Aug 22, 2026

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Cultivar Semanal



Thrips prey on two-spotted spider mites

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Thrips prey on spider mites in trials

The finding broadens our understanding of integrated pest management, but its effect under field conditions remains uncertain

21.08.2026 | 14:14 (UTC -3)

Schubert Peter, Cultivar Magazine



Photo: Whitney Cranshaw / Colorado State University - Bugwood

Three thrips species associated with vegetables can act as facultative predators

of the two-spotted spider mite Tetranychus urticae. The greatest pressure occurred on the eggs. In joint rearing for 20 days, the three thrips species reduced the abundance of active forms of Tetranychus urticae. The results broaden the understanding of the interactions between these pests and indicate a potential impact on integrated pest management strategies.

Researchers evaluated Frankliniella occidentalis, Thrips palmi, and Megalurothrips usitatus. All three species consumed Tetranychus urticae in laboratory assays. Predation intensity varied according to the thrips species, the predator's developmental stage, the prey's stage, and the presence of plant tissue (doi 10.3390/insects17080873).

Results by species

Frankliniella occidentalis showed the highest predation rate on eggs. First instar larvae reached a corrected rate of 96,8%, second instar larvae reached 95,7%, and adults reached 98,2%. Performance remained high in all three stages evaluated.

Thrips palmi showed a stage-dependent response. Adults consumed 64,1% of Tetranychus urticae eggs. First instar larvae accounted for 26,3%, while second instar larvae reached 15,2%. Megalurothrips usitatus showed lower rates, between 19,8% and 23,1% in the evaluated stages.

Predation on nymphs

Predation on mite nymphs showed greater variation. First instar larvae of Thrips palmi reached 57,3%. Adults of the same species registered 50,3%. Adults of Frankliniella occidentalis reached 46%. Megalurothrips usitatus showed values ??between 28,8% and 35,8%. Pressure on adults of Tetranychus urticae was lower than that observed on eggs and varied from 10,4% to 34,7%.

Host plant

The presence of the host plant altered predation on eggs. Removal of plant material increased consumption by Frankliniella occidentalis and Thrips palmi.

The effect on Megalurothrips usitatus was less intense and did not reach statistical significance. Predation on adult mites remained low on the different substrates.

According to the researchers, arenas without plant tissue increase the likelihood of predator-prey encounters. The absence of plants also eliminates potential refuges for eggs and removes an alternative food source for thrips. For this reason, the rates obtained without plants represent a potential limit to predatory capacity. They do not correspond to a direct estimate for protected crops or cultivations.

The co-reproduction experiments reinforced the effect on the mite population. After 20 days, Megalurothrips usitatus reduced the abundance of active

forms of Tetranychus urticae by 51,84%. Thrips palmi caused a reduction of 31,08%. Frankliniella occidentalis showed a reduction of 54,04%.

The study, however, does not attribute all of this decline to direct predation. Competition for plant resources, thrips-induced changes in plant quality, and host defense responses may also contribute to the result. The researchers consider semi-field and field trials necessary to separate these mechanisms.

Thrips and thrips

Predatory interactions between thrips species themselves were less intense. Adults did not significantly reduce the

survival of adults of other species during the 24-hour trials. Similar results occurred in most combinations involving larvae.

One exception involved second-instar larvae of Megalurothrips usitatus. They reduced the survival of Frankliniella occidentalis eggs by 57,4%. In the other combinations with eggs from different species, the researchers did not detect a significant effect.

Transfer of genetic material

The team also employed quantitative PCR to confirm the transfer of genetic material from prey to predators. DNA from Tetranychus urticae appeared in

individuals of all three thrips species after feeding trials. The method also detected DNA from thrips used as prey in selected combinations. The researchers emphasize the use of this analysis as confirmation of trophic interaction, not as a direct measure of predation intensity.

The tests were conducted in a laboratory at 25 degrees Celsius, 50% relative humidity with a ten percentage point variation, and a photoperiod of 16 hours of light and eight hours of darkness. The arenas did not contain previously established mite colonies or accumulated webs.

This condition limits extrapolation to the field. High populations of Tetranychus urticae produce webs on leaves, petioles,

and stems. This structure can hinder movement and the search for natural enemies. Previous studies cited in this work have already recorded a reduction in predation by Frankliniella occidentalis in the presence of webs.

Context-dependent omnivores

Researchers classify the three thrips as context-dependent omnivores, not just herbivores. The ability to consume Tetranychus urticae eggs may contribute to reducing mite populations in certain situations. This does not make the thrips beneficial organisms to the production system. The same species cause direct

damage to crops, and some also transmit plant viruses.

For integrated pest management, the study points to the need to consider this interaction when evaluating simultaneous populations of thrips and mites. Programs with broad-spectrum insecticides targeting thrips can also eliminate an incidental source of Tetranychus urticae mortality. The agronomic relevance of this effect still depends on validation under real-world growing conditions.

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Research detects signs of sexual recombination in Bipolaris maydis

The study found a balance between mating types and coexistence of the two profiles in leaves and crops

20.08.2026 | 16:56 (UTC -3)

Schubert Peter, Cultivar Magazine



Photo: Craig Grau / Bugwood

Chinese scientists have reported populations of Bipolaris maydis with indirect evidence of potential sexual reproduction under natural conditions. They found MAT1-1 and MAT1-2 mating types across all scales evaluated. The frequency of the two groups approached a one-to-one ratio after 2020.

The study analyzed 2.582 isolates and monitored fungal populations between 2015 and 2025. The annual monitoring included 1.093 isolates from seven locations in southeastern China. Between 2015 and 2020, MAT1-2 predominated significantly. From 2021 to 2025, the difference lost statistical significance, with a shift towards equilibrium between the two types (doi 10.3390/jof12080624).

Geographic assessment

The geographic assessment included 14 provinces. Researchers identified MAT1-1 in 47,7% of the 776 isolates analyzed in this phase and MAT1-2 in 52,3%. Eight provincial populations showed a ratio consistent with one to one.

The proximity between the types also appeared within the crops and leaves. In the evaluated fields, 197 isolates belonged to MAT1-1 and 199 to MAT1-2. In individual leaves, all locations presented both mating types.

Possibility of crossing

According to the researchers, coexistence alone does not prove sexual reproduction. However, the close one-to-one distribution and the simultaneous presence of opposite types increase the possibility of interbreeding. The study did not identify any sexual structures of Bipolaris maydis in the field.

Sexual reproduction can increase the genetic diversity of the pathogen and favor the emergence of genotypes capable of overcoming fungicides or host resistance. Researchers point to the need to investigate alternative hosts and other periods of the disease cycle.

Learn more about Bipolaris maydis by clicking here.

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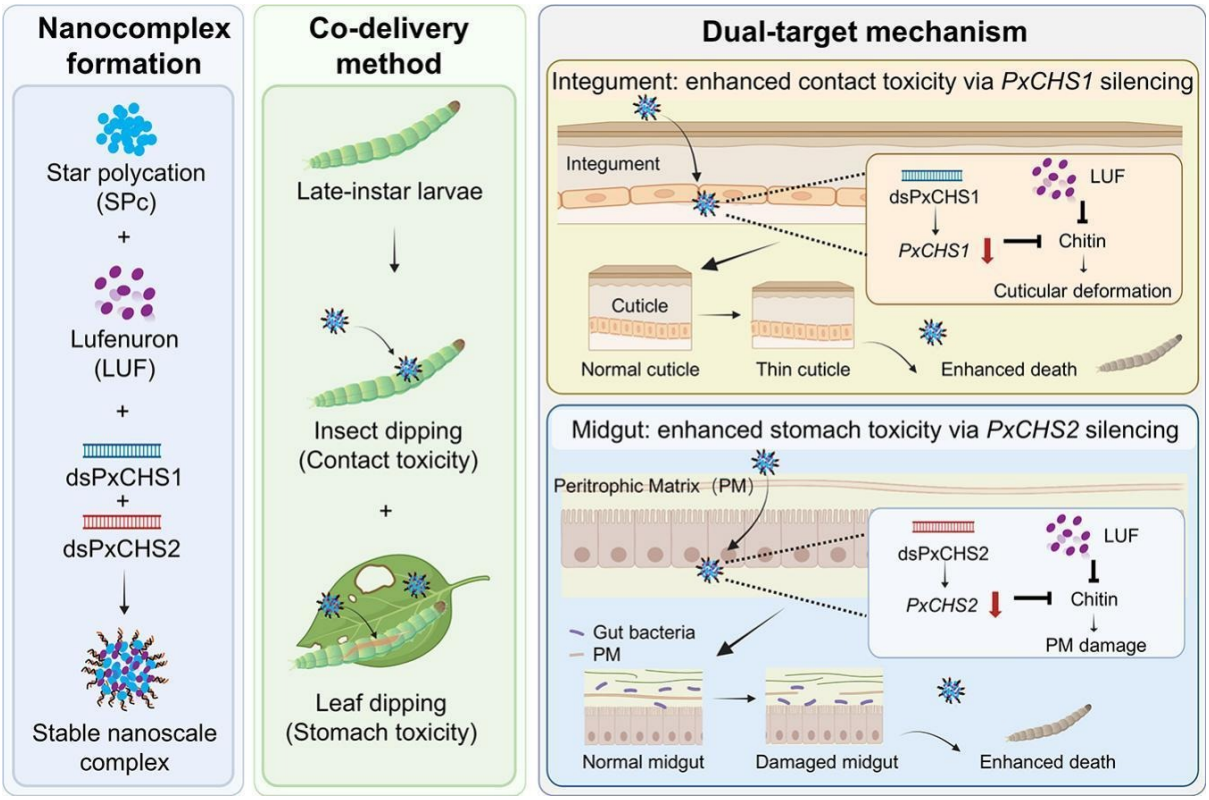
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Nanocomplex enhances control of diamondback moths

Lufenuron and RNAi breach cuticle and gut barriers in late-stage Plutella xylostella larvae

21.08.2026 | 13:56 (UTC -3)

Cultivar Magazine



doi 10.1016/j.pestbp.2026.107310

Researchers have developed a nanocomplex with lufenuron and double-

stranded RNA to enhance control of late-stage larvae of the diamondback moth, Plutella xylostella. In the laboratory, the formulation increased mortality of fourth-instar larvae to 83,33% eight days after application. Nano-lufenuron used as a control caused 50% mortality in the same period.

The strategy combines the insecticide lufenuron, the star polycation (SPc) nanocarrier, and dsRNA molecules targeting the PxCHS1 and PxCHS2 genes. These genes participate in chitin synthesis in different tissues. PxCHS1 showed higher expression in the integument. PxCHS2 concentrated its expression in the midgut.

Silencing PxCHS1 reduced the cuticle thickness from 4,25 to 2,70 micrometers and increased the contact toxicity of nano-lufenuron. Silencing PxCHS2 disrupted the integrity of the peritrophic matrix and increased ingestion toxicity.

In the combined application, the LUF/SPc/dsPxCHS1+dsPxCHS2 complex acted on both barriers. In third-instar larvae, mortality reached 91,67% four days after treatment, compared to 68,33% in the control with nano-lufenuron. In fourth-instar larvae, adult emergence fell to 15%, compared to 53,33% in the control with nano-lufenuron.

The study points to the potential for expanding the action of growth regulators against caterpillars in advanced stages. However, the researchers highlight

challenges for field use, including the stability of the nanocarrier, performance under agricultural conditions, and residual effects on the environment and non-target organisms (doi 10.1016/j.pestbp.2026.107310).

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Saiba mais!

Bedbug movement challenges the effectiveness of companion plants

Study documents rapid migration between raspberry, strawberry, and species used as trap plants

21.08.2026 | 10:24 (UTC -3)

Schubert Peter, Cultivar Magazine



Photo: Cnrdmroglu / Pexels

Companion plants can alter the movement of invasive stink bugs in raspberry and strawberry crops. However, the effect varies depending on the plant species, the time elapsed since the insects' arrival, and local conditions. Experiments with *Halyomorpha halys* and *Nezara viridula* showed frequent movement between the main crop and adjacent vegetation. The results indicate the potential of companion plants to concentrate pests, but also point to the risk of these areas functioning as dispersal routes.

Researchers at the University of Geisenheim, Germany, evaluated the insects in two experiments conducted in 2024 (doi 10.1002/ps.71217). The first followed adult Halyomorpha halys in semi-

field cages with raspberry, broad bean, sunflower, and a mixture of flowering plants. The second employed marking, release, and recapture of Nezara viridula in a strawberry area with companion vegetation strips.

Halyomorpha halys

In the trial with Halyomorpha halys, all adults began the experiment on raspberry bushes. The team monitored the insects for five days. Over the course of the period, the stink bugs began to occupy broad beans and sunflowers more frequently.

In the overall observations, 50,4% of the records occurred in raspberry bushes. The

open area of ??the cages accounted for 24,8%. Broad beans accounted for 10,9% of the records, and sunflowers, 10,7%. The mixture of flowering plants received 3,3%.

The distribution also changed between the two experimental environments. The shaded cage concentrated a higher proportion of insects on the raspberry plants. The environment exposed to the sun showed a higher relative use of sunflowers. The statistical model indicated a reduction in the likelihood of companion plant use in the shaded environment. The researchers point out an important limitation: each light condition corresponded to a single cage. Therefore, the study did not separate the effect of the environment from the identity of each structure.

Adult Halyomorpha halys exhibited an average displacement of 72,8 centimeters between successive detections. The median reached 37,4 centimeters. In 29,2% of the intervals, the insects remained at the same detected point.

Probability of movement

The probability of movement increased in observations made at 2 p.m. compared to 10 a.m. Higher temperature and relative humidity within each experimental period were also associated with a greater probability of movement. Among the moving insects, the distances traveled reached greater values ??in the shaded

environment and at 2 p.m.

The use of broad beans and sunflowers increased over time after the release of the stink bugs. Sunflowers showed greater relative use in the sun-exposed environment. The data reinforce the influence of the local context on plant selection. The experiment did not allow for the separation of the effects of phenology, season, and environmental conditions.

Nezara viridula

The field trial with Nezara viridula showed similar dynamics between strawberry plants and companion vegetation. The team released 600 marked adults. Half started the experiment in the strawberry

area. The other half started in strips with companion plants. After 24 hours, the researchers recaptured 104 individuals, equivalent to 17,3% of the total released.

Of the 56 adults recaptured after being released in the strawberry field, only 17 remained in the crop area. This number corresponded to 30,4% of the recaptures of this group. Another 39 individuals appeared in the companion plant strips. This portion represented 69,6%.

The group released in the vegetation strips showed a more balanced distribution. Of the 48 individuals recaptured, 25 remained in the strips and 23 migrated to the strawberry patch. The proportions reached 52,1% and 47,9%, respectively. Statistical analysis indicated less retention in the

original habitat among insects released on the strawberry patch.

Fixed retention points

The results rule out interpreting trap plants as fixed retention points. Companion species may receive adults from the main crop, but the insects also return to the crop. The strategy's effectiveness depends on the attractiveness period of each plant in relation to the crop's most susceptible phase.

Researchers highlight phenology as a central element in management. A companion plant can attract adults before the crop's critical period or offer a more attractive resource during that phase.

Local climate, cultivar, neighboring vegetation, and the developmental stage of the stink bugs also influence the outcome.

The strategy requires simultaneous monitoring of the crop and companion plants. These strips can act as concentration points and as indicators of insect arrival. Management also needs to consider the possibility of crop recolonization.

The study evaluated only adults and monitored short periods. The trial with Halyomorpha halys lasted five days. The test with Nezara viridula monitored recaptures for 24 hours. The experiments took place in a single location and in a single season. The research did not measure fruit damage or productivity. The

scientists recommend further studies examining egg laying, nymphs, damage, natural enemies, and different companion plant arrangements.

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Syngenta appoints Silvia Martinuzzo to head licensing operations

Executive assumes leadership of Licensing Operations for the seed sector in Brazil after working in strategic planning

21.08.2026 | 09:05 (UTC -3)

Cultivar Magazine



Syngenta has appointed Silvia Andrade Martinuzzo to lead its seed licensing operations in Brazil. The executive assumes the role after two years and seven months in the company's strategic planning area.

Silvia joined Syngenta in May 2023. In her first role, as seed strategy coordinator for Latin America, she led long-term planning for the region. Her work encompassed a 15-year horizon and supported mergers, acquisitions, and collaborations.

In January 2024, she moved into strategic seed planning in Brazil. In this position, she coordinated the five-year operational plan, the annual review of priorities, and the management of objectives and key results (OKRs), used by the executive

team as performance indicators.

The professional also participated in committees focused on digital tools and sustainability. She acted as a PMO in strategic projects and studies of new business models.

Before Syngenta, Martinuzzo worked at QuintoAndar and Votorantim Cimentos, with activities related to market intelligence, strategy, B2B marketing, and planning.

She holds a degree in Civil Engineering from the University of São Paulo and a specialization in project management from the same institution. She also completed executive programs in mergers and acquisitions and marketing strategy at Insper.

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Opsins regulate phototaxis in Myzus persicae

Study links MpUV1, MpUV2, and MpLW to insect responses to ultraviolet, green, and yellow light

21.08.2026 | 06:59 (UTC -3)

Schubert Peter, Cultivar Magazine



Opsin genes participate in distinct mechanisms of phototaxis and color preference in Myzus persicae. Researchers have identified specific functions of MpUV1, MpUV2, and MpLW in the aphid's response to different wavelengths. The results may support the development of management strategies based on insect vision.

