

January 31, 2026

N° 64

Cultivar[®] *Semanal*

A detailed microscopic image of a mite, likely a pest, on a plant surface. The mite is translucent with a yellowish-brown body and several pairs of thin, jointed legs. It is positioned in the center-right of the frame. The background is a complex, textured surface of plant tissue, showing various cellular structures and colors ranging from green to brown. The lighting is bright, highlighting the fine details of the mite and the plant.

**Infestation
order defines
defense**

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Order of mite infestation determines antioxidant defense.

Study shows that early arrival of *Tetranychus urticae* reduces *T. ludeni* population in bean plants.

28.01.2026 | 07:04 (UTC -3)

Cultivar Magazine

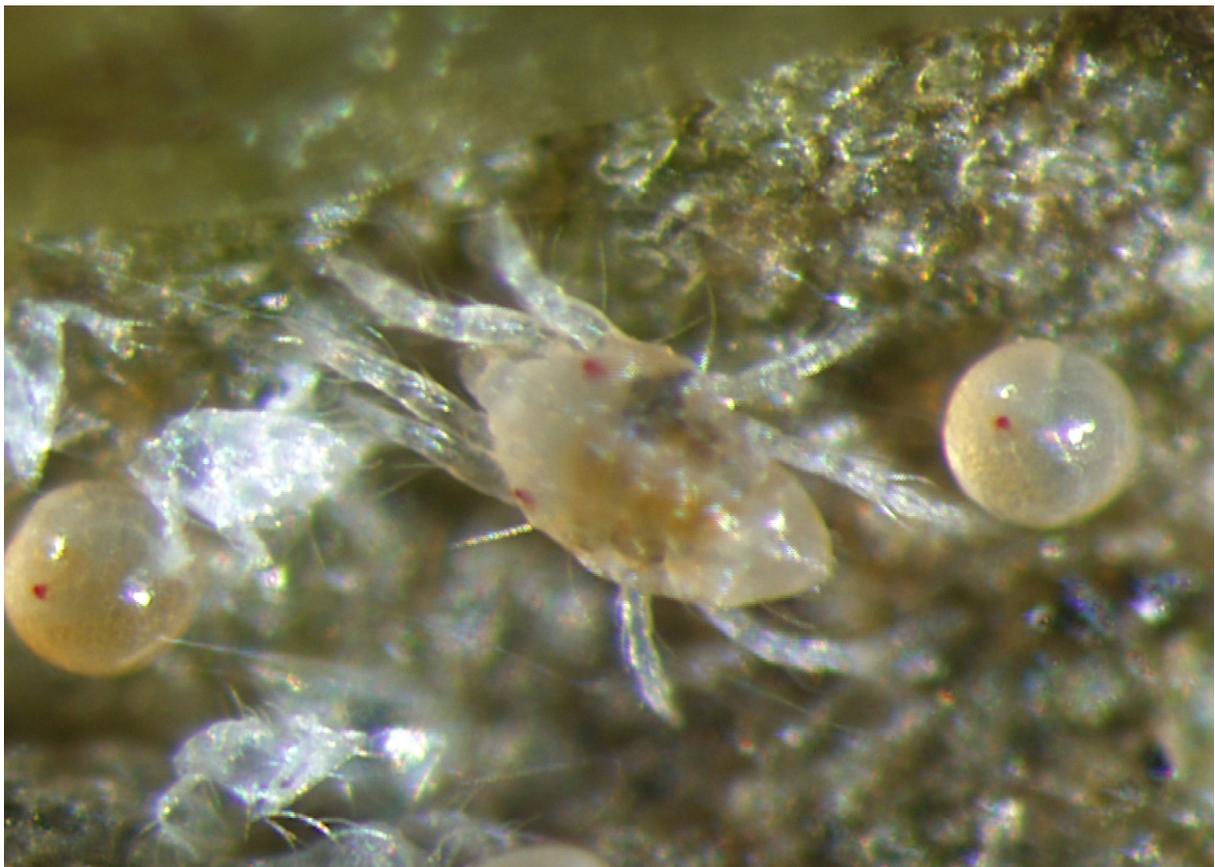


Photo: Bruce Watt, University of Maine

The order of colonization by phytophagous mites directly interferes with the population dynamics of pests and the biochemical response of the common bean plant.

Research conducted in Rio Grande do Sul demonstrated that the early arrival of *Tetranychus urticae* significantly reduces the population of *Tetranychus ludeni* and modulates the activity of antioxidant enzymes in the plant. The work evaluated common bean (*Phaseolus*) under different infestation scenarios and measured responses associated with plant defense.

The study started from the concept of priority effect. This effect describes the competitive advantage of the species that colonizes the host first. The hypothesis tested indicated that the first herbivore alters the plant's conditions and hinders

the establishment of the competitor that arrives later. To test this premise, the researchers compared isolated, simultaneous, and sequential infestations of the two mites.

The experiments took place in a controlled environment. Young bean plants received adult female plants. *T. ludeni* e *T. urticae*
The treatments included isolated infestation of each species, simultaneous release of both, and releases with a four-day interval between species. After 14 days, the researchers counted only the adult individuals, which allowed them to visually distinguish the species.

Results of the study

The results showed a clear effect of the order of arrival. When *T. ludeni* It infested the plant alone, and its population grew larger. When it divided the plant with... *T. urticae*, showed a marked reduction. The decrease occurred both in simultaneous infestation and in treatments where *T. urticae* He arrived first. In this scenario, *T. ludeni* It presented the lowest abundances recorded.

Yes, *T. urticae* It maintained high performance. The species showed similar population growth when alone or accompanied by... *T. ludeni* Even though he arrived later, he managed to establish himself at the plant. The result indicated greater competitive capacity of *T. urticae* in the bean plant.

The distribution of mites on the leaves did not vary between the adaxial and abaxial surfaces. Statistical analysis did not identify a preference for any leaf region. The result suggests that, under the experimental conditions, the available space on the plant did not favor spatial segregation between the species.

Physiological response

In addition to population dynamics, the study evaluated the physiological response of the common bean. Researchers measured the activity of three antioxidant enzymes. The enzymes analyzed included ascorbate peroxidase (APX), catalase (CAT), and superoxide dismutase (SOD). These enzymes participate in the control of

reactive oxygen species generated during stress caused by herbivory.

The presence of mites significantly altered the activity of the three enzymes. Plants infested by *T. urticae* They showed greater APX activity. This pattern indicated stimulation of the decomposition of hydrogen peroxide generated during the attack. Plants infested with... *T. ludeni* They showed an increase in the activity of CAT and SOD, enzymes associated with the initial steps of antioxidant defense.

In treatments involving coexistence, the response varied according to the order of infestation. When *T. urticae* It arrived first, and enzymatic activity did not increase significantly after the entry of *T. ludeni* The result suggests modulation of plant

defense conditioned by the first herbivore.

Correlation analyses

Correlation analyses reinforced this pattern. *T. ludeni* It was positively associated with CAT and SOD activity and negatively associated with APX. *T. urticae* It showed the opposite response, with a positive correlation with APX and a negative correlation with CAT and SOD. This behavior indicated that each species activates distinct components of the plant's antioxidant system.

The authors highlighted that the early arrival of *T. urticae* compromises the development of *T. ludeni*. The effect stems from both direct competition and the

induction of defensive responses in the plant. The study indicated that the common bean adjusts its defense metabolism according to the identity and sequence of herbivore infestation.

The research was conducted by Tairis da Costa, Julia Renata Schneider, Aline Marjana Pavan, Luana Fabrina Rodighero, Anderson de Azevedo Meira, Noeli Juarez Ferla, and Geraldo Luiz Gonçalves Soares.

