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Cultivar Semanal

Viruses protect vectors

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Viruses reduce the chemical defenses of rice and protect insect vectors.

Study shows that pathogens decrease the emission of methyl salicylate and repel parasitic wasps.

09.01.2026 | 14:47 (UTC -3)

Cultivar Magazine

Photo: OP Sharma

Insect-borne viruses manipulate the indirect defense of rice in the field and increase the survival of their vectors. The strategy reduces the emission of methyl salicylate (methyl salicylate), a volatile compound released by the plant after herbivore attacks. This chemical signal attracts natural enemies of insects. When the signal weakens, biological pressure decreases. The result favors the persistence of vectors and expands the spread of viruses in the crop.

The finding comes from field experiments, behavioral tests, and molecular analyses conducted in rice paddies in China. The data also point to a practical alternative. Applying methyl salicylate in the field restores biological control and reduces

populations of disease-carrying insects.

Indirect defense and natural control

The study evaluated rice paddies with controlled release of methyl salicylate during the crop cycle. The compound acts as an ecological signal. Plants attacked by herbivorous insects increase the emission of the volatile compound and attract parasitoids that attack the eggs of the vectors.

In the treated areas, the number of natural enemies increased over the weeks. The most responsive group was that of parasitic wasps. At the same time, the population of herbivorous insects

decreased. The decline was more pronounced among virus vectors.

Among them are Laodelphax striatellus, Sogatella furcifera, Nilaparvata lugens, and Nephotettix cincticeps. These insects transmit different viruses responsible for significant losses in rice crops.

Before the compound was released, there was no significant difference between the areas evaluated. After treatment, the curves began to diverge. The increase in parasitoids occurred in the first evaluations and continued until the end of the experiment.

Laboratory tests reinforced the field results. The parasitic wasp *Anagrus nilaparvatae*The natural enemy of

leafhopper eggs showed a clear preference for the odor of methyl salicylate. In contrast, adults of *Laodelphax striatellus* They avoided the compound.

Effect of viruses on the plant

When the plants were infected by viruses, the pattern changed. Diseased rice reduced methyl salicylate emissions after insect attack. The suppression was specific. Other feed-induced volatiles remained stable.

The effect appeared in plants infected with the rice stripe virus, transmitted by *Laodelphax striatellus*It also emerged in

infections caused by viruses transmitted by *Sogatella furcifera* e *Nilaparvata lugens*In all cases, the reduction in the chemical signal compromised the attraction of the parasitic wasps.

Under controlled conditions in the field, the parasitism rate of eggs decreased consistently in infected plants. The wasps located fewer vector eggs. As a result, more insects completed their life cycle and remained in the crop.

Behavioral tests showed another effect. Adults of *Laodelphax striatellus* They preferred infected plants over healthy ones. The choice coincides with the lower emission of the repellent compound.

Molecular mechanism identified

Methyl salicylate production depends on the enzyme encoded by the OsBSMT1 gene. Feeding on leafhoppers activates this gene. Viral infection has the opposite effect. Viruses reduce the transcription of OsBSMT1 and thus limit the biosynthesis of the volatile compound.

Regulation occurs through the transcription factor OsMYC2, a central component of rice's defense responses. The study showed that viral proteins sequester this factor in the cytoplasm of the plant cell. Outside the nucleus, it loses the ability to activate genes linked to defense.

With less functional OsMYC2 in the nucleus, the plant emits less methyl salicylate. Indirect defense weakens. Vectors find a more favorable environment.

Practical application in the field

The final stage tested the hypothesis under natural conditions. Infected and healthy plants, with eggs of *Laodelphax striatellus*, *Sogatella furcifera* e *Nilaparvata lugens*The plants received an application of methyl salicylate. The treatment increased the parasitism rates of the eggs and eliminated the difference between diseased and uninfected plants.

The results were repeated for different viruses and vectors. The application of the compound compensated for the suppression caused by the viral infection and restored the action of natural enemies.

The data indicate that the targeted use of methyl salicylate can strengthen biological control in rice paddies. The strategy works in harmony with ecological processes and reduces dependence on insecticides. The study also reveals that viruses not only exploit the host, but they also reprogram chemical signals from the environment to ensure their own spread.

Further information can be found at doi.org/10.1126/sciadv.aeb5215

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Syngenta appoints Bruno Zuntini as technical market director.

The executive has experience in technical development, marketing, and portfolio management.

09.01.2026 | 15:03 (UTC -3)

Cultivar Magazine

Bruno Zuntini recently assumed the position of Director of Technical Market

Development at Syngenta. An agricultural engineer graduated from the Federal University of Grande Dourados (UFGD), Zuntini has a solid track record in the areas of technical development, marketing, and portfolio management in the agricultural pesticides sector.

He began his career at Syngenta in 2016. Throughout his career at the company, he held strategic positions such as Product Manager and Fungicide Portfolio Manager. More recently, he led the Distribution Territory Management in the states of Goiás and Minas Gerais, in addition to the Branch Management for Goiás/Northern Mato Grosso do Sul.

Zuntini also gained experience at Nufarm, where he worked as a marketing coordinator and agronomist specializing in

product and market development, with a strong focus on agronomic trials, technical training, and building relationships with distributors and producers.

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John Deere defines new management strategy for after-sales service in Latin America.

Bruno Costa takes over post-sales marketing and customer support for the region.

08.01.2026 | 16:08 (UTC -3)

Cultivar Magazine

John Deere is planning changes to its structure in early 2026. **Bruno Costa**

(pictured), formerly the company's Divisional Manager of After-Sales and Customer Support, has just taken on a new position as Marketing Manager for After-Sales and Customer Support for Latin America.

With 18 years of experience in sales, marketing, and auditing, Bruno has built his career in segments such as agricultural machinery, power tools, and auditing services, working in Brazil and abroad. He has been with John Deere since 2014, where he has held strategic positions related to dealer network development, regional sales coordination, and leadership of after-sales marketing and precision upgrades for Brazil and Latin America.

He holds a degree in Business Administration and an MBA in

Agribusiness Management from USP/Esalq, as well as certification in agile methodologies. In his new role, the executive will focus on strengthening the customer experience, increasing the competitiveness of after-sales solutions, and driving results in the Latin American region.

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BioWorks will be managed by Biotrop in 2026.

Integration is part of the international growth strategy, boosting its presence in the US and the European Union.

08.01.2026 | 15:55 (UTC -3)

Thiago Silva, Cultivar Magazine edition

Starting in January 2026, Biotrop will manage the BioWorks division, which specializes in biopesticides and

biostimulants for horticulture. BioWorks is part of the BioFirst group—a global leader in biological technologies with a presence in more than 70 countries—and operates in the United States, Africa, and the European Union, with annual revenue of approximately US$22 million.

The incorporation of this division expands Biotrop's international reach, which has been intensifying investments in the North American and European markets. The company already has its own team in the United States, a research laboratory in Florida, and an expanding client portfolio, a movement that should be accelerated with the integration of BioWorks.

Second **Jonas Hipólito** (In the photo), the president of Biotrop, says the unification of

operations reinforces the growth strategy of the BioFirst group and enhances the company's performance in the horticulture segment, based on complementary skills between the two structures.

As part of its growth plan, Biotrop also announced that, throughout 2026, it will transfer its administrative headquarters from Vinhedo (SP) to Santo Antônio de Posse (SP). The new structure will be installed at BioOracle, the company's center for the dissemination of biological and natural technologies, bringing together areas such as research, regulatory affairs, marketing, sales, and finance.

The change marks a new phase of operational integration and expansion for Biotrop, focusing on strengthening innovation, sustainability, and its global

presence in the market for biological solutions for agriculture.

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BASF has a new Marketing Manager for Seed Treatment.

Igor Teles Oliveira has 13 years of experience in the agricultural sector and will work with a strategic focus in Latin America.

08.01.2026 | 14:44 (UTC -3)

Cultivar Magazine

BASF recently appointed **Igor Teles Oliveira** (pictured) as the new Strategic Marketing Manager for Seed Treatment,

focused on the Latin American region. An agricultural engineer, the executive has over 13 years of experience in agribusiness, with a career marked by the integration of technology, sustainability, and innovation.

Before assuming his new position, Oliveira served as Product Manager for New Business Models in Latin America at Bayer. Throughout his time at the company, he held coordination roles in marketing, participating in strategic projects for the development of solutions in the sector.

The executive graduated from the Federal University of Viçosa (UFV) and holds a master's degree in Marketing from ESPM.

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Bayer launches Baya Solara and enters the strawberry market.

New variety targets high productivity in protected crops in Europe.

08.01.2026 | 09:45 (UTC -3)

Cultivar Magazine, based on information from Alexander Hennig

Photo: Bayer

Bayer AG announced the launch of Baya Solara, the first commercial strawberry variety under the De Ruiter brand. This cultivar marks the company's strategic expansion into the strawberry segment and follows the acquisition of NIAB's assets in 2023. It will be marketed in European countries.

Baya Solara is part of Bayer's portfolio of vegetable seeds and serves producers of protected cultivation in Northern Europe. The launch aims to meet the growing year-round demand for strawberries, which exceeds supply. The variety offers high production and genetic resistance to pests. *Phytophthora cactorum*, a disease that causes crown rot and compromises the longevity of crops.

This June-bearer type cultivar, harvested in the early to mid-season, produces large, uniform fruits. Development prioritized less post-harvest browning and a longer shelf life. The sensory profile includes pleasant sweetness and a balance between sugar and acidity, aligned with consumer and retail demands.

According to the company, the new variety expands options for producers by combining reliable production and consistent quality. For retailers, the firm fruit reduces losses and ensures standardization. Bayer plans to make Baya Solara available to farmers in the United Kingdom, Germany, and the Benelux region.

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Glyphosate does not affect the effectiveness of viruses against Spodoptera frugiperda.

Research indicates the product has no impact on the biological control of corn pests in laboratory and greenhouse settings.

08.01.2026 | 09:37 (UTC -3)

Cultivar Magazine

Photo: University of Georgia

The use of glyphosate-based herbicides does not compromise the action of Spodoptera multiple nucleopolyhedrovirus (SfMNPV) in the biological control of *Spodoptera frugiperda*This was the main conclusion of a study by Mexican researchers.

Researchers report that they observed no changes in the growth, survival, or development of caterpillars exposed to recommended doses of the herbicide. The product did not alter the weight of the larvae, the time to pupation, or the ratio between males and females.

Herbicide on the virus

The study also analyzed the herbicide's effect on the virus. Tests indicated that the presence of glyphosate did not affect the infectivity of SfMNPV. The mortality rate caused by the virus remained similar, with or without contact with the herbicide.

In trials with corn plants, caterpillars acquired the viral infection in the same way on plants treated with herbicide and on plants without application. The result occurred both one day and six days after the use of the product, a period in which initial signs of phytotoxicity appeared in the plants.

Virus persistence

The persistence of the virus in the soil was also unaffected by the herbicide. During six weeks of greenhouse testing, SfMNPV maintained its ability to infect caterpillars, even in soils treated with glyphosate.

According to the authors, laboratory and greenhouse data indicate that the tested herbicide does not interfere with the effectiveness of the virus as a biological control tool for the fall armyworm. However, they recommend further studies under field conditions, with different soil types and commercial herbicide formulations, before extrapolating the results to production systems.

Further information at doi.org/10.3390/insects17010073

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Short-stature corn and moderate fertilization increase soil carbon.

Research indicates a greater supply of carbon to the roots with lower-growing hybrids and intermediate doses of nitrogen.

08.01.2026 | 08:53 (UTC -3)

Cultivar Magazine

Short-stature corn and moderate nitrogen fertilization increase carbon input into the soil. A study conducted by researchers at Purdue University in the United States, in partnership with the University of British Columbia in Canada, indicates greater root production and higher microbial biomass under these conditions.

The research evaluated commercial corn hybrids of tall and short stature developed by Bayer's breeding program. The tests were conducted in a greenhouse, with cultivation in pots containing clay soil and sandy soil. The nitrogen doses applied corresponded to zero, 90, 180, and 270 kg per hectare.

The results show that clay soil favored belowground processes. In this

environment, root biomass increased up to the intermediate dose of 180 kg of nitrogen per hectare. From this level, higher doses reduced plant investment in roots. Soil microbial carbon biomass followed the same pattern and peaked at intermediate doses.

Short-stature hybrids produced, on average, 22% more root biomass than tall-stature hybrids, considering all nitrogen doses. This increase occurred without a reduction in aboveground biomass or the rate of photosynthesis in the vegetative stage evaluated. The greater root growth increased the carbon input to the soil through root tissues and exudates.