In the tests, Myzus persicae showed a more intense phototactic response to green light compared to yellow light. In tests with colored surfaces, however, the insects preferred the yellow cardboard.

Scientists cloned and characterized four opsin genes: MpLW, MpUV1, MpUV2, and MpUV-Like. Ultraviolet irradiation induced the expression of MpUV1, MpUV2, and

MpUV-Like. Green and yellow light favored the expression of MpLW.

Specific functions

RNA interference assays showed specific functions of these genes. Reduced expression of MpUV1 or MpUV2 decreased the phototactic response to ultraviolet light. Reduced expression of MpLW decreased the response to green and yellow light.

Silencing MpLW in isolation did not significantly alter the choice between yellow and green cardboard. However, silencing MpUV1, MpUV2, and MpLW together reduced the attraction to both colors.

The results indicate different molecular mechanisms for phototaxis and color preference in Myzus persicae. The aphid's visual system may use specific strategies depending on the light stimulus (doi 10.1002/ps.71240).

What are opsins?

Opsins are light-receptor proteins found in the photoreceptor cells of the eyes. They participate in the conversion of light into electrical and chemical signals processed by the nervous system. Each type of opsin responds more efficiently to specific ranges of the light spectrum, such as ultraviolet, blue, green, or longer wavelengths.

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Agosto/2026

Agricultural Market - August 21, 2026

Soybean, corn, and wheat prices are rising internationally; exports and demand are supporting prices in Brazil.

21.08.2026 | 06:40 (UTC -3)

Vlamir Brandalizze - @brandalizzeconsulting



The rise in oil prices, weather problems in the United States, and the increase in

Brazilian exports supported the soybean, corn, and wheat markets. WTI crude oil surpassed US$85 per barrel, while Brent crude exceeded US$90 and approached US$100 again. This movement occurred amidst the crisis involving Iran and statements by US President Donald Trump. The appreciation of energy also broadened the support for other commodities.

In the United States, excessive rain and flooding in different regions also put pressure on agricultural prices. Soybeans in Chicago reached their best moment of the year. Some positions reached their highest levels in more than two years. Contracts remained in the range of US$12,20 per bushel or above that level. The market remained firm in short- and

medium-term positions, with support also in maturities up to September 2027.

In Brazil, soybeans followed the trend. Prices at ports ranged between R$154 and R$160 per sack, depending on the delivery month. Sales of the current crop reached 79%. Last year, the rate was 81%. The average is also 81%.

Producers still have a high volume of soybeans available. The stock held by farmers totals approximately 37,9 million tons. During the same period of the previous year, the volume reached 32,3 million tons.

Negotiations for the new harvest have reached 35%. Last year, they reached 37%, while the average is 38%. The

volume already negotiated totals 65,1 million tons.

Corn situation

Corn also received support from the international market. Assessments from the Pro Farmer circuit pointed to losses in US crops. Chicago reacted. The September contract moved from the US$4,30 region to around US$4,80 per bushel in approximately two weeks. The July 2027 positions reached the US$5,30 range.

In the Brazilian market, corn exports surpassed three million tons and continue to accelerate. Prices at ports ranged between R$ 71 and R$ 74 per sack for

positions between September and November. The B3 (Brazilian stock exchange) also saw increases. The March 2027 contract exceeded R$ 81 per sack.

The harvest of the second corn crop has reached 92%. Last year, it reached 95% at the same time. Mato Grosso has completed the work. Paraná reached 85%. Goiás and Mato Grosso are close to 88%, according to the data presented in the source. Planting of the first crop has begun in the South, still at a reduced pace. Progress should gain momentum starting next week.

Wheat situation

Wheat also saw price increases. The September contract approached US$7 per bushel, after exceeding US$6,80. Positions from the end of December onwards were above US$7. March 2027 surpassed US$7,20.

These prices increase the cost of imports for Brazil. Imported wheat can exceed R$ 1.900 per ton at the indicated levels. Difficulties in Russian supply and the effects of the war sustain this trend. In the domestic market, deals are being made between R$ 69 and R$ 71 per sack in Rio Grande do Sul and between R$ 72 and R$ 76 in Paraná.

The first wheat fields have begun to be harvested, mainly in Paraná. The weather has reduced some of the productive

potential of the crops. Quality has been less impacted, according to the assessment presented.

Rice situation

Rice prices remained firm in Rio Grande do Sul. Indications ranged from R$75 to R$82 per sack. Producers are only selling in small volumes, while retailers are restocking. The North and Northeast regions are driving demand. Industries are expanding their service to these regions, which is also reflected in the prices of rice bales.

Bean situation

The price of carioca beans has halted its downward trend. The premium variety, grade nine or higher, reached R$ 250 per sack during the period of greatest price pressure. New indicative prices range between R$ 280 and R$ 325. Above R$ 300, expectations suggest a gradual return of producers to sales.

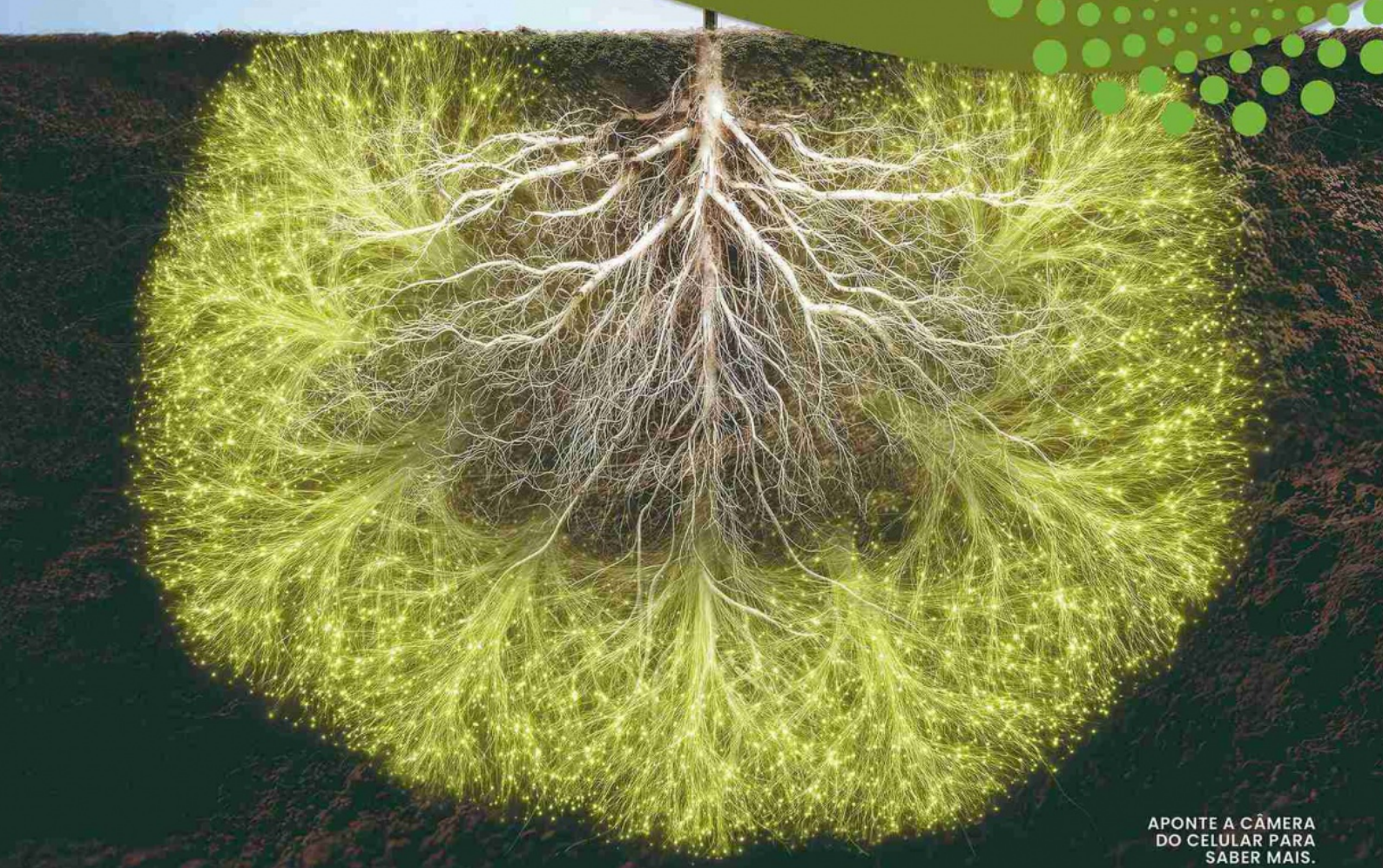
Commercial carioca beans also reacted. After fluctuating between R$ 220 and R$ 240 per sack the previous week, they moved to a range of R$ 255 to R$ 290. Producers are seeking prices of R$ 300 or more.

Black beans showed little change. Prices ranged between R$ 195 and R$ 225 per sack. In retail, commercial brands of carioca and black beans maintained prices between R$ 6 and R$ 10 per kilogram this

week.

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Biologicals



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UPL announces change in global crop protection leadership

Jai Shroff takes over the business following the departure of Mike Frank, who leaves the company on August 31st.

20.08.2026 | 16:19 (UTC -3)

Rafael Iglesias placeholder image



The UPL Group – a global provider of sustainable agricultural solutions – announced that Mike Frank will step down

as Chief Executive Officer (CEO) of UPL Corporation on August 31, after five years. Leadership of the crop protection business, which includes UPL Brazil, will pass to Jai Shroff (pictured), the current chairman and global CEO of the UPL Group.

During his tenure, Mike Frank prioritized strengthening the company, expanding relationships with clients and partners, and structuring operations with a future-oriented vision.

With the new structure, Jai Shroff will assume leadership of the operation, reinforcing the integration between the group's global strategy and the markets where UPL is present. The company will maintain its focus on long-term growth

objectives, paying attention to strategy execution, international expansion, and an innovative portfolio.

Regional leaders

Two changes are planned in UPL's regional leadership. Sameer Tandon has been appointed president of the Asia-Pacific and Africa division. The position expands his responsibility over strategic markets. The executive was previously responsible for Europe, the Middle East, Turkey, and Central Africa and will remain in charge of these regions until a successor is appointed.

Ashish Dobhal will assume the presidency of the Americas division, with responsibility

for Brazil, Latin America, and North America. Previously, he led the global sales and supply chain areas, including manufacturing, which will remain under his command.

Both Tandon and Dobhal built their professional careers at UPL and have accumulated extensive experience in different sectors and markets.

Experience with clients, operations, and local teams will be an important part of the new leadership structure. According to UPL, the new configuration seeks to bring decision-making closer to the markets and expand the capacity to respond to client demands.

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Arthur Toscano takes over regulatory area at Ruveon

Executive to lead company regulatory affairs after a career at Bayer, Monsanto and the agrochemical sector

20.08.2026 | 14:49 (UTC -3)

Cultivar Magazine



Arthur Toscano has assumed the role of US Regulatory Affairs Lead at Ruveon, in Saint Louis, United States. Previously, he worked at Bayer. Since March 2022, he held the position of Senior Regulatory Affairs Manager for North America.

Between November 2019 and March 2022, she worked as a Regulatory Science Manager in São Paulo. She also served as a Regulatory Affairs Supervisor for crop protection between August 2018 and October 2019.

His career path includes a stint at Monsanto Company. Toscano worked as a regulatory affairs supervisor for agrochemicals between July 2016 and August 2018. Prior to that, he served as a regulatory specialist in the same area,

from March 2014 to June 2016.

The professional also gained experience at Consagro Agroquímica, UPL, ALTA – América Latina Tecnologia Agrícola, and Cross Link, always in activities related to the regulation of agrochemicals.

Toscano holds a degree in Biological Sciences from the University of São Paulo.

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Indiscriminate use of biologicals threatens the foundations of integrated pest management

Researchers advocate for specific thresholds to preserve biological control

20.08.2026 | 14:28 (UTC -3)

Schubert Peter, Cultivar Magazine



Photo: David Cappaert - Bugwood

The adoption of biological control agents in scheduled applications, without pest sampling and without defined action thresholds, may repeat historical errors associated with the excessive use of insecticides. This warning comes from researchers at Embrapa, Esalq, Guizhou University, and Oregon State University. The group advocates for the inclusion of augmentative biological control within the principles of Integrated Pest Management (IPM).

Researchers acknowledge the gains achieved with biological agents and classify this strategy as one of the technical pillars of IPM (Integrated Pest Management). They also point to the

expansion of the global market. The segment registered annual growth exceeding 15% and reached US$ 3,3 billion in 2017. The projections they cite indicate a value above US$ 13 billion in 2027. More optimistic scenarios estimate US$ 49 billion in 2032.

Excessive use

This progress accompanies the quest to reduce dependence on synthetic insecticides, products that contribute to production gains and remain effective in various situations. However, their excessive use can favor the selection of resistant populations and stimulate outbreaks of secondary pests.

Integrated Pest Management (IPM) emerged as one of the main responses to this problem. According to scientists, integrated management programs have managed to reduce insecticide use in agricultural systems by more than 70%. Even so, adoption remains below its potential. Among the reasons cited are a lack of qualified personnel for monitoring and decision-making, fear of productivity losses, and the operational ease of the spray-based model.

Biological control

The expansion of biological control offers an alternative, but does not eliminate the need for technical decision-making. Scientists criticize repeated releases or

sprayings throughout the crop cycle without an established action threshold. In addition to the cost of unnecessary applications, the overuse of natural enemies can generate unintended effects.

One example involves Coccinella septempunctata. Releases of this species have been associated with the decline of native ladybugs in the Midwestern United States due to competition for habitat. Another case occurred in sugarcane fields in Brazil. Frequent and massive releases of Cotesia flavipes to control Diatraea saccharalis were associated with a significant decline in populations of native parasitoids from the Tachinidae family.

Resident populations

Researchers also express concern about potential alterations in the genetic structure of resident populations following excessive releases of natural enemies. According to the scientists, these risks do not negate the benefits of augmentative biological control. However, they reinforce the need for its use within IPM (Integrated Pest Management) and with the support of natural enemy conservation strategies.

Own thresholds

The central point involves economic thresholds. A control tactic should be implemented when the pest population reaches or exceeds the level defined for intervention. The problem arises from the direct transposition of thresholds

developed for chemical insecticides to biological control. According to the researchers, biological agents need their own thresholds, likely different from those used in chemical control.

The group considers the current availability of these parameters insufficient for many biological control agents. Therefore, it proposes prioritizing research to define specific economic thresholds. This measure would allow for guiding the timing of release or application and would help maintain the effectiveness of the technology over time.

The discussion revisits a lesson in pest management known, at least, since the publication of the classic book Silent Spring (in 1962, written by the American

biologist Rachel Carson). Replacing one tool with another does not, in itself, solve the problems caused by repetitive and indiscriminate use. For researchers, lasting IPM programs depend on a balanced combination of strategies and tactics, with decisions based on monitoring and the need for intervention.

Ideas and work were developed by scientists Adeney F. Bueno, Antônio R. Panizzi, Lessando M. Gontijo, Lian-Sheng Zang and Marcos Kogan (doi 10.1127/entomologia/4512).

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John Deere announces third quarter 2026 financial results

The company predicts a 15% to 20% drop in the tractor and combine harvester market

20.08.2026 | 10:50 (UTC -3)

Cultivar Magazine



Deere & Company raised its net income forecast for fiscal year 2026 and

maintained its bottom-up assessment of the current agricultural machinery cycle this year. The company now projects profits between $4,75 billion and $5 billion. The assessment considers trends in advance order programs, improved used machine inventories, and increased adoption of technologies.

In its third fiscal quarter, which ended on August 2, Deere reported net income of $1,379 billion. This represents a 7% increase compared to $1,289 billion in the same period of 2025. Worldwide sales and revenues rose 5% to $12,608 billion.

The Precision Agriculture and Production segment experienced a decline. Net sales fell 6% to $3,998 billion. Operating profit decreased 9% to $527 million. Lower shipping volumes pressured performance.

Prices and exchange rate effects offset some of the reduction.

In the Small Farms and Lawns segment, sales grew 12% to $3,383 billion. Operating profit increased 28% to $622 million. Higher volumes and prices contributed to the result.

By 2026, Deere projects a 15% to 20% decline in the market for large agricultural machinery in the United States and Canada. The company anticipates a similar contraction for tractors and harvesters in South America. Europe and Asia are expected to remain stable. The market for small agricultural machinery and lawn equipment in the United States and Canada may range from stable to a 5% increase.

DEERE & COMPANY

THIRD QUARTER 2026 PRESS RELEASE
(In millions of dollars) Unaudited

	Three Months Ended			Nine Months Ended		
	August 2 2026	July 27 2025	% Change	August 2 2026	July 27 2025	% Change
Net sales and revenues:						
Production & Precision Ag net sales	$ 3,998	$ 4,273	-6	$11,664	$12,571	-7
Small Ag & Turf net sales	3,383	3,025	+12	9,036	7,767	+16
Construction & Forestry net sales	3,618	3,059	+18	10,079	8,000	+26
Financial Services revenues	1,371	1,418	-3	4,121	4,273	-4
Other revenues	238	243	-2	689	679	+1
Total net sales and revenues	$12,608	$12,018	+5	$35,589	$33,290	+7
Operating profit: *						
Production & Precision Ag	$ 527	$ 580	-9	$ 1,372	$ 2,066	-34
Small Ag & Turf	622	485	+28	1,538	1,182	+30
Construction & Forestry	436	237	+84	1,134	681	+67
Financial Services	271	266	+2	823	740	+11
Total operating profit	1,856	1,568	+18	4,867	4,669	+4
Reconciling items **	52	60	-13	184	198	-7
Income taxes	(529)	(339)	+56	(1,243)	(905)	+37
Net income attributable to Deere & Company	$ 1,379	$ 1,289	+7	$ 3,808	$ 3,962	-4

* Operating profit is income from continuing operations before corporate expenses, certain external interest expenses, certain foreign exchange gains and losses, and income taxes. Operating profit of Financial Services includes the effect of interest expense and foreign exchange gains and losses.