More information at
doi.org/10.3390/insects17020145

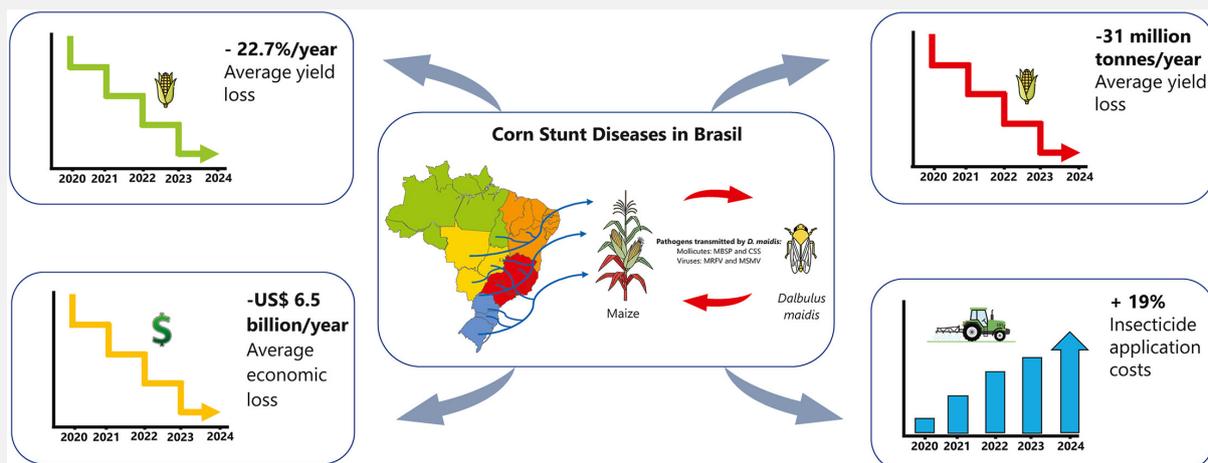
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Leafhopper causes losses of US\$ 25,8 billion to Brazilian corn.

A study by CNA, Embrapa, and Epagri analyzed four harvests and points to the growing impact of the pest and stunting diseases.

30.01.2026 | 14:26 (UTC -3)

Cultivar Magazine



Corn stunt diseases caused average losses of 22,7% in Brazilian production between the 2020/21 and 2023/24 harvests. The economic impact reached US\$ 6,5 billion per year. The unharvested

volume reached 31,8 million tons annually. The data are from a study that evaluated the productive and economic effects of the complex of diseases transmitted by the corn leafhopper in Brazil.

This study identifies corn stunt disease as the greatest phytosanitary threat to the corn supply chain in the country. The complex involves two pathogens restricted to the phloem: the maize bushy stunt phytoplasma and the corn stunt spiroplasma. Both depend on the corn leafhopper. *Dalbulus maidis* for transmission.

historical series

The analysis combined historical series from Conab, from 1976 to 2024, with data from the Campo Futuro project, by CNA and Senar. The survey considered technical panels carried out in 34 municipalities, distributed across the five producing regions of the country. These municipalities accounted for up to 19,8% of the national corn production during the evaluated period.

According to the study, losses varied depending on the harvest. In the 2020/2021 season, the corn stunt disease reduced production by 28,9%. In 2023/2024, the loss fell to 16,7%. Even so, the impact remained high. In the accumulated total of the four harvests, Brazil failed to produce approximately 2 billion 60-kilogram bags. The total loss

exceeded US\$ 25,8 billion.

The study highlights that, in 79,4% of the municipalities evaluated, producers and technicians identified the leafhopper and stunting diseases as one of the main causes of the drop in productivity. This attribution was reached by consensus in the regional panels. The methodology follows accepted practices when extensive field surveys prove unfeasible.

Inflection point

The historical series reveals a turning point starting in 2015. Until the early 2000s, average corn productivity in Brazil increased gradually. Growth intensified between 1999/2000 and 2014/2015, driven

by the second corn crop (safrinha), more productive hybrids, and the adoption of modern technologies. After this period, there were recurring declines in production and yield, even with an increase in planted area in some years. The study associates this trend with the intensification of corn stunt disease outbreaks.

Diseases had already been occurring sporadically in the country since the 1970s. Changes in the production system altered this scenario. The expansion of planting windows. The almost continuous presence of corn plants in the field. The spread of volunteer plants. These factors reduced the off-season period and favored the survival of the insect vector and pathogens throughout the year.

Economic impact

The economic impact is not limited to grain loss. Control costs have also increased. The study shows a 19% increase in the average cost of insecticide applications against the leafhopper between 2020/21 and 2023/24. The cost exceeded US\$9 per hectare per application. In some regions, producers intensified spraying in response to insect pressure, with limited results.

The authors emphasize that isolated chemical control does not interrupt the epidemiological cycle. The leafhopper retains the capacity for rapid dispersal and transmission of pathogens. Volunteer plants and abandoned crops act as sources of inoculum. Management

requires coordinated regional action.

The study points to a set of already known practices: Elimination of volunteer plants during the off-season; Reduction and synchronization of planting windows; Use of hybrids with higher levels of resistance or tolerance; Seed treatment with insecticides; Chemical or biological control in the early stages of the crop.

Effectiveness depends on collective adoption.

The work was developed by Charles Martins de Oliveira, Tiago dos Santos Pereira, Larissa Pereira Mouro, and Maria Cristina Canale.

More information at

doi.org/10.1016/j.cropro.2026.107549

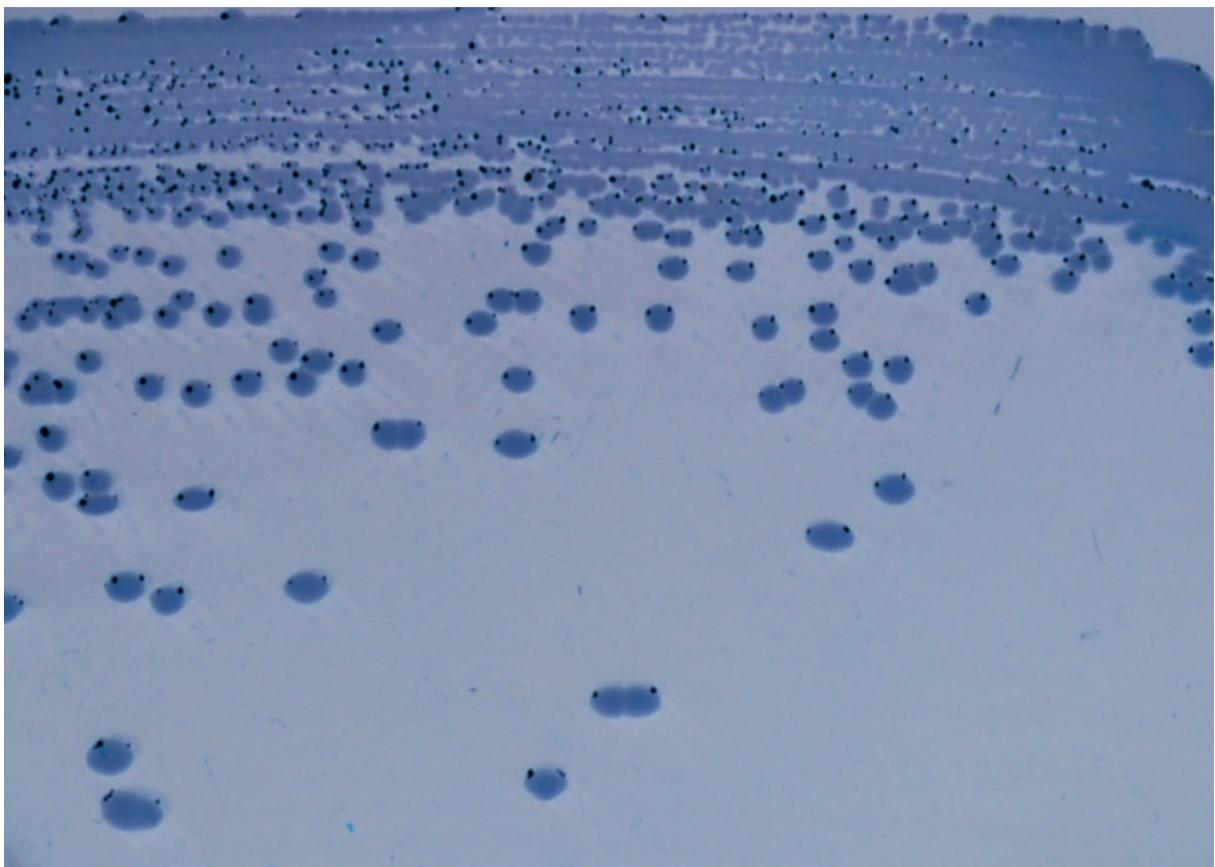
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Pseudomonas volatiles increase plant growth under drought conditions.