Carbon exudation

Carbon exudation from roots varied according to soil type, hybrid, and nitrogen dose. In clay soil, the highest values ??occurred at intermediate doses. In sandy soil, the responses were less consistent, associated with lower nutrient retention capacity.

Soil microbial carbon was approximately 45% higher in clay soil compared to sandy soil. The study did not detect relevant changes in total soil carbon in the short term, reinforcing the influence of soil type on this indicator.

The researchers conclude that hybrid selection and nitrogen management directly influence belowground carbon fluxes. The use of short-stature corn and the adoption of moderate nitrogen doses

can strengthen processes linked to soil health and the sustainability of agricultural systems.

Further information at doi.org/10.1007/s11104-025-08231-7

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Ballagro has a new sales manager for Goiás and Mato Grosso do Sul.

Marcio Fernandes has 15 years of experience in agribusiness and a strong background in biologicals.

07.01.2026 | 15:50 (UTC -3)

Cultivar Magazine

Ballagro Agro Tecnologia has strengthened its commercial structure with

the arrival of **Marcio Henrique Fernandes** (pictured), who will now serve as the company's sales manager. The executive will assume management of Region 5, responsible for operations in southern and southwestern Goiás, as well as the Chapadão region in Mato Grosso do Sul.

With a career built primarily in the biologicals market, Fernandes has 15 years of experience in agribusiness, having worked in both technical areas and commercial leadership positions. His background includes opening and consolidating markets, managing teams, strategic planning, and working directly with distributors, key accounts, and purchasing groups.

Throughout his career, the executive has worked for companies such as Andermatt Brasil, Mosaic Biosciences (The Mosaic Company), and Lallemand Plant Care Brasil, in addition to previous experience in technical sales and market development in different regions of the country.

Fernandes is an agricultural engineer with an MBA in Business Management and a specialization in bio-inputs. His work encompasses crops such as soybeans, corn, cotton, beans, pastures, and forage crops, with experience in the states of Goiás, Mato Grosso, Mato Grosso do Sul, Rondônia, and Minas Gerais.

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Corteva and bp launch joint venture focused on biofuels.

Partnership creates Etlas, which will produce vegetable oil for SAF (Sustainable Agricultural Production) and renewable diesel.

07.01.2026 | 15:12 (UTC -3)

Michel Triani, Cultivar Magazine edition

Judd O'Connor, Executive Vice President of Corteva's Seeds Business Unit; Ignacio Conti, the new CEO of Etlas; Gaurav Sonar, Chairman of the Board of Directors at Etlas.

Corteva Inc. (NYSE: CTVA) and bp (NYSE: BP; LSE: BP.L) announced on

Wednesday (January 7th) the launch of Etlas, a 50:50 joint venture focused on producing feedstock for biofuels. The new company will produce oil from crops such as canola, mustard, and sunflower, intended for the manufacture of sustainable aviation fuel (SAF) and renewable diesel (RD).

According to a statement from the companies, Etlas will combine Corteva's experience in seed technology and genetic improvement with bp's expertise in refining, logistics and marketing of fuels, meeting the growing demand from the commercial transport sector for lower carbon-intensive solutions.

The joint venture's goal is to achieve production of 1 million metric tons of

feedstock per year by the mid-2030s, a volume that could yield more than 800 tons of biofuels. Initial supply is expected to begin in 2027, both for co-processing in existing refineries and for use in plants dedicated to biofuel production.

Industry leaders estimate that global demand for SAF (Sustainable Agricultural Fiber) could jump from approximately 1 million tons in 2024 to 10 million tons by 2030. The renewable diesel market, meanwhile, could grow from approximately 17 million to 35 million tons during the same period. Etlas was structured to offer a reliable, scalable, and competitive supply of raw materials, contributing to meeting this expected growth.

According to the companies, the crops used will be grown in existing agricultural areas, between the main food crops. These intermediate crops can contribute to improving soil health and generate a new source of income for farmers, without putting pressure on opening new agricultural areas, since they occupy traditionally unproductive periods, such as fallow or cover crops.

“By helping to found Etlas, Corteva is advancing two central pillars of its mission: contributing to feeding the world and supporting farmers. Agriculture is part of the solution,” said Judd O’Connor, executive vice president of Corteva’s seed business unit.

According to Philipp Schoelzel, Senior Vice President of Biofuels Growth at bp, the joint venture represents a strategic opportunity in the value chain. "This is a partnership with low capital investment, which strengthens our position and contributes to generating attractive returns," he emphasized.

Etlas will have Ignacio Conti, current global director of business development at Corteva, as its CEO. Gaurav Sonar, vice president of new inputs at bp, will assume the chairmanship of the board of directors.

“As aviation seeks reliable, sustainable, and competitive sources of SAF, it becomes clear that farmers have an essential role to play in this process,” said Conti. “Etlas brings together agricultural innovation and energy expertise to expand

the supply of biofuels, while creating new revenue opportunities in the field," he concluded.

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Felipe Vieira assumes commercial directorship at PI AgSciences.

Executive to lead the expansion of the company's commercial operations in the country.

07.01.2026 | 14:49 (UTC -3)

Cultivar Magazine

Agricultural engineer Felipe Vieira (pictured) has assumed the role of

commercial director for PI AgSciences in Brazil. In this position, he will be responsible for building and leading the sales team, developing market access, and accelerating demand generation, with the goal of driving the sustainable growth of the company, part of the PI Industries Ltd Group, in the country.

With over two decades of experience in agribusiness, the executive has built a career in sales, marketing, market development, and team leadership. Throughout his career, he has worked closely with rural producers, focusing on commercial strategies aligned with innovation and sustainability.

Before joining PI AgSciences, Vieira held leadership positions at BASF, where he

was responsible for marketing strategies and market access, in addition to stints at Bayer Crop Science and companies in the seed and crop protection segments.

Vieira holds a degree in Agronomic Engineering from the "Luiz de Queiroz" Higher School of Agriculture (Esalq/USP), an MBA in Administration, Business and Marketing from ESPM, and a specialization in bio-inputs.

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Rural debt is growing and raising alarm bells in agribusiness.

Farsul indicates that rising interest rates and failures in renegotiation exacerbate the problem.

06.01.2026 | 17:03 (UTC -3)

Farsul

The financial health of Brazilian agribusiness has raised a red flag. In a Technical Note, the Rio Grande do Sul State Agriculture Federation (Farsul),

using data from the Central Bank, points out that the "stressed portfolio" of rural credit (which includes delays, defaults, and renegotiated debts) jumped from R$ 72,2 billion in July 2024 to R$ 123,6 billion in November 2025. The 71% growth in the period reveals an accelerated deterioration, concentrated mainly in recent months.

Currently, about 15% of all active rural credit portfolios in Brazil (estimated at R$ 812,7 billion) are under some type of financial stress. Unlike previous crises, the current situation in Brazil is not caused by climatic issues. Farsul emphasizes that the country recorded a record harvest in 2025, which reinforces that the problem is economic.

The entity points to the high level of interest rates as the main culprit, but makes an important caveat: the monetary authority is not to blame. "The root cause lies in the fiscal imbalance, which puts pressure on inflation and forces the maintenance of high interest rates," the document states, reiterating its support for the Copom's decisions in controlling inflation.

An analysis of the implementation of Provisional Measure No. 1.314/2025 and CMN Resolution No. 5.247/2025 reveals distortions that concern producers. Of the R$ 28,2 billion renegotiated until December 2025, only 19% (R$ 5,4 billion) used public funds with subsidized interest rates. 81% (R$ 22,8 billion) were renegotiated with free resources, subject

to market rates.

For Farsul, renegotiating debts at market interest rates in a scenario of high Selic rates could turn the solution into a bigger problem. With grace periods and installments, the outstanding balance tends to grow, creating an exponential accumulation of liabilities that could lead to new episodes of stress in the future.

Another critical point is the allocation of funds. While the National Treasury directed a large portion of its resources to Pronaf and Pronamp, the "other producers," who hold the largest volume of debt under more expensive conditions, ended up resorting almost exclusively to market interest rates. Of the R$ 22,8 billion renegotiated through free resources, 100%

went to this group, highlighting the lack of effectiveness of the public policy for this segment.

The short-term outlook is not encouraging. The forecast is that the situation for rural credit will continue to worsen in the first half of 2026, with possible stabilization only after May, depending on fiscal normalization and the absence of new economic shocks.

As a way out of the crisis, Farsul advocates for the urgent approval of Bill 5.122, currently being processed in the Senate, seen as a more suitable alternative for structuring the sector's debt. The organization also recommends reducing dependence on renegotiations at market interest rates, accelerating solutions that address the core of Brazil's

fiscal problem, and recalibrating support mechanisms to reach producers most exposed to free market interest rates.

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Nissan Chemical reinforces its strategy in Latin America.

Diego Pereira will now be responsible for marketing and business development in the region.

06.01.2026 | 15:36 (UTC -3)

Cultivar Magazine

Nissan Chemical America Corporation appointed **Diego Fernando Pereira** (pictured) for the position of Marketing and

Development Manager for Latin America, a role that marks a new stage in his career in agribusiness. The executive began the position in December 2025, focusing on markets in the region.

With 14 years of experience in the sector, Diego has built a career in marketing, business development, and portfolio management, focusing on biologicals, plant growth regulators, biostimulants, crop protection, and plant nutrition. Throughout his career, he has accumulated experience in commercial strategy, product positioning, and market expansion, including international experience.

Before assuming his new role, Diego worked at Rhizobacter do Brasil, where he was Portfolio Marketing Manager and

BioSolutions Manager, leading market entry strategies, product launches, and market intelligence initiatives. He also worked at Sumitomo Chemical Latin America, focusing on biosolutions and market access, and has previous experience in technical sales in different regions of the country.

With a degree in Agronomic Engineering from the State University of Northern Paraná (UENP), Diego holds an MBA in Marketing from USP/Esalq. In his new role, he will be responsible for strengthening Nissan Chemical's marketing and business development strategies in the region, expanding the company's presence in Latin American markets.

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Nortox announces Romeu Stanguerlin as CEO.

Executive with over 30 years of experience in agribusiness takes over leadership of the company.

06.01.2026 | 13:53 (UTC -3)

Cultivar Magazine, based on information from Vanderlei de Souza

Nortox, a Brazilian company that produces agricultural pesticides, microfertilizers, and hybrid corn and sorghum seeds,

announced on Tuesday (January 6th) the appointment of **Romeo Stanguerlin** (pictured) as the company's new CEO. The change is part of a strategic move aligned with the company's long-term vision and the current challenges of the agricultural market.

With over 30 years of experience in agribusiness, Stanguerlin built his career in leadership positions at global companies in the sector, spending 21 years at Syngenta and 11 years at Adama. Throughout his career, he has led projects focused on sustainable growth, operational efficiency, and strengthening teams.

According to Nortox, the arrival of the new CEO reinforces the company's commitment to operational excellence and the continuous improvement of its

governance. The new leadership also represents an important step in consolidating the long-term strategy, expanding support for clients and partners, with a focus on innovation, agility, and maintaining the company's tradition in the market.

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Ustilago maydis uses a lateral root pathway to form galls in corn.

Study shows that fungus activates auxin genes and reprograms cells to induce tumors.

06.01.2026 | 10:18 (UTC -3)

Cultivar Magazine

Photo: RL Croissant

the fungus *Ustilago maydis* This research explores genetic regulators of lateral root formation to induce galls on maize leaves and stems. The conclusion is based on research that identified pathogen effectors that reprogram plant cells and activate a pluripotent state.

Researchers have demonstrated that proteins called Tip, secreted by the fungus, interfere with the auxin repression system. The process releases auxin response factors equivalent to ARF7 and ARF19. This activation initiates genetic programs typical of lateral root development.

The result involves intense cell division and callus formation. These tissues give rise to the galls observed on the aerial parts of corn during infection. The study

shows that this process occurs without the external addition of plant hormones.

Transcriptomic analysis

Transcriptomic analysis revealed strong overlap between genes activated in fungal-induced galls and genes expressed at the beginning of lateral root formation. Among these are transcription factors from the LBD family, associated with organogenesis and cellular pluripotency.

In maize, infection increased the expression of Zmarf27, an ortholog of the ARF7 and ARF19 genes, and of LBD genes such as ra2 and rtcs. Plants with mutations in these genes formed fewer galls after infection, indicating a direct role

for these regulators in susceptibility to the fungus.

