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*Semanal*  
**Cultivar**®

# Soybean responds to dicamba drift

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# Sensors reveal how soybeans respond to dicamba drift

Study identifies specific spectral patterns in the canopy of herbicide-sensitive soybeans

17.07.2025 | 09:20 (UTC -3)

Cultivar Magazine



Photo: Aaron Hager

Researchers at the University of Illinois have demonstrated that dicamba drift, even at very low concentrations—1/10.000 of the recommended dose—alters the spectral response of soybean canopies. Their study analyzed these changes using multispectral sensors on unmanned aerial vehicles (UAVs). The results indicate that, starting eight days after exposure to the herbicide, indices such as "excess red" (ExR), "green leaf index" (GLI), and the "red-edge" (RE) channel already capture signs of injury.

The study used dicamba-intolerant soybean (variety CZ3750GTLL) as a sentinel crop to measure the extent and intensity of damage caused by herbicide drift. Leaf injury—characterized by wilting,

disproportionate growth, and marginal necrosis—was recorded in the field using a symptom scale and correlated with images obtained by RedEdge-MX Dual and Altum sensors in two consecutive growing seasons (2022 and 2023).

## **Drift simulations**

Drift simulations were performed with five sublethal rates of the herbicide dicamba diglycolamine, ranging from 1/10.000 to 1/300 of the recommended dose (0,056 to 1,87 g ae/ha). At all concentrations, sensitive plants showed morphological and spectral changes, with greatest severity at 29 days after application.

Cupping of the upper leaves reduced the exposed leaf area, revealing lower canopy tissues. This morphological reorganization of the canopy caused changes in light reflection, detected especially in the green, red-edge, and near-infrared (NIR) wavelengths.

The study revealed that the RE channel is the most sensitive for detecting dicamba drift injury. Based on spectral analyses, the researchers observed that the ExR, GLI, and GCC (green chromatic coordinate) indices showed correlations greater than 0,75 with visual damage scales.

## **Greater spectral response**

Among the three experimental areas, site F500 showed the greatest spectral response in the 2023 harvest. According to the authors, this behavior is due to water deficits, which delayed plant recovery. Rainfall during the period was below the 30-year average.

The experimental design was randomized blocks, with three replicates per treatment, and images were acquired at a height of 20 meters with 80% overlap. The data were processed with specialized software to generate high-resolution spectral orthomosaics (1,2 to 1,3 cm per pixel).

Statistical analyses included nonlinear regression and Pearson's correlation between spectral indices and damage symptoms. The four-parameter log-

inhibitor model allowed estimation of the relative spectral response (RSR) as a function of dicamba dose.

## **Non-vegetable background**

The experiment also highlighted the importance of considering the non-vegetative background (soil, straw) in field-scale spectral analysis. The use of multispectral sensors with separate channels, such as RE and NIR, allowed for greater precision in separating damaged canopy from healthy vegetation.

According to the researchers, the results prove that soybeans are sensitive to dicamba drift even at levels equivalent to

0,028 g ae/ha—or 1/20.000 of the recommended dose. Previous studies have shown that this concentration can occur through atmospheric deposition in areas kilometers from the original application.

Since the commercial introduction of dicamba-tolerant soybeans, reports of drift injury have increased. In the state of Illinois alone, the Department of Agriculture received 2.600 complaints between 2017 and 2022—1.500 directly related to dicamba.

## **Greater use**

Pressure for herbicide use intensified with the spread of glyphosate-resistant weeds

such as palmeri pigweed, horseweed, and ragweed. In 2018, 46% of Illinois' soybean acreage was planted with DT (dicamba-tolerant) varieties, and 36% of the crops received over-the-top (OTT) applications of dicamba. This represented more than 848 kilograms of the active ingredient sprayed in the state in just one season.

Although considered an essential tool in managing resistant weeds, dicamba is highly volatile: its vapor pressure is five times greater than that of glyphosate. This characteristic favors vapor drift, with the potential to reach neighboring crops days after application.

The authors suggest that satellite remote sensing platforms—such as Landsat 8/9 and Sentinel-2 A/B—can be used to detect

similar spectral patterns on a large scale. These satellites have visible, red-edge, and near-infrared channels, similar to those used by UAVs.

Integrating spectral data with machine learning algorithms can enable automatic mapping of affected areas, assisting regulators and producers in detecting and mitigating damage.

The study also indicates that the ExR index can distinguish vegetation from non-vegetation background, helping to identify damage with greater accuracy even in fields with partial soil cover.

Although soybeans were the focus of the research, the authors highlight that other crops are also sensitive to dicamba — including tomatoes, cucumbers,

watermelons, grapes, peaches, green beans, and pecans.

Further information at  
[doi.org/10.1002/ps.8954](https://doi.org/10.1002/ps.8954)

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# CNH and Petronas launch circular economy-based lubricant

Fleetpro Cycle uses Lwart re-refined oil and serves agricultural and construction machinery

17.07.2025 | 16:01 (UTC -3)

Cultivar Magazine, based on information from Renato Parisi Fonseca



CNH, in partnership with Petronas Lubricants International (PLI), has launched the Fleetpro Cycle line. The new product is intended for agricultural machinery from Case IH and New Holland, as well as construction equipment from CASE Construction Equipment and New Holland Construction.

According to the companies, the portfolio uses sustainable raw materials, with a focus on the circular economy. The formulation uses high-performance re-refined oil, produced by Lwart Soluções Ambientais. Lwart is a leader in the segment and the only manufacturer of GII base oil in Latin America.

The process begins with the collection of used oil from more than 500 CNH

dealerships in Brazil. After re-refining, the oil reaches a quality standard equal to that of first-refined oil. The technology reduces greenhouse gas emissions by 77%, according to Petronas.

Fleetpro Cycle is part of the Fleetpro line, designed for out-of-warranty machines. The parts and implements offer customers quality, warranty, and value.

Fernando Gaya, from CNH, emphasized that the launch reflects the company's strategy. According to him, the new product combines quality, innovation, and sustainability. "The initiative guarantees end-to-end performance and safety," he stated.

Luiz Eduardo de Silos Santos, Petronas's chief technology officer, emphasized the

importance of the partnership with Lwart. He emphasized that the new line maintains the high performance standards demanded by the industry, while maintaining environmental responsibility.

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# IBGE study highlights the role of pollination in agriculture

Pollinators contribute up to 25% of the value of production and are essential for the maintenance of ecosystems.

17.07.2025 | 14:28 (UTC -3)

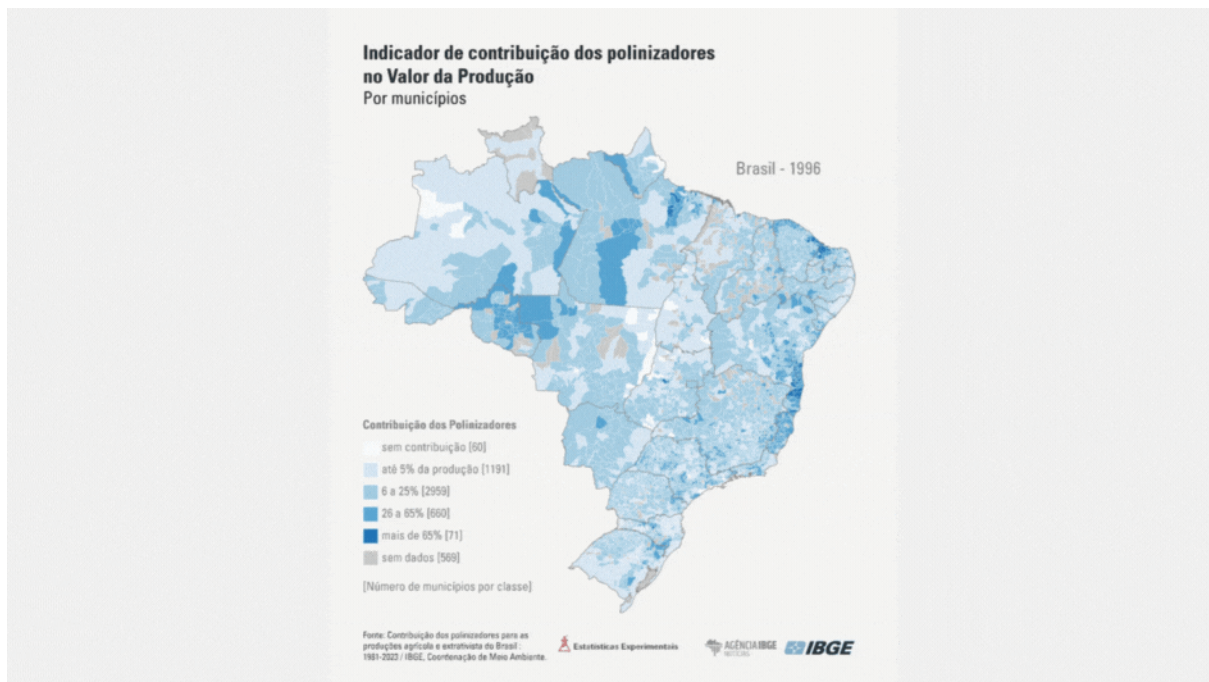
Igor Ferreira, Cultivar Magazine edition



The contribution of animal pollinators, such as bees, butterflies and bats, was

responsible for up to 25% of the value of Brazil's agricultural and extractive production in 2023, according to an experimental study released this Thursday (17/7) by the IBGE. The national average for the Pollinator Contribution to Production Value Indicator was 16,14%, an increase compared to the 14,4% recorded in 1996.

The survey analyzed 89 agricultural and plant extractive products, 48,3% of which depend to some degree on animal pollination. The influence is most significant in permanent crops, such as fruits, and in extractive activities.



According to the IBGE (Brazilian Institute of Geography and Statistics), temporary crops such as soybeans and cotton—which have a modest dependence—have a significant impact on production value due to their high harvest volume. Permanent crops, on the other hand, contributed an average of 38,7% to pollination in 2023. In extractive industries, the figure reached 47,2%, with açaí

standing out, especially in the North and Northeast regions.

