November 22, 2025 N º 57

Cultivar Semanal ®

Sound increases production

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- **Motor Cummins:** Alta potência com baixo consumo de combustível, garantindo desempenho e economia no campo.
- **Capacidade em terrenos inclinados:** Opera com eficiência em áreas com até 34% de inclinação, oferecendo segurança e estabilidade.
- **Tanque em aço inox:** Facilita a limpeza e agiliza a troca de misturas, ideal para operações com diferentes produtos.
- **Sistema Airspray:** Pulverização precisa com válvulas eletropneumáticas e pneumáticas. A recirculação contínua mantém o produto homogêneo, melhora o tempo de resposta e simplifica a limpeza do circuito.

KUHN

20 ANOS NO BRASIL FAZENDO HISTÓRIA COM VOCÊ

Sound increases tomato production.

Study reveals that sound frequencies between 50 Hz and 10.000 Hz promote self-pollination and increase production.

19.11.2025 | 07:48 (UTC -3)

Cultivar Magazine

Photo: Syngenta

Cows produce more milk when they listen to slow-tempo music. It may or may not be

classical. Piglets grow better and play more with calm music. The well-being of dogs, elephants, and chickens follows similar patterns.

And the plants?

Researchers have developed an approach for the artificial pollination of tomatoes using sound frequencies. The method, which does not require physical contact with the plant, has proven effective in promoting self-pollination and increasing fruit size.

The team tested frequencies ranging from 50 Hz to 10.000 Hz on four commercial cultivars with positive results in terms of seed count, fruit weight, and volume. The use of a subwoofer-type speaker proved to

be as effective as traditional methods involving physical contact, such as vibrating rods and robotic arms.

Buzzing of bees

The idea arose from observing the behavior of bumblebees, which emit vibrations between 100 and 400 Hz to release pollen from flowers with poricidal anthers, such as tomatoes. The study demonstrated that isolated sound vibrations—without physical contact with the flower—can also release pollen by causing the "unlocking" of the trichomes that hold the anthers together.

Photo: pixabay

Electron microscopy revealed that sound vibrations separate these interconnected trichomes, which function like zippers between the anthers of the floral cone. When they detach, they allow the release of pollen, essential for self-pollination.

Results surpass traditional techniques.

The researchers tested the responses of four commercial cultivars: Endeavour, Sweetelle, Paulanca, and Managua.

In tests with the Endeavour cultivar, all forms of vibration increased the number of seeds per fruit by up to 110% compared to the control without pollination. Fruit weight increased by up to 188% with the use of a frequency of 10.000 Hz. Mesocarp thickness also increased, even without variation in the number of seeds.

Photo: Silvia Trigo

The Sweetelle cultivar showed similar behavior, although the weight increase with high frequency was less pronounced. Paulanca and Managua also responded positively, with an average increase of 100% in fruit weight.

High frequency, high productivity

The study observed a "power law" response pattern in plant cells: while lower frequencies cause greater displacement, higher frequencies induce constant acceleration. The frequency of 10.000 Hz resulted in the greatest increase in fruit size and weight, especially in the Endeavour cultivar.

Despite this, the number of seeds remained stable regardless of the frequency. This suggests that pollination effectiveness is independent of amplitude, but the cellular response to sound frequency may modulate fruit growth.

Implications for protected agriculture

The technology shows particular promise in protected environments, such as greenhouses, where the use of bees is limited or prohibited for sanitary reasons. In Australia, for example, the introduction of bumblebees is prohibited due to risks to biodiversity.

Replacing manual pollination with automated sonication can reduce labor costs, ensure greater uniformity, and increase productivity. Furthermore, it avoids the risk of cross-contamination common in contact methods.

Photo: Roman Odintsov

Researchers suggest that sound frequencies can alter cellular processes linked to fruit growth, perhaps through epigenetic or hormonal modulation. The use of sonication as a precision mechanical stimulus represents a new avenue for sustainably increasing

productivity.

Results with other plants

Studies involving sound effects have also been conducted with other plants. In general, with good results.

In corn, low frequencies (e.g., 300 Hz) increase germination and biomass. In rice, frequencies between 500 and 1000 Hz accelerate germination and growth. In soybeans, high frequencies (between 3 and 9 kHz) increase nodulation and protein content.

Plants react to vibrations. However, there is no solid proof that they "hear" or "like" music, unlike animals.

Further information at
doi.org/10.1093/hr/uhaf053

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Xarvio Field Manager launched, aimed at European winegrowers.

Digital tool offers agronomic models for managing wine grapes in France, Spain, and Türkiye.

21.11.2025 | 15:14 (UTC -3)

Cultivar Magazine, based on information from Nathan Quigley

BASF Digital Farming has launched Xarvio Field Manager For Grapes for wine grape producers in France, Spain, and Turkey. The tool offers plant, pest, disease, fertilization, and irrigation models that improve crop health. According to the company, the system reduces costs, optimizes inputs, and decreases environmental impact.

In this way, BASF expands its presence in the viticulture market. The new Field Manager module supports more than 100 varieties, such as Cabernet Sauvignon, Pinot Noir, and Chardonnay. The solution delivers specific agronomic recommendations for each plot. The objective involves protecting productivity, improving management, and advancing sustainability.

Konstantin Kretschun, global head of BASF Digital Farming, states that the feature allows for measurable gains in productivity, profitability, and sustainability. The team developed the technology with the support of winegrowers in different regions. The process incorporated years of testing, evaluation, and improvements.

The system features intuitive dashboards and a simple interface. The platform integrates Hort@'s DSS with Xarvio models. Hort@, acquired by BASF in 2022, provides models for growth, irrigation, nutrition, pests, and diseases. The combination of technologies creates clear information flows for quick and accurate decisions.

Field Manager For Grapes uses process-based agronomic models. These models consider the life cycle of pathogens and pests, environmental factors, phenology, and soil characteristics. This approach offers more robust predictions in the face of climate change. The recommendations define the correct use of inputs in terms of dose, location, and timing. The producer can comply with local regulations and environmental targets, including emissions targets.

Access is via computer, tablet, or smartphone. The subscription is annual.

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SÓ QUEM SE BASEIA
EM BIOLOGIA, AGRONOMIA,
FÍSICA E QUÍMICA,
ANTES DA MECÂNICA,

PODE PRODUZIR O EQUIPAMENTO DE MAIOR PERFORMANCE NA APLICAÇÃO DE BIOINSUMOS DENTRO DO SULCO DE PLANTIO.