The authors point out that the pathogen hijacks a normal plant development pathway to create tissues of its own interest. The galls function as metabolic sinks and favor fungal colonization.

This work expands the understanding of the molecular mechanisms of gall formation in maize. The results also indicate new genetic targets for studies of resistance to diseases caused by biotrophic fungi.

More information at doi.org/10.1111/nph.70843

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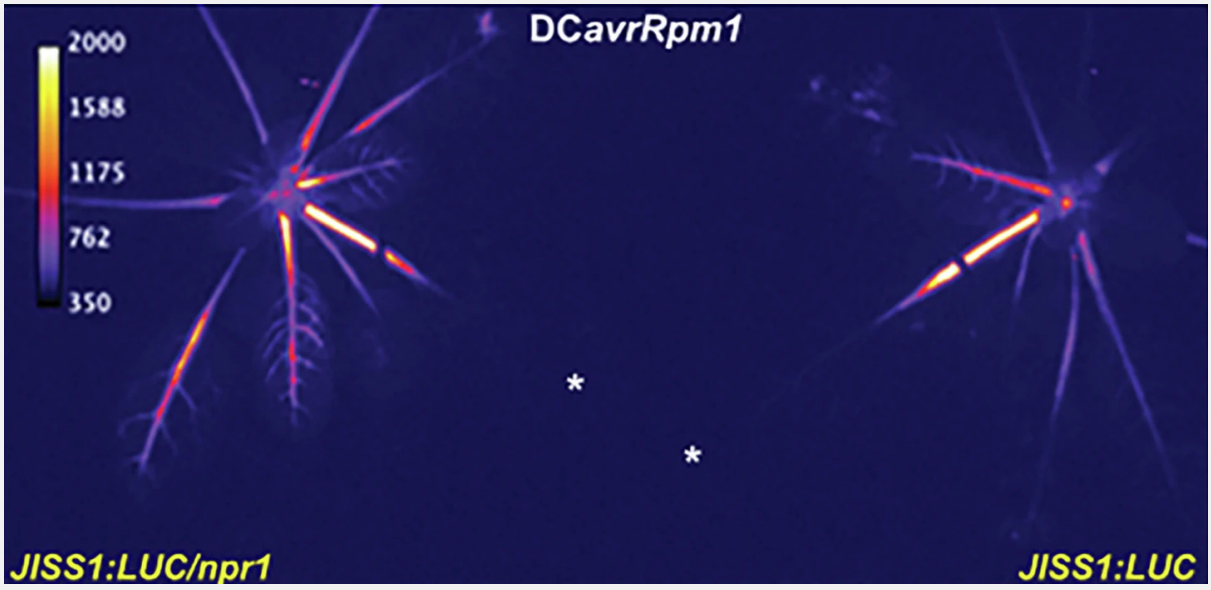
Jasmonate hormone triggers rapid systemic defense in plants.

Research reveals electrical and chemical signal that activates immunity in distant leaves after local attack.

06.01.2026 | 10:08 (UTC -3)

Cultivar Magazine



doi.org/10.1038/s41477-025-02178-4

The plant hormone jasmonate initiates and sustains systemic acquired immunity in plants after pathogen recognition. The response occurs rapidly and involves

chemical, electrical, and calcium signals that propagate from the attacked leaves to distant tissues.

Researchers have developed a sensitive reporter based on the JISS1 gene coupled to luciferase. The system allowed them to track, in real time, where and when the defense signal arises and spreads after immunity triggered by pathogen effectors. The signal appeared about three hours after local infection and reached adjacent leaves before the visible collapse of the attacked tissue.

Experiments showed that mutants unable to produce or perceive jasmonates lost the ability to establish systemic resistance against Pseudomonas syringae. However, classical mutants associated with the

salicylic acid pathway retained the signal detected by the reporter, indicating that the process occurs independently of this traditional route.

The application of jasmonic acid or coronatine activated the reporter hormone locally. Jasmonate biosynthesis inhibitors blocked signal propagation and systemic resistance. External hormone replacement restored the response in plants deficient in biosynthesis, but not in plants unable to perceive the signal.

Electric potentials

The study also detected surface electrical potentials that propagate between leaves after immunity activation. These signals

depended on jasmonate, glutamate receptor-type calcium channels, and the JISS1 gene. The loss of these potentials did not prevent systemic resistance, suggesting the existence of multiple coordinated signals in long-distance defense.

The JISS1 protein was located in the endoplasmic reticulum of epidermal and vascular cells. The pattern indicates signal transmission via vessels and cellular connections. According to the authors, this finding brings the defense mechanisms against pathogens closer to those observed in responses to injury and herbivory.

The results redefine the role of jasmonate, traditionally associated with defense

against insects, and place it as a central element in the rapid activation of systemic immunity against pathogens. The JISS1 reporter paves the way for mapping, with temporal and spatial precision, the signals that protect plants from future attacks.

Further information at doi.org/10.1038/s41477-025-02178-4

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Plant Health Care has a new commercial leader in Southern Europe.

Vitor Pereira takes on the role after a career in global agribusiness companies.

05.01.2026 | 15:02 (UTC -3)

Cultivar Magazine

Plant Health Care, Inc. has just appointed **Victor Pereira** (pictured) as the new commercial “leader” for Southern Europe. The executive will assume the position this

January and will be responsible for the company's commercial strategy in the region.

With over 15 years of experience in agribusiness, Pereira has expertise in sales, marketing, and digital transformation, having worked for global companies such as Bayer, Syngenta, Corteva, LongPing, Orbia, and Plant Health Care itself. Throughout his career, he has led operations in Latin America and Europe, focusing on sustainable growth, market expansion, and team development.

Holding a degree in Business Administration with a specialization in Marketing Management and training in Agricultural Engineering, the executive strengthens Plant Health Care's presence in the European market, particularly in

biological solutions and data-driven strategies.

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Mildew effector activates natural defenses in brassicas.

DM459 protein stimulates autophagy and increases Brassica rapa's resistance to disease, study shows.

02.01.2026 | 09:44 (UTC -3)

Cultivar Magazine

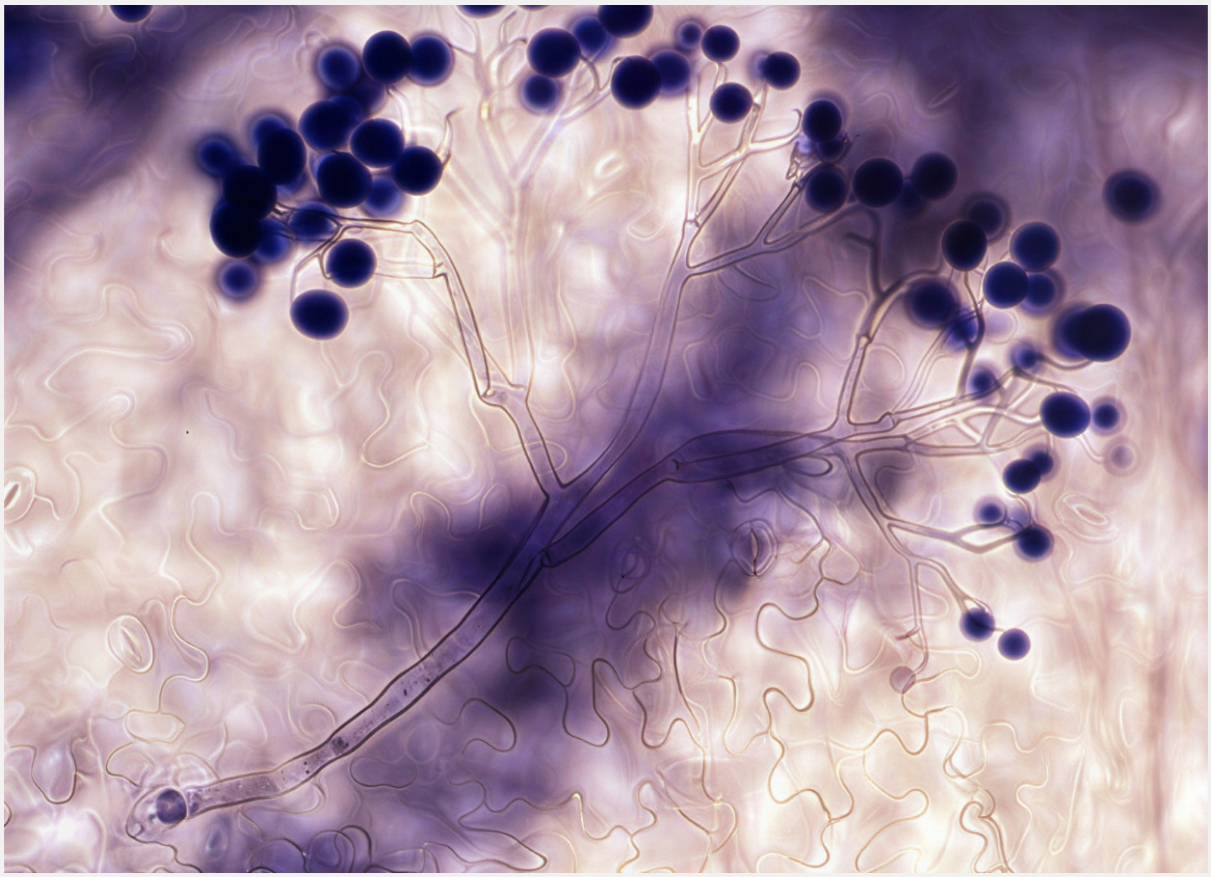

Photo: Emmanuel Boutet - CC 2.5

Study identified a defense mechanism that increases resistance to *brassica rapa* to mildew. Research has shown that the DM459 effector, produced by *Hyaloperonospora parasitica*It activates autophagy in plant cells and reduces the severity of the disease.

Downy mildew causes significant losses in brassica production. The pathogen infects living tissues and makes chemical control difficult. Genetic resistance emerges as a strategic alternative.

Researchers identified the DM459 effector as a protein secreted by the pathogen. The molecule interacts with plant proteins linked to autophagy, a cellular process of recycling components. The primary target was the BraATG8i protein, essential in the

formation of autophagosomes.

Plant studies showed that overexpression of BraATG8i increased resistance to downy mildew. Plants with this gene silenced showed greater susceptibility. The result indicated a positive role for autophagy in plant defense.

The study also demonstrated that DM459 binds to other key autophagy proteins, such as BraATG4, BraATG3, and BraATG7. This interaction strengthened the assembly of the autophagy complex and amplified the defense response.

The presence of the effector stimulated the production of salicylic acid, a hormone associated with plant immunity. The increase in this hormone activated the expression of BraATG8i and enhanced

autophagy. Resistant strains exhibited higher levels of this response.

In tests with an autophagy inhibitor, the plants lost resistance, even in the presence of the effector. The result confirmed the importance of the process for disease control.

Further information at doi.org/10.1093/hr/uhaf358

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CNH announces new executives for manufacturing and global legal area.

Carlo Materazzo and Britton Worthen assumed their positions today.

02.01.2026 | 08:55 (UTC -3)

Cultivar Magazine, based on information from CNH

Carlo Materazzo and Britton Worthen

CNH announced the appointment of Carlo Materazzo as Chief Manufacturing Officer and Britton Worthen as Chief Legal and

Compliance Officer. The changes take effect today. The executives will join the company's global leadership team.

According to the company, the appointments reinforce its focus on operational excellence, innovation, and governance, amidst the advancement of its growth strategy and transformation of global operations.

Carlo Materazzo assumes leadership of global agricultural industrial operations. The area encompasses five regions and 15 countries. The executive brings over 20 years of international experience in manufacturing, operations, and logistics. He replaces Carlos Santiago in the manufacturing organization.

Britton Worthen joins CNH to lead the legal and compliance areas. The executive brings experience in legal strategy, regulatory compliance, and corporate governance. Worthen will advise the company's governance bodies on legal and risk issues. He will also serve as secretary of the CNH Board of Directors, a position previously held by Roberto Russo.

In a statement, the company's CEO, Gerrit Marx, said that the appointments strengthen the leadership team with world-class talent. According to him, Materazzo and Worthen have a proven track record in their respective fields and should contribute directly to advancing strategic priorities.

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Fungi and plant enzymes enhance control of Tenebrio molitor.

Study shows synergistic action between Beauveria bassiana and papain against the insect.

