November 29, 2025 N º 58

Cultivar Semanal ®

Bayer launches Intacta 5+ soybeans

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Bayer launches Intacta 5+ soybeans in Brazil.

The technology tolerates five herbicides, protects against caterpillars, and is expected to reach the market in the 2027/28 crop season.

26.11.2025 | 11:47 (UTC -3)

Cultivar Magazine

Bayer announced the launch of Intacta 5+ soybeans. This is a new biotechnology

containing tolerance to five herbicide molecules and five proteins for caterpillar management. The company anticipates commercial varieties ready for the 2027/28 crop season. The presentation took place at the company's innovation center in Paulínia.

The CEO of Bayer's agricultural division in Brazil, Márcio Santos (pictured), explained that an internal review of processes, initiated in 2023, accelerated the launch of the new generation of soybeans in the country. This technology is part of a group of ten blockbusters planned for the next decade.

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New herbicides

Intacta 5+ soybeans offer tolerance to five herbicides: dicamba e glyphosate (present in the 2 Xtend technology); and mesotrione , glufosinate e 2,4-D.

As a result, the use of the new technology will allow for choices of pre- and post-emergent herbicides better adapted to the reality of each producer. This increases the precision of weed control. The proposal focuses on the control of horseweed, goosegrass, bittergrass,

pigweed e cravorana.

Intacta 5+ expresses:

- the cp4 epsps gene, originating from the bacterium *Agrobacterium tumefaciens*, CP4 strain, which confers tolerance to glyphosate;
- the dmo gene of *Stenotrophomonas maltophilia*, which encodes the DMO protein that confers tolerance to the herbicide dicamba;
- the tdo gene of *Oryza sativa* which expresses the triketone dioxygenase (TDO) protein, which confers tolerance to the herbicide mesotrione;
- the pat of *Streptomyces viridochromogenes*, which encodes the PAT protein, which confers

tolerance to the herbicide glufosinate; and

- the ft_t.1 gene, a modified version of the R-2,4-dichlorophenoxypropionate dioxygenase (Rdpa) gene of *Sphingobium herbicidovorans*, which expresses an FT_T.1 protein (FOPs and 2,4-D dioxygenase) that confers tolerance to the herbicide 2,4-D.

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Caterpillar control

The new technology also allows for the management of nine species of

caterpillars. Ipro soybeans protected against *Anticarsia gemmatalis*, *Chloridea virescens*, *Chrysodeixis includens* e *Crocidosema aporema*The Intacta 2 Xtend added *Helicoverpa armigera* e *cosmioides spodoptera*.

Now, in addition to the six mentioned, Intacta 5+ facilitates the handling of three other species: *Elasmopalpus lignosellus*, *Rachiplusia nu* e *Spodoptera eridania*.

This happens because the insect protection system uses five proteins: Cry2Ab2, Cry1A.105, Cry1Ac, Cry1A.2, and Cry1B.2. The last two were added in the new technology.

The two new chimeric proteins of *Bacillus thuringiensis* (Bt)Cry1A.2 and Cry1B.2 were constructed using specific domains,

minimizing receptor overlap.

Cry1A.2 has a sequence with approximately 75% similarity to related proteins, such as Cry1A.107 and Cry1A.105, but with differences that prevent cross-resistance.

In turn, the composition of Cry1B.2 results in approximately 60% sequence identity with Cry1F-related proteins in domains 2 and 3, but only approximately 30% in domain 2, differentiating it from commercial toxins such as Cry1Ac or Cry1F.

Demonstrations and marketing

Bayer will begin installing test fields in the next growing season. It will demonstrate the technology at events throughout the country. Commercialization is expected to begin in the 2027/28 growing season, depending on approval from importing countries. In Brazil, the technology has

already received authorization.

The company is forging partnerships with farmers, researchers, and other stakeholders in the supply chain. The goal is to launch with at least 13 varieties adapted to the main regions. In the first two years on the market, the offering could exceed 200 varieties.

Read also Bayer launches Vyconic soybean with five herbicide tolerances

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Syngenta is considering going public in Hong Kong.

Company considers asset sale and resumption of IPO plan as market shows signs of recovery.

24.11.2025 | 16:44 (UTC -3)

Cultivar Magazine, based on information from Bloomberg.

Photo: Waldo Swiegers

The Syngenta Group is considering an initial public offering (IPO) in Hong Kong, according to information released by

Bloomberg news agency. This move comes just over a year after the company withdrew a plan to list approximately US$9 billion on the Shanghai Stock Exchange.

According to sources familiar with the matter, the company has been holding preliminary talks with financial advisors and is considering going public in Hong Kong sometime in 2026. The sources, who requested anonymity due to the confidential nature of the matter, stated that Syngenta may sell assets considered non-core or with low profitability as part of its preparation for the process.

However, deliberations are still ongoing and may not result in a new attempt at an initial public offering (IPO). Syngenta has not commented on the matter.

The company had requested an IPO in Shanghai in 2021, but withdrew the request in March 2024, citing market volatility. At the time, the company – acquired by the state-owned China National Chemical Corp. (ChemChina) in 2017 – stated that it would resume evaluating a listing when it found more favorable conditions, either in China or another market.

According to estimates by Bloomberg Intelligence, initial public offerings in Hong Kong are expected to reach their highest volume in four years in 2025, with fundraisings potentially exceeding US$40 billion.

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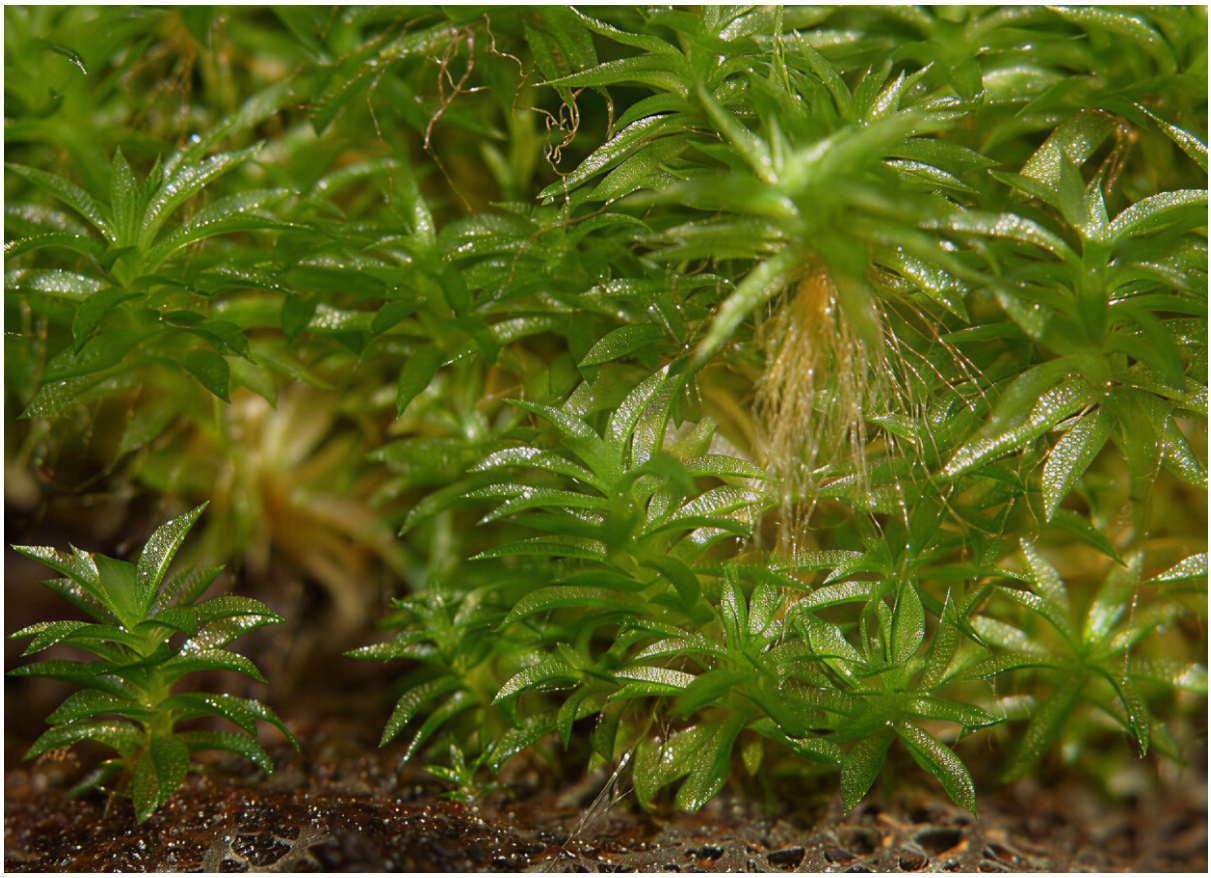
Moss survives nine months in the vacuum of space.

Physcomitrium patens spores defy UV radiation and extreme temperatures.

