24.may.2025 N º 31

Cultivar Semanal ®

Beauveria bassiana causes reproductive effects in thrips

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John Deere acquires US-based Sentera

With acquisition, company integrates high-resolution aerial images into its digital platform

23.05.2025 | 14:34 (UTC -3)

Cultivar Magazine, based on information from Danielle Morcelli Romanelli

John Deere announced the acquisition of Sentera, a Minnesota-based agricultural aerial imagery company. Sentera’s

technology will be integrated into the John Deere Operations Center, a digital platform used by producers for planning and analyzing data in the field.

Sentera's cameras, compatible with most drones, capture high-resolution images.

The data generated feeds into FieldAgent software, which allows visualization of plant stress, individual health and generation of accurate weed infestation maps.

From these maps, the system creates personalized herbicide prescriptions, which can be applied by sprayers with nozzle control, optimizing the use of inputs.

The combination of technologies will enable faster and more informed agronomic decisions, according to Chris

Winkler, director of software at John Deere. Drones equipped with Sentera sensors map large areas at high speed. The processed information can be integrated with other systems and shared via the internet.

Sentera will continue to work with drone manufacturers, agronomists and distributors. The Operations Center will remain open to integration with imagery from other vendors.

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Beauveria bassiana compromises the reproduction of Frankliniella occidentalis

Study details how the pathogen alters the insect's behavior, physiology and fertility

22.05.2025 | 14:37 (UTC -3)

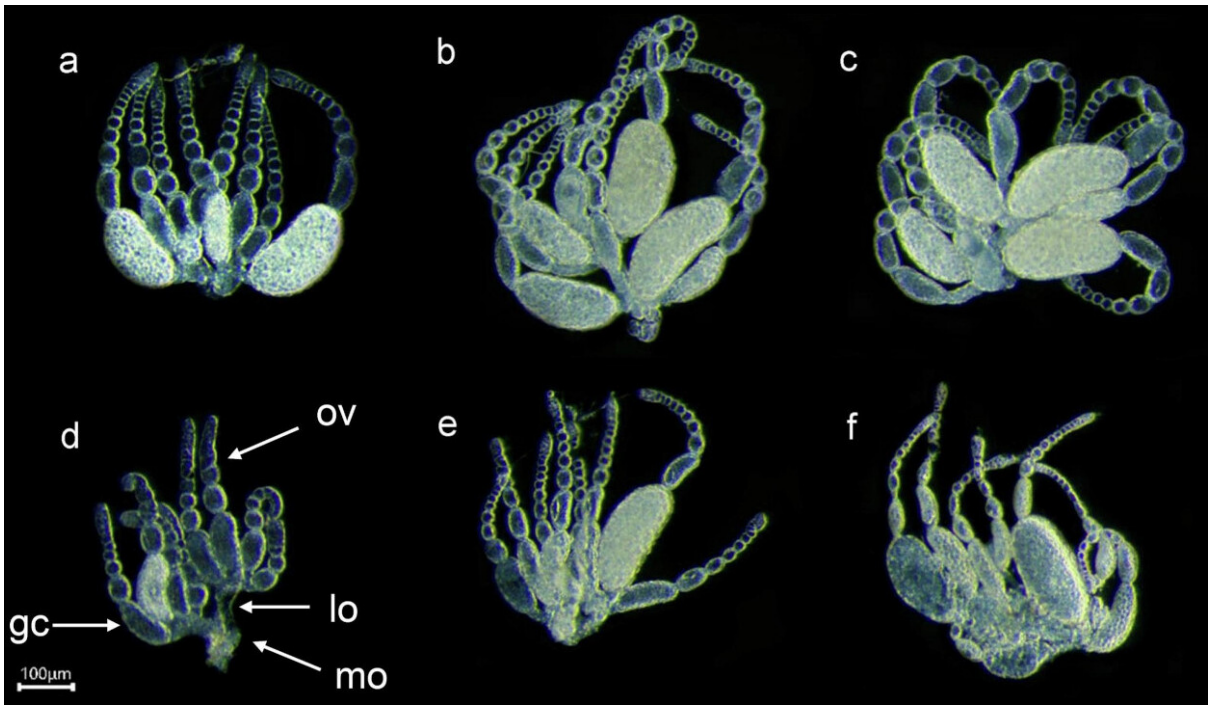
Cultivar Magazine

Scientists investigated the reproductive effects of fungal infection beauveria bassiana em *Frankliniella occidentalis* (thrips). More than causing the immediate death of insects, the pathogen compromises sexual behavior, ovary structure and number of viable offspring, with lasting impacts on the pest population.

The research, conducted by scientists from China and the United States, demonstrated that infection by the fungus significantly interferes with the insect's mating dynamics.

Infected males reduced courtship behavior. Females, in turn, increased their rejection of partners. The chance of copulation fell from 78% (in healthy groups) to less than 44% in combinations

with infected individuals.



Morphological evaluation of the reproductive system in *Frankliniella occidentalis* healthy and infected by *beauveria bassiana*; (ac) Microscopic images illustrating ovarian morphology of uninfected WFT 1, 2 or 5 days after adult emergence; (df) Comparative ovarian morphology of WFT after infection 1, 2 or 5 days after adult emergence

Reproductive anatomy also suffers. Infected females had underdeveloped ovaries and fewer mature eggs. Five days after adult emergence, the number of oocytes in infected females was clearly lower than in healthy females. The infection also reduced the length of the

ovarioles, structures responsible for egg production.

These changes are reflected in fecundity. The total number of eggs per female fell by half in infected pairs. The oviposition pattern also changed: while healthy individuals showed two reproductive peaks over the course of almost a month, infected females exhibited only an initial burst, followed by a rapid decline.

Sex ratio of offspring

Another relevant effect was the distortion in the sex ratio of the offspring.

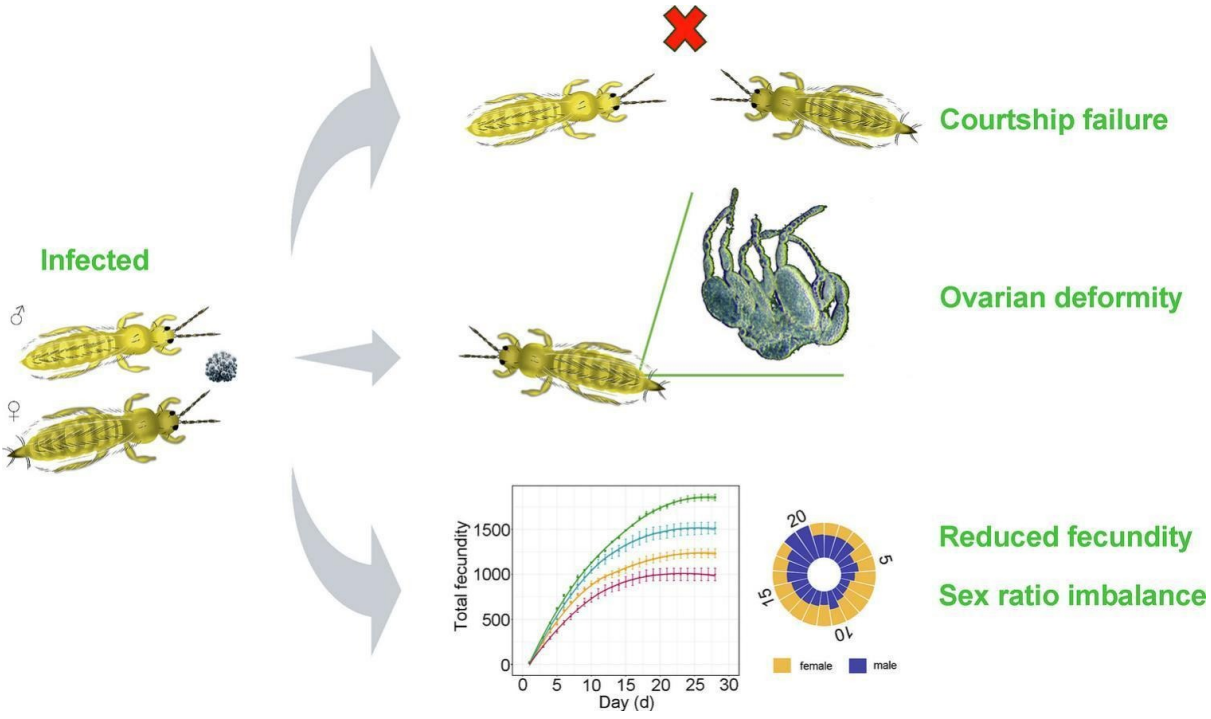
Under normal conditions, the species tends to produce more females. After infection, the number of male offspring

exceeded that of females in all experimental groups with the fungus. This change suggests interference in both fertilization and sperm viability of infected males.

This combination of effects—altered reproductive behavior, reduced egg formation, and changed sex ratio—points to new strategic potential in the use of *B. bassiana* as a biological control agent. Rather than acting solely as a lethal biopesticide, the fungus can function as a silent force that gradually undermines the pest's reproductive capacity.

The research used a virulent strain of *B. bassiana*, isolated from the Asian silkworm and maintained in official microbiological collections. The tests involved four types of

mating: healthy pairs, infected females with healthy males, infected males with healthy females, and both partners infected. The behavioral analysis followed precise protocols, with video recording and robust statistical evaluation.



Effects in the laboratory

The authors emphasize that the sublethal effects of the fungus — traditionally neglected in control programs — may be as important or even more important than its immediate toxicity. By compromising reproduction, the pathogen reduces the pest's population growth rate, increasing the intervals between outbreaks and facilitating integrated management.

Although the results were obtained under laboratory conditions, the authors advocate incorporating this evidence into management programs. In intensive crops, where the use of insecticides leads to rapid selection of resistance, strategies with multiple modes of action are increasingly necessary.

Adult survival

Infection also compromises the survival of adults. This reinforces the overall impact on the population. Infected females lived shorter lives and laid fewer eggs. The effects add up cumulatively: fewer matings, fewer eggs, fewer offspring and more males, which in themselves do not increase the population.

In the context of tropical and protected agriculture, where thrips represent a constant threat, the use of *beauveria bassiana* as a reproductive suppressor gains prominence. The fungus, already available in commercial formulations, offers a dual path of action: direct mortality and silent sabotage of the perpetuation of

the species.