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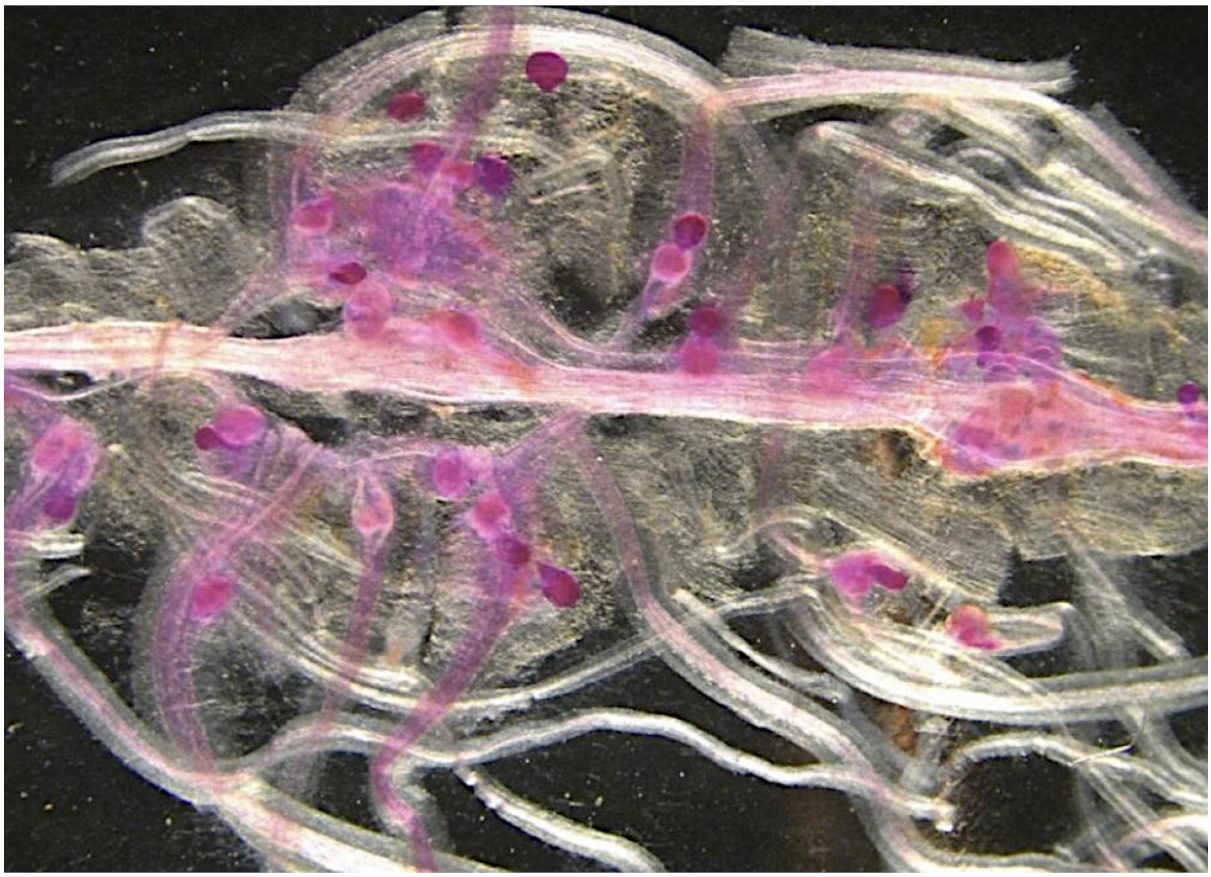
Study reveals how nematode parasitizes roots of various plants.

The analysis revealed 16 chromosomes with unusual characteristics.

21.11.2025 | 09:40 (UTC -3)

Cultivar Magazine



Meloidogyne hapla Infecting bean roots; the red-stained structures are female nematodes - Photo: Pallavi Shakya

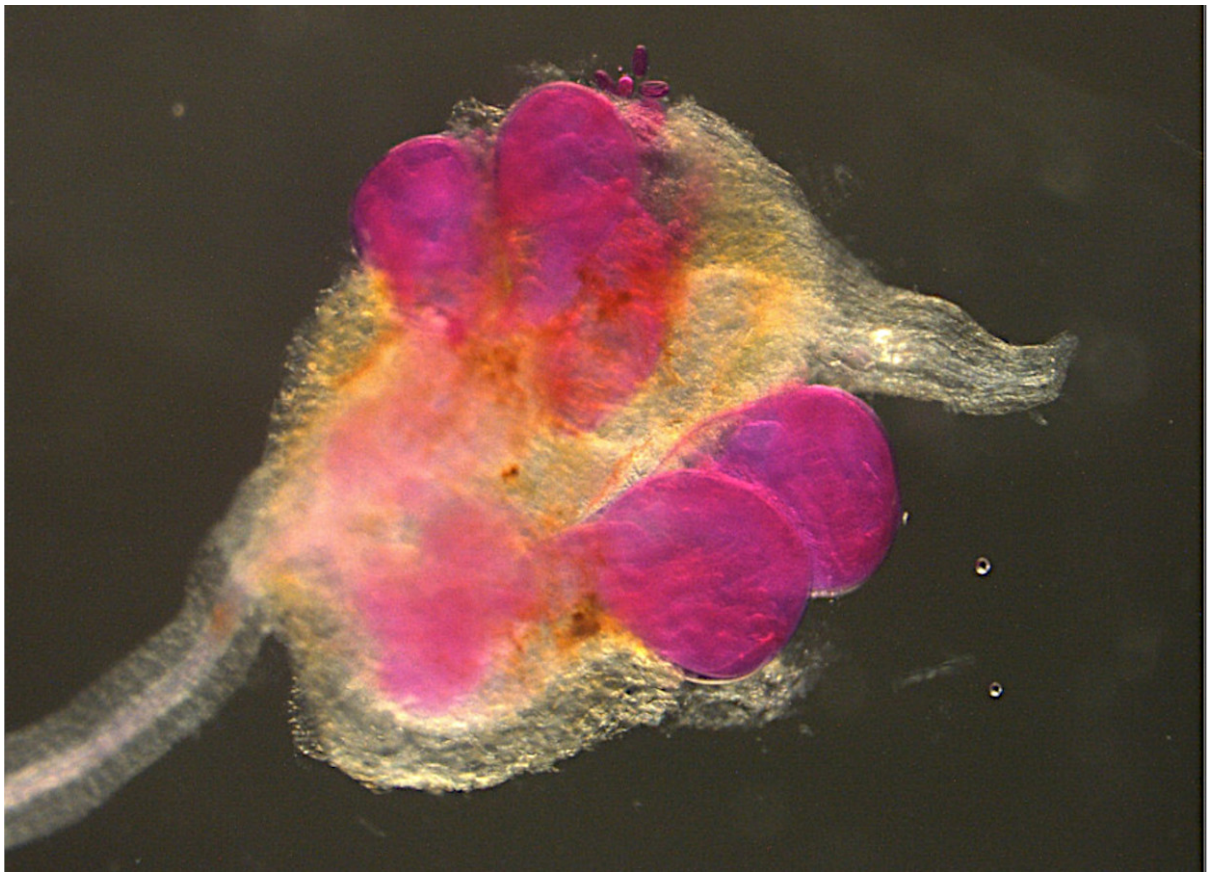
Researchers at the University of California, Davis (UC Davis) led a study that deciphered the genome of the northern root-knot nematode with unprecedented precision.*Meloidogyne hapla*The team discovered how the genetic structure of this organism allows it to infect a wide variety of plants.

The research resulted in the most complete assembly ever made of the genome of a plant-parasitic nematode. The study used advanced sequencing technologies such as PacBio HiFi, Nanopore, Illumina, and Hi-C. The analysis revealed 16 chromosomes with unusual characteristics. In place of typical telomeres, scientists identified repetitions of 16 nucleotides at the ends of the

chromosomes, suggesting an alternative mechanism for protecting the genetic material.

Genetic recombination

The researchers also identified regions with a very high rate of genetic recombination. These zones coincide with genes that encode secreted proteins, known as effectors. These genes help the nematode manipulate the defenses of the host plant. The concentration of these proteins in regions of intense recombination suggests that the parasite exploits this mechanism to diversify its infectious strategies and adapt to different plants.



Meloidogyne hapla Female (red structure) infecting bean roots - Photo: Pallavi Shakya

The structure of the genome of *M.hapla*

The study revealed variations among different lineages of the nematode. Scientists observed chromosomal fusions and breaks that influence reproductive behavior and infectivity. These differences may explain why certain variants of the

species attack specific crops, while others affect a wider range of plants.

Genome plasticity

The research also showed that effector genes are absent from regions with low recombination, where conserved genes are concentrated. This reinforces the idea that genome plasticity is crucial for the success of parasitism. According to the authors, genetic mapping can help in the development of more resistant plants and in more effective control of nematodes.