28.11.2025 | 14:36 (UTC -3)

Cultivar Magazine



Moss spores *Physcomitrium patens* They survived nine months outside the

International Space Station (ISS). More than 80% germinated upon returning to Earth. The study revealed the extreme resilience of this bryophyte.

Japanese scientists exposed spores encapsulated in sporangia to the real space environment. The exposure lasted 283 days, from March to December 2022. Ultraviolet (UV) radiation reduced the germination rate to 86%. Dark controls maintained 95% to 97% viability.

Soil tests simulated space conditions. Spores withstood UV-C doses of up to 12 MJ/m². Freezing at -80°C for 30 days preserved 80% germination. Heat at 55°C for 30 days maintained 36%. Vacuum and UV in vacuum caused minimal damage.

Protonemata and brood cells died quickly in these tests. Sporangia protected spores against UV, heat, and intense light. The structure acted as a barrier.

Extrapolation suggests survival of up to 15 years in space. Results indicate potential for planetary greening. Bryophytes such as *P. patens* They can sustain life support systems in extraterrestrial habitats.

Further information can be found at doi.org/10.1016/j.isci.2025.113827

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POTÊNCIA, EFICIÊNCIA E TECNOLOGIA PARA MÁXIMA PERFORMANCE NO CAMPO

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KUHN

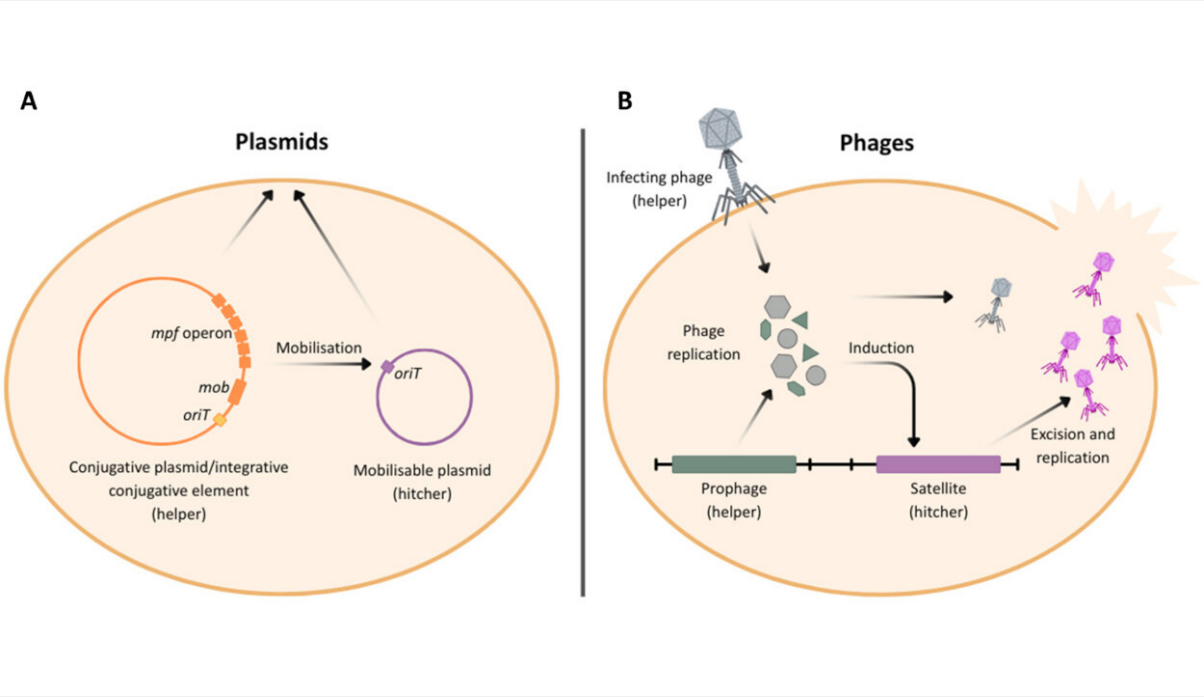
20 ANOS NO BRASIL FAZENDO HISTÓRIA COM VOCÊ

Bacterial immune system shapes microbiomes

Study reveals how bacterial defense mechanisms influence structure, function, and evolution.

28.11.2025 | 08:51 (UTC -3)

Cultivar Magazine



Bacterial immune defenses not only protect against invading viruses and plasmids, but also determine who lives,

who evolves, and how entire communities of microorganisms are organized. This finding, presented by an international group of researchers, broadens our understanding of the ecological role of bacterial immune systems in microbiomes.

These systems act against mobile genetic elements (MGEs), such as phages and plasmids. The new analysis proposes that the dynamics between MGEs and defense systems define the composition and functions of bacterial communities in different ecosystems.

Defenses shape the ecosystem.

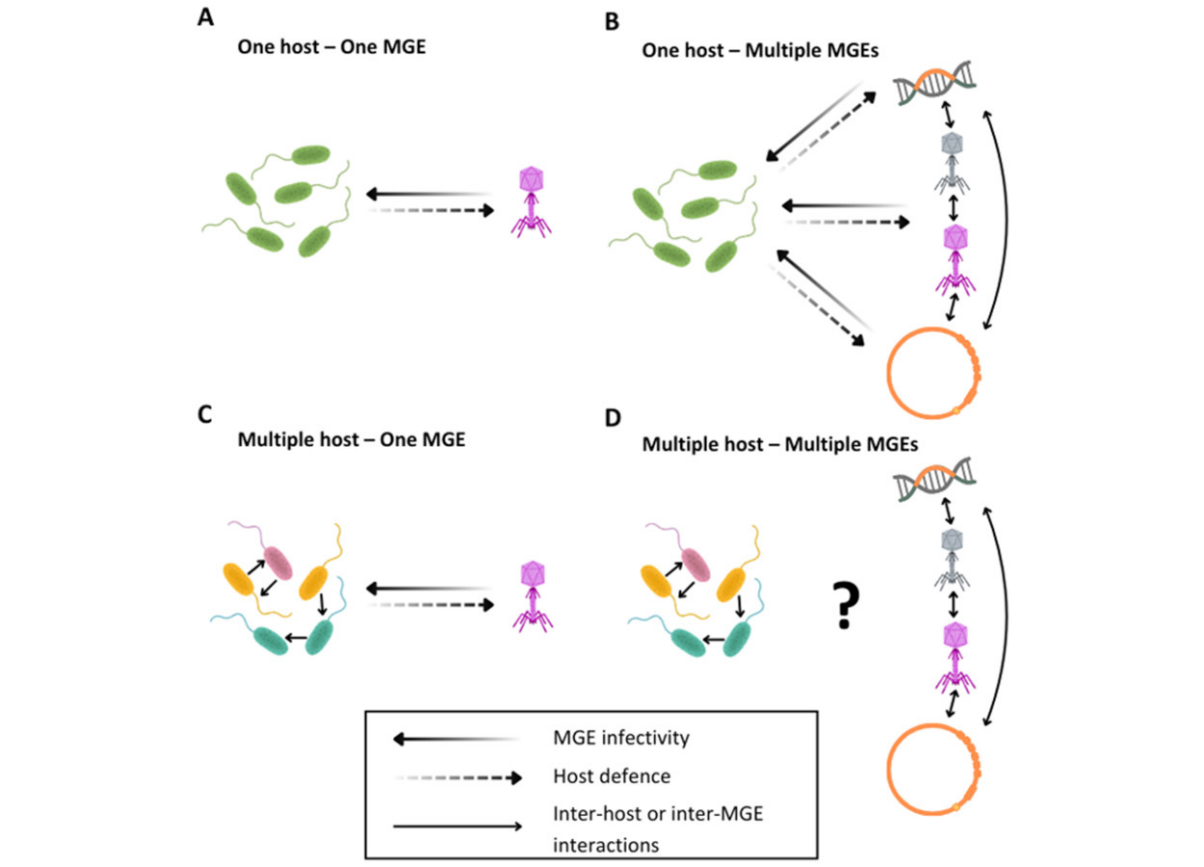
Bacteria coexist in complex communities, essential for processes such as the carbon cycle, nitrogen fixation, and the decomposition of organic matter. In these environments, GMOs promote genetic exchange and rapid adaptation. However, many of these elements are parasitic, and their spread poses risks. To contain them, bacteria have developed dozens of defense mechanisms, such as CRISPR-Cas and restriction modification (RM) systems.

Recent studies have cataloged more than 150 distinct families of bacterial immune systems. On average, each bacterial genome carries five to six of these systems. This diversity allows for multilayered resistance and acts as a

selective filter for MGEs circulating in the community.

Complex interaction with MGEs

The immune system does not act in isolation. The presence of certain immune systems can reduce the diversity of MGEs, but it can also favor the persistence of beneficial elements, such as plasmids that confer antibiotic resistance.



Some MGEs have evolved strategies to inhibit bacterial defenses. Plasmids, for example, often carry anti-immune genes capable of inactivating defense mechanisms as soon as they penetrate the cell.

Furthermore, the environment influences how these interactions work. Temperature,

the presence of antibiotics, and the spatial structure of the community alter the effectiveness of immune systems and the ability of GEMs to spread.

