Citrus farming changes due to greening

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Project evaluates early soybean productivity in sandy soil

The study aims to prospect and validate technological procedures that maximize the productive potential of soybeans in SP

20.03.2025 | 14:32 (UTC -3)

Guilherme Araujo dos Santos

An innovative project is being developed to evaluate the productivity of early soybean

cultivars in sandy soil and their economic impact compared to crops grown in more fertile soils. Led by Apta Regional de Brotas, part of the São Paulo State Department of Agriculture and Supply, the research has the support of public-private partners, including José Roberto Angelelli and AgriVitta, with support from the Agricultural Research Support Foundation (Fundag).

The study aims to prospect and validate technological procedures that maximize the productive potential of soybeans in the edaphoclimatic conditions of the Central-West Region of the State of São Paulo.

Coordinated by the researcher from Apta Regional de Assis Sergio Doná and the researcher from Apta Regional de Brotas

Carla Cachoni Pizzolante, the research aims to consolidate practices that associate cultural and phytosanitary management with sustainable cultivation, aligned with environmental and technical compliance.

The cultivars are being tested simultaneously in Brotas and Assis [at the research units in Cândido Mota and Palmital] to compare different soil and climate conditions. "Although the Brotas region does not have a tradition of soybean cultivation, the research represents a milestone in exploring the technical and economic viability of planting in sandy soil," Doná emphasizes.

With the expectation of evaluating 20 cultivars annually, the studies will provide

data on plant height, pod insertion, productivity and technical viability, helping technicians and producers in choosing the best cultivars.

"This work is essential to diversify agricultural activities in the region, promoting an economic alternative for producers and minimizing risks with the correct choice of adapted cultivars", highlights Doná.

The impact of the study also extends to the agricultural sector, providing opportunities for agricultural diversification and contributing to economic and environmental sustainability.

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Trimble launches technology to protect against solar disturbances

This is especially important during Solar Cycle 25, which began in 2024 and is expected to last until 2026.

20.03.2025 | 09:25 (UTC -3)

Cultivar Magazine, based on information from Eric Harris

Protecting RTK GNSS from ionospheric disturbances

Trimble announced the launch of IonoGuard technology, designed to improve the accuracy and reliability of precision agriculture. This innovation mitigates the effects of ionospheric disturbances caused by solar activity, which can affect the accuracy of Global Navigation Satellite System (GNSS) location tracking.

IonoGuard technology is designed to reduce the risk of signal loss and maintain signal integrity during challenging ionospheric conditions. This is especially important during Solar Cycle 25, which began in 2024 and is expected to last until 2026 and could cause global disruptions.

These disturbances occur when solar activity causes changes in the ionosphere,

a layer of the atmosphere that can affect the propagation of GNSS signals. This can result in signal loss, multipath and noise, affecting location accuracy.

IonoGuard technology detects and mitigates the effects of ionospheric disturbances. It does this by analyzing GNSS signals and applying corrections to maintain location accuracy.

"We are excited to offer a solution that minimizes the risk of signal loss and keeps agriculture running," said Andrew Sunderman, vice president of product and customer experience for PTx Trimble.

IonoGuard technology is available on Trimble's PTx NAV-900 guidance controller, via the latest Precision-IQ

firmware update, and on Trimble base stations that support the ProPoint GNSS positioning engine. When combined, users can achieve maximum RTK performance, the company said.

Solar Cycle 25

Solar Cycle 25 is a period of solar activity that began in 2024 and is expected to last until 2026. It is a cycle of solar activity that occurs approximately every 11 years, during which solar activity increases and decreases.
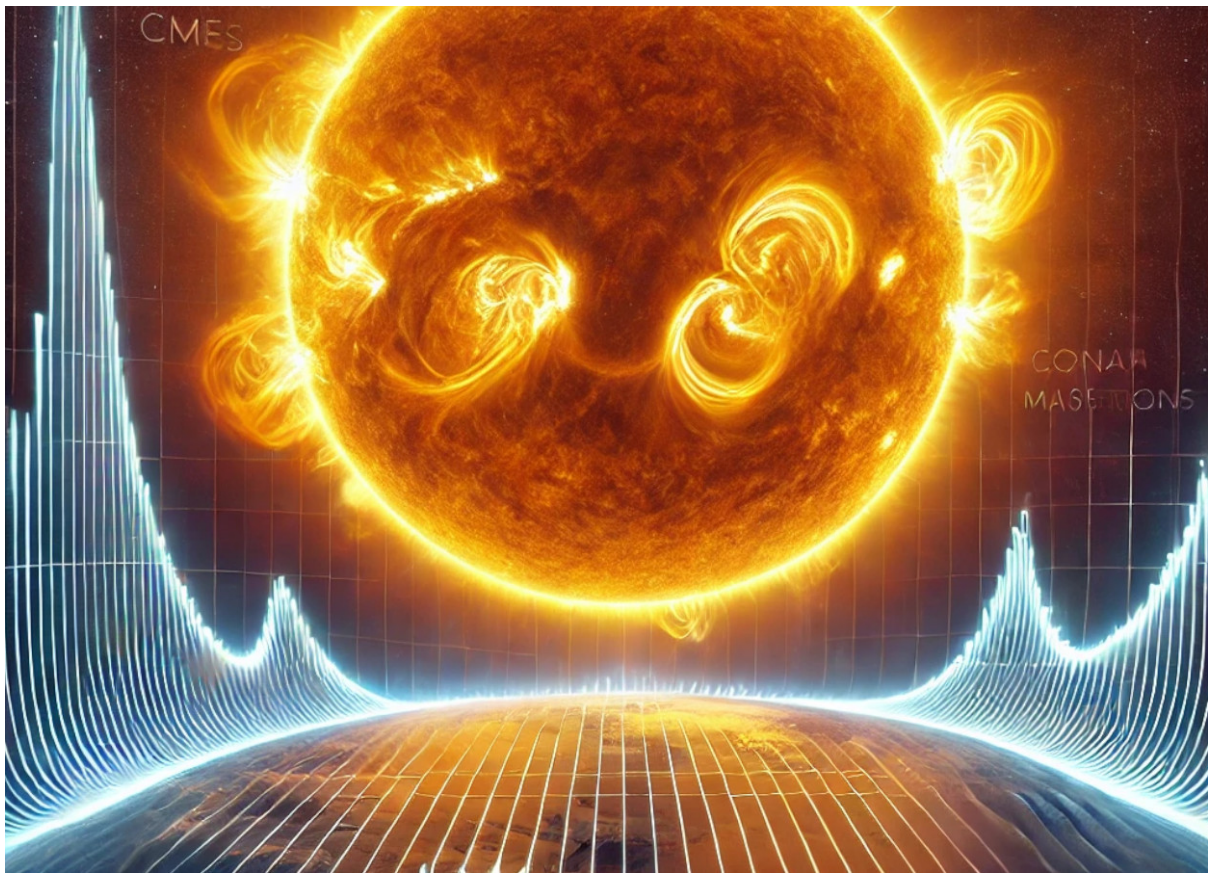
During Solar Cycle 25, solar activity is expected to increase in frequency and intensity of:

- Sunspots: Regions on the Sun's surface that are cooler and denser than the surrounding areas.

- Coronal mass ejections: large amounts of hot, charged plasma that

are ejected from the Sun.

- Geomagnetic storms: disturbances in the Earth's magnetic field caused by the interaction between the solar wind and the Earth's magnetic field.

This increased solar activity can affect Earth in a number of ways, including:

- Disturbances in the ionosphere: the layer of the atmosphere that can affect the propagation of radio and GPS signals.

- Increase in cosmic radiation: which can affect the health of astronauts and airplane passengers.

- Disturbances in the electrical grid: due to induced geomagnetic currents.

In the context of precision agriculture, Solar Cycle 25 may affect the accuracy of satellite navigation systems such as GPS due to disturbances in the ionosphere.
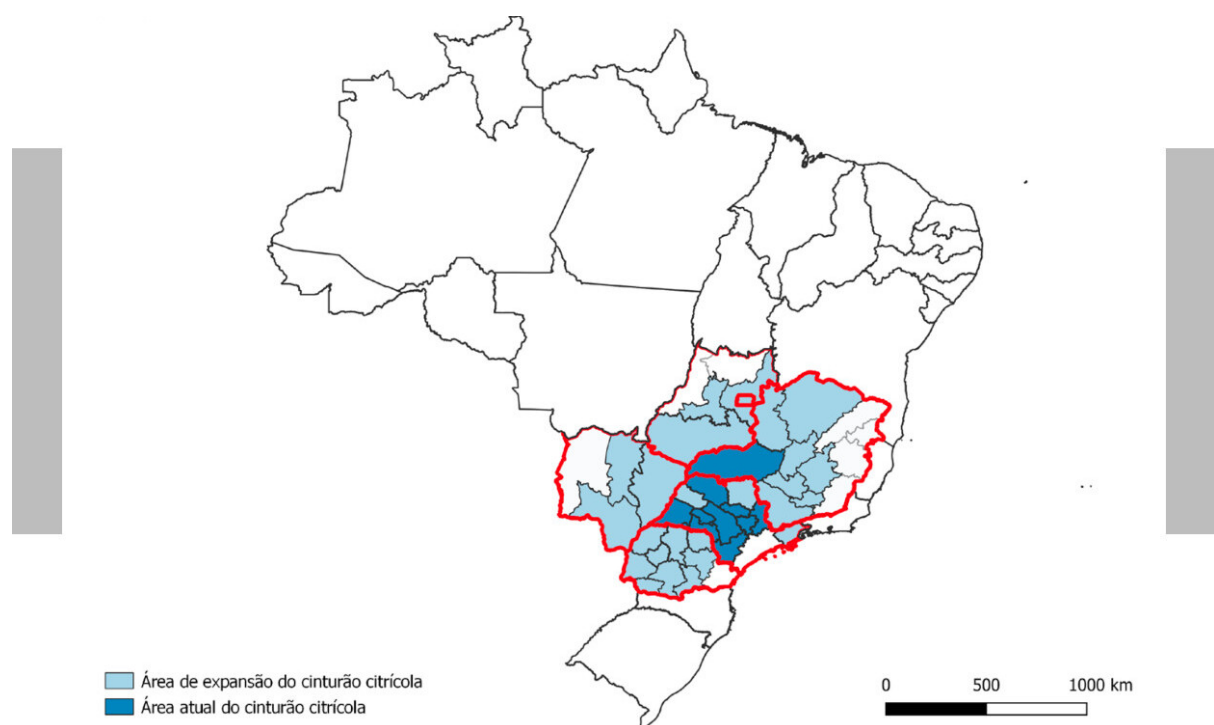
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Citrus Belt expands in Brazil due to Huanglongbing