Professor Valerie Williamson, co-author of the study, stated that advances in biotechnology were essential to overcome long-standing challenges, such as the

nematode's small size and the complexity of its DNA. The new genetic map will serve as a basis for studying other species of root-knot nematodes and identifying genes essential for parasitism.

Further information can be found at doi.org/10.1371/journal.ppat.1013706

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Fendt brings four new generations of tractors to Lamma 2026.

Models from the 500, 700, 800, and 1000 series arrive with more power and a new design.

21.11.2025 | 08:55 (UTC -3)

Cultivar Magazine, based on information from Fendt

Fendt will present four new generations of tractors at the Lamma Show 2026 in

Birmingham, UK. The launches include the 500 Gen4, 700 Gen7.1, 800 Gen5, and 1000 Gen4 series. The highlight is the 700 Gen7.1 line, now featuring DynamicPerformance technology extended to all models. This solution adds an extra 20 hp, previously only available on the 728 model.

The 700 series now offers versions ranging from 203 to 303 hp. The portfolio includes Power, Power+, Profi, and Profi+ configurations, positioning itself between the 600 series, launched in 2023, and the new 800. The 724 and 726 models have been approved to operate at 60 km/h. The entry-level version, the 720 Vario, delivers 223 hp.

The 800 Gen5 series introduces three new models, with power ranging from 260 to 343 hp. All feature the DynamicPerformance system, which adds 23 hp. The major technical innovation lies in the single-stage VarioDrive transmission, with permanent and independent all-wheel drive. The system ensures maximum traction when switching between road and off-road driving without the need for manual gear changes.

The 500 Gen4 line, scheduled to arrive in the UK in 2026, includes the 513, 514, 515 and 516 models, with power ranging from 134 to 164 hp. This generation also receives VarioDrive and DynamicPerformance technology, with an additional 10 hp gain. Weighing 11,75 tons and with a payload capacity of 4,9 tons,

the tractor can operate with planting and green crop harvesting implements.

At the top of the range is the 1000 Gen4, with four models: 1040, 1044, 1048 and 1052. Power outputs range from 426 to 550 hp.

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Registration is open for Eima 2026.

The international agricultural machinery trade fair will be held in November 2026.

21.11.2025 | 08:19 (UTC -3)

Cultivar Magazine

Registration has opened for the 48th edition of EIMA International, the world's leading agricultural machinery trade fair, which will take place from November 10 to 14, 2026, in Bologna, Italy. The organizers have made an online platform available for exhibitors to indicate their desired area

and the products they intend to present.

The initiative comes from FederUnacoma, the Italian federation of manufacturers in the sector, which aims to manage the anticipated high demand in advance. The last edition of the event brought together more than 1.800 manufacturers from 50 countries.

With the registration phase now complete, the organization will define the spaces and designs for the stands. The fair anticipates the exhibition of more than 50 models of machines, equipment, and components geared towards agriculture and gardening.

The previous edition attracted 350 visitors from 150 countries. The expectation is to repeat that success with stands that combine functionality and design,

conceived for a global audience.

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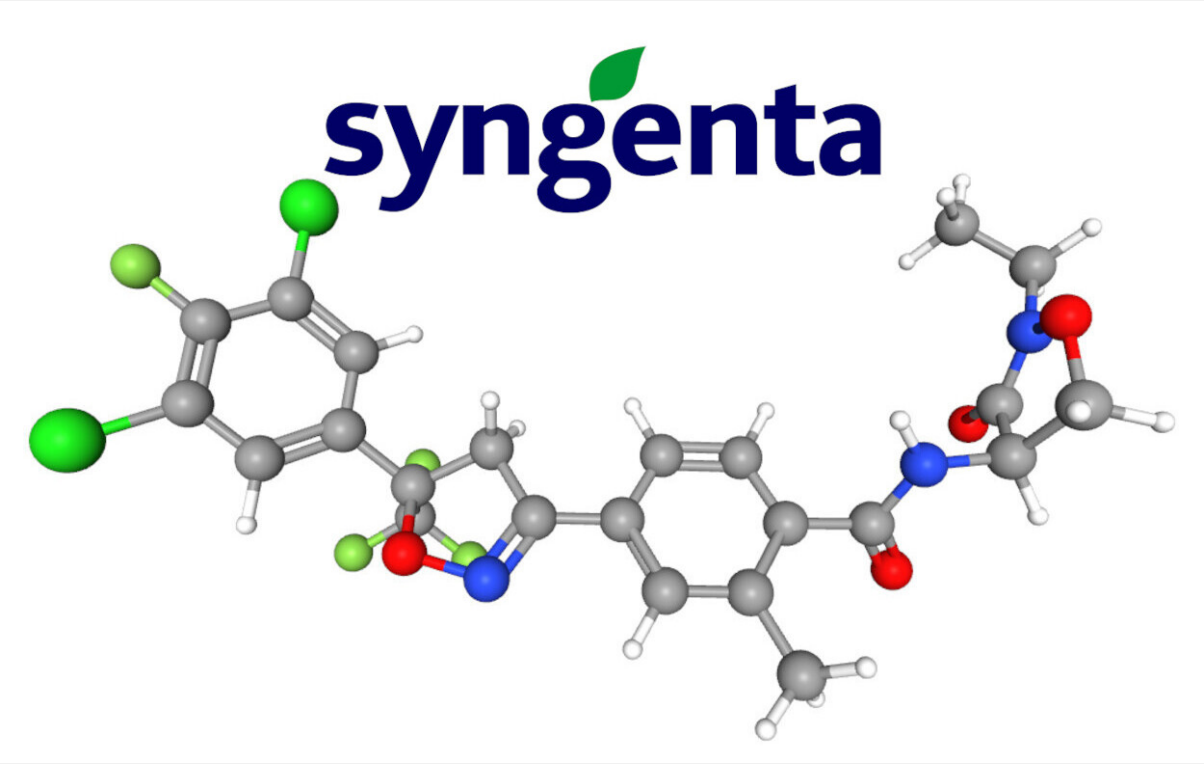
United States approves isocycloseram for agricultural use.

The pesticide functions as a broad-spectrum contact insecticide.

21.11.2025 | 08:07 (UTC -3)

Cultivar Magazine



The United States Environmental Protection Agency (EPA) has registered ten products based on the active

ingredient. isocycloseramThe compound functions as a broad-spectrum contact insecticide.

The approval covers uses in agricultural crops, lawns, ornamental plants, and commercial, industrial, and residential environments, both indoors and outdoors.

Among the targets of the pesticide are the Colorado potato beetle in potato crops and... diamondback moth in vegetables. Citrus growers will be able to use the product against Asian citrus psyllid, vector of the disease known as Greening.

To reduce impacts on non-target species, product labels list several mitigation measures. Among them, the EPA highlighted:

- Aerial application is prohibited, except in corn, cotton, potato, and soybean crops, with additional regional restrictions;
- Application restrictions apply during rain or when soil is waterlogged;
- Barriers against drift from ground, aerial or turbine spraying;
- Application is prohibited in orchards three days before and during flowering;
- Time restrictions for crops with indeterminate flowering times, to avoid exposing bees during their activity;
- Best practices for protecting solitary bees that nest in the ground;

- Instructions for preventing the dispersal of toxic dust from treated seeds;
- Guidelines for handling spilled or exposed treated seeds.

The labels also direct users to the "Bulletins Live! Two" system, which includes maps and specific instructions for protecting endangered species in certain areas.

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Scientists uncover how plants recognize and reject pollen.

Discovery in plants of the brassica family reveals mechanism of interspecific incompatibility.

21.11.2025 | 08:05 (UTC -3)

Cultivar Magazine

Professor Alice Cheung - Photo: University of Massachusetts Amherst

Researchers from the University of Massachusetts Amherst (UMass Amherst) in the United States and Shandong Agricultural University in China have made progress in understanding how plants reject pollen from different species. Their study used plants from the Brassicaceae family to reveal the workings of what is called interspecific incompatibility (ISI).