There was reprogramming of the root transcriptome and modulation of the microbiome.

30.01.2026 | 07:40 (UTC -3)

Cultivar Magazine



Plants exposed to volatile organic compounds emitted by bacteria of the genus *Pseudomonas* Increased growth and drought tolerance. The effect occurred without physical contact between the plant and the microorganism. Results appeared in *Arabidopsis thaliana* and *brassica oleracea* cultivated in soil. The study shows reprogramming of the root transcriptome and modulation of the microbiome associated with the maintenance of growth under water deficit.

Researchers tested volatile compounds. *Pseudomonas simiae* WCS417, *P. simiae* WCS315 and *P. protens* CHA0. Under simulated drought conditions, the volatiles increased biomass and the number of lateral roots. The gain exceeded that observed in well-irrigated plants. Under

saline stress, the compounds also stimulated growth, indicating a broad response to osmotic stresses.

Transcriptomic analyses revealed alterations in pathways linked to abscisic acid signaling, sugar transport, iron uptake, aliphatic glucosinolate biosynthesis, and coumarin metabolism. ABA signaling genes and SWEET11/12 transporters showed reduced expression. This change favored lateral root formation and growth under drought conditions.

Experiments with mutants

Tests with mutants indicated a negative role for the ABA pathway and aliphatic

glucosinolates in the response to volatiles. Plants with mutations in these pathways responded more strongly to bacterial compounds. SWEET transporter mutants did not respond, reinforcing the need for their repression to achieve a positive effect.

Metabolic analyses showed a reduction in some glucosinolates in the roots under drought conditions and an increase in coumarins, such as scopoletin. The profile suggests less oxidative stress when plants receive volatile compounds. Sugar measurements indicated less root accumulation under drought conditions with exposure to these compounds.

In *Brassica oleracea* grown in soil, volatiles increased aboveground biomass and plant

water content under normal irrigation and drought conditions. The treatment also altered the root-associated microbial community under water deficit conditions. The composition approached that observed in well-irrigated plants, indicating indirect modulation of the microbiome.

Further information at
doi.org/10.64898/2026.01.27.701981

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Bisexual release controls *Drosophila suzukii* with equal effectiveness.

Study suggests that separating sexes is not necessary in protected crops.

29.01.2026 | 08:46 (UTC -3)

Cultivar Magazine



Photo: Eric R Day, Virginia State University

The release of sterile females alongside males, known as bisexual release, controls *Drosophila suzukii* with similar effectiveness to the release of males only. The conclusion comes from an experiment conducted by French researchers using the Sterile Insect Technique (SIT). The study compared the effects of unisexual and bisexual release in simulated protected cultivation environments.

Sterile males and females obtained by irradiation of laboratory flies were used. Fertile insects, collected from infested cherry trees in southern France, were introduced into cages with artificial plants, feeding substrates, and simulated circadian rhythms. The environment was designed to mimic natural conditions and favor the typical behavior of the species.

The rate of fertile females that produced offspring fell from 84% (control) to 46% in the unisexual release and 45% in the bisexual release. The difference between the two TIE treatments was not statistically significant. The analysis was reinforced by dissection of the spermathecae, which confirmed mating in females that did not produce larvae.

Bisexual releases

Bisexual releases did not reduce the mating rate or increase the fecundity of wild females. The inclusion of sterile females also did not cause behavioral deviations in sterile males, such as a preference for partners of the same origin. The study also found no negative impact

related to the use of cage space or to differences in rhythms between wild and laboratory strains.

The authors point out that, although the results were obtained in cages of 20 cubic centimeters, larger setups with real plants in greenhouses reinforced the validity of the experiment.

Field experience

No stinging or oviposition by sterile females on fruit was observed, indicating a low risk of commercial damage. Field experience by French and Austrian researchers reinforces this perception. Despite the absence of formal tests on this aspect, the behavior of sterile females

indicates that there is no need for sexing systems for the application of STI in protected crops.

The study suggests that genetic techniques or robotic systems for sex separation can be discarded in control programs. *d.suzukii* in confined systems. Eliminating this step represents significant cost savings and logistical simplification for integrated management programs with TIE.

More information at
doi.org/10.1002/ps.70569

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Volatiles from potatoes attacked by aphids reduce the pest.

Chemical communication between plants affects *Myzus persicae* and attracts natural enemies for up to 48 hours.

29.01.2026 | 08:31 (UTC -3)

Cultivar Magazine



Photo: Jim Baker, North Carolina State University

Potato plants exposed for 48 hours to volatiles released by aphid-infested plants showed reduced pest performance and increased attraction of natural enemies. The effect occurred only in the first 48 hours after exposure, according to a study conducted in a controlled airflow system.

The experiment evaluated herbivory-induced volatile compounds, known as HIPVs. Recipient plants received volatiles from plants of the same species infested with aphids or from uninfested plants. After exposure, researchers performed bioassays with the green aphid (*Myzus persicae*) and with its natural enemies, the ladybug *Harmonia axyridis* and the parasitoid *Aphidius gifuensis*.

Between zero and 48 hours after exposure, plants that received HIPVs showed lower aphid survival and reduced nymph production. The settlement rate did not change. Both natural enemies showed greater attraction to these plants.

Chemical analysis showed a significant increase in the total emission of volatiles by the recipient plants immediately after exposure. Seven compounds showed higher levels in this interval. Between 48 and 96 hours after exposure, there were no differences in insect behavior. The chemical profile changed. Some of the initial compounds ceased to appear at elevated levels, while another group of six substances remained above the control.

The data indicate that brief exposure to aphid-induced volatiles activates rapid and temporary indirect defenses in neighboring plants. The process creates a short window of protection, with reduced performance of... *Myzus persicae* and greater recruitment of *Harmonia axyridis* e *Aphidius gifuensis* This dynamic reinforces the ecological role of chemical communication between plants and points to the potential for management strategies with time-adjusted defensive induction.

Further information at
doi.org/10.1002/ps.70577

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Photorhabdus strain achieves 90% mite mortality.

Study identifies optimized culture medium and points to potential for biological control of *Tetranychus truncatus*.

29.01.2026 | 07:35 (UTC -3)

Cultivar Magazine



Photo: Laura Milena Palacios Calderón

A new strain of bacteria *Photorhabdus luminescens* achieved up to 90% mite mortality. *Tetranychus truncatus* In laboratory tests, the result surpassed the performance of a previously known strain and indicates potential for use in integrated pest management.

Researchers compared the 0805-P2R and 2103-RUVI strains. The 2103-RUVI strain was isolated from entomopathogenic nematodes collected in southern Taiwan. The team evaluated bacterial growth, proteolytic activity, and acaricidal effect against *T. truncatus*, a species with a history of resistance to acaricides.

The best result was obtained using the culture supernatant from the 2103-RUVI strain. Mortality reached 90% within 72

hours. Under the same conditions, the 0805-P2R strain reached 83%. Whole cultures showed inferior performance in both strains.

The study used the Taguchi method to optimize the culture medium. The most efficient formulation combined 0,4% soluble starch, 2,5% sucrose, 1,5% milk powder, and 0,4% yeast extract and amino acids. This medium promoted high cell density, consistent enzymatic activity, and a greater acaricidal effect.

Histopathological analysis

Histopathological analysis of the treated mites showed severe damage to the

digestive tract. The alterations included cellular disorganization, degradation of hindgut tissues, and impairment of nerve structures. These effects appeared with greater intensity in treatments with the 2103-RUVI strain.

Genomic analysis revealed genes unique to 2103-RUVI that encode the phosphoprotein PhoE. These genes did not appear in the 0805-P2R lineage. The authors associate the presence of these proteins with the greater virulence observed, although they indicate the need for functional validation.

Researchers highlight that the use of supernatants, without the application of live cells, can facilitate the development of commercial bioacaricides. The medium

formulated with simple inputs, such as powdered milk and starch, also reduces production costs.

Further information at
doi.org/10.3390/agriculture16030327

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Angels' glow

Angel's glow was a phenomenon that occurred at the Battle of Shiloh (1862) during the American Civil War.

Approximately 16.000 wounded soldiers were left stranded on the battlefield for two days in the pouring rain and intense cold.

