability for farmers and low prices for active ingredients, resulting from structural overcapacity in China.

Latin America registers a drop in sales

Adama's revenue in Latin America totaled US$286 million in the third quarter,

compared to US$312 million in the same period of 2025. The reduction reached 8% in dollars and 12% considering constant exchange rates.

In Brazil, the company recorded a decline in sales despite intensified commercial activities ahead of the soybean harvest. The initiatives focused primarily on the fungicide and insecticide segments.

Adama pointed to three factors contributing to Brazil's poor performance: continuous price pressure, liquidity constraints for rural producers, and intense competition. This competition primarily affected agricultural pesticides traded as commodities.

In other Latin American countries, increased volumes sustained sales growth.

Argentina made a significant contribution to this result. The company also highlighted commercial progress in markets considered strategic, despite competition and price pressure.

In the period from January to September, Latin American revenue reached US$639 million, a 5% decrease compared to the US$675 million recorded in the same period of 2025. In constant exchange rates, the decline reached 10%.

EMEA experiences greater regional contraction

The region comprising Europe, Africa, and the Middle East recorded revenue of

US$203 million in the third quarter, a 13% decrease year-on-year.

Adama attributed the result to lower demand for pesticides in various European markets. High temperatures and drought reduced applications and increased stocks in distribution channels. High input costs for farmers also played a role.

In North America, sales grew 6% to US$174 million. This growth was supported by the professional solutions, consumer products, and Canadian operations segments. In the United States, lower prices and high inventories negatively impacted part of the agricultural portfolio.

The Asia-Pacific region showed 4% growth, with revenue of US$235 million.

China accounted for the largest share of the increase: sales in the country rose 9%, from US$91 million to US$99 million, with higher sales of branded formulations and non-agricultural products. In other markets in the region, demand for fungicides in Australia and growth in India offset the decline in Southeast Asia, affected by El Niño.

Results and indebtedness

In the first nine months of 2026, Adama recorded revenue of US$2,997 billion, a 1% decrease compared to the US$3,025 billion recorded in the same period of 2025.

Adjusted gross profit reached US$860 million, a decrease of 2%. Adjusted EBITDA fell 8% to US$395 million, with a margin of 13,2%.

The reported net loss decreased from US$59 million to US$53 million year-to-date. However, the adjusted net income went from a profit of US$29 million in 2025 to a loss of US$11 million in 2026.

Operating cash flow totaled $194 million in the nine months, down from $331 million a year earlier. Free cash flow fell from $112 million to $87 million.

As of September 30, Adama Agricultural Solutions' total debt reached US$1,958 billion. Of this amount, US$814 million corresponded to debentures and US$835 million to short- and long-term loans with

related parties.

The company also had approximately US$317 million in contracted but unused bank credit lines, in addition to US$260 million in available lines of credit with related parties.

Commercial strategy

Adama launched 31 products and obtained 70 new registrations in the first nine months of 2026. The commercial strategy prioritized differentiated formulations, selective market expansion, and improved operating margins.

In Brazil, the company highlighted the registration of the Sparta fungicide, developed to broaden the spectrum of

disease control in soybeans, including rust. The product combines three active ingredients in its own formulation.

In Argentina, the company registered the herbicide Paramer SC, formulated with piroxasulfone. According to the company, the technology offers a 40% higher concentration of active ingredient than conventional liquid formulations. The product is intended for weed management in soybeans, corn, and cereals.

Among its international launches, Adama presented the fungicide Rexaro, containing fluopicolide and cymoxanil, in India. It also launched the herbicide Actagon in that country, a combination of pyroxasulfone and metribuzin for pre-emergence application in wheat crops.

The company maintains initiatives for industrial reorganization, cost reduction, and concentration of investments in products and markets with greater potential for return.

Chairman and CEO Gaël Hili announced that he will step down as CEO in November 2026 and will then support the company as chairman of the board. In the statement, Hili expressed confidence in Dr. Zhigang Hao's leadership to continue the company's strategy.

ADAMA Solutions Q3 2026

Adjusted $ million	Q3 2026	Q3 2025	%▲
Sales	**809**	**853**	**(5%)**
Gross Profit	**205**	**242**	**(15%)**
% of Sales	*25.3%*	*28.3%*	
EBITDA	**66**	**96**	**(31%)**
% of Sales	*8.2%*	*11.3%*	
Net Loss	**(79)**	**(22)**	
% of Sales	*(9.8%)*	*(2.6%)*	
Reported Net Loss	**(117)**	**(42)**	
	(14.5%)	*(4.9%)*	

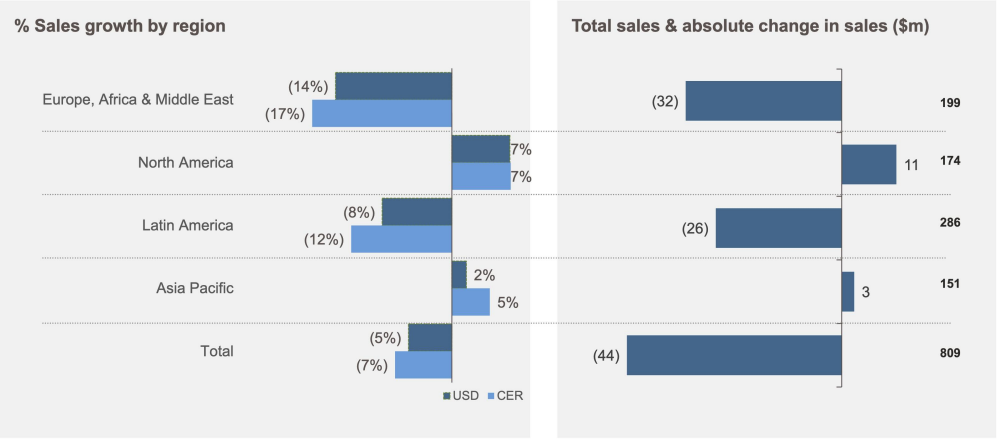
Highlights

- **Sales declined 5% to $809 million**
  - 4% lower volumes and 3% lower prices vs. PY
  - Lower volumes resulting from lower market demand in certain regions due to higher farmer costs and weather conditions compensated by new product introductions. Lower prices reflected the overall lower market pricing and weaker farmer purchasing power.
- **Gross Profit 15% below Q3'25**; Gross Margin of 25.3% vs. 28.3% PY
  - Lower volume and prices, as well as higher cost more moderated by improved mix and favorable foreign exchange
- **EBITDA** amounted to $66 million 31% below Q3'25; EBITDA Margin of 8.2%, vs. 11.3% PY
  - **Lower OPEX** mainly due to tight OPEX control despite FX headwinds
- **Adjusted Net Loss of $79m** vs. $22m PY
  - **Despite lower financial expenses** positively impacted by the CPI, improved overall loan terms, the benefit of the continued positive cash flow and lower hedging costs

* PY – previous year
There may be some difference in percentages due to rounding

Regional Sales Performance

Q3 2026 vs. Q3 2025

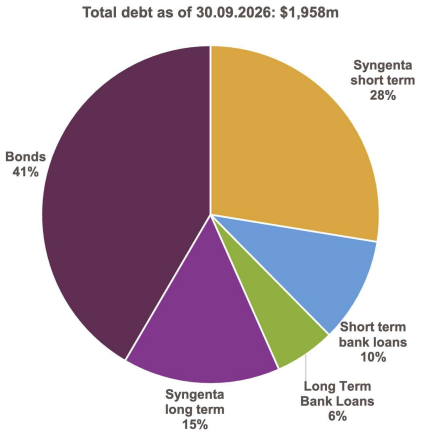


- CER - Constant Exchange Rates
- APAC includes ADAMA India; LATAM includes Brazil

Debt Breakdown: ADAMA Solutions

		Sep 30, 2026 in Million USD	Effective Interest Rate
Short-Term	Short-term loans and credit from banks and commercial papers	196	5. 64%
	Short-term loans from related parties	490	5.03%
Long-Term	Long-term loans from banks (including current maturities)	113	2.69%
	Long-term loans from related parties (including current maturities)	345	4.98%
	Debentures (ILS denominated) (including current maturities)	814	5.15%+CPI
	Total	**1,958**	

As of September 30, 2026, the Company has unused committed credit lines from banks (of approximately $317m), and unused committed credit lines from related parties (of approximately $260m).



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Syngenta Biologicals expands its portfolio of bio-inputs

The company is betting on solutions for soil health, nutritional efficiency, and root development

29.10.2026 | 15:10 (UTC -3)

Tárcila Galdino



In the first four months of this year alone, the Brazilian bio-inputs market generated over R$ 1,3 billion and reached 31 million

hectares of treated areas. Data from CropLife – a Brazilian association representing companies specializing in research and development of solutions for sustainable agricultural production, biotechnology, chemical pesticides, and bio-inputs – shows a 15% increase in treated area compared to the same period in 2025.

The survey also indicates that the bio-inputs sector remains focused on innovation. This is the case with Syngenta Biologicals, which has sought to combine the potential of nature-driven innovation with a scientific basis to offer complete and reliable solutions that accelerate the advancement of sustainable agriculture, prioritizing integrated management

between chemicals and biologicals.

Four fronts

Today, Syngenta Biologicals brings together four complementary areas. Biocontrol relies on products of natural origin, based on living organisms or their derivatives, aimed at managing pests, diseases, and nematodes. Bioactivators promote plant metabolism, balanced growth, nutrient absorption, root development, and stress tolerance.

Nutritional efficiency solutions support the utilization of nutrients available in the soil and fertilizers. Special nutrition brings together macro and micronutrients that contribute to plant metabolism, growth,

and productivity. This portfolio expands the management alternatives available to rural producers," explains Igor Lyra (pictured), Director of Biologicals and Seed Treatment at Syngenta in Brazil.

To understand the robustness of the company's biological portfolio, one only needs to look at Syngenta's main launches this year. One of the major new products is Avakitt Neo, based on mycorrhizal fungi. The product was formulated for application in the planting furrow in crops such as soybeans, corn, cotton, and sugarcane. The fungi establish a symbiotic relationship with the roots, forming fungal hyphae that expand the area of ??soil exploration.

Water and nutrients

The technology optimizes the use of water and essential nutrients, such as phosphorus and nitrogen, in addition to promoting soil structure and health. In field tests conducted in Brazil, the solution indicated an average gain of up to 15% in productivity, with results exceeding five sacks of soybeans per hectare in specific evaluations. The launch inaugurates a front focused on increasing nutritional and water efficiency (NUE, in the English acronym for Nutrient Use Efficiency).

Another major highlight is Viva, a bioactivator that helps improve rhizosphere efficiency and promote balanced plant development, supporting the crop for a long residual period. “Soil health has been gaining increasing importance in producers' decisions, especially with the

growing focus on biological quality and microbiological activity. It is in this context that Viva acts to contribute to more balanced plant development and increased productivity in the field," emphasizes Lyra.

In coffee cultivation, for example, Viva stimulates better conditions in the rhizosphere, favoring root development and soil microbiological activity. Its 100% natural formulation, based on brown algae extract and other biologically active ingredients, acts on soil nutrition and structure, in addition to contributing to balanced plant growth. The great advantage is its activity throughout the entire coffee plantation cycle, contributing to the longevity of the plants and the construction of a more sustainable and

healthy system, from the soil to the roots.

Plant extracts and algae

Syngenta Biologicals' portfolio of bio-inputs also includes Megafol, a bio-activator based on plant and algae extracts that stands out for its triple action: mitigating abiotic stresses, accelerating plant recovery, and activating metabolism for better vegetative development. The solution is especially effective during adverse periods, in which crops face situations such as water deficit, flooding, temperature fluctuations, cloudiness, salinity, and chemical stress (phytotoxicity). And with Yieldon – a biostimulant capable of increasing the productivity of major crops through the

modulation of metabolism, cell division and expansion, improving the transport of sugars and nutrients, as well as lipid biosynthesis.

“Recent studies show that, in recent years, the biologicals segment in Brazil has grown at an average annual rate of over 20%. This percentage is about four times the global average. This reinforces that the national biologicals market is experiencing accelerated expansion, reflecting the Brazilian farmer's openness to the combined use of chemical and biological technologies, aiming for productivity and sustainability. This growing openness to the use of biological products reinforces the success of Syngenta, which in 2024 decided to create Syngenta Biologicals, and today continues to expand its

operations in this segment,” concludes the director.