The research also shows that more than half of the country's agricultural products depend on animal pollination, and that the number of municipalities whose production is influenced by this service has increased over the past few decades. Among permanent crops, 71,4% of products require some level of pollination, while among temporary crops, this proportion is 31,3%.

### **Soybeans show modest dependence**

The expansion of soybeans, the country's main crop, has altered the pattern of cropland use. In 2023, crops with modest pollinator dependence occupied 53,5% of the total area, compared to 43,8% for

# crops without pollinator dependence.



Analyst Leonardo Bergamini, who led the study, warns of the risks to maintaining this essential environmental service, citing threats such as habitat loss, pesticide use, disease, climate change, and invasive species. "Overcoming these challenges requires investment in research and strategies that ensure the continuity of this service," he states.

Among extractive products, more than 40% of the harvested volume in 2023 depends on pollinators. Products such as açai and babassu are among those that benefit most from the action of bees and other animals.

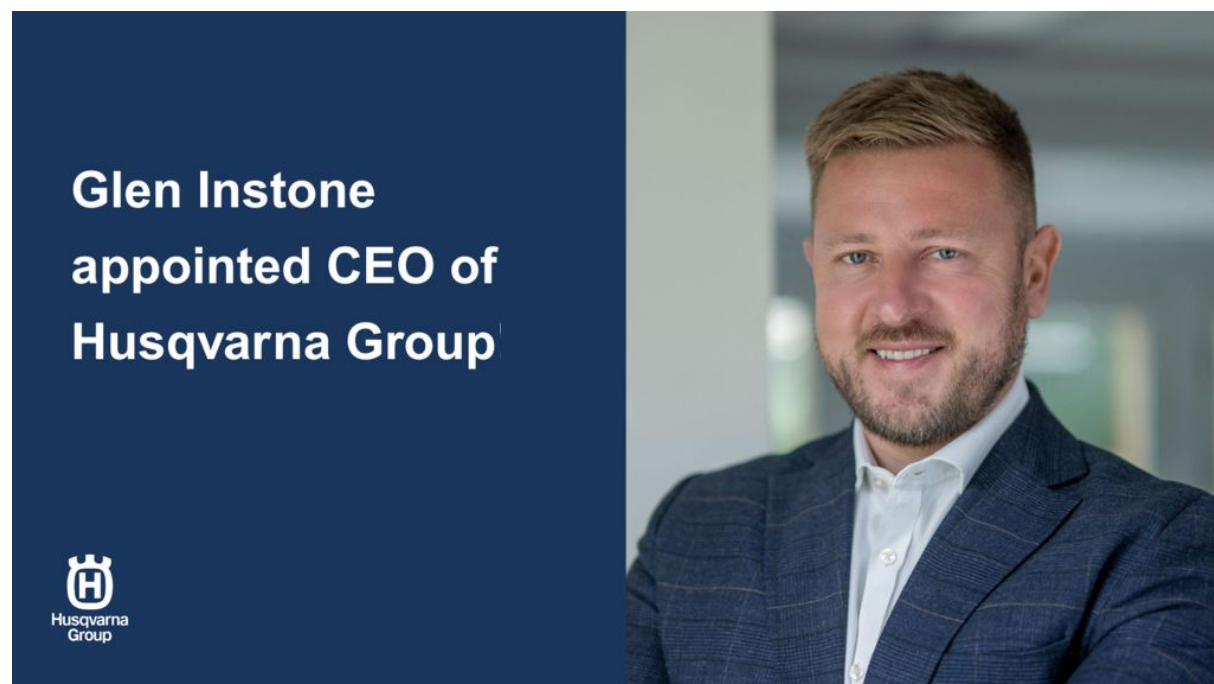
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# Husqvarna Announces New CEO: Glen Instone Takes Over in August

Current president of the forestry and gardening division replaces Pavel Hajman

17.07.2025 | 14:18 (UTC -3)

Cultivar Magazine, based on information from Henrik Sjöström



The Board of Directors of Husqvarna AB has appointed Glen Instone as the new

global CEO of the Husqvarna Group. The change in leadership will become official on August 11, 2025. Instone will replace Pavel Hajman, who will leave the company by the end of the year.

Instone currently serves as president of the Husqvarna Forest and Garden division. Joining the company since 2002, he has served as the group's CFO and led global sales and service.

According to Chairman Torbjörn Lööf, the appointment reflects Instone's in-depth knowledge of the business and his leadership capabilities. He also plays a central role in updating the company's strategy, which will be presented in December.

Instone stated that he intends to develop the team and continue transforming the industry, while maintaining a customer-focused approach. He is 48 years old, born in England, a certified management accountant (ACMA), and holds a degree in Accounting and Finance. He has been part of the group's management since 2018.

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# Chamber approves new rules for environmental licensing

Project creates Special Environmental License and reduces the power of agencies such as Funai and ICMBio

17.07.2025 | 09:02 (UTC -3)

Cultivar Magazine, based on information from Eduardo Piovesan and Tiago Miranda



Photo: Kayo Magalhães

The Chamber of Deputies approved a bill establishing new general rules for environmental licensing in Brazil. The bill, which now awaits presidential approval, includes 29 amendments from the Senate and creates simplified licensing modalities with shorter review periods.

Among the new features is the creation of the Special Environmental License (LAE), aimed at strategic projects defined every two years by the Government Council. Even projects with the potential to cause significant degradation will be eligible for this license, valid for up to 10 years. The analysis will be conducted in a single stage, with only one request for additional information possible.

The License by Adhesion and Commitment (LAC) was also approved, which waives the requirement for environmental impact studies. This modality will apply to small- and medium-sized activities with low or medium pollution potential. The entrepreneur must submit a technical report, and the environmental agency may conduct annual sample inspections.

Existing highways and transmission lines may be widened or expanded using the LAC. Maintenance work on existing infrastructure, including dredging in waterways, is also exempt from licensing.

The proposal reduces the influence of agencies such as Funai, Iphan, ICMBio, and the Ministry of Racial Equality in the

licensing process. These agencies have lost the power to determine when they should participate in the process. Their statements will only be valid if submitted within 30 days, extendable by up to 15 days, with justification.

The analysis of impacts on Indigenous lands will be limited to those already approved. According to the Socioenvironmental Institute (ISA), this excludes 259 lands in the process of demarcation, representing 32% of the total area.

In cases where an Environmental Impact Study (EIA) or Environmental Impact Report (RIMA) is required, the deadline for the agencies involved to respond will be 90 days, extendable for an additional 30 days.

Monitoring compliance with these conditions will be the responsibility of the consulted agency.

The text eliminates the need for ICMBio authorization for licensing that affects conservation units. For projects licensed by state agencies, Ibama will only need to report its fines. The licensing agency may cancel any fines.

The proposal allows for the automatic renewal of licenses for low- and medium-impact projects. All that's required is an online declaration from the developer, accompanied by a technical report. If the renewal request is submitted 120 days in advance, the license's validity will be extended until the authority makes a final decision.

In the Atlantic Forest legislation, the bill eliminates the requirement for state authorization to clear primary or advanced regeneration vegetation. It also eliminates the requirement for municipal authorization in cases of vegetation in a medium stage, provided the municipality has an environmental council.

The Chamber of Deputies removed a provision that required environmental agencies to submit a report on the human resources needed to comply with the new law. The Executive Branch will also not be required to respond to any reported shortages.

2159 / 2021 Bill

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# How six canola cultivars alter the fate of aphids

Study reveals that variety choice can speed up or slow down the reproduction of *Myzus persicae*

17.07.2025 | 07:26 (UTC -3)

Cultivar Magazine



*Myzus persicae* - Photo: S. Bauer

The silent battle between plants and insects has taken on new dimensions. Chinese researchers have demonstrated that six cultivars of *Brassica* — canola — directly influence the growth and fertility of green aphid (*Myzus persicae*). Some varieties stimulate insect reproduction. Others reduce its growth rate. The discovery could change pest control strategies in crops.

Three cultivars—Xinong 18, Aiyouku 999, and Aiganyou 558—function as biological greenhouses for aphids. They increase their longevity. They increase their reproduction rate. They increase the risk of infestation. Two others—Zhongshuang 11 and Mianxinyou 78—act in the opposite direction. They slow development. They reduce the number of offspring. They

reduce the potential for agricultural damage.

The study was conducted under controlled laboratory conditions. The temperature remained stable at 25 degrees Celsius. Humidity varied between 40% and 60%. The photoperiod was 14 hours of light, 10 hours of darkness. Each cultivar was evaluated for its impact on the aphid life cycle. The data were processed using life tables by age and stage, including males and females, although *Myzus persicae* reproduce by parthenogenesis.

The differences were striking. The cultivar AYK999, for example, produced aphids with the highest intrinsic growth rate (0,40) and the lowest population doubling time (1,75 days). MXY78, however, produced

the opposite effect: a growth rate of 0,23 and a doubling time of 3,04 days. The plants thus became biological promoters or inhibitors.

Behind these dynamics lie chemical compounds: glucosinolates and erucic acid. These substances vary among cultivars. AYK999 has a glucosinolate content of 28  $\mu\text{mol/g}$ . MXY78, 20  $\mu\text{mol/g}$ . Apparently, the lower the concentration, the greater the attractiveness to aphids.

The resistance or susceptibility of cultivars appears to follow a pattern: those with low glucosinolate content favor the insect.

Those with high glucosinolate content act as barriers. Zhongyou 821, the cultivar used as a control, has 113,5  $\mu\text{mol/g}$ —and exhibited intermediate performance.

*Myzus persicae* It infests more than 400 plant species. It transmits viruses. It extracts sap. It excretes substances that favor fungi. It is resistant to several insecticides. Its adaptability requires integrated approaches. And, as the study suggests, cultivar selection may be the first line of defense.