02.01.2026 | 08:41 (UTC -3)

Cultivar Magazine

Photo: Clemson University, USDA

Researchers at the Federal University of Lavras have proven that the combination of the entomopathogenic fungus... *beauveria bassiana* The use of the plant enzyme papain significantly increases mortality. *Tenebrio molitor*The combined treatment killed up to 89,7% of larvae and 85,9% of pupae in laboratory tests. The result surpassed the isolated applications of the fungus or the enzyme.

The study evaluated the compatibility between the two bio-inputs and the potential for their combined use in integrated pest management. Papain did not compromise the viability of the fungus in the first 12 hours of contact. Conidia germination remained close to 100% during this period. After 48 hours, viability

dropped to approximately 70% in all treatments, an effect attributed to the natural aging of the fungus.

Enzymatic activity

The enzymatic activity of papain maintained initial stability. Levels remained close to 26 to 28 U/mL for up to 12 hours. From 36 hours onwards, a gradual reduction occurred, more pronounced when the enzyme came into contact with the conidia. Even so, the combined performance in controlling the insect increased.

In bioassays, papain alone caused 49,6% mortality in larvae and 47,3% in pupae. The isolated fungus caused 62,2% larval

mortality and 63,6% pupal mortality. The combination raised the rates to almost 90% in larvae and above 85% in pupae. The differences were statistically significant.

Morphological damage

Researchers observed morphological damage in the treated insects. Papain caused desiccation and body collapse. The fungus covered the larvae with white mycelium. The combined use intensified the effects, resulting in developmental failures and deformities in the pupal stage.

The explanation lies in the complementary action. Papain degrades cuticle proteins and weakens the insect's outer barrier.

The fungus penetrates more easily and colonizes the host. The process accelerates death and increases the efficiency of control.

The study was conducted by Amanda do Carmo Alves, Ana Carolina Silva, Adriane Toledo da Silva, Nivia Kelly Lima Sales, Ruth Celestina Condori Mamani, Lisseth Bibiana Puentes Figueroa, Elias Honorato Gomes, Debora Castro Toledo de Souza, Rosangela Cristina Marucci, and Filippe Elias de Freitas Soares.

Further information at doi.org/10.3390/agrochemicals5010002

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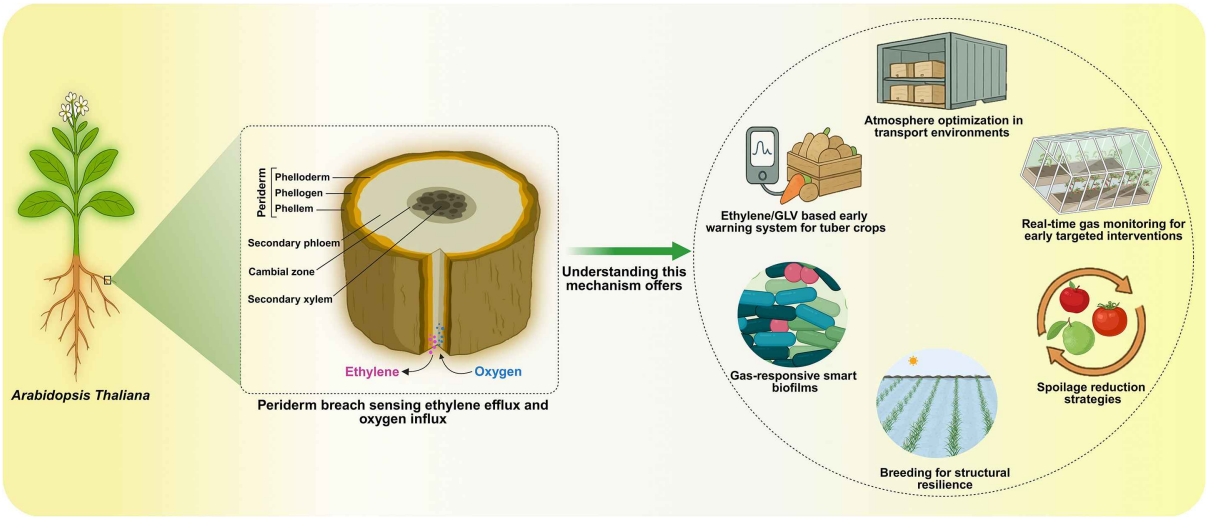
Ethylene and oxygen control tissue regeneration in plants.

Discovery paves the way for applications in agricultural management and post-harvest processing.

30.12.2025 | 13:52 (UTC -3)

Cultivar Magazine



doi.org/10.1016/j.xplc.2025.101576

Researchers have identified how plants detect injuries and regenerate the periderm, the tissue that protects roots and stems. The process depends on the

diffusion of gases, mainly ethylene and oxygen. The mechanism functions as a biological switch that activates and terminates healing. The finding expands the understanding of plant defense and indicates direct applications in agriculture.

The study analyzed the roots of the model plant. *Arabidopsis thaliana*Scientists performed controlled cuts and monitored the cellular response. Within 24 hours, initial markers of cork formation appeared near the lesion. Within 48 hours, cells began dividing to form a new meristem. After 96 hours, the plant had rebuilt a functional barrier, with lignin and suberin.

Research has shown that the rapid release of ethylene from the wound reduces the signal of this hormone at the site. This

reduction allows regeneration to begin. When ethylene remains concentrated, the formation of the periderm fails. Tests with artificial wound sealing blocked healing.

Oxygen also plays a central role. The entry of the gas through the lesion increases the activity of enzymes linked to the suberization of cell walls. Genes associated with hypoxia reduced their expression during healing. Sensors confirmed greater oxygen availability in the wounded areas.

Coordinated action

Ethylene and oxygen work together in a coordinated manner. The exit of one gas and the entry of the other initiate

regeneration. As the tissue closes, the gas flow decreases. The system then automatically terminates the process.

In stems, which lack a true periderm, the response was different. Even so, gas diffusion remained essential to rebuild the barrier. The result indicates that each tissue uses its own strategies, influenced by the availability of oxygen.

The authors point to direct impacts on agricultural crops. Roots and tubers, such as potatoes and carrots, depend on the periderm to avoid post-harvest losses. Controlling the atmosphere can accelerate healing and reduce rot. Fruits that form a periderm after damage can also benefit.

More information at doi.org/10.1016/j.xplc.2025.101576

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Alternaria resistance is advancing in tangerine orchards in Paraná.

The study evaluated fungicides from the sterol demethylation inhibitor group.

30.12.2025 | 08:24 (UTC -3)

Cultivar Magazine

Photo: Jeffrey W Lotz, Florida Department of Agriculture

The resistance of species of *Alternaria* Fungicides from the demethylation inhibitor (DMI) group compromise the control of tangerine brown spot in orchards in Paraná. Research conducted with isolates collected between 2020 and 2023 shows a marked reduction in sensitivity to tebuconazole and a direct association between resistance and the overexpression of the CYP51 gene, the target of these products.

The study evaluated 54 isolates of *alternaria alternata*, *A. longipes* e *A. arborescens* originating from commercial areas of the state. The results indicate a wide variation in sensitivity to DMIs. Tebuconazole showed the highest EC50 values, with averages above 17 µg/mL in resistant isolates and cases exceeding 190

µg/mL. As for... difenoconazole and mefentrifluconazole They maintained higher activity in vitro, with EC50 values ??generally lower than 1 µg/mL.

The analysis revealed cross-resistance among the three DMIs evaluated. Positive and significant correlations indicate that loss of sensitivity to one fungicide tends to be reflected in others within the same group. At the molecular level, isolates resistant to tebuconazole exhibited strong induction of CYP51 gene expression, while sensitive isolates maintained low levels even after exposure to the product.

Tests on detached leaves of 'Murcott' confirmed the practical impact of resistance. Tebuconazole reduced disease severity only in susceptible isolates. In

resistant isolates, the fungicide did not control brown spot, performing similarly to treatment without application.

According to the authors, the data indicate a risk to the sustainability of using tebuconazole in disease management. The study points to difenoconazole and mefentrifluconazole as more efficient options in the current scenario and reinforces the need for resistance management strategies, with rotation of modes of action and judicious use of fungicides in tangerine orchards in Brazil.

The study was conducted by Thiago de Aguiar Carraro, Yong Luo, Boris X. Camiletti, Themis J. Michailides, Victor Gabri, Geraldo José Silva-Junior, Lilian Amorime, and Louise Larissa May De

Mioa.

Further information at
doi.org/10.1002/ps.70487

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Cold plasma alters the surface of barley seeds.

Treatment with oxygen and nitrogen increases hydrophilicity without damaging the grain structure.

29.12.2025 | 09:00 (UTC -3)

Cultivar Magazine

Photo: Howard F Schwartz, Colorado State University

Low-temperature plasma treatments modify the surface of barley seeds (*vulgar*

hordeum) and accelerate the initial absorption of water. The effect occurs without structural damage to the grain. The result comes from tests with oxygen- and nitrogen-enriched plasmas, applied for ten minutes to commercial seeds by Argentinian researchers.

Chemical analyses show a significant increase in oxygen on the surface after treatment with oxygen plasma. The surface oxygen content rises from 9% to 24%, while carbon drops from 88% to 76%. Nitrogen plasma causes more moderate changes, with oxygen at 13% and carbon at 85%, in addition to the detectable incorporation of nitrogenous groups.

Photoelectron spectroscopy indicates a strong increase in hydroxyl groups on the seed surface. The fraction of these groups grows from 70% in the control to 90% in the oxygen plasma and 82% in the nitrogen plasma. The result points to greater hydrophilicity of the seed coat, a factor linked to water uptake.

Imbibition tests confirm the functional effect. The initial rate of water absorption practically doubles after treatment. The initial rate rises from 20,25/h in the control to 36,70/h in oxygen plasma and 38,87/h in nitrogen plasma. The final hydration capacity does not change significantly.

Spectroscopic techniques, such as Raman and infrared, show preservation of polysaccharides, proteins, lipids, and

carotenoids. Variations appear only in the intensity of the signals, associated with greater surface exposure. No new compounds appear, nor are there any alterations inside the seed.

Electron microscopy images reveal no morphological damage. The natural structure of the shell remains intact after the treatments. Elemental analysis at the micrometer scale detects only subtle changes, consistent with modifications restricted to the outermost layer.

Oxygen plasma promotes greater oxidation and surface cleansing. Nitrogen plasma induces gentler amination. Both accelerate initial hydration. The data indicate potential for improving the efficiency of barley steeping, a critical step

for germination and malting, without compromising grain integrity.

Further information at doi.org/10.3390/seeds5010002

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Climate redefines the risk of Helicoverpa armigera in China.

Warming alters insect life cycles, changes population peaks, and requires regionalized management, study indicates.

