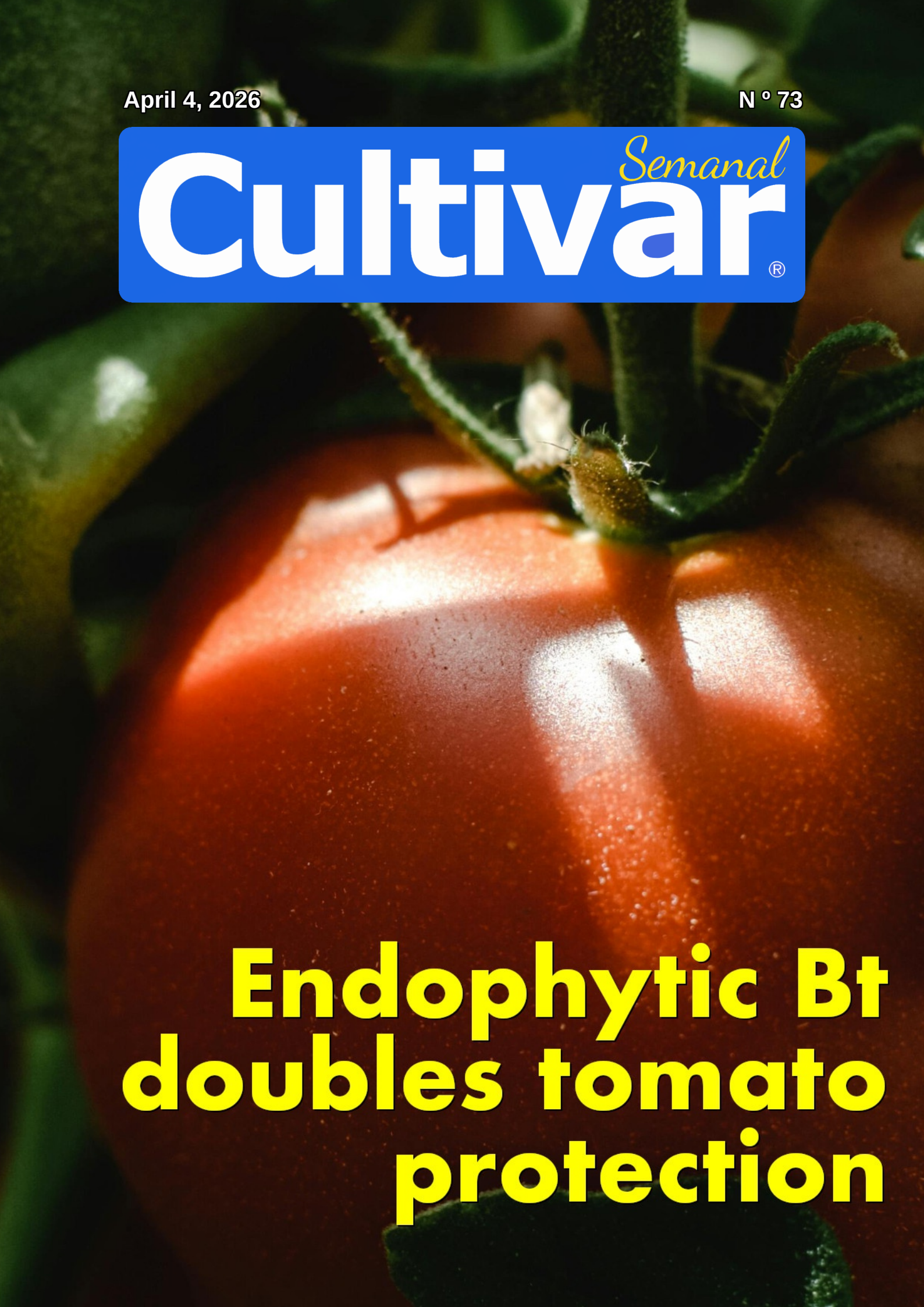
April 4, 2026 N º 73

Cultivar Semanal ®



Endophytic Bt doubles tomato protection

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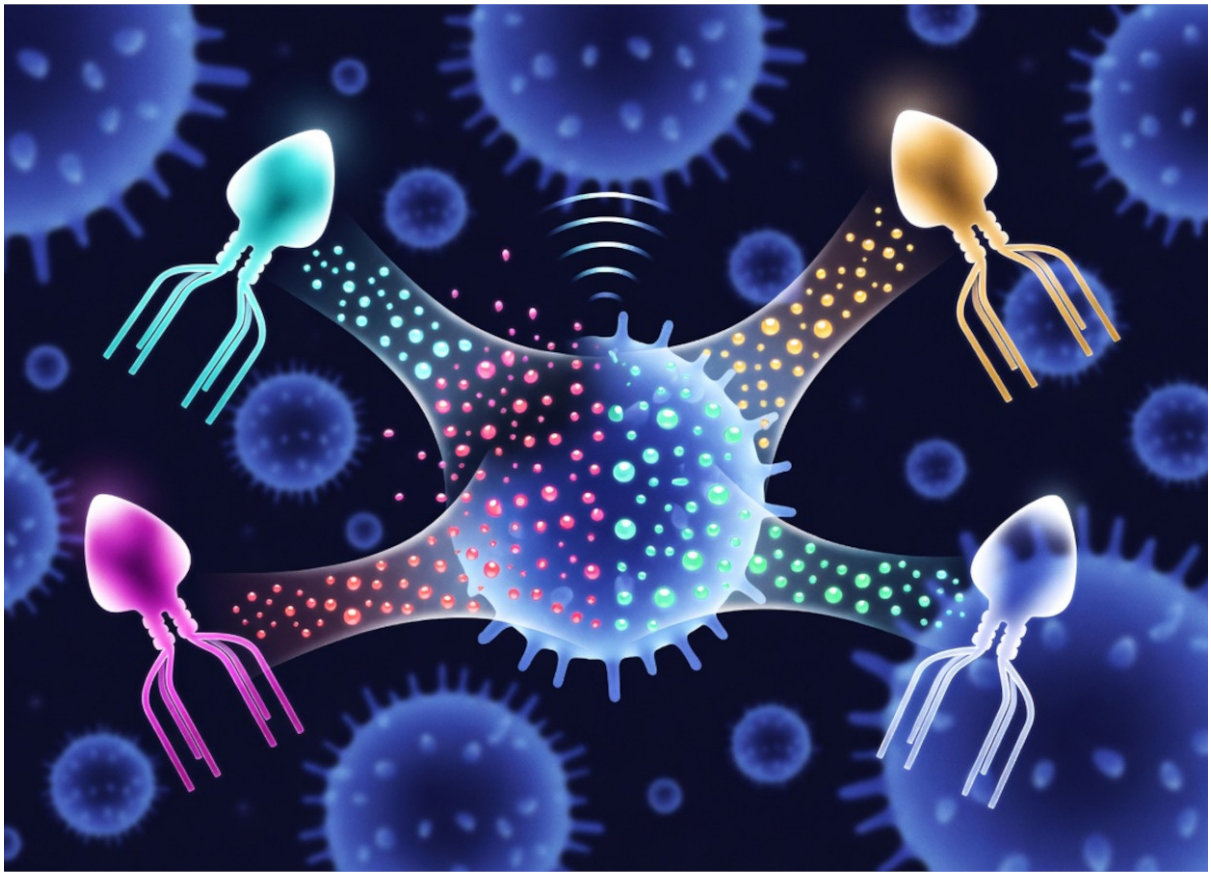
Bacterial viruses manipulate infection decisions among themselves