The wounds of many soldiers glowed in the dark, showing improved healing. In 2001, it was discovered that the cause was

bioluminescent bacteria. *Photorhabdus luminescens*.

The explanation lies in symbiosis: the bacteria, carried by nematodes from the soil, entered the soldiers' wounds. Due to hypothermia caused by the cold and rain, the body temperature dropped enough for the bacteria to survive. Once established, it produced natural antibiotics that eliminated dangerous pathogens, such as gangrene, "cleaning" the infection while emitting a bluish glow.

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Brazil should expand orange production in 2026/27.

USDA estimate contrasts with restricted scenario in the US.

28.01.2026 | 16:39 (UTC -3)

Fernanda Karla Venditte



The first estimate for the 2026/27 orange crop in the United States indicates that production will remain at historically low levels. According to data from the United

States Department of Agriculture (USDA), US production is expected to remain near the series lows, with the Florida crop estimated at 12 million boxes, a 1,6% decrease compared to the previous crop.

Of the total forecast, approximately 7,5 million boxes correspond to Valencia oranges, the main variety destined for juice production in the country. The number of productive trees in Florida decreased by 18% year-on-year, while the increase in the number of fruits per tree raised average productivity.

In Brazil, the USDA's projection for the 2026/27 crop year indicates production of 330 million boxes, a 3,7% increase compared to the 2025/26 estimate, driven by more favorable weather conditions

expected for 2026. As a result, orange juice production should reach 1,03 million tons in FCOJ (freshly chopped orange juice), a growth of 1,9%.

In international trade, the approval of the agreement between the European Union and Mercosur is expected to favor Brazilian orange juice exports in the long term, according to CitrusBR. The organization estimates that, in five years, the sector could accumulate tariff savings of approximately US\$320 million, with the gradual reduction of tariffs applied to the product.

For NFC juice, the impact should be more immediate, with tariffs expected to be eliminated within four years. For FCOJ, however, the tariff reduction should occur gradually, over an estimated period of five

to ten years.

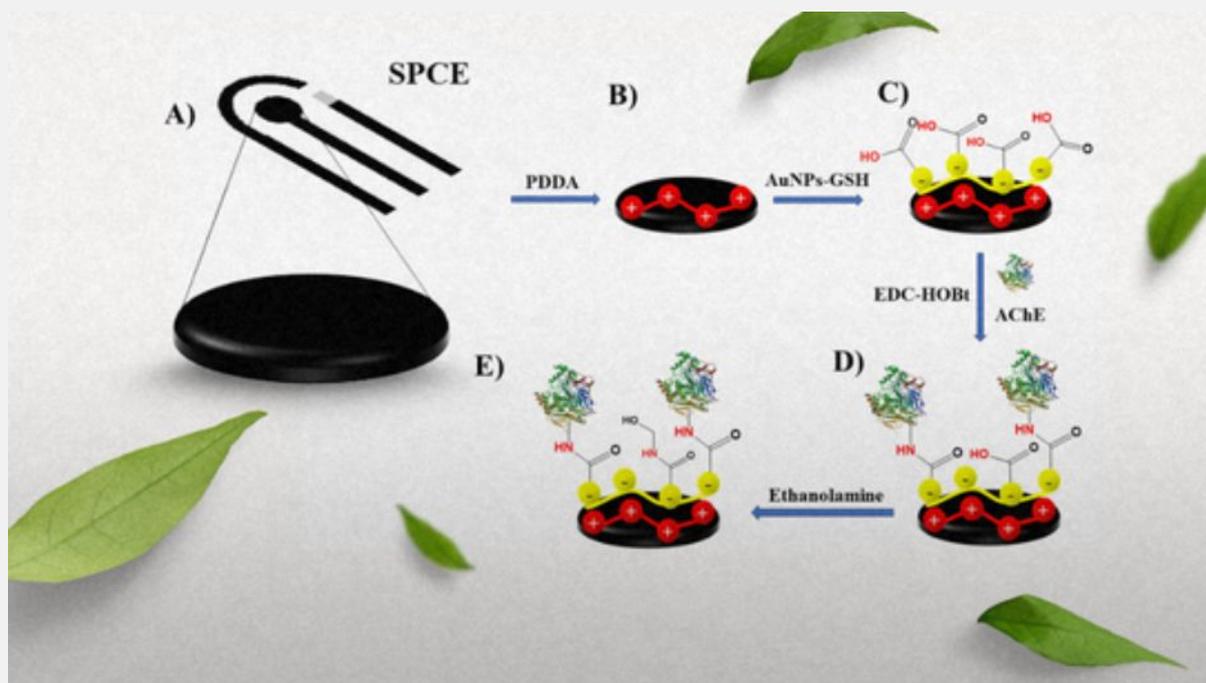
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Research creates biosensor for biological pest control.

Technology facilitates the selection of plants for new bioinsecticides.

28.01.2026 | 16:34 (UTC -3)

Antonio Rodrigues da Silva Neto, Cultivar Magazine edition



The search for more sustainable alternatives to chemical pesticides has been gaining momentum in Brazilian scientific research. At the Federal

University of São Carlos (UFSCar), a study developed in the Postgraduate Program in Chemistry (PPGQ) resulted in the creation of a biosensor capable of rapidly detecting natural compounds present in plant extracts with insecticidal potential.

The technology was developed by doctoral student Sean dos Santos Araújo and allows the identification of inhibitors of the acetylcholinesterase (AChE) enzyme — fundamental to the functioning of the nervous system of insects and considered a strategic target in the control of agricultural pests. According to the researchers, the tool can contribute to accelerating the development of new biopesticides.

The electrochemical biosensor, called Bio-AChE, is the result of a partnership between the Natural Products Laboratory (LPN-UFSCar) and the Bioanalytical and Electroanalytical Laboratory (LaBiE). The device uses a printed carbon electrode, modified with gold nanoparticles coated with glutathione, forming a suitable surface for enzyme immobilization.

One of the main challenges of the work was ensuring that AChE remained stable and biologically active in the sensor.

“Immobilizing the biological component is a fundamental step to ensure the enzyme's stability and the reliability of the measurements,” explains Araújo.

According to him, modifying the surface with gold nanoparticles was crucial to

intensify the electrochemical response and guarantee the accuracy of the readings.

technology advantages

Among the advantages of the technology are the lower cost and operational simplicity, especially when compared to traditional techniques, such as bioaffinity chromatography, which require more complex equipment and higher investments.

To validate the biosensor's functionality, the researchers initially used azadirachtin, a natural compound extracted from the *Azadirachta indica* plant and recognized as an AChE inhibitor. After validation, extracts from *Picramnia riedelli*, *Picramnia ciliata*,

and *Toona ciliata* were evaluated, showing inhibition rates between 41% and 55%, indicating potential for the development of bioinsecticides.

The study also allowed for the identification of specific compounds responsible for inhibiting the enzyme. The results were published in the journal *Analytical methods*. The research was supervised by professors Ronaldo Censi Farias, João Batista Fernandes, Moacir Rossi Forim, and Maria Fátima Fernandes da Silva, from the Chemistry Department at UFSCar.

The project received support from Capes, CNPq, and Fapesp.

Further information can be found at doi.org/10.1039/D4AY02084G

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Massey Ferguson will be the official combine harvester of Expoagro 2026.

The brand is betting on efficiency, grain quality, and technical support as key differentiators at the country's largest agro-industrial fair.

28.01.2026 | 15:26 (UTC -3)

Cultivar Magazine, based on information from Marcos D'Andrea



Massey Ferguson has renewed its agreement and will act as the official combine harvester at Expoagro 2026, which takes place in Argentina in March. The brand reinforces its positioning in harvesting solutions focused on operational efficiency, grain quality, and long-term reliability.

Participation in the trade fair prioritizes the technical attributes of the threshing and sorting system. The technology allows for precise crop treatment, reduces losses and mechanical damage, and delivers clean, intact grains with high commercial quality.

Another focus is on simple operation management. Clear commands, quick access to settings, and automation of key

functions make the operator's job easier and increase productivity from day one, even in demanding conditions.

The company also highlights support as a strategic differentiator. The network of specialized technical service, continuous monitoring, and availability of assistance throughout the machine's lifespan increase predictability for producers and contractors.

According to Sergio Karin, commercial director for the brand in Hispanic America, the harvest represents the decisive moment of the crop and demands a worthy ally. The presence at Expoagro 2026 reinforces this message.