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Ourofino Agrociência reinforces commercial leadership

The arrival of Hélio Romano Junior aims to bring the sales, development, and production areas closer together

29.10.2026 | 14:47 (UTC -3)

Fernanda Chiossi



Hélio Romano Junior and Fábio Prata

Ourofino Agrociência has strengthened its market presence with the arrival of Hélio Romano Junior to the Commercial

Directorate. The executive joins the team led by Fábio Prata, who joined the company in May of this year as Marketing Director and recently assumed the position of Chief Operating Officer (COO). Prata is also a member of the company's Executive Committee.

The initiative seeks to align commercial decisions with the planning of development and production areas. The proposal aims to guide the company's priorities based on the challenges faced by producers, focusing on offering solutions adapted to tropical agriculture.

Customers and distributors

“We want Ourofino to be increasingly closer to our customers and distributors, with connected teams and the agility to transform field demands into decisions and deliveries. This is the focus of this stage of the company: integrating our capabilities, clarifying priorities, and executing our plans consistently,” says Alessandro Flamini, CEO of Ourofino Agrociência.

In the Commercial Department, Hélio will work in client relations and with the sales teams. His role will focus on deepening his understanding of the specific needs of each partner and contributing to the achievement of shared results.

With 40 years of experience in agribusiness, he has worked for global and multicultural organizations. The executive

has expertise in managing sales teams and conducting negotiations with major distributors, clients, and decision-makers. His knowledge of distribution channels and experience in highly competitive environments and business expansion reinforce the company's growth strategy.

Complementary trajectories

Flamini highlights the complementarity between the two executives' career paths. "Fábio combines experience in strategy, marketing, and business development with a broad vision of the crop protection market. Hélio adds to this leadership a commercial background built both in

industry and distribution," he states.

According to him, this integration strengthens the company's ability to understand the challenges faced by its partners and respond to these demands with relevant solutions, quality service, and trusting relationships that support growth.

An agricultural engineer with a master's and doctorate degree, MBAs, and other business specializations, Prata has held senior management positions in multinational companies. His career includes establishing a company in Brazil and leading growth and channel expansion initiatives both domestically and internationally.

“Generating value in agriculture means connecting the producer's needs to the

company's capabilities throughout the entire journey, from research and development to the arrival of solutions in the field. Our job is to identify opportunities in this operation and direct efforts to transform them into results," Prata emphasizes.

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AGCO releases results for the third quarter of 2026

Revenue accumulated in the first nine months reached US$7,22 billion

29.10.2026 | 08:46 (UTC -3)

Cultivar Magazine





October 29, 2026

Third Quarter 2026

Financial and Operational Results



AGCO reported net revenue of US$2,26 billion in the third quarter of 2026, a decrease of 8,6% compared to the same period in 2025. Earnings per share fell

from US$4,09 to US$0,75. The comparison base is elevated by the gain from the sale of the company's stake in the Indian manufacturer TAFE, which added US$2,93 per share to the third quarter 2025 result. Adjusted earnings per share fell from US$1,35 to US$1,05. The company released the figures on Thursday (October 29th) and cited weakening global demand for agricultural machinery as the main factor for the performance.

Revenue accumulated in the first nine months reached US$7,22 billion, a growth of 0,7% compared to the same period in 2025. Without the favorable effect of currency conversion, accumulated sales showed a contraction of 2,7%. Adjusted earnings per share totaled US$3,42, compared to US$3,11 in the previous year.

Third-quarter operating profit reached US$116,1 million, a decrease of 23,4%. The operating margin fell from 6,1% to 5,1%. Considering accounting adjustments, operating profit reached US$137 million, a decrease of 25,9%, with a margin of 6,1%.

Eric Hansotia, chairman and CEO of AGCO, stated that the global agricultural machinery industry is facing its weakest demand environment in over a decade. According to the executive, high production costs, uncertainties in commodity markets and international trade, and difficulties in profitability for producers have reduced investments in equipment.

The manufacturer responded to the situation with adjustments to production, inventory control at dealerships, and cost reductions. Production hours fell 19% in the third quarter compared to the same period last year. For the whole of 2026, the company projects a drop of approximately 5% in production.

Latin America registers a drop in sales

Latin America reported revenue of US$292,3 million in the third quarter, a 15,4% decrease compared to the US$345,5 million recorded a year earlier. Excluding currency effects, the decline reached 19,1%. Since January 2026, the segment includes operations in Mexico,

previously counted in North America. The 2025 figures were revised to maintain the comparison.

AGCO attributed the result to lower demand for agricultural machinery. Reduced sales and production volumes also pressured regional profitability. Operating profit was US$13 million lower than that recorded in the third quarter of 2025.

In the period from January to September, Latin American revenue reached US$775,3 million, a decrease of 16,8%. In constant currency, the reduction reached 22,7%.

The Brazilian market experienced a downturn. According to company estimates, tractor sales to end consumers

decreased by 17% in the first nine months of 2026, compared to the same period in 2025. Combine harvester sales fell by 38%.

The manufacturer highlighted the reduced demand for larger equipment. High interest rates, credit restrictions, and lower agricultural profitability limited producers' investments. Economic and political uncertainties also contributed to the postponement of purchases.

North America grows 34,8%

North America showed the opposite trend. Regional revenue increased by 34,8%, to US$485,3 million. Excluding currency

effects, growth reached 35,1%.

The expansion resulted from higher sales volumes in most categories, mainly high and medium horsepower tractors and spare parts.

Operating profit improved from a loss of US$42 million in the third quarter of 2025 to a profit of US$13,8 million in 2026. This performance was boosted by approximately US$13 million in import tariff refunds levied by the United States under the IEEPA Emergency Economic Powers Act. In February, the US Supreme Court ruled that this law did not authorize the tariffs. Without the refunds, the region's operating profit would have been close to break-even. AGCO emphasizes that these amounts are still subject to review by US customs and appeal by the government in

court, and that the company may have to repay them.

Despite AGCO's growth, the North American agricultural machinery market remained in decline. Sectoral tractor sales decreased by 9% between January and September, excluding compact models. Combine harvester sales fell by 10%.

In Europe and the Middle East, AGCO's revenue fell 19,1% to US$1,31 billion. The decline reached 18,1% in constant currency. Germany, France, Italy, and Spain accounted for the largest reductions.

The Asia, Pacific and Africa region showed growth of 13,8%, with revenue of US$178,8 million. The increase reached 9,2% excluding currency effects, driven mainly by sales in Australia.

AGCO projects revenue of up to US$10 billion

For 2026, AGCO estimates net revenue between US$9,8 billion and US$10 billion. The company projects an adjusted operating margin of close to 7% and adjusted earnings of approximately US$5,50 per share.

The estimates take into account the tariff policies in effect on October 29, as well as the mitigation measures and supply strategies adopted by the manufacturer. Changes in trade tariffs may alter the projections.

The company plans production in a way that adjusts dealer inventories to market demand and anticipates a further reduction

in these inventories. The strategy also includes investments in technologies to increase the operational efficiency of agricultural properties.

Among the initiatives, AGCO highlighted AI-powered localized spraying systems, autonomous solutions, and PTx technologies. The proposal includes installing precision agriculture features on existing equipment, including those from other brands, without the need for complete machine replacement.

According to Hansotia, the company seeks to increase productivity and improve profitability for producers, while simultaneously strengthening its own cost structure.

Financial Summary

$M**

REPORTED	Q3 26	Q3 26 vs. Q3 25	YTD 26	YTD 26 vs. YTD 25
NET SALES	$2,262.5	(8.6)%	$7,215.1	0.7%
GROSS MARGIN	25.0%	(110)bps	24.8%	(70)bps
OPERATING INCOME	$116.1	(23.4)%	$337.5	(7.5)%
OPERATING MARGIN	5.1%	(100)bps	4.7%	(40)bps
DILUTED EPS	$0.75	$(3.34)	$2.59	$(5.86)

ADJUSTED	Q3 26	Q3 26 vs. Q3 25	YTD 26	YTD 26 vs. YTD 25
ADJ. OPERATING INCOME*	$137.0	(25.9)%	$416.0	(14.4)%
ADJ. OPERATING MARGIN*	6.1%	(140)bps	5.8%	(100)bps
DILUTED ADJUSTED EPS*	$1.05	$(0.30)	$3.42	$0.31

*Reflects non-GAAP measures. See reconciliations provided in the appendix to this presentation.
**Except per share amounts

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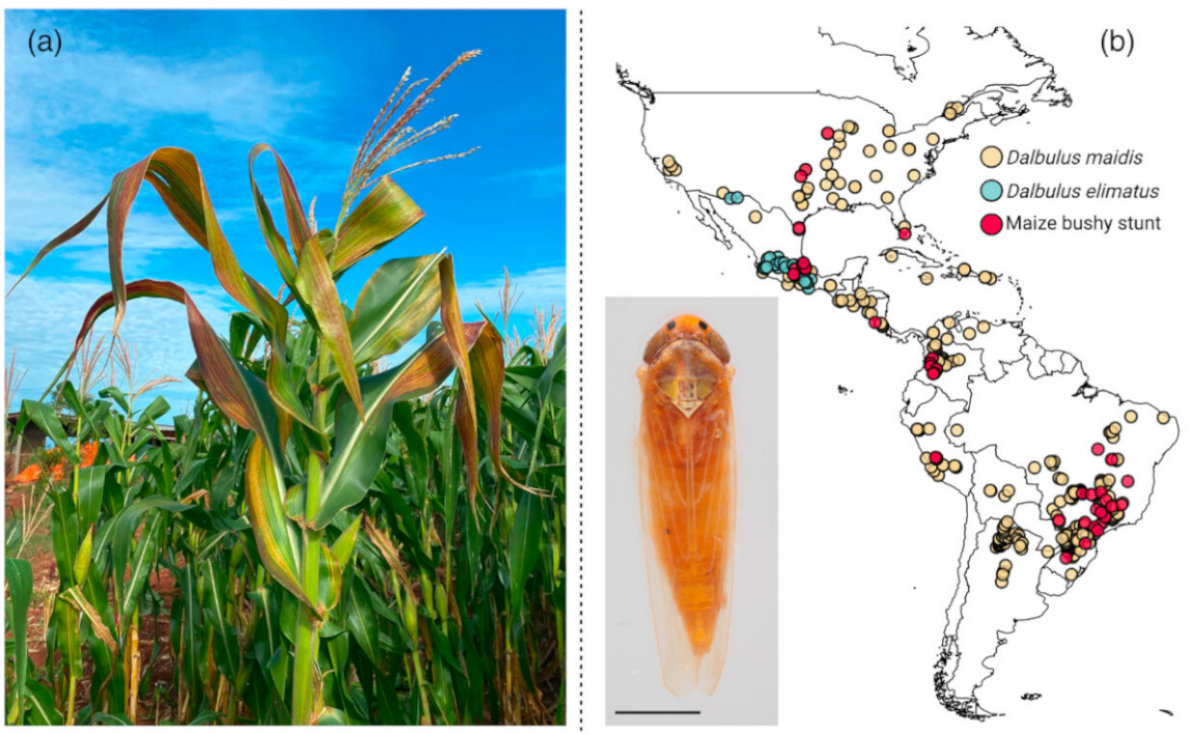
Researchers propose a new species of corn phytoplasma

Genomic analyses of samples support the classification of the red stunt agent as Candidatus Phytoplasma zeae

29.10.2026 | 08:20 (UTC -3)

Cultivar Magazine



doi 10.1099/ijsem.0.007301

Researchers have proposed recognizing Candidatus Phytoplasma zeae as a new

bacterial species associated with red stunt disease in maize. The study gathered genomic, ecological, and epidemiological evidence to differentiate the pathogen from other phytoplasmas. The investigation also confirmed its presence in corn leafhoppers (Dalbulus maidis) collected in the US states of Oklahoma and Iowa.

The proposal represents a change in the classification of the causal agent of the disease. Until now, researchers identified the red stunt phytoplasma as a lineage related to Candidatus Phytoplasma asteris, a member of subgroup 16SrI-B. The new analyses have demonstrated sufficient characteristics to support its taxonomic separation.

The new classification considers the pathogen's specificity in relation to maize (Zea mays), its insect vectors, and its geographic distribution. The phytoplasma has a known occurrence restricted to the Americas. Maize is the only confirmed natural host, although experiments have demonstrated susceptibility of other species of the genus Zea.

Differences between phytoplasmas

Scientists sequenced and reconstructed genomes of pathogen lineages from Brazil and the United States. The Brazilian samples originated from laboratory colonies of leafhoppers established from

insects collected in crops showing symptoms of the disease. The North American samples came from leafhoppers captured in the field.

The analyses yielded three nearly complete genomes, identified as MBSP-BR, MBSP-OK, and MBSP-IA. The sequences ranged in size from 567.501 to 569.327 base pairs. Each genome contained between 522 and 530 predicted coding sequences.