More information can be found at doi.org/10.1016/j.pestbp.2025.106464

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AGCO Opens Planter Development Center

With an investment of R$16 million, the new space at the Ibirubá (RS) unit brings together cutting-edge engineering and innovation

21.05.2025 | 13:33 (UTC -3)

Cultivar Magazine

AGCO, a global company specializing in the design, manufacture and distribution of agricultural machinery and technologies for

precision agriculture, has opened the Planter Development Center in Ibirubá, Rio Grande do Sul. The new unit, which received an investment of R$16 million and has a built area of ??2.400 m², transforms the city into a strategic hub for the global development of planting technologies.

The multifunctional center is designed to cover all stages of planter development, from design to final testing, including virtual, laboratory and field validations. “We have created a modern, collaborative environment prepared to accelerate the development of new solutions. It is a space where areas work together and closer to the field, with a focus on productivity, performance and sustainability,” explains Fernando Nogueira, vice president of

Manufacturing Operations at AGCO.

For the Global Director of Engineering for planting and soil preparation, Vinícius Fiori, the center is the result of work that has been consolidated in the city since 1999. "The technology we are able to deliver today makes a difference for producers to increase production using fewer inputs, generating greater profitability," says Fiori.

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Rodrigo Junqueira, AGCO's general manager and vice president of Massey Ferguson South America, highlights the strategic relevance of the new center. "The

initiative represents a milestone in AGCO's trajectory, reinforcing our commitment to farmers and innovation. It is not just about localizing or tropicalizing solutions, but about the complete development of new technologies," Junqueira emphasizes.

According to Fabrício Natal, AGCO's global vice president of Engineering, Brazilian engineering plays a central role in the company's global technological

advancement. "The structure was designed to increase process efficiency, allowing our teams to develop complete solutions with greater precision and agility," adds Natal.

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The center will start its activities with 35 professionals, including mechanical and electrical engineers, agronomists and software developers, and may reach 65 employees in the future. In addition, it will encourage regional partnerships and boost the local economy.

AGCO already has a factory in Ibirubá, where it develops agricultural implements, such as the Momentum planter, a global product designed specifically for the Brazilian market, which stands out for its practicality in transportation and operation. The machine is only 3,6 meters wide when folded, allowing easy passage through gates and bridges.

"The presentation of the Development Center expands our operation in Ibirubá and strengthens the strategy of delivering technological solutions aligned with the needs of farmers in different regions of the world", concludes Junqueira.

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Massey Ferguson presents MF 8S tractors at AgroBrasília 2025

The machines are equipped with 6-cylinder, 7,4-liter AGCO Power engines

20.05.2025 | 16:01 (UTC -3)

Cultivar Magazine

Massey Ferguson highlighted the MF 8S tractors at AgroBrasília 2025, which runs until May 24. The machines are equipped with 6-cylinder, 7,4-liter AGCO Power engines, which provide more power, torque and performance at low revs.

Their encapsulated engines contribute to better engine performance, improving cooling capacity by always receiving fresh air. They also isolate the cabin from noise, heat and vibrations, explains Gabriel Duarte, from the SM Tratores dealership.

Another relevant aspect, the Multipad lever operates the transmission and controls the working speed control, the rear hydraulics, the power take-off, headland management and remote controls via the integrated microjoystick.

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Valtra's Q5 tractors are a highlight at AgroBrasília 2025

With power ranging from 265 to 305 hp, the line has advanced technology for greater efficiency in the field

20.05.2025 | 14:55 (UTC -3)

Cultivar Magazine

The Q5 tractor line was one of Valtra's highlights at AgroBrasília 2025. These machines are designed to offer high performance, fuel economy and advanced automation technologies.

With power ranging from 265 to 305 hp, the Q265, Q285 and Q305 models meet the needs of medium and large producers looking for efficiency and profitability in the field.

Among the distinguishing features of the Q5 line are the CVT transmission, which guarantees greater precision in operations, and the SmartTurn system, which allows automatic maneuvers without operator intervention.

Additionally, the ergonomically designed cabin and SmartTouch interface enhance

comfort and productivity.

The models were developed to fill the gap between the T and S series tractors, explains Jeferson Ferreira dos Passos, from Valtra.

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Brassica rapa poses new challenge to Argentine countryside

The first worldwide case of wild turnip resistance to flurochloridone detected in the southeast of Buenos Aires

19.05.2025 | 08:22 (UTC -3)

Cultivar Magazine

brassica rapa - Photo: Aapresid

A plant common in Argentinean crops has crossed an unprecedented border. For the first time in the world, a biotype of *brassica rapa* — the well-known wild turnip — showed effective resistance to flurochloridone, a residual herbicide widely used in pre-emergence.

The confirmation comes from the Faculty of Agronomy of the National University of the Center of the Province of Buenos Aires. The case occurred in Tandil, a region already marked by multiple resistance of the plant to three other mechanisms of action.

This scenario is worrying producers and technicians. This is the fourth mechanism defeated by the species. The others that have already been compromised are

glyphosate, acetolactate synthase (ALS) inhibitors and hormonal herbicides such as 2,4-D.

Researchers Víctor Juan, Lucía Ledesma and Federico Núñez Fré signed the first official report on the case.

The tests were carried out in a greenhouse, with seeds from two biotypes. The Tandil biotype, exposed to flurochloridone for eight consecutive years, resisted the standard commercial dose (1X, or 250 g ai/ha) with 45% survival. The Olavarría biotype, which had limited contact with the product, died almost completely with half of this dose.

Until then, there had been no reports of resistance in the world. *brassica rapa* to flurochloridone, according to the HRAC

and WeedScience databases. Other cases of resistance to phytoene desaturase (PDS) inhibitors existed, but with other active ingredients and in other species of the Brassicaceae family, such as *Raphanus the radish* e *Sisymbrium orientale*, especially in Australia.

Brassica rapa - Photo: Aapresid

Flurochloridone acts as an inhibitor of carotenoid biosynthesis. The plant loses color, dries out and dies. Until now, the molecule served as an escape route to combat populations resistant to other herbicides.

Since 2018, it has become the standard for pre-emergence management of wheat, barley and sunflower in Argentina. Including corn, in some cases. However, continued use has created selection pressure. The path of resistance has been opened.

In practice, farmers began to notice control failures as early as the 2021/22 harvest. They responded by increasing the dose until it doubled the recommended amount. This did not prevent some of the plants

from surviving, flowering, and leaving descendants. The cycle was complete. Resistance was consolidated.

The Pest Management Network (REM) of Aapresid had already mapped a worrying increase in resistant turnips between 2019 and 2023. Today, all areas of the center and southeast of the province of Buenos Aires are facing the problem. The case now confirmed adds another molecule to the national list of resistance, which now totals 49 biotypes.

The results of the tests are clear. The Tandil population represents a new level. It is not only resistant to flurochloridone, but also has four mechanisms that have been overcome. What's more, the LD50 of the resistant biotype was 171,2 g ai/ha,

compared to just 28,5 g ai/ha in the sensitive biotype.

Researchers advocate immediate measures. Rotation of herbicides and crops. Constant monitoring of crops. Combining chemical strategies with agronomic practices. And paying attention to the first signs of escape.

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Case IH renews Farmall C tractors from 100 to 117 hp

Models gain a version with ManualDrive transmission, improvements in ergonomics and hydraulic capacity

19.05.2025 | 06:54 (UTC -3)

Cultivar Magazine, based on information from Silvia Kaltofen

Case IH Farmall 120c

Case IH has introduced the 100 to 117 hp Farmall C tractors with FPT F36 Stage 5 engine, updated to offer greater efficiency and versatility. The main new feature is the possibility of equipping the models with the ManualDrive transmission, an alternative to the already known ActiveDrive 2. Both systems receive the new ActiveClutch feature, which decouples the engine and transmission when applying the brakes, facilitating maneuvers with less effort for the operator.

With 12 forward and 12 reverse gears (or 20x20 with super-reducer), the ManualDrive transmission includes an electro-hydraulic reverser with response modulation. The option aims to increase the tractors' suitability for operations with front loaders. The line now accepts rear

tires up to 540/65 R38, increasing traction and performance in tasks such as soil preparation and planting.

The new Case IH L635 front loader, available from the factory, lifts up to 2,0 tons at 3,8 meters. It features automatic leveling, hydraulic auxiliary function and quick hitch with automatic locking.

Its hydraulic capacity has been increased with an 82 l/min pump, while the total gross weight allowed has increased to 7 tons, favoring the transportation of heavier implements.

The tractors maintain compact dimensions, but with gains in robustness and comfort. A new digital panel with adaptive lighting makes it easier to read data in any light conditions. LED headlights increase

visibility in night operations.

Farmall 120c

Farmall Cs can leave the factory with Isobus Class 2 electric autopilot. The data generated is automatically sent to the new FieldOps platform.

The first European showing of the new models takes place during Demoagro in Medina del Campo, Spain, from 20 to 22

May 2025.

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Molecule discovered could contain the spread of Fusarium graminearum

Researchers identify fungal protein that deactivates plant defenses; pathogen causes several diseases, such as head worm

23.05.2025 | 15:10 (UTC -3)

Cultivar Magazine, based on information from Jan Suszkiw

Top half of this wheat ear infected with *Fusarium* spp. - Photo: Mathew Helm, ARS

Under constant threat from head blight, a disease that costs billions in wheat and barley production in the United States, a team from the U.S. Department of Agriculture (USDA) has taken a decisive step. The group led by molecular biologist Matthew Helm has discovered a molecule essential to the fungus's success. ***Fusarium graminearum***. This discovery could transform the way the country deals with the disease that compromises the quality of grains and poisons crops with mycotoxins.

The molecule, called FgTPP1, acts like a switch. It turns off or weakens the plant's defense system, allowing the fungus to colonize wheat tissue. When scientists removed the FgTPP1 gene from strains of the fungus, the disease rate was cut in

half.

The FgTPP1 protein is a type of protease, an enzyme that the fungus secretes to install itself inside the plant.

In laboratory tests, wheat exposed to the fungus without FgTPP1 showed symptoms in only 18% to 27% of spikelets. In plants infected by the original fungus, the rate jumped to 50%.

The researchers are now investigating which wheat proteins are affected by the protease. The idea is simple: if the plant can lose these proteins without harm, gene editing could remove the fungus' entry point.