29.12.2025 | 08:37 (UTC -3)

Cultivar Magazine

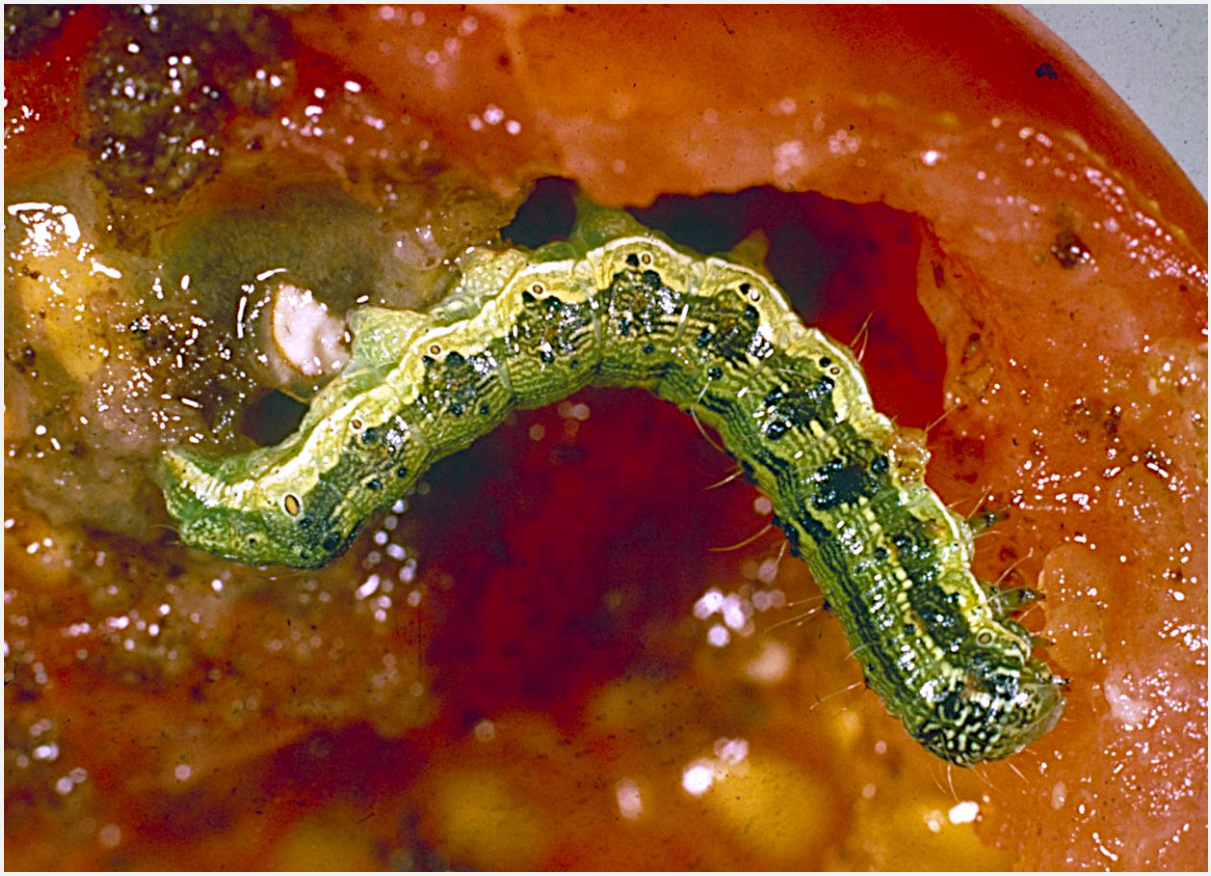

Photo: Central Science Laboratory, Harpenden

Climate warming has changed the dynamics of *Helicoverpa armigera* In China, populations have grown over the long term, with less annual variation. The effect of temperature varies by region and season.

The study analyzed historical capture data for the insect and meteorological data from three areas of Xinjiang: Maigaiti and Bachu in the south, and Shawan in the north. The researchers cross-referenced variations in maximum and minimum temperatures with the annual population growth rate of the insect.

In Maigaiti, the main regulating factor came from the winter. Differences in maximum winter temperature explained 98% of the annual changes. Warmer

winters favored the population by reducing pupal mortality in the soil and anticipating the emergence of adults.

In Bachu, the control occurred throughout the year. The minimum temperature in May accounted for 80,7% of the annual variation. Higher temperatures at the end of spring accelerated development and increased reproduction. Conversely, excessive heat in the summer reduced the population by inducing heat stress.

In Shawan, the decisive factor appeared in July. The month's minimum temperature explained 99,4% of the annual changes. Nighttime warming at the peak of summer accelerated development and increased fertility, without reaching the critical heat threshold.

Thermal limit

The study identified a clear thermal limit. Temperatures above 33°C in the summer suppressed population growth. *Helicoverpa armigera*Under these conditions, the insect entered summer diapause, which delayed development and reduced reproduction.

Warming also altered the phenology. The first annual occurrence moved earlier. The end of activity was delayed. The active period became longer. These changes increased the size of populations by allowing more time for feeding and reproduction.

Despite the average population increase, the amplitude of annual fluctuations

decreased. The authors associate this effect with the expansion of the population base and the insect's response to moderate warming.

Further information at doi.org/10.3390/insects17010040

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Carlos Aguillar strengthens Corteva's marketing team.

Executive assumes strategic role focused on business integration.

26.12.2025 | 15:25 (UTC -3)

Cultivar Magazine

Corteva Agriscience has strengthened its marketing structure with the appointment of Carlos Aguillar (pictured) as District Marketing Manager, a role he will assume

in December 2025. The position plays a strategic role in coordinating marketing and sales, focusing on the regional execution of the company's strategies.

With over a decade of experience in agribusiness, Aguillar built his career in the commercial, technical, and market development areas. Before joining Corteva, he led the commercial and strategic management of Toyobo do Brasil Produtos Biológicos and served as Territory Manager at Nutrien.

Throughout his career, the executive also worked at Bayer and Arysta LifeScience, accumulating experience in different market access models, distributor and cooperative management, as well as demand generation for chemical and biological solutions and innovation

platforms. He holds a degree in Agronomic Engineering from the University of São Paulo (USP) and an MBA in Strategic Marketing.

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Heringer Fertilizers strengthens its commercial area with a new CCO.

Marcelo Ferri Gonçalves will now be responsible for sales, marketing, and supply.

26.12.2025 | 14:35 (UTC -3)

Cultivar Magazine

Fertilizantes Heringer SA announced Marcelo Ferri Gonçalves (pictured) as its

new Chief Commercial Officer (CCO). The executive will lead the areas of Sales, Market Intelligence, Planning, Marketing, and Supply, with the goal of strengthening the company's market presence and increasing its proximity to customers.

According to the company, the new commercial structure seeks to integrate strategy, operational efficiency, and a focus on results, at a time of repositioning for Heringer, which combines its history in Brazilian agribusiness with a more agile management model oriented towards the demands of rural producers. The operation is also aligned with the development of premium fertilizers and higher value-added solutions for the field.

Marcelo Ferri Gonçalves has solid experience in the fertilizer and

agribusiness sector. Before assuming his position at Heringer, he served as Sales and Market Development Director at EuroChem Brazil and built a significant part of his career at Yara International, where he held positions in the commercial, agronomic, and market management areas. He is an agricultural engineer with a postgraduate degree in Plant Nutrition and an MBA in Commercial Management from Fundação Getulio Vargas.

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The epidermis controls root torsion and defines plant growth.

Research shows that the outer layer controls asymmetry and can guide soil exploration.

25.12.2025 | 09:24 (UTC -3)

Cultivar Magazine

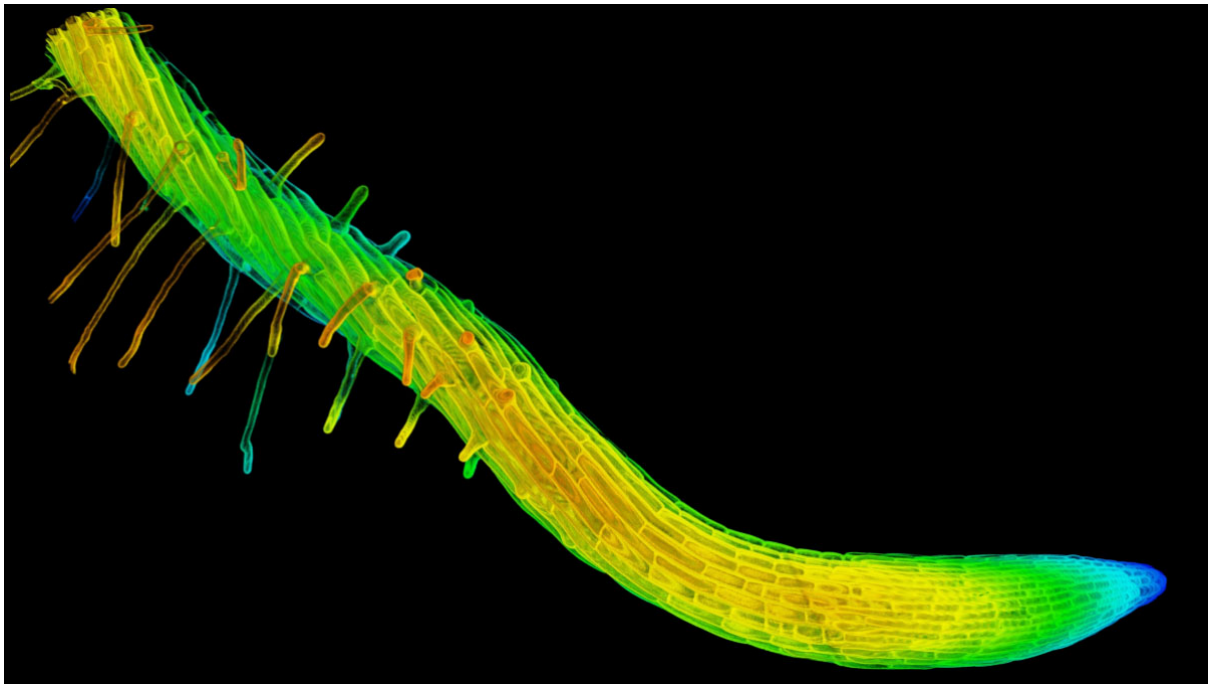

Photo: Dixit lab

A study by researchers at Washington University shows that the epidermis controls the symmetry disruption that leads

to root twisting in plants. The research reveals that microscopic alterations in this outer layer are enough to determine whether the root grows straight or in a spiral. The work suggests ways to adjust root architecture and improve plant adaptation to the soil.

The authors analyzed roots of *Arabidopsis thaliana* with mutations in proteins linked to microtubules. These mutations cause helical growth. The study connected events at multiple scales. The disorganization of cellulose microfibrils occurs at the nanometer level. Then, asymmetrical cell expansion occurs. Next, helical cell files appear in the epidermis. Finally, the entire root begins to grow in a twisted pattern.

Experiments showed that the epidermis dominates the process. Restoring normal microtubule activity in this layer alone restored straight root growth. The effect did not appear when the correction occurred in inner layers. Mechanical modeling explained the result. Torsional stiffness increases with the fourth power of the radius. Therefore, the outermost layer exerts a greater influence.

The environment interferes.

The environment also plays a role. In a homogeneous medium, such as agar, the roots grew straight even with twisted epidermal cells. On the agar surface and in

the soil, the imbalance of forces led to curvature. In soil, mutant roots maintained regions of torsion and pronounced curves. This behavior persisted without the involvement of root hairs.

The study evaluated responses to the environment. Twisted roots altered the adjustment to gravity and the reaction to obstacles. In tests with barriers, mutants exhibited directional deviations or reorientation failures. The results indicate a direct impact on soil exploration.

Tissue integrity

The integrity of the epidermal tissue proved essential. Reduced adhesion between the epidermis and cortex

suppressed root torsion, even with epidermal cells still helically oriented. This finding reinforces the mechanical role of the epidermis in coordinating growth.

The authors point to applications. Controlling microtubule-associated proteins in the epidermis could allow roots to penetrate compacted soils more efficiently or overcome obstacles. This strategy paves the way for engineering root systems that are better adapted to the physical and chemical stresses of the soil.

Further information at doi.org/10.1038/s41467-025-66029-8

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Commission authorizes tractor traffic on highway shoulders.

The bill also authorizes the circulation of agricultural vehicles outside the limits of Contran (National Traffic Council).

25.12.2025 | 09:07 (UTC -3)

Cultivar Magazine, based on information from the Chamber Agency

Marussa Boldrin - Photo: Mário Agra / Chamber of Deputies

The Constitution, Justice and Citizenship Committee of the Chamber of Deputies approved a bill that allows tractors to circulate on the shoulder and part of the lanes of highways, when necessary, without encroaching on the oncoming lane.

The text also authorizes agricultural vehicles or vehicle combinations exceeding the size and weight limits set by the National Traffic Council to travel on highways, provided they comply with the agency's regulations.

The rapporteur, Deputy Marussa Boldrin (MDB-GO), advocated for specific criteria for the circulation of this equipment. According to her, current legislation only addresses sporadic situations and ignores the routine of the agricultural sector, which

requires frequent travel during planting, cultivation, and harvesting.

Boldrin stated that the requirement for a Special Transit Authorization for each trip creates excessive bureaucracy that is inadequate for the needs of the countryside. The rapporteur highlighted the need to guarantee safety for rural producers and other users of public roads.

The approved text serves as a substitute and unifies six proposals: PLs 8841/17, 4223/20, 3239/23, 3596/23, 3717/23 and 4900/23. The original bill, PL 724/03, by former congressman Milton Monti, was ultimately rejected.

The proposal will now be analyzed by the full Senate. For it to become law, it needs approval from both the Chamber of

Deputies and the Senate.

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Bayer announces succession in regulatory affairs in Latin America.

Geraldo Berger retires; Natalie Alves takes over the leadership.

23.12.2025 | 11:57 (UTC -3)

Cultivar Magazine, based on information from Giselly Abdala

Bayer has announced a leadership succession for the agricultural science and

regulatory affairs area of ??its Latin American division. Natalie Alves will assume the position this month, replacing Geraldo Berger, who is retiring after more than three decades in the sector.