Research to mitigate climate and phytosanitary risks gains momentum in light of the spread of the disease

18.03.2025 | 10:25 (UTC -3)

Cultivar Magazine, based on information from Léa Cunha

Current (dark blue) and expanded (light blue) Brazilian citrus belt

The spread of Huanglongbing (HLB), also known as greening, is forcing Brazilian citrus farming to reorganize. The disease, which significantly affects citrus crops, has mainly impacted the Citrus Belt, an area traditionally formed by São Paulo, Triângulo Mineiro and southwest Minas Gerais.

As the problem worsens, new regions such as Mato Grosso do Sul, Goiás, Paraná and the Federal District are beginning to form part of the so-called Expanded Citrus Belt (CCE).

Embrapa and Fundecitrus have intensified research and actions to map climate and phytosanitary risks, seeking to support producers in adapting to these new areas. The goal is to minimize the impacts of the

disease and promote the economic sustainability of the orchards.

The role of research

The Agricultural Zoning of Climate Risk (Zarc), a tool developed by Embrapa, has been essential in mapping climate risks for citrus growers. Zarc, which provides detailed data on the risk of production losses, is an essential guide for producers when deciding whether to move orchards to regions with lower risk of loss.

The study provides analysis ranging from the early stages of flowering to harvest, allowing citrus growers to better plan their crops in a changing climate scenario.

Maurício Coelho, a researcher at Embrapa and coordinator of Zarc Citros, highlights the importance of zoning for the expansion of citrus farming. The study showed that areas bordering the current Citrus Belt are at high risk of water deficit, especially in the Triângulo Mineiro region and western São Paulo, where the lack of water can compromise the flowering of trees.

The publication "Expansion of the Citrus Belt" provides an overview of the capabilities of the new regions and the climate risks involved in this migration.

Laranja **Limas e limões** **Tangerinas**
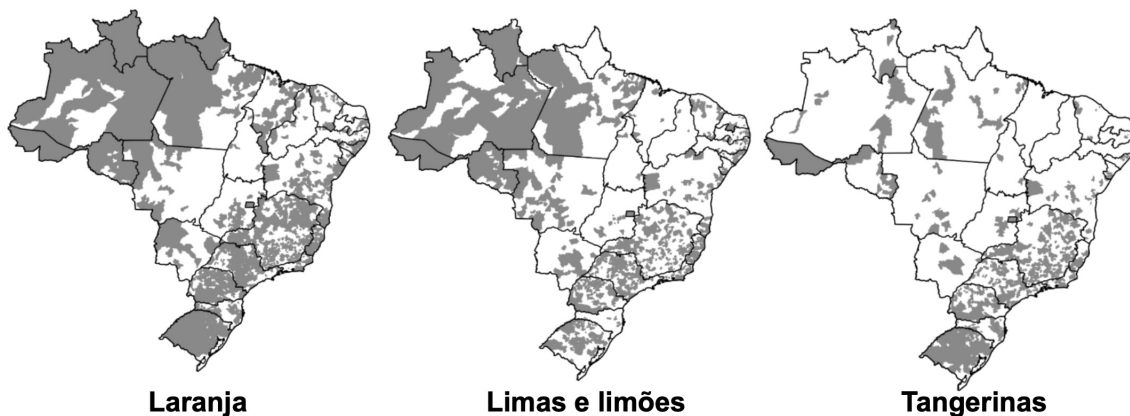
Production area (in gray) of oranges; limes and lemons; and tangerines in Brazil

Challenges and new technologies

In addition to climatic factors, HLB control is linked to the control of the vector psyllid (*diaphorina citri*) of the bacteria responsible for the disease. Embrapa, in partnership with Fundecitrus, is developing a specific zoning to map the presence of the psyllid and the occurrence of floral rot, another disease that harms citrus.

From 2025 onwards, risk maps for these pests should be made available, helping citrus growers make more informed decisions about where to plant.

HLB control requires an ongoing approach, involving constant monitoring of orchards and the adoption of integrated management techniques. The use of computational and mathematical models helps predict the incidence of diseases and pests, making management more accurate.

Expansion of the citrus belt

The migration of orchards to new regions is already a reality. Since 2023, citrus

growers have been seeking areas with a lower incidence of HLB, especially in states such as Mato Grosso do Sul, Goiás and Paraná.

In 2024, demand for these new regions increased considerably, despite the logistical challenges and the need for infrastructure. For producers, adapting to the new regions is a way to ensure the continuity of production and avoid the economic collapse caused by the spread of greening.

Fundecitrus and Embrapa also highlight the importance of zoning for planning new planting areas. Companies such as Cambuhy Agrícola and Agroterenas are investing in expanding to states with more favorable climates.

Cambuhy, for example, began its migration to Mato Grosso do Sul with the intention of generating 1.200 direct jobs and expanding production. Agroterenas plans to plant 1.500 hectares by 2026, based on guidance from researchers at Embrapa and Fundecitrus.

Overcoming obstacles

Although there are numerous challenges, such as high transportation costs, labor shortages and high temperatures in some regions, ongoing research and government actions have been a key support in ensuring the success of the migration. According to Danilo Yamane, a consultant at FortCitrus, guidance on climate and phytosanitary risks is essential to reduce

investment risk.

The expansion of the Citrus Belt is a reflection of the changes imposed by the evolution of the HLB and an attempt to ensure the viability of citrus farming in Brazil. With ongoing actions and research, the adaptation of citrus farming to new regions and climates will be essential for the sustainability of the production chain and for the future of the sector.

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Case IH successfully tests ethanol-powered sugarcane harvester

Austoft 9000 series sugarcane harvester achieves similar productivity and efficiency levels to diesel version

21.03.2025 | 13:57 (UTC -3)

Cultivar Magazine, based on information from Jessica Adriani

Tests carried out by Case IH with an ethanol-powered engine at a São Martinho unit in Pradópolis have yielded positive results. The Austoft 9000 series sugarcane harvester achieved productivity and efficiency levels similar to the diesel version, even in high-yield sugarcane, the company reported.

"We believe that ethanol is the best solution for the future of agricultural machinery, especially in Brazil," says Christian Gonzalez, vice president of Case IH for Latin America.

"Ethanol is a renewable fuel, produced by our customers and widely used in the country, which does not require new investments in infrastructure and logistics by producers," he added.

The use of ethanol as fuel for agricultural machinery brings several benefits, including the reduction of greenhouse gas (GHG) emissions and the possibility of reducing operational costs with transportation and logistics.

Case IH said it plans to expand its portfolio of ethanol-powered machines, including tractors, harvesters and sprayers, to meet the needs of the sugarcane and grain sectors.

"The future of agricultural machinery is ethanol," says Gonzalez. "And we are committed to providing sustainable and efficient solutions for our customers."

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Cotton production chain assesses prospects for the 24/25 harvest

Sector discusses global scenario, trade war and impacts on consumption, in addition to projections for fiber production and export

20.03.2025 | 14:46 (UTC -3)

Catarina Guedes, Cultivar Magazine edition

With an estimated growth in planted area of ??10,3% in 2024/2025, the Brazilian cotton harvest should reach 3,95 million tons of processed product (lint), according to figures presented by the Brazilian Association of Cotton Producers (Abrapa) at the meeting of the Cotton and Derivatives Production Chain Sector Chamber of the Ministry of Agriculture and Livestock (Mapa), held in Brasília. Trade war, global economic scenario, prices and points of attention regarding climate set the tone for the 78th meeting of the chamber, the first of four annual meetings.

In addition to the increase in area, production and exports, the sector may see an increase of up to 20 thousand tons in domestic industrial consumption, which

last year closed at 750 thousand tons, and Brazil has expanded its market beyond China, to countries such as Egypt, Pakistan and India. The next meeting of the Chamber is scheduled for June 30.

Normality

The estimated area of ??cotton crops is slightly higher than that projected by Conab for the last harvest, which was 3,70 million tons. Confirmation will depend on the performance of the productivity expected by cotton growers, at 1842 kilos per hectare, which already represents 3,2% less than that recorded in the previous cycle. At the moment, dry spells have alerted producers in some regions of states such as Bahia and Goiás.

According to the president of Abrapa, Gustavo Piccoli, who led the meeting for the first time, succeeding the former president of the association and the Chamber, Alexandre Schenkel, the numbers are still preliminary, since the harvest in Mato Grosso, the largest producer in the country, is just beginning.