But FgTPP1 is not just any protein. It is highly conserved among fungi of the Ascomycota phylum, a group that includes

several agricultural pathogens. This suggests that its role goes beyond head blight. And it makes it a strategic target for long-term solutions in several crops.

Another crucial finding: FgTPP1 not only disarms the plant's immune system, but also accumulates in chloroplasts — structures responsible for photosynthesis and also involved in defense against invaders. In tests, the protein inhibited typical cellular warning signals, such as the production of reactive oxygen species and the activation of MAPK signaling pathways, mechanisms that trigger programmed cell death in diseased cells.

Suppression of these signals by FgTPP1 renders the fungus invisible, allowing it to spread without resistance. In leaves of

Nicotiana benthamiana, a plant used as a model, the expression of FgTPP1 even prevented cell death induced by RPS5-type defense proteins, used by the plant to combat invaders.

Helm's team is now working on a bold solution: creating "decoy" proteins in wheat and barley that fool the fungus. These proteins mimic FgTPP1's natural targets, but when cut by the protease, they trigger an artificial alarm system that activates the plant's defenses.

The strategy is inspired by previous experiences with the bacteria *Pseudomonas syringae* em *Arabidopsis*, where the replacement of targets with specific sequences led to the creation of varieties resistant to viruses and bacteria.

Since FgTPP1 is present in virtually all isolates of *Fusarium graminearum*, any break in this mechanism represents a point of vulnerability for the fungus. This gives robustness to the technique, making it unlikely that the pathogen will evolve quickly to escape the new trap.

Head blight disease represents one of the greatest threats to food security in the United States. Its damage extends beyond the crop, affecting exports, animal and human health, and the reputation of the entire production chain. The mycotoxin DON, produced by the fungus, makes grain unfit for consumption and can cause poisoning.

More information at doi.org/10.1101/2024.08.30.610543

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Flowers play an important role in agricultural pest control

Strips with two or more flower species can increase the presence of predatory insects in crops by up to 70%

23.05.2025 | 09:37 (UTC -3)

Cultivar Magazine, based on information from Maria Hornbek

Along the edges of crops and ditches, they seem harmless. A splash of color in the field. But what we see goes beyond aesthetics. The flowering strips, increasingly common in Europe, are proving to be allies in the fight against agricultural pests. Research from the University of Copenhagen confirmed what producers and scientists suspected: plant diversity attracts natural enemies of insects that are harmful to agriculture.

The meta-analysis, coordinated by researcher Nika Jachowicz, analyzed 24 studies and 382 experiments in annual crops. The conclusion is straightforward: strips with two or more floral species increase the presence of natural predators, such as ladybugs, syrphids, stinkbugs, lacewings and soldier beetles, by an

average of 70%. A floral species alone does not generate a significant effect. However, with each new flower included in the mix, the number of natural enemies increases by 4,1%.

“Diversity pays off,” says Lene Sigsgaard, a co-author of the study. “More species means more food and shelter throughout the crop cycle.”

Why does it work?

The explanation is functional. Different flowers bloom at different times, extending the supply of nectar and pollen — energy sources for predatory insects.

Furthermore, each floral species benefits a specific group of natural enemies. This is

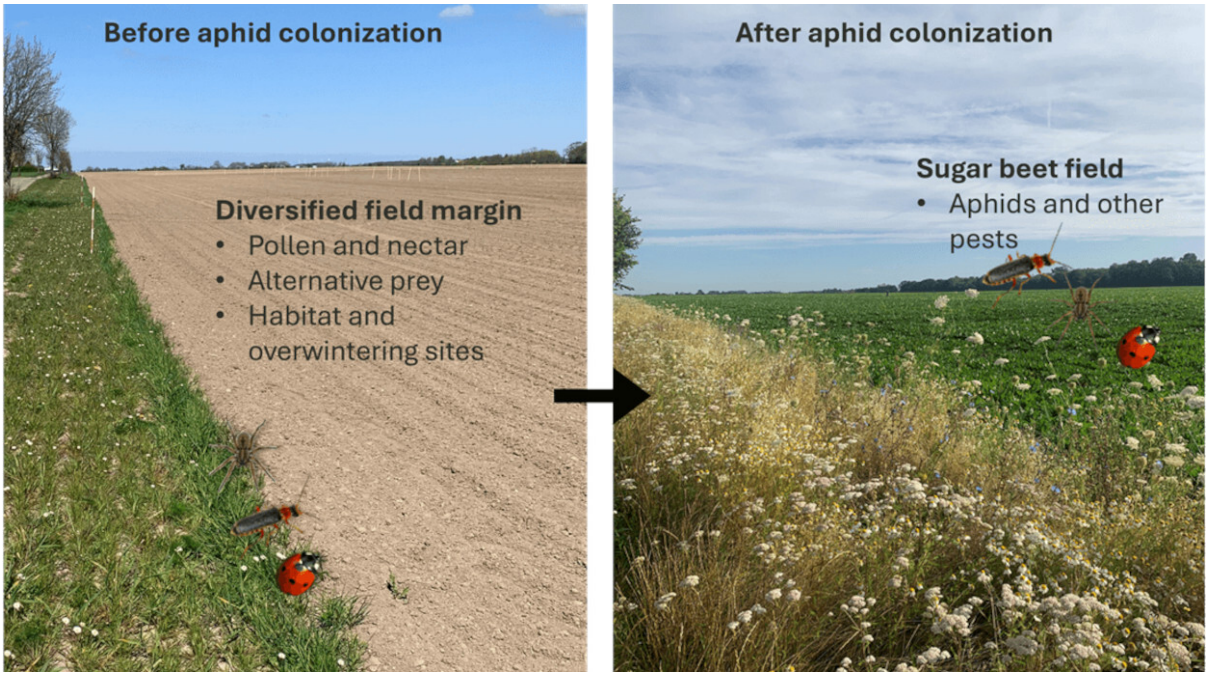
the case of open flowers - such as daisies, yarrow and umbellifers - whose structures facilitate access to food by ladybugs, parasitic wasps and solitary bees.

The importance of correct selection goes beyond the number of species. Flowers must have characteristics that prolong the longevity of predators.

The study scores a “quality index” for species based on their impact on the survival of natural enemies. Species such as yarrow (Asteraceae) and plants in the Apiaceae family, such as fennel, received high scores.

Flowering strips also function as winter shelter. When composed of perennial and native species, they can last for several years, sheltering populations of natural

enemies and favoring biological balance in the agricultural environment.



Early in the season, natural enemies may feed on resources available in the flower strip; later, they may move into the field when pests and other prey are present.

Limitation of effects

However, the effect of these strips is still concentrated on the edge of the crops. The research showed that the increase in the presence of predators occurs mainly in the first few meters from the flowering

strip. Studies that measured the presence of these insects more than 10 meters from the edge were scarce. This reveals a challenge: taking the beneficial effect of the flowers to the interior of large plantations.

In practice, the adoption of the strips faces bureaucratic barriers. “Many farmers report difficulties in accessing European subsidies. The sowing and management requirements are complex and, at times, not very compatible with the objective of attracting natural enemies,” comments Jachowicz.

Flowering strips do not replace all agricultural pest control measures, but they represent an important part of an integrated system that includes crop

rotation and biological control.

The authors acknowledge limitations in the study. The effect of the strips on pest populations is not yet conclusive. Of the 10 studies that measured this relationship, none found a statistically significant reduction. It was also not possible to correlate the use of the strips with increased productivity.

More information at doi.org/10.1016/j.agee.2024.109412

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Kuhn do Brasil will be present at AgroBrasília 2025

Company presents products in partnership with Agrovisão and Uniparts; producers are learning more about the company's lines

22.05.2025 | 15:55 (UTC -3)

Tatiane Mizetti

With special emphasis on its range of Accura distributors, Kuhn do Brasil, a world leader in agricultural implements, is one of the companies present at AgroBrasília until this Saturday (24/5). The French multinational's space is a partnership with regional resellers Agrovisão and Uniparts, presenting the focus on fertilization efficiency with machines that are a reference in fertilizer distribution technology.

Visitors can take a closer look at the Rauch Coaxial Distribution Adjustment System (CDA), which is present in all Accura distributors. The CDA allows precise adjustments of the application rate, ensuring a coefficient of variation of less than 12,5%, in accordance with strict European standards. The result is uniform

distribution across different types of fertilizers and working widths, enabling maximum soil productivity.

The Accura line also features an exclusive sealed agitator that preserves the physical characteristics of the fertilizers, preventing mechanical damage and dust formation. The stainless steel tank minimizes corrosion, extending the useful life of the equipment and reducing maintenance costs. The combination of high technology and quality materials makes Accura the ideal choice for producers looking to adapt fertilization at different stages of cultivation, from open fields to borders and late applications, boosting profitability and sustainability.

Highlights of the Accura line include:

- **Coupled distributors:** 1.200 L and 1.600 L, compact and versatile for medium-power tractors;
- **Towed distributors:** 12.000 L and 15.000 L, designed for large areas with high working autonomy;
- **Self-propelled:** Accura 4.0 BX, Accura 7000 ST and Accura 8.0 HD, with ergonomic cabin and advanced control systems, perfect for intensive operations.

"Our participation in AgroBrasília reinforces our partnership with Agrovisão and Uniparts and highlights our commitment to delivering solutions that combine precision and durability. Producers have the opportunity to see all of this up close, clarify their doubts and

project their productivity growth," highlights Lucas Moraes Castro, Marketing and Network Development Manager.

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Brazil is classified as medium risk in the EUDR

Cecafé reinforces actions to raise the status of national coffee

22.05.2025 | 15:27 (UTC -3)

Paulo André C. Kawasaki, edition of Cultivar Magazine

The European Union published today (22) the risk classification by country under the

Deforestation-Free Products Regulation (EUDR). As expected, Brazil, including its coffee production, was classified in the medium risk category.

The classification defines the frequency of audits that European economic operators must carry out in their supply chains. For medium-risk countries, such as Brazil, 3% of traded volumes will be subject to verification. Countries classified as low risk will have only 1% of volumes audited, in addition to benefiting from a simplified due diligence process.