Natalie Alves has been with Bayer for nine years. For the last three, she has led the global regulatory affairs area for herbicides, based in Germany. The executive has over 20 years of experience in regulation, science, and stewardship, working in Brazil, Latin America, and global markets. She holds degrees in pharmacy and biochemistry, MBAs, and completed executive programs at INSEAD in France and Columbia Business School in New York.

According to Natalie Alves, the regulatory area maintains a strategic role in the innovation of the agricultural portfolio. The executive highlighted the importance of dialogue on legislation and innovation, focusing on the positive impacts of the current and future pipeline for rural producers in Latin America.

Geraldo Berger concludes a career spanning approximately 40 years in the sector. The executive worked at Monsanto, which was acquired by Bayer in 2018. He led significant research and development projects in biotechnology. He contributed to the consolidation of legal frameworks for plant varieties and biosafety. These advancements enabled the modernization of the sector. Berger published over 100 scientific articles and received numerous

awards.

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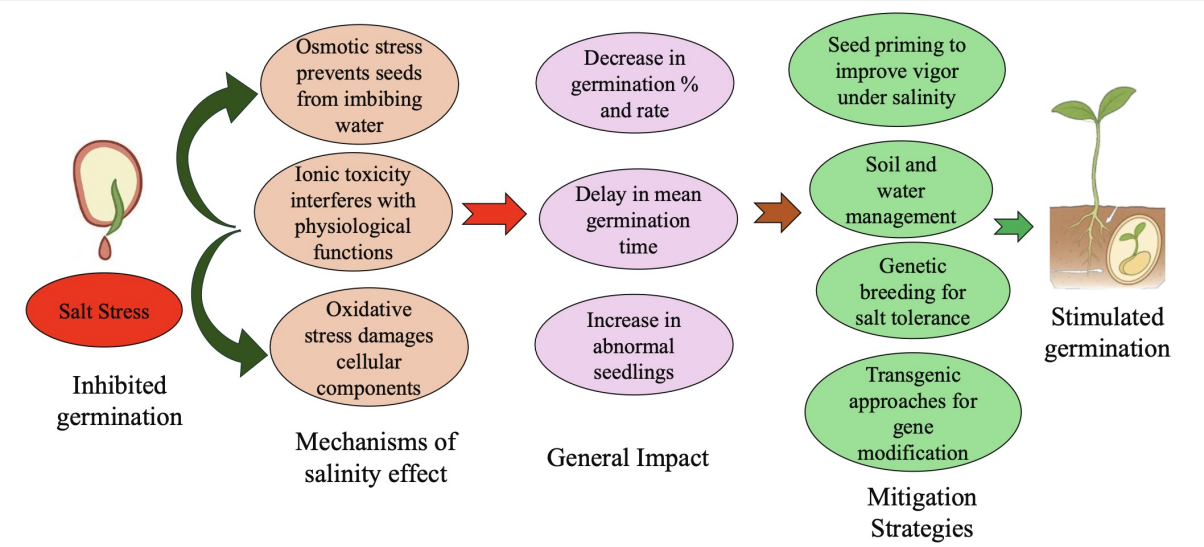
Soil salinity reduces seed germination.

Scientific review points to mechanisms of saline stress and highlights management and genetic improvement as mitigation strategies.

22.12.2025 | 14:20 (UTC -3)

Cultivar Magazine



Source: doi.org/10.3390/seeds5010001

Soil salinity limits seed germination and compromises agricultural productivity on a global scale. Approximately 20% of the world's cultivated areas already show some degree of salinization. Projections

indicate that the problem will advance to half of agricultural land by 2050. The impact appears right at the beginning of the crop cycle, in germination and seedling establishment.

Excessive salt levels reduce water absorption by seeds. This process generates osmotic stress, hinders imbibition, and delays emergence. Ions such as sodium and chloride cause cellular toxicity, disrupt metabolism, and displace essential nutrients like potassium. Saline stress also increases the production of reactive oxygen species, which damage membranes, proteins, and DNA.

Salinity alters the hormonal balance of seeds. Abscisic acid, which induces dormancy, increases. Gibberellins, which

stimulate germination, decrease. This imbalance blocks or delays the germination process even when other environmental conditions favor development.

The effects vary between crops and genotypes. Rice and soybeans show high sensitivity, especially in the early stages. Wheat and barley show intermediate tolerance. Sorghum, millet, and some forage crops tolerate higher salt levels. Genetic differences explain part of the variability observed in germination rates and initial vigor.

The scientific review highlights mitigation strategies. Physiological seed conditioning, known as "priming," improves germination under salinity by activating antioxidant

mechanisms and osmotic adjustments. Soil management includes salt leaching, the use of agricultural gypsum, organic matter, and soil cover. Genetic improvement and biotechnological tools, such as marker-assisted selection and gene editing, are advancing the development of more tolerant cultivars.

More information at doi.org/10.3390/seeds5010001

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Parasitic plants use a "chemical key" to avoid attacking themselves.

Discovery paves the way for creating crops resistant to weeds.

22.12.2025 | 10:37 (UTC -3)

Cultivar Magazine

Photo: Satoko Yoshida, Nara Institute of Science and Technology

Researchers at the Nara Institute of Science and Technology in Japan have identified the mechanism that prevents parasitic plants from attacking their own roots or related plants. The discovery points to strategies for protecting crops against parasitic weeds responsible for global losses exceeding US$1 billion annually.

These plants extract water and nutrients from the host through the haustorium, an invasive organ activated by chemical signals derived from the lignin of the attacked plant. Since all plants produce these signals, scientists sought to understand why the parasite does not react to its own compounds.

The group analyzed the model species. *Phtheirospermum japonicum*The team identified a mutant unable to prevent self-attack, which formed invasive structures without external stimulus. The cause arose in a single gene, PjUGT72B1, responsible for producing a glycosyltransferase-type enzyme.

This enzyme binds a sugar molecule to haustorium-inducing factors generated by the plant itself. The process, called glycosylation, neutralizes the chemical signal and blocks the formation of the parasitic organ. Without the functional gene, the signals remain active and trigger the invasion of the plant's own roots.

The authors also showed that the parasite's enzyme differs from the version

present in host plants as *Arabidopsis thaliana*This difference allows one to recognize "relatives" and distinguish potential targets.

According to the researchers, manipulating the production of these signals or their glycosylation could allow the development of agricultural crops that are "invisible" to weeds, reducing losses and increasing the genetic resistance of crops.

Further information can be found at doi.org/10.1126/science.adx8220

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Bayer changes leadership in Latin America.

Alex Merege takes on a global role in soybeans, and Ligia Izzo will now lead product supply in the region.

21.12.2025 | 17:44 (UTC -3)

Cultivar Magazine, based on information from Giselly Abdala

Bayer's agricultural division has announced changes to its leadership in Latin America. The changes will take effect

on January 1, 2026. **Alex Merege**The current leader of "product supply" in the region will assume the position of global leader of soybean products. This role expands their scope to the global market. The executive will be based in Saint Louis.

Merege has been with Bayer since 1999. The executive has accumulated experience in different countries. He has led the seed division in Latin America and the Asia-Pacific region, based in Singapore, in addition to other strategic roles. According to him, the new position reinforces the company's commitment to innovation, increased productivity, and offering producers more management options, focusing on regenerative agriculture.

On the same date, **Ligia Izzo** She will assume the role of new "product supply" leader for Bayer's agricultural division in Latin America. The executive will be responsible for seed manufacturing and crop protection operations, as well as the supply chain in the region. A Brazilian national, she has built an international career and lived in Switzerland for the past three years, where she served as "head of supply chain management" for the EMEA region.

Since July 2025, Ligia Izzo has been leading initiatives related to the implementation of "dynamic shared ownership" in the company's Crop Science division. This model seeks a more agile, collaborative, and customer-centric way of working. The executive becomes the first

woman to hold this position and joins the leadership team of the agricultural division for Latin America.

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ICL has a new Senior Director of Human Resources.

Alessandra Ditt takes on the role with a focus on people strategy for Growing Solutions and Additives.

19.12.2025 | 16:48 (UTC -3)

Cláudia Santos, Cultivar Magazine edition

ICL announced the appointment of Alessandra Ditt (pictured) as its new Senior Director of Human Resources and

Internal Communications. With nearly 30 years of experience in the field, the executive built her career in multinational companies such as DSM-Firmenich, Unilever, Philip Morris, Lactalis, ADM, Novartis, and Accenture. At ICL, Alessandra will be responsible for the people strategy of ICL's two businesses in Brazil: Growing Solutions, focused on agribusiness, and Additives.

A graduate in Agronomy from Esalq/USP, this executive holds a specialization in Marketing from ESPM and an Executive MBA in Human Resources from FIA/USP. Throughout her career, she has accumulated international experience as an expatriate in Switzerland and the United States, in addition to leading teams in Latin America and North America. In 2024, she

was recognized as one of the leading Human Resources executives in Brazil.

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Brazil's Supreme Court overturns the "time frame" thesis for indigenous lands.

The trial involves lawsuits against a law passed by Congress in 2023.

19.12.2025 | 16:24 (UTC -3)

Ana Lúcia Caldas

Photo: Marcello Casal Jr

The Brazilian Supreme Court has recognized the unconstitutionality of the

temporal framework for the demarcation of indigenous lands. The justices invalidated the understanding that indigenous people only have rights to lands that were in their possession on October 5, 1988, the date of the promulgation of the Federal Constitution, or that were under judicial dispute at the time.

There was no consensus regarding points presented by rapporteur Gilmar Mendes as rules for compensation to rural producers who occupy properties that are recognized as indigenous lands.

Actions challenging a law approved by Congress in 2023 were being analyzed in the virtual plenary session.

Two years ago, the Supreme Federal Court (STF) had already declared the time

frame unconstitutional. Furthermore, President Lula vetoed part of the law validated by the National Congress. However, parliamentarians overturned Lula's veto.

The issue resurfaced after the PL, PP, and Republican parties filed lawsuits to uphold the validity of the bill, recognizing the Temporal Framework thesis.

In parallel to the Supreme Court trial, the Federal Senate approved last week a proposal that incorporates into the Constitution the thesis of the temporal framework for the demarcation of indigenous lands.

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Whiteflies survive parasitism, but pay a reproductive price.

Study points to reproductive cost for insects that escape parasitism by wasps.

19.12.2025 | 13:39 (UTC -3)

Cultivar Magazine

Whitefly nymphs on a leaf; the black nymphs have been parasitized and are dead.

Researchers have identified a genetic variation that allows... White fly *Trialeurodes vaporariorum* survive the attack of the parasitoid wasp *encarsia formosa*The finding indicates the potential for the evolution of resistance to biological control. The study also showed reproductive costs for insects that escape parasitism.

The study evaluated the species. *T. vaporariorum*The wasp is a pest present in more than 800 cultivated plants, such as tomatoes, strawberries, and ornamentals. *E. formosa* It has acted as the main control agent since the 1970s. In trials with different families of whiteflies, about 30% of nymphs exposed to parasitism survived, compared to 97% in the unexposed group.

Survival varied between families, with total mortality in some and up to 60% survival in others.

Genetic basis

The analyses indicated moderate heritability for survival after wasp attack. The result suggests a genetic basis for escaping parasitism. According to the authors, this condition opens up space for an evolutionary response under continuous pressure from biological control.

Cost of living

The study went on to measure the living costs associated with escape. Females

that resisted parasitism produced fewer eggs over four days. The average dropped from 37,27 eggs in the control group to 21,47 eggs in the exposed group. The hatching rate also decreased. Only 16% of the eggs from exposed females hatched, compared to 28,3% in the control group.

The data indicate a trade-off between survival and reproduction. This cost may limit the spread of resistant genotypes in conditions without parasitism. The authors highlight that management strategies can exploit this disadvantage to maintain susceptible populations.

Among the suggested applications, the study cites the increase in environmental heterogeneity. The use of suboptimal host plants and the creation of refuges can

increase costs for resistant individuals. The approach follows a logic similar to that used in resistance management in transgenic crops.

Further information at doi.org/10.1093/jee/toaf338

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Romeu Stanguerlin steps down as head of Adama Brasil.

Eric Dereudre will assume interim leadership starting in January.

19.12.2025 | 10:02 (UTC -3)

Cultivar Magazine, based on information from Cláudia Santos

Romeu Stanguerlin and Eric Dereudre

After 11 years at Adama, CEO Romeu Stanguerlin has decided to end his time with the company. His departure,

discussed with global leadership since October, was communicated to employees during an internal conference.