"We can say that everything is going normally so far, but there are concerns about the climate, and some states are already feeling the effects of the drought. But we have news that today (19), it has already rained in Bahia, for example. In any case, it is still too early to make any final predictions. We always prefer to be conservative in our projections," said Picolli.
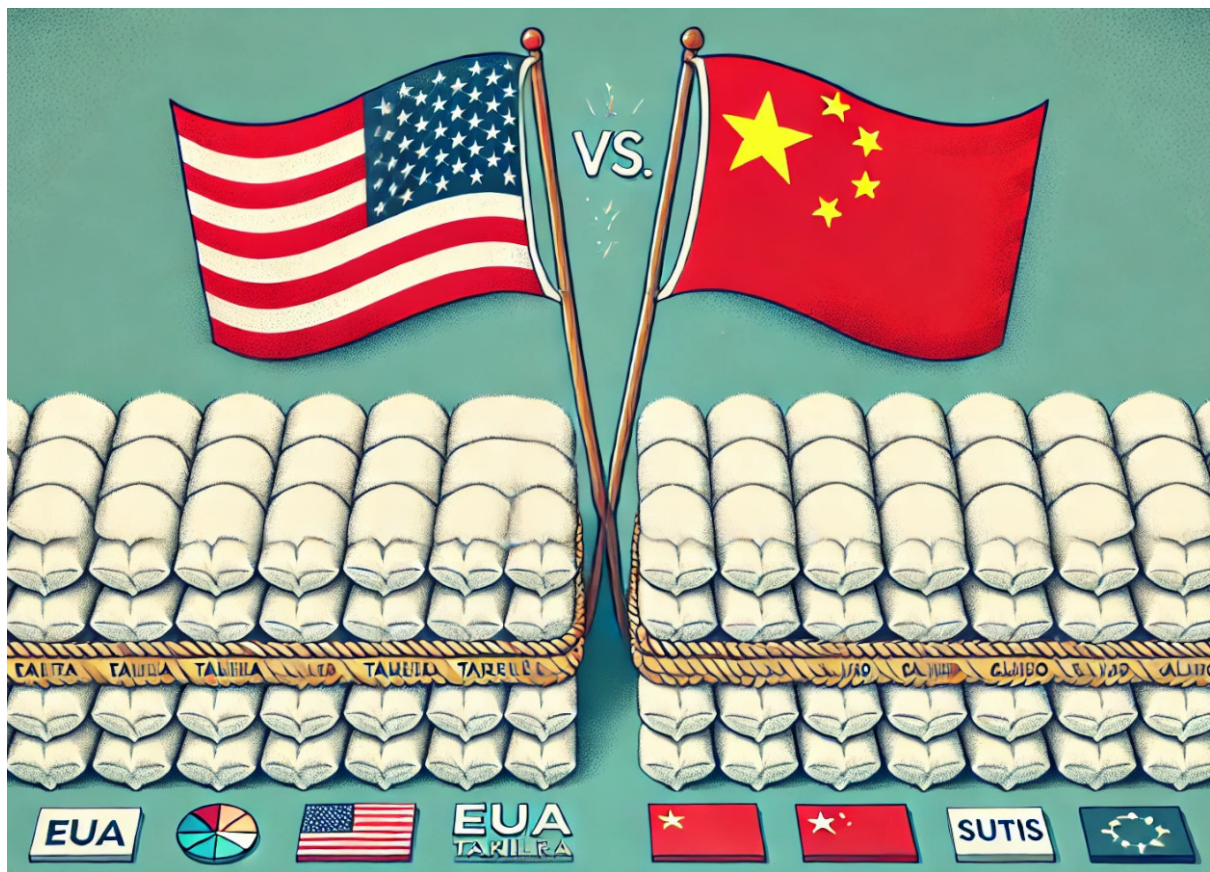
Trade war

The climate issue lost prominence at the meeting to the agenda that has been the focus of attention of producers, exporters and industry, the tariff war between the United States and China, and its repercussions on fiber consumption.

According to Abrapa's Director of International Relations, Marcelo Duarte, the new phase of the trade war – the first was in July 2018 – has a direct impact on Brazilian cotton. Among the positive aspects, Duarte highlighted the improvement of the basis in Asia, greater competitiveness in the Chinese market and the possibility of increasing exports in the short term.

"However, there are challenges, such as the drop in prices on the New York Stock Exchange, increased competition in other markets and the fact that Brazil has already significantly increased its share in China, reducing the room for further significant gains. Furthermore, since the cotton imported by China is mainly used

for exporting textile products, taxation on these goods could limit demand," he explained. According to the director, with the new tariffs announced for 2025, the US could lose even more share in China, consolidating Brazil as the main supplier, but without the same intensity as in the first phase of the trade war, at first.

De Minimis

According to Marcelo Duarte, the end of the "De Minimis" tax exemption – which allowed imports of up to US$800 without taxation in the US – could also affect global consumption, reducing the competitiveness of Chinese polyester-based textile products and contributing to

an increase in demand for higher-quality products made from cotton. "This could mean less demand for low-quality synthetic products via the post office and more imports of cotton products via conventional import channels," he explained.

Exports

According to figures presented by the National Association of Cotton Exporters (Anea) at the meeting, from July 2024 to March 2025, Brazil has already shipped 2,2 million tons of cotton, while in the last commercial year (July 2024/June 2025), the volume of cotton exported was 2.58 million tons. Anea president Miguel Faus states that the global scenario is one of

repressed prices, due to weakened international demand, influenced by factors such as inflation and low interest rates. "China continues to be an important destination for Brazilian cotton, but competition from the United States is expected to intensify in markets where Brazil has consolidated itself in recent years, such as India, Egypt, Pakistan, Bangladesh, Vietnam and Turkey," he highlighted.

"The United States, in turn, is negotiating a free trade agreement with India to exempt 60 tons of cotton from import tariffs, which could impact Brazil's share of this market," said Faus.

Half already sold

According to the president of Anea, export logistics have been outstanding, allowing Brazil to break records in cotton shipments. "Logistics should not be a major problem, as long as there is availability of ships, containers and transport routes - currently, around 50% of the harvest has already been sold", he said. The figures released by the USDA confirm that Brazil is the world's largest cotton exporter this harvest as well.

"As for prices, the trend is towards stability, since global production still exceeds consumption, limiting significant increases in prices. Demand is also below expectations, which prevents a significant appreciation of the product. However, the market has shown self-regulation: when prices fall significantly, demand tends to

increase, which helps to balance prices.

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DVA announces its first female general director in the world

The appointment of Natália Gonçalves was announced to the press this Tuesday

20.03.2025 | 08:37 (UTC -3)

Cultivar Magazine, based on information from Kassiana Bonissoni

DVA has announced the appointment of Natália Gonçalves as the company's new general director in Brazil. She becomes the first woman to hold this position in the company's global history.

With a degree in Chemistry, Natália joined DVA in 2018, working in research laboratories and production plants. Her International Executive MBA, completed at FIA with immersions in institutions such as Porto Business School (Portugal), Cambridge (United Kingdom) and Bocconi (Italy), was one of the factors that contributed to her professional advancement.

In a statement, the new director commented on the importance of her appointment. "This achievement has a

significant impact, as it represents the overcoming of barriers and recognition of my efforts in a challenging environment," she said.

The executive also highlighted the importance of female representation in leadership positions. For her, the presence of women in these positions can inspire other professionals to seek their own career paths in the job market.

[A few months ago, Cultivar Magazine published an article written by the executive: "Adjuvants are not all the same" (click here to read)](#)

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Syngenta and PepsiCo celebrate first year of partnership in regenerative agriculture

In the second phase of the project, the companies hope to expand the area by 25%.

20.03.2025 | 05:23 (UTC -3)

Cultivar Magazine, based on information from Celina Peper

In the first year of the regenerative agriculture partnership, Syngenta has supplied PepsiCo with 4.000 tons of sunflower oil produced by farmers in the provinces of Buenos Aires, La Pampa, San Luis and Santa Fe. The initiative focuses on promoting a sustainable farming model that aims not only to improve productivity, but also to preserve and regenerate soils.

In the second phase of the project, the companies hope to expand the area that adopts these regenerative practices by at least 25%. Farmers are encouraged to apply techniques such as crop rotation, use of cover crops, water use efficiency, use of biological products and creation of habitats for pollinators.

These practices are monitored and tracked, ensuring that farmers obtain additional value per ton of product, with verification of good practices carried out. The process includes third-party validation, ensuring safety and trust throughout the commercial chain.

Sunflower seed is sold through the AVC (Agriculture Value Chain) program, which facilitates the exchange and export of oil. Field practices are traceable through the Cropwise digital platform, which allows farmers to measure, verify and plan continuous improvements in their regenerative practices.

Mariale Álvarez, head of sustainability and corporate affairs at Syngenta for Latin America, highlighted the company's

commitment to sustainability.

"Regenerating soil and nature through practices that aim to leave the system better than we found it is a commitment we make every day. Together with a strategic partner like PepsiCo, we are taking it a step further. Farmers who participate in our Sustainable Sourcing Program receive an economic benefit by demonstrating the adoption of regenerative practices, which positively impacts the environment and their profitability," he said.

Santiago Desmery, "leader" of the PepsiCo oils category for the Southern Cone and Brazil, also commented on the partnership.

"Companies have a huge responsibility to care for and improve the way we produce

food. At PepsiCo, everything we do is driven by sustainability, within the pep+ framework, our global transformation strategy that aims to create and inspire positive change for the planet and people."

And he added: "with this project, the Southern Cone region becomes the first for PepsiCo in Latin America to use 100% regenerative agriculture in the sunflower we use."

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Losses in Piauí's grain harvest already exceed 25%

The lack of regular rainfall was the main cause of the losses

19.03.2025 | 15:36 (UTC -3)

Katya D'Angelles

The Piauí grain harvest, soybeans and corn, is compromised and according to the

Association of Soybean Producers of the State of Piauí (Aprosoja Piauí) the losses are already compromising the sector's results for the 24/25 harvest. The main factor for the reduction in productivity was the period of drought that hit the state, especially the southern region, in recent months.