Chemical signals between bacteriophages alter the balance between lysis and lysogeny and favor some viruses.

03.04.2026 | 12:54 (UTC -3)

Schubert Peter, Cultivar Magazine



Bacteriophages (phages) that infect bacteria use chemical signals to influence the behavior of other viruses in the same environment. A recent study shows an interaction between distinct communication systems. The result alters decisions between lysis and lysogeny. The mechanism favors emitting bacteriophages and imposes costs on receptors.

Researchers analyzed bacteriophages with an arbitrium system, based on signaling peptides. These compounds indicate host availability. Low concentrations stimulate lysis, while high concentrations lead to lysogeny. The study demonstrated frequent exposure to non-cognate signals produced by other phages present in the same host or environment.

Common coexistence

Data indicate the common coexistence of multiple prophages in bacterial genomes. Approximately 35% of the genomes evaluated carry two arbitrium systems. Some cases present up to eight. This overlap creates a favorable environment for signal interference.

Experiments with synthetic peptides confirmed cross-response. The Phi3T model bacteriophage reacted not only to its SAIRGA signal, but also to four other similar peptides. This interaction reduced virulence and increased the frequency of lysogeny. The effect occurred through direct binding to the AimR receptor.

Tests with different phages revealed a broad pattern of crosstalk. Some systems responded to multiple signals. Others showed high specificity. Interactions occurred bidirectionally or unilaterally. In certain cases, one phage influences another without reciprocity.

Ecological impact

Tests with conditioned media showed a direct ecological impact. Signals produced by a bacteriophage altered subsequent infections. Receptor phages began to adopt lysogeny earlier. Simultaneous co-infections confirmed the pattern. The presence of an emitting phage increased the lysogeny rate of another in the same culture.

Experiments with lysogens indicated an additional effect. A resident prophage produced signals capable of influencing invading phages. The result increased the formation of polylysogens. This process reduces the risk of lysis of the host cell.

Structural analysis explained part of the specificity. Interactions between peptides and receptors depend on fine-tuning in molecular structure. Small differences in amino acids alter affinity. This allows for the recognition of similar signals. It also limits interaction with divergent peptides.

Competitive Landscape

The results indicate a competitive scenario among viruses. Emitter bacteriophages

can manipulate rivals. They induce early lysogeny in competitors. This reduces the replication of these viruses. At the same time, it preserves the host for the emitter.

The study suggests evolutionary pressure on arbitrary systems. Interference between signals can create disadvantages. This favors the evolution of new signal-receptor pairs. Horizontal gene exchange contributes to the observed diversity.

Further information at doi.org/10.1016/j.cell.2026.02.020

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Endophytic Bt expands caterpillar control in tomatoes

Systemic colonization reduces survival and increases the effectiveness of bioinsecticides.

03.04.2026 | 01:32 (UTC -3)

Schubert Peter, Cultivar Magazine

Photo: Eva Bronzini, pexels

The use ofBacillus thuringiensis (Bt) how endophytes in tomatoes enhance control of *Spodoptera littoralis*. A recent study demonstrated systemic colonization of the plant, reduced larval survival, and increased effectiveness of foliar applications of the bioinsecticide.

Researchers inoculated tomato plants with a Bt isolate from a commercial formulation. The drench method in seedlings ensured colonization in roots, stems, and leaves. Spores showed greater efficiency. Colonization reached 100% of the tissues with this type of inoculum.

Evaluation with insects

In the insect evaluation, neonate larvae fed with colonized leaves showed a sharp reduction in survival. Only 45% reached the third instar. Surviving larvae completed the cycle, but showed shorter adult lifespan and lower fecundity. There was also a reduction in pupal survival.

Histological analyses showed damage to the midgut. There was epithelial rupture, loss of microvilli, and mitochondrial disorganization. The pattern coincides with the action of Cry and Vip toxins.

Consumption of colonized tissue led to the active presence of Bt in the larvae's intestines. This effect altered cellular immunity. There was a reduction in nodulation and phagocytosis. The number of hemocytes did not vary.

Susceptibility to bioinsecticide

The altered immune response increased susceptibility to the bioinsecticide. Foliar applications at sublethal doses caused near 100% mortality in young caterpillars fed on colonized plants. There was a sharp drop in survival after five days.

The effect also occurred in more advanced instars. These stages usually show low sensitivity to Bt in isolated sprays.

Integrated strategy

The researchers propose an integrated strategy. The management combines soil inoculation in seedlings with subsequent

foliar applications. The system promotes dual action: Bt acts inside the plant and on the leaf surface.

The results indicate a new avenue for integrated management programs. Field studies are still needed to validate colonization stability and agronomic efficiency under different environmental conditions.

Further information at doi.org/10.1002/ps.70771

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Agricultural Market - April 3, 2026

Geopolitical tension raises costs and puts pressure on agricultural inputs.

03.04.2026 | 01:10 (UTC -3)

Vlamir Brandalizze - @brandalizzeconsulting

The international market is experiencing a new escalation of geopolitical tension and a direct impact on energy and agricultural

inputs. Recent statements by Donald Trump have increased the risk of conflict with Iran. Oil reacted with a sharp rise. The WTI barrel surpasses US$110. Brent reaches US$115. This movement puts pressure on fertilizer costs and increases the risk of global shortages.