Completeness estimates ranged from 97,14% to 98,57% using the CheckM program. Another method, called CheckM2, indicated values ??between 95,27% and 97,69%. These results allowed for genomic comparisons with other phytoplasma species.

The average nucleotide identity between Candidatus Phytoplasma zeae and the available genomes of lineages related to Candidatus Phytoplasma asteris ranged from 92,6% to 98,4%. Among the maize phytoplasma lineages themselves, the identity exceeded 99,7%.

The researchers also identified differences in conserved regions of DNA. The 16S rRNA gene, used in bacterial classification, showed greater than 99% identity between the new taxon and Candidatus Phytoplasma asteris. Despite the similarity, 11 nucleotide positions allowed them to be differentiated.

Other genes, including rpoB, rps3, secY, secA, and cpn60, provided complementary evidence. Phylogenetic analyses placed

the maize pathogen lineages in a distinct cluster, close to Candidatus Phytoplasma asteris and Candidatus Phytoplasma tritici.

Specialization in corn

Comparison of the genomes identified gene clusters unique to lineages related to Candidatus Phytoplasma zeae.

The researchers found genes associated with amino acid transport and metabolism (15 genes), defense mechanisms (8 genes), and post-translational modification, protein turnover, and chaperones (2 genes).

Among the identified groupings, 45 appeared exclusively in lineages related to maize phytoplasma.

According to scientists, these characteristics may contribute to the pathogen's specialization in its plant host. However, the study did not experimentally demonstrate the function of these genes in infection or in the development of symptoms.

The analysis also identified a large number of genes without functional annotation. This limitation prevents a complete determination of the molecular mechanisms involved in the interaction between the phytoplasma, maize, and its insect vectors.

Two species of leafhoppers

The specificity of the vectors constitutes further evidence in favor of the new classification.

Researchers have identified Dalbulus maidis and Dalbulus elimatus as the only confirmed natural vectors of the phytoplasma. The former species has a wide distribution in the Americas and occupies a central position in the spread of the disease in corn-producing areas.

The second occurs mainly in Mexico and in regions of the southwestern United States. It usually occurs in areas above 1.000 meters in altitude.

Although experiments have demonstrated the ability of other insects to acquire and transmit the pathogen under controlled conditions, researchers emphasize the

lack of equivalent evidence in natural environments.

The study also mentions the leafhopper Leptodelphax maculigera, found infected with the phytoplasma in Brazil. Subsequent laboratory investigations indicated a lack of vector capacity for this pathogen.

Geographic distribution reinforced ecological differentiation. Confirmed records of the phytoplasma include Brazil, Colombia, Mexico, Peru, and the United States.

The article also compiles recent records of the geographic expansion of Dalbulus maidis in North American territory. In 2024, the species was recorded in different

Midwestern states. In another study, the same research group reported the first record of the leafhopper in Quebec, Canada. The presence of the insect, however, does not automatically prove the occurrence of the phytoplasma in these regions.

Losses of up to 93%

Red stunt disease compromises corn development and can cause significant productivity losses.

Symptoms associated with the infection include reddening and yellowing of the leaves, chlorotic streaks, reduced growth, shortened internodes, lateral branching, and ear deformation.

The severity of the damage depends on factors such as the timing of the infection and the population of vector insects. Previous studies cited in the research recorded production losses between 35% and 93%.

Scientists have adopted the Brazilian MBSP-BRRS lineage as a reference for the proposed species. This choice is part of a classification process based on molecular differences, biological specificity, and consensus among researchers dedicated to studying the pathogen.

The designation Candidatus Phytoplasma zeae follows the taxonomic guidelines applicable to phytoplasmas, bacteria without a cell wall that are incapable of

growing in conventional axenic culture media. The term Candidatus indicates the provisional nature of the classification of these microorganisms.

The research made the genomic sequences available in GenBank, linked to BioProject PRJNA1294367. The data allow for new comparisons between lineages and investigations into the genetic diversity of the causal agent of maize red stunt disease (doi 10.1099/ijsem.0.007301).

The study was conducted by scientists Thierry Alexandre Pellegrinetti, Joshua Molligan, Abraão Almeida Santos, Maria C. Canale, Maira Rodrigues Duffeck, Alejandro Olmedo-Velarde, Jordanne Jacques, Ivair Valmorbida, Ashleigh Faris, Marcos VS de Andrade, Magda AP Manica, Mauricio Luna, Paola Reyes-

Caldas, Jairo Rodriguez-Chalarca, Tim Dumonceaux, and Edel Pérez-López.

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Bunge's profit grows 91,6% in the third quarter of 2026

Results reflect performance in soybean and oilseed processing; company maintains adjusted annual profit forecast

29.10.2026 | 07:55 (UTC -3)

Cultivar Magazine



Bunge reported net income of US$318 million in the third quarter of 2026, a 91,6%

increase compared to the US$166 million recorded in the same period of 2025. The company released the results this Thursday (October 29). The performance was driven by advances in soybean and other oilseed processing and refining operations, as well as the benefits of expanding its global network after the integration with Viterra.

Diluted earnings per share from continuing operations reached US$1,64, compared to US$0,86 in the third quarter of 2025. On an adjusted basis, excluding certain gains, expenses, and mark-to-market adjustments, the indicator decreased from US$2,27 to US$2,56.

Adjusted operating income before interest and taxes (EBIT) reached US$846 million, an increase of 11,8% compared to

US$757 million a year earlier. Considering only the operating segments, adjusted EBIT totaled US$997 million, compared to US$924 million.

In the first nine months of 2026, Bunge reported net income of US$1,064 billion, compared to US$721 million in the same period of 2025. Total adjusted EBIT reached US$2,072 billion, compared to US$1,412 billion.

Soybean processing

The soybean processing and refining segment posted adjusted EBIT of US$565 million in the third quarter, an 18,2% increase over the US$478 million recorded a year earlier. Net sales rose from US$10,857 billion to US$11,442 billion.

The company processed 11,745 million tons of soybeans during the quarter, a volume 3,2% lower than the 12,139 million tons of the same period in 2025. Soybean sales decreased from 7,246 million to 5,274 million tons.

Conversely, refined soybean oil production increased from 932 to 1,051 million tons.

North America made the largest contribution to the improved results, driven by processing. However, refining activity underperformed compared to the previous year.

In South America, Bunge achieved better results in soybean processing in Argentina and Brazil. This improvement partially offset lower results in fertilizer and refining operations in both countries.

In Europe, processing also showed improvement. Gains were partially offset by reduced origination results in South America and processing in Asia. Global soybean oil sales were also lower than the previous year.

Processed volume decreased in South America and Asia, while Europe showed growth. In the United States, volumes remained close to those recorded in 2025.

In the period from January to September, the company processed 34,026 million tons of soybeans, compared to 29,553 million tons in the same period of 2025. The segment's adjusted EBIT reached US$1,387 billion, a growth of 35,6%.

Other oilseeds

The processing and refining segment for other oilseeds recorded adjusted EBIT of US$329 million in the third quarter, compared to US$275 million in the same period of 2025. This represents a growth of 19,6%.

The volume processed increased by 15,2%, rising from 3,129 million to 3,606 million tons. Production of refined oils increased from 711 to 872 tons.

Net sales reached US$4,302 billion, compared to US$3,661 billion in the third quarter of 2025.

According to the company, North America led the improvement in results, with advances in processing and refining. In Europe, processing showed superior performance, partially offset by lower

results in refining and biodiesel.

In Argentina, processing and refining results declined. Global distribution also underperformed, while canola origination operations in Canada and Australia saw improvements.

Bunge attributed the growth in processed volumes across all regions to more favorable margin conditions.

In the first nine months of 2026, the processing of other oilseeds reached 10,377 million tons, compared to 7,270 million tons in the same period of the previous year. Adjusted EBIT accumulated increased from US$371 million to US$779 million.

Grain marketing

The grain trading and milling segment showed a decline in results. Adjusted EBIT fell from US$120 million to US$87 million in the third quarter, a drop of 27,5%.

Net sales increased from US$6,428 billion to US$6,764 billion. However, the volume handled decreased from 24,080 million to 23,806 million tons.

The company reported improvements in its global grain trading and commercial services operations. These gains did not offset lower results in its ocean freight, sugar, and wheat milling activities.

In the first nine months of the year, the total volume handled reached 74,216

million tons, compared to 40,972 million tons in the same period of 2025.

Tropical oils and special ingredients

The tropical oils and specialty ingredients segment recorded adjusted EBIT of US$16 million, compared to US$51 million in the third quarter of 2025.

Results declined in North America, Europe, and Asia, primarily due to short-term margin impacts associated with geopolitical trade disruptions. Commissioning expenses, production ramp-up, and the transition of industrial units also weighed on the results.

These costs involved activities related to tropical oils and soy protein concentrates.

Global tropical oil trading operations, on the other hand, showed results that were better than the previous year.

Integration with Viterra and investments

Bunge reported progress in capturing cost synergies related to its integration with Viterra. The company also highlighted business opportunities arising from the expansion of its global structure.

Following the close of the quarter, Bunge Chevron Ag Renewables started production on a new oilseed processing line in Destrehan, Louisiana, U.S.

According to the company, investments in expansion are moving from the production acceleration phase to the stage of contributing to results.

Bunge CEO Greg Heckman stated that the company's global presence and diversified value chains have positioned it to seize opportunities and manage risks in an environment marked by geopolitical uncertainties, shifts in trade flows, and changes in government policies.

Projections for 2026

Bunge maintained its adjusted earnings per share forecast of between US$9,25 and US$9,75 for the full year 2026.

Compared to previous estimates, the company slightly revised downwards its expectations for soybean processing and refining and reduced its projections for tropical oils and specialty ingredients.

The outlook for grain sales and milling has improved. Estimates for processing other oilseeds and for the corporate sector remained unchanged.

The company also updated its forecast for net interest expenses to a range between US$640 million and US$670 million, compared to US$620 million to US$660 million in the previous estimate. The adjusted annual effective tax rate is expected to be between 23% and 25%, compared to the previous range of 22% to 26%.

Capital investments are expected to reach values ??close to the upper limit of the projected range of US$1,5 billion to US$1,7 billion. The company estimates depreciation and amortization of approximately US$975 million in 2026.

Bunge Global SA Earnings Highlights

(US$ in millions, except per share data)	Quarter Ended September 30, 2026	Quarter Ended September 30, 2025	Nine Months Ended September 30, 2026	Nine Months Ended September 30, 2025
Net income per share from continuing operations-diluted (1)	$ 1.64	$ 0.86	$ 5.45	$ 4.62
Adjusted Net income per share from continuing operations-diluted (1) (2)	$ 2.56	$ 2.27	$ 6.38	$ 5.56
Adjusted Segment EBIT (2) (3)	$ 997	$ 924	$ 2,454	$ 1,703
Soybean Processing and Refining	$ 565	$ 478	$ 1,387	$ 1,023
Softseed Processing and Refining	329	275	779	371
Tropical Oils and Specialty Ingredients	16	51	90	100
Grain Merchandising and Milling	87	120	198	209
Adjusted Corporate and Other EBIT (2) (4)	$ (151)	$ (167)	$ (382)	$ (291)
Adjusted Total EBIT (2)	$ 846	$ 757	$ 2,072	$ 1,412

(1) In the third quarter of 2025, Bunge concluded the sale of Viterra Limited's ("Viterra") business in Hungary, as well as part of Viterra's business in Poland (the "Divested Business"). The Divested Business was classified as discontinued operations during Bunge's period of ownership.
(2) Adjusted Net income per share from continuing operations – diluted, Adjusted Segment EBIT, Adjusted Corporate and Other EBIT, and Adjusted Total EBIT are non-GAAP financial measures. Reconciliations to the most directly comparable U.S. GAAP measures are included in the appendix attached to this slide presentation which are also posted on Bunge's website.
(3) Adjusted Segment EBIT comprises our Soybean Processing and Refining, Softseed Processing and Refining, Tropical Oils and Specialty Ingredients, and Grain Merchandising and Milling reportable segments.
(4) Corporate and Other includes salaries and overhead for corporate functions, including acquisition and integration costs related to the Viterra Acquisition, that are not allocated to the Company's individual reporting segments, as well as certain other activities including Bunge Ventures, the Company's captive insurance activities, and accounts receivable securitization activities.

BUNGE

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The information contained in this document was classified as Restricted

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NPK fertilization influences tomato productivity and quality

Research identifies dose with the best balance between yield, plant development, and mineral composition of the fruit

29.10.2026 | 06:35 (UTC -3)

Cultivar Magazine



Photo: Erkan budak - Pexels

Applying 1.500 kilograms per hectare of NPK fertilizer provided the best balance between productivity, plant growth, and nutritional quality of tomatoes. The study evaluated five fertilization rates on the Río Grande cultivar under field conditions in Peru.