Further information at  
[doi.org/10.3390/insects16070726](https://doi.org/10.3390/insects16070726)

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# PhytoGen launches new cotton cultivars for 2026

PHY 357 W3FE and PHY 433 W3FE varieties promise superior performance

17.07.2025 | 07:05 (UTC -3)

Cultivar Magazine, based on information from Caroline Ahn



PhytoGen, Corteva Agriscience's cottonseed brand in the United States, announced two new Upland cultivars for the 2026 growing season. PHY 357 W3FE and PHY 433 W3FE were developed to deliver high yields and superior fiber quality. According to the company, the cultivars have demonstrated consistent performance from the American Southeast to West Texas.

According to Joel Faircloth, Corteva's portfolio leader, the new materials represent a breakthrough in yield potential, a crucial factor in the challenging market conditions. He stated that the cultivars offer broad adaptability and contribute to more stable production under different agronomic conditions.

The adaptability of the new cultivars allows them to be grown in a variety of soil types and irrigation regimes. This facilitates selection and management throughout the season. Yield stability helps producers better plan each season.

Faircloth emphasized that the breeding program's initial focus is yield. However, selecting for fiber quality also increases the market value of cotton and improves the competitiveness of American producers in the global textile industry.

PHY 357 W3FE is medium-tall and has an early to medium maturity. PHY 433 W3FE is medium-tall and has a medium maturity. Both varieties offer resistance to important pests such as root-knot nematodes, reniform nematodes, and bacterial wilt.

Faircloth stated that native nematode resistance has become essential due to the increasing population of these pests. Genetic protection against nematodes reduces losses and helps reduce soil infestations, benefiting future crops.

The new cultivars were evaluated in official variety trials (OVTs) conducted by universities. PHY 357 W3FE won the 2024 Mississippi State University trials, outperforming its closest competitor by 54 pounds per acre. PHY 433 W3FE achieved the longest fiber length in the test, at 1,22 inches.

According to Faircloth, the materials demonstrated outstanding performance in OVTs, generating significant interest from producers and consultants. Many called for

an early commercial launch.

Dan Gorman, Corteva's global cotton breeding leader, explained that the excitement surrounding the new varieties began during the development phase. The use of genomic tools and molecular markers allowed for faster selection and increased reliability.

The company also used winter nurseries for continuous evaluation, which accelerated the advancement of materials. According to Gorman, the cultivars are the first to fully benefit from these breeding methodologies.

In 2025, growers from the PhytoGen Horizon Network will grow the varieties in commercial trials, providing field data to the team before official release in 2026.

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# Mato Grosso hosts the AvAg 2025 Congress in August

The largest event in the sector in the country will feature exhibitions, practical flights and debates focusing on innovation, training and sustainability

16.07.2025 | 16:22 (UTC -3)

Sindag, Cultivar Magazine edition



Photo: Castor Becker Júnior

The countdown to the Brazilian Agricultural Aviation Congress (AvAg Congress) 2025 has begun. The event's official launch took place this Tuesday (July 15th) in Cuiabá, Mato Grosso, bringing together approximately 7 people, including authorities, businesspeople, agricultural leaders, and journalists. The meeting took place in the AMPA and Aprosoja auditoriums, marking the launch of the new edition of Latin America's largest agricultural aviation event, which will take place from August 6th to 19th at Santo Antônio de Leverger Executive Airport, approximately 21 kilometers from the capital of Mato Grosso.

With the theme "A Look to the Future," the AvAg 2025 Congress will feature an

extensive program, including technology showcases, flight demonstrations, hands-on activities, and the Agricultural Aviation Scientific Congress, which will feature papers from more than 10 Brazilian universities. Registration is free, with an invitation code available from exhibitors.

## **Agricultural aviation: innovation, productivity and protagonism**

During the launch, the president of the National Union of Agricultural Aviation Companies (Sindag), **Hoana Almeida Santos** (pictured above), highlighted the importance of agricultural aviation in increasing agricultural productivity and

boosting the sector's value. According to her, Mato Grosso leads the national rankings, with over 700 aircraft, almost double the fleet of Rio Grande do Sul, which is second.

"The fleet grew 7% last year, keeping pace with the growth of agribusiness. We still face misinformation and prejudice, but our role is to show that agricultural aviation is as essential as any other piece of equipment in the field," said Hoana.

She also highlighted the presence of major aircraft manufacturers and the participation of thousands of visitors expected at this edition, which will include a special talk with former player Neto Zampier, survivor of the Chapecoense plane crash.

# **Sector generates billions and expands use of technology**

Sindag's chief operating officer, Cláudio Júnior Oliveira, presented updated data on the sector. Brazil has the second-largest agricultural aircraft fleet in the world, with 2.722 aircraft, second only to the United States. In Mato Grosso alone, there are 749 aircraft in operation.

Agricultural aviation is expected to cover approximately 170 million hectares per harvest by 2025, generating over R\$10 billion in annual service provision by 2028. “Just five crops — soybeans, corn, sugarcane, cotton, and wheat — could suffer losses of up to R\$114 billion per

year without aerial application,” he stated.

Oliveira also mentioned the advancement of spraying drones, which doubled in number between 2023 and 2024, and the arrival of autonomous aircraft, such as models from the American company Pyka.

## **Authorities highlight the strategic importance of the sector**



Photo: Castor Becker Júnior

Mato Grosso's Lieutenant Governor, Otaviano Pivetta, classified agricultural aviation as a "strategic and fundamental activity for crop protection," highlighting the state's leading role in the activity. He criticized international attempts to discredit Brazilian agriculture and emphasized the role of technical education in the sector's modernization.

State Representative Ondanir Bortolini (Nininho) stated that agricultural aviation is key to the competitiveness of agriculture and criticized environmentalist rhetoric that seeks to restrict the activity. "If we didn't have agricultural aviation, our production wouldn't be as large-scale as it is," he said.

Representatives from Famato, Aprosoja/MT, the Ministry of Agriculture, Indea/MT and the City of Santo Antônio de Leverger also participated in the event, all highlighting the importance of the Congress for the institutional and technical strengthening of the activity.

**The program will feature practical**

# **demonstrations, emerging technologies and a scientific conference.**

Sindag's administrative coordinator, Marília Schüller, presented a preview of the program, which includes:

- Flight demonstrations with spraying and firefighting
- Technical lectures on engines, components and operational safety
- Institutional and scientific conferences
- Technology showcases focusing on nanotechnology and artificial intelligence

The Congress will also feature a meeting of the Association of Women in Agricultural Aviation (Amag) and a space for networking between companies, technicians, students and producers.

## **Event strengthens political articulation and combats disinformation**

In addition to showcasing innovations, the AvAg Congress will also host discussions on regulation, public policy, and professional training. One of the priorities, according to the Ministry of Agriculture, is supporting the training of new agricultural pilots, given the growing demand and high

training costs.

For Indea president Emanuele de Almeida, the event will also be essential for reviewing state legislation and aligning the sector's needs with government actions.

Santo Antônio de Leverger's deputy mayor, Giseli Paim, celebrated the event's positive impact on the local economy and reinforced the city's support for the next edition.

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# Fungicide resistance generates economic losses on a regional scale

Mathematical model reveals hidden cost of fungicide resistance in cultivated landscapes

16.07.2025 | 15:23 (UTC -3)

Cultivar Magazine



Photo: Wenderson Araujo

Plant disease epidemics cause significant losses to global agriculture. Producers resort to intensive use of fungicides to contain these outbreaks. However, chemical control produces barely visible side effects, including the selection and spread of resistant pathogen strains. Recent research quantified the economic cost of fungicide resistance considering entire agricultural landscapes—not just isolated fields.

The team of scientists combined an epidemiological mathematical model with a regional-scale economic analysis. The work shows that as fungicides lose effectiveness, producers face reduced economic returns—even if they maintain or increase the volume of applications.

Contrary to expectations, the economic returns from fungicide application on various farms do not follow a diminishing returns curve. The study identified patterns of accelerated or decelerated returns, with implications for public policy and management strategies.

## **A new paradigm for estimating invisible losses**

The analysis proposes a concept called the economic cost of resistance evolution. This is the difference between the ideal economic return in a landscape without resistance and that obtained when resistance is already widespread.

Estimating this cost depends on four main variables:

- fungicide price
- degree of pathogen resistance
- basic reproduction number of the disease ( $R_0$ )
- relative yield loss in diseased fields.

The researchers observed a counterintuitive behavior: the cost of resistance tends to decrease as fungicide prices increase. This occurs because expensive fungicides discourage extensive treatment and reduce selective pressure on pathogens.

Furthermore, the cost of resistance does not increase continuously with the

disease's ability to spread. Instead, the economic impact of resistance is greatest for pathogens with intermediate invasiveness.

## **The dilemma of large-scale applications**

One of the main results of the study indicates that, in agricultural regions composed of many fields cultivated with the same crop, optimal decisions at the property level can become detrimental on a regional scale.

Extensive fungicide use in isolated fields favors the selection of resistant strains, which spread to other areas. Thus, even producers who use little or no fungicides

suffer the consequences of regionalized resistance.

This phenomenon falls under the definition of a negative externality: the use of fungicides in certain areas imposes indirect costs on the entire agricultural community. These costs include loss of product effectiveness, increased infestations, the need for new products, and more expensive practices.

## **Three economic response regimes**

Based on the models used, the study identified three main response regimes to fungicide use:

- Cheap and effective fungicides: applying them to all fields can be economically advantageous. Resistance, if it emerges, strongly impacts economic returns.
- Expensive fungicides: Even without resistance, extensive application may not be cost-effective. In this scenario, resistance has little additional effect.
- Mid-priced fungicides: There is a critical point of ideal coverage. Above this point, the cost of resistance increases rapidly; below this point, the return decreases due to lack of control.

The model indicates that, in the absence of resistance, the net return from fungicide application increases with the area treated.

However, the introduction of resistance reverses this relationship in many cases.