** Reconciling items are primarily corporate expenses, certain interest income and expenses, certain foreign exchange gains and losses, pension and postretirement benefit costs excluding the service cost component, and net income attributable to noncontrolling interests.

Industry Outlook for Fiscal 2026

Agriculture & Turf	
U.S. & Canada:	
Large Ag	Down 15 to 20%
Small Ag & Turf	Flat to up 5%
Europe	Flat
South America (Tractors & Combines)	Down 15 to 20%
Asia	Flat
Construction & Forestry	
U.S. & Canada:	
Construction Equipment	Up 5 to 10%
Compact Construction Equipment	Up ~5%
Global Forestry	Down ~10%
Global Roadbuilding	Up ~10%

Deere Segment Outlook for Fiscal 2026

$ in millions	Net Sales	Currency Translation	Price Realization
Production & Precision Ag	Down ~10%	+2.5%	~ +1.0%
Small Ag & Turf	Up ~15%	+0.5%	~ +1.5%
Construction & Forestry	Up ~20%	+1.5%	~ +3.0%
Financial Services	Net Income	~ $870	

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Bayer appoints Renato Carvalho to lead R&D in Latin America

Executive adopts regional strategy for research and development in crop protection

20.08.2026 | 10:35 (UTC -3)

Cultivar Magazine



Renato Assis de Carvalho has assumed leadership of Crop Protection Research

and Development at Bayer for Latin America. As Vice President and Head of Crop Protection R&D Latam, the executive will define the regional research strategy, align priorities with the company's global strategy, and lead its implementation.

Carvalho returns to São Paulo after working in the United States. Between August 2025 and July 2026, he led the transformation of field development activities into crop protection in North America. The work involved technical development, commercial support for the portfolio, and improvement of data quality and operational efficiency.

The executive has over 14 years of experience in positions related to Bayer Crop Science and Monsanto, working in

R&D and marketing. Between 2022 and 2025, he led the global pest management strategy for soybeans, corn, and cotton. Prior to that, he was responsible for the insecticide and nematicide strategy in Latin America.

Her career also includes leading insect resistance management programs in Brazil and entomological development. In these roles, she worked on evaluating biotechnological traits, screening proteins, and conducting field and controlled environment trials.

Carvalho holds a degree in Biology from the State University of Campinas, a master's degree and a doctorate in Genetics and Molecular Biology. He completed postdoctoral studies at Rothamsted Research in the United

Kingdom, studying genetic mechanisms of insecticide resistance in agricultural pests, including Spodoptera frugiperda. He also holds an MBA in Agribusiness.

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Corteva extends deadline for bond exchange before spin-off

Vylor reports over 86% uptake across all three series and extends offers until September 29, 2026

20.08.2026 | 09:49 (UTC -3)

Cultivar Magazine, based on information from Bethany Shively

Corteva today announced the anticipated results of the private swap offers for debt

securities issued by EIDP and extended the term of the operations to September 29, 2026. Vylor, a wholly owned subsidiary of Corteva, received over 86% acceptance in each of the three tranches included in the transaction. The completion of the offers is contingent upon the planned separation of Corteva into two independent, publicly traded companies.

The reorganization envisions one company dedicated to the current crop protection business and another focused on the current seed business. Vylor will own and operate, directly or indirectly, the seed operation. Corteva expects to complete the separation around October 1, 2026, subject to the fulfillment or waiver of the conditions stipulated for the transaction.

Three series of senior notes

The offering involves three series of senior notes from EIDP. In the series with 2,300% interest and maturity in 2030, investors submitted US$431,634 million in principal up to maturity. This amount represents 86,33% of the US$500 million outstanding.

In the series with 5,125% interest and maturity in 2032, the amount presented reached US$468,434 million. Subscription corresponds to 93,69% of the US$500 million in circulation. In the 4,800% series, maturing in 2033, Vylor received US$524,868 million of the US$600 million in circulation, equivalent to 87,48%.

The early deadline expired at 17 p.m. New York time on August 19. By that time, Vylor had received the necessary consents to amend the underlying deed of the EIDP securities and had also obtained the required majority in each of the three series to modify the supplemental deeds.

Restrictive clauses

The proposed changes eliminate almost all restrictive clauses and default events stipulated in the base deed. Provisions related to payments and bankruptcy remain. The changes also remove repurchase offer clauses in the event of a change of control from supplementary deeds.

EIDP and the trustee intend to formalize the changes through a supplementary deed. The modifications will only take effect after the settlement of the exchange offers and consent requests.

Titles submitted before the deadline cannot be withdrawn. Consents given within that period cannot be revoked either.

Extended due dates

Corteva has extended the expiration date for exchange offers and consent requests. The previous deadline was September 3, 2026. The new deadline is 17 p.m. New York time on September 29, 2026, unless further extensions or early termination are

granted.

Eligible investors participating by the early deadline will receive, for every $1 in principal of EIDP securities accepted in the exchange, the same principal amount in corresponding Vylor securities, plus a cash portion. This portion amounts to approximately $2,90 per $1 in the 2030 series, $2,67 in the 2032 series, and $2,86 in the 2033 series.

New titles

Vylor's new bonds will maintain the same interest payment dates, interest rates, and maturities as the respective EIDP series.

Eligible investors participating after the early deadline, but up to September 29,

may receive $970 in Vylor bond principal for every $1 in corresponding EIDP bond principal. In this case, there will be no additional cash payment. Investors with accepted bonds will also receive accrued and unpaid interest up to the settlement date, as per the terms of the offer.

Vylor's obligation to accept and exchange the securities depends on the conditions set forth in the transaction memorandum. Among these conditions is the completion of the separation from Corteva. Without this step, the offers and requests for consent will not be finalized, the expected consideration will not be delivered, and the amendments to the deeds will not take effect.

Settlement is expected to occur around the second business day after the closing of the offers and close to the completion of the separation. Vylor may extend the maturity and settlement dates to maintain this sequence.

The offers are intended only for EIDP bondholders who meet the eligibility criteria defined in the transaction documents. In the United States, the transaction includes qualified institutional investors within the applicable rules. Outside the country, the offer follows the conditions set forth in Regulation S of US legislation.

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Fendt and Massey Ferguson arrive in the game American Farming 2

The mobile simulator will feature tractors from both brands and will replicate agricultural operations in a setting inspired by Iowa

20.08.2026 | 09:37 (UTC -3)

Cultivar Magazine



AGCO has announced the inclusion of Fendt and Massey Ferguson machines in the mobile game “American Farming 2”. The free agricultural simulator, developed by SquadBuilt Inc., will be released on August 24th and will allow users to operate digital versions of tractors from both brands in a landscape inspired by the state of Iowa, in the United States.

At launch, the game will feature the Fendt 1038, 1046, and 1050 tractors, as well as the Massey Ferguson MF8130, MF8140, and MF8150. AGCO has announced plans to add other equipment after the release. The virtual models are based on the designs of the manufacturer's real machines.

Operations include planting, harvesting, spraying, and transportation. The player can also raise animals, customize trucks and characters, and use first- or third-person multiplayer modes.

According to Brandon Montgomery, senior brand manager at Fendt North America, the initiative seeks to introduce modern agriculture to farmers and new audiences through a hands-on experience in the digital environment.

The partnership is part of AGCO's Farmer-First strategy and seeks to expand contact with new generations of producers through digital platforms and games.

SquadBuilt developed the “American Farming” series in partnership with Grant Hilbert, a first-generation farmer and

content creator from Iowa. The new title will be available for free download on the App Store and Google Play.

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Trypsin genes emerge as targets for the control of Spodoptera litura

Silencing Sltrypsin1 and Sltrypsin7 reduced development and increased susceptibility to insecticides

20.08.2026 | 09:13 (UTC -3)

Schubert Peter, Cultivar Magazine



Photo: Charles Olsen / USDA APHIS PPQ - Bugwood

Silencing two trypsin genes reduced the development of Spodoptera litura and increased the pest's susceptibility to insecticides. In trials with soybean and corn leaves, the application of double-stranded RNA associated with the SPc nanocarrier achieved control efficacy between 48,1% and 57,4%. The combination with insecticides also reduced median lethal concentration values ??in specific treatments.

Researchers at the Henan Institute of Science and Technology in China have characterized seven trypsin genes linked to the development of Spodoptera litura. Trypsins act as digestive proteases in the insects' gut. The study evaluated gene expression, RNA interference silencing,

and effects on growth, feeding, pupation, and adult emergence.

Greater expression

The seven genes showed higher expression in the larval stage and predominant concentration in the intestine. The study also identified a positive relationship between the expression of these genes and juvenile hormone titer. The team used methoprene, an analogue of juvenile hormone, and geraniol to evaluate this regulation.

In the RNA interference assay, double-stranded RNA was associated with SPc, a stellate polycation used as a nanocarrier. After 24 hours of feeding on an artificial

diet, the expression of the seven genes decreased from 33,4% to 54,6% compared to the control. After 48 hours, Sltrypsin2 and Sltrypsin7 still showed a significant reduction of 28,3% and 42,1%, respectively.

Silencing Sltrypsin1, Sltrypsin5, and Sltrypsin7 reduced larval weight and feed conversion efficiency. The treatments also prolonged development. Pupation and pupal weight decreased after silencing these three genes. Based on these results, the researchers selected Sltrypsin1 and Sltrypsin7 for assays with host plant leaves.

Weight reduction

In soybean leaves, dsSltrypsin1/SPc and dsSltrypsin7/SPc reduced caterpillar weight from the second day onwards. Feed conversion efficiency also decreased. The pupation rate decreased by 23,3% with dsSltrypsin1/SPc and by 17,5% with dsSltrypsin7/SPc. The proportion of pupae with normal development decreased by 40,5% and 42,4%, respectively. Adult emergence decreased by 12,7% and 26,0%. Control efficacy reached 48,1% with Sltrypsin1 and 57,4% with Sltrypsin7.

In corn, both treatments also reduced larval weight from the second day onwards. The pupation rate fell by 18,9% with dsSltrypsin1/SPc and by 18,6% with dsSltrypsin7/SPc. The proportion of pupae

with normal development decreased by 37,9% and 37,1%. Adult emergence fell by 20,2% and 30,4%. Control efficacy reached 50,5% and 56,2%, respectively.

Gene silencing and insecticides

The study also evaluated the association of gene silencing with insecticides in an artificial diet. dsSltrypsin1/SPc significantly increased the susceptibility of Spodoptera litura to lufenuron, spinosad, and RH-5849. The synergism ratios reached 1,957, 1,571, and 1,545, respectively. dsSltrypsin7/SPc significantly increased susceptibility to chlorantraniliprole, with a synergism ratio of 1,764.

The results indicate the participation of Sltrypsin1 and Sltrypsin7 in the digestion of soybean and corn by Spodoptera litura. The study proposes these genes as targets for RNA-based biopesticides. The association with insecticides could increase control efficiency and reduce the amount of product needed. The researchers also point to potential for resistance management, but the application tests on plants were conducted under simulated field conditions (doi 10.3390/insects17080861).

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Gene combination improves RNAi effectiveness against mites

The association of Rpt2, Rpt3, and Rpt5 maintained an effect on different species and host plants

20.08.2026 | 07:23 (UTC -3)

Schubert Peter, Cultivar Magazine



Photo: David Cappaert / Bugwood

Researchers at Southwest University in China have developed a multi-target dsRNA to enhance the stability of RNA interference (RNAi) control of mites. The strategy simultaneously silenced the Rpt2, Rpt3, and Rpt5 subunits of the 26S proteasome. Tests indicated greater consistency of the effect across mite species and host plants.

The study used the dsRNAEngineer platform to select sequences against six mite species and assess potential off-target effects in ten non-target organisms. Mortality bioassays focused on Tetranychus urticae, Tetranychus evansi, and Panonychus citri (doi 10.1127/entomologia/4003).

In Tetranychus urticae maintained on soybeans, fusion dsRNAs caused mortality rates of 56,76% and 51,72% after ten days. The dsRNA targeting only Rpt3 caused 35,24%. In Panonychus citri, only the construct with Rpt5, Rpt3, and Rpt2 showed significant mortality, at 56,12%.

Varied performance

Performance varied depending on the host plant. In the Tetranychus urticae population reared on cowpea, the dsRNA against Rpt3 achieved 75,41% mortality. The three-target construct reached 67,54%. After transferring the mites to tomato or rose bushes, all three treatments produced significant and similar mortality.

The researchers also evaluated the predatory ladybug Propylaea japonica. The dsRNAs targeting the Rpt subunits did not affect survival, pupal weight, or the expression of the three genes most frequently predicted to have off-target effects. However, the study highlights the need for evaluations with more non-target organisms and longer exposure periods before drawing conclusions about environmental safety.

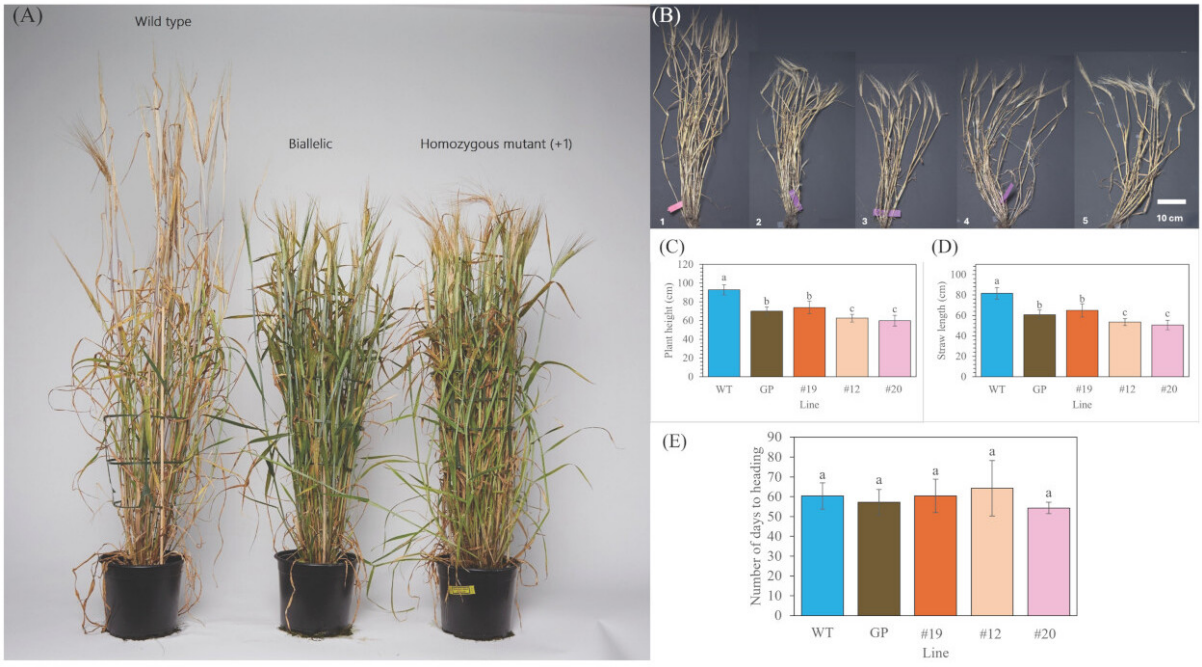
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Genetic editing induces dwarfism in barley and alters thin roots

HvDEP1 editing shortened plants and organs; study points to lower thousand-grain weight and reduction of fine roots

20.08.2026 | 06:58 (UTC -3)

Cultivar Magazine



doi 10.3390/ijpb17080077

European researchers used CRISPR/Cas9 to edit the HvDEP1 gene in barley (Hordeum vulgare), cultivar Maythorpe,

and induce dwarfism with precise mutations. The alterations reduced plant height, straw length, ear length, and awn length. The weight of a thousand grains also decreased, with a pleiotropic effect relevant to breeding.

In the tunnel test, Maythorpe averaged 93 centimeters. The mutant lines ranged from 60 to 74 centimeters. Knockouts #12 and #20 were between 30,4 and 33 centimeters shorter than the wild type. The in-frame mutation #19 showed an intermediate response for height, straw, and awns.

The weight of a thousand grains from Maythorpe reached 49,3 grams. Line #19 registered 36,9 grams and line #12, 30,6 grams. All mutant lines were below the

control. Researchers did not detect a significant effect on the heading date. The number of grains per ear varied between alleles, with no systematic pattern associated with HvDEP1.

In the root system, the experiment evaluated only knockout #12, with four replicates per genotype. The mutation did not alter the total root biomass. However, it reduced the specific root length and the length of the finest roots, with a diameter between zero and 0,25 millimeters. The total root length also decreased, but without statistical significance. Metabolomic analysis did not detect differences associated with the genotype.

Scientists consider the below-ground results preliminary and recommend validation in independent rows. The study

shows the potential of editing HvDEP1 to introduce short stature, but also reveals losses in agronomic traits linked to yield (doi 10.3390/ijpb17080077).