The estimated average loss in the state today is at least 25% for soybeans (in some regions/municipalities above 50%) and 50% for corn (regions/municipalities above 70%). February was a completely dry month, and, according to Aprosoja-PI, in the first half of March the rains were localized and did not cover all producing regions. On some farms, there have already been more than 45 days without significant rain.

"In the corn harvest, losses are expected to be even greater because the reproductive period (flowering, fruiting and grain filling) was concentrated in the month of February/March; the implementation of the second corn harvest (2nd harvest) was also quite compromised", explains the president of Aprosoja, Janailton Fritzen.

The president of Aprosoja Piauí explains that the lack of rain in February and the scattered rains in March made it difficult to recover activities. The losses are already consolidated, to a greater or lesser extent, depending on the situation of each farm/region.

According to Aprosoja's executive director, Rafael Maschio, producers were affected differently. "The losses are linked to the

time at which they planted, and may be greater for some," he explains.

"Those who planted earlier and have already harvested will experience losses of close to 25%, while those who sowed later will face losses of up to 50%," highlights Janailton.

Corn is the most affected

Corn is the crop most impacted by the drought, as its reproductive period mostly occurs in February, precisely when rainfall was practically non-existent.

This breakdown can also harm the production chain that depends on this grain for animal feed and marketing.

"The reduction in the harvest in Piauí is causing concern among producers, who are suffering financial losses and facing difficulties in the next agricultural cycle. In addition to the drop in production, operational costs are increasing, further worsening the situation," explains Fritzen.

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Researchers create predictive model of solar radiation

System helps adjust agricultural operations to daily variations in sunlight

19.03.2025 | 15:13 (UTC -3)

Cultivar Magazine
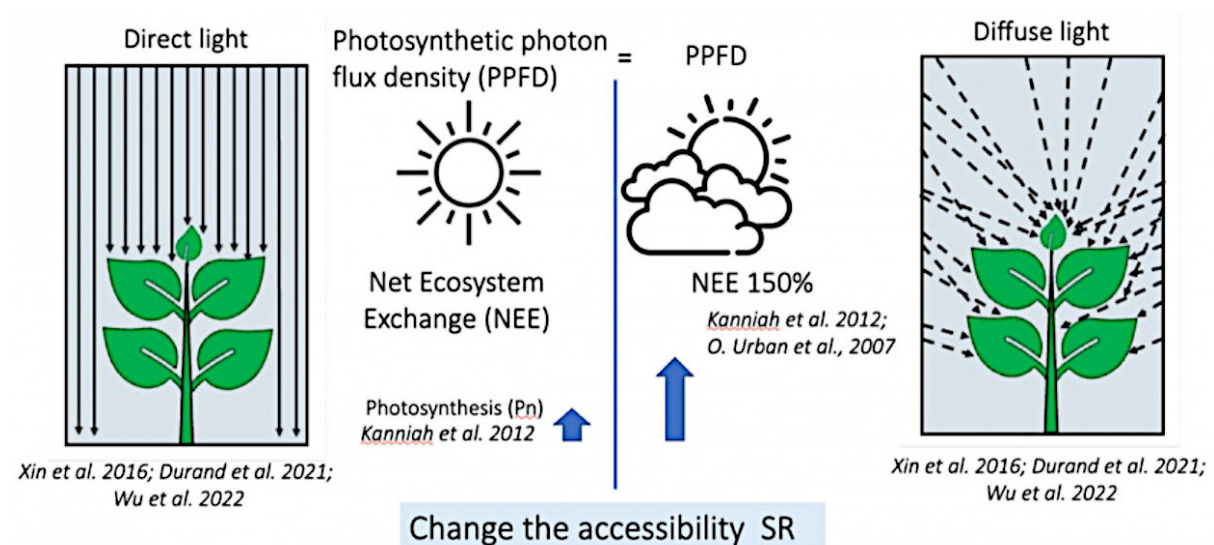
Differences between sunny and cloudy days. Left: On sunny days, the sun shines directly and hits mostly the upper leaves. Right: On cloudy days, sunlight is scattered in all directions, which allows the lower leaves to receive more light.

Researchers at Kyushu University have developed a numerical model to understand how solar radiation behaves

under different climate conditions.

Their study proposes a new way to classify the intensity and quality of sunlight, rather than focusing solely on the energy it transmits -- as done in previous research.

The aim of the model is to help farmers make informed decisions about crop growth and development, considering daily variations in solar radiation.

Importance for agriculture

The model proposes categorizing sunlight into five different types, ranging from clear days to cloudy days. This division allows us to better understand how solar radiation impacts photosynthesis and plant growth.

The research also discusses how the behavior of light can be modified by factors such as cloud cover and weather, especially in regions that experience all four seasons, such as Japan.

From these categories, farmers can optimize greenhouse operations and adjust plant spacing according to the variation in available light.
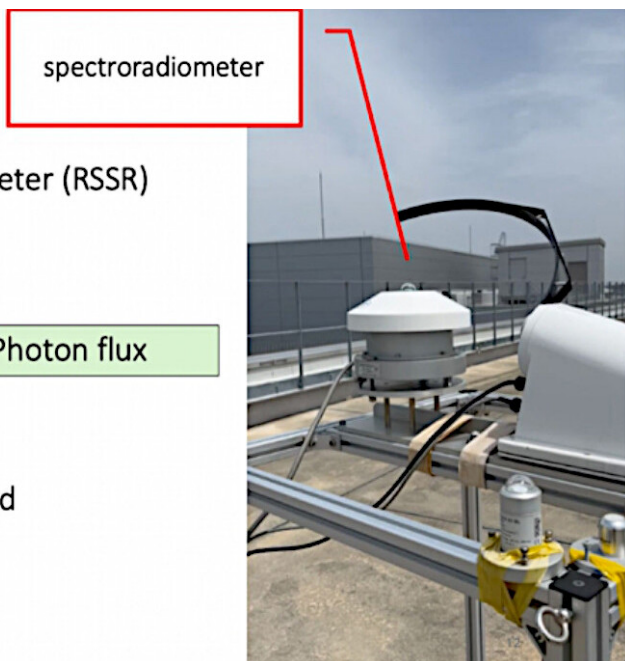

Image of Spectroradiometer. The Rotating Shadowband Spectroradiometer (RSS) measures sunlight. Its rotating band intermittently blocks sunlight, helping scientists measure two types of light: direct sunlight when the band is out of the way and scattered light when the band shadows the sensor.

Impacts on plants

Sunlight is not only a source of energy for plants, but it also directly influences their growth patterns. On cloudy days, sunlight spreads more evenly, reaching the lower parts of the plant.

In contrast, on sunny days, the strongest light hits the upper parts directly, leaving the lower parts in shadow. This can result in uneven growth, which the new model aims to correct by predicting how the plant would respond to different light conditions during the day.

Technology and inovation

The research used a spectroradiometer, a device that measures solar radiation across a full range of wavelengths, from visible light to ultraviolet rays. Data was collected over a year at Kyushu University, and from this data, a machine learning model was developed to predict sunlight patterns with 94 percent accuracy.

This model can be applied in various agricultural regions to improve productivity and crop management, especially at times of the year with significant light variations, such as the rainy season in Japan.

More information can be found at doi.org/10.1016/j.ecoinf.2024.102940

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Coconut biofuel drives energy transition

Sustainable alternative reduces waste and strengthens the circular economy

19.03.2025 | 14:28 (UTC -3)

Tiradentes University

Growing concerns about the carbon footprint have encouraged the development of strategies to decarbonize economic activities. The main approaches

include diversifying energy sources, increasing process efficiency, and implementing carbon capture technologies. In this context, the production of biofuel from residual green coconut biomass stands out, one of the most abundant wastes in Aracaju (SE), where the Institute of Technology and Research (ITP) is located.

Linked to the Tiradentes Group, ITP houses the Center for Studies in Colloidal Systems (Nuesc), created 15 years ago in partnership with the National Petroleum Agency (ANP), the Petrobras Research Center (Cenpes) and Petrobras. The scientific research center has established itself as one of the most important in the segment, also serving as an instrument for training highly qualified professionals for

the local and national market, in collaboration with the Stricto sensu Postgraduate Programs of the Tiradentes University (Unit).

"The Center has a very positive impact on environmental balance. In Aracaju, for example, it helps to reuse the 190 tons of green coconut waste discarded each week in the city. We transform into energy a material that represents a major challenge for the environment, due to its high volume and low decomposition rate," explains Cláudio Dariva, deputy coordinator of Professional Programs in the Engineering II Area at Capes, professor at Unit, researcher at ITP and coordinator of Nuesc.

Environmental challenge

Green coconuts are widely consumed in tropical regions, and their waste, especially the fiber, represents a major environmental challenge due to their high volume and low decomposition rate. In Aracaju, a study conducted by the Operations Department of the Municipal Urban Services Company (EMSURB) indicated that the city generates around 190 tons of green coconut waste per week. Eighty-seven points of sale were identified, 87 of which are considered large generators, discarding up to 30 kg per day or 200 kg on alternate days.

This amount of waste overloads household collection and generates an annual cost of approximately R$900 for public cleaning. Furthermore, when not sent to the landfill, much of this waste ends up being disposed of inappropriately, worsening the city's environmental liabilities. Converting this waste into biofuel not only reduces the environmental impact, but also offers a renewable and sustainable energy alternative.

Biofuel production process

The transformation of green coconut fiber into biofuel can occur through different technological routes, such as pyrolysis,

gasification and fermentation. In the case of the research carried out at Nuesc of ITP, priority is given to an efficient process with low environmental impact:

1. **Drying and grinding:** Coconut fiber is collected, dried and crushed to facilitate processing.