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BASF announces the opening of a global digital hub in India.

New unit expands global network of digital services and integrates cost reduction and standardization strategy.

28.01.2026 | 13:38 (UTC -3)

Cultivar Magazine, based on information from Antje Schabacker



Dirk Elvermann and Piyush Goyal

BASF plans to open a global digital hub in Hyderabad, India, in the first quarter of

2026. This initiative expands the company's international network of Digital Hubs, which already includes units in Ludwigshafen and Madrid in Europe, and Kuala Lumpur in Asia-Pacific. The goal is to strengthen the delivery of standardized digital services for the company's business on a global scale.

According to BASF, the Hyderabad hub concentrates digital expertise in a more cost-efficient location. The strategy aims to accelerate processes and streamline service delivery. The Global Digital Services division leads the movement, focusing on competitiveness and generating value for the company's core businesses.

BASF's Chief Financial and Digital Officer, Dirk Elvermann, states that the new unit ensures competitive conditions for the delivery of digital services. He highlights the integration between the Indian hub and other global structures as an operational priority.

The company also intends to standardize its digital portfolio and focus efforts on areas with the highest strategic return. The plan includes structural changes and a gradual reduction in the division's global workforce by 2030, including an impact on positions in Germany. BASF reports that all measures will follow existing social criteria and co-management agreements.

Preparations have already begun. The new legal entity, BASF Digital Solutions Private Limited, is starting hiring and

operational activities immediately. The company sees the hub as part of BASF's consolidated presence in India, which already includes industrial and research and development units in the country.

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Methyl jasmonate reduces cell damage in radishes.

Foliar applications of the regulator, however, did not prevent losses under severe water stress.

28.01.2026 | 08:18 (UTC -3)

Cultivar Magazine



The application of methyl jasmonate (MeJa) reduced oxidative damage in

radish leaves grown under water stress, but failed to prevent a decline in growth, photosynthesis, and physiological quality of the plants. This is the conclusion of a study conducted by researchers at the Federal University of Paraíba.

The experiment evaluated the effect of foliar applications of 100 micrometers of MeJa, carried out 7, 14, and 21 days after sowing, on plants subjected to normal irrigation (80% of water retention capacity) or to total suspension of irrigation between 15 and 30 days after sowing.

Water deficit severely reduced the fresh and dry mass of leaves and roots, as well as root volume, by more than 80%. Leaf area decreased, while specific leaf area increased. MeJa did not prevent these

losses. There was also no effect of the regulator on stomatal conductance, CO₂ assimilation, or photosynthetic efficiency. Chlorophyll fluorescence (Fv/Fm) remained stable in all treatments.

Electrolyte leakage

The application of MeJa was effective in reducing electrolyte leakage—an indicator of cell membrane damage—in plants under stress, suggesting a positive effect on membrane stability. However, MeJa did not influence the relative water content in the leaves, nor the water use efficiency, which limits its contribution to tolerance to water stress.

Stress increased the levels of reducing and non-reducing sugars in the roots, with increases of up to 200%, in addition to raising magnesium and phosphorus levels and antioxidant capacity (ABTS method). These effects occurred independently of MeJa application. The content of phenolic compounds did not change.

Root luminosity

Root luminosity was reduced under drought conditions, making the tissues less commercially attractive. Even so, color parameters indicated maintenance of the reddish hue. Manganese concentrations decreased in irrigated plants treated with MeJa.

According to the authors, the 100 micrometer concentration of MeJa may have been excessive for the species, especially under severe drought conditions. Trials with lower doses and different radish varieties are needed. The acidic soil used (pH 5,0) may also have interfered with the results by inducing additional stress.

The results suggest that, although MeJa acts on cellular integrity and antioxidant defenses, its isolated application is not sufficient to protect radishes against severe water deficits.

The research was conducted by Damiana J. Araujo, Vanessa A. Soares, Estephanni FO Dantas, Antônio N. Andrade, Cosma J. Araujo, Daniel S. Gomes, Sabrina K.

Santos, Adriano S. Lopes, José ES
Ribeiro, Valquiria CS Ferreira, Juliane M.
Henschel, Tancredo Souza, Thiago J.
Dias, and Diego S. Batista.

More information at
doi.org/10.3390/plants15030397

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ADM settles and pays \$40 million for accounting irregularities.

Department of Justice closes investigation without further action.

28.01.2026 | 07:08 (UTC -3)

Cultivar Magazine, based on information from Jackie Anderson



ADM announced an agreement with the U.S. Securities and Exchange Commission (SEC) to settle an investigation into

previous disclosures of cross-segment sales in the United States. The settlement provides for a payment of \$40 million, without admission or denial of wrongdoing. The Department of Justice (DOJ) concluded its investigation without taking further action. The decisions end the investigations.

According to the SEC, after becoming aware of the matter, ADM ordered an internal investigation by an external firm, under the direction and supervision of the board's audit committee. The company voluntarily communicated the results to the regulator's technical team.

In March 2024, ADM corrected errors from prior periods. In November 2024, the company republished the 2023 Form 10-K

and the first and second quarter 2024 Forms 10-Q. The revisions addressed errors in historical reporting by segment.

The transactions addressed in the agreement only affected segment-level information. There was no impact on the consolidated balance sheet, earnings, or cash flows for the periods presented in the republished documents.

ADM reported significant changes in financial leadership and internal controls.

The chairman, president, and CEO, Juan Luciano, stated that the company has incorporated lessons learned to strengthen the business. He said that the actions have expanded internal controls and improved the accuracy of financial information. The company reiterated its commitment to

transparency and integrity.

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AGCO has a new Chief Operating Officer.

Júlio Reghelin has over 13 years of experience with the company and a career in agribusiness since 1998.

27.01.2026 | 16:36 (UTC -3)

Cultivar Magazine



Júlio Reghelin (pictured) has taken on a new role at AGCO. With over 13 years of experience at the company, the executive has been promoted to director of

operations.

Before joining AGCO, Reghelin worked at Hauni Maschinenbau AG and John Deere. He holds degrees in Production Engineering from the Federal University of Rio Grande do Sul (UFRGS) and in Mechanical Engineering from Faculdade Horizontina.

With a career in agribusiness that began in 1998, he has accumulated experience in management and production engineering positions, especially in the area of agricultural machinery.

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BASF launches three varieties of Stoneville cotton in the United States.

Materials incorporate Axant Flex technology and focus on plant productivity and health.

27.01.2026 | 14:59 (UTC -3)

Cultivar Magazine, based on information from Pace Sagester



BASF announced the launch of three new varieties of Stoneville brand cotton seeds for the 2026 crop season in the United States. The expanded portfolio targets producers in the Eastern Cotton Belt and the Mid-South region.

The new varieties include Axant Flex technology. The package combines four herbicide tolerances and insect control with three genes through the TwinLink Plus trait.

According to the company, the materials aim to offer greater safety in handling and support for high yields and fiber quality.

The focus is on initial vigor, adaptation to different soil types, and protection against nematodes and diseases.

The ST 4130AXTP variety has an early cycle. The material shows high initial vigor and large seeds. It is recommended for productive soils and areas in the East. The plant exhibits tolerance to root-knot nematodes and reniform nematodes.

The ST 4650AXTP combines an early to medium cycle with high yield potential. The material demonstrates broad adaptability and vigor at the beginning of the cycle.

The genetics include tolerance to root-knot nematodes and resistance to bacterial leaf spot.

The ST 5260AXTP variety has a medium growth cycle and consistent performance in the Mid-South. The plant facilitates height management. The genetic package offers protection against root-knot

nematodes, reniform nematodes, and resistance to bacterial leaf spot.

BASF reported that all product launches incorporate the same set of technologies and traits. The company highlighted that registrations for herbicides specifically for use with Axant Flex are still in process and are subject to regulatory approval.