Although Brazil occupies a superior position in volume and traceability compared to traditional producers of specialty coffees – such as Vietnam, Kenya and Jamaica, which were classified

as low risk –, Cecafé (Coffee Exporters Council of Brazil) sees room for progress.

According to the entity, the current classification reflects the European Union's choice for national rather than regional analyses, due to technical complexity, time constraints and lack of resources. However, there is an expectation that, in the future, the EU will adopt a regionalized approach, which will allow Brazil to present technical data by producing region, strengthening the position of national coffee.

Cecafé emphasizes the importance of accelerating the implementation of high-resolution georeferencing of the coffee park and fully meeting the requirements of the EUDR, such as validation of the Rural

Environmental Registry (CAR) and integration with electronic invoices. These actions are seen as essential to prove the compliance of Brazilian coffee with the zero deforestation criteria, whose cut-off date is December 2020.

The entity states that it will continue to work with European authorities, providing technical information and promoting transparency in the Brazilian production chain, with the aim of achieving, in the future, recognition of low risk of deforestation for Brazilian coffees.

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With Eva planter, Stara presents technologies at AgroBrasília 2025

Model combines precision, robustness and automation to increase productivity and reduce costs in the field

22.05.2025 | 15:03 (UTC -3)

Cultivar Magazine

Stara is participating in AgroBrasília 2025 with the Eva planter as one of its highlights. It is offered with a robust technological package. Recommended for summer crops such as corn, soybeans and beans, the model operates with up to 11 rows and has electric motors for distributing seeds and fertilizers.

Eva can be controlled via smartphone or the Topper 5500 monitor. In the Topper version, the farmer has access to real-time telemetry, variable rate and direct remote support with the factory. With the Syncro feature, up to four machines share data and operate in a synchronized manner, reducing seed overlap and increasing efficiency.

It offers line-by-line shutdown, zero-crushing system and curve compensation, which guarantees precision even in small or irregular areas, generating savings and increasing productivity with its on-board technologies, as explained by Matheus Henrique Baumgratz, who works in product marketing at the company.

Matheus Henrique Baumgratz

Eva's seed line has precise distribution, with a DPS-E electric doser and seven double seed elimination points. The Fertisystem system ensures uniformity in fertilizer application. The pantographic lines with independent wheels ensure better soil copying.

With suspended reservoirs of 75 liters per row for seeds and 150 liters for fertilizers, Eva makes refueling easier and also eliminates the need for lubrication during planting, thereby increasing the machine's operational performance. Its articulated header allows for easy handling and transportation with a width of 2,60 meters.

The Eva is manufactured with a rigid chassis and offers durability and low maintenance requirements, adds Matheus. It is available in versions with 7 to 11 rows,

with different spacing options. "The combination of on-board technology and practicality of use positions the planter as a complete solution for high performance in planting," he concludes.

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Senate approves General Law on Environmental Licensing

Changes to the bill affect agriculture, mining and infrastructure

22.05.2025 | 14:26 (UTC -3)

Senate Agency, edition of Cultivar Magazine

The Senate approved last Wednesday (21/5) the bill that institutes the General Environmental Licensing Law (PL 2.159/2021), with 54 votes in favor and 13 against. The proposal, under debate in Congress for over 20 years, aims to unify and simplify the rules for issuing environmental licenses in the country. As it was amended, the text returns to the Chamber of Deputies.

Among the main points, the creation of the Special Environmental License (LAE) stands out, which allows simplified processing for projects considered strategic by the Executive, with analysis within one year. The measure could make possible projects such as oil exploration on the Equatorial Bank of the Amazon River.

For the agricultural sector, the text maintains the exemption from licensing for activities already provided for in the version approved by the Chamber, as long as conditions such as land regularization and authorization to remove native vegetation are met.

The proposal also simplifies the issuance of the License for Adhesion and Commitment (LAC), valid for small and medium-sized enterprises with low or medium pollution potential. In these cases, licensing may be done by self-declaration, as long as environmental requirements are met and there is no deforestation of native vegetation.

Another significant change was the inclusion of large-scale mining activities in

the scope of the new law, which had been removed by the Chamber. Stricter rules were also established for the automatic renewal of licenses and increased penalties for those operating without environmental authorization, which can be up to two years in prison.

Reported by Senator Tereza Cristina (PP-MS), the text received 56 amendments in the Senate. Among them, proposals that simplify the licensing of infrastructure works on already paved highways and projects linked to energy security.

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Agricultural robots compete in international farming challenge in Italy

Teams from 16 universities test autonomous solutions for navigation, fruit and fungus detection

22.05.2025 | 13:57 (UTC -3)

Cultivar Magazine, based on information from Malene Conlong

The 22nd edition of the Field Robot Event will take place from June 9 to 12 in the city of Rodano, near Milan, Italy. The event will bring together 16 teams of students who will compete with autonomous robots on a 700-hectare farm.

The competition tests technologies applied to agriculture in real scenarios, such as navigation between curved corn rows, fruit recognition and detection of bioluminescent fungi at night.

The event is supported by the DLG (German Agricultural Society), organizer of the DLG Feldtage, and is held by the AirLab laboratory of the Politecnico di Milano. This is the first time that the competition has taken place on Italian soil.

The tasks require the robots to navigate on their own, recognize strawberry plants and map fruits on the plants. One of the tests takes place after sunset, focusing on detecting fungi that glow in the dark.

According to Professor Matteo Matteucci, from the university's Department of Electronic and Information Engineering, the new challenges simulate orchards and test the technology in complex environments.

Sensors such as cameras and lidar, intelligent algorithms and precision actuators allow robots to perform tasks without human interference. The system needs to identify area and fruit boundaries in real time, avoiding damage to the crop.

The robots will be evaluated by a technical and academic panel, based on the complexity, performance and applicability of the solutions in the field.

DLG is also integrating the event into its “FarmRobotix” platform, which will be at Agritechnica 2025, the world’s leading agricultural machinery trade fair. According to Timo Zipf, project manager, while the Field Robot Event tests prototypes, Agritechnica showcases commercial solutions, connecting innovation and application in the field.

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At AgroBrasília 2025, Baldan offers Skadi seeder

With up to 41 lines and 62 fertilization combinations, the model combines high capacity with simplified maintenance

22.05.2025 | 13:35 (UTC -3)

Cultivar Magazine

Baldan Skadi 9000

One of Baldan's highlights at AgroBrasília 2025 is the Skadi continuous flow seeder, developed for planting wheat, oats, barley and other winter crops. It has a robust and reinforced chassis, with a carbon steel structure, designed to withstand various planting demands.

The series includes models ranging from 4000 to 9000, with varying numbers of rows: 21, 25, 29, 33, 37 and 41, depending on the configuration. The seeder offers 170 mm spacing between rows. It has excellent row spacing, which ensures excellent straw flow during planting and prevents straw from accumulating on the rows, known as “plugging”. All versions use pantographic rows with self-lubricating bushings, a system that prevents blockages and the entry of residue,

extending the useful life of the components.

The power requirement of this seeder varies according to the series and number of rows, with a requirement of 105 hp for smaller versions and 240 for larger ones.

Fertilizer adjustment is performed using Badan's exclusive Speedbox transmission system, which allows up to 62 different combinations for fertilizer distribution. This adjustment is made in less than 1 minute, without the need for tools. The fertilizer dosing system is performed using Fertisystem dosers, which allows precise dosing and homogeneous flow in the dosing.

The seed is regulated using a millimeter-point handwheel, which allows axial

adjustment for opening and closing the dosers, ensuring a precise minimum dosage. The dosing system is composed of individual grooved cylinders, which guide the seeds to the conductive tube without friction, preserving their morphological characteristics.

Skadi offers optional fine seed storage, ideal for planting seeds with smaller granulometry, weight and shape, such as - for example - brachiaria, millet and crotalaria.

It also has the option of a hydraulic side transport system, with a width of up to 3,20 meters, which facilitates movement on narrow and difficult-to-access roads.

In addition, it has optional hydraulic line marker and electric line trimming systems,

allowing operations to be carried out directly from the tractor cab.

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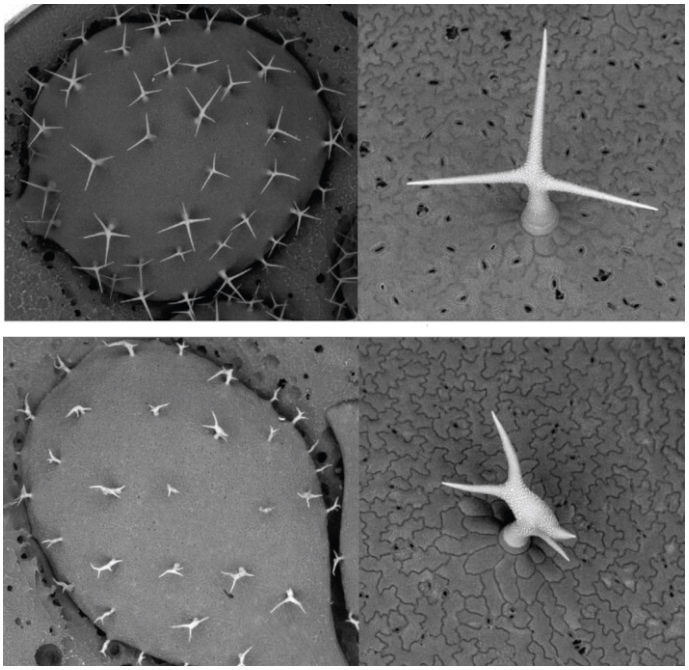
IDRs define distinct functions of SCAR proteins in plants

Study reveals how structural variations in cytoskeletal proteins affect root and leaf development in plants

22.05.2025 | 05:55 (UTC -3)

Cultivar Magazine



Trichomes on a leaf *Arabidopsis thaliana* (shown by electron microscopy) are formed by a single cell that adopts this spike-shaped shape (upper images). Plants of *Arabidopsis* without the SCAR/WAVE gene they cannot form trichomes with the correct shape, as their control of the internal cytoskeleton is impaired (bottom images) - Photos: Sabine Brumm

The complexity of plant development depends on the dynamic organization of the actin cytoskeleton. In legumes, such as *Medicago truncatula*, SCAR/WAVE proteins play a central role in this process. A new study shows that small variations in structurally disordered regions of these proteins explain distinct functions in different tissues and species.