2. **Thermal conversion:** Biomass can be subjected to pyrolysis, which converts the material into bio-oil, biochar and combustible gases.

3. **Refining and utilization:** Bio-oil can be refined for use in engines and generators, while biochar can be used as an energy source or to improve soil quality.

Integrated process

Recently, technological advances have enabled the integration of three essential steps for the production of sustainable fuels: oil extraction, biodiesel production and bio-oil production from oilseeds. This innovative technology uses pressurized fluids, significantly reducing the use of organic solvents and promoting an environmentally sustainable approach.

According to ITP research, the approach maximizes the use of waste generated in the process, contributing to a circular economy and reducing the environmental impact of fuel production.

The initiative not only contributes to reducing dependence on fossil fuels, but

also improves urban waste management, preventing the accumulation of organic waste. Furthermore, the creation of a production chain around biofuel fosters job creation and local development, promoting the circular economy.

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MT productive sector defends 90m limit for spraying

Public hearing discussed project that could increase distance to 300m

19.03.2025 | 14:00 (UTC -3)

Famato System

The Agriculture and Livestock Federation of Mato Grosso (Famato), represented by

agricultural technician Alex Rosa, was present at a public hearing that discussed Bill No. 1.833/2023, which establishes a minimum distance of 90 meters for spraying agricultural pesticides. However, the Permanent Committee on Health, Social Security and Assistance seeks to increase this distance to 300 meters. The meeting was held at the Legislative Assembly of Mato Grosso (ALMT), in Cuiabá.

The productive sector was mobilized in defense of the 90-meter limit, with the presence of leaders such as presidents of rural unions, producers and agribusiness entities. The massive participation of rural producers reinforced the importance of maintaining the limit established by the project, guaranteeing the viability of

agricultural and livestock production in the state.

Famato's president, Vilmondes Tomain, highlighted the importance of the sector's mobilization and thanked the producers and presidents of rural unions for attending the hearing. "The unity of the production sector was crucial in demonstrating the strength of Mato Grosso's agricultural sector. We defend the 90-meter distance because we have modern technologies and advanced equipment that ensure safe and efficient application. I would like to thank each producer and each union leader who was present and demonstrated that we are attentive and committed to the sustainability of our activity," said Tomain.

According to Congressman Gilberto Cattani, his proposal aims to defend small producers, ensuring that regulation does not harm the economic viability of rural properties. "My project aims to defend small producers. The person who was shouting 300 meters away, who is nothing to the big producer. He doesn't care. Most congressmen defend our cause. No one wants to poison anyone. We want to survive and make sure other people survive too," said the congressman.

Sufficient distance

The producers present emphasized that the distance of 90 meters is sufficient to guarantee the safety of properties that have agriculture, livestock, common areas

and housing. In addition, they highlighted that the production sector relies on advanced technologies and cutting-edge equipment that guarantee safety in the application of pesticides.

Producers also mentioned that when farm workers handle pesticides, they use Personal Protective Equipment (PPE), such as gloves, overalls and masks, to avoid contamination. There are a number of techniques that minimize any risk of contamination.

The vote on the bill is scheduled for today (19/03), making the hearing a decisive moment to ensure that the voice of the productive sector is heard.

The presidents of rural unions participated: Valcir Batista (Ipiranga do Norte), together

with his board; Rodrigo Cassol (Campos de Júlio), together with the board; Juliana Bortolini (Jaciara), together with the board; Antônio Brólio (Campo Novo do Parecis), with the board; in addition to rural producers from the respective unions and from Nova Mutum.

The expectation is that the Legislative Assembly will take into consideration the arguments presented by professors, researchers, doctors, producers and Famato, ensuring balanced regulation aligned with the needs of Mato Grosso's agribusiness.

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Plants use clever strategy to absorb water

British research reveals how roots adjust absorption according to soil water availability

19.03.2025 | 08:52 (UTC -3)

Cultivar Magazine

Plants are able to strategically adjust water absorption by their roots according to water availability in different layers of the soil. The discovery is included in a study published by researchers from the United Kingdom, who analyzed this behavior in wheat fields and permanent pastures.

According to the research, plants reduce water absorption at the surface when the soil dries out, increasing water withdrawal in deeper layers.

Conversely, when the top layer receives rainwater, the roots immediately increase absorption at the surface, reducing the use of groundwater.

Scientists call this mechanism "root economy" and it represents an efficient way of managing water resources.

To reach their conclusions, the researchers developed a method that allows daily measurement of water absorption, root water potential and root radial hydraulic permeability at different depths in the soil.

The results showed that the water content in the surface soil layer is not only a resource, but also a signal that coordinates absorption in deeper layers.

It is still unclear how plants regulate this hydraulic permeability. One hypothesis is the involvement of aquaporins, proteins that form pores in cell membranes, allowing rapid adaptation to water availability.

The study also showed subtle differences between wheat and grasses. Grasses

showed greater efficiency in the use of subsoil water and greater tolerance to surface water stress.

More information can be found at doi.org/10.1111/nph.70013

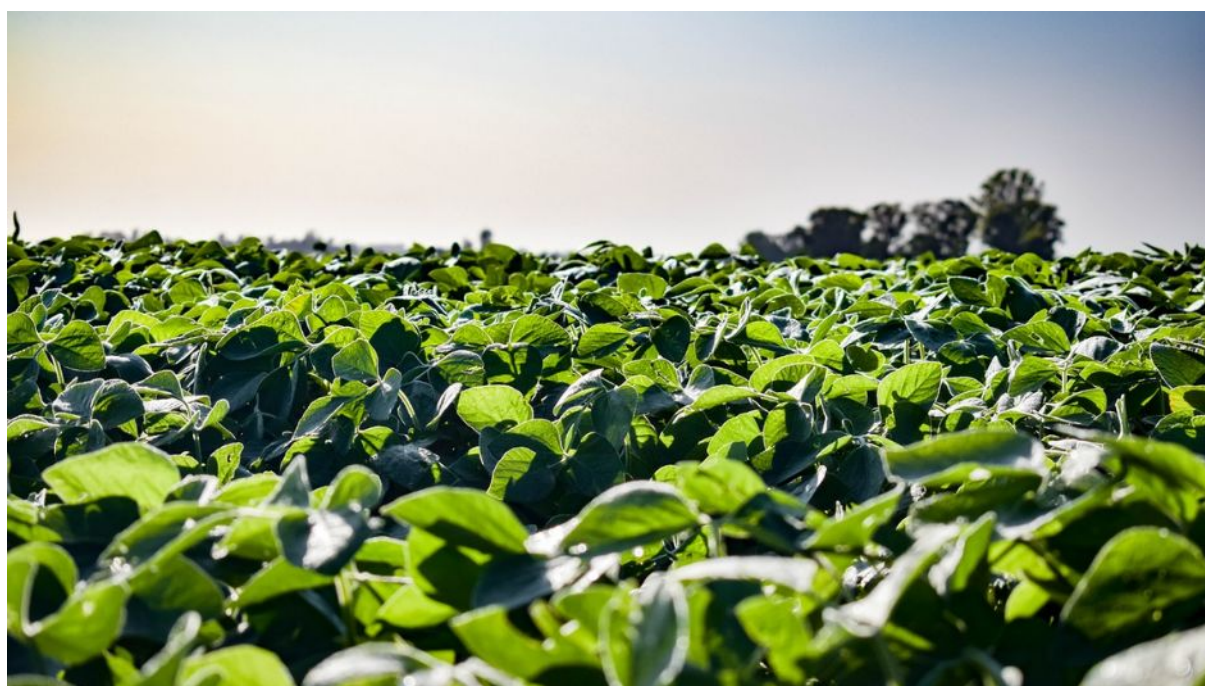<div style="border: 1px solid green; text-align: center; color: green;">

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Tool that detects soybean diseases is in the testing phase

Technology favors the optimization of the use of pesticides

18.03.2025 | 16:06 (UTC -3)

Valéria Cristina Costa

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The tool that detects soybean diseases,
resulting from the partnership between

Embrapa, Macnica DHW and InnerEye, is available for testing this harvest. Technicians and producers who work with the crop in the country can now access the PlantCheck ID app, free of charge, for Android and iOS systems in the app stores. It will soon also be available for detecting corn diseases.

The partnership began in 2022 with training the system to recognize diseased and non-diseased plants, then for diseases of economic relevance, and is now advancing to offering the tool for large-scale testing. The application has a simplified interface, according to Jayme Barbedo, researcher at Embrapa Digital Agriculture and leader of the project,

"The user observes a symptom in the crop for which he would like a diagnosis. He takes a photograph and transmits it, via cell phone or computer, to InnerEye's servers in Israel. There, the model is run and a response is produced for the user. The process takes no more than a few seconds," explains Barbedo.

"One of the great advantages of the application is that it makes the disease identification process faster and more assertive, making the producer's life easier. In addition, it will also soon include some of Embrapa's own apps, such as ClimaAPI and Agrotermos, allowing the user to access all this information from a single platform", reinforces Fábio Petrassem de Sousa, president of Macnica DHW.

Asian rust, powdery mildew and target spot are among the main diseases that affect soybean plants that the application, trained using artificial intelligence (AI) based on analyses by experts from Embrapa Soja, can identify at an early stage.

Diseases with similar characteristics make it difficult to distinguish symptoms. "Diseases occur at different stages of the crop, requiring specific management according to the pathogen to ensure efficient application of fungicides," explains researcher Dagma da Silva Araújo, from Embrapa Milho e Sorgo.

The use of AI to create disease identification mechanisms will provide greater security for decision-making, he

says. Without control, Asian rust can cause losses of up to 90% in productivity, according to the Anti-Rust Consortium. The numbers highlight the value of prevention, especially in times of extreme weather events that favor the emergence and expansion of new fungi.