Barriers to gene transfer

Bacterial defenses also regulate horizontal gene transfer (HGT). Systems such as CRISPR-Cas and RM limit the entry of foreign DNA, acting as genetic barriers. In some cases, such as in Pectobacterium atrosepticum, CRISPR systems allow the selective entry of useful genes while blocking harmful phages.

This creates a partition in the gene flow within communities, directly influencing the

speed and scope of microbial evolution.

Selective pressure in the community context

The composition of the microbial community affects the selection of defenses. In biodiverse environments, such as soil or the gut, there is a higher prevalence of immune systems. This diversity expands the so-called "distributed immunity," in which different strains share defenses through horizontal transfer.

The "pan-immunity" model suggests that the immunity of a community does not reside in a single cell, but in the entire pan-genome accessible via HGT. This phenomenon has been observed in Vibrio

cholerae, where phages induce the exchange of defense genes between bacteria.

On the other hand, maintaining these defenses imposes costs, such as autoimmunity. These costs vary according to the environment and the composition of the community. In some contexts, bacteria lose defense systems to maintain adaptation, as occurs in environments with intensive use of antibiotics.

Beyond protection: MGEs as active agents

In a conceptual twist, the study shows that MGEs also carry their own defense systems. This transforms mobile genetic

elements into agents capable of protecting their interests by blocking competitors. Some plasmids and phages, for example, encode defenses against other MGEs, which profoundly alters the dynamics of infection, competition, and survival.

Scientists highlight the importance of experimental models with multiple species and multiple MGEs. These synthetic systems will allow us to understand how defenses and MGEs influence the collective functioning of microbial communities, with applications in agriculture, human health, and biotechnology.

Further information at doi.org/10.1371/journal.pbio.3003489

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Agricultural Market - 28.Nov.2025

Soybean and corn exports hit record highs, but marketing of the new crop is a concern.

28.11.2025 | 08:40 (UTC -3)

Vlamir Brandalizze - @brandalizzeconsulting

Brazilian soybean exports are expected to end November with a volume between 4,5 and 5 million tons. Of this total,

approximately 82 million tons were destined for China. The annual total is approaching 105 million tons, the highest ever recorded. The soybean harvest in the United States has been completed, and the global market is now turning its attention to South America.

In Brazil, soybean planting has reached 85%. The historical average for this period is 90%. Sales of the harvested crop are between 80,5% and 81%, below the average of 85% to 86%. The new crop is also progressing slowly, with only 27,5% negotiated, compared to the average of 36%. This delay raises concerns about the concentration of sales during the harvest.

The soybean complex is expected to generate more than US$2,6 billion in

November.

Corn situation

In the United States, the corn harvest is 98% complete. In Brazil, the first crop has already surpassed 95% of the planted area. The second crop (safrinha) yielded 113,3 million tons, of which approximately 72,5% has been sold. There are still 37,3 million tons in the hands of producers, which could benefit the animal feed sector, which intends to purchase it between January and February.

Brazilian corn exports are expected to exceed 5 million tons in November, potentially reaching 5,3 million tons. The year-to-date total has already surpassed

35 million tons.

Wheat situation

In the wheat market, the possibility of an end to the war in Ukraine and interest rate cuts in the United States could increase the price of the commodity. The Brazilian harvest is approaching 7,5 million tons, with good quality. In Rio Grande do Sul, more than 85% of the harvest has been completed. Prices remain stable: between R$ 1.030 and R$ 1.050 in the Rio Grande do Sul market and from R$ 1.100 to R$ 1.200 in Paraná.

Rice situation

Rice prices ended November under downward pressure. In Rio Grande do Sul, more than 95% of the area has been planted. The harvest will have a smaller area, less technology, and lower productivity. Santa Catarina is showing good development. Tocantins, Goiás, and Mato Grosso are facing a decrease in planted area. In Paraguay, rains delayed planting, which may not reach 70%. The lower supply in these countries may reduce pressure on the market.

Prices remain low: promotional prices range from R$10 to R$18, with most brands priced between R$17 and R$26. Brazilian rice, the cheapest in the world, has helped to contain inflation. But the scenario could change from 2026

onwards.

Bean situation

Bean farming is facing difficulties. The first harvest suffered from weather problems and reduced acreage. Production may not reach 800 tons, compared to 1 million tons the previous year. Despite this, Brazil is expected to break export records in 2025, potentially reaching 500 tons.

By **Vlamir Brandalizze** - *@brandalizzeconsulting*

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SÓ QUEM SE BASEIA
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Vetoes to environmental law are overturned after vote in Congress.

Members of the Chamber of Deputies and the Senate resume reviewing provisions of Bill 2159/21 and continue analyzing pending amendments.

27.11.2025 | 17:26 (UTC -3)

Ralph Machado

Photo: Kayo Magalhães

The National Congress overturned some of the presidential vetoes to Bill 2159/21, which gave rise to the General Law on Environmental Licensing. In the Chamber of Deputies, there were more than 260 votes to overturn 24 items. In the Senate, these same topics received 50 votes. To be overturned, a veto needs the votes of at least 257 deputies and 41 senators.

During the voting, PT (Workers' Party) deputies requested a separate vote on 27 items. There was also a motion from PSOL (Socialism and Liberty Party) in the Chamber of Deputies. Currently, these 28 topics are still being analyzed by deputies and senators.

Initially, 59 items were to be voted on, but seven were postponed following an

agreement between party leaders. All relate to the Special Environmental License (LAE), currently regulated by Provisional Measure 1308/25, which is still under review by Congress.

Congress also overturned 6 of the 30 items vetoed in the proposed Program for Full Payment of State Debts (Propag). In the case of Senate salaries, the entire text approved by parliamentarians was reinstated.

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Xtend Max 2 and Roundup Transorb Top are coming for the next harvests.

Solutions promise gains in performance, sustainability, and ease of management.

27.11.2025 | 15:48 (UTC -3)

Cultivar Magazine

Bayer will offer producers two new products for the upcoming harvests: Xtend Max 2 and Roundup Transorb Top. This information was shared during an event at the company's innovation center in Paulínia by the company's Latin America herbicide manager, Matheus Palhano (pictured).

Xtend Max 2 arrives as the most advanced Dicamba-based formulation on the market. The product features a novel monoethanolamine salt, which provides greater stability and efficacy. In addition, it incorporates VaporGrip technology, which reduces volatilization and increases application safety. The herbicide will be marketed in combination with the Xtend Protect adjuvant, guaranteeing superior performance in pre-planting and post-

emergence applications of tolerant cultivars, such as Intacta 2 Xtend and, in the future, Intacta 5+.

Roundup Transorb Top, available for the 2026/27 crop season, represents an evolution in the Roundup line. The liquid formulation maintains the potassium salt and the one-hour interval between application and rain, but now features a 20% higher concentration of the active ingredient: 575 grams of acid equivalent per liter. This change reduces water usage in manufacturing and decreases the volume of packaging per hectare treated. For the farmer, this translates to operational gains and less complexity in disposing of empty containers.

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Potatoes with Cry1C and Cry2A genes resist the potato tuber moth.

New variety achieves 100% pest mortality.

27.11.2025 | 14:26 (UTC -3)

Cultivar Magazine

Photo: Henry Juarez, International Potato Center

Researchers have developed a transgenic potato capable of resisting the potato tuber

moth (*Phthorimaea operculella*The strain expresses the Cry1C and Cry2A genes, which encode insecticidal proteins derived from *Bacillus thuringiensis* (Bt).

The experiment used the E3 cultivar, transformed by *Agrobacterium tumefaciens*The resulting lineages showed high gene expression and integrated unique copies in the genome.

In bioassay tests, larvae fed transgenic leaves died at a significantly higher rate than those in the control group. The Cry1C-2 line caused 60,4% mortality in just 24 hours. Lines with higher expression of Cry1C and Cry2A killed 100% of the larvae within four and seven days, respectively.

Photo: David Jones, University of Georgia

Histological analyses showed that Bt proteins caused lysis of intestinal epithelial cells and damage to the peritrophic membrane of the larvae. The effect resulted in complete death of the insects fed with the genetically modified plant.

According to the authors, the study confirms, for the first time, that the Cry2A

gene confers resistance to the potato tuber moth in potatoes.