The fertilizer sector is facing a critical scenario. Russia and China are signaling restrictions or suspension of exports. Urea has already accumulated a price increase of nearly 70%. Producers need to anticipate purchases to guarantee supply for the next harvest. Product availability emerges as the main risk in the short term.

In the agricultural market, Chicago shows slight support. Soybeans are trading between 1150 and 1190 points. The May

contract is trading above 1170. The July contract is exceeding 1180. The market awaits trade agreements between the United States and China. An agreement could unlock volumes close to 20 million tons from the old crop and up to 25 million tons from the new crop.

The weather in the Northern Hemisphere is a concern. Winter continues unabated. Snowstorms are affecting the United States and Eastern Europe. Corn planting is progressing behind schedule. Winter wheat is showing germination failures. The scenario indicates support for agricultural prices in the medium term.

In South America, production is proceeding normally. Paraguay is reaching approximately 10,7 million tons. Argentina

projects 48,5 million tons. In Brazil, the soybean harvest has reached 82%. Mato Grosso leads with 99%. Rio Grande do Sul is progressing slowly, with about 25%. National production could reach between 176 and 180 million tons.

Sales in Brazil remain delayed. Only 51% of the harvest has been traded. Producers still hold approximately 87 million tons. The need for cash is expected to put pressure on sales in April.

Corn situation

Corn shows positive fundamentals. Global demand is growing. Brazil is increasing consumption through ethanol and animal feed. Planting in the United States is

delayed due to cold weather. The planted area is expected to decrease compared to the previous year. The Brazilian second corn crop is expected to reach approximately 105 million tons, below the previous record.

Sorghum situation

Sorghum is gaining ground. The area under cultivation could reach 2,2 million hectares. Production could reach 7,5 million tons. Demand is growing with the expansion of ethanol and animal feed production.

Wheat situation

Wheat prices remain high. Chicago is trading above US$6 per bushel. In Brazil, prices are rising due to high import costs. The planted area may decrease due to high costs and the negative results of the previous harvest.

Rice situation

Rice prices remain firm even with the harvest underway. In Rio Grande do Sul, 50% of the area has been harvested. Productivity shows good performance. Prices rose in March, reflecting lower supply compared to the previous cycle.

Bean situation

Beans are also experiencing limited supply. The first harvest fell to around 800 tons. The market is maintaining high prices. The second harvest indicates a further decline in production.

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Sindiveg announces new board of directors for the 2026-2029 term

The Board of Directors is now chaired by Antonio Mauricio Haddad Marques.

02.04.2026 | 17:17 (UTC -3)

Wellington Torres

The National Union of the Plant Protection Products Industry (Sindiveg) announces the composition of its new board of directors for the period 2026 to 2029. The

new management assumes the position with a commitment to strengthening the institutional representation of the sector, based on statistical data and scientific support, as well as encouraging the adoption of good practices for the safe and responsible use of pesticides.

The Board of Directors is now chaired by Antonio Mauricio Haddad Marques (pictured), from Bequisa, with Júlio Borges Garcia, from Ihara, as vice-chairman. Also on the board are Cristiano Campos de Figueiredo, from UPL, as 1st director; Alexandre Gobbi, from Sipcam Nichino Brasil, as 2nd director; Humberto Amaral, from Nortox, as 3rd director; and Thaís Balbão Clemente Bueno de Oliveira, from Ourofino Química, as 4th director. The alternate members are Andrey Gyorgy

Filgueira de Araújo, from Adama, and Luis Henrique Rahmeier, from Sumitomo.

In addition to the Council, they make up the Executive Board of the entity along with Sebastian Luth, from Helm do Brasil; Bertrand Jean Marie Desbrosses, from Gowan Produtos Agricolas; and Renato Francischelli, from Ascenza Agro.

The Fiscal Council is composed of Luis Carlos Cerresi, from UPL; Massaki Hassuike, from ISK Biosciences of Brazil; and Leandro Alves Martins, from Sipcam Nichino Brasil, with Sergio Watanabe, from Ihara, and Carlos Henrique Zago, from Adama, as alternates. As delegates representing the Federation of Industries of the State of São Paulo (FIESP), Sindiveg has João Sereno Lammel, from Ihara, as the principal representative, and

Imero Padula, from Oxiquimica, as the alternate.

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UPL appoints Cristiano Figueiredo as new CEO in Brazil

Executive with 25 years of experience replaces Rogério Castro following company expansion cycle.

02.04.2026 | 14:18 (UTC -3)

Rafael Iglesias, Cultivar Magazine edition

UPL announced the appointment of Cristiano Figueiredo (pictured) as the new CEO in Brazil. The executive replaces

Rogério Castro, who is leaving the leadership of the operation after leading a period of growth and consolidation for the company in the country.

An agricultural engineer, Figueiredo has been with UPL since 2018 and, most recently, held the position of Chief Commercial Officer (CCO), being responsible for the commercial area. With over 25 years of experience in agribusiness, the executive has worked in multinational companies and led projects in the areas of marketing, sales, and company integration after acquisitions.

The succession occurs at a strategic moment for the company, which has been expanding its operations in innovation and solutions for the agricultural sector. In the

last fiscal year (April 2025 to March 2026), UPL launched eight new technologies on the market, reinforcing its agenda focused on sustainable agriculture.

“Brazil is UPL’s main global market, and I assume this position with the commitment to accelerate the innovation agenda and strengthen partnerships to support rural producers,” Figueiredo stated in a press release.

Rogério Castro is leaving the company after an 18-year career, which began even before DVA was acquired by UPL in 2011. During his tenure, the company increased investments in technology, expanded its portfolio, and recorded significant growth in the Brazilian market.

According to UPL, the transition was planned as part of the company's global strategy and seeks to ensure continuity for ongoing initiatives, focusing on innovation, proximity to producers, and business expansion in the country.

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High humidity alters plant defenses against bacteria

Study reveals role of ABA and CYP707A3 gene in competition for leaf water.

02.04.2026 | 02:52 (UTC -3)

Schubert Peter, Cultivar Magazine

Symptoms of the disease on leaves of *Arabidopsis thaliana* infected with the pathogenic bacteria *Pseudomonas syringae* p.v. *tomato* (Pst). After infection, the plants were kept for three days under moderate humidity (left) or high humidity (right), showing more severe disease under high humidity - Photo Shigetaka Yasuda

High humidity modulates the interaction between plants and bacterial pathogens by altering the hormonal balance and water availability in the leaves. A recent study demonstrates a reduction in abscisic acid (ABA) mediated by the CYP707A3 gene as a central factor in limiting bacterial infection.