ISI prevents different species, even closely related ones, from interbreeding. This mechanism protects the genetic integrity of plants, but it also hinders crossbreeding that is useful for agriculture. Combining characteristics from different species can lead to more resistant or productive crops.

The team, led by Alice Cheung, Professor of Biochemistry and Molecular Biology at

UMass Amherst, studied the reproductive system of species such as broccoli, cabbage, turnip, and canola. The scientists identified a protein called SRK, which was already known to block pollen from the same plant (incompatibility with close relatives). The new finding was the discovery of a chemical signal present in the pollen of other species in the family, called SIPS.

When SIPS comes into contact with the stigma of the recipient plant, it activates the SRK protein. This combination attracts the FERONIA enzyme, which stimulates the production of reactive oxygen species (ROS). This chemical reaction prevents the pollen from penetrating the female organ of the flower and thus prevents fertilization.

The research demonstrated that, unlike what occurs in self-incompatibility, different variants of the SRK protein interact similarly with the SIPS signal. This discovery helps explain how ISI acts as a broad barrier against cross-fertilization between species of the same family.

Further information can be found at doi.org/10.1126/science.ady2347

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Agricultural Market - 21.Nov.2025

Brazilian soybean planting progresses, but sales remain slow.

21.11.2025 | 07:05 (UTC -3)

Vlamir Brandalizze - @brandalizzeconsulting

Brazil has planted 75% of the planned soybean area so far. The previous week's figure was 65%. Last year, at the same

time, it was 85%. The historical average is 80%. The progress has been strong. States like Mato Grosso and Paraná have already finished planting. Regions in the North and South, such as Tocantins, Bahia, Maranhão, and Rio Grande do Sul, are still in the fields. The Rio Grande do Sul crop has reached 43% planting, compared to 22% last week. The historical average is 50%.

Soil moisture in Rio Grande do Sul has favored the progress of planting. The state suffered from droughts in the last three years. Now, conditions have improved. The expectation is for a harvest close to normal.

The commercialization of the 2023/24 crop has reached 79,9%, with 137 million tons

traded. The historical average for this point is 84%. The total crop was 171,5 million tons. The new crop is experiencing a delay in sales: 26% has already been traded, compared to 36% in the same period last year. The average is 34%. So far, 45 million tons of the new crop have been traded. Production is expected to reach 175 million tons, leaving approximately 130 million tons still without a destination.

In the United States, 99% of the soybean crop has been harvested. The arrival of winter is a cause for concern. Weather institutes predict heavy snowfalls, which could impact logistics. Frozen rivers hinder the transport of goods. Snow-covered silos and stranded barges are obstacles to the flow of production.

China purchased 1,425 million tons of American soybeans last week. These were three consecutive purchases, according to official USDA data. This movement supported prices in Chicago. The January contract is at US$11,40 per bushel. The July contract exceeds US$11,60. The expectation is that prices will rise to US$12, depending on the evolution of Chinese purchases.

In Brazil, soybean prices improved in the domestic market. There was an increase in premiums and price gains at ports. Soybeans from December and January exceeded R$ 145,50 per sack. The new crop also showed gains.

Corn situation

The corn harvest in the United States has reached 92%. Producers are scrambling to avoid losses as winter approaches. In Brazil, the 2023 second corn crop (safrinha) yielded 113,3 million tons. Of this total, 81 million tons have already been traded, representing 71,5%. The historical average is 78%.

There are still 32,3 million tons of the second corn crop and 6,1 million tons of the first crop that have not yet been sold. The total amount of corn available for sale in the country reaches 38,4 million tons. The first crop has already reached more than 90% of the planted area. Rio Grande do Sul leads with 84%, above the historical average.

Prices are trying to stay above R$70 per sack at the ports. In the American market, corn contracts for December are around US$4,30, while July/26 exceeds US$4,50.

Wheat situation

Wheat harvesting in Paraná is almost complete. In Rio Grande do Sul, 77% of the area has been harvested, according to Emater. At the same time last year, the rate was 90%. The average is 89%. Production in Rio Grande do Sul is expected to reach 3,72 million tons. The Brazilian harvest, previously estimated at 7,5 million tons, may not reach that volume.

China bought 132 tons of American wheat last week. The Chicago market reacted with a slight increase. In Brazil, trade remains slow. Prices vary between R$ 1.030 and R$ 1.200 per ton, depending on the region. 6,1 million tons have already been imported, a historical record.

Rice situation

The rice market remains under pressure. Planting has reached 92% of the area, with Santa Catarina standing out, where sowing is complete. The planted area is expected to be below 900 hectares, although the official figure is still 920. Tocantins, Mato Grosso, and Goiás have planted between 15% and 30%.

Prices have fallen in the Western Border region. The average price is R$ 52,55 per sack. The industry has reduced purchases, waiting for January to resume business. In retail, commercial packages range from R$ 14 to R$ 18. Premium products reach R$ 28, but sales remain weak.

Bean situation

Bean harvesting has begun in São Paulo and Paraná. The crop will be smaller, but prices remain stable. Commercial carioca beans range between R$ 190 and R$ 225 per sack. Black beans are between R$ 125 and R$ 135. Few transactions were recorded.

Conab's estimate for the first harvest was 950 tons. Now, it will hardly exceed 800 tons. The weather hampered planting. Intense cold in some regions and excessive heat in others reduced the productive potential.

The market is expected to shift in January, with lower supply and higher demand starting in early 2026.

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

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Mahindra lays the foundation stone for a new factory in Dois Irmãos.

The company is expanding its offering of locally produced models and can bring product development closer to specific demands.

19.11.2025 | 16:24 (UTC -3)

Cultivar Magazine

In the year that it completed nine years of operations in Brazil, Mahindra took a new step in its expansion strategy in the country with the laying of the foundation stone for its new factory in Dois Irmãos (RS). The announcement was made during an event that brought together the brand's dealer network, as well as state and municipal authorities and employees of the current unit.

According to Jak Torretta Junior, CEO of Mahindra Brazil, the new plant, built on an area of ??83 square meters, will elevate the company to a new level of production in the Brazilian market. "With the new factory, we will triple our production capacity, going from 3 to 9 tractors per year," says the executive.

Currently, the land in Dois Irmãos is in the earthmoving phase. According to Torretta, the civil works for the unit will effectively begin in January 2026, with operations expected to start in April 2027. The new plant will replace and expand Mahindra's current structure in the country, allowing it to increase the volume and diversify its portfolio of locally produced tractors.

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For Anderson Melo, director of industrial operations at Mahindra Brazil, the project's distinguishing feature goes beyond increased capacity. "The new plant allows us to produce more, but the main thing is how it will be designed internally," he

notes. Today, the current factory operates with six models on the main assembly line. With the new industrial layout, the company plans to expand the number of models assembled in Brazil.

Among the first new developments is the arrival of a new 50 hp tractor, which should be added to the lines already produced in the country. The future assembly line was designed in a modular format. "It will be a line capable of working with a mix ranging from 25 hp to 80 hp. With this flexibility, we will be able to bring the entire Mahindra portfolio to Brazil," highlights Melo.

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The director also reinforces the strategic significance of the factory for the brand's positioning in the country. "The great significance of this plant is Mahindra's firm presence on Brazilian soil, something highly anticipated by our dealers and customers," he states. According to him, the project fulfills a long-held desire of the company. "Today we are realizing a Mahindra dream: to begin 'painting' Brazilian soil with Mahindra's colors."