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João Silvatti is the new Marketing Leader at Rovensa Next

The executive has over 15 years of experience in agribusiness and previously worked at Ihara

19.08.2026 | 16:55 (UTC -3)

Cultivar Magazine



Agricultural engineer João Augusto Silvatti is the new Strategic Marketing leader at Rovensa Next in Brazil. In this role, he will be responsible for the company's growth

strategies, portfolio priorities, and competitive positioning.

Responsibilities include managing the areas of Product Management, Pricing, and Marketing Communication, as well as leading market intelligence, innovation, and strategic investment initiatives. The work will be carried out in conjunction with the Commercial, Research and Development (R&D), Supply Chain, and Executive Leadership areas.

Before joining Rovensa Next, Silvatti worked as a regional Marketing leader at Ihara. He has over 15 years of experience in agribusiness, working in marketing, sales, market access, and project management in multinational companies, including international experience.

Holding a degree in Agronomic Engineering from the São Paulo State University (Unesp), the executive also has a specialization in Agribusiness from the Luiz de Queiroz Higher School of Agriculture (Esalq/USP).

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FMC appoints Patricia Smirmaul as global marketing manager

The executive will be responsible for the global portfolio of chemical and biological insecticides

19.08.2026 | 15:00 (UTC -3)

Cultivar Magazine



FMC has appointed Patricia Guerra Smirmaul as its new Global Marketing Manager. In her new role, she will be responsible for the global portfolio of

chemical and biological insecticides.

Her responsibilities include strategic and financial portfolio management, market strategy, cross-functional leadership and influence, global stakeholder management, and product launches. Patrícia will also be responsible for the P&L (Profit and Loss) area, which encompasses the management of revenues, costs, and business results.

With over 15 years of experience leading agricultural pesticide and seed businesses in Latin America, Patrícia has built her career focusing on the customer journey, progressing from technical field roles to strategic leadership positions. Before assuming her new position at FMC, she served as Senior Marketing Manager for

Soybeans – Brazil at BASF. In that role, she was responsible for managing a P&L of approximately US$750 million related to the fungicide and herbicide businesses.

“I am very excited for this new chapter in my global career and to contribute to FMC’s transformation journey under Eric Vandenbrink’s leadership, alongside an incredible team,” Patricia said in a statement.

Patricia, an Agronomist Engineer graduated from the Federal University of Viçosa (UFV), holds a postgraduate degree in Plant Protection from the same institution. The executive also has specializations in management and marketing from the Getulio Vargas Foundation (FGV), in addition to training in management and leadership.

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Stevia compounds affect fall armyworm in laboratory tests

Stevioside had a lower LC50; leaf powder reduced the growth of larvae susceptible and resistant to Cry1Fa

19.08.2026 | 14:16 (UTC -3)

Schubert Peter, Cultivar Magazine



Photo: John C French Sr / Auburn University

Compounds derived from Stevia rebaudiana increased mortality and reduced the development of Spodoptera frugiperda larvae, the fall armyworm, in laboratory bioassays. Stevioside showed the highest toxicity among the materials evaluated. Whole leaf powder caused lower mortality but resulted in a significant reduction in larval weight. The effects also occurred in a population resistant to the Cry1Fa protein of Bacillus thuringiensis.

Researchers at the University of Tennessee, in the United States, evaluated stevioside, rebaudioside A, and leaf powder of Stevia rebaudiana (doi 10.1016/j.napere.2026.100224). The team used a susceptible colony and a colony with documented resistance to Bt corn with

Cry1Fa.

Susceptible population

In tests with susceptible populations, stevioside showed a median lethal concentration, or LC50, of 9,50 grams per liter. Rebaudioside A reached an LC50 of 15,42 grams per liter. Leaf powder showed an estimated value of 48,82 grams per liter.

Researchers recommend caution when interpreting the LC50 of leaf powder. The maximum mortality observed in this treatment was below 50%. Therefore, the value resulted from extrapolation of the probit analysis model.

The highest mortality occurred in the diet with 40% stevioside. This treatment killed 100% of the larvae. A 40% concentration of rebaudioside A caused an average mortality of 90%. Stevioside at 15% caused 73% mortality.

Different behavior

The leaf powder exhibited different behavior. At a concentration of 40%, mortality reached 43%. At the other concentrations, the rates remained lower. Four of the five concentrations evaluated produced mortality rates below 16%. The treatment with 5% leaf powder did not cause mortality in the first trial.

Despite this result, the whole-leaf material reduced larval growth. After nine days, individuals maintained on the control diet reached an average weight of 127,65 milligrams. Larvae fed a diet containing 2,5% leaf powder weighed 72,51 milligrams.

The increased concentration amplified the weight reduction. In the diet with 5% leaves, the larvae had an average weight of 32,50 milligrams. The values ??dropped to 16,67 milligrams with 10%, 2,48 milligrams with 20%, and 3,35 milligrams with 40%. The researchers point to a possible insect growth regulator effect for the whole leaf material.

Responsible mechanism

The mechanism responsible for this response remains unknown. The reduced growth may result from steviol glycosides or other components present in the leaves. The study cites, among the possibilities, feeding deterrence effects, growth regulation, or general toxicity.

Cry1Fa-resistant larvae

The team also tested the compounds on larvae of the 456 strain, resistant to the Cry1Fa protein. Each treatment received 18,35 grams per liter of the respective material. Stevioside caused 34,5%

mortality. Rebaudioside A caused 30,1%. Leaf powder caused 2,65%.

The analysis found no significant difference in mortality between the resistant and susceptible strains after exposure to the three materials. According to the researchers, the result indicates that the compounds maintained their activity despite resistance to Cry1Fa. However, the experiment was conducted under laboratory conditions.

Limitations as an insecticide

The results also show limitations for potential application as an insecticide. The concentrations required to cause mortality

were higher than those reported in the study itself for several synthetic insecticides. The team also highlights the differences between experimental methods, species, and evaluation periods, factors that can limit direct comparisons.

For researchers, leaf powder may be of greater interest as a growth regulator than as a conventional insecticide against Spodoptera frugiperda. The material requires little processing and reduced larval development even in treatments with low mortality.

The study recommends further research into the mode of action of Stevia rebaudiana compounds, their effectiveness under practical conditions, and their viability for commercial development. The scientists also indicate the need to

evaluate sublethal and deterrent effects on pollinators and predatory insects exposed to concentrations compatible with field conditions.

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Autophagy limits CLCuMuV in whitefly

Cellular response reduces viral DNA in Bemisia tabaci, but does not restore begomovirus transmission.

19.08.2026 | 09:37 (UTC -3)

Cultivar Magazine



Photo: Pflanzenschutzamt Saarbrücken, Husken-Thimm, Bugwood

The acquisition of Cotton leaf curl Multan virus (CLCuMuV) activates autophagy in

the cryptic MED species of Bemisia tabaci. This cellular mechanism limits the accumulation of viral DNA in the insect. However, this response alone does not explain the inability of this whitefly to transmit the virus.

Researchers from the Guangdong Academy of Agricultural Sciences in China monitored autophagy markers after the acquisition of CLCuMuV (doi 10.3390/insects17080862). Levels of the LC3-II protein increased after 24, 48, and 72 hours. The insects' gut also showed increased formation of structures associated with autophagy.

Scientists silenced the Atg3 and Atg9 genes through RNA interference. The procedure increased the accumulation of

CLCuMuV DNA to 1,4 times the control level after 48 hours. Chemical blockade of autophagic flux with bafilomycin A1 also increased the viral load. In 48 hours, the level reached 2,2 times the control.

The opposite effect occurred after induction of autophagy with rapamycin. The treatment reduced viral DNA by 46,4% after 24 hours and by 33,3% after 48 hours.

The highest viral load after silencing Atg3 and Atg9 did not restore transmission capacity. Recipient plants remained symptom-free after 30 days. PCR and qPCR also did not detect CLCuMuV.

The results indicate distinct mechanisms for viral accumulation and vector competence. Autophagy acts in the

containment of CLCuMuV in Bemisia tabaci MED, but other cellular and tissue barriers participate in blocking transmission.

Cotton leaf curl Multan virus (CLCuMuV) does not exist in Brazil. It is an exotic pest of quarantine importance to national agriculture, being mainly restricted to Asian countries such as Pakistan, India, and China.

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Wheat loses, apples win: the role of bees in the climate

German study points to differences between cereals, oilseeds and fruits under the influence of warming

19.08.2026 | 09:10 (UTC -3)

Schubert Peter, Cultivar Magazine



Photo: Ali Goode / Prexels

The dependence on insect pollinators interferes with the response of agricultural productivity to climate change. Researchers at the Technical University of Munich analyzed more than 35 years of production data in two regions of Germany. The results indicate a loss of favorable climatic conditions for some annual crops. Fruit trees with a high dependence on pollination, such as apples and cherries, still showed a positive response to warmer and drier environments.

The study evaluated data from 1985 to 2019 in Lower Franconia, with its hot and dry climate, and Upper Bavaria, with its cold and humid climate (doi 10.1002/ece3.73751). The team grouped

the crops into three classes. Cereals such as wheat, corn, oats, rye, barley, and triticale were included in the group with no dependence on pollinators. Rapeseed, sunflower, and broad beans showed moderate dependence, estimated at 25%. Apples, pears, plums, and cherries were included in the group with strong dependence, estimated at 65%.

Productivity increase

Productivity increased throughout the period in both regions and across all three classes. Researchers attribute this progress to technological advancements in agriculture, including improvements in machinery, precision agriculture, soil management, pest control, and genetic

improvement. The gains were less pronounced in the hot and dry region. The annual rate of increase reached 1,4% in this area, compared to 3,6% in the cold and humid region. According to the team, this result suggests a possible reduction in the technology's ability to compensate for the effects of climate over time.

Climate analysis revealed clearer differences between the groups. Crops independent of pollinators showed an optimal productivity range associated with the climate. This point was shifted towards warmer and drier conditions compared to the long-term climate average. Crops with moderate dependence also showed a climatic optimum. In this case, favorable conditions occurred in a slightly cooler and

wetter environment. The long-term climate average has already surpassed this optimum point for this group.

Loss of productivity

On the other hand, researchers highlight wheat as an example of performance loss. Temperatures above the optimal range, dry soil, and heat favor the formation of smaller grains and fewer in number. Fruit trees have not yet shown the same response. The researchers' hypothesis involves less damage from late frosts during flowering. This scenario may favor fruiting in warmer areas.

Crops heavily dependent on pollinators showed increased productivity as

conditions progressed to warmer and drier environments. This group mainly includes fruit trees. These plants flower early and are at risk of damage from spring frosts. Deep root systems can also increase access to water during short periods of drought. Researchers also point to a possible contribution from changes in the insect community. Bees exhibit high diversity and abundance in hot, dry regions and act as pollinators of fruit trees.

Protection against overheating?

The observed benefit for fruit trees does not indicate permanent protection against warming. Sara Diana Leonhardt, professor

of plant-insect interactions at the Technical University of Munich, warns of a possible double stress. The advancing climate can push the crop itself beyond its optimal range. Heat and drought can also reduce the number and size of flowers, as well as the supply and quality of pollen and nectar. With less floral attractiveness, insect visitation tends to be impacted.

The second component of this stress affects pollinators. Insects exhibit distinct thermal tolerances. Increased temperatures can alter daily activity, flight periods, abundance, diversity, and community composition. Changes in precipitation also interfere with foraging activity. Differences in response between plants and insects can also cause mismatches between the flowering period

and the presence of pollinators.

In the cold and humid region, warmer and drier years showed a higher frequency of above-average yields across all three classes. In the hot and dry region, the same condition reduced the performance of crops that are independent of and moderately dependent on pollinators. For the group with strong dependence, warmer and drier years increased the occurrence of above-average yields. The pattern reinforces the combined effect between regional climate and the level of pollination dependence.

Adaptation strategies

Paula Prucker, a researcher at the Technical University of Munich and the lead author of the study, advocates for the inclusion of crop climate requirements and pollinator needs in adaptation strategies. Johannes Kollmann, professor of restoration ecology and a member of the research team, cites flowering areas, hedgerows, more diversified crop rotations, and reduced pesticide use among the supporting measures.

The team emphasizes the importance of pollinator diversity. Communities with a greater number of species occupy a wider climatic range. This diversity can compensate for the reduction of heat-sensitive species and preserve pollination services under varying conditions. The researchers consider this component

relevant for productivity predictions and for planning agricultural adaptation to climate change.

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Organic fertilizer alters the nitrogen cycle in tobacco

Replacing 15% of mineral nitrogen with organic fertilizers reduced emissions and accelerated nitrogen cycling in the soil

19.08.2026 | 06:43 (UTC -3)

Schubert Peter, Cultivar Magazine



Photo: Mark Stebnicki / Pexels

Replacing 15% of mineral nitrogen with organic sources reduced cumulative nitrous oxide emissions and intensified nitrogen transformation processes in soil cultivated with tobacco (Nicotiana tabacum). The result came from a study conducted in Yunnan, China. Researchers compared commercial organic manure, farmland manure, and bio-organic fertilizer inoculated with Trichoderma viride with a treatment based solely on mineral nitrogen fertilizer.

The three treatments with organic replacement showed lower cumulative nitrous oxide emissions than those recorded with mineral fertilization. The difference reached statistical significance. However, among the three organic

sources, the researchers did not detect a statistically significant difference in cumulative emissions. The order observed started with the highest value in the mineral treatment, followed by cattle manure, commercial organic manure, and bio-organic fertilizer (doi 10.48130/nc-0026-0008).

Autotrophic nitrification

Autotrophic nitrification remained the main pathway for nitrous oxide formation. Its average contribution corresponded to 67,2% of emissions in mineral treatment, 62,3% in treatment with commercial organic manure, 65,4% with cattle manure, and 59,7% with bio-organic fertilizer. Heterotrophic nitrification accounted for

15,3% to 18,6%. Denitrification accounted for 17,5% to 21,7%. Co-denitrification did not show a significant contribution.

Organic substitution also altered the rate of nitrogen cycling. Gross nitrate production reached between 6,43 and 7,43 milligrams of nitrogen per kilogram of soil per day in treatments with organic sources. In the mineral treatment, the value reached 6,00 milligrams of nitrogen per kilogram of soil per day.

Gross ammonium production increased from 0,88 milligrams of nitrogen per kilogram of soil per day in the mineral treatment to values ??between 1,01 and 1,37 milligrams in the organic replacement treatments. Gross ammonium consumption also increased. The range

went from 6,50 to 6,96 milligrams of nitrogen per kilogram of soil per day, compared to 6,14 milligrams in the mineral treatment.

Ammonia consumption

Autotrophic nitrification dominated both nitrate production and ammonium consumption. The process accounted for 63,0% to 74,8% of gross nitrate production in the treatments evaluated. In ammonium consumption, its share ranged from 62,6% to 79,2%. Treatments with cattle manure and bio-organic fertilizer showed greater activity of this pathway compared to the exclusive use of mineral fertilizer.

The bio-organic fertilizer showed the highest gross ammonium production value,

with 1,37 milligrams of nitrogen per kilogram of soil per day. It also achieved the highest gross nitrate consumption, with 3,58 milligrams of nitrogen per kilogram of soil per day. In this treatment, the dissimilatory reduction of nitrate to ammonium accounted for 90,9% of ammonium production.

The researchers highlight an important point about this percentage. The high proportion of dissimilatory nitrate reduction to ammonium did not result from an abnormally high rate of the process. The result stemmed mainly from the low gross ammonium production and weak mineralization in the bio-organic treatment. The rate of this pathway remained within ranges reported for other soils.

Soil properties

The effects also appeared in the soil properties. The bio-organic fertilizer increased the levels of organic carbon and total nitrogen compared to the exclusively mineral treatment. Cattle manure showed the highest carbon/nitrogen ratio and the highest content of dissolved organic carbon. The researchers associate these changes with the availability of substrates for microorganisms and the alteration of nitrogen transformation pathways.