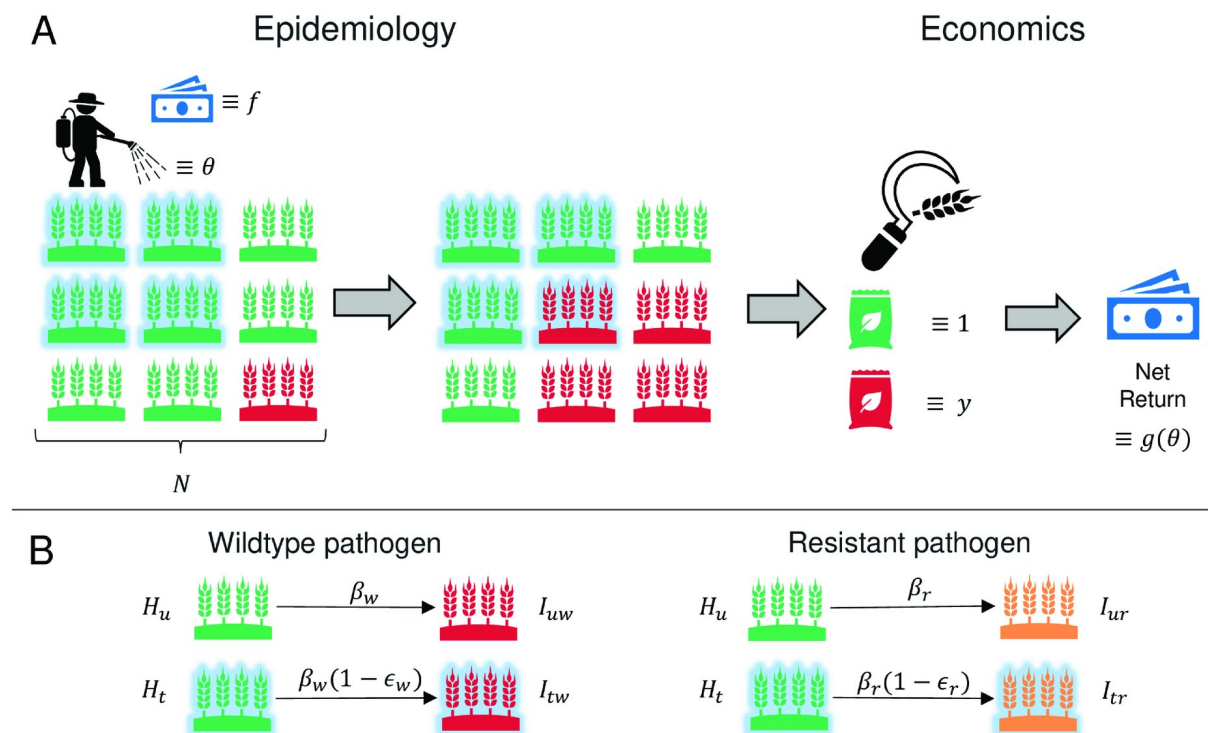
Based on this, the authors suggest that agricultural policies should consider subsidies, taxes, or incentives for crop rotation to slow down the selection of resistance.

## **A generalizable model**

The mathematical framework developed considers homogeneous crop fields and regional dispersion through natural vectors or human movement. Although simplified, the model serves as a basis for more specific analyses. It can be adjusted to consider cultivar variability, climate patterns, and differentiated management

systems.

As an example, the authors cite foliar diseases of cereals and legumes that are widely spread by spores, such as soybean target spot in Mato Grosso or wheat rust in the US grain belt.



[doi.org/10.1371/journal.pstr.0000178](https://doi.org/10.1371/journal.pstr.0000178)

# Perception versus reality: the Australian case

To contextualize the theoretical data, the authors cite a survey of 137 farmers in the Wheatbelt region of Australia. In the 2019/2020 crop year, these farmers spent an average of AU\$42 per hectare on barley fungicides. In contrast, they were willing to pay AU\$18 per hectare to delay or mitigate resistance. This willingness suggests a partial perception of the true cost of resistance, which can be much higher depending on the variables involved.

On a larger scale, the economic impact of pesticide resistance in the United States has been estimated at \$2,5 billion per year, adjusting for inflation. Herbicide resistance, such as that identified in *Alopecurus myosuroides* in the UK, it can double weed management costs.

## Implications for public policy

By providing a robust method for estimating the cost of resistance, the study enables the creation of more realistic, evidence-based policies. Possible proposals include:

- Variable taxation of fungicides, proportional to the risk of resistance;

- Subsidies for sustainable practices, such as crop rotation or integrated use of biological control;
- Genetic monitoring of pathogens to detect resistant variants early.

The sustainability of chemical control depends on cooperation between producers, technicians, and policymakers. Research shows that ignoring the cost of resistance compromises the economic viability of the entire production system in the medium term.

## **Resistance cost is not constant**

Another relevant finding of the study concerns the behavior of the cost of

resistance over time and price variations. When the fungicide is cheap, the cost of resistance tends to remain stable, even with price increases.

However, there's a tipping point. With mid-priced fungicides, resistance causes a sharp drop in returns. When the product becomes too expensive, resistance no longer impacts the bottom line, as growers simply abandon application.

This pattern suggests that preventive measures are more effective and viable when fungicide use is still economically advantageous. Once fungicides become ineffective, control alternatives become more expensive and less predictable.

Further information at  
[doi.org/10.1371/journal.pstr.0000178](https://doi.org/10.1371/journal.pstr.0000178)

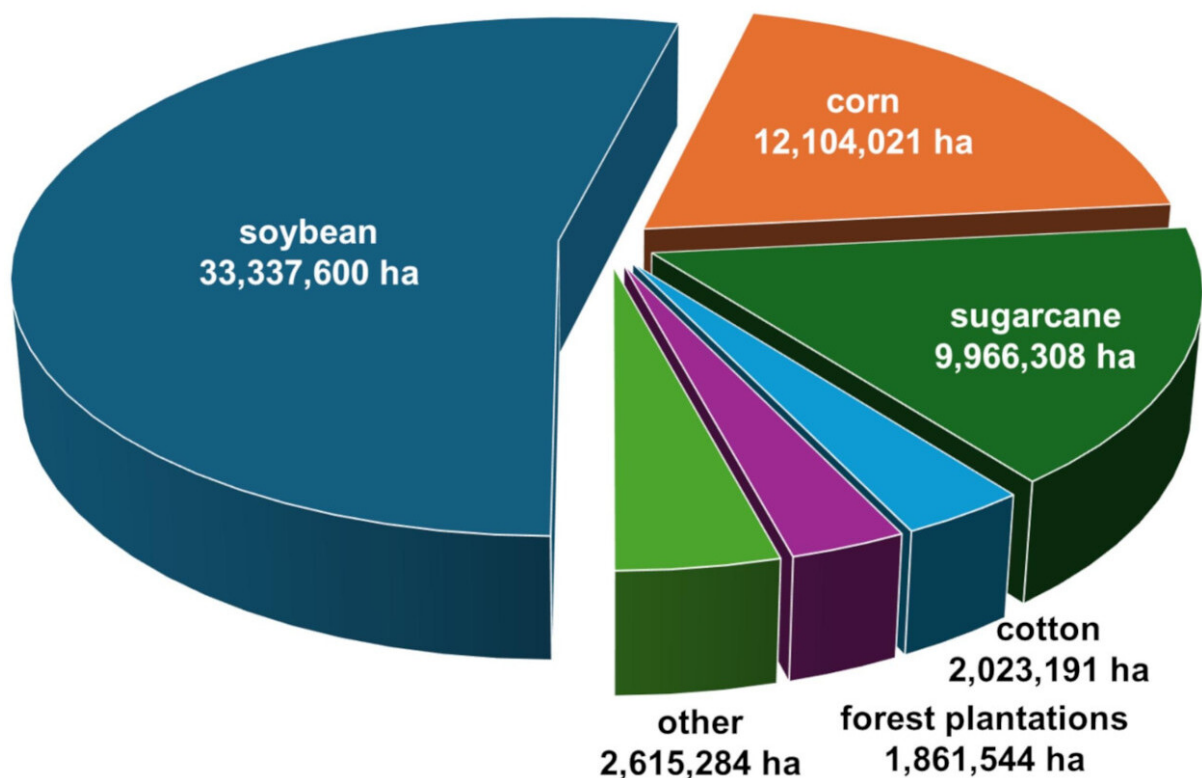
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# Latin America leads biological control in open-air crops

Study indicates use of technology on more than 62 million hectares treated in 2024

16.07.2025 | 14:10 (UTC -3)

Cultivar Magazine



In 2024, Latin America and the Caribbean registered the largest area under biological control in the world, with over 62 million hectares treated. Most applications occur in open-air crops and primarily use microbial agents. This advance represents double the area estimated in 2018.

This scenario was the subject of study by researchers Vanda Bueno (Federal University of Lavras), Joop C. van Lenteren (Wageningen University) and Wagner Bettioli (Embrapa Environment).

The growth in the use of biological control over the past 30 years has been driven by several factors. The production of microbial agents has proven to be cheaper and more reliable. Changes in regulatory processes, such as the simplification and

speed of approval of biological products, have also contributed. In Brazil, the average time for approval of these products by administrative authorities is two years; in Europe, it takes more than ten.

Furthermore, a new generation of farmers is more willing to embrace alternatives to synthetic pesticides than their predecessors.

Brazil leads the use of biological control, with over 56 million hectares treated, followed by Cuba, Bolivia, Mexico, and Peru. In proportion to agricultural area, the largest users are Cuba, Trinidad and Tobago, Brazil, Bolivia, and the Dominican Republic.

Biological control applications are concentrated in soybean, corn, sugarcane, and cotton crops, which account for over 96% of the total treated area.

Further information at  
[doi.org/10.1016/j.biocontrol.2025.105827](https://doi.org/10.1016/j.biocontrol.2025.105827)

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# Bayer extends CEO Bill Anderson's contract through 2029

He leads restructuring with a focus on innovation, cost cutting and profitability.

16.07.2025 | 13:19 (UTC -3)

Cultivar Magazine, based on information from Christian Hartel



The Supervisory Board of Bayer AG has decided to extend CEO Bill Anderson's contract until March 31, 2029. His previous contract was due to expire in 2026.

Anderson took over the company in June 2023.

The decision comes amid a broad restructuring. Bayer is implementing measures to strengthen its pharmaceutical pipeline, increase the profitability of its agricultural division, reduce debt, contain legal risks in the United States, and simplify its organizational structure.