Further information at doi.org/10.1002/ps.70403

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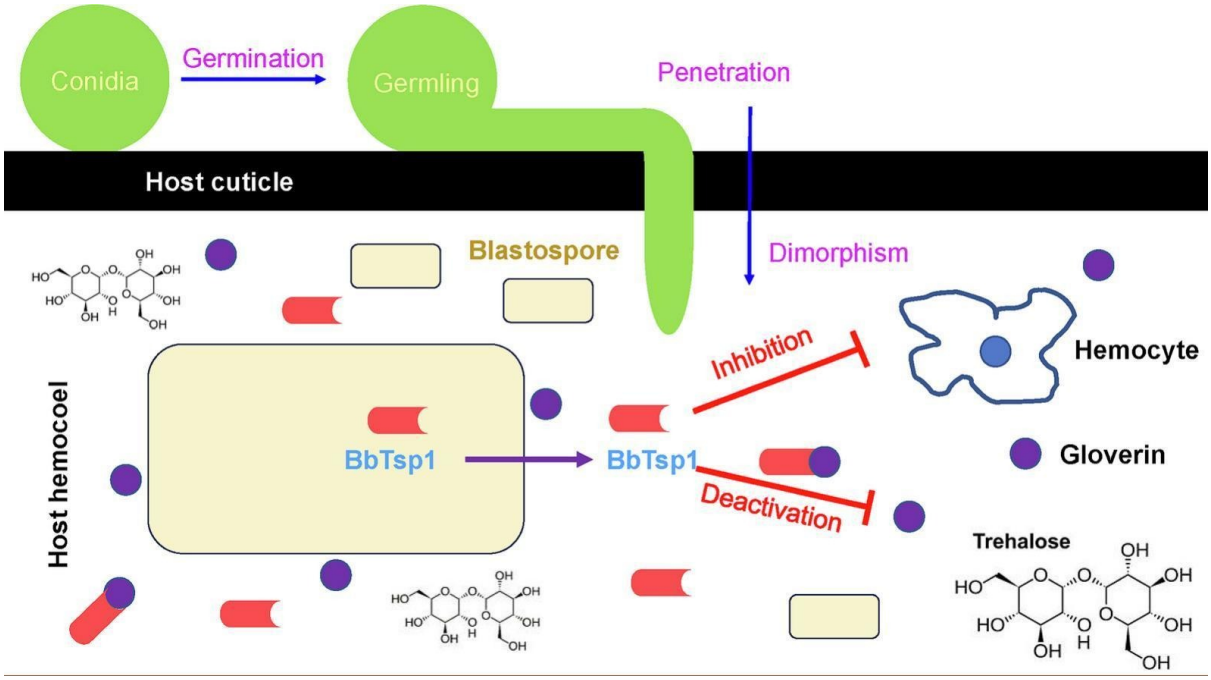
The fungus Beauveria bassiana secretes a protein that neutralizes insect defenses.

Study reveals that the BbTsp1 protein interacts with the host's immune peptide and increases the virulence of the fungus.

27.11.2025 | 08:44 (UTC -3)

Cultivar Magazine



Researchers have identified a protein secreted by the entomopathogenic fungus.

beauveria bassiana which neutralizes the immune response of insect hosts and enhances the potential for biological control. The protein, named BbTsp1, was detected through comparative proteomic analysis after cultivating the fungus in a medium with trehalose, the main carbon source in insect blood.

BbTsp1 has 156 amino acids, is rich in cysteine, and contains a secretion signal at the N-terminal end. The protein does not have a predictable functional domain. It has been considered a possible effector, a substance that interferes with host immunity. Bbtsp1 expression increased significantly when the fungus was grown in a medium with trehalose.

Gene interruption

Disruption of the Bbtsp1 gene resulted in up to a 46% reduction in conidia production and decreased proliferation in the host. Furthermore, virulence was compromised. The median lethal time (LT50) increased in both topical and direct injection infections. Conversely, overexpression of the gene increased fungal virulence by up to 23%.

Toxicity tests revealed that the BbTsp1 protein, purified and injected into larvae of *Galleria mellonella*This led to the death of all insects within six days. The protein also reduced the number of hemocytes, essential immune cells in the insect.

Interaction analysis

Interaction analyses showed that BbTsp1 binds directly to the antimicrobial peptide gloverin, a natural inhibitor of fungi in insects. In vitro tests confirmed that this binding neutralizes the antifungal action of gloverin. Deletion of the Bbtsp1 gene increased the fungus's sensitivity to this peptide. The addition of BbTsp1 restored spore viability.

Homologues of BbTsp1 have been identified in other species of entomopathogenic fungi, such as ***Metarhikum anisopliae***, suggesting an evolutionarily conserved mechanism. The study points out that BbTsp1 represents a new class of effectors in filamentous fungi,

with unprecedented action on host antimicrobial peptides.

Further information at doi.org/10.1016/j.pestbp.2025.106844

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Lavoro announces new CEO for Brazilian operation.

Marcelo Pessanha takes over leadership of agricultural input distribution.

27.11.2025 | 08:24 (UTC -3)

Cultivar Magazine, based on information from Lavoro

Lavoro announced that Marcelo Pessanha will assume command of its Brazilian agricultural input distribution operation on December 1, 2025. The executive

currently holds the vice presidency of sales, marketing, and operations and previously led the holding company Crop Care.

The appointment occurs within the context of the company's out-of-court restructuring, approved on November 25th. The process began in June and, according to the company, was conducted with aligned technical, legal, and operational aspects. The leadership transition, planned throughout the negotiations, is taking place in an environment considered stable.

With the restructuring, Lavoro seeks to strengthen processes and broaden its focus on performance and value creation. Pessanha has been involved in both the company's strategic achievements and

challenges. His close relationship with the sales teams is seen as key to driving growth and efficiency.

The change also marks the departure of Ruy Cunha, who led the company during a critical phase. He will continue to support the transition before taking on new challenges. Lavoro highlighted Cunha's role in leading the recovery process and reiterated its commitment to its strategic stakeholders.

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John Deere releases fiscal year 2025 results.

Company identifies 2026 as the weakest year in the cycle for large agricultural machinery.

26.11.2025 | 14:49 (UTC -3)

Cultivar Magazine

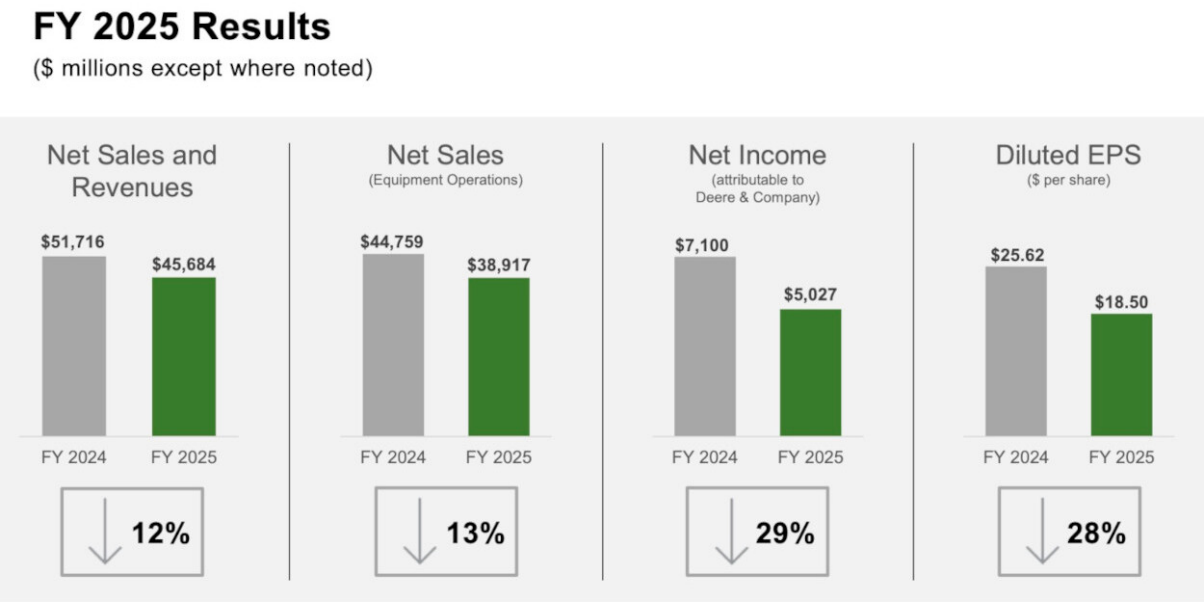
Deere & Company ended fiscal year 2025 with net income of US$5,027 billion. This result fell 29% compared to the US$7,1

billion obtained in 2024. Global revenue decreased 12% during the year, to US$45,684 billion, compared to US$51,716 billion in the previous fiscal year. Machine sales declined 13%, to US$38,917 billion.

The annual performance of the segments confirmed the pressure on margins. Production and Precision Agriculture recorded a 17% drop in sales, to US$17,311 billion, and a 41% decrease in operating profit. Small Farming and Gardening fell 7% in sales, to US$10,224 billion, and lost 26% in operating profit. Construction and Forestry fell 12% in sales, to US$11,382 billion, and shrank 49% in operating profit. The financial arm, in turn, increased its annual profit by 25%, to US$1,114 billion, driven by better

spreads and lower provisions for credit.

CEO John May stated that the company weathered high costs and uncertainties, but maintained resilience thanks to operational adjustments and a diversified market presence. Deere projects that 2026 will represent the low point of the large agricultural machinery cycle. The company estimates profits between US$4 billion and US$4,75 billion next year. The forecast indicates a further decline in the large machinery segment and moderate growth in small-scale agriculture, gardening, and construction.