The field experiment took place in Qujing, Yunnan Province. The soil had a silty-clay loam texture. The Yunyan 100 cultivar was transplanted in May 2023 and harvested in September. After harvesting, researchers collected soil from the 0-20 centimeter

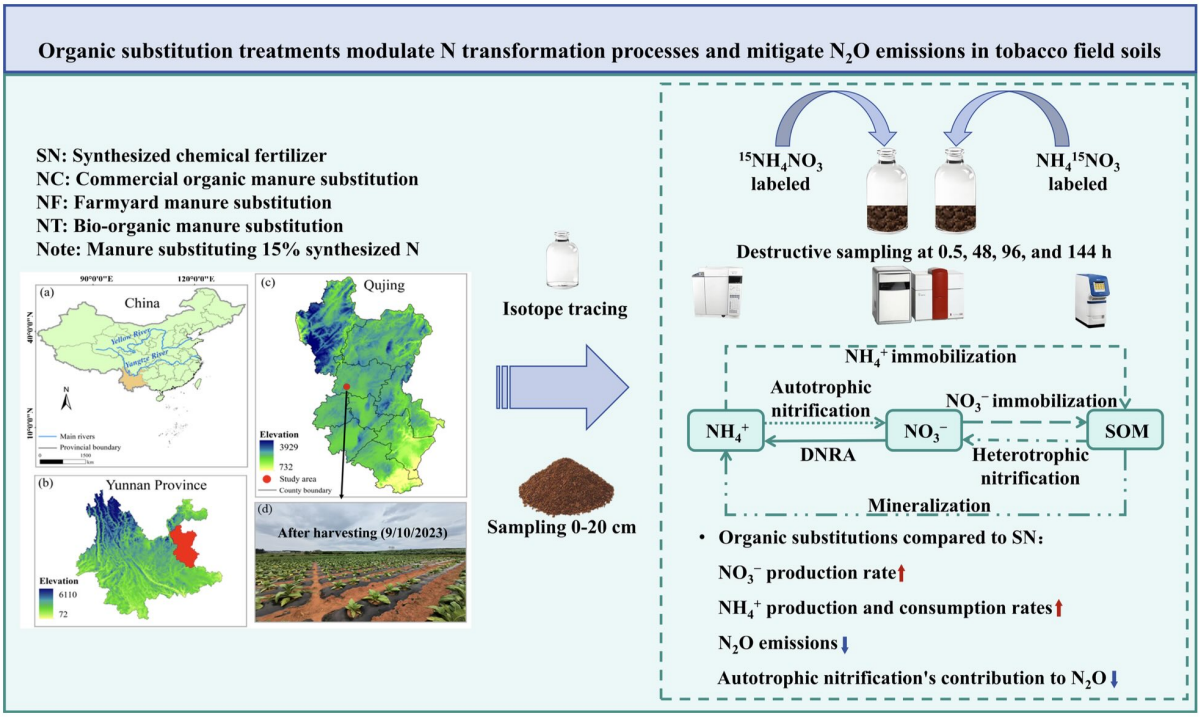
layer.

The team used isotopic labeling with nitrogen-15 to track the transformation of ammonium and nitrate. The samples were kept at 25 degrees Celsius with 60% of the pore space filled with water. Incubation continued for 144 hours.

Interpretation of values

The researchers explain that interpreting absolute values ??requires caution. The study applied 50 milligrams of nitrogen per kilogram of soil as an isotopic tracer. This dose exceeded the common stocks of inorganic nitrogen found in soil under field conditions.

According to the researchers, the procedure can stimulate microbial activity and increase absolute transformation rates. Therefore, the results represent potential rates under controlled conditions, and not direct measurements of rates occurring in the field. All treatments, however, received the same amount of the tracer and remained under identical conditions, allowing for comparison between fertilization strategies.



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Centipede grass provides pollen for the development of bumblebees

Study indicates potential of Eremochloa ophiuroides as a resource for pollinators in late summer and autumn

19.08.2026 | 06:24 (UTC -3)

Cultivar Magazine



Photo: Andrew Davis Tucker/UGA

Centipede grass (Eremochloa ophiuroides) provides pollen used by bees and can support the development of Bombus impatiens larvae and pupae. The result indicates evidence of the role of managed lawns as a supplementary food source for pollinators (doi 10.1007/s10841-026-00793-w).

Researchers evaluated five lawns in the state of Georgia, in the United States, in 2021 and 2022. Samples were collected between July and September, in two phases after mowing: ten to twelve days and fourteen to sixteen days. Bees of the genera Apis, Bombus, and Lasioglossum visited the inflorescences.

Pollen loads showed a higher proportion of Poaceae compared to pollen from other

families in both flowering phases and in both years. The presence of Bombus increased in September. Metabarcoding of 15 Bombus impatiens samples detected Eremochloa ophiuroides DNA in all of them.

Other grasses

Bees also collected pollen from other grasses, including Zoysia japonica, species of Paspalum and Axonopus, as well as plants of the genera Hedera, Lagerstroemia and Solanum, and Ulmus parvifolia.

In a no-choice experiment, Bombus impatiens colonies were given access to either centipede grass or Buddleja. In

2022, the treatments did not differ in the number of larvae and pupae, colony weight, or sugar solution consumption. In 2023, centipede grass and Buddleja resulted in more larvae and greater colony weight gain compared to the control without plants.

Researchers point to the potential of centipede grass as a complementary resource in urban and suburban landscapes, especially during periods with lower floral availability at the end of summer and in autumn. The nutritional profile of the pollen still needs further study.

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Bacteria become transistors in living circuits developed at MIT

A system using Pantoea agglomerans performs logical operations and can support biological sensors in plants

18.08.2026 | 16:47 (UTC -3)

Schubert Peter, Cultivar Magazine

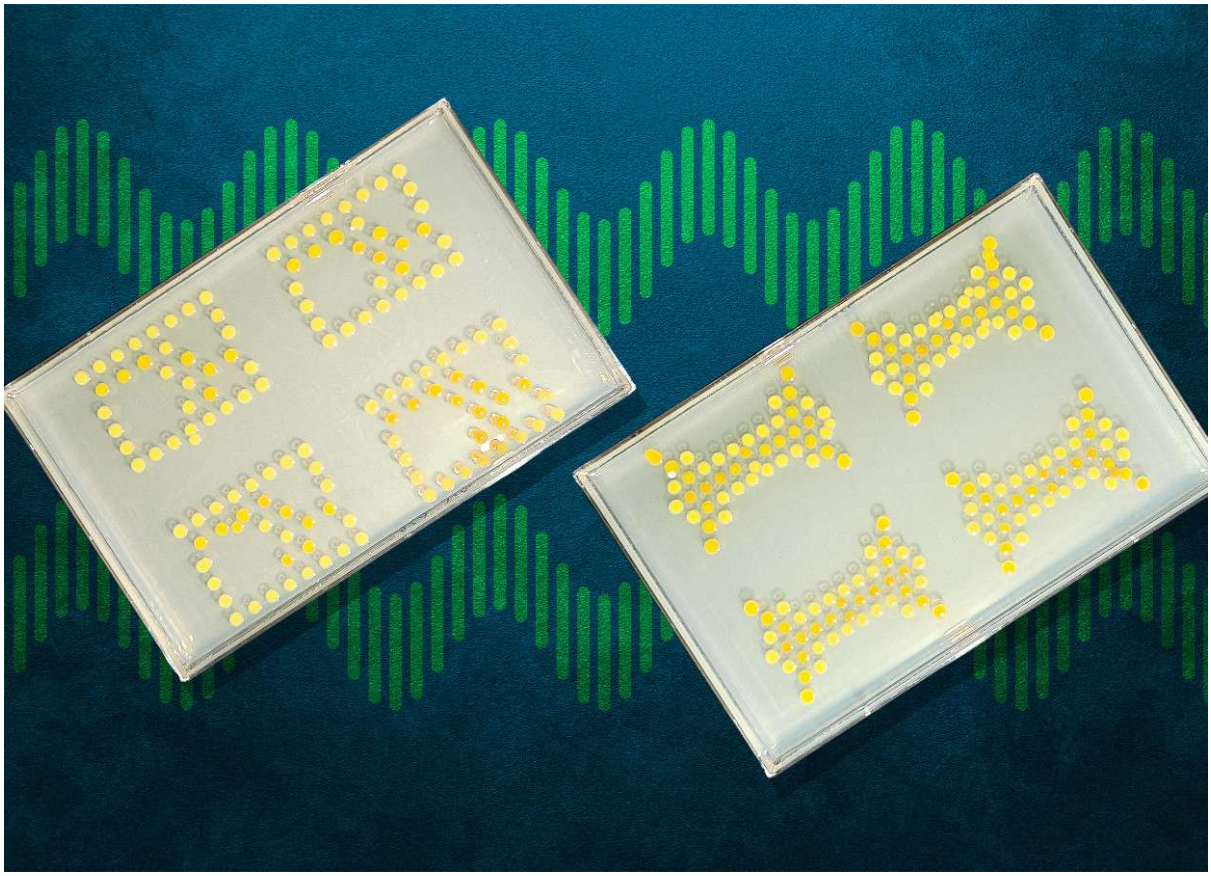


Image: researchers and editing MIT News

Researchers at the Massachusetts Institute of Technology (MIT) have programmed strains of Pantoea agglomerans to function as biological transistors. The system allows for the printing of living circuits onto a solid medium and the execution of logical operations through the flow of small molecules. The team points to possible future uses in leaves and roots, with the detection of drought, pest attacks, and other types of stress.

The work applies principles of pass-through transistor logic. The scientists developed two types of bacterial transistors, N and P, as well as three relay strains. The transistors receive molecular signals and control the production of

output molecules. The relay strains connect components and direct information between colonies.

Chosen bacteria

The chosen bacterium, Pantoea agglomerans, grows on surfaces, including plants. In the circuits, a molecule called OC-6 turns one type of transistor on and turns off another. Another signal, OC-12, acts as a target molecule. Depending on the combination received, the cells produce OHC-14. The relay strains transform this signal into a new output, capable of powering another transistor.

The team prints the colonies onto agar plates. Each colony is about five

millimeters from its neighbor. The spacing limits signal diffusion to the nearest point and helps keep the flow of information in one direction. The change in the printed design alters the circuit's function without requiring further genetic modification.

Using only five cell types, the researchers assembled different architectures. The tests included logic operations with multiple inputs, "OR" and "implies" gates, a demultiplexer, a half adder, and a full adder. The largest circuit described combines 24 colonies and sums two inputs. The combination of simple functions allows for the expansion of the complexity of biological processing.

A different proposal

The proposal differs from traditional synthetic biology approaches, in which several functions are concentrated in the same cell. This strategy faces limitations related to the number of transcription factors available and the overload of the cellular machinery. In the new system, each strain performs a simple function. The spatial arrangement connects these functions.

The circuits take about eight hours to complete each calculation. This time exceeds that of electronic devices, but the researchers consider the duration compatible with biological applications. The goal is not to replace computers. The aim is to bring processing power to living systems.

In agriculture, the team cites the possibility of applying circuits to roots to detect different forms of stress (doi 10.1038/s41589-026-02300-3). After recognizing a specific signal, the system could trigger a biological response. An example cited by the scientists involves the synthesis of fungicide after detecting the corresponding stimulus.

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Research confirms Erysiphe vignae in cowpea in Brazil

Study confirms first global record of the fungus associated with powdery mildew in Vigna unguiculata

18.08.2026 | 16:05 (UTC -3)

Schubert Peter, Cultivar Magazine



doi 10.1111/jph.70375

Researchers have identified Erysiphe vignae as the causal agent of powdery

mildew in cowpea (Vigna unguiculata) in Brazil. According to the scientists, the study may represent the first worldwide record of this species causing the disease in the crop.

Powdery mildew gained importance after the expansion of cowpea cultivation into the Brazilian Cerrado. The disease had secondary importance in the traditional areas of the Semi-arid region. Researchers link the advance into the Cerrado to the dry conditions prevailing during the crop cycle.

The first symptoms appear as small, circular, whitish lesions with a cottony appearance. The superficial growth of the mycelium forms white colonies. As the disease progresses, these colonies can

cover the entire leaf surface.

Five isolated

The team analyzed five isolates obtained between 2019 and 2025. The samples were collected in Ceilândia, Brazlândia, and Gama, in the Federal District, as well as Tijucas, in Santa Catarina, and Oliveira, in Minas Gerais.

The identification combined morphological characteristics and phylogenetic analyses of genomic regions. The five isolates showed grouping compatible with Erysiphe vignae. Pathogenicity assays in a greenhouse also produced typical powdery mildew symptoms in the Poços de Caldas cultivar.

Previous records associated Erysiphe polygoni and undefined Erysiphe species with cowpea powdery mildew in Brazil and other countries. Erysiphe vignae had been recorded on Vigna mungo and Vigna radiata in Australia.

Given the increased importance of the disease, researchers recommend breeding programs focused on identifying sources of resistance to Erysiphe vignae under Brazilian conditions (doi 10.1111/jph.70375).

The work was carried out by scientists Rafaela CF Borges, Nelly M. Porras-Diaz, Maria DM Santos, Maria EN Fonseca, Leonardo S. Boiteux, Josiene S. Veloso, and Ailton Reis.

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Agricultural technology gains strength in the face of El Niño risks

High-performance machines allow for greater agility and precision to take advantage of favorable weather conditions during the harvest season

18.08.2026 | 15:24 (UTC -3)

Monica Pileggi



Brazilian agribusiness, a historical engine of the national economy, is preparing to

face a period of turbulence. We are facing the arrival of a historically intense El Niño, with projections that the phenomenon will extend until the beginning of 2027, that is, for a longer period than in previous cycles. To mitigate the impacts that the "Super El Niño" may cause to different regions of Brazil, the innovative high-tech agricultural machinery brand Fendt, from the AGCO Group, highlights how its unique portfolio can be the key to profitability in the coming harvests.

"Extreme weather events like this don't forgive operational inefficiencies. When producers only have a few days of favorable weather to plant, spray, or harvest an area that would normally take longer, the operational capacity of our machines, combined with millimeter

precision and low compaction, ceases to be just a competitive advantage and becomes an essential tool for risk management and food safety," emphasizes Fabio Dotto, Product Marketing Director at Fendt.

El Niño drastically alters rainfall patterns in Brazil, requiring machinery to deliver not only power, but also agronomic intelligence and operational speed to take advantage of increasingly narrow and unpredictable weather windows. In the southern region, for example, where the phenomenon usually causes rainfall volumes well above average, producers face the challenge of waterlogged soil and very short windows of dry weather.

In this sense, Fendt Ideal harvesters, equipped with a track system, distribute the machine's weight optimally, reduce compaction of wet soil, and allow the machine to enter the field in conditions where conventional wheels would get stuck. This allows the harvest to be collected before the next rainy season. During planting, the Fendt Momentum planter, which offers high input capacity and operating speed, allows the producer to plant large areas of land on the few sunny days available.

Soil moisture management and fuel economy

In regions that concentrate the largest volume of grain production in the country, such as the Southeast and Midwest, the phenomenon will bring irregular rainfall and intense heat waves. The key to mitigation is ensuring that the seed finds the correct moisture and that the operation is efficient. In this sense, the technology embedded in the chassis of the Fendt Momentum planter, such as SmartFrame and Weight Transfer, reads the terrain and applies the exact pressure, ensuring that the seed is deposited at the ideal depth.

In addition to these supporting features, the Delta Force system stands out, automatically controlling the pressure exerted by the planting rows, instantly adjusting the load on each unit according to variations in soil moisture and

resistance. In humid conditions, it prevents excessive compaction and inadequate furrow closure, maintaining the correct seed depth and ensuring greater uniformity of emergence. This perfect construction of the planting furrow results in a better plant population and greater yield potential.

Complementing the planting solution, the Fendt 900 Vario and 1000 Vario series tractors operate at low speeds (Fendt iD concept), delivering maximum torque with the lowest possible fuel consumption. This allows for faster pulling of heavy implements, preparing the soil and planting before moisture evaporates due to the excessive heat that occurs during this phenomenon.

Fendt Rogator sprayers help farmers make the most of the short application windows imposed by adverse weather conditions. With high operational capacity and stable booms that allow for high-speed operation, the equipment allows for covering extensive areas in less time, ensuring that applications occur at the most agronomically appropriate time. Furthermore, embedded spray control and application rate management technologies contribute to greater operational uniformity, reducing losses due to overlapping and increasing the efficiency of input use – decisive factors in a harvest marked by climatic instability.

Maximizing resources during the Matopiba drought

In areas facing severe droughts due to El Niño, minimizing input waste is crucial for profit margins. Through PTx's FarmEngage digital fleet management and autopilot and section control systems, sprayers and planters avoid any product overlap. With water scarcity, sprayers ensure that each droplet of pesticide hits the target with surgical precision at the exact moment the plant needs it. “In a scenario of tight margins and severe climate uncertainties, every droplet of pesticide and every seed counts. Fendt's precision technology has gone from being

a differentiator to being the producer's main line of defense against waste, ensuring that crop profitability is protected even under the effects of El Niño," emphasizes the executive.

It is also worth highlighting that, through real-time connectivity, fleet monitoring, and precision engineering, Fendt reaffirms its commitment to delivering the necessary tools for Brazilian producers to continue breaking productivity records, regardless of the challenges posed by the weather. "Historically, the weather dictates the pace of the harvest, but precision engineering has given producers back the ability to intervene assertively. Our goal with these technologies is to guarantee stable production, allowing agriculture in Brazil to maintain its growth rate even in the most

challenging harvests," concludes Dotto.

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Case IH expands Nutri-Tiller 1000 with a 16-row version

The new configuration combines strip tillage, early riser planting, and active guidance to expand operational capacity

18.08.2026 | 15:21 (UTC -3)

Cultivar Magazine, based on information from Meghan Brown



In the United States, Case IH has expanded its Nutri-Tiller 1000 series with a 16-row mounted and foldable configuration and a new option with a knife and cutting disc. The changes aim to increase the operational capacity of row tillage without altering the pattern of bed formation intended for planting. The manufacturer also highlights the equipment's integration with the Early Riser 2000 series planters and guidance technologies.

The Nutri-Tiller 1000 uses a strip-till tillage system. The equipment only tills the area designated for the seeding line. The rest of the surface retains plant residue. This cover helps protect the soil against erosion caused by wind and water.

Within the tilled area, the implement concentrates fertilizer application in the region targeted for root development. According to Case IH, this positioning promotes nutrient use efficiency. The strategy also reduces the number of field operations and, consequently, fuel consumption.

New bar

The new 16-row assembled and foldable bar is now integrated into the Nutri-Tiller 1030 version. The model already had eight- and twelve-row configurations. The line also includes the Nutri-Tiller 1010, with a six-row assembled rigid bar.