Researchers investigated two closely related SCAR proteins: MtAPI and MtHAPI1. Both share a common phylogenetic origin and conserved domains. Despite this, they present non-interchangeable functionalities.

MtAPI is essential for root hair growth in *M. truncatula*, while MtHAPI1 acts in the development of trichomes in *Arabidopsis*

thaliana.

The team used a systematic approach with chimeric proteins. By swapping specific regions between MtAPI and MtHAPI1, they found that two central disordered regions—identified as IDRs (intrinsically disordered regions)—determine the specific function of each protein.

These regions do not follow a fixed three-dimensional structure, but influence the stability and cellular localization of proteins.

Em *A. thaliana*, the presence of a 42-amino acid segment within one of these IDRs caused the degradation of the MtAPI protein, preventing its action on trichome development. After this segment was removed, the protein regained

functionality.

Additional trials have shown that this effect also occurs in *Nicotiana benthamiana*. The introduction of the 42 amino acid segment drastically reduced the fluorescence of labeled proteins, indicating decreased protein stability.

Interestingly, mutations in potential phosphorylation and ubiquitination sites within this segment did not restore stability. The exact mechanism remains to be elucidated.

This type of post-translational control, via IDR-mediated selective degradation, points to an additional level of functional regulation in plant cytoskeletal proteins. Rather than relying solely on conserved catalytic domains, functional specificity

may reside in structurally flexible regions.

The finding that IDRs determine the functionality of SCAR proteins expands our understanding of how plants regulate cell growth in distinct tissues.

The diversity of functions between paralogs such as MtAPI and MtHAPI1 may be explained by differences in these variable regions.

Despite limitations in the direct detection of SCAR proteins in total extracts—possibly due to their low abundance—experiments with fluorescent fusions and transgenic plants provided consistent evidence of the influence of these regions.

More information at doi.org/10.1126/sciadv.adt6107

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Microneedles and hormones against food waste

After applying the needles with melatonin, the plant lasted four more days at room temperature

21.05.2025 | 22:05 (UTC -3)

Cultivar Magazine

Researchers manually applied small areas of the melatonin-filled microneedles to the base of pak choi plants; area can be seen in the image - Photo: Yangyang Han / MIT News

A leaf of chard rots silently. In Asian markets or in Brazilian countryside markets, time moves quickly. The loss happens before the pot. Now, a group of scientists from the Massachusetts Institute of Technology (MIT) and the Smart Alliance in Singapore promises to slow down this process. The proposal is simple in form but ingenious in content: using biodegradable microneedles made of silk to inject melatonin directly into plant tissue. The result? Greener leaves for longer. No need for a cold chain.

The experiment focused on pak choy, a vegetable common in Asia that is highly perishable. After applying the melatonin needles, the vegetable lasted four days longer at room temperature. When refrigerated, it lasted up to ten extra days.

The change begins with the cut. When separated from the root, the plant begins a natural aging process — called senescence. Melatonin, a hormone also present in plants, acts as a moderator of this process.

“We wanted to see if we could control post-harvest physiology,” says Benedetto Marelli, an MIT professor and lead author of the study.

Innovation is a response to a global problem. Around 30% of harvested food is lost before consumption. Most of it spoils during transport and storage. Refrigeration helps, but it requires energy, logistics and money. In many countries, especially in Africa and Southeast Asia, these resources are scarce. Silk needles are

emerging as an alternative.

The material chosen was not by chance. The silk used in the needles comes from fibroin, a natural, biodegradable and non-toxic protein. The shape allows the plant to pierce its waxy skin without causing visible injuries. The injected substance is distributed throughout the plant's internal vessels, reaching its vital parts.

Before testing melatonin, the researchers applied a fluorescent dye to the pak choy plants to see if their vascular system was working as intended. Once the distribution was confirmed, they tried two conventional approaches: spraying and dipping the plants in melatonin. Neither had any effect. Uptake was minimal. Only direct injection worked.

The treated leaves remained green until the fifth day, while the control group turned yellow on the third day. The scientists monitored weight loss, coloration and chlorophyll content. The difference was clear. On average, the injected leaves remained saleable until the eighth day at room temperature.

Under refrigeration, the benefit increased even further. The treated vegetables survived until the 25th day with good appearance. Laboratory analysis showed greater antioxidant activity. Gene expression also changed: the hormone activated mechanisms that protect the pigments and delay cell death.

The idea of ??using silk and hormones on crops is not new to Marelli’s lab. His team

has previously tested microneedles to deliver nutrients and monitor crop vital signs. The current challenge is to scale up the technique. In the experiment, the needles were applied manually. In the field, the application would need to be adapted to agricultural machinery, tractors, and drones.

“To adopt it on a large scale, you have to make the technology cheap,” Marelli admits. “But the potential is huge.”

More information at doi.org/10.1021/acs.nanolett.5c00487

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Ihara highlights solutions to recent problems at AgroBrasília 2025

Bedbugs and weeds were some of the main threats faced by rural producers

21.05.2025 | 11:26 (UTC -3)

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At AgroBrasília 2025, Ihara is presenting solutions for soybeans at a stand with a Japanese theme. In the last harvest, bugs and weeds were some of the main problems faced by rural producers, explains Jorge Mendes, the company's agronomist.

Therefore, the highlights include the insecticides Terminus and Zeus, effective against bedbugs, and the herbicide Yamato, with pre-emergent action and long residual.

The effects of these and other products are demonstrated in the field. The company also offers technical circuits and social activities for farmers.

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Eduardo Penha takes on new role at Case IH Latin America

With over 20 years of experience at CNH, executive leaves marketing area and assumes new leadership

21.05.2025 | 09:46 (UTC -3)

Cultivar Magazine

After almost six years as the marketing director of Case IH, Eduardo Penha has

been named the brand’s commercial director for Latin America. The change marks another important step in his career at CNH, where he has worked for more than two decades.

Eduardo began his career at the company as an intern in demand planning and, over the years, gained experience in different strategic areas, including sales management, business intelligence and communications. As marketing director, Penha led a broad structure and helped strengthen the brand's presence in strategic regions, expanded the digitalization of processes and consolidated the relationship with the dealer network.

With the new role, Penha takes on the challenge of leading the brand's

commercial area throughout Latin America, with a focus on sustainable growth, excellence in service and strengthening the network.

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Palmeri caruru worries farmers and demands integrated management

Glyphosate resistance and easy seed spread make the use of integrated strategies essential

21.05.2025 | 08:35 (UTC -3)

Wellington Torres

Photo: Marlon Bastini

The palmeri caruru (*Amaranthus palmeri*)

represents a serious threat to agriculture due to its aggressiveness and resistance to herbicides, especially glyphosate. Effective management requires the integration of different strategies: chemical, cultural and preventive. Constant surveillance and the adoption of good agricultural practices are essential to minimize the impacts of this weed.

Originating from the southwestern United States and Mexico, Amaranthus palmeri was first identified in Brazil during the 2014/2015 harvest, in the state of Mato Grosso, and more recently, its presence was recorded in Mato Grosso do Sul. According to Anderson Cavenaghi, professor and researcher at the Várzea Grande University Center (Univag), the weed has an impressive growth capacity,

reaching up to four centimeters per day. In addition, a single plant is capable of producing between 200 and 600 seeds, which contributes to the formation of a persistent seed bank in the soil, with an average viability of four to five harvests. However, data from the United States indicate that this viability can extend for up to 18 years. The combination of high fecundity and long dormancy makes controlling the plant more challenging and significantly increases the risk of new infestations.

Palmeri caruru affects a wide variety of crops around the world. In Brazil, outbreaks have already been recorded in soybean, corn and cotton crops. International studies indicate that competition for water, nutrients and light

can cause productivity losses of up to 91% in **corn**, 79% on **soybean** and 77% in the **cotton**. According to Professor Cavenaghi, the advance of caruru-palmieri in the country was relatively slow thanks to the mobilization of farmers, researchers, producers' associations, pesticide companies, the Mato Grosso State Agricultural Defense Institute (Indea-MT) and the Ministry of Agriculture and Livestock (Mapa), which prepared a specific Normative Instruction for the control of the species, updated in 2020 through IN Indea-MT 003/2020.

Even so, Cavenaghi warns of the need for continued attention to infestation hotspots and reinforces the importance of guiding farmers on proper management. “Due to the high quantity of seeds produced per

plant and their small size, dissemination to areas that are not yet contaminated can occur easily. Management of the species should include the use of both pre- and post-emergent herbicides," explains the professional.

The researcher points out, however, that palmeri caruru is already resistant to glyphosate — an EPSPS-inhibiting herbicide widely used in agriculture — and to ALS inhibitors such as chlorimuron and imazethapyr. This resistance makes controlling the plant more difficult, causing losses to production and compromising crop competitiveness.

"Alternating mechanisms of action between these effective active ingredients is essential to reduce selection pressure

and delay the advance of resistance, although the ideal would be not to rely solely on isolated chemical control," explains the specialist.

Cavenaghi also emphasizes that complementary cultural practices are essential and may involve the use of cover crops, such as Brachiaria, manual elimination of plants before they reach the flowering and fruiting phase, as well as strategies that favor crop development, such as choosing appropriate varieties, sowing at recommended times, planting in clean areas, maintaining crop health and balanced fertilization. "These measures help reduce the seed bank in the soil and make it difficult for new outbreaks to appear," he highlights.

Among the preventive actions, the professor and researcher also highlights the importance of cleaning machinery when moving between agricultural areas, frequent monitoring of plots and reporting incidents to the responsible agencies. According to him, the adoption of an integrated management protocol is currently the most effective approach to contain the expansion of the palmeri caruru.

“Continuous monitoring, combined with the judicious use of pesticides and the integration of agronomic strategies, is essential for the sustainability of Brazilian crops. Joint work between producers, consultants and research institutions is crucial to addressing this threat and maintaining productivity in the main chains

of national agribusiness," he concludes.

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Threats to pollinators put food security at risk

International report points to war, microplastics and artificial light as emerging threats to bee survival

20.05.2025 | 21:55 (UTC -3)

Cultivar Magazine

Bees are facing a new siege. In addition to habitat loss and climate change, a new wave of threats — more subtle, more

diffuse — is silently advancing on pollinators on a global scale. War, microplastics and light pollution are among the twelve emerging factors highlighted in a report released this Tuesday (20/5) by Bee:wild, an international campaign dedicated to pollinator conservation, with scientific support from the University of Reading, in the United Kingdom.