"The company is already showing clear results, but there's still a lot of work to be done," said Norbert Winkeljohann, Chairman of the Supervisory Board. He said Anderson is leading a recovery

program that's crucial for Bayer's future.

In the pharmaceutical sector, the company launched new products with strong growth. In the agricultural segment, it initiated actions within a five-year plan to improve profit margins. Bayer also advanced with the "[Dynamic Shared Ownership](#)", which seeks to eliminate bureaucracy and speed up decisions by transferring power to teams close to customers.

Since adopting the new model, Bayer has reportedly cut management positions in half and reduced approximately 11 jobs. The company is approaching its goal of saving €2 billion by 2026. Debt has also fallen.

On the legal front, Bayer is executing a multi-pronged strategy to reduce risks

arising from legal disputes involving glyphosate in the United States.

Anderson believes Bayer is progressing well despite the challenges. "Our team has the right focus and plan to transform Bayer into the most agile, innovative, and lean life sciences company," he said.

A chemical engineer, Anderson began his career in 1989. He worked at companies such as Biogen, Genentech, and Roche, where he was CEO of the pharmaceutical division before joining Bayer.

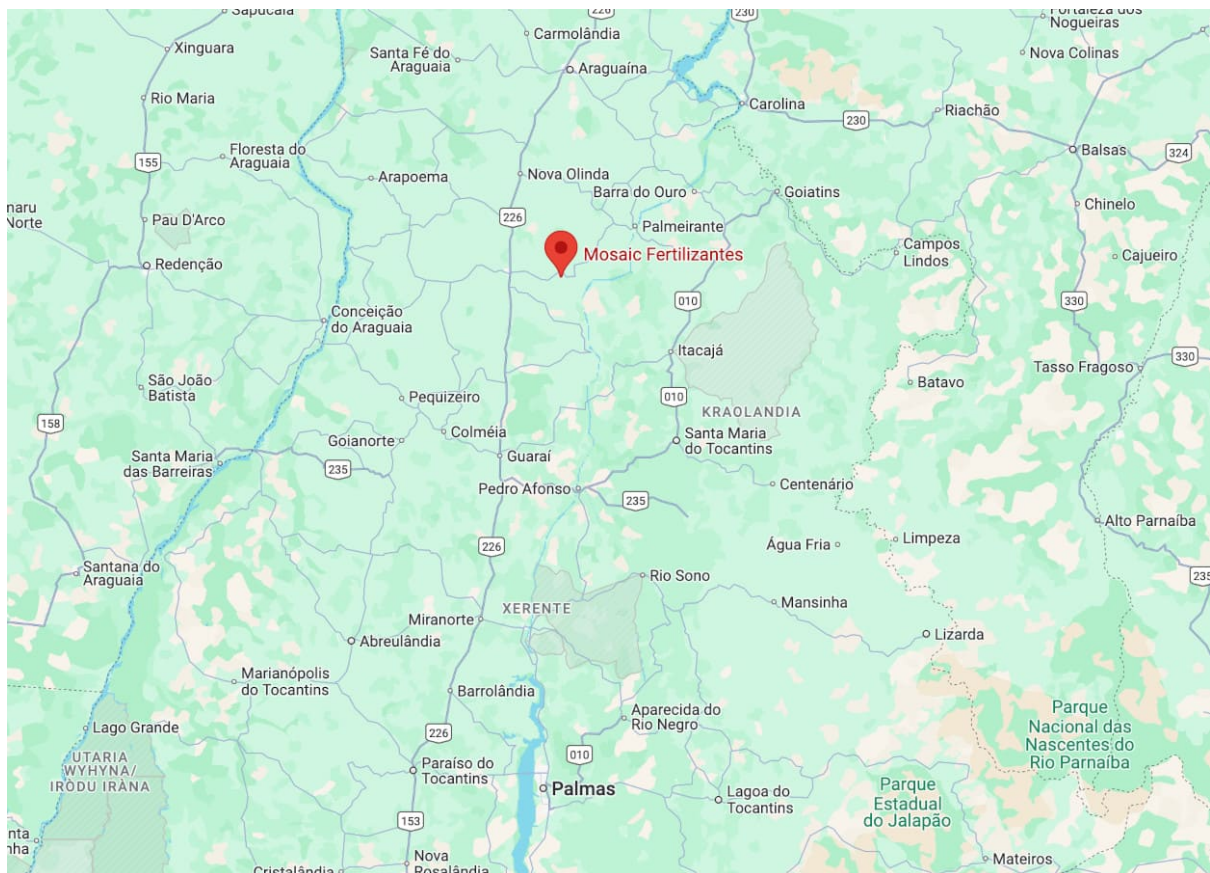
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# Mosaic opens new fertilizer plant in Palmeirante

Unit expands blending capacity and strengthens the company's presence in northern Brazil

16.07.2025 | 07:53 (UTC -3)

Cultivar Magazine, based on information from Jason Tremblay



Mosaic Company begins operations this month at its new fertilizer blending, storage, and distribution facility in Palmeirante, Tocantins. The inauguration will take place today (16) in the presence of local authorities and Mosaic's executive vice president, Jenny Wang.

With an annual capacity to process 1 million tons of fertilizers, the new unit is expected to process around 500 tons by 2025. The project expands the company's presence in the north of the country and strengthens its growth strategy in the Matopiba region – an agricultural frontier comprising areas of Maranhão, Tocantins, Piauí, and Bahia.

The plant received an investment of US\$84 million. According to the company,

the project was delivered on time and within budget. The expected margin is US\$30 to US\$40 per ton, with an internal rate of return exceeding 20%.



Photo: Rafael F. Photography

The facility includes warehouses, automated mixing and bagging systems, and a direct rail link to the port of Itaqui, Maranhão. This logistical connection aims to reduce operating costs and ensure quality control with cutting-edge

technology.

Mosaic's projection is to increase distribution sales in Brazil, from less than 8 million tons in 2024 to up to 14 million by the end of the decade.

"With the new unit, we're taking an important step toward making Tocantins an even stronger and more competitive hub within the national agribusiness sector. This modern structure allows us to be closer to producers, offering technological solutions and a high level of service. Furthermore, we reaffirm our commitment to local socioeconomic development, generating jobs, income, and opportunities in the region.

Palmeirante is an important milestone for us, aligned with the company's long-term strategy," says Eduardo Monteiro, Country

Manager at Mosaic.

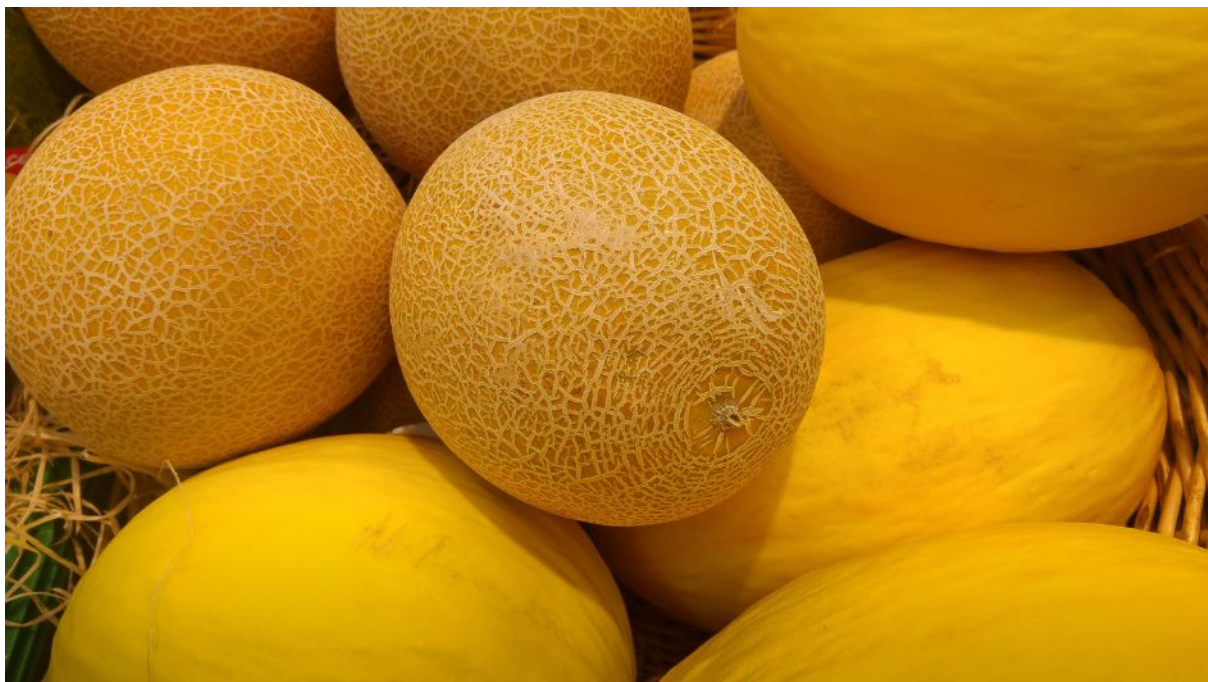
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# Volume of fruit exported by Brazil increases 27,1% in 2025

Melons, bananas, and grapes are among the highlights; the sector faces challenges and targets new markets abroad

15.07.2025 | 16:18 (UTC -3)

Telma Tuesdays



Brazilian fruit exports closed the first half of 2025 with positive results. According to

data from the Brazilian Association of Fruit and Derivative Producers and Exporters (Abrafrutas), based on the AgroStat/Mapa platform, the country exported more than 546 tons of fresh and processed fruit, with revenue of US\$583 million, representing an increase of 27,17% in volume and 12,58% in value compared to the same period in 2024.

Among the most exported fruits, melons lead the way with over 118 tons, registering a 19,74% increase in volume compared to the same period last year. Next come lemons, with around 107 tons, and mangoes, with almost 88 tons.