In the global context, the new unit also fits into the company's expansion plan outside of India, where Mahindra holds almost 45% of the tractor market share. Within this strategy, Brazil and the United States are considered key markets. “This new plant marks an important addition to Mahindra's global expansion. The

investment in Dois Irmãos will be a main hub to serve not only Brazil, but also Latin America," explains Melo.

The new plant will have a production capacity of up to nine thousand tractors per year.

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Ancient Italian wheat gains traction in sustainable agriculture.

With lower productivity but high added value, traditional wheat cultivars attract farmers.

19.11.2025 | 14:47 (UTC -3)

Cultivar Magazine

Ancient Italian wheat has returned to the spotlight. Despite its low productivity, these

varieties offer agronomic and market benefits that can strengthen sustainable production chains. A survey gathered historical, productive, and economic data from 34 ancient cultivars, mainly concentrated in Tuscany and Sicily.

Reaching heights of up to 180 cm, ancient wheat varieties are taller and less productive than modern varieties. Yields range from 1,4 to 4,8 t/ha. Their height favors competition with weeds. Their hardiness ensures resistance to climatic stresses and diseases. These factors make them ideal for low-input systems and organic farming.

Poor soils

These varieties require less fertilizer and are adapted to poor soils and marginal regions. In mountainous areas of Sicily and the Apennines, crops such as Timilia, Solina d'Abruzzo, and Verna remain active, protected by regional legislation or labels such as Slow Food and PAT.

In the market, flours from ancient wheat varieties reach prices between €3 and €7,55 per kilo. This value reflects artisanal methods, the use of stone mills, organic farming, and belonging to short supply chains. Typical products highlight these grains. Timilia is used in the traditional "pane nero di Castelvetrano"; Majorca wheat is used in Sicilian sweets. In Tuscany, Verna is used in the local DOP bread.

Source: doi.org/10.3390/agriculture15222375

Despite the advantages, data on the environmental impact of older varieties are still scarce. Comparative analyses with modern wheat varieties using methods such as Life Cycle Assessment (LCA) are lacking.

There are also gaps regarding technological parameters such as

hectoliter weight (TW) and thousand grain weight (TKW). Varieties like Perciasacchi and Senatore Cappelli show good results in these indices, but others show yields below the ideal for milling.

Further information at doi.org/10.3390/agriculture15222375

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Planters with advanced technology improve planting quality.

Intelligent systems allow for real-time adjustments, reduce seeding errors, and ensure greater uniformity in crops.

19.11.2025 | 14:26 (UTC -3)

Flavia Amarante

Sowing quality is one of the main factors that determine crop productivity. Uneven depth, distribution failures, or excess

seeds can compromise crop development. To help producers avoid losses in the field, technologies embedded in planters allow monitoring of operational performance and real-time adjustments, ensuring more uniform and efficient planting.

“Today, the planter goes far beyond a seed distribution implement. It has become a valuable source of data, capable of accurately showing what is happening in the soil and how this influences the crop yield,” says João Dombroski, Massey Ferguson product marketing coordinator.

An example of how technology can make planting more efficient is the application of seeds in the ideal quantity and in the right location. “Monitoring the seed rate and deposition depth contributes to more

uniform germination and better use of inputs. Through the monitor installed inside the cabin, the producer can identify if any row is failing or sowing at a different depth, being able to adjust in real time and avoid productivity losses," he explains.

The autopilot ensures ideal parallelism between the planting rows, and the fleet management system monitors the machine's performance and transmits the information to a central system that assesses the equipment's condition, preventing unexpected downtime. "This information also generates reports that help in decision-making for the next harvest," he emphasizes.

João Dombroski listed some practices that, combined with the use of technology,

contribute to more uniform sowing, less waste, and better use of the soil's productive potential:

- Check the calibration of the dispensers and the depth adjustment before starting the operation;
- Monitor the indicators on the seeding monitor during planting to identify deviations;
- Keep sensors and electronic components clean and properly serviced.

According to the expert, the combination of technology and best practices allows the producer to plan and execute planting more safely and precisely. "With the correct planter, there is better soil utilization, optimization of inputs, and a

guarantee of more uniform and productive crops," he emphasizes.

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Rovensa Next launches biological solutions in Europe.

Company introduces Orocide Plus and Tulga Spinex

19.11.2025 | 09:36 (UTC -3)

Cultivar Magazine, based on information from Elisa Lipperheide

Rovensa Next has announced the launch of two biological products for the European

market. Orocide Plus and Tulga Spinex expand the company's portfolio of biosolutions.

Orocide Plus arrives on the French market as the first product based on orange oil (D-limoneneauthorized to fight *Phytophthora infestans*This disease causes significant losses for producers. The solution was already being marketed in Germany under the name Prev-Gold.

The product acts through direct contact with the fungus's mycelia and spores. It controls the progression of the infection with both preventative and curative action. The formulation includes Orowet technology, which improves the oil's coverage and adhesion to the leaves, increasing its effectiveness.

Orocide Plus has also been approved for the control of aphids in cereals. The pre-harvest interval for potatoes is three days and the re-entry interval is 24 hours. These parameters highlight the product's safe and environmentally friendly profile.

Tulga Spinex

Tulga Spinex, a bioinsecticide based on spinosad, was launched in Spain and will be introduced in Greece as Tulga 480SC. The active substance is obtained through natural fermentation of *Saccharopolyspora spinosa*The product is certified for use in organic farming.

Tulga Spinex acts through contact and ingestion. It rapidly eliminates pests such

as thrips and caterpillars in crops like peaches and apricots. It is harmless to beneficial insects such as bees and other pollinators.

Field and laboratory tests have shown effectiveness greater than 90% against pests such as *Tuta absoluta*, *Lobesia botrana* e *Frankliniella occidentalis* in tomato, bell pepper, grapevine and eggplant.

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Matricide in the ant colony: invading queens manipulate worker ants.

Researchers identify unprecedented behavior in temporary parasitic ants.

18.11.2025 | 15:10 (UTC -3)

Cultivar Magazine

Images: doi.org/10.1016/j.cub.2025.09.037

Queens of two species of parasitic ants have found a way to conquer rival colonies without resorting to brute force. Instead of directly killing the resident queen, these invaders use a chemical substance to convince the worker ants to eliminate their own mother.

A scientific study documents this type of manipulation. The phenomenon was observed in the species Lasius orientalis and Lasius umbratus, which invade colonies of the species Lasius flavus and Lasius japonicus, respectively.

The invader's plan

The parasitic queen enters the rival colony stealthily. She avoids being recognized as

an intruder by covering herself with the characteristic odor of the nest. Then, she locates the legitimate queen and releases several jets of a strong-smelling abdominal fluid. This liquid, probably formic acid, alters the scent of the host queen. The worker bees, who identify their members primarily by smell, then begin to treat their own mother as an enemy.

The response is immediate. The worker bees attack and kill the queen in the nest. The parasite leaves during the commotion and only returns after the attack has ended. Then, she begins to receive care from the orphaned worker bees, who now look after her eggs as if they were those of the former queen.

A rare type of social parasitism

The behavior described belongs to a form known as "temporary social parasitism." In this type of behavior, the invading queen takes command of the colony after the death of the original queen. This strategy

requires eliminating the leader, who is protected by dozens or hundreds of worker bees, which represents a significant challenge.

Historically, known cases involved direct elimination. The parasitic queen would kill the rival by biting its neck or tearing off its antennae and limbs. These attacks exposed the invader to high risks. Worker bees normally defend their queen aggressively. The new method avoids direct confrontation and reduces the risks for the parasite.

Manipulation and evolutionary convergence

According to the study's authors, Taku Shimada, Yuji Tanaka, and Keizo Takasuka, the attacks only occur after the

fluid is applied. This indicates that the queen's death does not depend on the constant presence of the invader. The substance acts as a trigger for the aggression.