The company's projections indicate a decline of between 5% and 10% in sales of Production and Precision Agriculture in 2026. Small-scale Agriculture and Gardening is expected to grow by approximately 10%. Construction and Forestry is also expected to advance by about 10%. For the North American market, the expectation indicates a drop of between 15% and 20% in sales of large agricultural machinery. In other markets,

the company predicts stability or small variations, with a notable increase of up to 5% in Europe.

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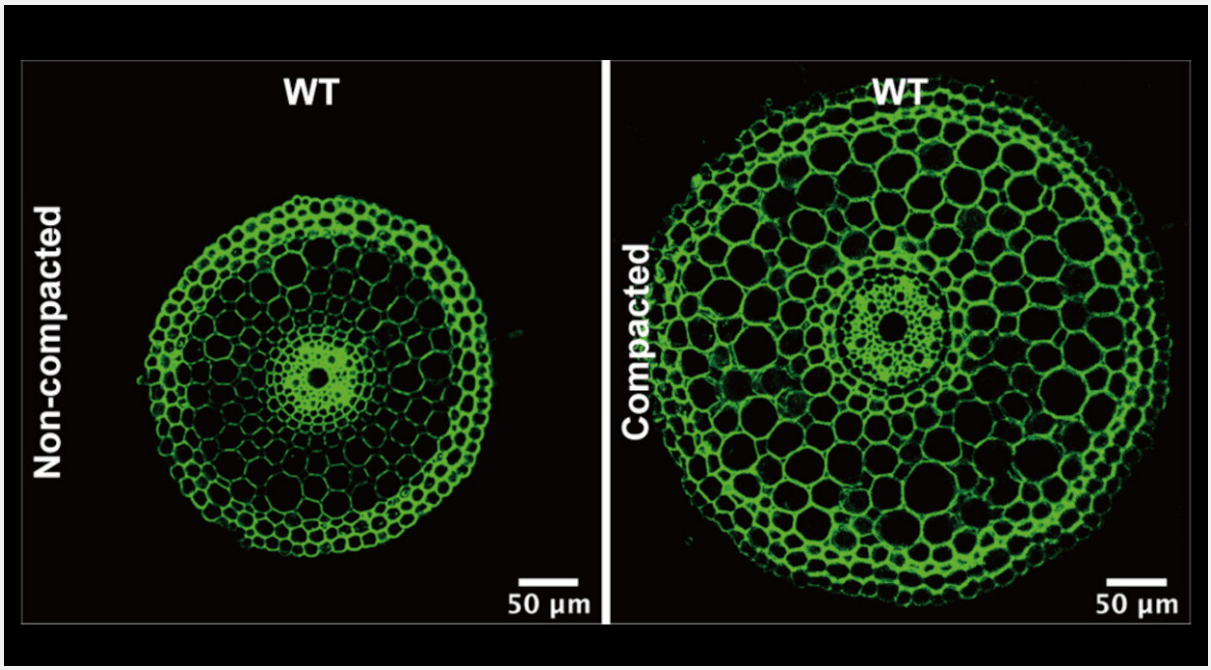
Ethylene helps roots break through compacted soil.

Study reveals how roots thicken and alter cellular structure.

26.11.2025 | 14:22 (UTC -3)

Cultivar Magazine



Plant roots are able to adapt to compacted soils using a mechanism similar to that used in engineering projects to prevent structural collapse. This discovery could

help in the development of crops that are more resistant to soil compaction caused by agricultural machinery and climate change.

Research shows that, when faced with compaction, plant roots thicken and reinforce the outer layer. This increase in diameter, combined with the rigidity of the cell wall, transforms the root into a kind of biological wedge capable of breaking through dense soil.

Ethylene hormone

The process is activated by the accumulation of the hormone ethylene around the root, which triggers a chain of biochemical reactions. This hormone

induces the expression of the transcription factor OsARF1 in the root cortex. OsARF1 suppresses genes responsible for cellulose production, such as OsCESA5, OsCESA6, and OsCESA8, which reduces the rigidity of the cell wall in this inner layer.

With less cellulose, the cortex cells expand radially. The root thickens, but without losing flexibility, facilitating penetration into the soil. At the same time, the outermost layer (epidermis) gains thickness and rigidity, which prevents the structure from collapsing and maintains the stability of the root during growth.

Experiments with rice

Experiments with rice confirmed this mechanism. Seedlings genetically modified to produce more OsARF1 were able to grow better in compacted soil. Plants with mutations in cellulose synthesis genes also showed greater soil penetration capacity, with thicker roots and thinner cell walls in the cortex.

The study suggests that differential regulation between the cortex and epidermis follows the same principle used in pipe engineering: thick outer walls for stability and a larger diameter to resist collapse. This discovery expands the possibilities for improving crops adapted to degraded soils, focusing on root architecture and hormonal regulation.

Further information at doi.org/10.1038/s41586-025-09765-7

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Increased tractor sales herald a new cycle in the agricultural sector.

Consortium moves R$ 9,13 billion and boosts investments; Valtra grows in sugarcane and medium-power operations.

26.11.2025 | 14:15 (UTC -3)

Beatriz Voltani

During the month of September, domestic sales of tractors and harvesters increased by 27,3% compared to the same period in

2024, according to a recent report from the Brazilian Association of Machinery and Equipment Industries (Abimaq). This increase in volume, even in the face of a slight decrease in the sector's total revenue, reinforces the trend of recovery in domestic demand focused on modernization in the field.

“The positive sales results show that producers remain confident and attentive to opportunities to modernize their activities in the field. Even in a cautious environment, there is a constant search for technology and efficiency in the field,” comments Cláudio Esteves, commercial director of Valtra, a global brand of agricultural machinery belonging to the AGCO group.

Among Valtra's operations, the highlight in 2025 was the sugarcane segment, one of the most representative crops in the national agribusiness. The brand also maintains good performance in the medium power range. "Valtra is recognized for the robustness and reliability of its equipment, attributes valued especially in sugarcane and grain crops, which demand high performance and durability," explains Esteves.

The plurality of acquisition alternatives has also sustained the pace of investment in the sector. Agricultural machinery consortia, for example, have become a viable option for producers of different profiles. "The consortium has attracted producers of different profiles precisely because it allows for planned investment

without interest, which fits well into the dynamics of agribusiness," emphasizes Cláudio Esteves.

From January to September, the agricultural machinery sector registered a 47% growth in loans granted through consortiums, reaching R$ 9,13 billion, according to a survey by the Brazilian Association of Consortium Administrators (Abac).

Positive performance in direct sales and consortiums reinforces the confidence of rural producers and indicates a new cycle of fleet renewal and mechanization in the field. With the growth in sales and the consolidation of new forms of investment, the agricultural machinery sector is expected to end 2025 with revenue growth close to 8%, according to projections by

Abimaq.

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Itaú BBA and Mosaic advance in resilient agriculture program.

Collaboration funds technologies and practices that increase productivity and reduce vulnerability to climate change.

25.11.2025 | 09:34 (UTC -3)

Camille Magri, Cultivar Magazine edition

During COP30, Itaú BBA and Mosaic announced a partnership to expand financing for rural producers who adopt

plant nutrition technologies and conservation practices aimed at reducing emissions and increasing productive efficiency. The program, which had its first disbursement in early November, initially plans to serve approximately 50 rural properties, with an estimated credit volume of R$ 250 million.

The initiative brings together the largest wholesale bank in Latin America and one of the global leaders in phosphate fertilizers. The goal is to encourage the use of Mosaic's high-tech fertilizers and bionutrition inputs in production systems that also adopt cover crops and sustainable fertilizer use during the off-season—practices considered essential for soil conservation, water retention, and increased biodiversity.

According to Itaú BBA, producers who meet the program's criteria will have special financing conditions, aligned with the bank's ESG Agro lines of credit. These options are part of the institution's strategy to support the transition to low-greenhouse-gas-emission agriculture.

"The sustainable development of Brazilian agricultural production is the premise of this union," he emphasized. **Peter Fernandes** (In the photo, left), Director of Agribusiness at Itaú BBA. "The partnership combines technological solutions and technical guidance to strengthen high-performance production with sustainable practices."

To **Eduardo Monteiro** (In the photo, right), Mosaic's country manager in Brazil, said

that proper soil management will be one of the main benefits of the initiative. "Healthy soil is more resilient to climate change and can help sequester carbon. We work with scientifically effective solutions that increase productivity and are sustainable," he stated.

The project will be expanded in a second phase, which should include pastures and integrated systems. At Mosaic, actions focused on soil health and emission reduction targets are part of the company's global strategy, which develops innovations in plant and animal nutrition and works directly alongside producers.

Itaú BBA's ESG Agro lines currently include five thematic categories: Bioinputs – Commercialization, Bioinputs – Use, Certifications, Solar Energy, and Roofing.

To access these lines, producers must meet socio-environmental criteria that go beyond those required in conventional operations.

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New Holland expands portfolio for narrow vineyards.

The new 9.80N combine harvester features an improved cab with greater operator comfort.