There are good reasons for the production sector to participate in the improvement of the technological solution that provides autonomy and agility in the identification of phytopathologies at an early stage and assertiveness in decision-making, according to the team of experts. Sustainable agricultural practices are also favored by the use of technology, optimizing the use of pesticides and reducing environmental impacts.

Neural signals

The pioneering initiative to capture neural signals from plant pathologists at Embrapa Soja and Embrapa Milho e Sorgo to detect diseases is done using an ECG device, a type of helmet with electrodes (photo/Macnica) that capture brain waves. The brain signals are then sent to InnerEye software, which processes the

images and provides the results, says Sousa. "This system served as a basis for Macnica specialists to design the application," he adds.

The system simulates brain function when experts view images of diseased plants, automating labeling and making the step faster and more efficient. Researcher Jayme Barbedo points out that AI tools have evolved a lot, but they lack a large volume of data for continuous improvement.

This is a challenge that the app's development team intends to overcome with the participation of producers. "The more feedback we get in this large-scale testing phase, the more we will expand the database and the accuracy of the tool,"

says Barbedo. The researcher also highlights the educational role of technology in disseminating information about diseases. Free access to the app will continue after the testing phase.

Validation

After the proof of concept, in 2023, which confirmed the accuracy of the method for identifying diseases in soybeans using AI and the model was completed, the first phase of validation of the technology for the crop began this year, with a restricted group of around 20 producers.

The suggestions were used to improve the tool, which is now available free of charge to professionals in agronomy, rural

extension and the production sector for the expanded testing stage.

"Diseases have very specific characteristics regarding symptoms and can also be confused with symptoms of other diseases and symptoms caused by abiotic factors (which do not result from the action of living beings), says Dagma Araújo. In the future, other diseases should be included, expanding the potential and functionalities of the application, aimed at decision-making.

In the current phase, the goal is to validate whether the use of brain waves as a methodology can be safely applied. The other steps will come with suggestions from producers who are testing the tool in the app, says the researcher.

The improvement of the application should result in a version to be delivered in the second half of 2025, but the improvement will be continuous, aiming to keep up with the dynamics of agricultural activity.

Corn

Corn, which usually follows soybean, will be the next crop to receive support from the app. According to a study by Embrapa, the consumption of the grain in human food is not very representative from a market perspective, although it is relevant in low-income regions. Between 60% and 80% of grain consumption in Brazil goes to animal feed.

The enfezamentos complex, corn white spot and turcicum spot are the diseases to

be included in the system initially. The choice of diseases to be included in the application testing phase is justified by their economic importance for the crop in the country.

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Tomato production advances; whitefly remains challenging

The insect feeds on tomato sap, causing direct damage that affects the harvest.

18.03.2025 | 15:14 (UTC -3)

Cultivar Magazine, based on information from Wellington Torres

The advance in tomato production in Brazil is driven, among other factors, by the constant fight against pests, such as whitefly (*Bemisia tabaci*, find out more here), which directly affects the productivity and quality of the fruits. The country reached 4,7 million tons in 2024, a growth of 19,2% compared to the previous year.

According to Fábio Kagi, Regulatory Affairs Manager at the National Union of the Plant Protection Products Industry (Sindiveg), pest control requires constant investment.

"Crops require substantial efforts to ensure quality and productivity. Whitefly is a significant threat as it can compromise the entire harvest," said Kagi.

Whiteflies feed on tomato sap, causing direct damage that affects the harvest. Severe infestations can lead to plant death or reduced fruit quality.

In addition to the direct damage caused by sucking the sap, whiteflies release toxins that impair the ripening of tomatoes, making them irregular. The excretion of sugary substances by the insects favors the growth of sooty mold, a fungus that hinders photosynthesis, further compromising the quality of production. The pest also transmits viruses that cause diseases such as dwarfism and yellowing of leaves, impairing the development of plants.

To address these challenges, Kagi highlights the importance of integrated

pest management. The practice involves continuous crop monitoring, crop rotation and the responsible use of pesticides.

"With adequate technical support, it is possible to control the whitefly population and minimize damage, ensuring the sustainability of production," he explained. The manager also warned of the need to strictly observe the safety interval when applying products, especially when the fruits are already present on the plant.

Click here to find out which pesticides are registered for whitefly control (*Bemisia tabaci*).

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RS wine sector celebrates historic harvest

Significant increase in harvest compared to the last cycle promises products with even more intense aromas and flavors

18.03.2025 | 14:41 (UTC -3)

Diego Adami

Photo: Siderlei Ditadi

A year to go down in history. The Rio Grande do Sul Institute of Management, Planning and Development of Viticulture (Consevitis-RS) predicts the harvest of 750 thousand tons of grapes in the state in 2025, with a predominance in the Serra Gaúcha region. Compared to last year, there was an increase of 38,5% in the production chain of wines, sparkling wines, juices and derivatives of the fruit.

The positive results and exceptional quality of the products promise to boost sales and boost the sector. The president of Consevitis-RS, Luciano Rebelatto, shares this expectation.

"If we look at the history, I would venture to say that this will be the harvest of harvests in recent years. From the harvest onwards,

we have excellent capacity and technology to produce high-quality products within the industries, boosting our market," he emphasizes. Along the same lines, the director of the Rio Grande do Sul Association of Winemakers (Agavi), Darci Dani, hopes to convince local and international consumers that Brazilian products "are a great choice."

"Our perspective is that the market will expand this year and that we will have a year with a good increase in the sale of wine products, given the quality of the harvest, one of the best we have ever harvested", he celebrates.

"It was a special year"

The climate tragedy that hit Rio Grande do Sul in May last year worried producers about the risk of new heavy rainfall. Fortunately, during the growing season, the weather remained drier in the state, preventing significant losses.

"It was a special year due to the excess rainfall, which was overcome in the following seasons with a harsh winter, followed by a spring that allowed for normal budding," emphasizes winemaker Carlos Azambuja, from the municipality of Pinto Bandeira. And the good news goes beyond the borders of Rio Grande do Sul. Winemaker Isabela Peregrino, who works in the states of Minas Gerais and São Paulo, also talks about the climate conditions. "The grapes harvested between December and January suffered

a little from the rain, however, the dry weather in February favored the ripening and health of the fruit," says Isabela.

Henrique Pessoa dos Santos, a researcher in production physiology at the Brazilian Agricultural Research Corporation (Embrapa Grape and Wine), points out that the thermal conditions

favorable to vegetative growth, with the absence of late frosts at the beginning of the grapevine cycle, contributed to the quality and volume of the harvest.

"Throughout the spring of last year, there were only six days of temperatures below 10 degrees and without reaching the freezing limit. This was crucial to ensure the full development of the flowers and grape berries," he explains.

Rainfall is another essential element in this process. From August to February, the period between budding and harvest, the region had a total of 657 mm of rain, a figure below the historical average, similar to the dry cycles of the last five years.

"The low rainfall, with fewer cloudy days and greater incidence of sunshine, favors

uniform ripening and reduces the conditions for the development of diseases in the vines," adds Santos. In addition, the favorable weather conditions allowed for better oenological quality of the fruit, with aromas and pigmentation even more striking for consumption.

Winemakers celebrate the quality of the harvest

The enthusiasm for the harvest figures is ratified by the president of the Brazilian Enology Association (ABE) and producer, Mário Lucas Ieggli, both due to the quantity and quality of the products perceived since the beginning of budding,

and by the reports of producers who consider the 2025 harvest to be one of the best in the last decade. Ieggli states that consumers will enjoy top-quality wines and sparkling wines.

"For red and white wines from later varieties, we can expect a lot of structure, power and a slightly high alcohol content. As for sparkling wines, we observed excellent health and balance between acidity, sugar and pH."

The same view regarding the quality of wines and sparkling wines is shared by winemakers from the Campos de Cima da Serra region, André Donatti and Delto Garibaldi. "We had little rain in a summer with high temperatures and mild nights, which provides aromatic intensity in the

whites and color intensity in the reds," Donatti assures.

For Garibaldi, white and rosé wines are highly appreciated by consumers, as are red wines, which are still in the development phase but are expected to be of excellent quality. As for table wines and grape juice, the Bordô and Niagara varieties stand out. "It is an exceptional harvest, with perfect technical and phenolic maturity, which will certainly bring excellence to the products," he points out.

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Embrapa clones 700-year-old araucaria tree that fell in PR

Cloning was a challenge due to the advanced age of the tree

18.03.2025 | 14:12 (UTC -3)

Katia Pichelli

The Embrapa Florestas (PR) team managed to clone an araucaria (*Araucaria*

angustifolia) about 700 years old that fell during a storm in Paraná, an unprecedented feat in Brazilian forestry research. The tree, 42 meters tall, was considered the largest of its kind in the state, which is a symbol of the local landscape. The genetic rescue project resulted in cloned seedlings that were planted in Cruz Machado, the city where the original tree was located.

Cloning such an old plant presented great challenges, since the regenerability of old tree tissues is reduced. However, the researcher managed to produce four trunk seedlings, preserving the DNA of the original tree. "Rescuing such an old araucaria and successfully cloning it is a scientific achievement," celebrates Embrapa researcher Ivar Wendling.

Because they originate from adult tissue, cloned seedlings will produce smaller trees that begin producing pine nuts earlier than conventional trees, which can benefit farmers interested in the sustainable use of the species. In addition to being a traditional food, pine nuts have a growing commercial value and can represent an additional source of income for farmers.

However, Wendling warns that the seedlings are still delicate and require special care in the first years of development, including irrigation and control of natural competitors. "The original tree has survived for centuries, but these seedlings need attention so that they can grow healthy and continue this legacy," he explains.