Although formic acid is a logical suspect—given its presence in the Formicinae group, which includes the genus Lasius—the exact composition of the liquid has not yet been confirmed by chemical analysis. Even so, the results point to a sophisticated behavioral manipulation mechanism that has converged evolutionarily across different lineages.

The two species studied are not closely related within the ant group. Both appear to have developed this strategy

independently. This reinforces the idea that chemical manipulation offers evolutionary advantages in certain contexts.

Matricide without direct benefit

Cases of matricide are rare in nature. When they occur, they usually involve some advantage for the offspring. In some arachnids, for example, the mother offers her own body as food. In wasps and social bees, worker bees sometimes eliminate the queen to produce their own eggs.

In the ants described, this pattern is not repeated. The worker ants gain nothing by killing the mother. On the contrary, they

end up serving the invader and caring for her offspring. The only one who benefits is the new queen, who takes over a colony without having to found it from scratch.

Further information can be found at doi.org/10.1016/j.cub.2025.09.037

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Oregano essential oil shows effectiveness against the Solenopsis invicta ant.

Researchers at the University of Mississippi have identified a natural compound with a strong repellent effect.

18.11.2025 | 14:53 (UTC -3)

Cultivar Magazine

Photo: Johnny N Dell, Bugwood

Researchers at the University of Mississippi have discovered that oregano essential oil can help control imported fire ants, one of the most destructive invasive species in the United States. Their study points to the compound carvacrol as responsible for the repellent effect.

Fire ants arrived in the country through the port of Mobile, Alabama, in the early 20th century. Since then, they have invaded approximately 350 million acres in southern regions, causing an estimated $8 billion in damage annually, according to the U.S. Department of Agriculture's National Invasive Species Information Center. The losses include damage to agriculture and risks to human health.

Natural alternatives

At the university's National Center for Natural Products Research, scientists sought natural alternatives to synthetic pesticides. After laboratory tests, oregano oil demonstrated a high capacity to repel both the red fire ant (*Solenopsis invicta*as well as the hybrid (*S. invicta x S. richteri* The substance carvacrol, present in high concentration in the oil, had the lowest effective dose index among the compounds tested.

The team analyzed 21 similar compounds, obtained commercially or produced in the laboratory. Ten showed a significant effect. Computer modeling showed that the repellent action is linked to binding with

proteins responsible for chemical communication between ants.

According to researchers, carvacrol is recognized as safe by the FDA (US health agency), which favors its application in gardens, crops, and domestic environments. In addition to being biodegradable, the compound represents a lower risk to humans, animals, and beneficial insects.

Further information at doi.org/10.1002/ps.70297

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Felipe Pecci assumes the commercial vice-presidency of Mosaic in Brazil.

Executive to lead new global trading structure

18.11.2025 | 14:43 (UTC -3)

Cultivar Magazine, based on information from Carol Freitas

Mosaic announced Felipe Pecci (pictured) as its new commercial vice president in Brazil. The executive assumes the role after nearly three years as senior commercial director for North America and international markets at the company's headquarters in Tampa, United States.

With his new responsibilities, Pecci will now report to Eduardo Monteiro, the company's country manager. The executive will lead the creation and management of Mosaic's new global trading organization. The commercial, planning, and Mosaic Biosciences areas will also report directly to him.

Felipe Pecci highlighted his return to Brazil as a significant step. “It’s a great joy to return to the strongest and most dynamic

agricultural market in the world – where I developed for over a decade. And an even greater privilege is being able to work alongside Mosaic employees, who form the best crop nutrition and bionutrition team in Latin America," he stated.

With a degree in business administration and a postgraduate degree in administration and business, Pecci has 12 years of experience at the company. During this time, he led areas such as sales, supply chain, finance, and strategy.

Mark Ringkob, who previously held the position of Vice President of Sales, is returning to the United States. He will assume the role of Vice President of Global Product Management and will also oversee international distribution in India.

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Valent BioSciences and Seipasa are set to launch biostimulants in the US.

The agreement provides for the introduction of the Sweetsei product to North American crops.

18.11.2025 | 14:11 (UTC -3)

Cultivar Magazine, based on information from Emily Stoutenborough

Salman Mir (Valent BioSciences) and Pedro Peleato (Seipasa)

Valent BioSciences has announced a strategic partnership with the Spanish company Seipasa for the exclusive marketing of agricultural biostimulants in the United States. The agreement marks the official entry of the Sweetsei product into the North American market, aimed at improving the quality of specialty crops.

According to the companies, Sweetsei works through an optimized biochemical matrix that influences the metabolic pathways of plants. The product is already showing positive results in countries in Latin America, Europe, and Africa.

The partnership expands Valent BioSciences' operations in the biostimulant segment. The company created a unit dedicated to the sector in 2022. In 2023, it

strengthened this portfolio with the acquisition of FBSciences, manufacturer of the Transit line.

According to Salman Mir, CEO of Valent BioSciences, Seipasa's scientific rigor complements the standards of the American company. "Sweetsei is a proven technology that will help producers optimize their harvests," he stated.

Pedro Peleato, CEO of Seipasa, highlighted the importance of the United States in the company's international expansion. Founded in 1998, Seipasa focuses on high-tech natural solutions for agriculture.

Valent BioSciences is owned by Sumitomo Chemical of Japan and operates in more than 95 countries with biorational products

focused on agriculture, public health, and forestry. In 2026, the company will be incorporated into the new Sumitomo Biorational Company, the group's global innovation center.

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Amoebas become allies against fungal diseases of wheat in Europe.

Syngenta and Amoeba form a partnership to launch a biofungicide with Willaertia magna lysate.

18.11.2025 | 07:29 (UTC -3)

Cultivar Magazine, based on information from Pierre Jacquemin-Guillaume

A new biological solution based on amoebas promises to reduce losses caused by fungal diseases in wheat and other crops. The biofungicide, made with lysate of *Willaertia magna* C2c MakyIt has proven effective in combating fungi, as well as activating the plants' natural defense mechanisms.

The technology was developed by the French company Amoéba SA and will now be boosted by a partnership with Syngenta Crop Protection. The companies have signed a memorandum of understanding to develop and commercialize the solution in the European Union and the United Kingdom.

The initial focus will be on controlling wheat septoria leaf spot and yellow rust.

The biofungicide was designed to meet the principles of integrated crop management. It is based on an active substance of biological origin approved by the European Union in June 2025, following a favorable opinion from EFSA. Specific product authorizations are pending.

The agreement aims to offer sustainable alternatives to farmers in the face of increasing pest resistance and reduced options in the pesticide market. The goal is to finalize a definitive distribution contract by spring 2026.

Amoeba's technology He received the Bernard Blum Gold Medal. in October 2025, as the world's most promising biological solution.

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China reduces MAP and DAP exports, putting pressure on the market.

Chinese shipments fall 23%, altering global flows; restrictions increase competition among importers, including in Brazil.

17.11.2025 | 16:54 (UTC -3)

Marcos Araujo

Chinese exports of MAP (monoammonium phosphate) and DAP (diammonium phosphate) fertilizers have fallen to their

lowest levels in recent years, according to StoneX, a global financial services company. Between January and September 2025, China shipped 3,7 million tons of these phosphates, a volume 23% lower than that recorded in the same period of 2024. The decline occurs at a time of stricter control over foreign sales by the Chinese government, a common practice before the domestic peak season, but which is proving more restrictive in this cycle.

According to market intelligence analyst Tomás Pernías, the data confirms that the Asian country is more aggressively reducing its exports. "China already tends to limit exports to protect domestic supply, but in 2025 the intensity of the restrictions surpasses that of previous years, which

has increased the concern of international buyers," he states.