The document warns that the collapse of pollinator populations directly compromises human food security. Almost 90% of flowering plants and more than three-quarters of food crops on the planet depend on agents such as bees, butterflies, bats and birds to reproduce.

The survey identified the risks with the greatest potential impact over the next 5 to

15 years. At the top of the list, the report highlights the simplification of crops imposed by armed conflicts.

A recent example is the war in Ukraine, which forced farmers to abandon crop diversity, drastically reducing the food supply for pollinators throughout the seasons.

Another silent danger is directly infiltrating the nests: microplastic particles have been detected in honeybee colonies across

Europe. Among the materials identified, PET — the same material found in plastic bottles — has proven to be ubiquitous. These contaminants threaten the health and longevity of the insects.

Nighttime light pollution compromises the work of nocturnal pollinators, such as moths. Experiments indicate that flower visits decrease by up to 62% when there is intense artificial light. This directly interferes with the fertilization of plants that depend on the night to reproduce.

The report also highlights the side effects of poorly designed environmental policies. For example, the massive planting of non-flowering trees with an exclusive focus on carbon capture can reduce the supply of pollen and nectar.

Mining for metals used in batteries, such as lithium and cobalt, destroys essential habitats. The frequent burning of natural areas, intensified by climate change, is worsening this scenario of devastation.

In light of this scenario, the report points to ways forward. Among the proposed solutions are strengthening laws against antibiotic pollution, encouraging electric vehicles to reduce harmful emissions, cultivating plants with better nutritional value for bees, and using solar parks as

flower-rich habitats.

Initiatives such as the development of selective pesticides based on RNAi, which prevent damage to beneficial insects, are also gaining prominence. The use of artificial intelligence to monitor populations and pests and the valorization of stingless bees, which are crucial for pollination in tropical areas, complete the list.

“This is not just about saving bees,” warns Professor Simon Potts, who led the study. “They underpin food systems, climate resilience and the economic security of entire populations. Protecting pollinators is protecting ourselves.”

More information at beewild.rewild.org

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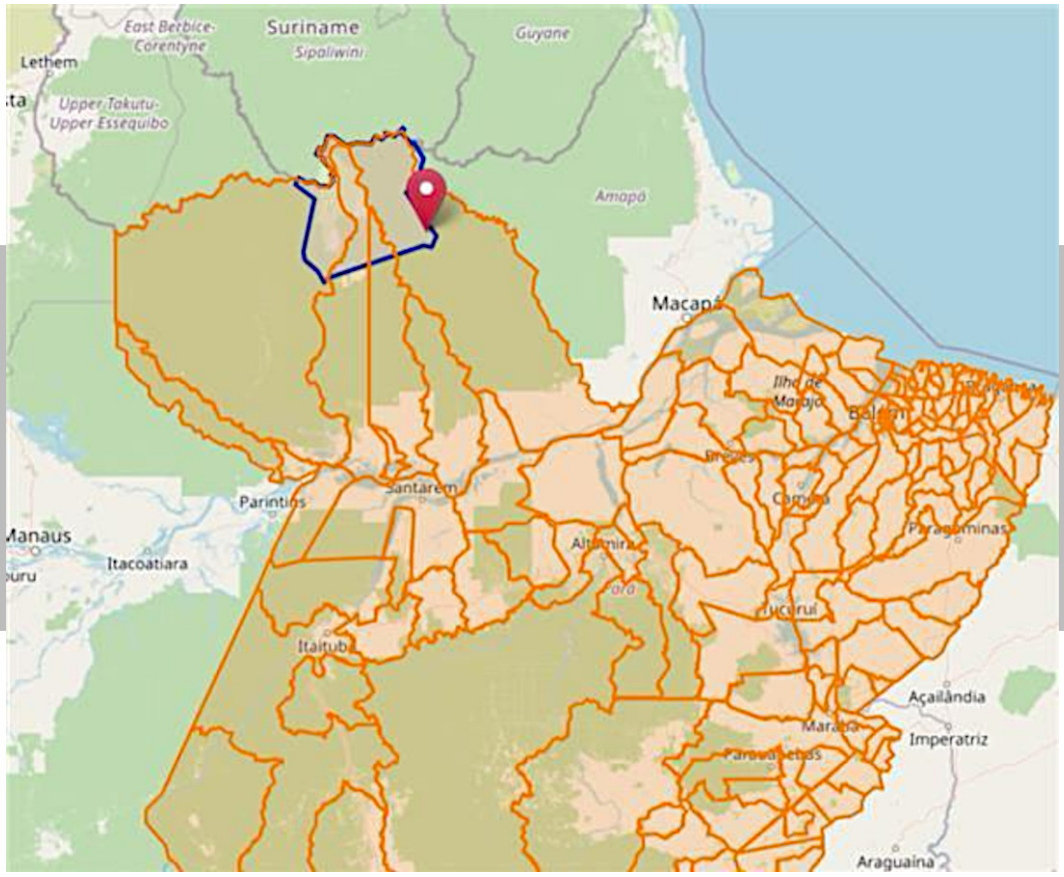
First outbreak of cassava witch's broom confirmed in Pará

Disease caused by destructive fungus hits indigenous plantation in remote area of ??Almeirim

20.05.2025 | 21:18 (UTC -3)

Cultivar Magazine



Fungus focus *Ceratobasidium theobromae* in cassava in indigenous territory in northern Pará

The Ministry of Agriculture (Mapa) has confirmed the first outbreak of cassava witch's broom in the state of Pará. The case was identified on May 15, in an indigenous area of ??Tumucumaque Park, in the far north of Almeirim, on the border with Suriname.

The findings were made after an inspection carried out on April 28 by state technicians. Following a complaint, the professionals visited Aldeia Bona, where they collected samples of plants with suspicious symptoms. Tests at the Federal Laboratory of Agricultural Defense of Goiás confirmed the presence of the fungus. *Ceratobasidium theobromae*.

The affected area is difficult to access. It can only be reached by chartered flights.

The outbreak is located far from the commercial cassava-producing regions of Pará.

The Pará State Agricultural Defense Agency and the Ministry of Agriculture, Livestock and Food Supply (MAPA) monitor the state through phytosanitary surveys. So far, there have been no reports of the disease in commercial crops, nor have any contaminated material been seized at inspection checkpoints in northern Pará.

The disease is not related to the witch's broom disease of the cocoa tree. The fungus does not pose a risk to human health, but it causes serious damage to plantations. It causes deformations, wilting, chlorosis, and death of leaves and plants. It spreads through plant material, tools,

soil, and water. Embrapa Amapá detected the first case in 2024, in indigenous lands of Oiapoque.

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Study analyzes wasps in cassava crops

Research investigates parasitoid insects as allies in natural pest control in the Amazon

20.05.2025 | 16:48 (UTC -3)

Denise Britto

Photo: Francisco Damião dos Santos Souza

A study by the Ecology Department of the São Carlos Campus of the Federal University of São Carlos (UFSCar) is

studying the diversity of parasitoid wasps in the interior of the state of Amazonas - a region of extreme ecological importance and still little explored by scientists. The study will also relate the action of these wasps in the natural biological control of pests in the crops of small cassava producers in the region.

"Although many parasitoid insects act as natural biological control agents for agricultural pests, information about these species is still scarce, especially in relation to cassava, which is the most important crop for subsistence in the northern region of Brazil. The Amazon is one of the biomes where information about parasitoid wasps is most limited. This knowledge gap extends to both vertical and horizontal

dimensions, leaving a large part of the region unexplored and unknown," reports Gabriela do Nascimento Herrera, a doctoral student in the Postgraduate Program in Ecology and Natural Resources (PPGERN) at UFSCar and researcher responsible for the study.

Insects studied

The objective of the study, according to Gabriela Herrera, is to contribute to the knowledge of the diversity of Ichneumonoidea, a group of parasitoid wasps, which are insects belonging to the order Hymenoptera, which includes bees, wasps and ants. They are characterized by having "two pairs of membranous wings, complete metamorphosis (egg, larva, pupa

and adult), modified apex of the abdomen, often forming an ovipositor or stinger, well-developed antennae, generally with several segments and varied body size and shape, with great ecological and behavioral diversity". This order of insects, according to the scientist, includes solitary and social species, with important roles mainly in pollination and biological control.

In the research, the doctoral student will work specifically with the group of wasps, from the superfamily Ichneumonoidea, the largest superfamily of the order Hymenoptera and which has large associations with pests of various agricultural crops, playing an important role in natural biological control.

Amazon biome

The focus of the study is to investigate the action of these wasps in the Amazon biome, comparing their diversity, richness and abundance in the different strata of soil, understory and forest (vertical stratification) at different times of the year. "I chose to look for them in the Amazon due to the lack of knowledge in this biome and also because of my origins there. In addition, Professor Angélica [Maria Penteado-Dias] is a great reference in this area of ??research, leading a research group (INCT Hympar - National Institute of Science and Technology of the Amazon) *Hymenoptera Parasitoids*), already consolidated with several studies in other Brazilian biomes", says the doctoral

student.

According to her, the Western Amazon region as a whole, especially the interior of Amazonas, is a little explored area. "There is not much research in the region, often due to difficult access, as there are isolated places that many people may even consider dangerous," she says. "I believe that this area is important from an ecological point of view because it is a preserved area and much of its fauna and flora still remains unknown."

Forest x crop

The study will also outline the differences in the occurrence of wasps in native forests and in crops, indicating possible

species for biological control in cassava crops.

According to the researcher, "the vast majority of producers in the region are small producers and there are still many conservative production habits, without much machinery available and without much use of agricultural pesticides, which helps even more to maintain some of the region's original characteristics."

Potential for preservation

Another advance in the research will be the collection of information about the local hymenoptera fauna, enabling the description of many new species for

Science. "Knowing the species is essential to help preserve them. Scientists believe that many species become extinct before they are even described. This is what we don't want to happen," says Gabriela Herrera.

"I have always been very interested in researching the Amazon and trying to bring and publish new discoveries or bring new information to more people, because the Amazon has always been a part of me. I was born in the interior of Acre and grew up in the interior of Amazonas, always in contact with nature and cassava crops. Cassava cultivation is, in fact, the most important for the people of the North region, both as a subsidy and historically speaking. And while developing my

master's research, I was able to realize how there is a lack of data on *Hymenoptera Parasitoids* for the entire Amazon region and how important this is for ecological balance."