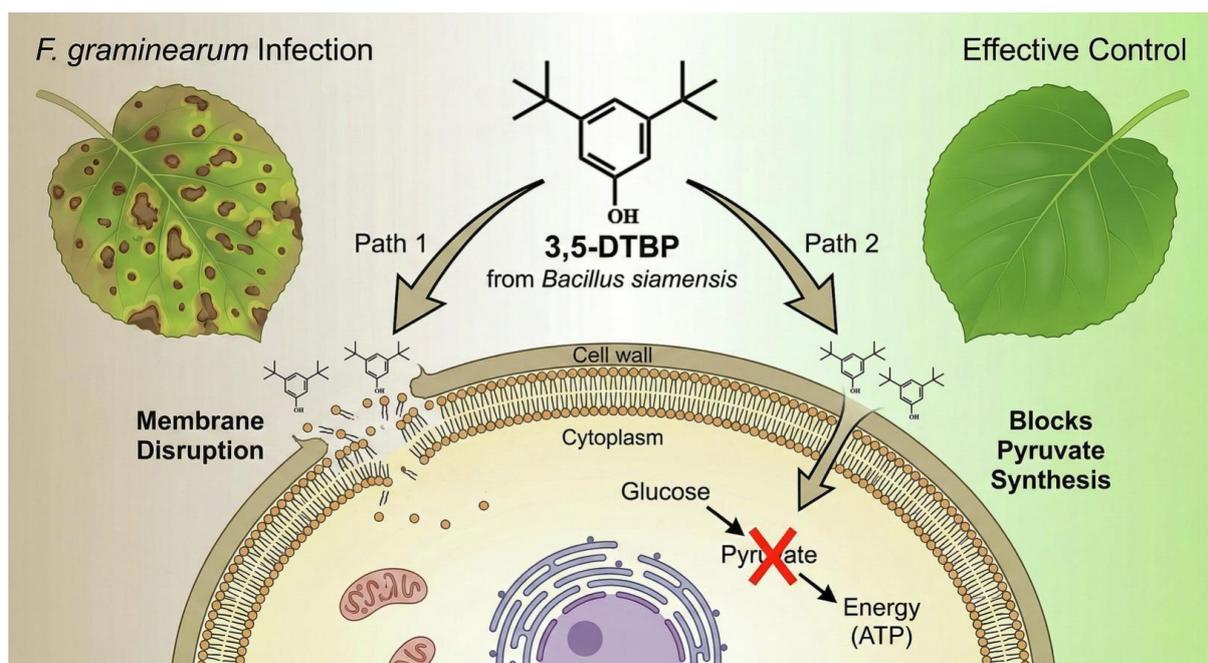
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Bacillus compound controls Fusarium graminearum in kiwi

3,5-di-tert-butylphenol reduces the severity of disease caused by the fungus and shows potential as a biological fungicide.

27.01.2026 | 14:51 (UTC -3)

Cultivar Magazine



doi.org/10.1016/j.pestbp.2026.106979

Chinese researchers have identified an antifungal compound produced by *Bacillus siamensis* capable of controlling kiwi leaf

spot. The metabolite, 3,5-di-tert-butylphenol, acts by disrupting the cell membrane and collapsing the energy metabolism of *Fusarium graminearum*. The study points to the potential for the development of biologically based fungicides.

The work isolated the bacteria. *Bacillus siamensis* BsiaSC07 from the phyllosphere of healthy kiwi leaves. In vitro assays showed antifungal activity against six leaf spot pathogens. *Fusarium graminearum* It showed greater sensitivity. Extraction with ethyl acetate concentrated thermostable compounds with high efficacy.

Analysis by gas chromatography coupled with mass spectrometry identified 3,5-di-tert-butylphenol as the main active

compound. The study records for the first time the production of this molecule by species of the genus *Bacillus*. In culture plates, the compound inhibited the mycelial growth of the pathogen at low concentrations. The average effective concentration for *F. graminearum* It reached 5,32 mg/L.

3,5-di-tert-butylphenol also reduced sporulation and conidia germination. Treated spores showed swelling, deformation, and structural rupture. In detached kiwi leaves, application of the compound reduced the damaged area in a dose-dependent manner. Control efficiency reached 89,08% at the highest concentration tested.

Microscopic and biochemical analyses indicated the mechanism of action. The compound compromised the integrity of the fungal cell membrane. There was a reduction in ergosterol and lecithin, as well as alterations in sphingolipid metabolism. Permeability increased, with leakage of ions, proteins, and nucleic acids.

The study also assessed energy metabolism. Genes linked to the tricarboxylic acid cycle showed repression. Pyruvate, acetyl-CoA, and ATP levels decreased after treatment. Tests with ATP supplementation did not reverse the growth inhibition, indicating that the energy collapse occurred as a secondary effect of membrane destruction.

The study concludes that *Bacillus siamensis* BsiaSC07 and 3,5-di-tert-butylphenol show potential for managing kiwi leaf spot.

Further information at
doi.org/10.1016/j.pestbp.2026.106979

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Rasip projects harvesting 55 tons of apples in the 2026 crop year.

Production represents growth of approximately 30% compared to 2025, with up to 20% of the volume destined for export.

27.01.2026 | 14:17 (UTC -3)

Leonardo Bandeira



Rasip Agro, a unit of RAR Agro & Indústria, projects a harvest of

approximately 55 tons of apples in the 2026 crop year, an increase of approximately 30% compared to 2025, when production totaled 42 tons due to the climatic challenges faced that year. Of the total projected, between 15% and 20% should be destined for the export market, reinforcing the company's presence in the international fruit trade.

The harvest will consist of 75% Gala apples, which includes the Belgala clone, and 25% Fuji apples. According to Celso Zancan, director of Rasip Agro, the Rasip Agro Belgala is an exclusive clone of the company, with an intense red color from the initial stages of development, allowing for greater precision in harvesting and adding value to attributes such as crispness and sweetness. "For this

harvest, the expectation is to strengthen the marketing of this variety in the domestic market," he states.

With approximately 1,5 hectares of orchards located in Vacaria (RS), in the Campos de Cima da Serra region, Rasip Agro maintains a strategy focused on market diversification. In addition to other international destinations, exports are expected to reach countries such as India, Ireland, England, the Netherlands, Portugal, Russia, and Bangladesh. The company is also continuing its expansion strategy into the Middle Eastern market and new markets such as Malaysia, Indonesia, and Taiwan.

According to Sergio Martins Barbosa, CEO of RAR Agro & Indústria, the increase in

production reflects the consolidation of operations over the past few years. “The projection of harvesting approximately 55 tons of apples in the 2026 season confirms the consistent evolution of our operation, a result of investments in technology, management, and genetics. The growth compared to the previous year and the allocation of up to 20% of production for export reinforce the quality of the apples produced in Vacaria and the competitiveness of Rasip Agro in the international market,” he emphasizes.

In addition to productive performance, the 2026 harvest also positively impacts the job market in the region. During the harvest period, the company generates approximately 2.500 formal jobs, contributing to the economic activity of the

Campos de Cima da Serra region.

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Integrated pest management reduces insecticide use in Paraná.

Adopting IPM, Bt cultivars, and biological control reduces applications by up to 50%.

27.01.2026 | 09:13 (UTC -3)

Cultivar Magazine



Photo: Gyorgy Csoka, Hungary Forest Research Institute

Consolidated data from commercial crops in Paraná show an average reduction of 52,8% in the number of insecticide applications over eleven growing seasons. One of the reasons for this is integrated pest management (IPM). The system combines pest monitoring, economic action thresholds, Bt cultivars, biological control, and the rational use of selective insecticides. The conclusions are based on a study conducted by Brazilian, American, and Chinese researchers.

Integrated pest management organizes pest control based on diagnosis. The method requires correct species identification, systematic sampling, and decision-making based on economic action thresholds. Insecticide application occurs only when the pest population

reaches a level capable of causing economic damage. The plant tolerates controlled levels of injury without compromising productivity.

In Paraná, the Integrated Pest Management (IPM) program for soybeans is one of the most consistent in the country. The initiative involves cooperation between federal and state institutions, notably Embrapa Soja and the Paraná Rural Development Institute.

Demonstration areas are monitored weekly throughout the crop cycle. Technicians quantify insects per meter and estimate defoliation. Spraying strictly follows the recommended action thresholds.

Accumulated results

The accumulated results show a significant decrease in the number of applications.

Producers who adopted IPM reduced control costs by an average of 51,6%. This value is equivalent to 117 kilograms of soybeans per hectare. Average productivity increased by 2,8%, with an additional gain of 93,8 kilograms per hectare. Final profit grew by an average of 210,7 kilograms of soybeans per hectare.