Researchers tested applications of 700, 1.000, 1.500, 2.000, and 2.500 kilograms per hectare of fertilizer formulated with 12,4% nitrogen, 11% phosphorus pentoxide, and 18% potassium oxide. The experiment took place between July and November 2025 in low-fertility soil after acidity correction.

The dose of 1.500 kilograms per hectare resulted in an estimated productivity of 52,67 tons per hectare, equivalent to 1,58

kilograms of fruit per plant. In this treatment, the plants reached an average height of 154,61 centimeters and produced 3,86 inflorescences per plant.

Physicochemical characteristics

Fertilization also modified the physicochemical characteristics of the fruits. At the dose with the best agronomic performance, the tomatoes showed intermediate values ??between the treatments: 6,13 degrees Brix of total soluble solids, 4,32% of soluble sugars and an antioxidant capacity of 23,6%, evaluated by the FRAP method.

The mineral composition showed differences between treatments. Fruits from the 1.500 kilograms per hectare dose accumulated higher concentrations of calcium, potassium, and magnesium. The values ??were approximately 80% to 123% higher than those recorded in the reference treatment of 700 kilograms per hectare, which is roughly double.

Doses lower or higher than 1.500 kilograms per hectare did not surpass the combined performance of this treatment. The researchers highlight the importance of balanced fertilization management to reconcile productivity and nutritional quality. The results refer to the specific conditions of the experiment, conducted with the Río Grande cultivar in low-fertility soil (doi 10.3390/ijpb17110115).

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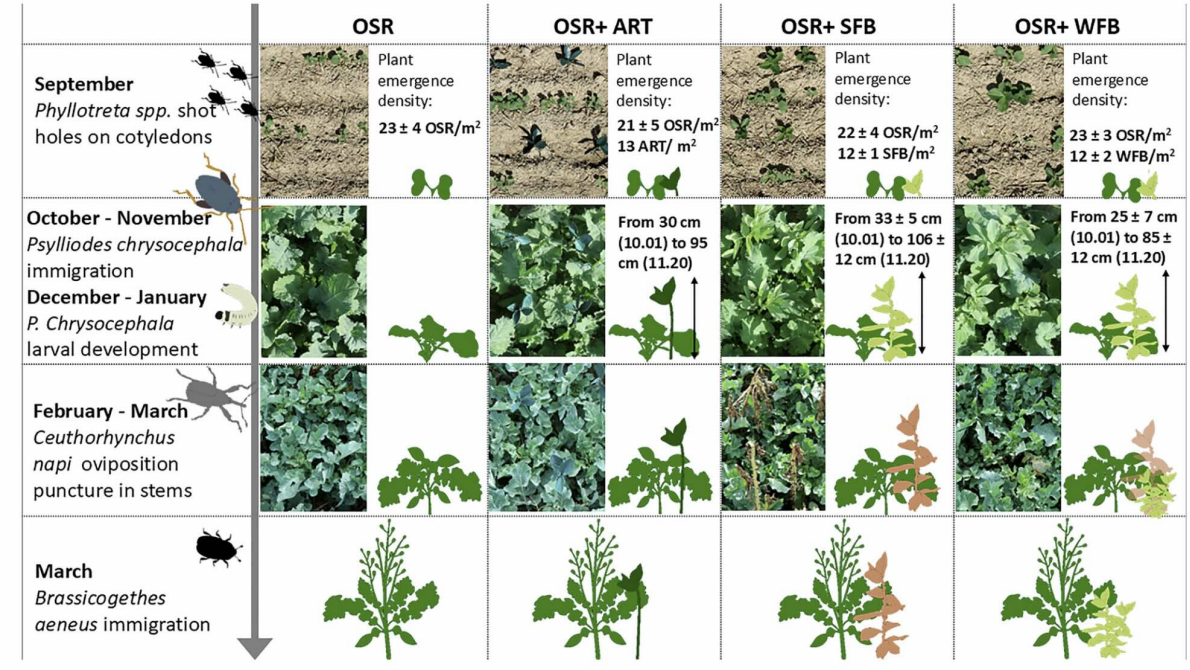
Intercropping with broad beans reduces the incidence of pests in canola

Research conducted in Switzerland identified a reduction of up to 89% in weevil oviposition and 58% in the presence of beetles

28.10.2026 | 15:04 (UTC -3)

Cultivar Magazine



doi 10.1002/ps.8835

Intercropping canola with broad beans (Vicia faba) reduced the incidence of four groups of insect pests. Research conducted by Agroscope in Switzerland, with participation from INRAE, AgroParisTech, and Université Paris-Saclay in France, identified a reduction in leaf damage, adult colonization, and oviposition. Intercropping with cold-sensitive spring broad beans showed the best results against spring pests.

The study evaluated field experiments in the 2022/2023 and 2023/2024 growing seasons. The researchers compared canola in monoculture, intercropping with winter beans (frost-resistant) or spring beans (frost-sensitive), and canola with artificial polyethylene plants.

The consortium reduced damage caused by Phyllotreta spp. to cotyledons by between 35% and 38%. The presence of adult Psylliodes chrysocephala decreased by between 32% and 37%.

Spring pests

The effects reached spring pests. Oviposition of Ceutorhynchus napi fell by 62% with cold-resistant broad beans and 89% with cold-sensitive broad beans. The abundance of Brassicogethes aeneus in the inflorescences decreased by 30% and 58%, respectively.

Artificial plants also reduced damage from Phyllotreta spp. by 19%, oviposition by Ceutorhynchus napi by 49%, and the

presence of Brassicogethes aeneus by 46%. The results indicate the role of visual and physical barriers in the difficulty insects face in locating the host crop.

On the other hand, artificial plants did not significantly reduce the presence of adult Psylliodes chrysocephala and resulted in more larvae per plant than intercropping with broad beans. According to the authors, the weaker effect of artificial plants on autumn pests and on Ceutorhynchus napi suggests the involvement of other mechanisms, such as olfactory interference.

Protective effects

The frost-sensitive bean retained protective effects after its death in winter. Researchers point to possible contributions from plant residues and volatile compounds released during decomposition. The experiment did not allow them to determine the role of each mechanism.

Intercropping with cold-sensitive broad beans showed a tendency to increase canola productivity compared to monoculture, with only a marginally significant effect (P = 0,07). The other treatments did not alter the yield (doi 10.1002/ps.8835).

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Fruit farming in Minas Gerais advances 29% in ten years

According to a survey by Emater-MG, growth in planted area surpasses that recorded for traditional crops

28.10.2026 | 14:53 (UTC -3)

Marcelo Varella



Fruit farming is expanding its presence in Minas Gerais. Between 2015 and 2025, the area planted with fruit in the state grew

by 29%, from 138 to 179 hectares. The survey, conducted by Emater-MG, shows a greater increase than that recorded by traditional crops, such as coffee, whose area increased by 17% during the same period. Corn, on the other hand, saw a 15% reduction.

Oranges occupy the largest area among cultivated fruits in Minas Gerais and have also shown significant growth. Cultivation increased from 42,6 hectares in 2015 to 67,2 hectares in 2025, an expansion of 57%. Bananas, the second most planted fruit, advanced 17%, from 46,2 to 54,2 hectares.

The largest proportional growth was recorded for avocados. The area dedicated to the crop increased by 374%

in ten years, going from 2,7 to 12,9 hectares.



Favorable conditions

According to the coordinator of Fruit Growing at Emater-MG, the growth of the activity results from a combination of factors. The increased demand for foods associated with a healthy diet is one of them. "People are looking for health, and

fruit is one of the recommendations," he emphasizes.

The natural conditions in Minas Gerais also favor this activity. The state has different types of climate, allowing the cultivation of tropical, subtropical, and temperate species, in addition to suitable soils and availability of water resources. The technology available for different crops also contributes to increasing productivity.

Another advantage is Minas Gerais' location, close to major consumer centers. The road infrastructure facilitates the transport of produce within the state and to other regions of the country. The presence of six CeasaMinas distribution centers in the state also contributes to marketing, by

concentrating production and facilitating distribution.

The potential for income generation is another encouraging factor. According to the coordinator, fruit farming has high productivity per area, reaching tens of tons per hectare in some crops.

"Fruit farming can be an additional option for producers, even without competing with other activities on the property," he explains. The activity also opens up opportunities for female labor and for adding value with juices, pulps, jams, sweets, and other products.

Production by the state

Fruit farming is present in different regions of Minas Gerais, with specializations according to the characteristics of each territory. In Northern Minas Gerais, bananas and lemons stand out. In the Triângulo Mineiro region, orange and pineapple production is significant. Regions such as Southern Minas Gerais, Zona da Mata, Central, Campos das Vertentes, and Eastern Minas Gerais have more diversified production.

In addition to production and marketing conditions, institutional programs for purchasing from family farms (National School Feeding Program/PNAE and Food Acquisition Program/PAA) and the expansion of agro-industries can also stimulate the activity, creating markets and

expanding the possibilities for adding value.

Ranking

In 2025, the main fruits cultivated in Minas Gerais, considering the planted area, were: orange (67,2 hectares), banana (54,2), avocado (12,9), tangerine (12,8), pineapple (9,9), mango (6,5), lemon (4,9) and papaya (1,8).

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Hectre opens laboratory to develop in-house fruit analysis

Company invests in hyperspectral technology to assess ripeness, starch content, and firmness without cutting the fruit

28.10.2026 | 09:49 (UTC -3)

Cultivar Magazine, based on information from Ksenia Gruzin



Agtech company Hectre has opened a fruit quality research lab in Auckland, New Zealand. The facility will develop hyperspectral technology to identify internal fruit characteristics using light. The project involves an investment of approximately NZ$5 million, with joint funding from the government.

The laboratory will develop a new generation of the Arc camera. The equipment will use light to assess ripeness, starch content, and firmness through the peel. The technology will allow processing units to define storage, classification, and marketing strategies based on the internal quality of the fruit.

According to Hectre CEO Matty Blomfield, identifying internal characteristics is a

greater challenge than evaluating color and external classification. Access to this information could reduce losses during storage and transport, as well as improve economic returns for producers and processing plants.

Duration of three years

The research program will last three years. Hectre is leading the development, with resources from the New Zealand government's Primary Sector Growth Fund and its own investments.

The first goal is to develop an algorithm capable of identifying internal characteristics with a minimum accuracy of 80% by June 2027. The next step involves

validating a prototype under commercial conditions by June 2028.

The current Arc camera analyzes fruit as trucks arrive at processing plants. The system provides data on size, color, and external quality in near real-time.

Companies in 22 countries use the technology. The system processes information from billions of fruits per year, with an accuracy close to 99%. Sampling volumes reach approximately 200 times greater than manual methods.

The inauguration comes after Hectre raised NZ$12 million in a Series A funding round, led by the Punakaiki Fund, with participation from Cultivate Ventures, Nuance, and private investors. The company also won two categories at the

Hi-Tech Awards 2026, including the award for most innovative agtech solution.

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Sumitomo Chemical launches SeiCho E for pasture management

Biorational acts on the physiology of forage plants and seeks to promote growth, regrowth, and nutrient utilization

28.10.2026 | 09:33 (UTC -3)

Cultivar Magazine, based on information from Luis Fernando Duarte



Sumitomo Chemical is launching a series of nine regional events today in Campo Grande to present SeiCho E, its first biorational product aimed at the pasture market. The product acts on the physiology of forage plants, focusing on growth, regrowth, and root system development.

Of natural origin, SeiCho E aims to stimulate leaf area formation, water and nutrient absorption and utilization. The technology also intends to increase plants' tolerance to stress conditions. According to the company, application requires low dosages and allows the use of drones.

“The solution was developed to contribute to pasture development, forage availability, and the reduction of the interval between

grazing cycles,” says Henrico Bizão, Biorationals Manager at Sumitomo Chemical.

The product is part of Portfolio E, a line designed for pasture management. The set includes the herbicide Tempest E, indicated for the control of weeds of varying difficulty levels. The company's proposal combines weed control and forage development to maximize the use of livestock areas.

According to Mário Drehmer (pictured), Portfolio and Crops Manager, the regional meetings will allow the applications of the technology to be presented according to the conditions of each producing region.

The program began after a pre-launch held in September in Castanhal (PA). The next

events will take place in Maceió (AL), on November 4th; Alta Floresta (MT), on November 6th; Londrina (PR), on November 10th; Chapecó (SC), on November 12th; Marabá (PA), on November 13th; Goiânia (GO), on November 17th; Sapeaçu (BA), on November 26th; and Imperatriz (MA), in December.