Cloning

Photo: Katia Pichelli

The technique used for this cloning was grafting, which consists of joining a fragment of the original plant to a young seedling. In the case of the cloned araucaria, as soon as the tree fell, shoots were collected (photo on the right), which were then grafted onto already established seedlings, ensuring that the new individual

has the same genetic material as the original plant. This process allows the tree to regenerate from its own cells, maintaining characteristics such as resistance and productivity.

Grafting can be done using shoots from the trunk or branches of the tree, resulting in different types of plants. Trunk seedlings tend to grow like conventional trees, while branch seedlings produce what are known as "mini araucarias". Both types produce pine nuts earlier. After grafting, the seedlings go through a period of growth before being planted in the field.

In the case of older trees, cloning is more difficult due to the low regeneration capacity of older tissues. As the years go by, plant cells reduce their rate of

multiplication and lose part of their ability to produce new individuals.

Furthermore, very old trees have a different hormonal system than young plants, which can hinder the growth of grafts and reduce the success of cloning. In the case of this araucaria, estimated to be around 700 years old, the Embrapa researcher had to conduct experiments to identify the ideal conditions for growing cloned seedlings. The success of the procedure represents an advance in forestry technology, paving the way for the genetic conservation of other centuries-old trees.

Photo: Katia Pichelli

Clones planted in symbolic locations

The seedlings were planted in two different locations. One of them was taken back to the rural property of Terezinha de Jesus Wrubleski (pictured above), where the original araucaria was located. "I am very happy to have this new tree here, as a

daughter of the old one," she says happily. According to her, the old araucaria attracted visitors interested in its grandeur, and the new seedling represents a continuation of that story. "My family has been on this property for over 70 years and the araucaria was part of our family. Now, we will be able to show its 'daughter'," she says. Another seedling was planted at the Cruz Machado Agricultural College, in an event with students, teachers and local authorities.

The choice of the agricultural school as the location to receive the sapling reinforces the importance of education in biodiversity conservation. For the school's director, Anilton César Michels, the presence of the araucaria will serve as a teaching tool for students. "This is a historic moment for our

school and for the city," he says. According to the school's pedagogical director, Anderson Kaziuk, the planting will encourage students to develop araucaria cultivation on their properties, in association with yerba mate, diversifying production and generating income for family farming. "And the process of watching the growth of this araucaria will be unique, won't it?" adds Kaziuk.

Photo: Katia Pichelli

For students, the opportunity to watch a cloned tree grow is a unique experience. "I want to come back in a few years to see how it is doing and maybe pick some pine nuts," says student Reginaldo Litka. Professor Ana Carolina Majolo emphasizes that learning about the araucaria can change students' perceptions about the sustainable use of the forest. "Before, many saw the tree as an obstacle. Now, they understand that it can be a valuable resource," she explains.

The cloning technique used by scientists allowed the production of seedlings from trunk shoots, ensuring that the new generation maintains the genetics of the original tree. Unlike seedlings generated from seeds, which can result in genetically varied trees, cloned seedlings preserve

unique characteristics of the mother plant, such as the shape of the pine nuts and the production season. In addition to planting the seedlings, students from the agricultural college participated in a lecture on the importance of the araucaria in biodiversity and its economic potential for family farming. The species, which once covered large areas of the South of the country, is now threatened by uncontrolled exploitation carried out in the past. "We need to find ways to preserve the araucaria and, at the same time, make it economically viable for producers," emphasizes Wendling.

Photo: Katia Pichelli

The mayor of Cruz Machado, Carlos Novak, emphasizes the symbolic value of the project: "This tree is part of the history of our city. Today, we have learned to preserve it and use it sustainably." The city's Secretary of Agriculture, Daniel Waligura, adds: "Araucaria wood was once used to build houses, but now it can also be a living economic asset."

The project also includes donating one of the cloned seedlings to the Paraná State Government and preserving another in Embrapa Florestas' Araucaria genetic collection, ensuring the continuity of research on the species. "This tree has unique DNA and we need to study what makes it so resilient," concludes Wendling.

Araucaria trunk X Araucaria branch

"The araucaria is a species with a very distinct physiology: it is the only tree where it is possible to completely separate the trunk and branches. Understanding this allowed us to improve the cloning technique via grafting, providing trunk and

branch seedlings," reveals the researcher. "In about four years, when the trees are better established, we will also be able to make clones of these clones and thus replicate this genetic material," he explains.

Araucaria seedlings produced via grafting can originate from trunk or branch shoots, resulting in distinct characteristics:

- **Branch cuttings:** They give rise to "mini araucarias", without the presence of a trunk, which reach a maximum height of 3 to 5 meters and produce pine nuts early. The pine nuts generated by these mini araucarias are normal and will give rise to trees of normal size.

- **Trunk seedlings:** they give rise to trees with "normal" morphology, with the presence of a trunk and branches, although they may not reach the same height as the original tree, since mature shoots are collected. The genetics of the original tree are maintained.

How old are the cells of a cloned plant?

The ontogenetic (cellular) age of a cloned plant is the same as that of the original plant, from the point where the graft was collected, at the time of cloning. In other words, in terms of DNA and the information contained in it, the cloned plant is "born" with the same age as the plant from which the cell or tissue for cloning was taken. "The physiological age is zero at the time of creation, as it is a new plant, in a new life cycle," explains Wendling.

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CNH appoints Cameron Batten as Chief Communications Officer

Executive with 25 years of experience in communications takes office at the end of March

18.03.2025 | 07:46 (UTC -3)

Cultivar Magazine, based on information from CNH

CNH announced the appointment of Cameron Batten as Chief Communications Officer (CCO). He will take on the role effective March 31, 2025, and will join the company's global leadership team, focusing on executing strategies for long-term, sustainable growth.

Batten brings over 25 years of experience in communications, with a focus on media, government and institutional relations, brand marketing, corporate reputation, employee engagement and social impact.

Prior to joining CNH, he was CCO of Volkswagen Group of America. He has also held leadership roles at companies including Samsung Electronics America, Capital One, Johnson & Johnson and American Express.

Gerrit Marx, CEO of CNH, said that the company is entering a new strategic chapter and that Cameron Batten, with his vast experience, will be essential to effectively tell the company's story. According to Marx, CNH is looking for a visionary communicator who can use technology strategically to highlight the positive impacts of the company's brands, which operate globally.

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Techniques quickly identify transgenic corn

Researchers use spectrometry and machine learning to accurately distinguish grains

17.03.2025 | 18:00 (UTC -3)

Joana Silva

Laser-induced plasma spectroscopy (Libs) combined with machine learning algorithms could be an alternative screening technique to identify and

discriminate GM corn grains from conventional varieties. The methodology, developed by researchers from Embrapa, four universities from three regions of the country and an Italian institute, has proven capable of making the distinction in an accurate, fast and accessible way.

Currently, the detection and quantification of genetically modified foods and feeds is performed by the standard Polymerase Chain Reaction (PCR)-based test, which detects and quantifies the presence of specific DNA proteins in the sample. Despite its good accuracy and sensitivity, this method is time-consuming and expensive.

In recent decades, the production and consumption of genetically modified

agricultural products worldwide has increased significantly, due to population growth and the growing demand for food. At the same time, the demand for rapid and inexpensive methods to identify and discriminate between genetically modified products (whose DNA has been altered through genetic engineering techniques) and non-genetically modified products in the food control and marketing sectors has grown.

Validated techniques

The study was part of Matheus Cicero Ribeiro's doctorate, supervised by Professor Bruno Marangoni in the Postgraduate Program in Materials Science at the Federal University of Mato

Grosso do Sul (UFMS). At Embrapa Instrumentation (SP), the experiments were supervised by the coordinator of the National Agrophotonics Laboratory (Lanaf), researcher Débora Milori.

"The main novelty of our research is the combination of the use of the LIBS technique, with multivariate analyses and machine learning, in which the elementary information of the samples was evaluated and used to build decision criteria that differentiate transgenic samples from non-transgenic samples", states Ribeiro.

According to him, the work showed that the combination of techniques can differentiate different varieties of genetically modified and conventional corn, if they have similar elemental

composition. "They have essential advantages, such as low cost, fast response, reasonable sensitivity and easy application," he adds.