Researchers observed increased expression of CYP707A3 in leaves under high humidity. This process induces ABA degradation. The reduction of the hormone promotes stomatal opening. This opening limits the formation of lesions with water accumulation in the apoplast, a condition essential for bacterial multiplication.

The work used Arabidopsis thaliana as a model, plants exposed to high humidity

showed a rapid drop in ABA levels within two hours. Mutants lacking CYP707A3 maintained elevated hormone levels. These materials exhibited a higher incidence of "water-soaking" and increased bacterial growth.

Stoma opening

Stomatal opening acts as a key mechanism. Strains with constitutive opening drastically reduced water accumulation and bacterial proliferation, even in the absence of CYP707A3. The result indicates a direct link between stomatal regulation and resistance to infection.

The study also identified calcium-dependent signaling as an initial step in the process. High humidity rapidly increased cytosolic Ca2+ in leaf cells. Ion channels CNGC2 and CNGC4, with the participation of CNGC9, mediated this response. The increase in Ca2+ activated the transcription factor CAMTA3, responsible for inducing CYP707A3.

Genetic reprogramming

Transcriptomic analysis revealed extensive gene reprogramming under high humidity. More than 2 genes showed altered expression. CAMTA binding motifs appeared enriched in genes induced early. The result reinforces the central role of this regulator in the response to a humid

environment.

Bacterial pathogens, however, interfere with this mechanism. The bacteria *Pseudomonas syringae* pv *tomato* DC3000 utilizes effectors of the type III secretion system to suppress the induction of CYP707A3. Among them, AvrPtoB plays a relevant role. This effector blocks the reduction of ABA and promotes water accumulation in leaf tissue.

Furthermore, the pathogen stimulates ABA biosynthesis by inducing genes such as NCED3. The combined effect maintains elevated hormone levels, promotes functional stomatal closure, and intensifies the environment favorable to infection.

Results indicate direct competition between plant and bacteria for control of

leaf water. The plant activates pathways that reduce ABA and hinder water accumulation. The pathogen induces opposite pathways to increase water availability in the apoplast.

More information at doi.org/10.1038/s41467-025-67469-y

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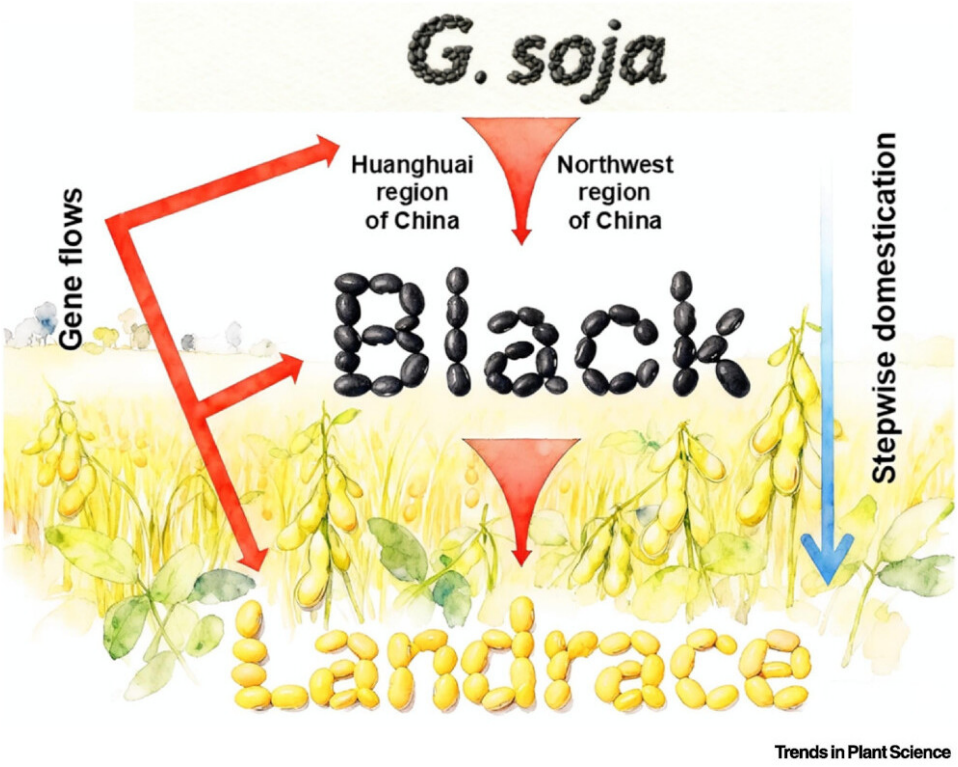
Genomic atlas redefines soybean domestication

Study highlights the role of black soybeans and indicates two centers of origin in China.

02.04.2026 | 02:32 (UTC -3)

Schubert Peter, Cultivar Magazine



The domestication of soybeans has gained new interpretation after genomic analysis of 8.105 accessions. The study identifies

black-seeded soybeans as an intermediate stage between wild forms and modern cultivars. The work also points to two independent centers of domestication in China. The results indicate new avenues for genetic improvement.

Wild soybean (*Glycine soy*) gave rise to cultivated soybeans (*Glycinemax*) through a gradual process. The analysis reveals a step-by-step trajectory: wild forms, black soybeans, then yellow-seeded cultivars. Black soybeans show greater genetic proximity to wild materials. The fixation index confirms this relationship, with lower values ??compared to modern cultivars.

The study identifies 135 regions under selection during the transition from wild to black soybean. The next stage, with the

formation of local varieties, involves 486 selected regions. Initial characteristics include seed size, cycle, and pod dehiscence. Oil and protein content were also included in the initial selection. Later stages prioritize seed coat color, dormancy, and permeability.

Continuous selection

Genes such as E4 and GmSHAT1-5 show continuous selection throughout the process. These loci indicate progressive adjustment of agronomic traits. The analysis also reveals selection of similar genes in different countries. Each region uses distinct haplotypes. This pattern suggests local adaptation.