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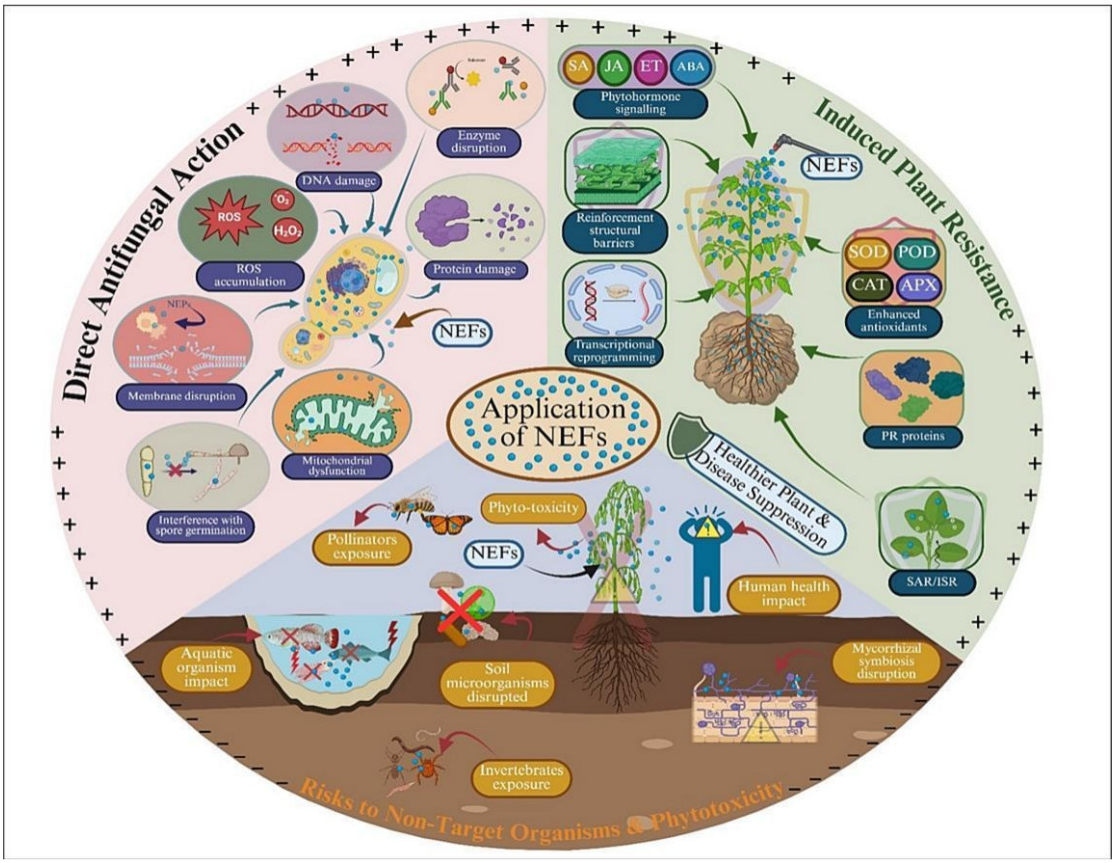
Nanofungicides combine pathogen control and plant defense

Scientific review points to mechanisms of action against fungi, activation of plant immunity, and environmental risks of nanoparticles

28.10.2026 | 09:21 (UTC -3)

Cultivar Magazine



doi 10.1016/j.pestbp.2026.107404

Fungicides developed with nanotechnology can act directly on pathogens and stimulate the plants' natural defense mechanisms. This combination expands the possibilities for controlling agricultural diseases and can reduce the amount of active ingredients used in applications. However, the environmental safety of these products requires assessments of their effects on non-target organisms, soil microorganisms, and the treated crop itself. These conclusions are part of a scientific review by researchers at Guizhou University.

According to the study, these products utilize nanoparticles with antifungal properties or nanometric structures responsible for transporting conventional active ingredients. Among the properties

explored are a high surface area to volume ratio, greater reactivity, and improved bioavailability of the active ingredients at low concentrations. Some formulations also allow for the controlled release of compounds in response to changes in pH, temperature, enzymatic activity, or signals associated with pathogens.

The mechanisms of action include damage to the cell wall and plasma membrane of fungi, inhibition of spore germination, and alterations in hyphal development. Nanoparticles can also cause accumulation of reactive oxygen species, impairment of mitochondria, and damage to DNA, proteins, and enzymes.

Among the examples presented, magnetite nanoparticles demonstrated antifungal

activity superior to that of ningnanmycin against Fusarium oxysporum f. sp. lycopersici. Another study identified complete inhibition of mycelial growth of Fusarium oxysporum f. sp. pisi with silicon and chitosan nanoformulations. In the comparison presented, conventional silicon achieved 50 percent inhibition.

The diversity of mechanisms represents a relevant characteristic of these formulations. Nanofungicides can target different structures and physiological processes of the pathogen. However, the review points to the need to clarify how the size, morphology, charge, coating, and dissolution behavior of the particles influence both the antifungal efficacy and the effects on non-target organisms.

Activation of plant resistance

In addition to direct toxicity to fungi, nanofungicides can activate defense responses in plants. The review identified alterations in the signaling pathways of salicylic and jasmonic acids, ethylene, and other phytohormones involved in disease resistance.

Responses include increased expression of defense-related genes, production of pathogenesis-associated proteins, and frequently, greater activity of antioxidant enzymes. Alterations in the structural barriers of plant tissues and activation of systemic resistance mechanisms also occur.

In rice, nanoparticles with a metal-organic framework containing iron promoted antioxidant responses and jasmonic acid-mediated signaling against Rhizoctonia solani. In maize, selenium nanoparticles activated the ?-linolenic acid and jasmonic acid signaling pathways. This activation stimulated the production of phenolic phytoalexins and benzoxazinoids against Fusarium graminearum, the causal agent of stem rot.

In another study included in the review, tomato plants treated with zinc oxide nanoparticles doped with cobalt or nickel showed increased expression of the pathogenesis-related protein PR1 and the enzyme linoleate 9S-lipoxygenase D. These responses occurred during infection by Fusarium oxysporum f. sp. radicis-

lycopersici.

The combination of direct pathogen suppression and activation of plant immunity can increase the efficiency of phytosanitary control. However, the review highlights the need to distinguish the effects of nanoparticles themselves from those caused by the release of metal ions or by products resulting from their transformation.

Risks to non-target organisms

The potential benefits of nanofungicides are accompanied by concerns about environmental persistence, bioaccumulation, and toxicity. Exposure of

plants to certain nanoparticles can cause oxidative stress, reduced germination, cell damage, and decreased biomass.

The effects depend on factors such as the size, chemical composition, and concentration of the particles. High doses of some nanomaterials can compromise photosynthesis, alter gene expression, and harm plant development.

In soil, zinc oxide nanoparticles have been associated with alterations in microbial diversity and in populations involved in the nitrogen cycle. Silver nanoparticles have also shown negative effects on denitrifying bacteria and mycorrhizal fungi. In maize, these particles reduced root colonization by mycorrhizae and available phosphorus in the soil.

These changes are concerning due to the role of microorganisms in nutrient cycling and the decomposition of organic matter. Among the processes affected are nitrogen fixation and phosphorus mineralization. The review also gathers evidence of adverse effects on aquatic organisms, earthworms, and pollinating insects.

Scientists highlight gaps in knowledge regarding human exposure, residues in edible plant tissues, and occupational safety during application. Doubts persist about the effects of repeated use, the transformations of nanoparticles in the environment, and their interactions with other agrochemicals.

To advance agricultural application, the review recommends integrating antifungal efficacy, activation of plant defenses, and ecological safety from the formulation development stage. It also points to the need for field trials, life cycle assessments, and studies on economic viability.

Integration with sensors, artificial intelligence, and the Internet of Things appears among the future possibilities. These technologies can allow for continuous monitoring of crop health and targeted release of compounds. However, researchers consider it essential to validate the efficacy, selectivity, and long-term environmental effects before adoption on an agricultural scale (doi 10.1016/j.pestbp.2026.107404).

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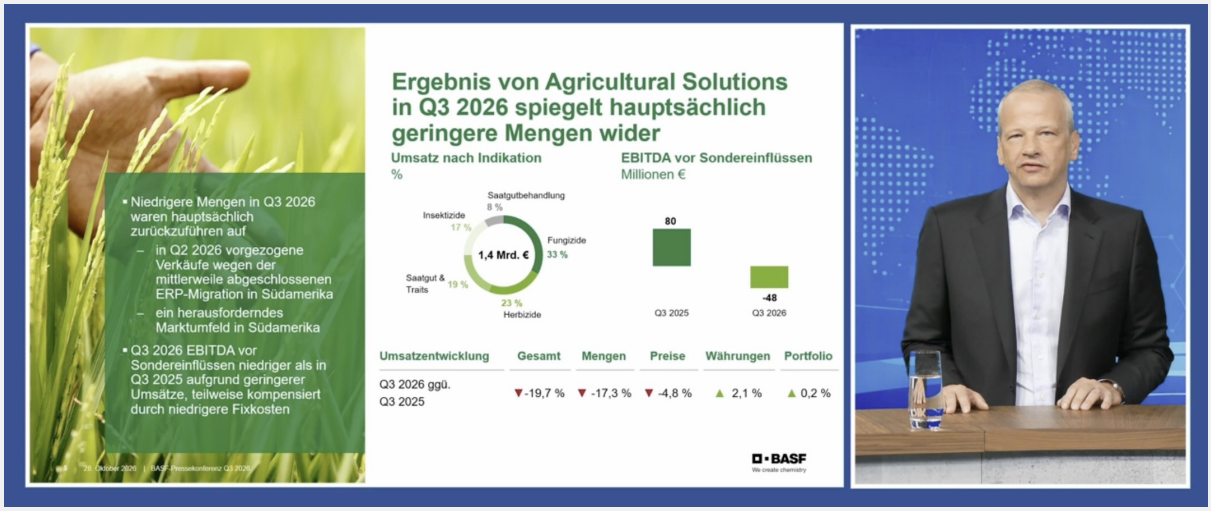
BASF announces results for the third quarter of 2026

The Agricultural Solutions segment recorded revenue of €1,4 billion and negative EBITDA of €48 million

28.10.2026 | 06:46 (UTC -3)

Cultivar Magazine



BASF reported a 19,7% drop in sales in its Agricultural Solutions segment in the third quarter of 2026, compared to the same period of the previous year. Revenue fell from €1,748 billion to €1,404 billion.

Earnings before interest, taxes, depreciation and amortization (EBITDA), excluding special items, went from a positive €80 million to a negative €48 million. The results are included in the balance sheet released by the company this Wednesday, October 28th.

The decline in sales reflected a 17,3% drop in sales volume and a 4,8% decrease in prices. Currency effects contributed a positive 2,1 percentage points, while portfolio changes added 0,2 percentage points. The company attributed the performance to unfavorable weather conditions in certain regions and to the anticipation of sales in the South America, Africa, and Middle East region.

Variation by segments

Among the product lines, herbicides registered the largest percentage decrease in revenue. Sales fell 31,3%, from €461 million to €316 million. Revenue from fungicides decreased 22,2%, from €604 million to €470 million.

The seed treatment segment experienced a 29,7% decline, with revenue of €108 million, compared to €154 million in the third quarter of 2025. Insecticide sales fell 11%, from €266 million to €237 million.

The area of ??seeds and genetic traits showed a different result. Revenue increased by 3,3%, from 263 million to 272 million euros. This line represented the only agricultural category with revenue

growth in the quarter.

Variation by region

In South America, Africa, and the Middle East, BASF recorded a significant reduction in sales compared to the third quarter of 2025. According to the company, part of the decline resulted from the anticipation of business to the second quarter of 2026. This measure aimed to facilitate the migration to a new enterprise resource planning (ERP) system. Price reductions contributed to the negative performance. Slightly positive exchange rate effects offset some of the losses.

In Europe, agricultural sales also fell sharply. The company cited adverse weather conditions as the main factor for

the reduction in sales volumes. Prices showed a slight decrease.

In North America, revenue showed a slight decline. Volumes of herbicides, fungicides, and seed treatment products decreased. Increased volumes of seeds for agricultural crops offset some of this reduction. Positive exchange rate effects, mainly related to the US dollar and the Canadian dollar, contributed to sales.

In the Asia-Pacific region, sales fell considerably, with lower volumes of herbicides. BASF attributed this reduction to adverse weather conditions associated with the El Niño phenomenon. Lower prices and negative exchange rate effects, mainly related to the Indian rupee, also affected revenue.