Next, watermelon stands out, with approximately 74 tons and a significant increase of 75,93% in volume. Bananas

performed consistently, with 43 tons exported, a 97,27% increase in volume and 80,74% in value, totaling US\$15,7 million exported during the period.

Papaya, with 27,4 thousand tons; avocado, with 19,5 thousand tons, which despite an 11,17% drop in volume, reached 38,3 million dollars in exports; and apples, with 13,1 thousand tons, which grew 42,17% in volume and 60% in value.

Grapes also gained prominence, with 10,3 thousand tons exported, an increase of 106% in volume and 77,48% in value, totaling 26,5 million dollars.

"Our performance in the first half of the year is the result of the tireless work of our producers and exporters, who face logistical, climatic, and political challenges

and still manage to maintain Brazil as a global leader in tropical fruits. Thanks to them, we all reap the rewards of the country's development," emphasizes Abrafrutas president Guilherme Coelho.

Despite the positive results, the sector still faces challenges, such as the threat of new trade barriers. Among these is the potential imposition of taxes on Brazilian agricultural products by the Trump administration in the United States. Given this scenario, the strategy will be to further diversify markets and strengthen trade relations with other countries.

Since 2023, Brazil has gained access to seven new markets for fruits such as avocados, papayas, citrus fruits, and grapes, including strategic countries such

as Chile, India, Japan, Costa Rica, and China. The country is also negotiating to open other markets.

According to the Association's president, the organization's mission is to defend the sector's interests, provide technical support to producers, and promote Brazilian fruit abroad. "Despite growing challenges, we remain steadfast, focusing on innovation, sustainability, and commercial openness. Our fruit industry is a source of national pride," concludes Guilherme Coelho.

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# Fendt announces support for the Sou de Algodão movement

Adhesion is in line with the global strategy of helping farmers who already adopt responsible practices in the field

15.07.2025 | 15:46 (UTC -3)

Beatriz Voltani



Once again, Fendt, a German manufacturer of agricultural machinery and

implements owned by the multinational AGCO, announces its support for the Sou de Algodão (I'm Cotton) movement, an initiative led by the Brazilian Cotton Producers Association (Abrapa), which promotes the conscious consumption of Brazilian cotton. The partnership reinforces the brand's commitment to sustainable practices and the strengthening of responsible production in the field.

Fendt's support for the movement is aligned with the brand's global sustainability strategy and its operations in Brazil, particularly in cotton farming. With high-powered tractors and precision planters, Fendt contributes to more efficient agriculture, with a lower environmental impact and better use of resources.

"Sustainability starts at the foundation of production. Cotton farmers are doing an incredible job of ensuring traceability and connecting the field with the fashion world, with the ultimate goal of increasing the value of cotton fiber. We are very proud to value Brazilian fiber and support farmers who already adopt responsible practices with this systemic vision, working on several important fronts," says Rafael Antonio Costa (pictured above), commercial director of Fendt in Brazil.

According to Abrapa, the 2024/25 harvest is expected to produce 3,96 million tons of cotton lint, a 7,1% increase compared to the previous cycle. Planted area is also expected to increase 10,2%, reaching 2,14 million hectares. Brazil remains one of the world's leading exporters of the fiber, with

over 80% of its national production certified for good socio-environmental practices.



Present in important production centers such as Bahia, Mato Grosso, and Goiás, Fendt works directly in planting operations—a fundamental step in ensuring quality and traceability in production and offering high-performance solutions for the field.

High-performance, fuel-efficient tractors, such as the Fendt 700 Vario Gen7 series, are equipped with the AGCO Power Core 75 engine with 283 hp of nominal power. With Dynamic Performance—available in the 265 and 283 hp versions—it can deliver up to 20 hp for auxiliary workloads, reaching a maximum power of 303 hp. The Fendt 900 Vario Gen7 series tractors combine the robustness of the six-cylinder MAN engine with the Fendt iD concept, which delivers high torque at low rpm, providing smooth operation with maximum performance and minimum fuel consumption. The tractor features an exclusive self-cleaning air filter system, which, combined with the reversible impeller system for cleaning the front grille, results in fewer maintenance downtimes

and greater operational efficiency. The Fendt Vario 1000 G3 tractors adapt to the different power requirements of a wide range of operations, including soil preparation and cotton planting. High-tech precision agriculture is provided through the FendtONE platform, which includes customizable controls and screens for efficiency and simplicity in operation.

And the Fendt Momentum planters with 18 to 40 rows, which, through exclusive technologies, contribute to operational efficiency and crop productivity. The equipment plants on flat areas and uneven terrain or contour lines, ensuring seed is always deposited at the same depth. To achieve this, the Fendt Smart Frame maintains comb pressure with a 40° angle provided by Wing Flex.

For 18- to 24-row models, the Weight Transfer system, which distributes the machine's central weight to the side modules, increases emergence by 7%. Furthermore, Delta Force's individual control of the planting rows improves furrow construction and makes up to five adjustments in one second. When folded, the planter reaches 3,6 m in working order, the smallest transport width in its category, without the need to disassemble any components. "Our goal is to deliver solutions that increase productivity while maintaining environmental responsibility. Supporting Sou de Algodão strengthens this purpose and expands our connection with producers who are transforming Brazilian agriculture," reinforces Costa.

"In cotton farming, we look for equipment that combines robustness, precision, and technology. In the case of planters, uniform seed distribution is essential to ensure a well-formed crop. Tractors, on the other hand, need to offer power, fuel efficiency, and compatibility with precision agriculture systems. These attributes make all the difference in productivity and the sustainability of field operations. Fendt equipment can serve the sector with excellence in cotton crops." Gustavo Piccoli, President of Abrapa.

The Responsible Brazilian Cotton (ABR) program, implemented by Abrapa, works in tandem with Better Cotton and certifies farms that adopt good socio-environmental practices, following 195 rigorous criteria. Furthermore, the Abrapa Identification

System (SAI) ensures the traceability of each bale of cotton produced in the country, strengthening the transparency and reliability of national production.

The Sou de Algodão movement unites strategic links in the production chain—from farmers to the textile industry, including retailers and end consumers—with a focus on promoting sustainable fashion and domestic production. Fendt's support helps expand the reach of this cause, demonstrating that innovation and sustainability go hand in hand in agribusiness.

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# Drones advance in agricultural spraying in Brazil

Equipment now allows for spraying over 100 hectares per day and attracts farmers and service providers

15.07.2025 | 14:39 (UTC -3)

Lebna Landgraf, Cultivar Magazine edition



Photo: Rafael Soares

Increasingly present in Brazilian farms, agricultural drones are establishing themselves as an efficient alternative for farmers and service providers. With technical advancements and higher-capacity models, drone spraying can cover more than 100 hectares per day with just one piece of equipment.

The growing adoption of technology is the subject of Embrapa Soja's new Document 474, entitled *"Use of agricultural drones in Brazil: from research to practice"*. Signed by Embrapa researcher Rafael Moreira Soares and businessman Eugênio Passos Schröder, the material will be launched at the Brazilian Soybean and Mercosoja Congress 2025, which takes place from July 21 to 24, in Campinas (SP).

The publication brings together information on regulations, operations, research results, and practical examples of their use in different crops. According to Soares, drones represent an intermediate technology between ground-based sprayers and agricultural aircraft. "A careful analysis before adoption is essential to ensure real benefits for agricultural activity," he emphasizes.

Highlighted advantages include eliminating soil compaction, reducing water consumption, ensuring application traceability, and reducing operator exposure to chemicals. The technology is still undergoing improvements, particularly the growing adoption of rotary nozzles, which offer greater uniformity in droplet

formation and help reduce drift.

# Regulatory and technical aspects



Photo: Rafael Soares

The operation of agricultural drones involves specific regulations. Equipment must be approved by Anatel and registered with the National Civil Aviation Agency (ANAC), in addition to following

the rules of the Department of Airspace Control (DECEA) and the Ministry of Agriculture and Livestock (MAPA) in the case of applying inputs.

Soares emphasizes the importance of complying with all applicable legislation. "It's crucial to ensure operational safety and avoid problems with regulatory agencies," he states.

## **Drone as an investment or service**



With the arrival of drones with tanks of 40 liters or more starting in 2022, the technology's economic viability has increased. According to Soares, farmers can adapt existing structures, such as vehicles and mixers, to operate the equipment at a lower initial cost.

For service providers, the total investment is higher. Schröder estimates that the cost of starting a drone spraying business can

be up to three times the cost of the equipment, including accessories, transportation, infrastructure, and working capital. "Technical and financial planning is necessary to ensure the viability of the business," he warns.

The cost of drone application varies between R\$100 and R\$400 per hectare, depending on factors such as relief, distance, type of product and complexity of the operation.

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# John Deere has a change in global product marketing

Greta Griffante takes over as global grain harvest manager after 12 years with the company.

15.07.2025 | 14:10 (UTC -3)

Cultivar Magazine



## Greta Griffante has been appointed Global Product Marketing Manager – Grain

Harvesting at John Deere. With over 12 years of experience at the company, she will now lead global marketing strategies for the brand's grain harvesting solutions.

Prior to her new position, Greta served as product marketing manager for Latin America in the same division. During this time, she led the launch of new technologies in the region and contributed to the definition of value propositions, aligning the company's solutions with the needs of producers and dealers.

Greta graduated in agricultural engineering from the Federal University of Lavras and holds an MBA in Strategic and Economic Business Management from the Getulio Vargas Foundation. She also has additional training in manufacturing and quality from Fahor – Faculdade

Horizontina.

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# Argentine producers can join the SMR to sell grapes without quarantine

Registration for Senasa's Risk Mitigation System is open until August 15th

15.07.2025 | 10:55 (UTC -3)

Cultivar Magazine



Lobesia botrana - Photo: Andrea Lucchi

Between July 15 and August 15, table grape producers in the Argentine provinces of Mendoza and San Juan can register with the Risk Mitigation System (SMR) of the National Service for Agri-Food Health and Quality (Senasa).

Participation allows them to sell their fruit domestically and export to Brazil without applying the quarantine treatment with methyl bromide against *Lobesia botrana*.