Another relevant effect involves the timing of the first application. In areas where IPM (Integrated Pest Management) was adopted, the interval between sowing and initial spraying increased by approximately 37%. This delay favors the conservation of predators and parasitoids. These organisms play a central role in the natural regulation of pest populations.

The use of Bt cultivars reinforces the results of IPM (Integrated Pest Management). In Brazil, the adoption of these varieties reached 94% of the cultivated area in the 2023/24 crop season. The technology expresses proteins of *Bacillus thuringiensis* with high efficiency against lepidopteran pests. Data from Paraná indicate that the isolated adoption of Bt soybeans already reduces spraying. When combined with IPM (Integrated Pest Management), the reduction intensifies. In some harvests, the number of applications fell by more than 70% compared to areas without Bt and without IPM.

Reducing insecticide use does not compromise productivity. Crops with Bt

soybeans showed yields equal to or higher than conventional systems. Control costs also decreased consistently. In areas with Bt and IPM, pest control expenses fell by up to 76% in certain harvests.

Biological control

Biological control completes the strategy. Predators, parasitoids, and entomopathogens act naturally in the soybean agroecosystem. Reducing spraying increases its efficiency. Studies cite high rates of natural mortality in key pests, such as... *Helicoverpa armigera*, soon after its introduction in the country. The bio-inputs market is growing rapidly and is expected to exceed US\$10 billion

by 2027.

Adoption of integrated management

Despite advancements, the adoption of integrated pest management still faces barriers. Some producers are familiar with the concept but do not apply it. In Paraná, less than a third of soybean farmers who claim to know about integrated management actually use it. The fear of production losses and the demand for labor for monitoring explain part of this resistance.

The research was conducted by Adeney de F. Bueno, William W. Hoback, Yelitza C. Colmenarez, Ivair Valmorbida, Weidson

P. Sutil, Lian-Sheng Zang, and Renato J. Horikoshi.

More information at
doi.org/10.3390/plants15030366

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Albaugh Brazil has a new commercial director for the Cerrado-Oeste region.

Willian André Araújo de Oliveira assumes the role and operates from a new headquarters in Cuiabá (MT).

26.01.2026 | 17:20 (UTC -3)

Daniel Friedlander, Cultivar Magazine edition



Albaugh, a global agricultural pesticide company, announced today (January 26th)

the hiring of Willian André Araújo de Oliveira (pictured) as Commercial Director for the Cerrado-West region in Brazil. He will head a new Albaugh headquarters in Cuiabá (MT) and will be responsible for leading commercial strategies in the important regions of Mato Grosso, Rondônia, and northern Mato Grosso do Sul. His role will encompass both Direct Sales and Distribution.

With over 25 years of experience, Willian holds a degree in Agricultural Engineering from the Federal University of Mato Grosso do Sul and an MBA in Marketing from USP. His extensive experience encompasses process optimization, the development of high-performing sales teams, and in-depth knowledge of operations management and market

expansion.

"It is with great enthusiasm that I join Albaugh Brazil. My mission is to expand our presence in the Cerrado-Oeste region, strengthening partnerships and ensuring our clients have access to high-quality, competitive alternatives with the necessary support to help their crops achieve even better results," said the executive.

Albaugh also reported that Jaime Hurtado remains in charge of the Cerrado-Leste Commercial Directorate, responsible for the states of Minas Gerais, Goiás, Pará, Maranhão, Piauí, Tocantins, Bahia, Espírito Santo and Rio de Janeiro, also covering Direct Sales and Distribution.

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Otávio Mamede assumes new directorship at UbyAgro Group.

Executive assumes newly created position to lead Marketing, Innovation and Portfolio.

26.01.2026 | 15:06 (UTC -3)

Suzi Correa



The UbyAgro Group, a Brazilian multinational agribusiness company with

international operations, announces the arrival of **Octavio Mamede** (pictured) as Marketing Director. The position was strategically created for the executive's arrival, a strategic move that reinforces the company's growth and innovation agenda.

With over 15 years of experience in agribusiness, Mamede is an agricultural engineer who has built his career in marketing, sales, portfolio development, innovation, and market access, working for multinational companies such as Arysta LifeScience, Timac Agro, UPL, and Grupo Santa Clara.

Throughout his career, he has led projects focused on positioning agricultural solutions, integrating technical and commercial areas, launching products, and

strengthening brands in the sector, with a focus on technologies applied to productivity, plant physiology, and solutions for the field.

The creation of the directorate reflects the company's decision to anticipate trends, strengthen its Market Access and Portfolio pillars, and promote greater integration between key areas, in line with the transformations in agribusiness and the demands of producers, partners, and channels.

“Agribusiness is undergoing a profound transformation. Our role is to anticipate trends, develop efficient solutions, and contribute to sustainable long-term growth, always connected to the real needs of the market,” says Otávio Mamede, Marketing

Director of the UbyAgro Group.

According to Fabrício Simões, CEO of the UbyAgro Group, “the creation of this position and the addition of Otávio Mamede reinforce our vision for the future, based on operational efficiency, innovation, and proximity to the market. This move is aligned with our sustainable growth plan and the evolution of the group's portfolio.”

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Biological clocks regulate insect herbivory.

Circadian rhythms of plants and insects influence feeding, plant defense, and the efficiency of agricultural strategies.

26.01.2026 | 10:11 (UTC -3)

Cultivar Magazine



Drosophila melanogaster Photo: Paul Langlois, USDA

The circadian clocks of insects and plants play a central role in the timing and intensity of herbivory. This temporal control affects agricultural losses, the efficiency of plant defenses, and the performance of pest management strategies. This finding emerges from a review that analyzes how internal time-marking systems, present in both organisms, modulate plant-insect interactions with a direct impact on agriculture and forestry.

Insects account for a significant portion of global crop losses. Estimates cited in the study indicate that approximately 38% of agricultural losses result from attacks by insectivorous pests, not considering post-harvest damage or pathogen transmission. The intensive use of insecticides has

increased the resistance of target populations and generated side effects on natural enemies and pollinators. In this scenario, understanding when insects feed and when plants activate their defenses becomes practically relevant.

Circadian clocks

Circadian clocks consist of endogenous systems that generate rhythms close to 24 hours. These systems remain active even in the absence of external stimuli, although they adjust to light, temperature, and other environmental signals. In insects, these clocks control locomotion, feeding, oviposition, metabolism, and development. In plants, they regulate growth, photosynthesis, energy metabolism, and

the production of defensive compounds.

The study describes that herbivory rarely occurs randomly throughout the day.

Several insect species exhibit well-defined feeding peaks, often concentrated during the night or specific phases of the light-dark cycle. Lepidoptera, aphids, and other herbivores maintain feeding rhythms even under constant laboratory conditions, indicating internal control and not just an immediate response to the environment.

These feeding patterns are related to the circadian regulation of the insects' digestive system. The release of digestive enzymes, the expression of detoxification genes, and the functioning of the midgut follow daily rhythms. This temporal adjustment improves the efficiency in

utilizing plant food and neutralizing toxic compounds produced by plants.

Circadian clock in plants

From a plant perspective, the circadian clock coordinates metabolic processes linked to defense. The production of phytohormones such as jasmonic acid, ethylene, and salicylic acid varies according to the time of day. These hormones regulate signaling cascades responsible for the synthesis of defensive metabolites, such as alkaloids, glucosinolates, and protease-inhibiting proteins.

The study highlights that plants do not maintain maximum defenses continuously. Activation occurs in a temporally regulated manner, which reduces metabolic costs. In many cases, defense peaks coincide with times of greatest herbivore activity. This alignment results from evolutionary pressures and increases the efficiency of the plant's defense system.

In addition to direct defense, the plant clock regulates the emission of herbivory-induced volatiles. These compounds attract natural enemies of pests, such as parasitoids and predators. The release of volatiles also follows daily patterns and may coincide with periods of greater activity of these biological control agents.

Plants and insects

The interaction between plant and insect clocks therefore defines time windows of greater or lesser vulnerability for the crop. When the rhythms are misaligned, the plant may exhibit less resistance, or the insect may face more intense defenses. This concept is receiving increasing attention due to its applied potential.