The acquisition of AgBiTech, a company based in Brisbane, Australia, generated a positive contribution to the portfolio. BASF completed the transaction on March 31, 2026.

Agricultural profitability

The decline in agricultural sales has put pressure on the segment's profitability. The EBITDA margin before special items went from a positive 4,5% in the third quarter of 2025 to a negative 3,4% in the same period of 2026. The company reported a reduction in fixed costs, but the measure did not fully offset the loss of revenue and the effects of lower prices.

Total EBITDA for the agricultural segment was negative €78 million, compared to a

positive result of €44 million in the previous year. Special items represented expenses of €30 million, mainly related to the legal separation of the division and the migration of the ERP system.

Operating profit (EBIT) showed a loss of €206 million, compared to a loss of €88 million in the third quarter of 2025. The segment's cash flow fell 36,9%, from €465 million to €294 million. The company attributed the reduction to lower EBITDA and increased inventories.

In the period from January to September 2026, Agricultural Solutions recorded revenue of €6,718 billion, a 6% decrease compared to the €7,150 billion obtained in the same period of 2025. EBITDA before special items totaled €1,501 billion, a reduction of 11,7%. The corresponding

margin fell from 23,8% to 22,3%.

Spending on research and development in the segment totaled €218 million in the third quarter, a 12,4% decrease compared to the €249 million recorded a year earlier. In the first nine months of the year, these expenses reached €695 million, compared to €701 million in 2025.

BASF group results

Agricultural performance contrasted with the consolidated results of the BASF group. The company recorded sales of €16,360 billion in the third quarter, an increase of approximately 14% year-on-year. EBITDA before special items rose 15% to €1,6 billion.

The group's EBITDA growth was driven by contributions from the Chemicals, Materials, Industrial Solutions, and Nutrition & Care segments. The company raised the lower limit of its annual EBITDA projection before special items from €6,9 billion to €7,4 billion. The upper limit increased from €7,7 billion to €7,8 billion. The forecast considers the cumulative performance of the businesses and economic and geopolitical uncertainties.

Sales in the Agricultural Solutions segment declined significantly versus the third quarter of 2025.

Factors influencing sales in Q3 2026 – Agricultural Solutions

	Agricultural Solutions
Volumes	-17.3 %
Prices	-4.8 %
Currencies	2.1 %
Portfolio	0.2 %
Sales	**-19.7 %**

Segment data – Agricultural Solutions

	Q3			January–September		
Million €	2026	2025	+/-	2026	2025	+/-
Sales to third parties	1,404	1,748	-19.7%	6,718	7,150	-6.0%
of which Fungicides	470	604	-22.2%	2,068	2,124	-2.6%
Herbicides	316	461	-31.3%	2,023	2,230	-9.3%
Insecticides	237	266	-11.0%	752	810	-7.2%
Seed Treatment	108	154	-29.7%	380	411	-7.7%
Seeds & Traits	272	263	3.3%	1,496	1,575	-5.0%
EBITDA before special items	-48	80	.	1,501	1,700	-11.7%
Special items in EBITDA	-30	-36	15.6%	-87	-114	23.8%
EBITDA	-78	44	.	1,414	1,586	-10.8%
EBITDA margin before special items (%)	-3.4	4.5	.	22.3	23.8	.
Depreciation and amortization[a]	128	132	-3.1%	402	435	-7.5%
EBIT before special items	-179	-53	-240.5%	1,098	1,267	-13.3%
Special items in EBIT	-27	-36	23.7%	-86	-116	25.8%
Income from operations (EBIT)	-206	-88	-133.6%	1,012	1,151	-12.1%
Investments including acquisitions[b]	64	76	-15.9%	321	217	47.6%
Segment cash flow	294	465	-36.9%	14	299	-95.2%
Assets (September 30)	15,928	15,175	5.0%	15,928	15,175	5.0%
Research and development expenses	218	249	-12.4%	695	701	-0.9%

[a] Depreciation and amortization of property, plant and equipment and intangible assets (including impairments and reversals of impairments)
[b] Additions to property, plant and equipment and intangible assets

BASF Group

		Q3			January–September		
		2026	2025	+/-	2026	2025	+/-
Sales	million €	16,360	14,328	14.2%	49,586	45,625	8.7%
EBITDA before special items	million €	1,643	1,430	14.9%	6,448	5,521	16.8%
EBITDA	million €	1,206	1,207	-0.1%	5,358	4,600	16.5%
EBITDA margin before special items	%	10.0	10.0	.	13.0	12.1	.
Depreciation and amortization[a]	million €	1,305	976	33.7%	3,258	2,813	15.8%
Income from operations (EBIT)	million €	-98	232	.	2,100	1,787	17.6%
Special items in EBIT	million €	-780	-301	-158.6%	-1,494	-1,024	-45.9%
EBIT before special items	million €	681	533	27.8%	3,595	2,811	27.9%
Income before income taxes	million €	-41	140	.	1,837	1,374	33.7%
Income after taxes from continuing operations	million €	184	169	8.8%	1,657	1,016	63.2%
Income after taxes from discontinued operations	million €	–	32	.	3,627	131	.
Income after taxes	million €	184	202	-8.7%	5,284	1,147	360.9%
Net income	million €	155	172	-9.8%	5,227	1,059	393.4%
Earnings per share[b]	€	0.18	0.19	-6.3%	6.00	1.19	405.4%
Adjusted earnings per share[b]	€	0.72	0.52	38.5%	3.33	2.58	29.3%
Research and development expenses	million €	434	489	-11.3%	1,343	1,447	-7.2%
Personnel expenses	million €	2,786	2,975	-6.4%	8,980	9,093	-1.2%
Employees (September 30)		93,032	110,709	-16.0%	93,032	110,709	-16.0%
Assets (September 30)	million €	79,944	76,441	4.6%	79,944	76,441	4.6%
Investments including acquisitions[c]	million €	617	1,201	-48.6%	2,312	3,218	-28.2%
Equity ratio (September 30)	%	47.2	44.4	.	47.2	44.4	.
Net debt (September 30)	million €	16,652	20,891	-20.3%	16,652	20,891	-20.3%
Cash flows from operating activities	million €	1,096	1,371	-20.1%	823	1,974	-58.3%
Free cash flow	million €	523	398	31.5%	-1,040	-868	-19.9%

[a] Depreciation and amortization of property, plant and equipment and intangible assets (including impairments and reversals of impairments)

[b] The weighted average number of outstanding shares amounted to 859,222,207 in the third quarter of 2026 and 868,186,714 from January to September 2026. In the third quarter of 2025 as well as from January to September 2025, the weighted average number of outstanding shares amounted to 892,522,164. For more information on the share buyback program, see Significant Events in this quarterly statement.

[c] Additions to property, plant and equipment and intangible assets

Due to rounding, individual figures may not add up to the totals shown and percentages may not correspond exactly to the figures shown.

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Modified virus reduces survival of the Asian citrus psyllid

Research uses citrus tristeza virus to silence genes essential to the development of Diaphorina citri

28.10.2026 | 05:46 (UTC -3)

Cultivar Magazine



Photo: Fundecitrus

Researchers have developed a strategy to control the Asian citrus psyllid (Diaphorina citri) based on silencing genes involved in the insect's osmoregulation. The technique uses modified versions of the citrus tristeza virus (CTV) so that the plant itself produces RNA molecules capable of reducing the survival, longevity, and fecundity of the vector of the bacterium that causes huanglongbing (HLB).

Current pest management largely relies on repeated insecticide applications. Silencing targeted genes was already known to reduce psyllid survival. What was lacking were efficient and durable delivery systems capable of sustaining the effect under natural plant feeding conditions. This is where the contribution of this study lies.

Scientists have constructed recombinant CTV vectors that express double-stranded RNA (dsRNA) targeting two genes: DcSuh, responsible for the production of a sucrose hydrolase, and DcAQP, associated with the production of aquaporins. Both are key components of the psyllid's osmoregulatory network. The mechanism is RNA interference (RNAi), which reduces the expression of these genes.

Essential functions

These processes play indispensable roles in the physiology of Diaphorina citri. The insect feeds exclusively on phloem sap, which is rich in sucrose, and needs to continuously regulate carbohydrate metabolism and water balance to maintain

physiological homeostasis.

The study evaluated the performance of psyllids reared on citrus plants infected with recombinant CTV vectors, monitoring two consecutive generations of the insects.

Silencing any of the genes caused a significant reduction in the psyllid's fitness, with decreased survival, longevity, and fecundity. Researchers also observed increased mortality and developmental abnormalities. The effects persisted into the second generation, demonstrating sustained RNAi activity.

According to the scientists, the results show that CTV is an efficient and durable vehicle for plant-mediated RNAi in citrus – the dsRNA reaches the insect through the sap – and identify osmoregulation as a

highly susceptible physiological target for the management of Diaphorina citri. The combination of virus-mediated dsRNA production and essential physiological targets of the insect is seen as a promising strategy for the long-term suppression of psyllid populations and for reducing the spread of HLB.

The research presents experimental results, without demonstrating control efficacy under commercial field conditions (doi 10.1002/ps.71407).

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ICL announces new Senior Commercial Director for the Northern Region

With over 30 years of experience in agribusiness, André Franco has worked for several companies in the sector

27.10.2026 | 17:25 (UTC -3)

Claudia Santos



ICL announced the arrival of André Franco (pictured) as Senior Commercial Director

for the Northern region, which, according to the company's internal classification, includes the Cerrados region, Rondônia, Bamatopipa, as well as other municipalities in Northeastern states. The executive will report directly to CEO Alfredo Kober and will be responsible for leading the company's commercial operations in the region and supporting its growth plans.

Franco, an agricultural engineer graduated from the Luiz de Queiroz Higher School of Agriculture at the University of São Paulo (Esalq-USP) and with an Executive MBA from Fundação Dom Cabral, has approximately 35 years of experience in agribusiness. Throughout his career, he has led operations, teams, and projects in companies such as Monsanto, Ceres

Seeds, Trouw Nutrition, Nidera Seeds, and Syngenta Seeds, in Brazil and other Latin American countries.

His career path encompasses senior leadership positions and solid experience in sales, marketing, strategy, human resources, and general management. He has led initiatives for market expansion, business development and transformation, as well as operational integration processes. More recently, he served for over two years as an advisory board member for companies in the sector and as an associate at consulting firms specializing in strategy, succession, and governance, in addition to developing activities focused on executive counseling and leadership development.

“It is a great satisfaction to join the ICL team. At a particularly challenging time for agribusiness, producers need, more than ever, technologies and solutions that contribute to increasing productivity and, above all, the profitability of their business. Plant Nutrition plays a fundamental role in this equation, offering concrete and recognized opportunities for return on investment. I am very motivated to contribute, together with the ICL team, to expand this impact and generate even more value for farmers,” he says.

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Massey Ferguson unveils new baler system in the USA

A hydraulic device organizes bales into a single row and aims to reduce the number of passes during collection

27.10.2026 | 09:14 (UTC -3)

Cultivar Magazine



Massey Ferguson has introduced a new hydraulic bale alignment system for its MF SB.1436DB small rectangular baler in the United States. The technology organizes the bales into a single row, aiming to reduce the number of passes required for collection.

The MF SB.1436DB baler simultaneously produces two 14-by-18-inch bales. The new device, called a singulation chute, uses a hydraulic mechanism to position the bales sequentially. The system propels one bale first and then the other, forming a single row in the field.

According to AGCO, the manufacturer of Massey Ferguson, the solution reduces collection time, fuel consumption, and labor requirements. The company

highlights the difference compared to the conventional system, in which the bales remain distributed in two parallel rows.

The equipment incorporates adjustable paddles to accommodate different bale lengths. The mechanism also allows control over the release time of each unit.

The drive system utilizes a hydraulic pump from the baler itself. An additional hydraulic hose connects the system to the tractor and allows the device to be raised or lowered.

The unit features a towed frame, swivel wheels, and suspension. This configuration allows it to follow the uneven terrain during operation. For transport, the operator can raise and lock the equipment using the hydraulic system.

The project also includes access to the components for maintenance. Lifting the device frees up the lower part of the assembly. The conveyor belts have splices to facilitate interventions.

Massey Ferguson also reported that the design of the alignment mechanism has a patent application pending.