The geographic origin of cultivated soybeans involves two centers in China. One center is located in the Huanghuai Plain. The other center is located in the northwest of the country. Each region harbors distinct genetic lineages derived from black soybeans. Genetic divergence between groups remains low. Even so, genes linked to seed size, flowering, and stress tolerance show differentiation.

Gene flow occurs between wild populations, black soybeans, local varieties, and modern cultivars. This genetic exchange indicates parallel domestication followed by recombination. The model reinforces multiple origins rather than a single event.

The study also describes changes in selection goals throughout the breeding process. Early phases prioritize protein. Modern programs begin to prioritize oil and productivity. This shift reflects market demand and industrial use.

Functional variants

Scientists present a library with 92 functional variants. These markers influence traits such as seed size, stress resistance, and composition. Examples include GmCYP78A70, associated with size, and SoyWRKY15a, linked to resistance.

The analysis points to a side effect of selection for yellow seed coat. The

process reduced favorable haplotypes at linked loci, such as Rhg4. This gene contributes to resistance against soybean cyst nematodes. This genetic loss limits the crop's defense.

The results indicate potential for introgression of black soybean alleles. This strategy can recover lost variability. It can also increase resilience to stress. The integrated use of genomic and phenotypic data tends to amplify gains.

Artificial intelligence

The genomic atlas provides a basis for the use of artificial intelligence in breeding. Models can integrate environmental, genetic, and phenotypic data. This

approach allows for more precise selection for complex traits.

The study also hypothesizes about the selection of root characteristics. Domestication may have influenced root architecture and interaction with nitrogen-fixing bacteria.

Further information at doi.org/10.1016/j.tplants.2025.11.011

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Nanoscale gold reduces anthracnose

Study points to antifungal action of metal nanoparticles and enhanced immune response in plants.

01.04.2026 | 03:08 (UTC -3)

Schubert Peter, Cultivar Magazine

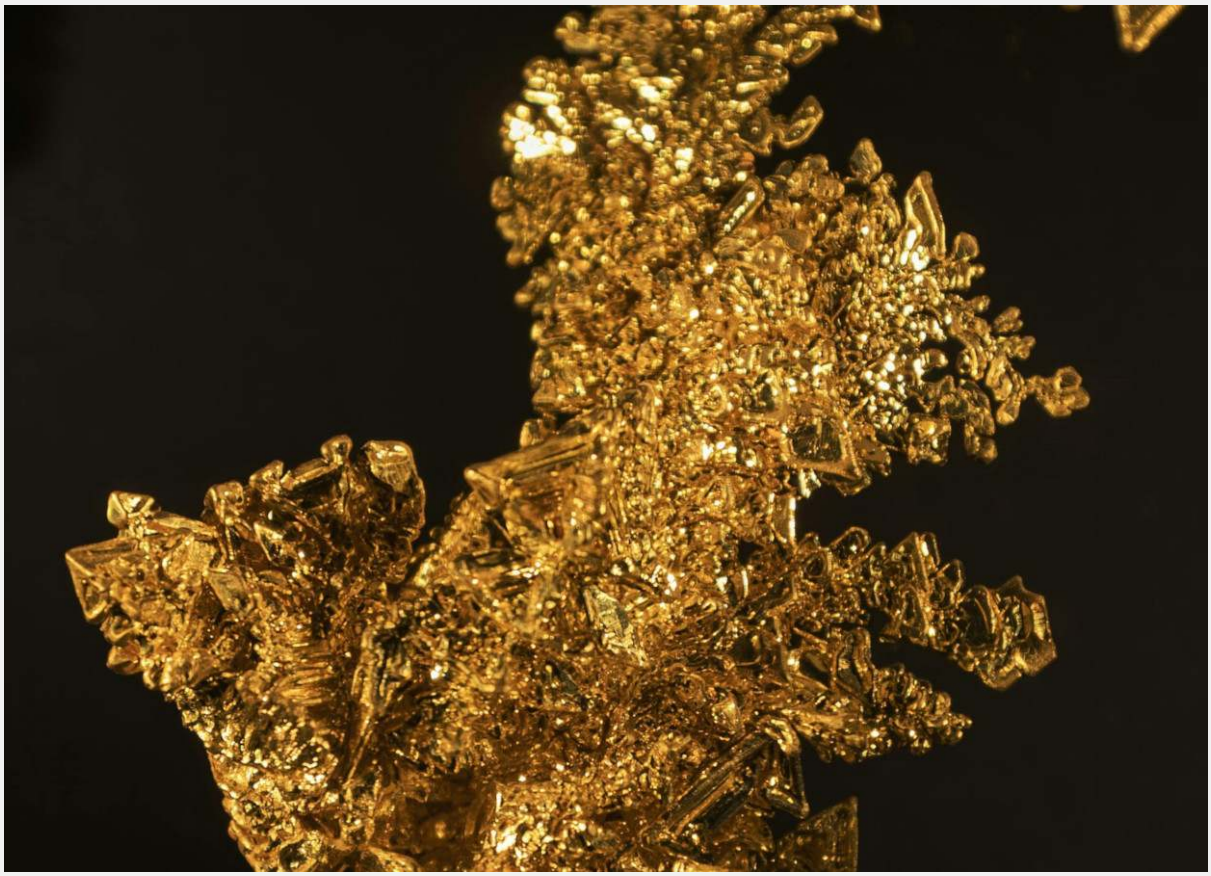

Photo: Matheus Bertelli

Gold nanoparticles have advanced the control of anthracnose in peppers and

enhanced the plant's defense mechanisms, according to a study with *Colletotrichum gloeosporioides*. A dose of 75 mg/L inhibited mycelial growth of the fungus by 61% and reduced spore germination by 25%.

The treatment also increased the membrane permeability of the pathogen. In tests with detached fruits, the incidence of the disease fell to 21%. In fruits attached to the plant, the rate decreased to 17%.

In addition to the direct effect on the fungus, the gold nanoparticles favored the physiology of the culture. The study recorded an increase in the levels of total phenols, chlorophyll, free amino acids, and glycine betaine.

The authors also observed gains in nutrient absorption and translocation. There was an increase in the concentrations of phosphorus, nitrogen, zinc, and potassium in roots, leaves, and fruits. This result may be linked to the modulation of root physiology.

In the molecular response, the gold nanoparticles activated genes linked to defense and transcription factors. This movement increased the plant's resilience during infection.