Starting in January, Eric Dereudre, Chief Commercial Officer, will assume interim leadership of Adama Brazil. He will remain in the position until a new leader is appointed. The company stated that it maintains its strategy in the country, considered a relevant market for its global business, focusing on execution, close relationships with clients and partners, and prioritizing the Brazilian market.

With over 30 years of experience in the industry, Romeu built his career in the crop protection sector. He joined Adama in 2014 as Marketing Director in Brazil. Since 2019, he has led the Brazilian operation. In

2023, he also took over leadership of the Latin America region, expanding operations in strategic markets. More recently, he has returned to focusing exclusively on leading Adama Brazil.

“I would like to thank Romeu for his career, which has always brought trust, quality, and the customer as a priority. This was fundamental in strengthening Adama's presence in Brazil and its relationship with the market over the past few years. At Adama, we continue to stand alongside the farmer, moving forward with stability, responsibility, and a vision for the future,” says Dereudre.

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Pathogen activates ripening and accelerates citrus canker.

Research shows how Xanthomonas citri releases sugars in leaves by activating a typical fruiting program.

19.12.2025 | 08:02 (UTC -3)

Cultivar Magazine

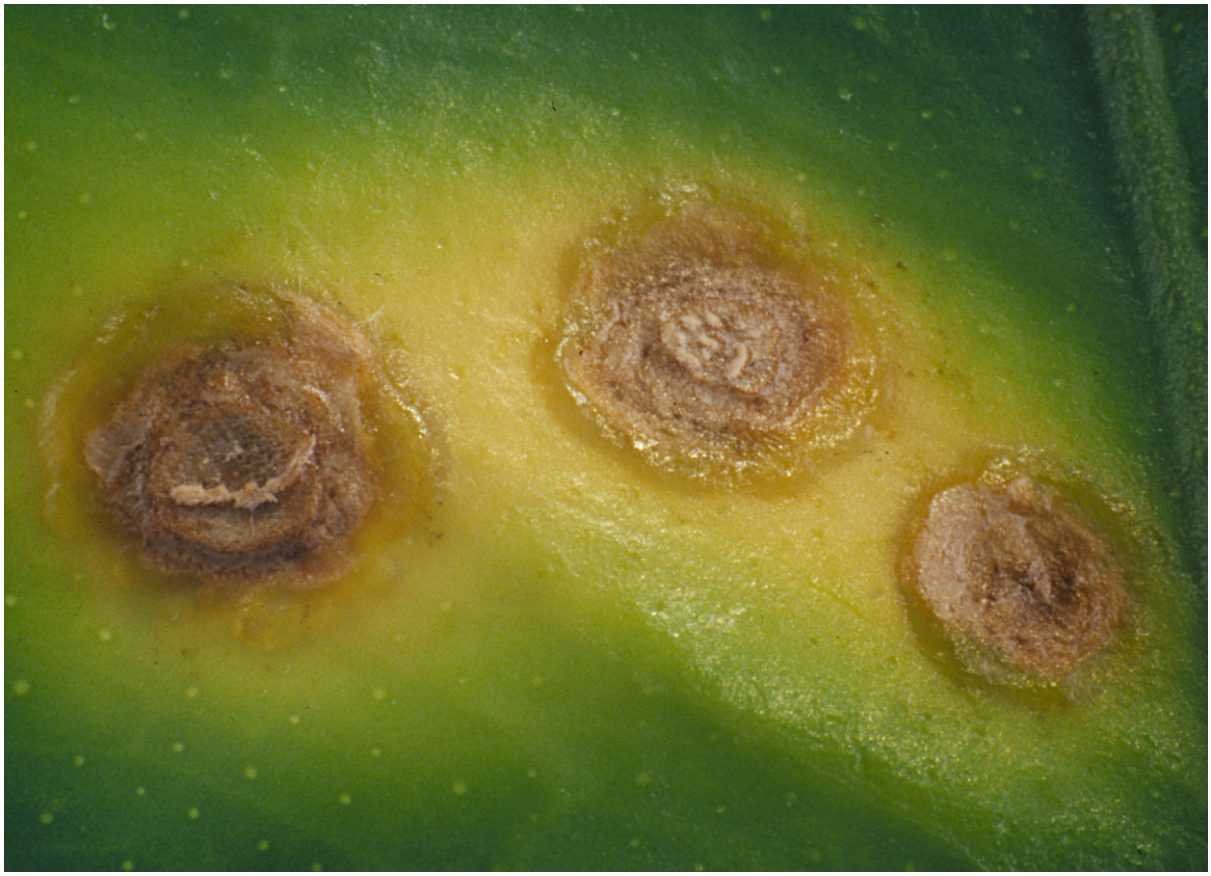

Photo: Jeffrey W Lotz, Florida Department of Agriculture

The bacterium *Xanthomonas citri*The pathogen, which causes citrus canker, activates parts of the fruit ripening program in citrus leaves to obtain nutrients and accelerate its multiplication. This mechanism allows the pathogen to grow up to one hundred times larger within the plant tissue. The discovery was made in a study led by the University of Tübingen, Germany.

Bacterial infection causes brown spots and pustules on leaves and fruits, leading to premature fruit drop and significant production losses. The new study details how the bacteria overcome the barrier of the plant cell wall, which is rich in carbohydrates but difficult for microorganisms to access.

According to researchers, *Xanthomonas citri* The doctor injects effector proteins into plant cells using a syringe-like system. One of these proteins reaches the cell nucleus and activates a regulator that normally coordinates fruit ripening. This triggers genes linked to tissue softening and sugar release in leaves, an unusual environment for this process.

Sequencing analysis revealed a strong similarity between the genes activated in infected leaves and those expressed during the natural ripening of the fruit. The pathogen then has access to free sugars precisely where it multiplies, which guarantees a clear nutritional advantage.

The study also describes the integrated action of bacterial proteins from different

secretory systems. Activation of the maturation program stimulates the degradation of xylan from the cell wall and triggers bacterial mechanisms for the use of this sugar, forming a cycle that sustains the infection.

Further information can be found at doi.org/10.1126/science.adz9239

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Brazil's Supreme Court upholds tax exemption rules for pesticides.

The decision was made by a vote of 8 to 2.

18.12.2025 | 17:17 (UTC -3)

Agency Brazil

Photo: Fabio Rodrigues-Pozzebom

The Supreme Federal Court (STF) decided this Thursday (18) to uphold the validity of granting tax benefits for pesticides. The Court judged two actions that were filed by

PV and PSOL. The parties questioned the validity of Agreement No. 100 of 1997, of the National Council of Finance Policy (Confaz), and of Constitutional Amendment (EC) 132 of 2023.

The regulations allowed for the application of a differentiated tax regime for pesticides and a 60% reduction in the rates of the Tax on the Circulation of Goods and Services (ICMS) on these products.

By a vote of 8 to 2, the Court dismissed the lawsuits and ruled that the tax exemption on the sale of pesticides cannot be considered unconstitutional. The votes to uphold the exemption were cast by Justices Cristiano Zanin, Luiz Fux, Dias Toffoli, Alexandre de Moraes, Gilmar Mendes, Nunes Marques, André

Mendonça, and Flávio Dino.

Edson Fachin and Cármen Lúcia expressed their opinions that the tax benefits were unconstitutional.

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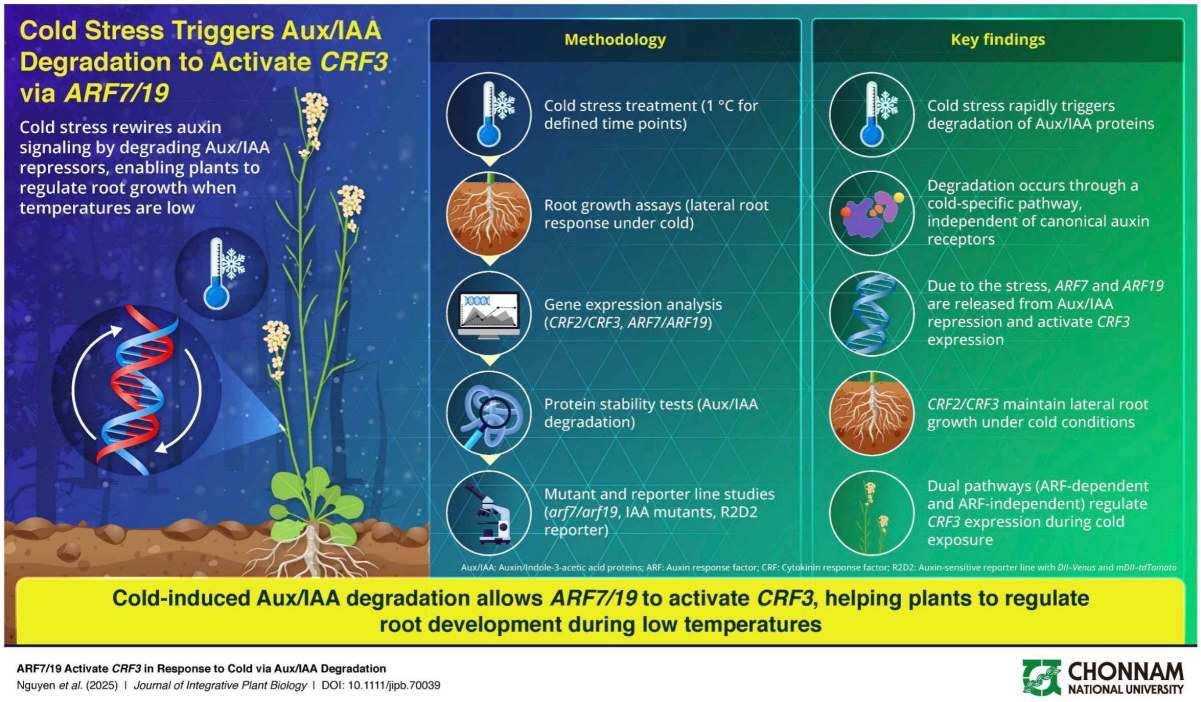
Plants activate a molecular switch to survive cold waves.

Study identifies rapid mechanism that reconfigures roots.

18.12.2025 | 08:34 (UTC -3)

Cultivar Magazine



Researchers have discovered how plants detect sudden drops in temperature and activate a survival response. The

mechanism involves the rapid degradation of Aux/IAA repressor proteins. This degradation releases the regulators ARF7 and ARF19. They activate the CRF3 gene. The process reprograms root development to resist cold.

The study, led by Professor Jungmook Kim of Chonnam National University, revealed that cold stress reconfigures hormonal signaling. Aux/IAA proteins normally suppress genes related to growth. With cold-induced degradation, ARF7 and ARF19 gain the freedom to activate CRF3. This gene controls root architecture under adverse conditions.

Cold also activates cytokinin signaling. This pathway induces the CRF2 gene. CRF2 and CRF3 work together. They

integrate internal environmental and hormonal signals. The two genes adjust the initiation of lateral roots under stress.

Experiments with mutants

Experiments with mutants confirmed the findings. In plants with double mutations in ARF7 and ARF19, CRF3 expression decreased after hours of cold exposure. Mutants in Aux/IAA genes showed elevated CRF3 expression. Tests in *Nicotiana benthamiana* They showed degradation of IAA3 and IAA14 proteins under cold conditions. The proteasome inhibitor MG132 blocked this degradation.

The mechanism operates via a pathway distinct from canonical auxin signaling. Cold induces Aux/IAA degradation without relying on classical auxin receptors. A specific E3 ligase likely mediates the process.

The results open up new perspectives for agriculture. Improving CRF2 and CRF3 signaling could lead to varieties with stable roots in cold soils. These crops maintain strong initial growth, increase nutrient absorption, and reduce fertilizer needs. Synthetic molecules or biostimulants could protect seedlings during unexpected cold spells.

Further information can be found at doi.org/10.1111/jipb.70039

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Adama and BASF sign agreement on flumethylsulforim fungicide in Europe.

Partnership accelerates new solutions against resistance in cereals and foresees launch in the United Kingdom in 2027.

18.12.2025 | 08:03 (UTC -3)

Cultivar Magazine, based on information from Tal Moise

Adama Ltd. and BASF announced a strategic co-development and

commercialization agreement focused on a fungicidal active ingredient. Gilboa (flumethylsulforim), owned by Adama. The partnership seeks to accelerate the delivery of new disease management solutions to European farmers, in a context of increasing resistance and the withdrawal of active ingredients from the market.