According to David Brennan, Case IH's planter marketing manager, the 16-row configuration allows for an expanded tillage area within the available operating window. He also highlights the combination of the Nutri-Tiller 1000 with the Early Riser 2000 series planter as part of the company's strategy for soil management and crop establishment.

Nutri-Tiller moves crop residue away from the planting path and keeps the soil mobilized along the rows. This improves planter movement and creates a uniform seedbed.

Line unit

Following the operation, the row unit of the Early Riser 2000 series works on the strips formed by the Nutri-Tiller. The system aims to maintain precision in seed placement, uniform depth control, and seed-soil contact. Case IH attributes these characteristics to uniform initial emergence and root system development.

Operators can also adjust the waste handlers from the cab. This feature allows them to modify the settings during operation according to the conditions encountered in the field. The goal is to maintain a similar cleaning standard across the strips and avoid additional tillage operations.

Embedded systems

The manufacturer also incorporates FieldOps and Active Implement Guidance into the system. FieldOps allows for the storage and sharing of guidance lines between machines in the fleet. Active Implement Guidance corrects lateral deviation of the implement during operation.

In this system, the tractor and implement use the same guidance line and make independent corrections to follow the defined path. The technology aims to keep the planter on the rows prepared by the Nutri-Tiller in successive operations. According to the company, the alignment also helps reduce crop damage and soil compaction.

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CNH appoints Frederico Carvalho as CFO for Latin America

Executive takes over regional finance area after a career in companies such as Nissan, Infiniti, Cameron and Neoenergia

18.08.2026 | 10:58 (UTC -3)

Cultivar Magazine



CNH has appointed Frederico NF Carvalho as Chief Financial Officer (CFO) for Latin America. The executive assumed the role in August 2026, based in Curitiba, after working for approximately ten years at Nissan Motor Corporation.

Carvalho will be responsible for CNH's financial matters in the region. According to the company, his arrival aims to strengthen strategy execution, financial discipline, sustainable value creation, and long-term growth. The company also highlights his international experience in finance, strategy, and business management.

Before joining CNH, Carvalho served as CFO of Nissan in Mexico and of the import business units in Latin America between

September 2023 and August 2026. During the same period, he was responsible for the financial area of ??Infiniti in Mexico and Latin American markets.

At Nissan, he also served as Chief Financial Officer for South America between 2021 and 2023. Prior to that, he worked in Japan as Global Director of Business Partnership Controlling. Between 2016 and 2019, he held the position of CFO for Nissan in Brazil, with responsibility for finance, information technology, foreign trade, and controlling areas.

Carvalho also worked at Cameron, a Schlumberger company, Neoenergia, and others.

The executive holds a degree in Business from the Armando Alvares Penteado Foundation (FAAP), an MBA in Corporate Finance from the Getulio Vargas Foundation (FGV), a postgraduate degree in Accounting and Tax Planning from the Federal University of Bahia (UFBA), and a master's degree in Industrial Engineering from UFBA, with a focus on energy and sustainability.

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Adama reports a 3% drop in sales; Brazil faces price pressure

In Brazil, higher volumes did not compensate for lower prices, low producer profitability, and increased competition

18.08.2026 | 10:04 (UTC -3)

Cultivar Magazine



Adama reported sales of US$1,063 billion in the second quarter of 2026, a 3% decrease compared to US$1,092 billion in the same period of 2025. In constant currency, the decline reached 5%. In renminbi, revenue fell 7%. Volumes decreased by 1% and prices fell by 3%.

The company reported a net loss of US$20 million in the second quarter. A year earlier, the loss reached US$32 million. The reduction in losses was 38%. The reported net margin went from -2,9% to -1,9%. In adjusted results, Adama obtained a net profit of US$4 million, compared to US$6 million in the second quarter of 2025.

Cash flow from operating activities generated an inflow of US$242 million in

the quarter, compared to US$271 million in the same period last year. Free cash flow, on the other hand, increased from US$176 million to US$193 million. Investing activities consumed US$3 million, compared to an outflow of US$52 million in the second quarter of 2025. Financing activities recorded an outflow of US$278 million, compared to US$263 million a year earlier.

Sales by region

In terms of sales by region, Europe, Africa, and the Middle East reached US$324 million, a 3% increase in dollars. In constant currency, there was a 2% decrease. North America totaled US$281 million, a 2% increase in dollars and also

in constant currency. Latin America registered US$209 million, a 3% decrease in dollars and an 8% decrease in constant currency. Asia-Pacific presented revenue of US$248 million, a 13% decrease in dollars and a 12% decrease in constant currency. In China, included in Asia-Pacific, sales reached US$104 million, a 28% decrease in dollars and a 30% decrease in constant currency.

The crop protection segment accounted for US$988 million, equivalent to 93% of quarterly sales. In the second quarter of 2025, the segment had recorded US$998 million and a 91% share. Intermediates and ingredients totaled US$75 million, or 7% of revenue, compared to US$94 million and a 9% share a year earlier.

Product categories

Among product categories, herbicides generated US$483 million, equivalent to 45% of sales. In the previous year, they reached US$474 million and 43% of the total. Insecticides totaled US$315 million and accounted for 30% of revenue, compared to US$302 million and 28% in 2025. Fungicides registered US$190 million, or 18% of sales, compared to US$222 million and a 20% share in the second quarter of last year.

ADAMA LTD Q2 2026

Adjusted $ million	Q2 2026	Q2 2025	%▲
Sales	**1,063**	**1,092**	**-3%**
Gross Profit	**315**	**318**	**-1%**
% of Sales	*29.6%*	*29.1%*	
EBITDA	**152**	**150**	**1%**
% of Sales	*14.3%*	*13.7%*	
Net Profit	**4**	**6**	**-25%**
% of Sales	*0.4%*	*0.5%*	
Reported Net Loss	**(20)**	**(32)**	**38%**
% of Sales	*(1.9%)*	*(2.9%)*	

Highlights

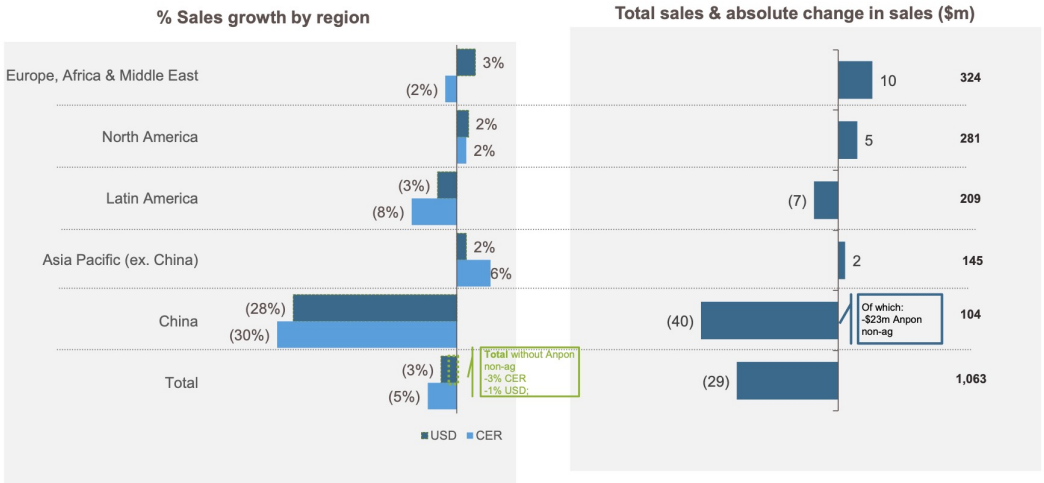
- **Sales down 3% to $1,063 million**
  - 1% lower volume and 3% lower prices vs. PY
  - Lower volumes resulting from the Company's decision in Q3'25 to reduce manufacture and sale of certain basic chemicals, partially compensated by new product introductions and improved market demand. Lower prices reflected the overall lower market pricing and weaker farmer purchasing power
  - Excluding the Company's decision to reduce the manufacture and sale of certain basic chemicals, sales would have decreased by 1%
- **Gross Profit down 1%; Improved Gross Margin of 29.6%** vs. 29.1% PY
  - Despite lower sales, improved quality of the business, favorable foreign exchange impacts and lower cost, compensating for lower prices
- **EBITDA up 1%; Improved EBITDA Margin of 14.3%** vs. 13.7% PY
  - **Lower OPEX** mainly due to capital gain from the disposal of fixed assets and credit impairment in Q2'25, despite the negative impact of exchange rates
- **Adjusted Net Profit $4m** from $6m PY; Reported Net loss reduced to $20m from $32m PY
  - **Lower financial expenses** positively impacted by better debt structure, lower FX hedging costs and benefits of continued positive cash flow

8

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

Regional Sales Performance

Q2 2026 vs. Q2 2025



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- CER - Constant Exchange Rates

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Marcelo Neves assumes the role of License Director at Corteva

Executive to lead the Seeds & Traits area in Brazil and Paraguay after a career at Bayer and Monsanto

18.08.2026 | 08:21 (UTC -3)

Cultivar Magazine



Marcelo Neves has assumed the position of License Director at Corteva Agriscience. The executive will now work in the area of ??seeds and biotechnological traits for Brazil and Paraguay, based in São Paulo.

Neves has over 20 years of experience in agribusiness, working in the seed, crop protection, and biotechnology sectors. Before joining Corteva, he worked for eight years at Bayer.

At the company, he held the position of Enterprise Transformation Leader for Latin America between April and August 2026. Prior to that, he served as Commercial Director in Brazil, from September 2018 to March 2026. During that period, he worked in crop protection in the Eastern and Northern Cerrado regions and in seeds

and biotechnology for soybeans and cotton.

Between 2010 and 2018, Neves worked at Monsanto. He held the positions of technical sales representative, regional sales manager, and national sales manager. His work involved seeds and biotechnology for soybeans and cotton, as well as strategic accounts in corn and herbicides.

The executive began his career at Sucocítrico Cutrale, where he worked as a new business analyst between 2007 and 2009.

Neves holds a degree in Economics from the University of São Paulo and supplementary academic training from the University of Florida. He also completed a

master's degree in Production Engineering from UFSCar and MBAs from Fundação Dom Cabral and ESPM.

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Scientists record Atta opaciceps attacking neem in Brazil

Observation in Piauí shows progressive defoliation and collection of leaflets after cutting the petiolule

18.08.2026 | 07:52 (UTC -3)

Schubert Peter, Cultivar Magazine



Photo: Shannon Hartman / AntWeb - CC-BY 3.0

Researchers at the Federal University of Piauí have recorded, for the first time in a scientific publication, the attack of Atta opaciceps on neem trees (Azadirachta indica) in Brazil. The monitoring took place over eight days in January 2026 on the university campus in Bom Jesus, Piauí. The colony caused progressive defoliation and concentrated its foraging only on neem trees during the observed period.

The activity involved 26 active nest openings under the canopy. The attack began on one tree, reached the second on the third day, and continued to the third by the end of the observations. Worker bees cut the leaflets at the petiolule, dropped the material to the ground, and then collected and transported it. Semicircular cuts in fresh leaf tissue occurred

infrequently.

Researchers suggest this behavior as a possible flexible response to neem's chemical defenses. Deposition in the soil may reduce exposure to bioactive volatile compounds present in fresh tissues, although the mechanism still requires investigation.

Neem contains compounds such as azadirachtin, salannin, and nimbin, associated with insecticidal and repellent effects. Previous studies cited in this work show negative effects of azadirachtin on worker survival, queen oviposition, and the development of the symbiotic fungus of leaf-cutter ants. Even so, the record shows the ability of Atta opaciceps to exploit this host in an anthropized environment (doi

10.37486/2675-1305.ec08033).

The work was carried out by Daniel M. Pacheco, Rodolfo M. de Souza, Andressa Ribeiro, Antônio C. Ferraz-Filho, and Luciana B. Silva.

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Sunflower does not regenerate xylem embolisms after drought

Microtomography shows persistent damage even after a week of rehydration

18.08.2026 | 06:45 (UTC -3)

Schubert Peter, Cultivar Magazine



The xylem tissues are highlighted with a red coloration in this cross-section of a sunflower stem - Photo: Jared Stewart / Colorado State University

Researchers found no evidence of embolism regeneration in sunflower xylem after plant rehydration. The study monitored intact individuals using low-radiation micro-computed tomography during drought and recovery. Embolisms remained in stems and leaves, despite the partial resumption of transpiration and photosynthesis.

The experiment evaluated 55 plants of the Mammoth cultivar. During dehydration, stomatal closure and turgor loss occurred near -1 megapascal. A 50% loss of photosystem II efficiency appeared at -1,45 megapascal. A 50% loss of xylem capacity occurred at -1,46 megapascal in leaves and -1,56 megapascal in stems.

After irrigation, the researchers monitored plants overnight and for a week under good water availability. The extent of the emboli in the stem remained similar. In one plant, the blockage persisted for three weeks, even with an increase of about 240% in the stem's cross-sectional area.

Physiological recovery

Physiological recovery occurred without the elimination of embolisms. Transpiration, carbon dioxide assimilation, and photosystem II efficiency increased after one week. However, most plants maintained performance below that observed in plants without water deficit.

The results contrast with previous work based on excised tissues. According to

researchers at Colorado State University, authors of the study, cutting tissues under water stress can induce embolisms and create the appearance of recomposition (doi 10.1093/jxb/erag294). The study reinforces the need for direct observations on intact plants to assess hydraulic damage and recovery after drought.

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Corn bacteria change their programming as they grow in the roots

Proteomics shows alterations in up to 60% of proteins and distinct responses among seven species associated with corn

17.08.2026 | 16:09 (UTC -3)

Schubert Peter, Cultivar Magazine



Bacteria associated with corn roots undergo extensive changes in their programming during plant growth compared to laboratory cultivation. Researchers in the United States found differences in the abundance of proteins detected in seven bacterial species, ranging from 20% to 60%. The alterations involved thousands of proteins and functions related to nutrition, motility, secretion, and colonization. The results reinforce the need to evaluate microorganisms in the plant environment to understand their functioning and develop agricultural applications.

The team cultivated seven bacteria isolated from corn roots under two conditions. One group grew in a defined minimal medium in the laboratory. The

other group grew individually on sterile corn roots. Differential proteomics analysis detected between 1.507 and 2.159 proteins per species.

The number of proteins with different abundances between conditions ranged from 339 in Herbaspirillum robiniae to 1.278 in Brucella pituitosa. The study also included Chryseobacterium indologenes, Curtobacterium pusillum, Enterobacter ludwigii, Pseudomonas putida, and Stenotrophomonas maltophilia.

Study limitations

According to the researchers, the results show a limitation of studies based solely on in vitro conditions. The behavior

observed in the laboratory did not, in several cases, reproduce the physiology of the bacteria during interaction with the plant. The seven species modified their protein expression in the roots. The type of response, however, showed a strong dependence on the species.

The main common response appeared in the transport systems. Transporter proteins increased in all seven bacteria during growth in the plant. The team identified 570 transporter proteins with differential abundance and distributed them into 21 functional categories. Amino acid and sugar transporters and porins appeared among the groups with the highest participation in the proteomes.

Of the 82 components linked to the transport of sugars with differential abundance, 69 increased in the roots. The set included systems related to the input of five- and six-carbon compounds, disaccharides, and polysaccharides. This pattern indicates access to a diversity of carbon sources in the root environment.

Significant differences

Beyond this common response, the strategies presented striking differences. Some bacteria increased proteins associated with motility. Others reduced these components during their stay in the root. Herbaspirillum robiniae, for example, showed a greater abundance of

chemotaxis and flagellar proteins in the plant. Enterobacter ludwigii showed the opposite pattern. Thirteen chemotaxis proteins were more abundant in the laboratory. The same occurred with six of the seven flagellar proteins, with a significant difference.

Carbon metabolism

The changes also affected carbon metabolism. Curtobacterium pusillum increased the abundance of enzymes associated with hemicellulose degradation during root growth. Among them were alpha-L-arabinofuranosidase, arabinose isomerase, and xylose isomerase.

Laboratory tests supported this interpretation. Curtobacterium pusillum grew in minimal medium with xylan as the main carbon source. Five of the six proteins linked to hemicellulose catabolism evaluated increased in the xylan culture, compared to the medium with glucose and malate. The researchers consider the results consistent with the degradation of hemicellulose by this species in the root environment.

Herbaspirillum robiniae also showed an increase in proteins associated with hemicellulose utilization in the plant. The assay with xylan did not confirm the use of the compound as the main carbon source. The bacteria grew similarly in the medium with xylan and in the medium without a primary carbon source. Even so, proteins

linked to xylose transport and degradation increased in the presence of the polysaccharide.

Another possible carbon source appeared in Curtobacterium pusillum and Herbaspirillum robiniae. Enzymes of beta-oxidation of fatty acids showed greater abundance in the roots. Herbaspirillum robiniae also elevated components of the glyoxylate cycle. The combination suggests potential utilization of fatty acids during plant growth.

Response to phosphorus

The response to phosphorus showed differences between species. Enterobacter

ludwigii increased proteins related to nutrient metabolism in the roots. Alkaline phosphatase appeared in greater abundance under this condition. This enzyme participates in the release of phosphate from organic compounds and polyphosphates.

Enterobacter ludwigii also solubilized phosphate in an assay with Pikovskaya agar. Curtobacterium pusillum, Herbaspirillum robiniae, and Pseudomonas putida showed solubilizing capacity in the test. Brucella pituitosa, Chryseobacterium indologenes, and Stenotrophomonas maltophilia did not produce the same result under these conditions.