Fieldwork and analysis

To develop the work, monthly collections will be carried out in an area of ??native forest and cassava crops, in the municipality of Guajará, in the state of Amazonas, from May 2025 to February 2026. For this, the researcher has the assistance of Francisco Damião dos Santos Souza, who acts as a field guide and was responsible for helping to set up the traps, distributed in different strata of the forest.

The traps used, called Malaise Traps, are tent-shaped and have fine netting, and are used to capture flying insects, especially flies and wasps, in different environments (native forests, crops and borders) and at different heights (0, 5, 10, 15 and 20 meters) to check both the diversity and the functional roles of the individuals collected. "I went to the field to install the traps on April 27th and will now go back a few more times for the other stages of the project. But there is a team there responsible for collecting the material from the traps already installed and sending it to the laboratories at UFSCar, São Carlos, so that this material can be properly sorted and identified", explains the PPGERN doctoral student.

The study

The study, titled "*Vertical stratification and diversity of parasitoid hymenoptera (Ichneumonoidea) in native forest and cropland environments in western Amazonia, Amazonas, Brazil*", is supervised by Professor Angélica Maria Penteado-Dias, from the Department of Ecology and Evolutionary Biology (DEBE), and co-supervised by researcher Eduardo Mitio Shimbori, from the Center for International Cooperation in Agricultural Research for Development (Cirad), in France.

The research began on April 27 of this year and is expected to be completed in May 2026, and has financial support from the National Council for Scientific and

Technological Development (CNPq) and the São Paulo State Research Support Foundation (Fapesp), in addition to a scholarship granted by the Coordination for the Improvement of Higher Education Personnel (Capes).

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Tropical canola hybrids to be developed in Brazil

Partnership between Embrapa and Advanta Seeds aims to reduce dependence on imported seeds

20.05.2025 | 13:48 (UTC -3)

Cristiane Vasconcellos

Photo: Cristiane Vasconcelos

Embrapa Agroenergia (DF) and the company Advanta Seeds have just signed a partnership to develop the first tropical canola hybrids adapted to Brazil's environmental conditions. The initiative has the potential to change the crop scenario in the country, opening up new opportunities for rural producers, especially in the second harvest, and should help meet the growing demand for vegetable oil and biofuels. The partnership launched the BRSCanola project, which aims to develop hybrid cultivars with high agronomic performance, with disease resistance, herbicide tolerance and adaptation to the climate and tropical soils of the Center-South region of the country.

Canola, a plant from the cruciferous family, like cabbage and kale, of the Brassica

genus, is already growing in Brazil, especially in the South of the country. However, they use seeds that come mainly from Australia. The project will last two years and combines the results of two ongoing projects also focused on sustainable canola production in Brazil. “These are efforts in Research and Development and Innovation that complement each other to improve and consolidate the canola production chain in Brazil for the production of biofuels,” highlights Embrapa researcher Bruno Laviola, who coordinates BRSCanola.

Laviola says that canola plays a strategic role in crop diversification and sustainable vegetable oil production in Brazil. “With this partnership, we will combine Embrapa’s accumulated knowledge in

genetic improvement for the Cerrado with Advanta’s global expertise with its elite lines, to generate hybrid cultivars adapted to our tropical environment,” says the scientist.

He believes there is ample room for productivity gains and reduced dependence on imported seeds, since there are currently no commercial canola cultivars developed in Brazil. All are imported from other countries, mainly Australia. Furthermore, by tropicalizing canola, the crop is adapted to the conditions imposed by climate change, resulting in materials that are more tolerant to high temperatures and water deficits.

Crossing of Brazilian and Australian lines

For this reason, the project is based on the crossing of lines developed by Embrapa with those of Advanta originating in Australia. Dozens of hybrid combinations will be generated and evaluated, with field and greenhouse tests, including assessments of tolerance to water stress, grain quality and resistance to the main diseases of the crop, such as blackleg, white mold and Alternaria leaf spot. Advanta participates by supplying genetic materials developed over 40 years of traditional genetic improvement.

The project is a pioneering initiative for the Brazilian market, given that the lack of hybrids adapted to tropical conditions has been one of the main barriers to the expansion of the crop and, especially, to increasing average grain productivity. For Ana Luiza Scavone de Camargo, leader of New Business Development in the Americas at Advanta, this partnership is a valuable opportunity that uses the best of the scientific knowledge that exists between the two institutions. “This will allow us to accelerate the development of more resilient and productive genetic materials, which are essential for the advancement of the production chain,” predicts the executive. The partnership also includes the Arthur Bernardes

Foundation (Funarbe) for administrative and financial support for the execution of the activities.

Brazil's agroenergy potential

“We believe that the development of tropical canola hybrids could position Brazil as a leading player in the global bioeconomy. We are promoting applied science with a focus on concrete results for producers, the food sector and the biofuels market,” concludes Laviola.

The area planted with canola in Brazil reached 40 thousand hectares in 2021, jumping to 250 thousand ha in 2024. The outlook is to reach around 350 thousand

ha in 2026. With public policies focused on the production and adoption of biofuels in the country, with emphasis on Biodiesel, SAF and Renewable Diesel, this production needs technical improvement to increase productivity in addition to increasing the cultivated area. Consolidating a sustainable production system for canola.

Potential for expansion in the second harvest

Canola has been consolidating itself as a strategic option for crop rotation in the second harvest, especially in the Cerrado regions, where there is a growing demand for alternatives to second-crop corn. With a

relatively short cycle, good adaptation to mild temperatures and the ability to add value to the production system, canola can be grown right after the soybean harvest, optimizing land use and promoting sustainability in the agricultural system.

“Cultivating canola as a second crop can become a vector of transformation for Brazilian agribusiness. We are talking about a crop that improves soil structure, breaks pest and disease cycles and also generates grains with high value for the food and biofuel industries,” emphasizes Laviola (photo on the left).

In Brazil, canola has the potential to occupy up to 20% of the second crop area cultivated with soybeans, which makes it possible to expand its production without

the need to incorporate new areas into agriculture. This is a differential for the country.

Studies conducted by Embrapa Agroenergia indicate that areas currently underutilized during the fall/winter in the Center-West, Southeast and South of Brazil have great potential for canola cultivation. The expectation is that, with the supply of more productive and adapted tropical hybrids, the area planted in the country may grow significantly in the coming years, expanding and diversifying the supply of vegetable oil for the production of Biodiesel, Renewable Diesel and SAF (acronym in English for sustainable aviation fuel).

Integrated projects

In the SAFCanola project, aimed at using the species as a raw material for sustainable aviation fuel, lines adapted to the tropical climate were selected, with productivity similar to commercial hybrids. The ten most productive lines identified in this study served as a basis for the start of testing in the BRSCanola project.

When canola is grown during the fall/winter in the southern region of Brazil, water is generally available throughout almost the entire crop cycle. On the other hand, in the Cerrado, where canola is used as a second crop alternative, water availability is generally limited to the first half of the cycle, posing challenges to the adaptation

of production systems. To overcome this limitation, strategies have been developed in the SAFCanola project that involve the optimization of nitrogen fertilization, associated with the use of bioinputs based on microorganisms with specific functionalities, such as mitigating water stress and promoting biological nitrogen fixation. These experiments also aim to develop more sustainable production systems, with lower carbon emissions.

RedeCanola - Development of the canola production chain in tropical regions: cultivars, cultivation systems, climate risk zoning and sustainability, a third project with the variety, also led by Laviola, seeks to transform data into knowledge. The project aims to develop the canola production chain in tropical regions with a

focus on the validation of cultivars, cultivation systems, agricultural management, agricultural climate risk zoning and sustainability metrics.

The project carried out tests at a Technological Reference Unit (URTs) in Mato Grosso, evaluating management systems for canola cultivation in tropical regions; plant life cycle in commercial plantations; economic-social-environmental impact of adopting the tropicalized cultivation system; generating data for the Agricultural Zoning of Climatic Risk – Zarc Canola 3.0 (new regions), in addition to training farmers through tools generated by the research: the online course (e-Campo), Sustainable Canola Production, and the Mais Canola App.

Another project action evaluated 18 canola hybrids in 14 municipalities in seven states of Brazil and generated data that will also be used for the project's research. This action will enable a broad understanding of the interaction of cultivars with the growing environments, in addition to providing data for Zarc Canola.

“With all these projects developed in partnership with the production sector, we want to make canola another successful case of tropicalization of crops in Brazil, increasingly consolidating the country as a reference in tropical agriculture in the world”, concludes Laviola.

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How fertilization sustained agricultural dominance in northern Europe

Analysis reveals that intensive and fertilized cultivation of rye began centuries earlier than imagined

19.05.2025 | 23:11 (UTC -3)

Cultivar Magazine

O rye (*Secale cereale*), a drought- and cold-resistant cereal, did not become one of the pillars of European agriculture because it was an undemanding plant. The real reason for its success is now emerging with scientific precision. A study reveals that, since Late Antiquity, farmers in northern Europe cultivated rye using intensive fertilization techniques, challenging established ideas about the origin and expansion of this grain.

The research employed stable isotope analysis on archaeological and modern rye grains, revealing that the practice of fertilizing fields with animal manure was common as early as the 4th century AD.

The discovery breaks with the idea that rye thrived solely on poor soils due to its

hardiness. In fact, the isotopic data show that its cultivation was integrated into sophisticated agricultural systems, which included the strategic use of animal waste, peat and even marine debris.

The team analyzed grains from 11 archaeological sites in Germany and the Caucasus, dating from antiquity to the late Middle Ages. The results indicate that up to 15 tons of manure were applied per hectare per year, similar to modern agricultural experiments. This suggests that even in the earliest stages, rye was grown in fields enriched by intensive fertilization.

Comparison with agricultural experiments conducted at the Thyrow and Halle centers in Germany reinforces this conclusion.

There, plots cultivated with and without fertilizer produced grains with contrasting levels of nitrogen isotopes.

Fertilization increased the rates by up to 7%, revealing the direct impact of fertilization on the grain. Interestingly, the type of soil — sandy or loam — modulated this effect: more fertile soils amplified nitrogen absorption, even under moderate fertilization regimes.