24.11.2025 | 17:33 (UTC -3)

New Holland, Cultivar Magazine edition

Sitevi 2025, taking place from November 25th to 27th in Montpellier, France, will be the launch platform for several updates to the New Holland 9.80N self-propelled

grape harvester for narrow-row vineyards, as well as improvements to the TE6 Straddle tractors. Designed to offer greater precision, comfort, and maximum grape quality in narrow vineyards, these products can be seen at booth B2 B 017 - B2 B 018.

In the 2026 New Holland Braud 9.80N combine harvester models, a new front axle provides better terrain compensation, increasing precision and productivity in narrow vineyards. This ensures maximum stability and safety, allowing operators to work with greater precision and productivity in compact rows.

The operator also benefits from a superior level of comfort and control, with a new luxury package for the modernized cab and a new IntelliView IV Plus touchscreen

display that provides fingertip machine operation. New Holland's RS1 GNSS receiver enables automatic control of spray sections, eliminating the need for the operator to manually switch sprayer sections on/off in triangular jobs, maximizing precision and minimizing waste.

A new full set of LED lights increases visibility when working early in the morning or late in the afternoon. New decals and a silver finish on the hood and wheels complete the high-quality details.

Innovations in the harvesting unit include evolutions of New Holland Braud's proven Opti Grape sorting technology. This further enhances the sorting process and delivers higher levels of grape quality thanks to

improved destemming and cleaning. Other updates in various areas, from the hitch to the harvesting platform, have been designed to facilitate maintenance and operation.

Sequence of Maneuvers at the Headland II for TE6 Rail Tractors

The 2026 TE6.120 and TE6.150 headland cutting tractors now come equipped with Headland Turn Sequence II (HTS II), a patented technology that simplifies end-of-row operations. With just one switch, operators can control all attached implements, making maneuvers faster, safer, and less tiring.

Operators can customize the settings for each implement, and there is a sequence saving mode for quick setup and repeatability, ensuring greater efficiency when starting or finishing work at the ends of the rows.

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PI AgSciences incorporates Plant Health Care

Company strengthens global presence in biologicals after integration with PI Industries and expands portfolio of sustainable solutions.

24.11.2025 | 17:26 (UTC -3)

Wes Hays, Cultivar Magazine edition

In August 2024, PI Industries Ltd. (PI) acquired Plant Health Care Plc (PHC), including its subsidiaries in the United

States, Brazil, Mexico, and other markets. Today, PI announces that Plant Health Care is now PI AgSciences, PI's global agricultural business.

This transition strengthens PI's global presence in biologicals and sustainable crop solutions. PI is a rapidly growing global life sciences company with revenues of approximately US$1 billion and over 80 years of history pursuing innovation across the entire agricultural value chain, from discovery to commercialization.

The company operates in the areas of crop protection, biologicals, customized synthesis and manufacturing, and branded products, serving clients worldwide with a partnership model, integrated R&D,

excellence in execution, and deep agronomic knowledge. With operations in over 40 countries, PI has more than 4.000 employees, a world-class R&D ecosystem with over 700 scientists in 4 locations worldwide, and 7 production facilities.

Ranked among the top five global companies in the synthesis and custom manufacturing of agrochemicals, it is a leader in the biologicals sector, with over 25 years of experience. It has also been featured in the S&P Global Sustainability Yearbook 2025 for two consecutive years.

With the addition of PHC's biologics technology platform, PI AgSciences strengthens its biologics portfolio and accelerates its innovation pipeline.

Investments in comprehensive solutions

PI AgSciences has its global headquarters in St. Louis, Missouri, a location known for possessing a world-class agricultural innovation ecosystem, a strong scientific community, and its proximity to the heart of U.S. agriculture. PI AgSciences maintains regional operations in Brazil, Mexico, the United Kingdom, and Spain, with a biologicals R&D center in Seattle, Washington.

“We have made significant investments in our biotechnology platform and continue to see strong market traction. These solutions complement PI’s differentiated

portfolio to offer comprehensive agricultural solutions to growers worldwide, in line with our goal of reimagining a healthier planet," he said. **Mayank Singhal** (pictured, left), vice president and managing director of PI Industries Ltd.

"We are building a global agricultural business with commercial reach and scientific depth to compete at scale, offering innovative solutions that generate real value for producers," he concluded. **Jagresh Rana** (pictured, right), CEO of PI AgSciences.

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Tobacco industry fears a more restrictive environment after COP11.

SindiTabaco highlights progress in mobilization and criticizes regulations suggested in Geneva.

24.11.2025 | 15:10 (UTC -3)

SindiTabaco, Cultivar Magazine edition

The Interstate Tobacco Industry Union (SindiTabaco) expressed concern about

the recommendations discussed at the 11th Conference of the Parties to the Framework Convention on Tobacco Control (COP11), held in November in Geneva, Switzerland. According to the organization, the proposals could create a more restrictive environment for the production chain, which includes thousands of producers in southern Brazil.

Considered one of the countries that most quickly adopts international anti-tobacco guidelines, Brazil may increase regulatory pressure on segments ranging from cultivation to marketing. Among the points of concern, the president of SindiTabaco, **Valmor Thesing** (In the photo), he cites possible stricter environmental requirements, especially related to cigarette filters. "If they move forward in

this direction, the risk is pushing consumers from the legal market to the illegal one," he says.

The conference brought together more than 1.600 delegates from member countries, NGOs, and observers. However, representatives of producers, industry workers, parliamentarians, and even the press were prevented from following the discussions, which generated expressions of outrage in Brazil. Even from a distance, Thesing highlights the political mobilization that occurred in parallel. “The actions of federal and state deputies were essential to guarantee some dialogue. Without them, there would have been no space for discussion,” he points out.

Concern about holding the industry accountable

Among the issues that most concern the sector is Article 19, which encourages Parties to adopt accountability legislation and greater control over the entire supply chain. For SindiTabaco, this move could tighten the regulatory environment in the coming years. "Parliamentary mobilization will continue to be fundamental in the post-COP period. Without political support, the sector will face increasingly restrictive rules," says Thesing.

The next international conference on the topic, COP12, is scheduled for 2027 in Yerevan, Armenia.

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BASF announces Integral Pro for sunflower seed treatment in France.

Registration opens access to biological technology across the European Union starting with the 2026 crop season.

24.11.2025 | 08:26 (UTC -3)

Cultivar Magazine, based on information from Verena Kempter

BASF has announced the registration of its biological fungicide Integral Pro for sunflower seed treatment in France. The approval guarantees the product will be available to producers in the European Union starting with the 2026 planting season. The technology prevents seed- and soil-borne fungal diseases and increases crop yield potential.

The solution has been protecting canola fields in Europe since 2018. According to Pierre Lopez, portfolio manager for seed treatment at BASF Agricultural Solutions, technical results in sunflower indicate control of... *Alternaria* spp., *Phoma* spp. And *Botrytis* spp.. The performance motivated the first registration for the crop. The executive states that the company delivers to the market an alternative that

supports seed companies and producers.

The product uses bacteria *Bacillus amyloliquefaciens* MBI600. The microorganism rapidly colonizes the seed and radicle after application in a solution. Its action creates a biological barrier in the first few days after sowing. The bacteria also produce natural antifungal compounds that interrupt the life cycle of pathogenic fungi. This dual mode of action ensures protection from emergence onwards.

Trials conducted in the European Union between 2022 and 2024 recorded control of *Alternaria* spp. and *Phoma* spp. and efficacy against *Botrytis* spp. Tests showed improvements in emergence, initial vigor, and root development.

Evaluations indicated an average increase of 3,5 decitons per hectare compared to untreated seeds.

Ludovic Grosjean, an agronomist at BASF Agricultural Solutions, states that the treatment reduces pest and disease pressure right from the start of the cycle. According to him, the combination of protection, initial growth, and vigor offers security to the producer.

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Seeds and bio-inputs: pillars for assertive positioning.

By André Luiz Radunz, UFFS - Chapecó

23.11.2025 | 14:41 (UTC -3)

Action of *Trichoderma* about corn seed infected by *Fusarium*, demonstrating the potential for competition and mycoparasitism of *Trichoderma* sobre or *Fusarium* Photo: Sérgio Miguel Mazaro

Bio-inputs applied to seeds, along with other chemical and nutritional strategies,

are important tools for more efficient, sustainable, and productive agricultural production. However, the choice of products has generated many doubts and errors, which is why this article was written. Based on laboratory and field research conducted in recent years, it aims to address 7 (seven) practical pillars to be considered for achieving accuracy (using what is needed and what works), as presented below:

Pillar 1: Seed quality

This highlights the need to be familiar with the available seeds prior to treatment, regarding their quality attributes (genetic, physical, sanitary, and physiological), and to understand that there is no miracle

treatment or product, but rather a well-positioned one.

Understanding seed quality will provide valuable insights for working with and leveraging bio-inputs to maximize productive potential and reduce unnecessary investments. Seeds are crucial farm inputs and essential for achieving high yields. Pay attention to pathologies and physiological quality, as there is generally a correlation between the volume of liquid and products used, the storage period, and germination and vigor attributes.