One of the clearest effects on colonization appeared in Herbaspirillum robiniae. The bacterium possesses two type VI secretion systems. Proteins from both systems increased in the roots. The team produced mutants with functional loss of one or both systems to evaluate their role in the interaction with maize.

The simultaneous loss of both systems reduced the abundance of the bacteria in the roots by approximately three times after 14 days, compared to the original strain. Individual alterations caused smaller reductions without statistical significance. The data indicate joint participation of both systems in the colonization and growth of Herbaspirillum robiniae on the roots.

Functions still unknown

The study also revealed a wide range of still unknown functions. Among 5.265 proteins with differential abundance, 2.192 did not receive reliable functional annotation or categorization. For the researchers, this set may include mechanisms of adaptation and colonization of the root environment that have not yet been characterized.

The experiments evaluated each species in isolation. This condition allowed for the identification of specific responses to the plant, but did not reproduce the interactions present in microbial communities. The researchers point to the analysis of multiple species in the same host as the next step. This advancement

could show how bacteria modify their functioning in the presence of the plant and other microorganisms and contribute to the development of microbial products aimed at agriculture (doi 10.1128/msystems.00371-26).

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Mosaic launches enzyme to accelerate straw decomposition

Renuvis Enzara acts on residue fibers and can promote planting, emergence, and soil management

17.08.2026 | 10:52 (UTC -3)

Cultivar Magazine

Mosaic launches enzyme to accelerate straw decomposition

Renuvis Enzara acts on residue fibers and can promote planting, emergence, and soil management

17.08.2026 | 10:52 (UTC -3)

Cultivar Magazine

Mosaic Biosciences announced Renuvis Enzara in the United States, a solution to accelerate the decomposition of crop residues and anticipate planting conditions. The product uses enzymatic

technology with endoglucanase and targets structural fibers in crop residues. According to the company, this action creates entry points for soil microorganisms and maintains activity even at zero degrees Celsius.

The proposal targets areas with high residue loads, a scenario associated with higher-yielding hybrids, no-till farming, and continuous corn cultivation. Excess straw can require additional tillage operations, reduce planting capacity, and increase the risk of uneven emergence and irregular seed depth.

Field trials conducted in 2025 indicated greater residue decomposition in corn-corn and soybean-after-corn cropping. Spring applications also improved emergence,

plant population, and uniformity in corn and soybeans, according to Mosaic. The company did not disclose the values ??of these gains in the material released.

Enzara can be applied in the fall or spring. The formulation is compatible with tank mixing with fertilizers and herbicides, without the need for an additional pass. Mosaic recommends its use in corn-on-corn, no-till, minimum tillage, areas with high crop residue, and conventional tillage after high-yield crops.

With a smaller volume of waste, the company also sees potential for improving machine performance, reducing equipment wear, decreasing the intensity of soil preparation, and promoting erosion control and lower fuel costs.

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Endophytic fungus accelerates the drop of young mango fruits

Lasiodiplodia theobromae activates ethylene, alkalization, and callose in the abscission zone and reduces fruit retention

17.08.2026 | 09:59 (UTC -3)

Schubert Peter, Cultivar Magazine

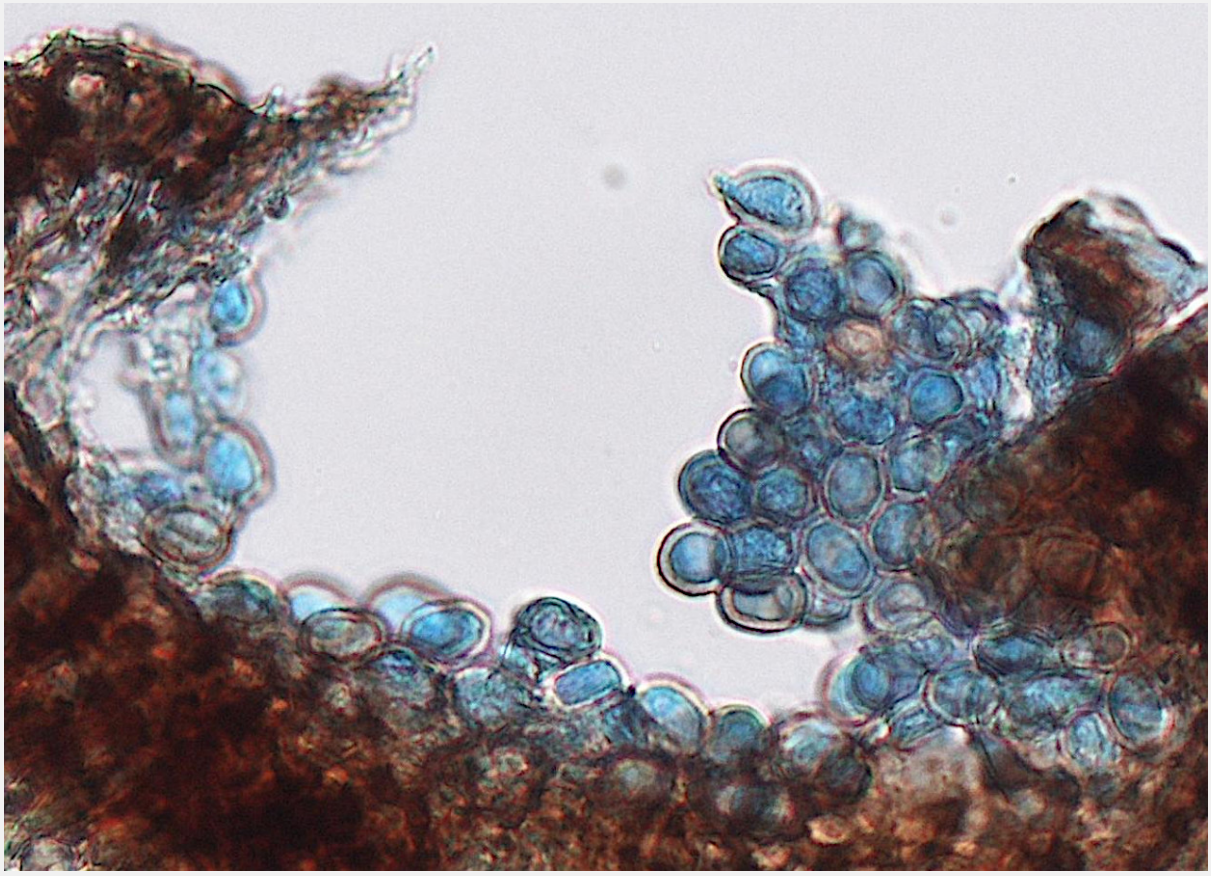


Photo: Cesar Calderon / USDA APHIS PPQ, Bugwood

Chronic endophytic colonization by Lasiodiplodia theobromae in young mango (Mangifera indica) flowers and fruits activates abscission mechanisms and increases premature fruit drop. The process occurs before the necrotrophic phase of the fungus and can reduce productivity, according to a study by the Volcani Institute in Israel.

Researchers inoculated mango trees with species of Botryosphaeriaceae. Lasiodiplodia theobromae had the greatest effect. In the Shelly cultivar, inoculated plants lost 98,6% of their flowers by the post-fruiting stage. The control group lost 92,6%. Inoculation resulted in a 5,3 times greater loss of retained fruit.

Three harvests

Monitoring over three growing seasons, between 2023 and 2025, showed colonization of 95,55% in inoculated flowers and young fruits. The fungus occupied petals, sepals, internal regions of the flower, and tissues near the abscission zone.

The infection increased the production of reactive oxygen species and ethylene. In the post-fruiting phase, the ethylene concentration reached a value 3,8 times higher than the control. The fungus also secreted ammonia and promoted cellular alkalinization near the abscission zone.

Callose deposition

The response included increased callose deposition and a strong reduction in auxin. During the maturation phase, the auxin concentration decreased 276 times after inoculation. Cytokinin showed an 85% to 90% reduction during the formation of young fruits.

Researchers interpret the drop as a defense response of the plant. The mango tree eliminates colonized organs and limits the pathogen's advance. However, this mechanism reduces fruit retention before the appearance of typical symptoms associated with the necrotrophic phase (doi 10.1093/hr/uhag349).

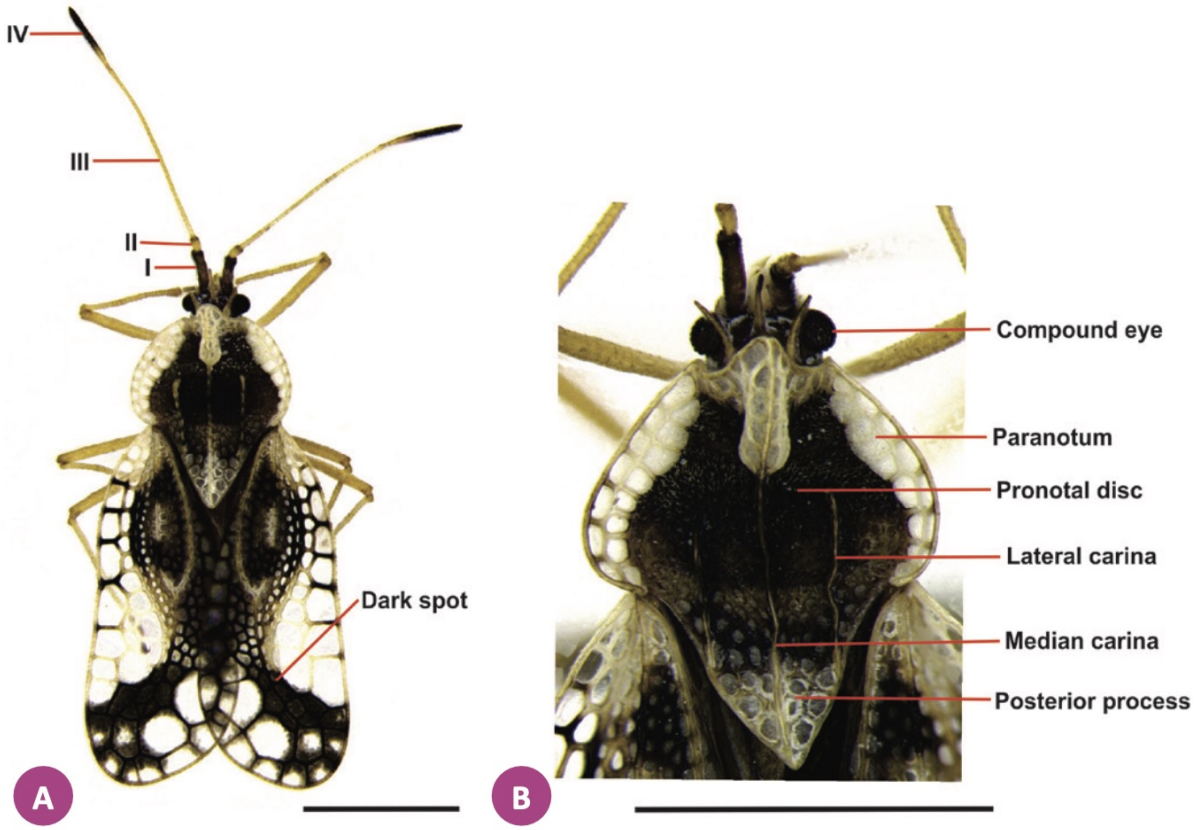
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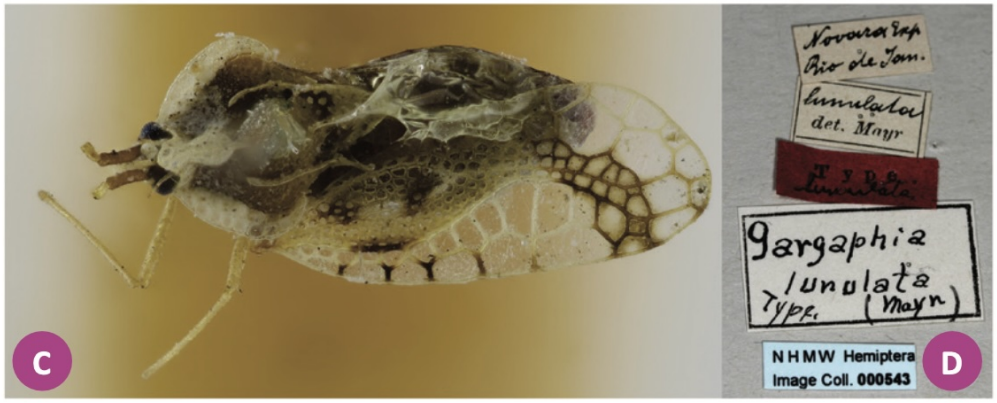
Gargaphia lunulata has a wider geographic distribution and a new host

Study records the tingid fly in 12 states and reports acerola as a host in Brazil

17.08.2026 | 08:08 (UTC -3)

Cultivar Magazine





Images: doi 10.37486/2675-1305.ec08031

Researchers have recorded Gargaphia lunulata causing damage to Turnera subulata in Maranhão, Piauí, Minas Gerais, and São Paulo. The study also reports, for the first time in Brazil, the insect's association with acerola (Malpighia emarginata). The new records expand the known occurrence of the pest to 12 states, in four regions of the country.

The collections took place between December 2025 and July 2026. In Turnera subulata, the insects appeared in urban

areas of Barão de Grajaú, Floriano, São José do Peixe, Piracicaba, and Janaúba. In Malpighia emarginata, the collection occurred in a backyard in Americana, São Paulo.

The insect occupies the underside of the leaves. The attack causes chlorosis, leaf curling, and drying. Researchers observed eggs, nymphs, and adults on both host plants. The finding indicates completion of the life cycle in both (doi 10.37486/2675-1305.ec08031).

Polyphagous habit

Gargaphia lunulata exhibits polyphagous habits and has already been associated with more than 30 host plants, including

cultivated, spontaneous, and ornamental species. Among the crops cited in the pest's history are soybeans, beans, okra, passion fruit, and guava.

Researchers point to the wide distribution of Turnera subulata as a possible factor for the presence of Gargaphia lunulata in different locations. The study recommends phytosanitary monitoring of spontaneous plants near commercial crops and backyards. For acerola, the new record reinforces the need to monitor the occurrence of the insect and the damage in production areas.

The work was developed by scientists Nyeppson S. Soares, Jun Souma, Leonardo S. Duarte, Roberto A. Zucchi, Alexandre S. Araújo, and Marcoandre Savaris.

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Study redefines avirulence gene of Phytophthora sojae

Rare recombination identifies Avr3c as a recognized target for Rps6, Rps3c, and Rps4 in soybeans

16.08.2026 | 15:11 (UTC -3)

Cultivar Magazine



Photo: Craig Grau / Bugwood

Researchers at Université Laval have identified Avr3c as the avirulence gene for Phytophthora sojae recognized by Rps6 resistance in soybeans. The result revises the previous association with Avr4/6 and offers a more reliable molecular target for pathotyping the pathogen.

The group analyzed 236 isolates of Phytophthora sojae obtained from soybean areas in five Canadian provinces. Among them, 234 showed complete linkage between the Avr3c and Avr4/6 alleles and their respective virulence phenotypes. Two isolates exhibited discordant combinations, a result consistent with a rare recombination between the loci (doi 10.1111/mpp.70326).

In both cases, the response of the Rps3c, Rps4, and Rps6-carrying cell lines followed the Avr3c allele. Inoculation assays confirmed the pattern. Tests with soybean protoplasts also showed specific recognition of Avr3c by Rps6. The interaction reduced the relative luciferase activity, an indicator of cell death, by approximately 80%. Avr4/6 did not elicit a detectable hypersensitive response in the presence of Rps6.

Complete resequencing of the isolates confirmed the genomic rearrangement and showed greater variation in the Avr3c region. The researchers point to Avr3c as the only avirulence gene associated with recognition by Rps3c, Rps4, and Rps6.

Among these three resistance genes, only Rps6 is present in commercial cultivars.

The study proposes renaming Avr3c as Avr6. The team also highlights the need to monitor Phytophthora sojae populations and target resistant cultivars according to the pathotype present in the field.

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Thorsten Schwindt assumes the vice presidency of Weed Control at Corteva

The executive joins the company after a career spanning more than 20 years in agribusiness, crop protection, and seeds

16.08.2026 | 14:57 (UTC -3)

Cultivar Magazine



Thorsten Schwindt has assumed the position of Vice President, Weed Control at Corteva Agriscience in Indianapolis, United States. The executive highlighted the positive reception he received during his first two weeks at the company.

Schwindt brings over 20 years of experience in international agribusiness, working in crop protection and seeds. His professional career includes a stint at Bayer Crop Science.

At Bayer Vegetable Seeds, she held the vice presidency of commercial operations for vegetable seeds. In this role, she was responsible for commercial operations and sales of the Seminis and De Ruiter brands in the United States, Mexico, Canada, and Central America.

My experience also includes leading teams and commercial activities related to the vegetable seed market.