The country's importance to global trade reinforces the warning. Estimates indicate that, in 2024, approximately 16% of global exports of MAP, a fertilizer also widely used in Brazil, originated in China. Alongside Morocco, Russia, and Saudi Arabia, the country is among the main international suppliers. The reduction in its share creates additional tensions for importers, especially those most dependent on these flows.

In the Brazilian case, the impact is indirect, since only 4% of the MAP imported by Brazil in 2024 originated from China, with the majority coming from Russia, Saudi Arabia, and Morocco. Even so, when

China restricts exports, global demand shifts to other suppliers, increasing competition for cargo and raising competitiveness among markets.

“When Chinese volumes disappear from the market, buyers from different regions start looking for the same suppliers. This sudden change puts pressure on prices and reduces the predictability of negotiations,” Pernías notes.

Brazil is also experiencing a period of lower MAP imports in 2025, reflecting high raw material prices and unfavorable terms of trade in recent months. In this scenario, Brazilian producers have increased purchases of SSP (single superphosphate), a less concentrated fertilizer that, at various times, has offered a better cost-benefit ratio.

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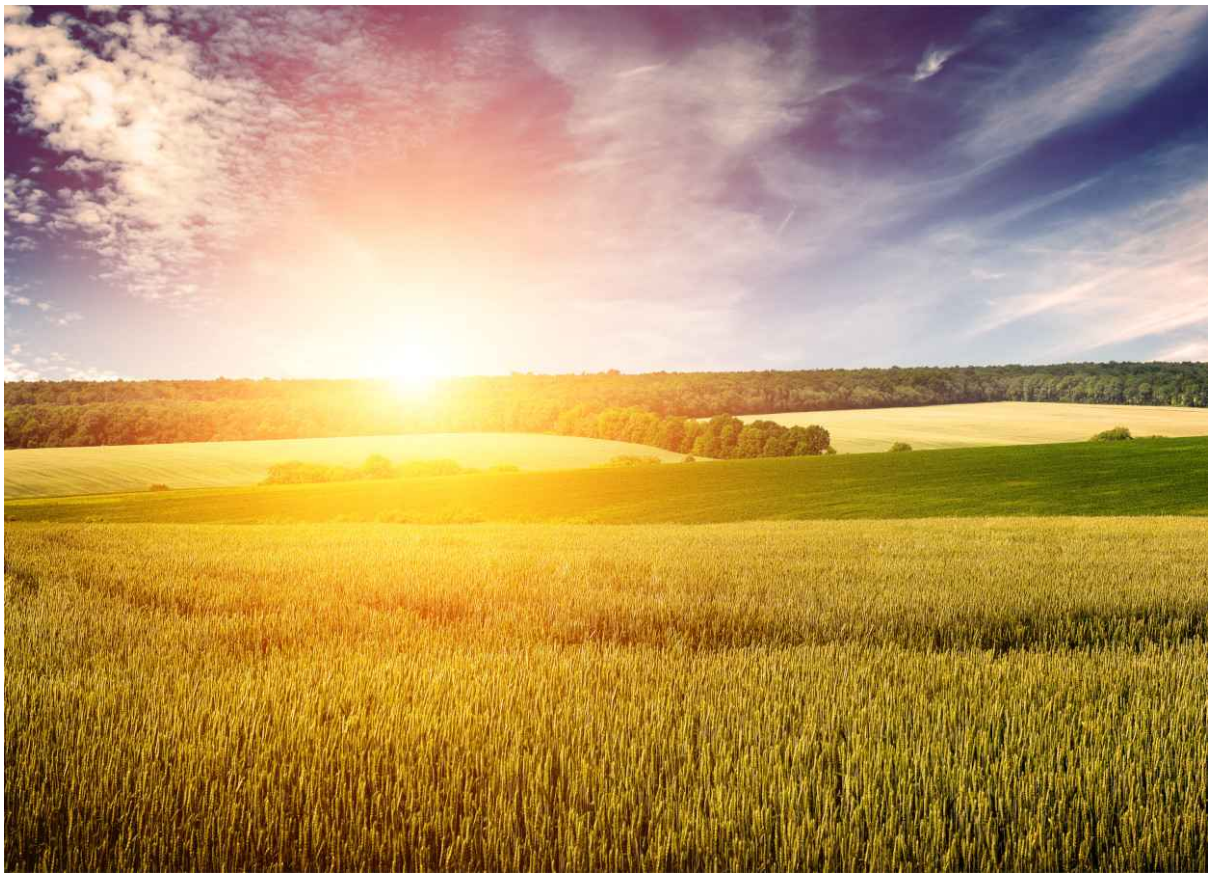
Heat waves increase water loss in wheat.

The combination of heat and CO2 intensifies leaf transpiration and can reduce productivity.

17.11.2025 | 16:08 (UTC -3)

Cultivar Magazine



Photos: Syngenta

The combination of intense heat waves and high concentrations of atmospheric CO2 reduces the ability of wheat to close

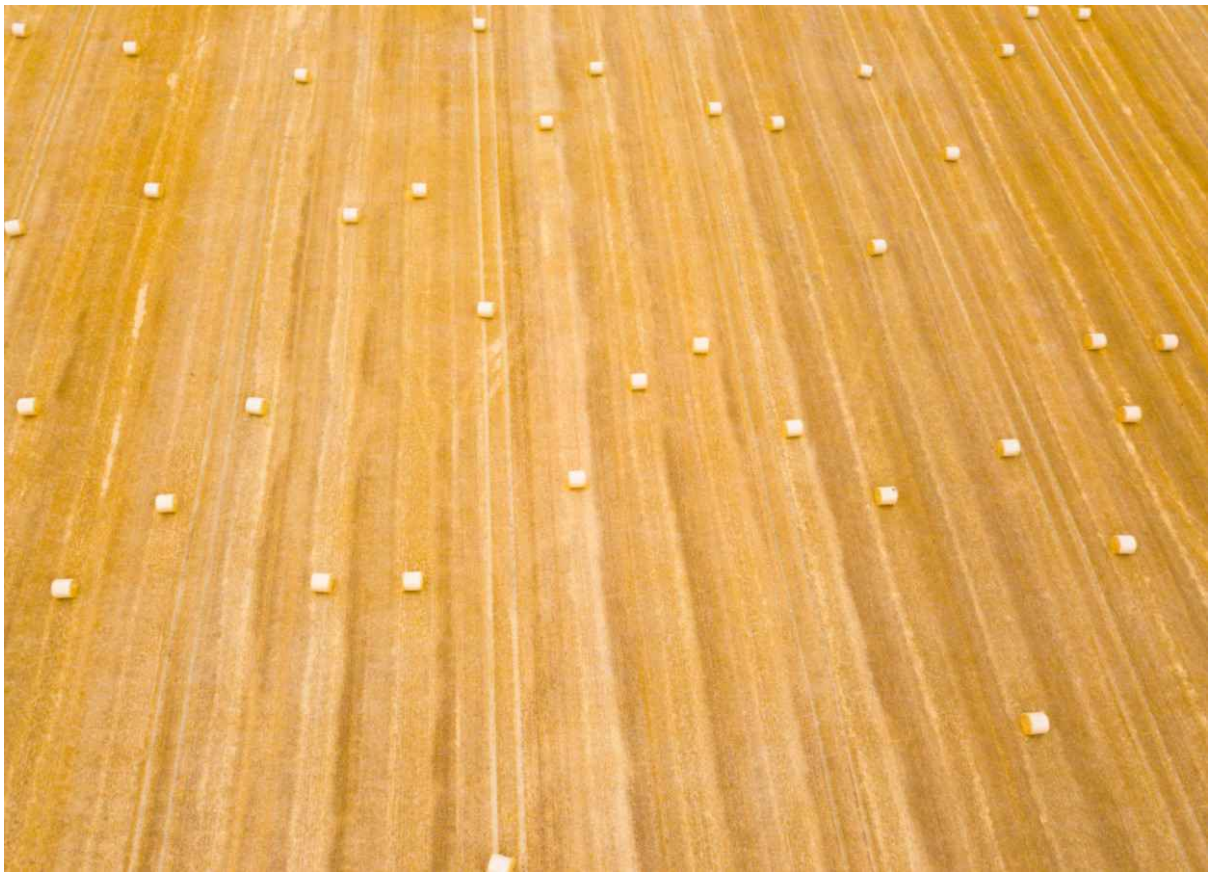
its stomata. This study analyzed the physiological behavior of wheat under simulated future climate conditions, including extreme heat, high vapor pressure deficit (VPD), and varying application of nitrogen fertilizers.