Pillar 2: Product asset

This pillar highlights the importance of knowing the active ingredient of the bio-input, whether it is biological or non-biological, or a combination of active ingredients or products, such as micronutrients, amino acids, humic and fulvic acids, among others.

If biological, the pillars developed by Professor Dr. Sérgio Miguel Mazaro from UTFPR serve as a reference for the choice: selection of quality products/companies; choice based on the specificity of the isolates/strains; application method that reaches the biological target; application and stabilization conditions; compatibility with chemicals and biologicals; technologies involved in relation to the active ingredient and the formulation; and system

management. These pillars will not be explored in detail due to the importance of the topic and the focus of this article.

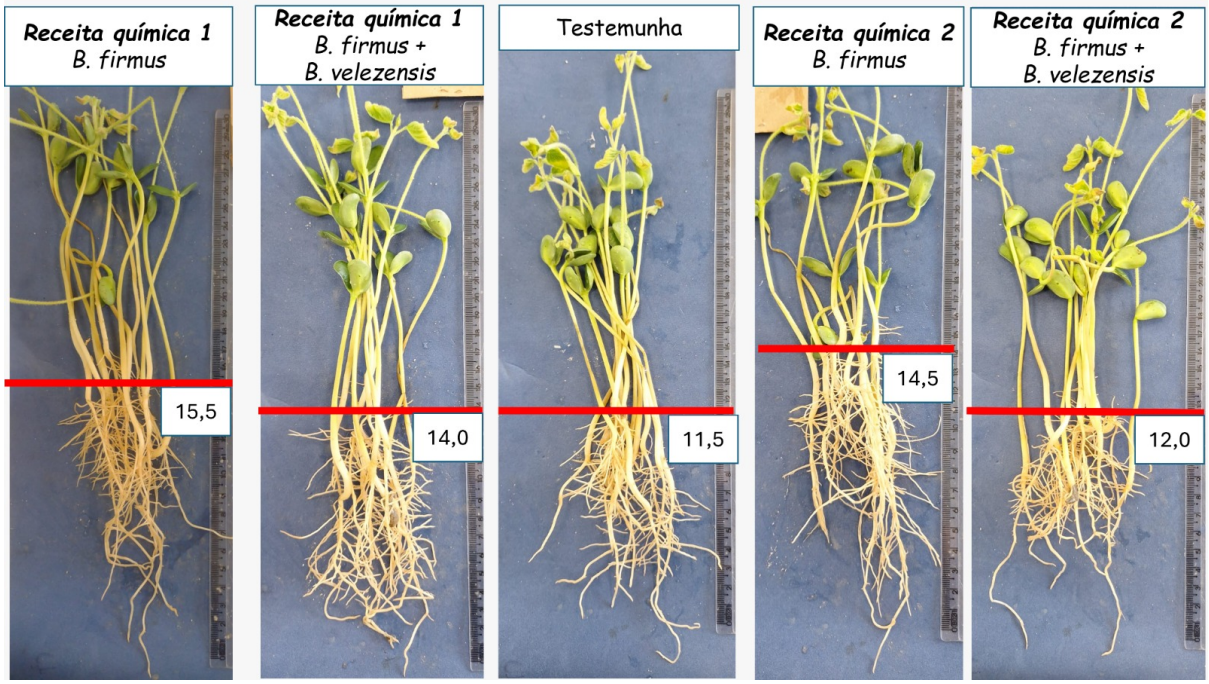


Photo: André Radunz

Among non-living substances, the application of metabolites, nutritional "musts" derived from biological actives, amino acids, essential oils and extracts (e.g.: *Ascophillum* sp.) are noteworthy, contributing to pathogen reduction, protection and nutrition, or in many cases

acting as auxin precursors and offering more suitable conditions for the establishment and multiplication of biological agents.

Understanding the active ingredient allows one to comprehend the care and viability time in the seed, its compatibility with other products and with the seeds themselves. It's crucial to understand that seeds are living beings and must receive active ingredients that condition/improve their quality, but also act as vehicles for the establishment of active ingredients to address soil problems. The choice of active ingredient should be based on seed quality, product availability in the region, investment, technologies available on the farms, crop management system, and the

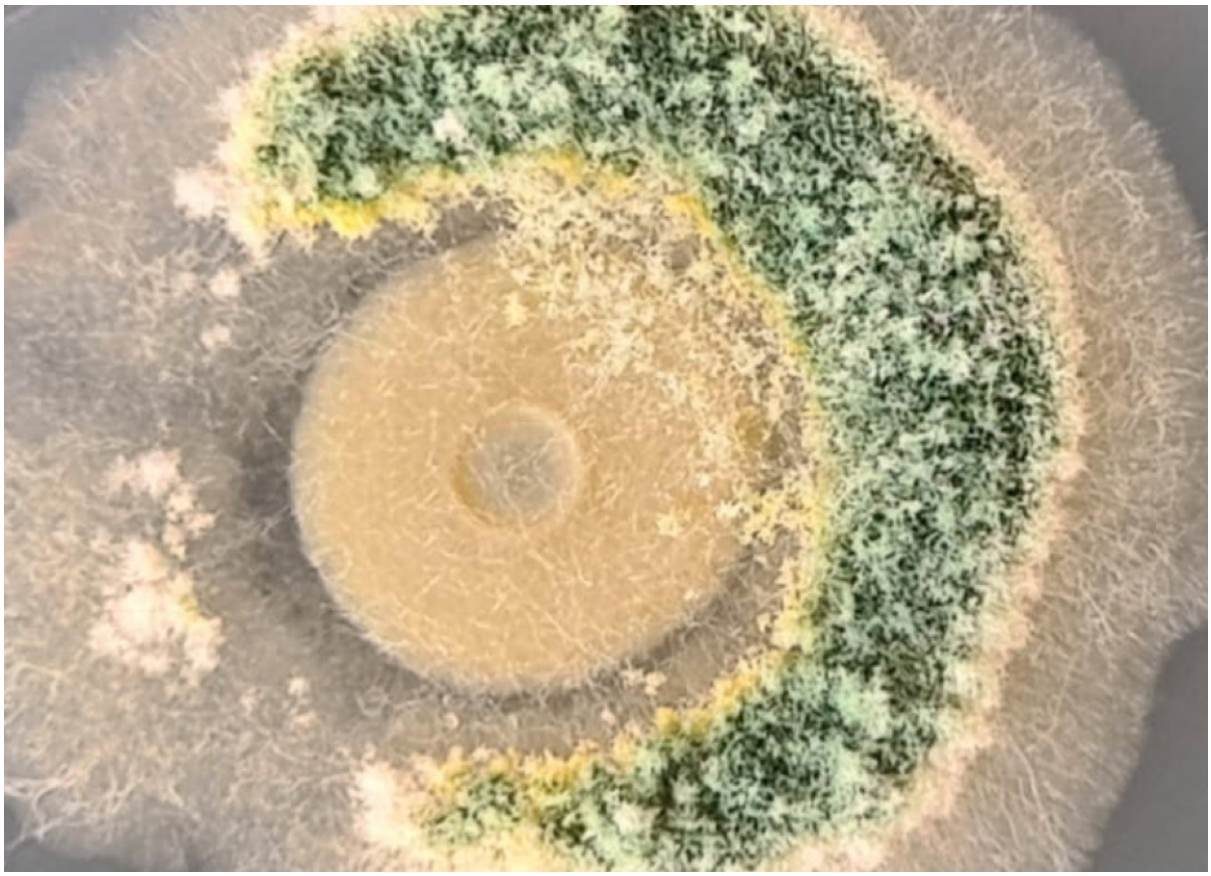
environmental conditions prevailing at the time of application, as well as those expected to occur during the cycle.

Pillar 3: application method on the seed

Among the strategies is seed treatment done on the property before sowing (TS – on farm), which may involve chemical, nutritional and bio-input products or just some by retreatment, such as inoculants, with more rudimentary or more technological equipment, via treatbag and application in the sowing furrow, usual strategies for bio-inputs produced "on farm". It shows good performance when well executed, in addition to flexibility in the

choice of products, allowing work with bio-inputs that have a shorter "shelf life".

Industrial seed treatment (IST), primarily carried out in factories, is an excellent strategy because it provides greater safety for operators and allows farmers to invest their time in other farm tasks, as they acquire seeds with a ready-to-use technological package. IST can also be performed on the farm using appropriate equipment and/or by qualified companies.



Compatibility of biological agents: *Bacillus amyloliquefaciens*, *Trichoderma harzianum* e *Trichoderma asperellum*Products with this type of formulation tend to be more efficient because they broaden their mechanisms of action - Photo: Sérgio Miguel Mazaro

Pay attention to seed quality and capabilities, as improper placement without technical knowledge can often fail to deliver the expected results, harm the physiological attributes, and potentially damage the product/company.

Pillar 4: the moment of application

Related to the technical knowledge addressed in the previous pillars and understanding the technology used on the property. The time, after inoculation treatments, that the seeds maintain their physiological quality -- low-vigor seeds are more susceptible to quality losses during storage. And also the viability time of the product's active ingredient according to its formulation (e.g., low storage capacity of *azospirillum* sp.).