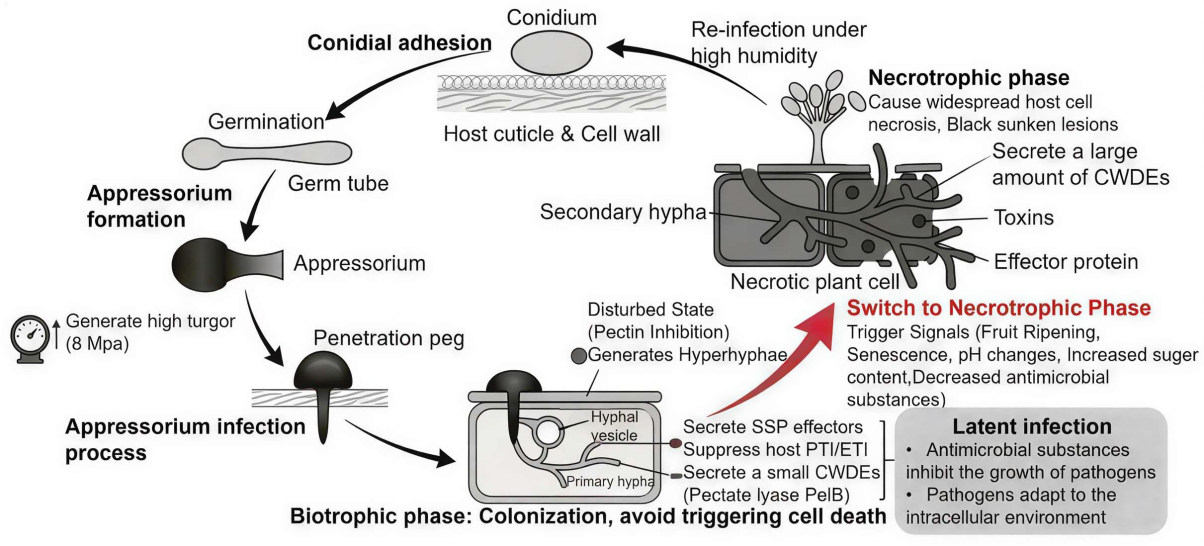
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Nanotechnology expands options for anthracnose management

This study gathers evidence on nanoparticles and nanocarriers and points out limitations for their adoption in the field

16.08.2026 | 09:18 (UTC -3)

Schubert Peter, Cultivar Magazine



doi 10.3390/jof12080615

Nanotechnology can expand strategies for managing anthracnose in agricultural crops. Nanoparticles with antifungal

activity and nanocarrier systems have shown action against Colletotrichum species, greater efficiency in fungicide delivery, and potential to reduce doses and residues. Despite the results, most of the evidence still comes from laboratory tests, controlled environments, or leading organizations. Field validation, ecotoxicity, formulation stability, and large-scale production remain among the main obstacles.

The assessment incorporates work by Chinese researchers. They analyzed mechanisms of action, application advances, and prospects for the use of nanomaterials against anthracnose. The disease affects hundreds of crops and involves Colletotrichum species with high

genetic diversity, a wide range of hosts, and the capacity for latent infection.

Asymptomatic fungus

This behavior makes control difficult. The fungus can infect flowers or young fruits and remain asymptomatic for extended periods. Disease development intensifies during fruit ripening or under favorable environmental conditions. This strategy also favors post-harvest losses and reduces the effectiveness of interventions based solely on the presence of symptoms.

The infection process includes the formation of an appressorium. This structure accumulates melanin and

osmotically active compounds. The mechanism can generate turgor pressure of up to eight megapascals. This force allows direct penetration of the cuticle and cell wall of the host. After entry, some species go through a biotrophic phase and advance to a necrotrophic phase, with the production of cell wall-degrading enzymes, toxins, and effector proteins.

Limitations in the tools

Scientists point to limitations in the available tools. Fungicides continue to play a central role in management, but Colletotrichum populations can develop resistance under continuous selection pressure. Mutations related to

benzimidazole resistance are already appearing in different species. Resistance to quinone outside inhibitor fungicides also occurs in populations associated with strawberry anthracnose. According to the study, conventional formulations have an active ingredient utilization efficiency close to ten percent. Some of the product can reach soil and water through leaching, runoff, and volatilization.

Two fronts

Nanomaterials offer two main approaches. Some have their own antifungal activity. Others function as carriers of fungicides, biological agents, or ribonucleic acid molecules. In this second approach, the goal involves protecting the active

ingredient, controlling its release, improving deposition on the plant, and increasing its arrival at the target.

Metallic and metal oxide nanoparticles are the focus of a significant portion of the research. Gold nanoparticles, at a concentration of 75 milligrams per liter, reduced the mycelial growth of Colletotrichum gloeosporioides by 61 percent and increased spore germination by 25 percent in assays. Experiments under controlled conditions also recorded the activation of genes related to plant defense.

Silver nanoparticles have shown activity against several species of Colletotrichum. Materials ranging from five to 24 nanometers achieved inhibition close to 90

percent at a concentration of 56 micrograms per milliliter in in vitro assays. Proposed mechanisms include cell membrane disruption, silver ion release, formation of reactive oxygen species, and interference with spore germination and appressorium melanization.

Preliminary results

Preliminary field results also appear in the study. Foliar applications of silver nanoparticles at 50 parts per million reduced the severity of pepper anthracnose by 90 percent. The researchers emphasize the need for evaluation during successive growing cycles. The accumulation of silver also requires attention due to the risk to non-

target organisms and its potential movement through the food chain.

Copper-based materials showed similar performance. Copper nanoparticles achieved 71,7 percent control of anthracnose in 20-year-old olive fruits in an orchard trial. In another study, nanoscale copper hydroxide, at a concentration of 300 milligrams per liter, inhibited 99,16 percent of Colletotrichum siamense growth after two days of in vitro evaluation.

Mechanisms associated with copper include increased reactive oxygen species, membrane damage, altered hyphal morphology, and loss of cellular content. Dosage is a critical factor. High concentrations can increase phytotoxicity

and the risk to microorganisms in soil and aquatic environments.

Natural polymers

Natural polymers are emerging as an alternative to metallic nanomaterials. Chitosan nanoparticles of approximately 30 nanometers achieved 97 percent inhibition of Colletotrichum gloeosporioides mycelial growth in mangoes at a concentration of 0,5 percent. The positive charge of chitosan favors interaction with negatively charged fungal surfaces. This contact alters membrane permeability, interferes with cellular calcium homeostasis, and can cause deformation and fragmentation of hyphae.

Chitosan can also act as an elicitor of plant defenses. Studies analyzed have recorded increased activity of enzymes linked to the defense response. Hybrid systems combine this polymer with copper, silver, titanium, or other components to provide direct action, gradual release, and greater stability.

Fungicide nanodelivery

Nanodelivery of fungicides constitutes another line of development. Biodegradable nanospheres with azoxystrobin, with a size close to 130,9 nanometers, increased the relative toxicity against Colletotrichum higginsianum by more than ten times in in vitro tests. Smaller particles showed greater

absorption by the hyphae, greater release of the active ingredient, and greater induction of oxidative stress in the fungus.

A system composed of chitosan, O-carboxymethylchitosan, and tebuconazole also enhanced activity against Colletotrichum gloeosporioides. The formulation showed 3,13 times greater efficiency than the conventional concentrated suspension in the parameters evaluated. The work attributes the result to transport across the membrane, deposition on the target, and an increase in reactive oxygen species.

Other nanocarriers respond to stimuli from the infection environment. A system with prochloraz showed a release of 89,8 percent of the active ingredient in 24 hours

at pH 5,0. The concentration required to reduce pathogen growth by half fell from 0,0429 milligrams per liter in free prochloraz to 0,0150 milligrams per liter in the nanoformulation against Colletotrichum fructicola.

This type of response is of interest to the management of latent infections. Changes in pH, sugar concentration, and tissue physiology accompany the fungus's transition to the necrotrophic phase. Nanocarriers sensitive to these signals could, in principle, release the active ingredient close to the time of greatest pathogen activity. Scientists classify this possibility as promising, but emphasize the still preliminary nature of the evidence.

Platforms for delivering double-stranded ribonucleic acid represent another front. The proposal involves silencing genes linked to virulence, the formation of infection structures, or other essential steps in the Colletotrichum life cycle. The nanocarrier can protect the molecule against degradation and facilitate its arrival at the fungus. Practical application still depends on advances in stability, delivery efficiency, and environmental assessment.

From the laboratory to the field

The transition from laboratory to field application represents the main challenge. Many studies have employed culture

media, detached fruits, detached leaves, or greenhouses. Few materials have accumulated field data on a scale compatible with commercial systems. The behavior of nanoparticles after repeated applications also remains poorly understood.

Scientists highlight the need to assess persistence, chemical transformation, mobility in soil, accumulation in plants, and effects on non-target organisms. There is also a lack of established parameters for industrial production, stability during storage and application, standardization of formulations, and specific regulations.

Researchers advocate for the development of systems guided by the principle of safety from the design stage. The strategy includes biodegradable

materials, release triggered by pathogen or host stimuli, and reduced amounts of metals used. For the management of anthracnose, nanotechnology expands the possibilities of acting on different phases of the infection. However, agricultural adoption will depend on proof of efficacy, safety, and viability under field conditions (doi 10.3390/jof12080615).

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Syngenta has new Global Finance Transformation Lead

Martin Inhargue steps down as financial leader for Latin America and will now head the global transformation of the area in Basel

16.08.2026 | 08:35 (UTC -3)

Cultivar Magazine



Syngenta has appointed Martin Inhargue as Global Finance Transformation Lead,

based in Basel. He leaves his position as Finance Head for Latin America and will now lead the company's global financial transformation.

According to the executive, the new role will continue the work developed over the last ten years with teams from Latin America, Brazil, and Syngenta's finance area. During this period, the teams structured work methods and a financial operating model for the company.

In his new role, Inhargue will work with Nelson Jiang, CFO of the Syngenta Group, and global finance teams. The work will focus on evolving the financial support model. The company is seeking a scalable structure prepared for changes associated with technology and artificial intelligence.

Desmond Dai assumes the financial leadership for Latin America. Dai previously held the position of CFO at Syngenta China and succeeds Inhargue in the regional role.

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Corteva details agreements foreseen in the separation of Vylor

Drafts submitted to the SEC address intellectual property, seed treatment, minimum purchase amounts, and exclusivity

15.08.2026 | 15:43 (UTC -3)

Schubert Peter, Cultivar Magazine

Corteva yesterday submitted two draft contracts to the U.S. Securities and Exchange Commission (SEC) related to

the spin-off of Vylor. The documents detail rules for intellectual property and the supply of seed treatment products after the completion of the transaction.

One of the draft agreements brings together Corteva, Vylor, and other signatory parties in an agreement on intellectual property. The instrument organizes cross-licensing, joint ownership, use of regulatory studies, and patent maintenance. The other draft agreement governs the seed treatment supply relationship between Corteva Agriscience LLC and Pioneer Hi-Bred International, Inc., identified as Vylor in the document.

Intellectual property

The intellectual property agreement provides for cross-licensing of patents, technical know-how, copyrights, and software. The licenses will have worldwide scope, be non-exclusive, and royalty-free. The document also classifies them as irrevocable and fully paid.

The duration varies depending on the type of asset. For patents and copyrights, the term matches the duration of the respective rights. For other licensed assets, the instrument provides for an indefinite term. The structure preserves the use of intellectual property necessary for each company within the economic fields defined in the separation.

Vylor and Corteva

Vylor's assigned field encompasses plant genetics, biofuel production from plants, and certain applications in animal nutrition. Plant genetics includes breeding, seed development, transgenic, non-transgenic, and edited traits, as well as digital tools for planting and management.

The field maintained by Corteva encompasses crop protection, biologicals, technologies applied directly to seeds, animal health, and industrial biosciences. The definition of crop protection includes products intended for the control of insects, nematodes, fungi, and weeds. The field of technologies applied to seeds includes chemical, biological, or other materials applied to seeds before or during sowing.

Restrictions for five years

Licenses may extend to affiliates and certain third parties within the contractual limits. The instrument imposes restrictions for five years after the effective date on sublicenses or collaborations with specific third parties and companies linked to those groups. Collaborations existing before May 1, 2026, are exempt from this restriction.

Corteva and Vylor will also share, in equal and indivisible parts, the ownership of certain joint intellectual property. Each company may exploit its share according to the conditions stipulated. Transfers to third parties must preserve rights granted

to the other party.

Right of first refusal

The agreement also creates a right of first refusal for certain licensed patents. A company interested in halting the processing or maintenance of a patent must notify the other party at least sixty days in advance of the next applicable deadline. The other company will then have thirty days to exercise its right to acquire the patent without payment.

Joint regulatory studies are governed by specific rules. Corteva and Vylor will have equal stakes in studies classified as joint. The transfer of these rights to third parties will, as a rule, depend on the consent of

the other party. The use of a joint study in a submission to a government authority will require at least thirty days' prior notice.

Enlist Technology

Enlist technology occupies a significant part of these regulations. For Vylor, regulatory activities include approvals related to Enlist seeds with isolated or combined events. For Corteva, the scope includes registrations and maximum residue limits or import tolerances related to Enlist herbicides.

In the case of soybeans (Glycine max), the document cites the DAS-44406-6 event, associated with the Enlist E3 and Conkesta Enlist E3 products. This event

confers tolerance to herbicides based on 2,4-D, glyphosate, and glufosinate. The agreement also includes references to corn and cotton within the definition of Enlist seeds.

Seed treatment

The second draft organizes the global supply of seed treatment products. The text establishes categories for current portfolio products, products acquired directly from specific suppliers, and short-term products under development. Other products may also be included in the scope through supplementary instruments.

Contractual supplements will play a central role for current portfolio products and

short-term products. These documents may define specifications, crops, territories, volumes, prices, destinations, and delivery conditions. Products acquired directly from suppliers follow their own rules. The need for a supplement, in this case, depends on the conditions stipulated in the draft.

Supply planning uses rolling forecasts of eighteen months. The first six months represent a binding purchase commitment, subject to the specific rules of each supplement. Orders must reach Corteva at least thirty days in advance of the requested shipment date.

The draft also outlines minimum purchase requirements for certain categories. The calculation considers the volume of treated

Vylor seeds on the market and penetration rates defined in the contractual annexes. The public version retains several commercial parameters under revision.

Failure to meet volume requirements.

Failure to meet minimum volumes will initiate a corrective action process. Vylor must present measures to the management committee stipulated in the contract. The solution may include payment to Corteva. The absence of a solution or material improvement may allow for the termination of obligations related to the affected product.

The price of certain categories is based on the cost of products sold by Corteva and applies factors stipulated in the contract. Percentages and commercial factors remain as stated in the public version. The instrument also provides for periodic adjustments between initial values ??and updated costs.

For products purchased by Vylor from direct suppliers, Corteva may receive compensation for support activities. The document links this support to regulatory activities, branding, development, intellectual property protection, and responsible product management. The applicable percentage is specified.

Short-term products will transition to the commercial market after fulfilling the

stipulated launch criteria. These criteria include registration, PASSER assessment, and specific economic parameters. Corteva shall employ commercially reasonable efforts to obtain and maintain registrations in the key countries within the scope of the contract.

Exclusivity obligations

The relationship combines non-exclusive supply with exclusivity obligations for specific categories. During the initial applicable terms, Vylor shall purchase current portfolio products and short-term products covered by the supplements from Corteva, except as otherwise provided.

During this period, Vylor also faces restrictions on purchasing, manufacturing, contracting the manufacture of, or applying to its seeds any other treatment with the same active ingredients as the covered products, within the specified crops and territories. The draft also restricts sales of seed treatment products to third parties until March 31, 2031, with exceptions related to operations with authorized treaters.

Supply disruptions suspend part of these obligations in proportion to the deficit. Vylor may seek alternative supply during a shortage, within the contractual limits. Corteva will distribute availability between Vylor and other customers according to the established criteria. A prolonged shortage may lead to the termination of obligations

associated with the affected product after the corrective procedure.

The draft agreement stipulates validity until the latest date between March 31, 2031, and the termination of all existing supplements. Supplements for current products will have an initial term until March 31, 2031, with the possibility of renewal for periods of two years. Short-term products will have an initial marketing term of five years, also subject to renewal.

Intellectual property of the products

The intellectual property of the supplied products will remain with Corteva. Vylor will receive a non-exclusive, royalty-free

license to use the products in the treatment of its seeds and to market these treated seeds. The draft restricts reverse engineering and modifications of the products within the scope of the license. The instrument allows for testing related to seed and crop safety, compatibility, and comparison with other options.

The annexes are part of the filed version, but several contents appear redacted. The omissions affect, among other points, product names, crops, territories, penetration rates, percentages, and price factors. For this reason, the public documentation details the structure of the relationship between Corteva and Vylor, but does not reveal all the commercial parameters foreseen for the operation.

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Jean Sabini takes over commercial management of Ubyfol in the South.

The manager will now be responsible for the Ubyfol and Vitales brands in Rio Grande do Sul and Santa Catarina.

14.08.2026 | 17:28 (UTC -3)

Cultivar Magazine



Jean Sabini has been appointed commercial manager for Ubyfol in the

states of Rio Grande do Sul and Santa Catarina. In his new role, he will be responsible for the Ubyfol and Vitales brands. An agricultural engineer graduated from the University of Passo Fundo (UPF), Sabini has experience in the agricultural sector, working in the areas of sales, crop protection, plant nutrition, royalties, and soybean seed production.

Before joining Ubyfol, he worked as a sales manager in Maranhão and northern Tocantins for the ICL, Aminoagro, and Dimicron brands. He also worked at Bayer for over 11 years.

Throughout his career, he has accumulated experience in commercial strategies and in developing businesses focused on the agricultural market, working

in different segments of the input supply chain.

In addition to a degree in Agronomic Engineering, Sabini holds an MBA in Marketing with an emphasis on Sales from the Getulio Vargas Foundation (FGV).

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