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Nanoemulsion reduces greening bacteria in citrus seedlings

Research by Unesp records a reduction of up to 2,46 logarithmic units in the population of Candidatus Liberibacter asiaticus

27.10.2026 | 07:05 (UTC -3)

Cultivar Magazine



Photo: Natalie Hummel / Louisiana State University AgCenter - Bugwood

Researchers at São Paulo State University (Unesp) have developed a nanoemulsion capable of reducing the population of the bacterium Candidatus Liberibacter asiaticus, associated with citrus greening (HLB), in orange tree seedlings. The formulation, applied directly to the substrate, reduced the bacterial load by up to 2,46 logarithmic units compared to untreated plants after 300 days. In the experiment with the greatest response, 90% of the treated plants showed bacterial concentrations at or near the detection limit.

The study involved researchers from Unesp and the N&P Pharmaceutical Technology laboratory. The formulation, called V13, contains oregano essential oil, hexyl gallate, and eugenol.

The experiments used sweet orange (Citrus sinensis) Valencia variety seedlings infected with the psyllid Diaphorina citri. The team conducted two independent trials, each with ten treated plants and ten controls.

Application method

The application was carried out by watering the substrate, with approximately 150 milliliters of the solution per seedling. Each 60-day cycle included seven applications, on days 0, 3, 6, 14, 21, 35, and 42, and the treatment continued throughout the experiment. The researchers measured the bacterial concentration by quantitative PCR at the end of each cycle, for 300 days.

In the first experiment, the formulation reduced the bacterial load by 1,29 logarithmic units. At the end, 70% of the treated plants showed concentrations at or near the detection limit. In the second trial, the reduction reached 2,46 logarithmic units, with a similar response in 90% of the plants.

The nanoemulsion showed a predominance of particles approximately 50 nanometers in size and maintained bactericidal activity during 120 days of storage.

Non-toxic

Ecotoxicological tests did not identify acute toxicity in Tenebrio molitor nor significant

alterations in the survival of Melipona scutellaris under the evaluated conditions.

The researchers highlight the need to validate the technology in commercial orchards. The study did not demonstrate definitive elimination of the bacteria nor replacement of conventional greening management measures (doi 10.3389/fagro.2026.1965184).

The work was carried out by scientists Vitória Rodrigues Bergamo, Vítor Rodrigues Marin, Caio Felipe Cavicchia Zamunér, Lucas Miotelo, Maicon Segalla Petrônio, and Henrique Ferreira.

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Study reveals regional differences in the adoption of bio-inputs

Research from UnB identifies differences in the use of inoculants, biofungicides, bioinsecticides, and bionematicides in eight soybean-producing regions

27.10.2026 | 06:36 (UTC -3)

Cultivar Magazine

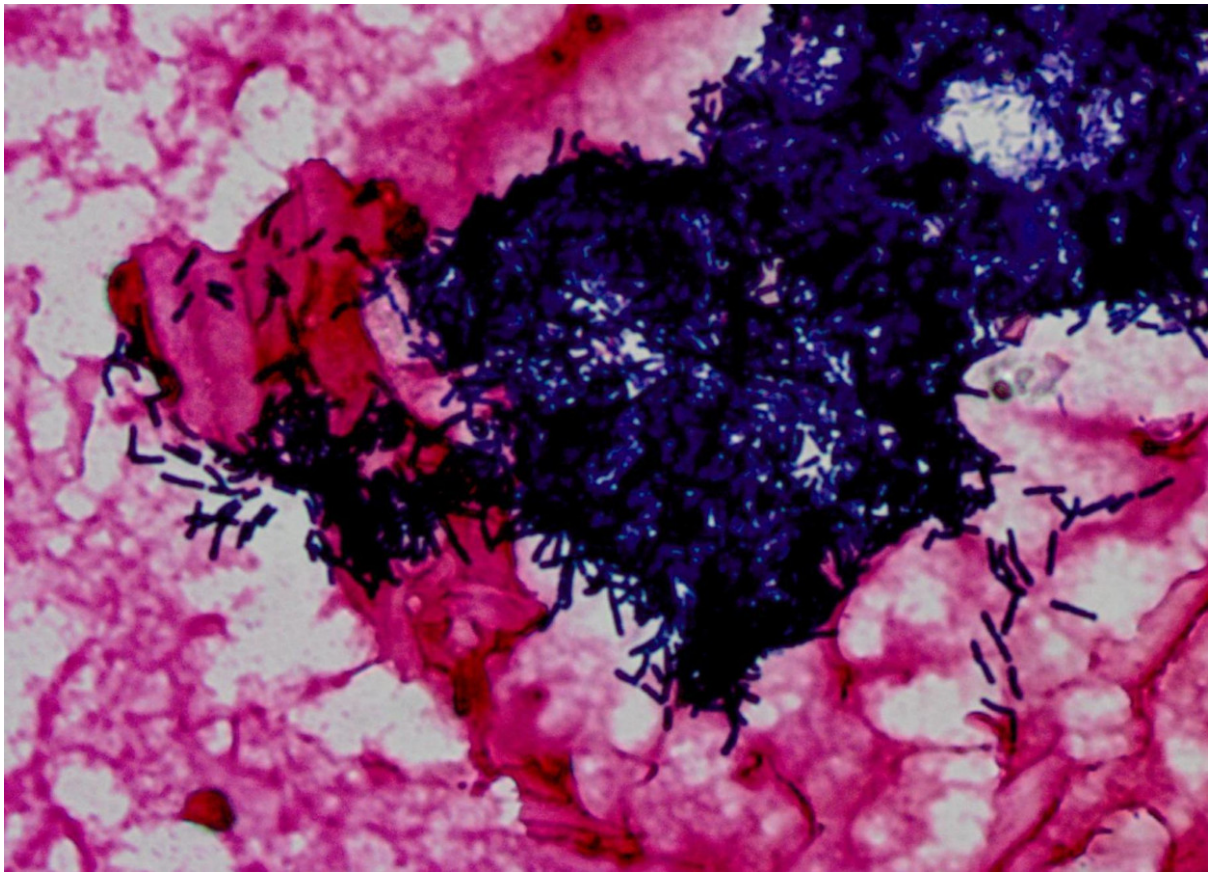

Photo: Ansel Oommen - Bugwood

Bio-inputs have expanded their role in the management of Brazilian soybeans and already offer alternatives to chemical pesticides in certain applications. Research conducted by Professor Gabriel da Silva Medina, from the University of Brasília (UnB), identified possibilities for replacing nematicides and fungicides, mainly in preventive treatments and situations of low disease pressure. For insect control, biological products predominate as complementary tools to conventional pesticides.

The study analyzed the commercial portfolio of inoculants, biofungicides, bioinsecticides, and bionematicides available in Brazil. The investigation also evaluated the agronomic positioning of these technologies and estimated their

adoption in eight soybean-producing regions.

The results indicate differences between product categories and production systems. Inoculants show the most consolidated adoption. Bionematicides have gained ground as alternatives to synthetic nematicides. Biofungicides are being positioned as substitutes for chemical applications in certain phases of the crop.

The research used information from package inserts, technical recommendations, interviews with company representatives, and a review of scientific studies. Adoption estimates were based on consultations with sales representatives. Therefore, the

percentages represent assessments by these professionals, not statistical measurements of national adoption.

Adoption in producing regions

Santa Catarina showed the highest average adoption rate among the eight categories evaluated, with 58,8%. The Federal District reached 54,7%. Next were Piauí, with 43%, Bahia, with 42,5%, São Paulo, with 37,5%, and the Triângulo Mineiro region, with 31,3%.

Rio Grande do Sul and Pará recorded the lowest averages, with 21,8% and 21,4%, respectively.

Inoculants were the most used in all regions, although they shared the lead with nutrient solubilizers in Santa Catarina. Estimates ranged from 60% of producers in Rio Grande do Sul to 99% in Piauí. Bahia, Triângulo Mineiro, Pará, and the Federal District reached rates of 90%.

Bionematicides showed an estimated adoption rate of 70% in Bahia, 60% in Piauí and São Paulo, and 50% in Santa Catarina and the Federal District. In Pará, the representatives consulted did not identify the use of this category.

Santa Catarina also showed high rates for nutrient solubilizers, at 80%, and bioinsecticides based on Bacillus thuringiensis, at 70%.

In the Federal District, the estimated adoption of fungus-based insecticides reached 80%. Products containing Bacillus thuringiensis reached 70%.

Possible replacements

The research identified changes in the commercial positioning of foliar biofungicides starting in 2025. Some companies began recommending biological products as substitutes for multi-site chemical fungicides in the initial applications during the vegetative development of soybeans.

One of the commercial strategies analyzed involves exclusively biological application at the V3 stage. At the V5 stage, it

recommends combining a biofungicide with a site-specific chemical fungicide. From R1 onwards, the program uses multi-site and site-specific chemical fungicides.

This approach offers the possibility of reducing chemical applications. However, its viability depends on disease pressure, product efficacy, and management conditions.

Foliar biofungicides available on the Brazilian market primarily utilize bacteria of the genus Bacillus. Their mechanisms include antibiosis, biofilm formation, and induction of resistance in plants.

Many formulations contain metabolites such as surfactin, iturin, and fengycin. These substances act on the cell membranes of phytopathogenic fungi.

Commercial records cover diseases such as brown spot, cercospora leaf blight, anthracnose, and Asian soybean rust, caused by Phakopsora pachyrhizi.

For soilborne diseases, products formulated with fungi of the genus Trichoderma predominate. These microorganisms act through parasitism, competition, and antibiosis.

In the management of white mold, caused by Sclerotinia sclerotiorum, Trichoderma species can parasitize sclerotia and reduce the pathogen's survival in the soil. The research cites an independent evaluation by Embrapa, conducted in 2025, in which certain biofungicides achieved up to 80% effectiveness in controlling the disease.

Bionematicides are gaining ground.

The survey identified registered biological products for the main nematodes associated with Brazilian agricultural crops.

Among the pests targeted by soybeans are Meloidogyne javanica, Meloidogyne incognita, Heterodera glycines, Pratylenchus brachyurus, and Rotylenchulus reniformis.

The formulations primarily utilize bacteria from the genera Bacillus, Pseudomonas, and Priestia, as well as fungi from the genera Trichoderma, Paecilomyces, and Pochonia.

Bacteria can form biofilms on roots and interfere with nematodes' ability to locate host plants. Fungi act primarily by parasitizing eggs and juveniles.

The study highlights the importance of applying products preventively or at the beginning of an infestation, preferably in the sowing furrow, as a seed treatment, or via soil application. For nematode management, it points to the need for a combination of methods. Chemical control can be combined with biological control, depending on the infestation level, soil and climate conditions, the nematode species, and subsequent crops.

No single product is registered to control all economically important species. The researcher also emphasizes that the

number of registered targets does not indicate technical superiority, only the spectrum of control approved in the product label.

Different mechanisms

In caterpillar management, research has identified products based on baculovirus and Bacillus thuringiensis.

Baculoviruses exhibit specificity for certain species. After ingestion, they infect caterpillars and cause their death, usually between three and seven days.

Bacillus thuringiensis produces toxic proteins that are activated in the intestines of caterpillars. Its effectiveness depends on product ingestion, leaf coverage, and

the timing of application.

For sucking insects, the survey highlights products formulated with Beauveria bassiana, as well as other entomopathogenic fungi and bacteria.

The combination of biological and chemical technologies offers distinct mechanisms of action and can contribute to resistance management. However, their combined use requires prior evaluation of compatibility between formulations, adjuvants, and pesticides.

The study also highlights the consolidation of biological nitrogen fixation with Bradyrhizobium in soybeans. For phosphorus solubilization and growth promotion, it identifies alternatives with Bacillus megaterium, Bacillus subtilis,

Pseudomonas fluorescens, and Azospirillum brasilense (doi 10.18488/cras.v13i2.5193).

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Enza Zaden announces changes in the Commercial and Marketing areas

Timóteo Scheidt takes over as Commercial Manager for Brazil, while Aline Borges leads marketing in Brazil and South America

26.10.2026 | 15:19 (UTC -3)

Victor Deliso Ferrage, published by Revista Cultivar



Timóteo Scheidt and Aline Borges

Enza Zaden, a company specializing in genetic improvement and vegetable seed production, announced changes in its Commercial and Marketing areas. Timóteo Scheidt has taken over as Commercial Manager for Brazil, while Aline Borges will now be responsible for the company's Marketing activities in Brazil and South America.

At Enza Zaden since 2017, Scheidt has built his career in different areas of the company, working in commercial coordination, product development, and portfolio management of tomatoes and peppers for South America and the Caribbean.

The executive also has experience in companies such as Agrosema, Incotec,

and Casa Bugre, working in technical, commercial, and market areas. Since September, he has been leading the commercial management of the Brazilian operation, focusing on relationships with producers and expanding the brand's presence in the country.