The main challenge of the research involved identifying the constituents, elements such as carbon (C), nitrogen (N), magnesium (Mg), potassium (K), hydrogen (H), iron (Fe) and sodium (Na). Among these, carbon had the greatest influence in differentiating the transgenic class from the non-transgenic class of corn.
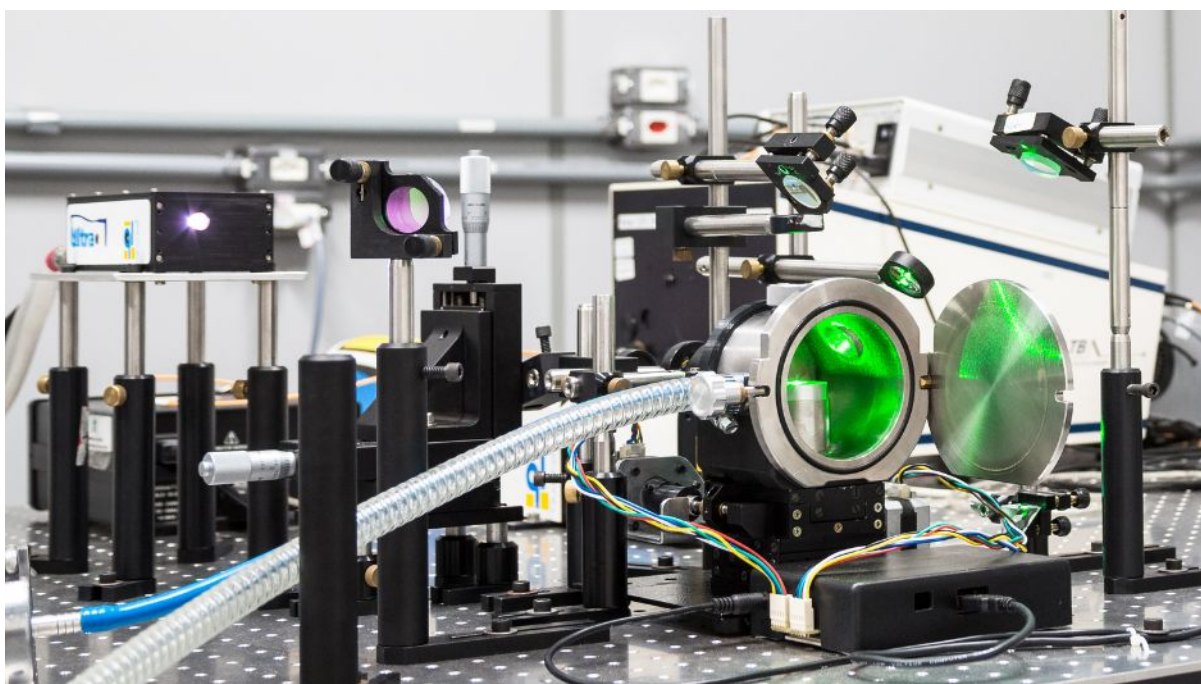
"Since the samples had very similar elemental composition, that is, they had the same elements, identifying specific markers for each class was a painstaking process that took a lot of analysis time. Therefore, it was necessary to combine multivariate analysis with machine learning, at which point the computer was able to identify markers that were capable of differentiating the samples in the

classification process," explained Ribeiro.

Another distinguishing feature of the study was that it evaluated a significant number of samples, 160 in total, from different transgenic and non-transgenic varieties of corn. The research involved six species of corn, four transgenic and two conventional. Ribeiro says that this is the first time that an external validation protocol has been tested for the classification of transgenic corn using Libs. "The external validation corroborated the robustness of the model," he reports.

direct impacts

"This method offers an effective solution for monitoring and traceability in the

agricultural sector, meeting regulatory and food safety requirements and ensuring compliance with national and international policies," reinforces Professor Bruno Marangoni, highlighting that the methodology identifies the origin of the sample in an agile and accessible way.

The technique can be used by food analysis laboratories, quality control centers, agri-food industries and regulatory bodies. But agricultural and biotechnology companies can also use the technology to monitor and certify the origin of their products. According to him, national and international health surveillance authorities can also apply it to inspect food products, ensuring consumer protection and compliance with current regulations.
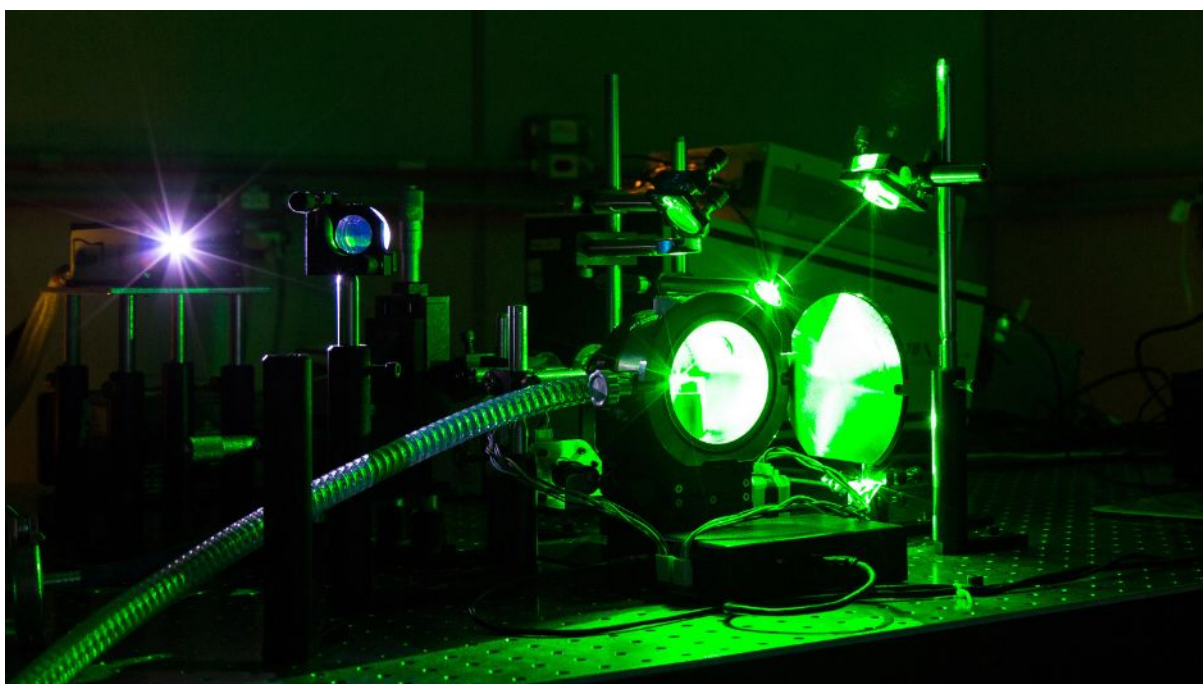
"With rapid testing of the origin of products, it would be possible to increase the number of items analyzed, resulting in greater safety and transparency in the market. This technology would also increase trust in the food supply chain, allowing consumers to make informed choices about what they buy and consume," says the professor.

Next steps: large-scale testing

The next step of the research aims to expand the database, including a greater number of samples from different locations to improve the machine learning algorithm, increasing its robustness and reliability.

"Next, it is important to explore ways to make the methodology more accessible and applicable on a large scale, such as the creation of portable devices for field testing. Standardizing the method is also essential, facilitating its validation and acceptance by different regulators and allowing it to be integrated into quality control and GMO certification processes," says Marangoni.

Corn at the top of GMOs

Corn is one of the most widespread and essential foods in the world, widely consumed by humans and animals. According to Ribeiro, corn is the crop that presents the greatest number of transgenic events among genetically modified crops.

This means that different genes are inserted into the plant's DNA to resist adverse effects that can compromise its growth and production. According to Embrapa, 90% of all corn grown in Brazil is transgenic.

Benefits of Libs

Milori, who has been working with the technique for about 20 years, says that in recent years laser-induced plasma emission spectroscopy (Libs) has attracted significant interest from the scientific community for its ability to quickly provide invaluable qualitative and quantitative information about the elemental composition of various materials.

"In addition, LIBS combined with chemometric and machine learning methods has significantly improved the performance in successful sample identification and discrimination," the researcher reports. She says that LIBS is a popular analytical technique that has found research and practical applications in several areas, including the agricultural sector. "The technique is also particularly attractive due to the availability of portable instruments that allow in situ and online LIBS analysis," she says.

The study "*Discrimination of transgenic and non-transgenic maize varieties by laser induced spectroscopy (Libs) and machine learning algorithms*", published by the Microchemical Journal, was supported by the National Council for

Scientific and Technological Development (CNPq), São Paulo Research Foundation (Fapesp), Minas Gerais Research Foundation (Fapemig) and the Coordination for the Improvement of Higher Education Personnel (Capes).

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Coffee rust can reduce production by up to 35%

Aldir Teixeira, CEO of Experimental Agrícola/illycaffè, highlights solutions to combat the problem

17.03.2025 | 16:46 (UTC -3)

Larissa Takahashi

Coffee plants can be affected by several diseases that have a significant impact on

production and the economy of producers, among these diseases it is worth highlighting coffee rust - *Hemileia vastatrix* (learn more by clicking here).

Coffee rust is caused by the fungus *Hemileia vastatrix* and is one of the most damaging diseases to coffee. It affects the leaves, causing spots and weakening the plant, which can lead to significant losses in production.

"Technically well-managed crops, with liming and adequate fertilization, generally withstand rust epidemics better. Paradoxically, however, productive crops are the ones most affected by the disease. The incidence of rust in productive plants, compared to plants whose loads have been removed, can be 100% to 200%

higher," explains Aldir Alves Teixeira, agronomist and CEO of Experimental Agrícola/illycaffè.

The climate also plays a role, as winters in coffee-producing regions have been warmer and, in some years, rainier, contributing to an increase in inoculum at the beginning of the crop cycle. Rust forms yellowish powdery spots on the underside of leaves after the formation of uredospores. The damaged leaves fall and weaken the plant, which is unable to form flower buds for the following harvest, accentuating the biennial production cycle of the crop. The disease can reduce production by an average of 35%.

Combining products from different chemical groups is not only effective, but

also helps prevent the pathogen from developing resistance. However, the pathogen's ability to produce large numbers of uredospores (each lesion can generate between 300 and 400 thousand active uredospores over approximately two months) and the genetic variability of *H. Vastatrix* increase the probability of breaking the resistance of cultivars and the development of pathogen populations resistant to fungicides applied to the crop. This is a constant challenge in disease management.

Since there are no fungicides available that are as efficient for controlling rust – such as mixtures of triazoles and strubulurins – one strategy could be to resume applications of copper fungicides, which also act as adjuvants in controlling other coffee diseases, such as cercospora leaf spot and halo spot. Since this is an endemic disease, it is important that chemical control be preventive and carried

out with a maximum level of 5% incidence of rust in the crop, monitored during the period favorable to the disease, continuing treatments whenever the disease approaches this level of infection.

"It is important that producers adopt appropriate control measures, such as constant monitoring of crops and the use of integrated pest and disease management practices. This way, it is possible to reduce the economic impacts caused by these diseases and ensure healthier and more sustainable production," he concludes.

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