The findings indicate that, even in atmospheres rich in CO2, heat waves inhibit this natural response. The consequence is a significant increase in transpiration, especially through the lower (abaxial) leaf surfaces, and greater vulnerability to drought.

High evaporative demand

During the simulations, the VPD (vapor pressure per minute) increased from 1,43 to 3,14 kPa during heat waves. Transpiration and stomatal conductance increased in this scenario, regardless of CO2 concentration or nitrogen dose.

The increase in water loss was more pronounced on the abaxial surfaces of the leaves. Under these conditions, wheat used more water, even with photosynthesis (A) improved under some conditions.



The instantaneous water use efficiency (iWUE), measured by the ratio between photosynthesis and transpiration, fell significantly. In scenarios of high heat and high CO2, the plant began to release more water without a proportional gain in carbon.

Stomata at high temperatures

The experiments also showed that stomata lose sensitivity to increased CO2 during heat waves. This was evidenced by measurements in which the stomata remained open even with elevated CO2 concentrations, which contradicts the expected physiological response.

Tests involving transitions from intense light to darkness revealed that, under high VPD (Visual Potential Depth), the ability of stomata to close in response to the absence of light was severely reduced.

After an hour in the dark, stomatal conductance dropped only 37% to 38%,

even under elevated CO2. Under normal conditions, closure would be faster and more intense.

Nitrogen exacerbates water demand.

The application of nitrogen fertilizers increased transpiration on both leaf surfaces, particularly the underside. Highly fertilized plants lost more water, even under conditions of high CO2. This suggests that, although nitrogen increases photosynthetic capacity, it also increases the risk of dehydration, especially during extreme heat events.

Thermal imaging revealed that plants exposed to high heat and CO2 levels exhibited greater evaporative cooling, especially in leaves with more open stomata. The cooling was proportional to the amount of water lost, highlighting the water cost of this adaptation.

Threatened productivity

The study also analyzed the combined impact of heat, elevated CO2, and drought. Plants grown under elevated CO2 and without extreme heat performed better under drought conditions, maintaining higher chlorophyll content and transpiration. However, when subjected to intense heat, these advantages disappeared.

Irrigation loss during ear emergence drastically reduced final ear weight and accumulated biomass. Even in well-irrigated plants, heat waves decreased water use efficiency for grain production. Productivity was most affected in plants with high nitrogen application.

More information at

doi.org/10.1111/nph.70722

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Study identifies genes associated with resistance to Fusarium graminearum.

Researchers map regions of the corn genome linked to resistance to the fungus.

17.11.2025 | 15:35 (UTC -3)

Cultivar Magazine

Photo: Alison Robertson

Corn ear rot, caused by the fungus *Fusarium graminearum*This disease represents a serious threat to food safety because it produces toxic mycotoxins. A study led by the University of Illinois, in partnership with the Canadian government, identified segments of the genome associated with resistance to this disease.

The research evaluated three populations of near-isogenic lines (NILs) derived from crosses between commercial lines and a wild variety of teosinte. These lines share the same genetic background, except for segments inherited from different parents.

They were field-tested in the US and Canada for two years, with artificial inoculations of the pathogen using two

distinct methods: stigma channel and direct injection into the grain.

Inoculation method

The study confirmed that the inoculation method influences the severity of the disease, but does not alter the ranking among the genotypes.

Significantly more susceptible lines to the disease were identified, particularly regions on chromosomes 1, 5, and 9. An extensive region on chromosome 5 stood out as a possible "hotspot" of resistance not only to ear rot but also to other fungal ear diseases.

The team also performed QTL (quantitative trait loci) mapping in the DRIL

population. Four markers linked to resistance were found, three of which had alleles from the susceptible parent that increased disease severity.

Despite the strong environmental influence observed in the assays, the data point to genomic regions with potential for future validation.

Further information can be found at doi.org/10.1002/csc2.70187

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Case IH tests ethanol-powered tractor in partnership with São Martinho

Machine operates alongside ethanol-powered harvester in sugarcane field.

17.11.2025 | 13:46 (UTC -3)

Cultivar Magazine, based on information from Jéssica Adriani

Case IH has begun field testing of the Puma 230 tractor powered by ethanol. The evaluation is being conducted in partnership with São Martinho, one of the world's largest producers of sugar, ethanol, and bioenergy. The operation is taking place in Pradópolis, with the tractor working alongside the Austoft 9000 harvester, also fueled by ethanol (see also: Case IH successfully tests ethanol-powered sugarcane harvester).

This initiative is part of the agricultural decarbonization project led by the CNH brand. The focus on ethanol as a strategic fuel aims to reduce emissions in the field and strengthen a low-carbon economy. The N67 Otto cycle engine, supplied by FPT Industrial, delivers 234 hp and uses

technology similar to that of automobiles, which also reduces operating noise.

Benchtop tests

The tractor underwent more than 100 hours of bench testing before entering agricultural operation. According to Leandro Conde, Case IH's director for Latin America, the results have been positive. The partnership with São Martinho allows for validating performance under real-world conditions.

São Martinho sees the adoption of ethanol as a significant step towards the sustainability of agriculture. According to CEO Fábio Venturelli, the technology can transform the sector and directly contribute

to environmental goals.

After the harvest, the tractor will be tested in soil preparation, planting, and corn ethanol production. The expectation is to expand the technology to grain harvesters and sprayers.

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Peanut compounds can become bait against warehouse pests.

Study indicates preference of female Plodia interpunctella

17.11.2025 | 10:37 (UTC -3)

Cultivar Magazine

Photo: Pest and Diseases Image Library

The female of grain moth (*Plodia punctella*) It shows a preference for laying eggs in common peanuts compared to varieties with a high oleic acid content and grains -- such as corn, wheat, and rice. The choice is due to the emission of volatile compounds present in peanuts, which act as chemical attractants.

Chinese researchers have identified 17 volatile compounds emitted by six varieties of low-oleic peanuts. Among them, five aldehydes (heptanal, nonanal, hexanal, octanal, and decanal) elicited a strong electrophysiological response in the antennae of moths and intensified oviposition behavior.

Laboratory behavioral tests confirmed the attractiveness of these compounds. In the

olfactometer, females were significantly attracted to the five aldehydes at concentrations of 10 µg/µL. At higher concentrations (100 µg/µL), however, the same compounds began to repel the insects.

Wind tunnels

In wind tunnels, heptanal, octanal, and decanal induced a greater number of directed flights and closer approaches by moths. Application of the compounds to wheat grains resulted in a significant increase in the number of eggs in samples treated with the five aldehydes, compared to the control.

These results suggest that the volatile aldehydes in common peanuts can be used as attractants for monitoring and controlling *P. interpunctella* in warehouses and food processing facilities. The use of these compounds can complement other biorational control strategies, such as mating disruption with pheromones, reducing the use of insecticides in environments that are difficult to seal.

More information at doi.org/10.3390/insects16111145

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