The study highlights a dual function for Au-NPs. The technology combines antifungal action with enhanced growth, nutrition, and immunity. According to the authors, this performance positions the material as a superior and more sustainable alternative

to traditional approaches using silver nanoparticles in disease management.

Further information at doi.org/10.1002/ps.70768

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Living fences increase insect biomass in agricultural areas

Perennial structures outcompete floral bands and double biomass at crop edges.

01.04.2026 | 02:51 (UTC -3)

Cultivar Magazine

Photo: Radboud University

Living fences increase insect biomass in agricultural areas, even in landscapes with a high presence of natural habitat. Research conducted by Robin Lexmond of Radboud University measured an increase of more than two times in borders with these structures.

The study assessed 24 field and pasture edges in the Waal River region, between Ooijpolder and Duffelt, in the Netherlands. Malaise-type traps captured insects for three years. Researchers weighed the collected material to estimate biomass.

Results showed an average of 0,231 grams per hour in areas with hedges. Locations without natural elements recorded 0,105 grams per hour. Floral strips showed an intermediate value, with

0,150 grams per hour.

Permanent structure

Living fences maintain a permanent structure. They offer shelter, food, and breeding sites throughout the year. Floral strips undergo annual soil preparation. This management reduces shelter in winter and limits the early availability of resources. Variability in floral strips occurred throughout the seasons. Part of the areas received annual tillage. This factor compromises the cycles of insects associated with the soil or remaining vegetation.

The study incorporated climatic and seasonal variables into the statistical

model. Temperature and time of year influence flight activity and capture. The analysis considered biomass per hour to standardize differences between collections.

Local factors

Local factors had a limited impact. The height of vegetation near the trap had a negative effect. Management practices, such as the use of fertilizers, manure, or pesticides, did not show a significant direct effect on biomass.

Landscape scale showed reduced influence. The percentage of agricultural area within a 500-meter radius reduced biomass. Protected natural areas

increased values ??at different spatial scales.

Even in highly complex landscapes, hedges maintained a consistently positive effect. The presence of this local element determined much of the observed variation.

The study indicates the relevance of perennial structures in insect recovery. Increased biomass contributes to pollination and biological control. Each additional meter of hedge expands the availability of functional habitat in the agricultural landscape.

Further information can be found at doi.org/10.1016/j.baae.2026.03.004

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Technical training takes on an immersive format at AGCO

Smart glasses allow you to monitor operations in real time.

31.03.2026 | 10:45 (UTC -3)

Flavia Amarante, Cultivar Magazine edition

AGCO is changing the way it trains mechanics and technicians in its dealer network for the Massey Ferguson, Valtra, and Fendt brands. The company has

implemented the use of the SmartGlass RealWear Navigator 500, an Assistive Reality device that breaks down the barriers of distance learning, providing the same experience as an in-person class.

The technology works as follows: while the instructor is physically present at the machinery performing real procedures, the students, who are the technicians, follow each movement in real time via videoconference.

“Until recently, online teaching was limited to slides and recorded videos, which made engagement difficult. Now, the instructor uses the glasses to transmit their exact vision to the students. It's like catching a 'visual ride' in the instructor's eyes,” explains Vitor Kaminski, technical training

manager at AGCO. The executive also emphasizes that the company intends to expand the use of this technology to customer service and interaction with its brands.

Unlike conventional filming, the smart glasses are operated 100% by voice commands, leaving the instructor's hands completely free to operate tractors, connect implements, or install measuring instruments. “The fit is comfortable and very secure, allowing access to any point on the tractor. I was able to perform my tasks naturally, without worrying about the SmartGlass falling off my head. All activities were carried out safely because I always had both hands available,” explains Wagner Leite, the instructor responsible for the tests.

Marcelo da Silva Schuler, a technician at the Polisul dealership (Fendt) with approximately 20 years of experience with AGCO products, participated in the tests and highlighted the change in perspective: “I found it very interesting, a great tool, because it seems that when the instructor is operating, the technician is seeing with their own eyes, so the visual perception is much better. Of all the training I've participated in over all these years at AGCO, this one was very different.” According to the technician, because the instructor focuses exactly on what they want to show, the real-time transmission is extremely efficient.

The agricultural environment demands robustness; therefore, the device offers extreme resistance, being drop-proof,

dustproof, and waterproof, maintaining its functionality even under intense heat of up to 50°C. To ensure clear communication amidst the noise of the machines, the system has four microphones that provide unparalleled noise cancellation, allowing the instructor's voice to be heard clearly even with the tractor engine running at high RPM. Image quality is guaranteed by a modular camera with a 48 MP sensor, capable of transmitting sharp details of electrical components and hydraulic diagrams even in low-light environments.

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Fendt bets on an engine compatible with biofuel

The equipment operates on HVO100 and expands options beyond conventional diesel.

31.03.2026 | 08:23 (UTC -3)

Beatriz Voltani

Fendt has announced the arrival of the new AGCO Power Core 80 engine to the Brazilian agricultural sector. Winner of the 2026 Diesel Engine of the Year award –

one of the most respected in the industry, recognizing revolutionary innovations in propulsion systems for off-road vehicles – the engine, developed and manufactured in Linnavuori, Finland, represents the most advanced technology in AGCO Power's new Core engine family.

Featured in the new Fendt 800 Vario Gen5 tractor series, recently launched in Brazil by Fendt, it is certified to operate with HVO100 diesel (Hydrohydrated Vegetable Oil), known as "green diesel" and derived from vegetable oils and animal fat, significantly reducing CO? emissions and the carbon footprint in agribusiness.

“Working with alternative fuels is extremely important for agribusiness today. Besides being more sustainable, it's an efficient

solution for the energy transition in the field. Designed to allow the use of these fuels, the Core engine platform promotes versatility in equipment power and an advanced system for controlling greenhouse gas emissions," highlights Fernando Silva, commercial coordinator at AGCO Power.

The Core80 is the largest in the Core engine family. It offers 15% more torque and 12% more power than the also award-winning Core75. Furthermore, it has 25% fewer parts – ensuring its robustness and reduced vibration – and is the first engine in the Core family to feature an engine brake that saves fuel, improving machine uptime and operational economy.

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Drosophila suzukii resistance to pyrethroids persists without pressure

Study indicates resistance stabilizes after insecticide withdrawal and increases after population bottleneck.