From the 10th century onwards, the practice of cultivating rye in a system known as Ewiger Roggenbau (perpetual rye cultivation) became established. This technique involved the deposition of a mixture of soil and stable manure over delimited fields. The constant application of organic matter raised the level of the

land in relation to the surrounding area and allowed for permanent crops without crop rotation — something rare in pre-modern agriculture.

In addition to nitrogen, the study analyzed sulfur levels, identifying lesser-known agricultural practices.

In Neermoor, for example, low sulfur isotope values ??indicated the use of bog peat as fertilizer, a practice linked to salinization and anaerobic processes. This type of analysis makes it possible to distinguish the origin of the fertilizer — whether manure, plant compost or marine sediments.

Carbon isotope values, in turn, made it possible to estimate the relative yields of the fields. The best results were obtained

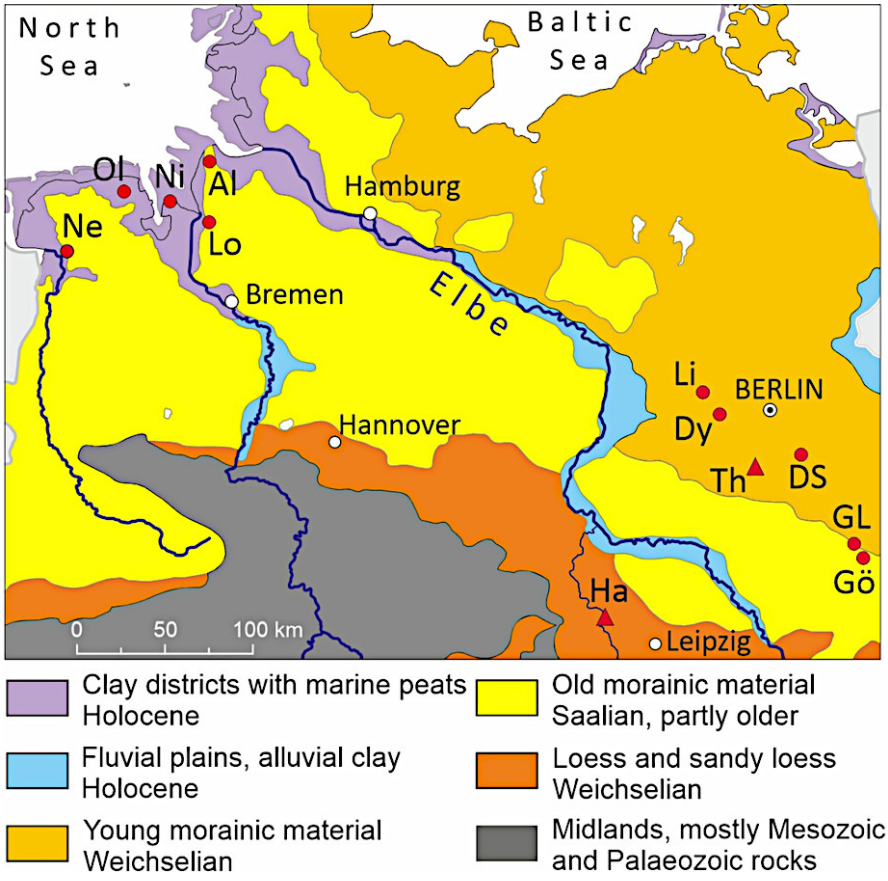
in coastal areas, especially on artificial elevations known as Wurten (or terps), where proximity to the sea and organic fertilization ensured ideal conditions. There, cultivation probably took place in the summer, after the winter tides had receded. The productivity of these fields rivaled that of the best continental soils.

Contrary to expectations, no clear trend of increasing fertilization intensity was observed over time.

Ancient sites such as Göritz and Loxstedt already show signs of intense fertilization, comparable to those of medieval castles and villages such as Neermoor or Diepensee.

Fertilization varied more with local context—soil type, proximity to stables,

availability of manure—than with historical period.



Northern German soil regions with the sites Neermoor (Ne), Oldorf (Ol), Niens (Ni), Loxstedt (Lo), Altenwalde (Al), Lietzow (Li), Dyrotz (Dy), Diepensee (DS), Groß Lübbenau (GL), Göritz (Gö), Thyrow (Th), Halle (Ha)

Domestication of rye

The domestication of rye followed a peculiar path. Originally a weed that invaded wheat and barley fields, rye

gained ground with the adoption of the moldboard plow, which turned the soil deeply.

This technological advance reduced the competitiveness of wild forms and favored varieties with non-brittle ears, better adapted to human harvesting and sowing.

Over time, rye's productivity surpassed its image as a rustic cereal.

In the Middle Ages, it became the staple food of castles, churches and urban centers. Archaeology reveals significant stocks at sites such as Groß Lübbenau, Bremen and Starigard.

Abundance not only allowed for feeding growing populations but also for generating surpluses, which were fundamental for the consolidation of

political-religious powers.

The data also disprove the theory that the rye found in Wurten was imported from Geest areas (high sandy areas). Isotopic analysis clearly differentiates the grains grown in each region. Those from the coast exhibit distinct signatures, indicating local cultivation, even in frequently flooded and salinized lands.

More information at doi.org/10.1098/rstb.2024.0195

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K+S strengthens sales team in Goiás and Minas Gerais

Douglas Caldeira and Fernando Martiniano take on strategic positions to increase Korn-Kali sales

19.05.2025 | 16:40 (UTC -3)

Cultivar Magazine

K+S has announced changes in its regional sales management for the states

of Goiás and Minas Gerais. Douglas Caldeira (pictured, left) has taken on the role in Goiás, while Fernando Martiniano (pictured, right) will now work in Minas Gerais.

Douglas is an agricultural engineer from UFU and has over 15 years of experience in the fertilizer sector, having worked for Heringer, Mosaic and EuroChem. Fernando graduated from Unipinhal and has worked for over 20 years in the commercial area, with a track record at companies such as Timac, ADM and Mosaic.

The appointments reinforce Korn-Kali's expansion strategy in the Midwest and Southeast, strengthening the company's operations in these key regions for agribusiness.

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Climate change and pests worsen crisis in potato production

Production declines and prices rise as Europe invests in innovation and new varieties

19.05.2025 | 14:38 (UTC -3)

Cultivar Magazine, based on information from Elena Vincenzi

Global potato cultivation is facing increasing pressure. The combination of climate change, new pests and diseases has worsened agronomic problems and reduced global production. The warning was given during the International Potato Symposium, held at Macfrut, with the participation of 35 experts and around 400 participants.

In recent months, prices have increased across the European market and also outside Europe. Global availability has fallen significantly, in line with five-year averages.

Today, the world harvests about 375 million tons. China leads with 95 million, followed by India (56 million) and Ukraine (21 million). The European Union

produced 48,5 million in 2023, according to Eurostat. Germany, France, the Netherlands, Poland and Belgium account for 76% of this volume.

During the event, experts highlighted the pressure of *Agriotes* spp., of the bacteria Ralstonia solanacearum and weeds of the genus *Cyperus*. Threats require strict protocols. At the same time, the consumption of processed potato products is growing.

The European Commission recently created a specific CMO (Common Market Organization) for the sector. So far, only Italy has adopted the measure, allowing producer organizations to access operational programs similar to those for fruit growing. The aim is to renew

processes and seek innovation.

Italy still depends on imports, especially from France, to meet 40% to 50% of demand. Experimental work led by UNAPA has developed varieties that are better adapted to the current scenario.

The Fiorella potato, with a three-month latency period, requires less treatment during storage. The Morisa variety, crossed with the French Gazelle, achieves productivity of up to 500 bags per hectare.

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Fertilizer mitigates the impact of drought and surprises researchers

Experiment in nine countries finds fertilizers can sustain grass growth even in severe drought

19.05.2025 | 14:30 (UTC -3)

Cultivar Magazine, based on information from John Brhel

Cedar Creek Long Term Ecological Research Site was one of 26 sites studied as part of a global study examining the effect of drought and nutrient addition on grasslands - Photo: Sydney Hedberg.

Fertilizing can protect plants against drought. That was the unexpected result of a global study led by researchers from nine countries, including Binghamton University professor Amber Churchill. The experiment found that applying nutrients helped grasses grow even during short periods of extreme drought.

The research was carried out in 26 experimental areas distributed across all inhabited continents.

Scientists tested the combined effects of severe drought and fertilization on natural grassland ecosystems. On average, drought reduced plant growth by 19%. Fertilization increased growth by 24%. When the two factors occurred together, the average impact was zero.

Grasses and other graminoid plants responded positively to nutrient additions, even when water was scarce. This behavior surprised scientists.

The initial expectation was that, under arid conditions, the plants would not respond to fertilization. However, the result was the opposite: they were able to take advantage of the available nutrients and continue growing.

According to Churchill, this discovery could have important implications for regions that depend on livestock and forage production.

“The benefit exists, but it comes at a high cost. In production systems, it can be a useful tool, but it does not represent a long-term solution,” he said.

The researchers used nitrogen, phosphorus, potassium and a single dose of micronutrients. Each site tested the same methodology, giving the study an unprecedented scope.

“The difference was scaling a local experience to a global network, while maintaining consistency in methods,” explained Churchill.

She was directly involved in two locations. In Yarramundi, Australia, she was responsible for monitoring the species. In Minnesota, United States, she organized the data and coordinated its sharing with other scientists.

Plant responses varied according to climate and soil type. In arid regions, the effect of fertilizers was stronger. In humid

areas or areas with soils already rich in nutrients, the impact was less. Locations with greater species diversity showed greater sensitivity to both fertilization and drought.

Churchill highlights that plant diversity can be more decisive for the stability of productivity than the use of inputs.

“If you have more species, you increase the chance that some of them will resist drought. This ensures a more stable biomass over time.”

This point, however, could not be tested in this study, which was limited to a single annual cycle. The researcher intends to expand the tests in a new project at Binghamton University, in the Nuthatch Hollow open-air laboratory.

Despite cautious optimism, the authors warn that the effects of large-scale fertilization still need to be analyzed. In addition to the high cost, there are environmental risks associated with excessive use of fertilizers.

More information at doi.org/10.1038/s41559-025-02705-8

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