Furthermore, it is necessary to understand the possibility/capacity for storage on the property and the climatic conditions of the

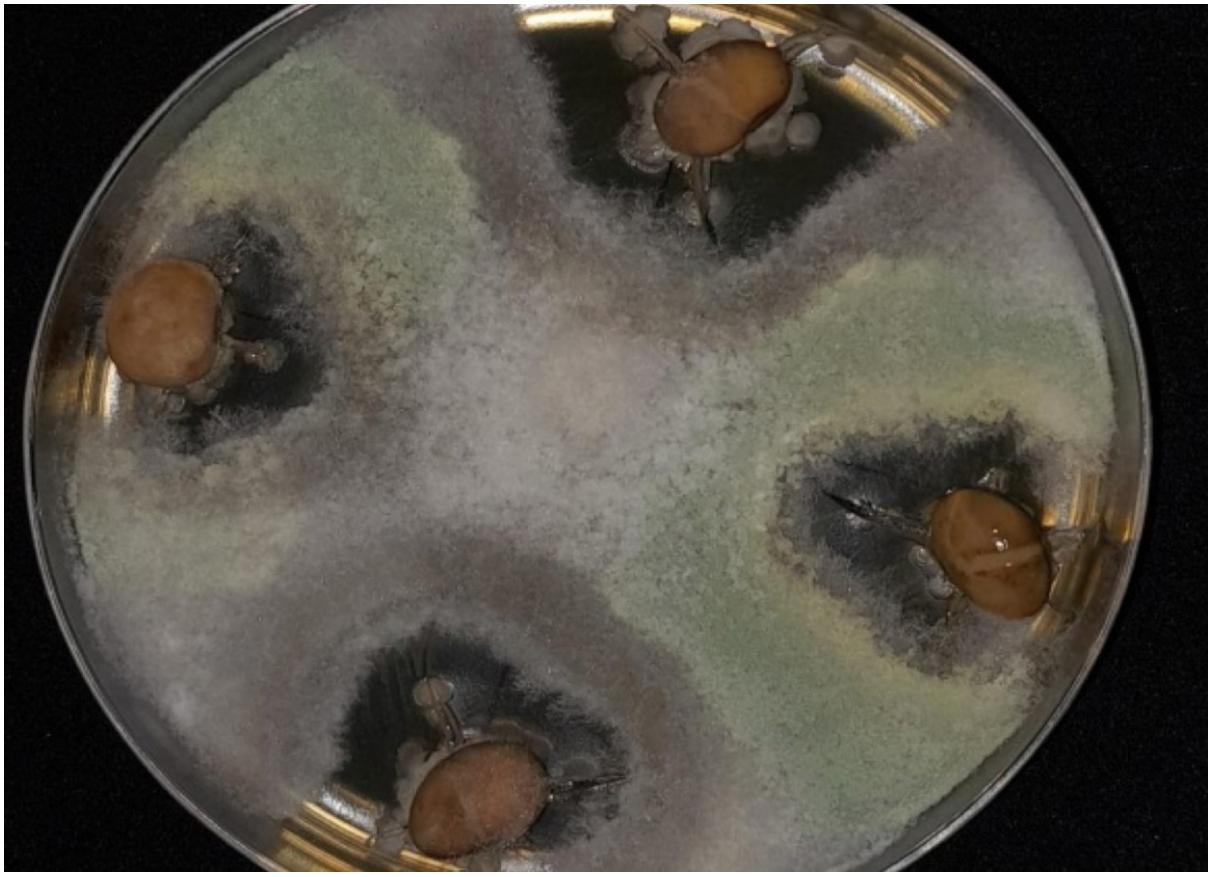
region/storage location, highlighting the importance of validations and research in order to understand the response of species and cultivars to treatments.

Pillar 5: What am I using it for?

In general, the focus/objective and main concern of those who use bio-inputs in the system (farmer/cooperative/seed producer, etc.) is acquiring the technologies/products that are being offered in abundance on the market. In many cases, the criteria for effectiveness are unknown or disregarded, with a more commercial or subjective view prevailing over technical and rational knowledge.

It is the cornerstone of decision-making regarding what will be added to the spray mixture, requiring significant expertise from both the technician and the producer, as many mistakes can be made by selecting unnecessary, incompatible products, products with little synergy, or products that are not priorities for the property. This

can lead to investments that will not deliver the expected results in terms of plant productivity and economic return.



Product synergy: seed treated with Bacillus and Trichoderma, where a fungus was placed in the middle of the plate. *Trichoderma* The action of competition led to the encounter with the fungus; *Bacillus* Because it depended on living material, it remained around the seed - Photo: Sérgio Miguel Mazaro

Inoculants are the first strategy to consider, due to the productive and economic gains that the addition of inoculants offers. *Bradyrhizobium* sp. It's

from *azospirillum* sp. bring, not necessarily as the first option in seed treatment, but certainly an indispensable option.

Secondly, consider the "producer's pain points," that is, problems that may be associated with seeds (sanitary quality) and the soil/property/region, the main examples being fungi, bacteria, insects, nematodes, and adverse weather conditions. Available bio-inputs may present synergies between the purposes for which they are applied – for example: *T. Harzianun* (biofungicide and bionematicicide); *P. fluorescens* e *P. thivervalensis* (biofungicide -- but also in growth promotion and solubilization); the genus *Bacillus*, among which we have -- *amyloliquefaciens*, *velezensis*, *firmus* (with functions as a bionematicide, biofungicide,

growth promoter, among others), but also the *aryabhattai* For water stress, highly recommended in the south of the country during La Niña years; *P. lilacinum* (bionematicide).

After these definitions, look at strategies that improve/condition germination, emergence, and initial plant stand establishment, such as bioregulators and biostimulants. In many cases, this approach considers possibilities that synergize with the grower's needs, but algae extracts (e.g., seaweed extracts) are also options. *Ascophyllum* sp.) and vegetables, metabolites, which may be associated with amino acids and micronutrients (Co, Ni, Mn, Mo, S, Zn) -- note that the salinity index must be less than 30.

Some microorganisms or biostimulants can produce significant "aggressiveness" in the process and should be used, without significant overlap and with recommended doses, for example. *Bacillus* e *azospirillum* e *Trichoderma*This is especially true for seeds with lower physiological quality. The sequence of application presented follows a generic approach and can be reorganized according to the needs identified from the analysis of the previous pillars. Finally, adding a large number of products is not synonymous with better returns, as seeds have limitations in receiving products and solutions, and the cost of treatment must also be considered, since the best tool is not always the most economically viable.

Pillar 6: compatibility and syrup volume

It's time to decide which of the available products will be used. To do this, evaluate the compatibility between them, their formulations, and their mechanisms of action (antibiosis, mycoparasitism, competition, induction of resistance), calculate the dose, and assess the seed's ability to receive the product. Using bacterial protectants and applying biological products together with or immediately after polymers allows for better conditions for the polymers on the seeds.

Generally, the ideal spray volume for chemical, nutritional, polymer, protectant,

and bio-input products is 7 to 8 ml/kg of seed, with good safety. However, spray applications of around 10 to 12 ml/kg of seed are used, but attention must be paid to ensuring the seed has high physiological quality. For pre-sowing treatments, such as the Tratabag and furrow treatments, the recommended spray volume is between 40 and 50 L/ha.

Therefore, it is clear that for various reasons it is not possible to position all products of interest, and thus, accuracy is built on technical and scientific knowledge combined with the expertise of the producers and technicians responsible for decision-making.

Pillar 7: Systems and interactions with the environment

Fundamental to the success of the production process and the use of bio-inputs, especially in the medium/long term and with stability. It involves strategies related to plantability, soil quality, water and organic matter availability, among others; that is, it is important to understand that in addition to quality seeds and well-positioned products, the basics must be done well.

Furthermore, production processes go beyond short-term results (at harvest time), and the use of bio-inputs positioned in different crops—winter and

summer—and at different phenological stages can produce results in the system, contributing to gains in productivity and reduced production costs over the years.

As an example of systems management, consider the use of biofungicides and bionematicides in winter and off-season crops, contributing to the reduction of fungal diseases, assuming a correlation between the occurrence of *M. javanica*, *P. brachyurus* e *H. dihystera* with phytopathogens such as *Fusarium* sp. *Phomopsis* sp. *rhizoctonia* sp. It is *Macrophomina* sp..

Final considerations

The assertive placement of bio-inputs alongside seeds is a fundamental tool for crop management and contributes to making Brazilian agriculture increasingly competitive. To this end, understanding seed quality and positioning necessary products considering inoculation strategies, producer needs, and biostimulation and bioregulation are important and eliminate errors.

It's no use treating just any seed and putting any product on it; you need assertiveness, knowing that proper crop establishment is key to achieving high yield potentials.

By **André Luiz Radunz***, UFFS - Chapecó*

** Acknowledgement: to my friend Professor Sérgio Miguel Mazaro for the

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