Registration is available through the SIGTrámites platform, available on the ARCA website. Producers must subscribe to the corresponding service. If you have any questions, you can seek guidance from your nearest Senasa office.

# Requirements for membership

The SMR was approved by Senasa Resolution No. 373/2025. Annex II of the regulation details the mandatory criteria. Establishments must install, at their own expense, complete traps with authorized sexual attractants for the pest.

Mandatory phytosanitary measures must also be implemented, such as the sexual confusion technique and the use of active ingredients registered with Senasa. The use of these inputs must comply with the regulatory framework, crop, environmental conditions, and flight alerts issued by the agency.

During harvest, producers must perform sanitary pruning and ensure that no fruit or plant material remains remain on the soil or plant. This residue must be immobilized or destroyed on the farm.

Another requirement is the completion and constant updating of the Phytosanitary Measures Registration Booklet, in accordance with the guidelines of current regulations.

If the property is located in an area where, in the last two years, the pest has not been captured in the Official Monitoring Network, the use of chemicals or the sexual confusion technique will not be mandatory.

Senasa will oversee the installation of the traps and compliance with the required actions. The entity will also conduct periodic monitoring.

## **Additional requirements for export to Brazil**

To export fresh grapes to the Brazilian market, producers must also meet the requirements of Mercosur/GMC Resolution No. 22/19. The regulation establishes additional criteria related to other pests: *Brevipalpus chilensis*, *Brevipalpus lewisi*, *Cenopalpus pulcher* e *Drepanothrips reuteri*.

These requirements are listed in item II.19.B of product category 3. Even with adherence to the SMR, the exporter must comply with these requirements for Brazil to accept the entry of the fruit without phytosanitary restrictions.

## **Domestic destinations with mandatory quarantine**

The use of methyl bromide treatment remains mandatory in specific cases. Fresh grapes grown in areas with the presence of *Lobesia botrana* must go through the procedure if it is destined for Patagonia (Neuquén, Río Negro, Chubut, Santa Cruz and Tierra del Fuego) or the

Argentine Northwest (Jujuy, Salta, Tucumán and Catamarca).

These regions maintain protected phytosanitary status and, therefore, require quarantine treatment even if the establishment is qualified in the SMR.

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# Glyphosate resistance reshapes the herbicide market in Brazil

Between 2010 and 2020, sales of active ingredients almost doubled

15.07.2025 | 10:12 (UTC -3)

Cultivar Magazine



Image: Embrapa

Brazil more than doubled its sales of herbicide active ingredients between 2010 and 2020, increasing from 157,5 tons to 329,7 tons. This 128% growth far exceeds the expansion of agricultural land during the same period. The main reason: the proliferation of glyphosate-resistant weeds, such as *Amaranthus* spp., *Conyza* spp., *Digitaria insularis* e *Eleusine indica*. This information is contained in a study by researchers from Embrapa Meio Ambiente and the University of Rio Verde.

The advancement of these species forced the adoption of new active ingredients, which became indispensable to complement or replace the glyphosate. The most emblematic case is that of clethodim. Its sales grew 2672% in the period.

Haloxypop-p-methyl saw an increase of

897%. Both are post-emergent graminicides. They are applied to areas infested with *Digitaria insularis*, one of the most problematic species since 2015.

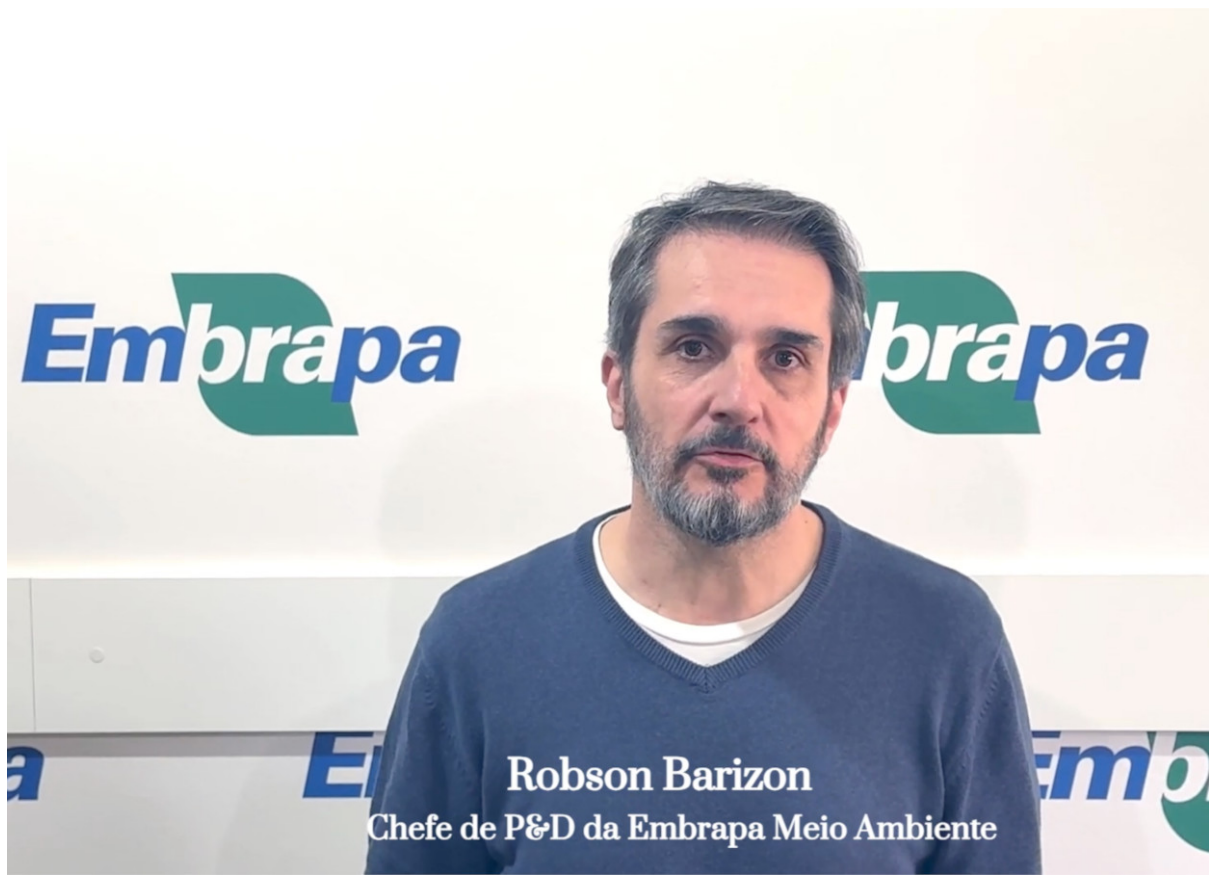
Triclopyr and 2,4-D also soared. They are herbicides of the synthetic auxin class, efficient in controlling *Conyza* resistant spp. Triclopyr increased by 953%; 2,4-D, by 234%. The increase is concentrated in areas with mixed infestation, where auxin resistance also emerges. Triclopyr has been used as an alternative for biotypes with rapid necrosis caused by 2,4-D, an effect that reduces its efficacy.

Flumioxazin and diclosulam, herbicides with residual action, have returned to the table in production systems. Both act on the pre-emergent stage of soybeans.

Sales of diclosulam increased 561%; those of flumioxazin, 531%. Use intensified as a strategy to prevent weed emergence.

*Amaranthus* spp. and other glyphosate-resistant species, especially in no-till farming.

The herbicide glufosinate saw a 290% increase in use, driven by three main factors: (a) an increase in the area infested with resistant weeds; (b) the entry into the market of genetically modified cultivars tolerant to the molecule; (c) and the ban on the use of paraquat. Glufosinate acts by contact, with a broad spectrum of action and no residual effect on the soil—similar to those of paraquat, which was banned from the Brazilian market at the end of the decade.



Glyphosate sales volume also grew: 106% during the period. However, its relative share of total herbicide sales fell from 64% to 58%. This data shows that diversifying active ingredients has become common practice in crops. The selection pressure caused by more than two decades of intensive glyphosate use has resulted in a

new paradigm in chemical weed management.

The industry's response was swift. The availability of products formulated with key ingredients increased significantly. The number of clethodim formulations increased from 2 to 14; haloxyfop-p-methyl, from 1 to 9; glufosinate, from 1 to 9; triclopyr, from 4 to 20; and 2,4-D, from 27 to 55.

This increased supply may have contributed to the price reduction.

According to the study, a liter of clethodim, for example, cost R\$51 in 2010 in Paraná. In 2020, the price dropped to R\$8,45.

Haloxyfop-p-methyl fell from R\$32 to R\$9,92 in the same period, according to data from São Paulo. This reduction in

prices increased producers' access to chemical alternatives.

The environmental classification of herbicides sold between 2010 and 2020 remained stable. No Class IV (negligible environmental risk) products were marketed. Most remained in Class III (moderate risk), with a small percentage variation. No herbicides were recorded as extremely or highly toxic to human health according to the World Health Organization.

The spread of *Conyza* spp., *Amaranthus* spp., *Digitaria insularis*, *Eleusine indica* and the emergence of volunteer RR corn complicated chemical control. Glyphosate-resistant GM corn escaped from harvesters, invaded subsequent soybean

crops, and required specific control with post-emergence graminicides.

The no-till system and the reduced labor supply also put pressure on herbicide use. Mechanical use became less viable.

Agricultural acreage grew only 24% during the period, while soybean acreage grew 59%. Herbicide sales surpassed both, indicating an increase in the volume applied per hectare.

The study was written by: Sergio de Oliveira Procópio, Robson Rolland Monticelli Barizon, Ricardo Antônio Almeida Pazianotto, Marcelo Augusto Boechat Morandi and Guilherme Braga Pereira Braz.