31.03.2026 | 01:16 (UTC -3)

Schubert Peter, Cultivar Magazine

Photo: Hannah Burrack, North Carolina State University

The resistance of populations of Drosophila suzukii resistance to the insecticide zeta-cypermethrin remains stable even after the removal of selection pressure. This phenomenon may intensify after population bottleneck events. The results come from a study conducted in California with field populations.

The study evaluated the stability of resistance across generations under continuous selection and after discontinuation of insecticide use. The research also simulated a population bottleneck with increased dosage. The analysis used dose-response bioassays and LC50 estimates.

Populations collected in the field showed high initial tolerance. The LC50 of the

susceptible population was 1,57 ppm. The initially resistant population registered 8,11 ppm. After continuous selection, the values ??reached 54,03 ppm. After pressure removal for 16 generations, the LC50 remained at a high level, at 40,51 ppm.

Adaptive cost

The results indicate the maintenance of resistance without a significant adaptive cost during the evaluated period. The absence of a reduction in mortality after discontinuation of insecticide treatment suggests the persistence of the resistant phenotype.

Population bottleneck

The study also evaluated a population bottleneck scenario. Researchers applied a higher dose to drastically reduce the number of individuals. After population recovery and resumption of exposure, resistance increased. Mortality fell from 27,2% before the bottleneck to 5,73% after recovery.

Statistical analysis indicated a higher probability of survival after the bottleneck. The dose response ceased to follow a concentration-dependent pattern. This behavior suggests selection of highly tolerant individuals.

The experiment simulated common field conditions. Successive applications of insecticides can reduce populations and favor survivors with greater tolerance.

These individuals repopulate the area and increase the level of resistance.

The data reinforce the risk to temperate climate fruit production systems. The pest attacks ripe fruit and requires frequent chemical control. The persistence of resistance may compromise the effectiveness of pyrethroids.

More information at doi.org/10.1002/ps.70760

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Case IH expands its operations in Uruguay during Expoactiva

The company is showcasing its portfolio of machines and technologies at the event considered the main meeting point for the sector in the country.

30.03.2026 | 14:08 (UTC -3)

Cultivar Magazine, based on information from María Micaela Albónico

Case IH reinforced its presence in Uruguay by participating in Expoactiva

Nacional, the country's main agro-industrial fair, held in Palmitas. The brand was represented by the dealership Pertilco SA, which presented solutions in agricultural machinery and technologies focused on digital agriculture to the public.

Considered the main event for the sector in Uruguay, it annually brings together rural producers from various regions, with a focus on rainfed farming systems. During the fair, the dealership had a 2.880 m² stand where it displayed part of its equipment portfolio, including harvesters, tractors, sprayers, and agricultural implements.

According to Pertilco's director, Fermín Laffitte, participation in the fair is strategic for building relationships with the

production sector. "Expoactiva is an opportunity for direct contact with producers from all over the country and to present solutions aligned with the demands of the field," he stated.

In addition to the machinery, the booth featured a space dedicated to digital agriculture, with demonstrations of connectivity solutions for equipment management and supporting decision-making in the field. The company also highlighted the advancement of digitalization in the agricultural sector and the expansion of technical support services through its dealer network.

Another focus was the provision of financing, with CNH Capital initiatives aimed at facilitating producers' access to

machinery and technologies.

With the theme "Cultivate opportunities, connect with the world," participation in the fair aimed to strengthen relationships with clients and expand the brand's presence in the Uruguayan market.

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Ihara announces planned succession for the presidency

Julio Borges moves to the Board of Directors and transfers command to Clayton Veiga.

30.03.2026 | 11:27 (UTC -3)

Iara Soriano, Cultivar Magazine edition

Ihara announced a planned succession for its presidency. After more than 30 years with the company, including more than 15 as president, Julio Borges will move

exclusively to the Board of Directors starting in 2026. Clayton Veiga (pictured) has been appointed to the position of president.

Veiga has worked at Ihara for over 20 years and has experience in different areas of the business, including sales, marketing, research & development, and operations. He is an agricultural engineer graduated from the Federal University of Viçosa, with specializations in Sales and Marketing Management from the Escola Superior de Propaganda e Marketing (ESPM), Business Management from the Fundação Getúlio Vargas, PMD from Iese Business School, and a Program in Management, Regulation and Infrastructure Financing from the Harvard Kennedy School.

The company also announced André Nannetti as the new vice president.

According to Ihara, the change is part of a structured governance process and reinforces the continuity of the company's strategy, focusing on innovation, sustainable growth, and strengthening its operations in Brazilian agribusiness.

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Syngenta Seeds is making changes to its R&D program in Brazil

Marco Guimarães takes over as head of field crop seeds.

30.03.2026 | 09:43 (UTC -3)

Cultivar Magazine

Marco Guimarães (pictured) has taken on a new role at Syngenta Seeds, where he will head the Research and Development (R&D) team for Field Crop Seeds in Brazil.

With over 35 years of experience in agribusiness, the executive has previously worked at Agroceres, Monsanto, and Bayer in research and leadership positions.

Guimarães has experience in research and development, focusing on genetic improvement, biotechnologies, and crop protection. He holds a degree in agronomy from the Federal University of Viçosa, an MBA in Business Administration, and a master's degree in Genetics and Plant Breeding.

“This will be another great learning opportunity and I am excited about this new step. I am grateful to the leadership of Syngenta Seeds in Brazil and globally for trusting me to take on this opportunity,” he commented.