The review points to direct implications for pest management. Knowledge of insect feeding times and peak plant defense periods can guide insecticide application, reducing doses and increasing efficiency. Spraying carried out outside the period of greatest pest activity tends to have less effect. Similarly, applications synchronized

with the insect's greatest sensitivity can enhance control.

Chronoculture in the field

The work also mentions the so-called "chronoculture." The concept involves adjusting agricultural practices to the biological clock of crops and pests. This includes the timing of planting, irrigation, fertilization, and chemical or biological control. The approach seeks to reduce environmental impacts and delay the evolution of resistance.

The authors emphasize that most of the evidence still comes from experimental models, such as *Arabidopsis thaliana* and

laboratory insects. Despite this, results in agricultural crops and economically important pests already indicate similar patterns. Translating this knowledge to production systems appears to be a necessary step.

Further information at
doi.org/10.3390/insects17020139

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Polysaccharide gives fluidity to biofilms and accelerates bacterial wilt.

Study shows that *Ralstonia solanacearum* forms biofilms capable of flowing in the xylem.

26.01.2026 | 08:04 (UTC -3)

Cultivar Magazine

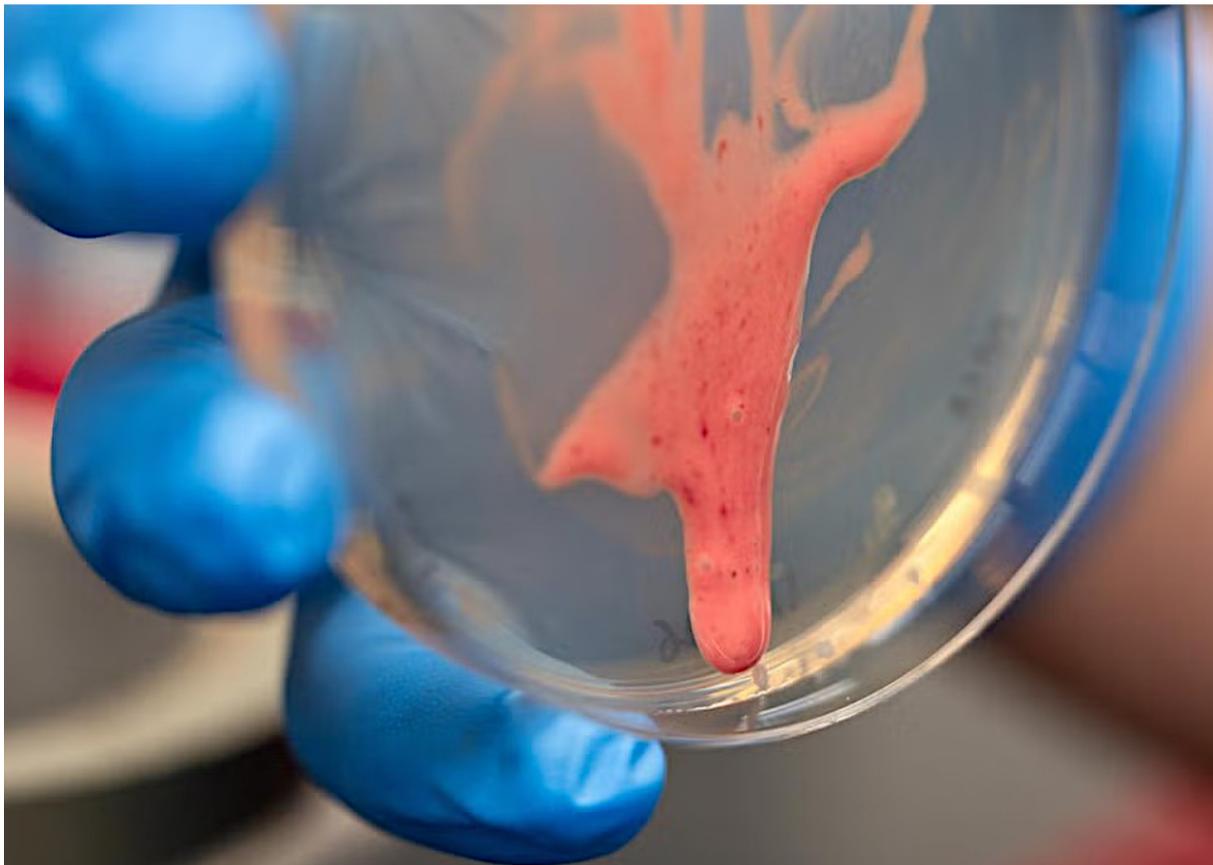


Photo: Jael Mackendorf, UC Davis

Researchers have demonstrated that the extracellular polysaccharide EPS-I transforms biofilms of the complex *Ralstonia solanacearum* in viscoelastic fluids. This characteristic allows for rapid dissemination of the bacteria in the xylem and explains the high aggressiveness of bacterial wilt in various crops.

The team analyzed the mechanical behavior of biofilms using rheometry. The results showed that, unlike classic biofilms, which behave like viscoelastic solids, the bacterium's biofilms exhibit viscous dominance. Under forces similar to sap flow, these biofilms thin and begin to flow.

The effect depends on EPS-I production. Mutants unable to synthesize or export this polysaccharide lost fluidity. These mutants

formed more rigid biofilms, with a greater elastic component, and were unable to move along the xylem.

Plant trials

Plant assays confirmed the role of EPS-I in colonization. In tomato plants, wild-type strains reached greater distances above and below the inoculation point. Mutants lacking EPS-I showed lower incidence in distal stem regions and smaller populations at the infection site.

Experiments in microchannels simulating xylem vessels reinforced the result.

Biofilms with EPS-I occupied a larger area under intermediate flow rates. Under these conditions, the fluidity of the biofilm

avored the collective expansion of the bacteria.

Simple tests on tilted plates revealed the phenomenon. Colonies with EPS-I flowed due to gravity. Colonies without the polysaccharide remained static. The authors called this behavior "biofilm mobility".

Mobility led to improved fitness. On agar, EPS-I-producing colonies occupied a larger area and concentrated up to four times more cells. The metabolic cost of producing the polysaccharide was offset by greater access to water and nutrients.

Genomic analyses

Genomic analyses indicated that the set of eps genes appears only in the complex.

Ralstonia solanacearum Other species of the genus, isolated from soil, water, or clinical settings, did not exhibit the biofilm trait or mobility. The origin of EPS-I coincided with the evolutionary emergence of bacterial wilt.

The researchers conclude that the fluidity of the biofilm represents a key virulence innovation. EPS-I allows the bacteria to passively spread through the vessels, at a rate of centimeters per day. This mechanism helps explain how quickly plants wilt after infection.

More information at

doi.org/10.1073/pnas.2512757123

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Abag warns of the effects of the review of the Mercosur-EU Agreement.

Referral to the European Supreme Court delays gains and weakens cooperation between the blocs.

23.01.2026 | 15:44 (UTC -3)

Cultivar Magazine, based on information from Enio Campoi



The Brazilian Agribusiness Association (Abag) expressed concern about the

referral of the review of the Mercosur-European Union Agreement by the European Parliament to the European Supreme Court. According to the organization, the decision represents a setback after more than 26 years of negotiations, in addition to technical and legal assessments already completed throughout the process.

According to Abag, the move reduces the Agreement's potential to contribute to international trade based on rules, predictability, and cooperation between blocs, especially in a global scenario marked by high economic and geopolitical volatility.

The organization believes that the measure delays concrete economic

benefits and limits the capacity for a joint response from Mercosur and the European Union in the face of growing international uncertainties. Furthermore, in the association's view, this course of action does not strengthen multilateralism and weakens the European project itself of shared responsibilities and the construction of joint sovereignty.

For Abag, the integration between the two blocs is strategic for expanding markets, generating value, and strengthening production chains. The organization advocates for a technical and pragmatic approach to the process, focusing on concluding the Agreement and reducing the uncertainties that currently limit decisions in the international market.

The association also hopes that stakeholders in favor of the Agreement will find ways to accelerate its implementation, for the benefit of consumers and citizens of both continents, and affirms that it will continue to actively contribute to solutions built through dialogue.

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*The Cultivar Semanal magazine is a technical and scientific publication focused on agriculture in Brazil.
It was designed to be read on mobile phones.
It is published on Saturdays.*

Grupo Cultivar de Publicações Ltda.

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