To take over marketing activities, the company hired Aline Borges, who joined the team in August. With experience in the seed sector since 2011, she has worked for multinationals such as Bayer and BASF, through the Nunhems operation.

In his new role, Borges is responsible for planning and executing marketing strategies in Brazil and South America. The work involves integrating with sales and product teams, with the goal of generating value for the different links in

the horticulture supply chain.

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ADM announces new Vice President of HR in Latin America

Karina Ude joins the company with over 20 years of experience in the agricultural sector

26.10.2026 | 10:00 (UTC -3)

Cultivar Magazine, based on information from Nicole Kloeble



ADM announced Karina Ude (pictured) as the new Vice President of Human Resources for Latin America. The executive will be responsible for leading

the area in the region, focusing on talent and leadership development and aligning people strategy with business needs.

Based at ADM's corporate office in São Paulo (SP), Karina will report directly to Jennifer Weber, the company's global Chief Human Resources Officer. ADM operates in 22 countries in Latin America and has approximately 11 employees in the region.

The executive has over 20 years of experience in people management, having worked at companies such as Bosch, Skanska, Syngenta, and Puratos. Before joining ADM, she held the position of Vice President of Human Resources for South and Central America at Puratos. At Syngenta, where she worked for over nine

years, she held various leadership positions, focusing on organizational development and global talent management.

Her experience includes talent management, organizational structure, change management, compensation, and leadership development. Karina holds a degree in Psychology from the Federal University of Bahia (UFBA) and an MBA in Business from the Brazilian Institute of Capital Markets (Ibmec).

“I am very happy to begin this journey at ADM and to be able to work alongside teams and leaders from different countries in Latin America. It is a diverse, dynamic and very relevant region for the company's business, which makes it even more

important for us to have a people strategy capable of keeping pace with the evolution of the business," said the executive.

According to ADM, the appointment reinforces the role of the Human Resources area in developing skills and preparing leaders to keep up with transformations and sustain business growth in the region.

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Research identifies molecular target for weevil control

Gene silencing and microRNA action caused deformities and mortality in Lasioderma serricorne

25.10.2026 | 16:34 (UTC -3)

Cultivar Magazine



Photo: Brian Little / University of Georgia - Bugwood

Researchers have identified a molecular mechanism involved in the metamorphosis of the tobacco beetle (Lasioderma serricorne). The study demonstrated the participation of the microRNA Lse-novel_mir23 in the regulation of the LsPI3K21B gene. The discovery opens possibilities for the development of RNA-based control strategies.

The research involved scientists from institutions in China and Belgium. The team investigated insulin signaling and its role in the transformation of pupae into adults (doi 10.3390/insects17111100).

Gene LsPI3K21B

Silencing the LsPI3K21B gene through RNA interference compromised insect development. Individuals exhibited difficulties in molting, body deformities, malformations, and reduced wing pigmentation. Mortality reached 90%, compared to 5,8% in the control group.

Researchers identified three microRNAs with the potential to regulate LsPI3K21B. Among them, Lse-novel_mir23 showed the most consistent results. In luciferase assays with human cells, the team introduced a microRNA mimic, a synthetic RNA molecule that imitates it. The mimic reduced the reporter gene's activity by 55,3%. The effect disappeared when the binding site was altered, indicating specificity. An additional test indicated direct binding of the microRNA to the

gene's messenger RNA.

Microinjection of the mimic into pupae caused approximately 90% mortality within 12 days. In the control group, about 90% of individuals completed metamorphosis.

wing area

The treatment also reduced wing area by 31,3%. Molecular analyses identified alterations in the expression of genes related to wing formation and chitin metabolism.

The results indicate potential for exploring this mechanism in the control of Lasioderma serricorne, a species with records of phosphine resistance. However, the in vivo experiments used

microinjections in pupae. The research did not evaluate oral or environmental application, RNA stability in storage environments, or effects on non-target organisms.

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Environmental DNA allows monitoring of insect resistance to insecticides

Research identifies mutations associated with pyrethroid resistance in plant samples, without the need to collect insects

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Cultivar Magazine



Photo: Paul Langlois / USDA APHIS PPQ - Bugwood

Researchers have demonstrated the feasibility of using environmental DNA (eDNA) to detect and estimate the frequency of mutations associated with insect resistance to insecticides. The technique uses genetic material deposited by organisms in plants. In the laboratory, the results showed a significant correlation with genetic analyses performed directly on the insects. Their study points to an alternative for expanding resistance monitoring in the field.

The research used the beetle Psylliodes chrysocephala, a cruciferous pest of economic importance to canola cultivation in Europe. The scientists investigated mutations in the voltage-gated sodium channel (VGSC), associated with resistance to pyrethroid insecticides.

The work brought together researchers from the University of Trier, the Luxembourg Institute of Science and Technology, and Bayer, which funded the study. The team evaluated the ability of environmental DNA to identify specific mutations and estimate their frequency in pest populations.

Pyrethroids act on the sodium channels of insect neurons and prevent their normal closure. Genetic alterations in these channels can reduce sensitivity to the products. Among the known mechanisms, the kdr (knock-down resistance) and s-kdr (super knock-down resistance) mutations stand out. These are associated with higher levels of resistance.

The study focused its analysis on the M918L and L925I mutations, which are related to the s-kdr mechanism.

Environmental DNA and resistance

In the first stage, the researchers used 100 beetles from laboratory strains originating from populations in England and France. The insects remained for 24 hours on Chinese cabbage leaves, distributed in 20 experimental units with five individuals each.

After the exposure period, the team collected the insects and the genetic material deposited on the leaves separately. This procedure allowed them

to compare the actual frequency of mutations with the estimates obtained from environmental DNA.

Of the 100 individual samples, 95 had sufficient sequencing for analysis. Among the insects, the relative frequency of alleles without the investigated s-kdr mutations reached 86,84%. The L925I mutation represented 7,63%, while M918L accounted for 5,53%.

Environmental DNA analysis also identified the two mutations. The estimated relative frequency reached 0,89% for L925I and 4,03% for M918L.

Despite the differences in values, the researchers identified a significant correlation between the frequencies obtained in the leaves and insects of each

experimental unit. The statistical model presented a coefficient of determination R2 of 0,97, with a P-value less than 0,01.

The result indicates potential for estimating the relative frequency of resistance mutations from DNA deposited in plants.

However, the technique showed limitations in identifying infrequent mutations. Some plant samples did not reveal variants present in the insects used in the experiment. Detection showed greater consistency when the frequency of mutations reached approximately 10% of the population.

Experiments in crops

The second stage took place in a canola field in Oberkorn, Luxembourg, in February 2025. Researchers collected 120 leaves from different plants and, a week later, 60 Psylliodes chrysocephala larvae.

Among the leaves, 24 samples presented a sufficient quantity of genetic sequences for analysis. Environmental DNA indicated a relative frequency of 55,72% for the M918L mutation.

In individual analyses, 51 larvae provided adequate data. The frequency of the M918L allele reached 76,47%. The mutation appeared in 82,35% of individuals, including 70,6% homozygotes.

In the field, therefore, environmental DNA estimated a lower frequency of M918L than that observed in larvae (55,72%

versus 76,47%). Unlike the laboratory assay, this comparison did not undergo statistical testing.

The researchers also analyzed composite samples of canola stems collected during the spring of 2024 in three locations in Luxembourg.

The M918L mutation showed relative frequencies of 61,18% in Kehmen, 88,56% in Oberkorn, and 57,61% in Reuler.

According to the team, the results indicate a widespread presence of the mutation in the evaluated populations. The high frequency of M918L deserves attention due to the association of this genetic alteration with high levels of resistance to pyrethroids.

Scientists highlight potential limitations in the effectiveness of these insecticides against populations carrying the mutation, even at the doses recommended in the product label. However, the study did not include efficacy trials of the products in the evaluated crops.

Limitations and applications

Environmental DNA analysis utilizes genetic traces deposited by insects during their interaction with plants. Extraction of this material, followed by amplification and sequencing, allows for the identification of alterations in specific regions of the genome.

This approach can reduce the need to collect and analyze large quantities of insects individually. It also allows for the investigation of the spatial and temporal distribution of mutations associated with resistance.

However, factors related to DNA collection, extraction, and amplification can influence the results. Among the possible biases, the following stand out: PCR inhibition, amplification of unwanted sequences, sample dilution, and the amount of genetic material deposited by the insects.

In the field experiment conducted during the winter, only 24 of the 120 leaves collected met the minimum sequencing criteria. The researchers suggest two possible explanations: excessive dilution of

the DNA during processing and lower beetle activity at that time of year.

The team recommends using repeated samples or larger composite samples, especially in situations with low frequencies of the mutations being investigated.

The results also indicate the need to test different protocols, sequencing depths, and collection periods (doi 10.1002/ps.71414).

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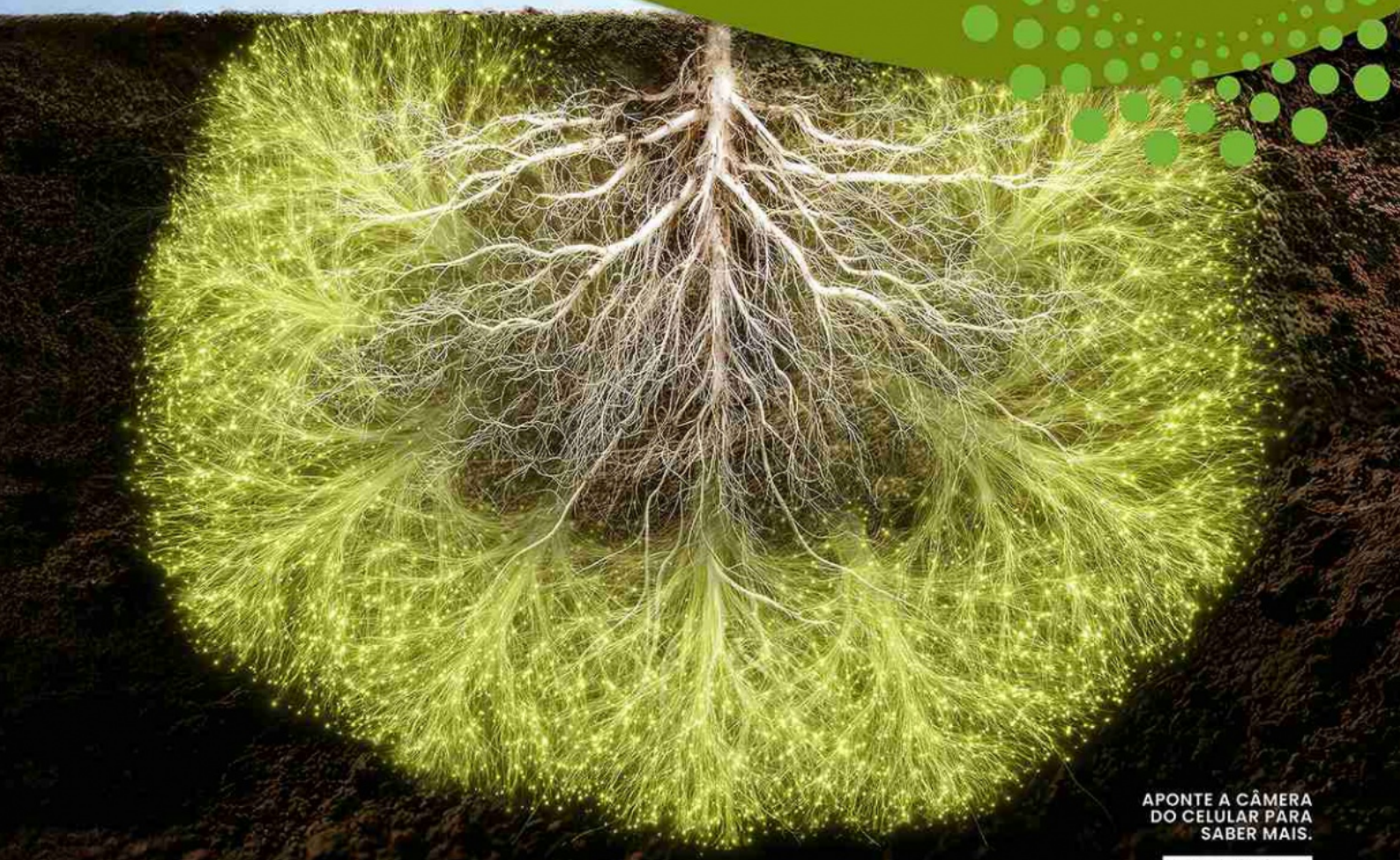

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CONTACT
editor@grupocultivar.com
comercial@grupocultivar.com