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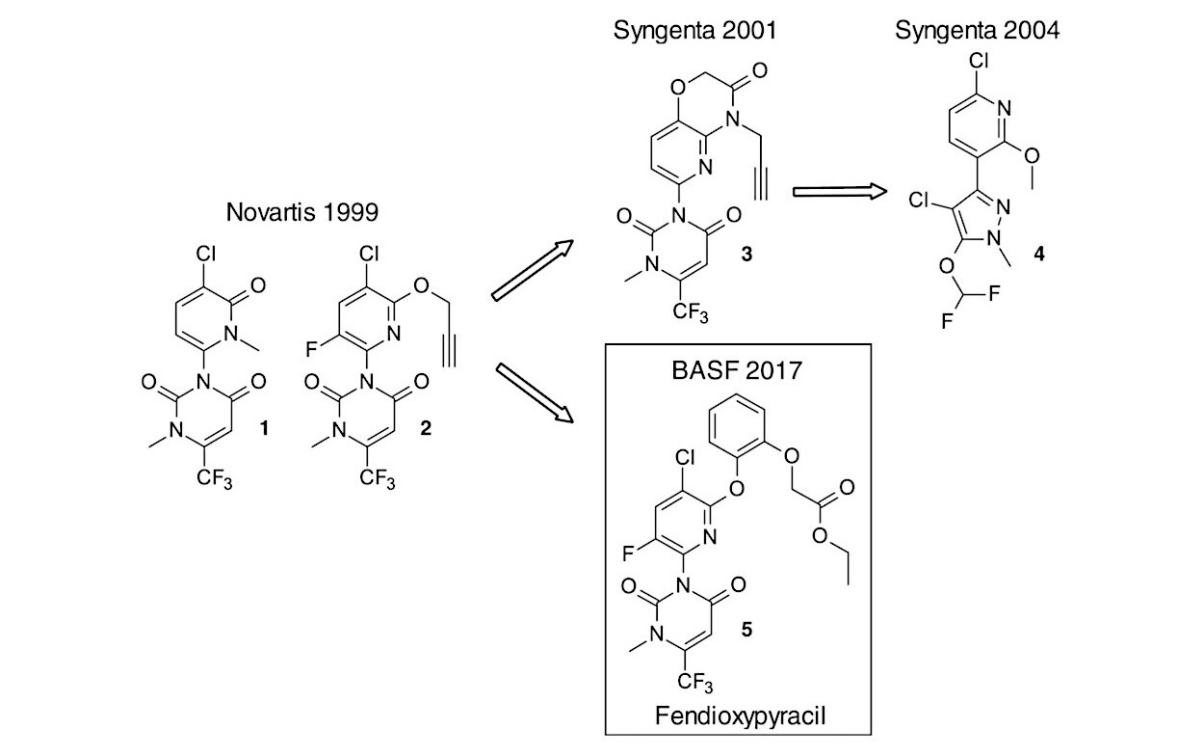
The herbicide fendioxypyracil enhances post-emergence control

The product demonstrates systemic action and a broad spectrum of activity against grasses and broadleaf weeds.

30.03.2026 | 02:30 (UTC -3)

Schubert Peter, Cultivar Magazine



A new protoporphyrinogen oxidase (PPO) inhibitor herbicide emerges as an alternative for post-emergence weed management. Fendioxypyracil exhibits systemic activity and broad-spectrum control of grasses and broadleaf weeds, with high efficacy at low doses.

The compound acts on PPO1 and PPO2 enzymes, which are linked to chlorophyll and heme biosynthesis, explain the scientists involved in the project. The inhibition blocks the conversion of protoporphyrinogen IX into protoporphyrin IX. The accumulation of this intermediate leads to the formation of reactive oxygen species under light. The process causes membrane damage, necrosis, and plant death.

Mode of action

Biochemical assays confirmed the mode of action. Fendioxypyracil showed lower IC50 values ??than the commercial standard saflufenacil for both enzyme isoforms. The result indicates greater potency, especially in PPO2 *Amaranthus tuberculatus*.

Physiological evaluations reinforced the mechanism. The herbicide induced rapid necrosis in tissues exposed to light and strong growth inhibition. CO2 uptake decreased significantly. There was no direct inhibition of photosystem II; the effect is light-dependent. The physiological profile aligned the compound with other PPO inhibitors, with a probability greater than 99% for this mode of action.

Broad spectrum

Greenhouse trials demonstrated broad spectrum control. The product controlled grasses such as *Avena fatua*, *Digitaria sanguinalis*, *Eleusine indica* and *Echinochloa crus-galli*. Broadleaf weed control also occurred consistently, explain the researchers involved in the project.

The effectiveness was demonstrated under different environmental conditions. Experiments included greenhouses with temperatures between 12°C and 24°C. Visual assessment indicated high levels of weed damage a few days after application.

The molecule combines a pyridine core with an aryloxyl side chain. This structure favors fitting into the enzyme's active site.

This configuration increases biological activity and contributes to field performance.

More information at doi.org/10.1002/ps.70763

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Biological control of Tetranychus urticae varies with temperature.

Combined use of Phytoseiulus persimilis and Amblyseius swirskii enhances control in strawberry plants.

29.03.2026 | 17:13 (UTC -3)

Schubert Peter, Cultivar Magazine

Photo: Eugene E Nelson, Bugwood

The temperature increases the population of Tetranychus urticae in strawberry plants and alters the efficiency of predatory mites. A study conducted in a greenhouse indicates greater suppression of the pest with the combined release of *Phytoseiulus persimilis* e *Amblyseius swirskii*.

Researchers monitored the dynamics of *Tetranychus urticae* They evaluated biological control strategies in three temperature ranges: 25-27 ºC, 28-30 ºC, and 30-32 ºC. The average density of the two-spotted spider mite increased from 21,7 to 95,66 individuals per plant over the period. The temperature ranged from 23,83 ºC to 31,88 ºC. There was a strong positive correlation between temperature and population (r = 0,921).

Treatments included isolated release of *Phytoseiulus persimilis* e *Amblyseius swirskii* and combined release. Both predators reduced the population of *Tetranychus urticae* in relation to the witness. The most intense reduction occurred with combined use. The density of *Tetranychus urticae* It dropped from 43,49 to 0,63 individuals per plant at the end of the cycle.

Response and temperature

The response varied depending on the temperature. *Amblyseius swirskii* It showed greater efficiency above 28°C. The control of *Tetranychus urticae* It

increased with the rise in temperature and reached 91,88% at 31,88 ºC. *Phytoseiulus persimilis* It showed peak efficiency near 28 ºC, at 86,67%. Above this point, performance dropped, falling to 47,24% at 31,88 ºC.

The combined release of *Phytoseiulus persimilis* e *Amblyseius swirskii* It outperformed isolated treatments across all temperature ranges. Efficiency reached 94,63% between 30-32 ºC. A gain occurred under conditions of 25-27 ºC, although without a statistically significant difference.

The data indicate a direct effect of temperature on the cycle of *Tetranychus urticae*Increased temperatures accelerate development and reproduction. Adjusting

the biological control strategy according to the environment promotes greater stability in management.

The combined use of *Phytoseiulus persimilis* e *Amblyseius swirskii* It broadens the spectrum of action. Each species has a distinct temperature range of optimal performance. The combination reduces failures associated with climatic variations within the greenhouse.

More information at doi.org/10.3390/insects17040366

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