Under the agreement, BASF will develop and market new formulations based on Gilboa, in parallel with Adama's own products. Each company will independently define concepts, pricing, sales, and market access strategies. The cooperation combines Adama's innovation capacity and expertise in mixtures with BASF's strength in development and market access.

Flumethylsulforim presents a novel mode of action for cereals and is part of FRAC Group 32, linked to nucleic acid metabolism, recognized this year. The ingredient functions as a platform for broad-spectrum, long-lasting solutions in disease control, focusing on protecting productivity and quality.

According to Florian Wagner, executive vice president of portfolio and innovation at Adama, European producers demand reliable and resilient protection against various diseases. He stated that BASF was chosen because of the convergence in innovation, quality, and sustainability, with the goal of bringing the technology to the field more quickly.

Marko Grozdanovic, Senior Vice President of Global Strategic Marketing at BASF Agricultural Solutions, highlighted the history of cooperation between the companies and the combination of BASF's fungicide portfolio and market knowledge with Adama's active ingredient and product expertise.

Subject to regulatory approvals, the companies plan to launch flumethylsulforim-based formulations for wheat in Great Britain in 2027, with expansion into other European markets in 2029.

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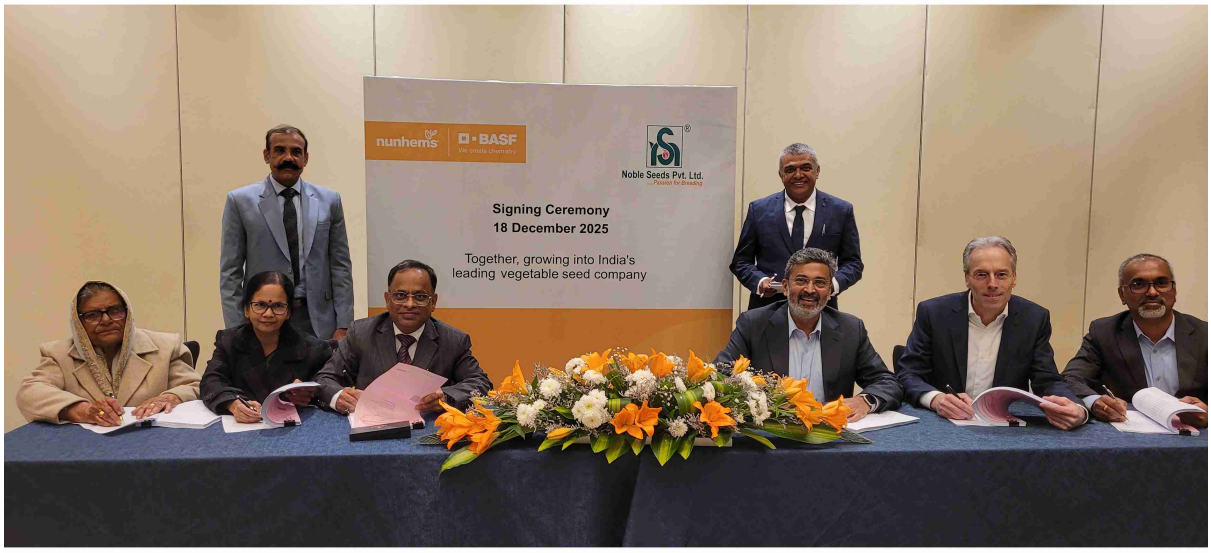
BASF Nunhems announces the purchase of Indian company Noble Seeds.

Operation expands vegetable portfolio and strengthens presence in Northern India.

18.12.2025 | 07:30 (UTC -3)

Cultivar Magazine, based on information from Úlia de Domènech



BASF Nunhems has reached an agreement to acquire Noble Seeds Pvt.

Ltd., an Indian vegetable seed company. The transaction strengthens the multinational's position in the Indian market and is expected to lead the sector in the country. Closing is subject to regulatory approvals and is expected to occur by the end of the first quarter of 2026. The financial details were not disclosed.

With the acquisition, BASF Nunhems incorporates two new crops into its portfolio. Cauliflower and radish will complement seeds already offered, such as peppers, watermelon, cucurbits, and tomatoes. The deal also expands commercial coverage in Northern India, a strategic region for vegetables.

Noble Seeds is headquartered in New Delhi. Founded in 2004, the company specializes in breeding and supplying

hybrids of cauliflower, radish, tomato, peppers, watermelon, cucurbits, okra, and cucumber. It employs 154 people and is among the leading sellers of hybrid cauliflower seeds in India.

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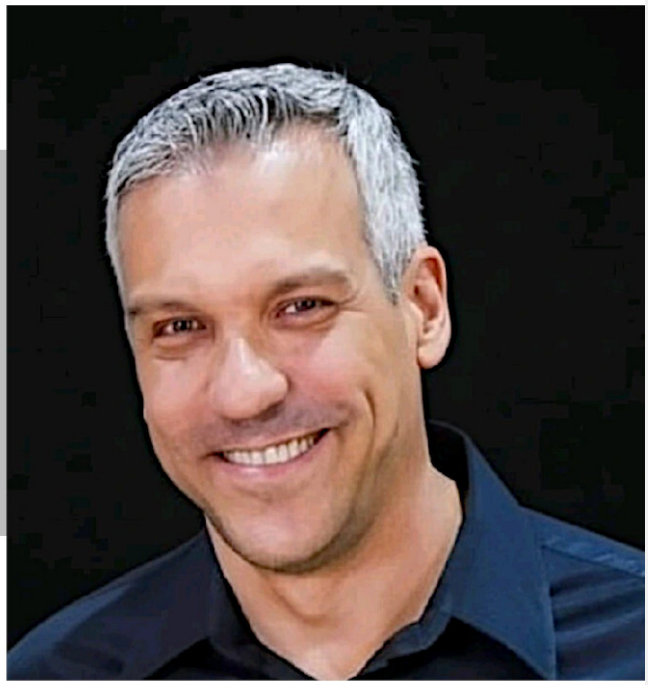
Sumitomo Chemical strengthens its team in Western Goiás.

Breno Reis takes on the role to boost growth and partnerships in the region.

17.12.2025 | 09:37 (UTC -3)

Cultivar Magazine, based on information from Luis Fernando Duarte



Sumitomo Chemical has announced the appointment of agricultural engineer Breno Reis (pictured) as regional sales manager

for Western Goiás. He began his duties in December.

His arrival reinforces the company's expansion strategy in the region. The focus is on building closer relationships with producers and partners. The company seeks to consolidate partnerships and offer sustainable solutions. Breno Reis leads a team that operates in cities such as Rio Verde, Jataí, Mineiros, Montividiu, Acreúna, Santa Helena de Goiás, Goiatuba, and Itumbiara.

Breno Reis has nearly 20 years of experience in the sector. He works in team management, direct sales, distribution, and cooperatives. He graduated in agronomic engineering from the Federal University of Viçosa (UFV) and holds an MBA in finance and business planning from the Federal

University of Uberlândia (UFU).

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Corteva and Hexagon Bio announce joint venture.

Partnership unites biotechnology, artificial intelligence and natural products.

16.12.2025 | 10:27 (UTC -3)

Cultivar Magazine, based on information from Derek Burleson

Corteva and Hexagon Bio have announced the creation of a multi-million dollar joint venture to accelerate the development of nature-inspired crop

protection solutions. The agreement involves two firsts: Hexagon Bio's first partnership in the agricultural sector and Corteva's first collaboration with the pharmaceutical industry.

The joint venture brings together Corteva's portfolios in naturally sourced crop protection and its capabilities in bacterial product discovery with Hexagon Bio's platform focused on identifying natural compounds. The goal involves advancing the companies' pipelines in both agriculture and human health.

According to Sam Eathington, Corteva's Chief Technology and Digital Officer, the partnership expands the company's discovery engine and accelerates the delivery of new options to farmers. The

company is betting on the growing demand for effective and sustainable solutions inspired by nature.

The Hexagon Bio platform combines microbial genetics, artificial intelligence, chemistry, and synthetic biology. The technology enables the identification and characterization of new natural products and reveals mechanisms of action not evident through conventional methods. This process increases the efficiency in the discovery of molecules.

For Maureen Hillenmeyer, CEO and co-founder of Hexagon Bio, the joint venture enables two simultaneous objectives: developing transformative therapies for patients and delivering new modes of action for global agriculture. The executive emphasizes that the platform generates

more high-value compounds than a single development path would absorb.

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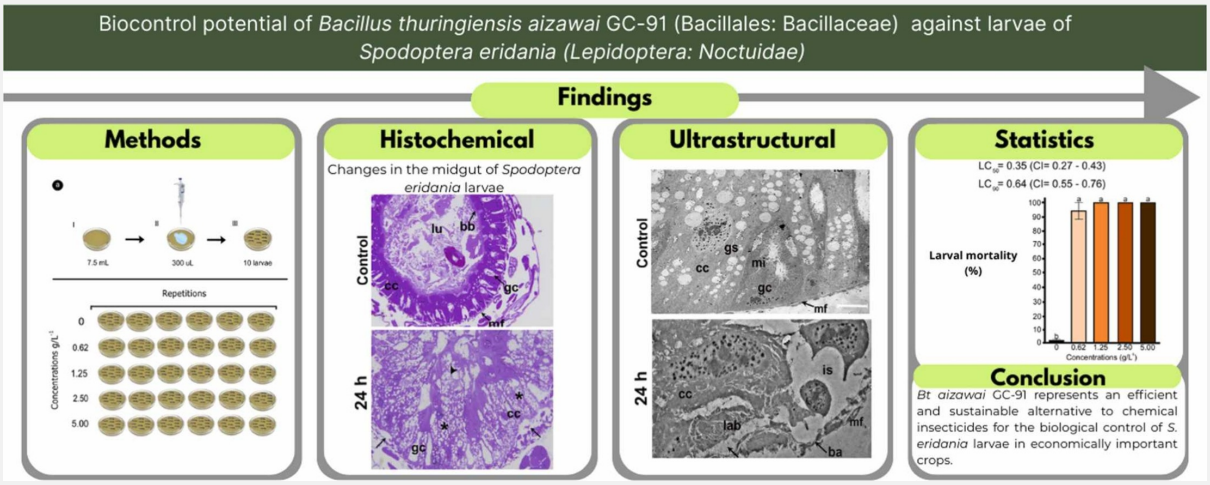
Bacillus thuringiensis shows high efficacy against Spodoptera eridania.

Research showed 100% mortality of the insect and destruction of the insect's intestine.

15.12.2025 | 14:25 (UTC -3)

Cultivar Magazine



Bacillus thuringiensis subspecies *aizawai* GC-91 showed strong action against newly hatched larvae of *Spodoptera eridania*The microorganism caused total mortality within 168 hours and promoted severe

damage to the midgut of the caterpillars, according to a study conducted by researchers at the State University of Maringá, in Paraná.

The trials used four doses of a commercial Bt-based bioinsecticide. Concentrations of 1,25, 2,50, and 5,00 g per liter led to 100% larval mortality. The lethal concentration to kill half the population was 0,35 g per liter. For 90% mortality, the estimated value was 0,64 g per liter.

The larvae consumed an artificial diet treated with the product. Researchers monitored mortality for seven days. Statistical analyses confirmed a significant difference between the treatments and the control without Bt.

Effects on the intestine

In addition to mortality, the study evaluated the effects of the bioinsecticide on the midgut of caterpillars. Analyses using light, scanning electron, and transmission electron microscopy revealed intense changes within the first 24 hours after ingestion. The cells of the intestinal epithelium projected into the lumen. The cytoplasm showed vesicles. The basal lamina shifted. Intercellular spaces increased.

After 48 hours, the condition worsened. The intestinal epithelium underwent complete degeneration. Only the basal lamina and ruptured muscle fibers remained. Bacteria were observed in the

intestinal lumen, in the peritrophic matrix, and on the microvilli.

In the control group, without application of the product, the intestine maintained a normal structure throughout the period. The cells presented preserved nuclei, intact microvilli, and a continuous peritrophic matrix.

The trials were conducted under controlled laboratory conditions with an artificial diet. The authors highlight the need for further field testing to confirm its effectiveness in commercial crops. Even so, the results point to the microorganism as a promising and sustainable option for pest control in different agricultural crops.

The researchers who participated in the study were Enrique Yamakawa, Fabio de

Deus Oliveira-Junior, Elton Luiz Scudeler, Helio Conte, Bruno Vinícius Daquila, and Satiko Nanya.

Further information at doi.org/10.1016/j.napere.2025.100179

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