Further information at  
[doi.org/10.3390/agriculture14122315](https://doi.org/10.3390/agriculture14122315)

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# Producing more and polluting less is the challenge until 2034, says FAO

Projections indicate the need to increase productivity with less climate impact

15.07.2025 | 07:48 (UTC -3)



Food and Agriculture  
Organization of the  
United Nations

## OECD-FAO Agricultural Outlook 2025-2034

Global food production will need to grow more efficiently to address two simultaneous challenges: combating undernutrition and reducing greenhouse gas emissions. This is according to the

new Agricultural Outlook 2025-2034 report, published by the Food and Agriculture Organization of the United Nations (FAO) and the Organization for Economic Cooperation and Development (OECD).

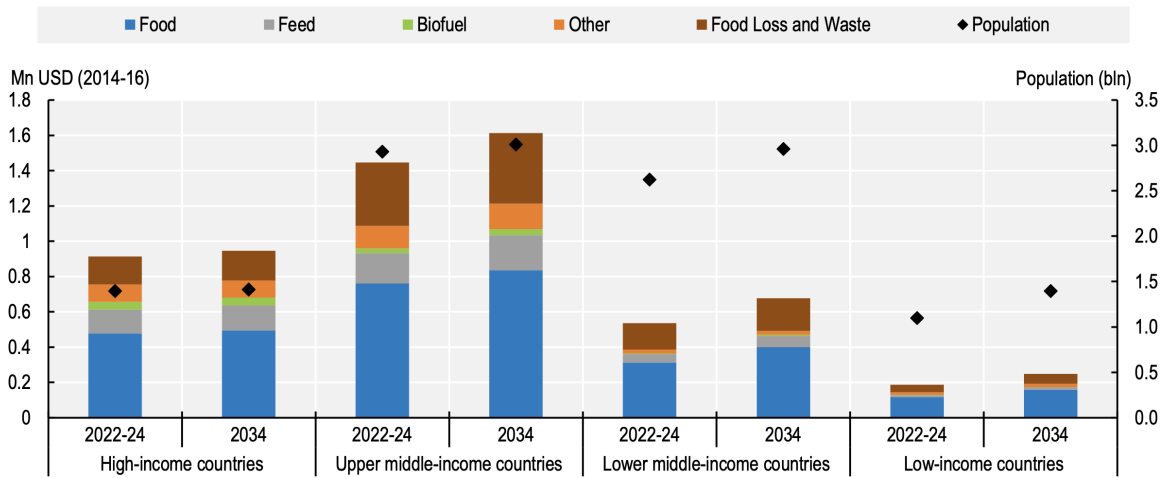
According to the document, middle-income countries, especially those in the lower income bracket, are expected to drive growth in the consumption of animal products over the next ten years. In these countries, per capita consumption of calories from meat, fish, eggs, and milk is expected to increase by 24%. This rate is almost four times higher than the global average, projected at 6%.

This progress reflects improved income and more nutritious diets. However, a glaring gap remains between countries. By

2034, the average daily calorie intake from these products will be 364 kcal in lower-middle-income countries. In low-income countries, it will be just 143 kcal. The FAO adopts 300 kcal as the minimum reference for a healthy diet.

The report estimates that, by 2034, global food and fish production will increase by 14%. This growth will come primarily from increased productivity, especially in developing countries. Meat, dairy, and egg production is expected to grow by 17%. As a result, global cattle, pig, sheep, and poultry herds will grow by 7%.

**Figure 1.4. Use of agricultural commodities by type and income group**



Note: Values are measured at constant USD of the period 2014-16.

Source: OECD/FAO (2025), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://data-explorer.oecd.org/s/1hc>.

These advances will have an environmental impact. Direct emissions from the agricultural sector are estimated to increase by 6% over the period.

However, there will be a reduction in carbon intensity per unit of production, which indicates a certain efficiency gain.

Agricultural productivity tends to improve, putting downward pressure on commodity prices. This can affect small producers, who are more vulnerable to market

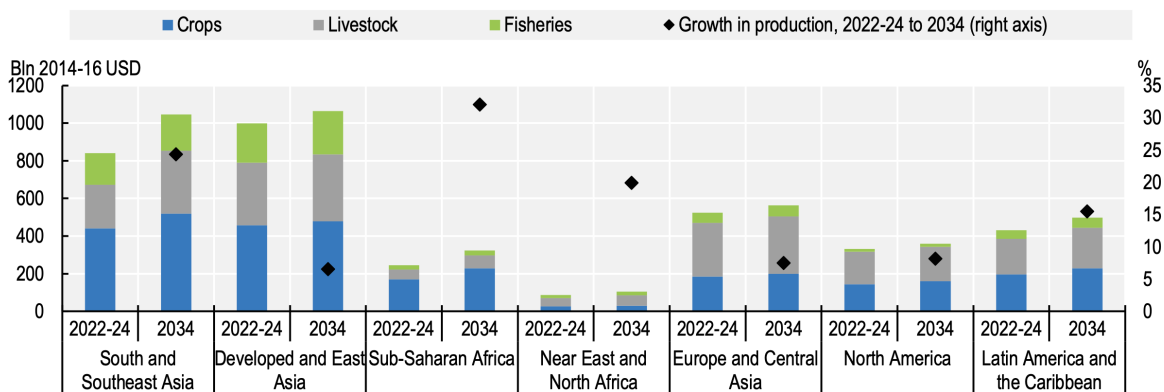
fluctuations and have less access to technology. The report recommends that governments expand localized support programs and facilitate farmers' access to markets and innovations.

A simulation conducted by the FAO and the OECD suggests that it is possible to eradicate malnutrition and still reduce agricultural emissions by 7%, provided that investments in low-carbon technologies are combined with a 15% increase in global agricultural productivity.

Already available technologies can help along this path. Among them are precision agriculture, improved nutrient and water management, improvements in animal feed, and simple practices such as crop rotation and intercropping.

Trade agreements and multilateral cooperation remain essential. The report estimates that by 2034, approximately 22% of the world's calories will cross borders before reaching the final consumer. Agricultural trade will balance food deficits and surpluses, contribute to price stability, and promote global food security.

Figure 1.10. Trends in global agricultural production



Note: Values are measured at constant USD of the period 2014-2016.  
 Source: OECD/FAO (2025), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), <http://data-explorer.oecd.org/s/1hc>.

Among the regional highlights, Sub-Saharan Africa concentrates both

opportunities and challenges. The region has a cattle herd three times larger than that of North America, but productivity per animal is only one-tenth as high. This herd is projected to grow 15% by 2034.

Cereals will remain central to human nutrition. Their production will grow 1,1% per year, supported by productivity gains—the harvested area will increase only 0,14% per year, a slower pace than in the previous decade. By 2034, 40% of cereals will be destined for direct human consumption. Another 33% will be used as animal feed, and the remainder will be used for biofuels and industrial uses.

Demand for biofuels will grow 0,9% annually, driven by Brazil, India, and Indonesia. At the same time, wealthy

countries are expected to consume less fat and sugar in response to public policies and health concerns.

Global food consumption growth will be driven primarily by India and Southeast Asia, accounting for 39% of the total by 2034—up from 32% a decade earlier.

China's share will fall from 32% to 13% in the same period.

OECD Secretary-General Mathias

Cormann stated that countries have the tools to end hunger. He believes that well-coordinated policies, combined with open markets and increased productivity, will be crucial. FAO Director-General QU Dongyu, meanwhile, emphasized that nutritional improvements are positive, but still insufficient in the poorest countries. Both emphasized the organizations'

commitment to supporting governments with data, analysis, and technical recommendations.

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# Presidential decree details procedure for commercial retaliation

Act regulates text regulates Law 15.122/25

15.07.2025 | 07:13 (UTC -3)

Cultivar Magazine



Decree No. 12.551 was published in today's Official Gazette of the Union. The text regulates Law No. 15.122/2025. It serves as a guide for determining how public officials should apply the law's provisions. The immediate target is the new 50% tariff imposed by the United States on all Brazilian products, effective August 1st. U.S. President Donald Trump announced the measure last week.

The mechanism revolves around two axes. First, provisional countermeasures. Then, definitive actions. Everything starts with the Interministerial Committee for Negotiations and Economic and Trade Countermeasures, composed of four ministers: Development, Industry, Commerce, and Services (MDIC), the Chief of Staff's Office, Finance, and

Foreign Affairs. Chaired by the MDIC's head, this committee has deliberative power. It also decides on provisional retaliation. In the event of a tie, the president has the deciding vote.

The decree delegates the MDIC Executive Secretariat the task of coordinating the technical procedure. It is responsible for sharing retaliation requests with the relevant ministries. They must assess the commercial, diplomatic, and economic impacts of unilateral foreign measures. Once approved, the countermeasures are immediately implemented. Suspension of tariff concessions. Investment restrictions. Suspension of patent protection.

Any retaliation requires justification. The interested party must explain why the case

requires urgent action. The committee may hear representatives from the private sector and other public administration bodies. Measures can be changed or suspended at any time. Flexibility and speed define the first phase of the system.

## **Ordinary countermeasures**

The second axis requires more impetus. Ordinary countermeasures follow a detailed procedure. The proposal must indicate which country imposed the barrier, which sectors were affected, and the estimated impact. The request is sent to the Executive Secretariat of the Foreign Trade Chamber (Camex), which is shared with the members of the Executive

Management Committee (Gecex). It may also involve other public agencies.

Camex has up to thirty days—extendable for another thirty days—to prepare a technical report. Once the report is completed, Gecex has the same period to decide whether the case falls under Law No. 15.122. If the case falls under Law No. XNUMX, a working group will be created to design possible countermeasures. The group may include representatives from other agencies and the private sector. Suggestions will be forwarded to Gecex and then to Camex's Strategic Council.

Before any ordinary retaliation, a public consultation will be held. The maximum period is thirty days. The objective: to hear from affected stakeholders and business

partners. Additional consultations may be held. At the end of the process, Camex will make a decision. The Strategic Council has sixty days, extendable by another sixty, to reach its decision. The decision may be postponed if there are significant diplomatic advances.

## **Foreign relations**

The Ministry of Foreign Affairs is involved at every stage, from the initial notification to the trading partner to diplomatic negotiations. Itamaraty coordinates its actions with the Ministry of Foreign Affairs and periodically informs Camex of the progress of the negotiations. The stated objective: to mitigate or nullify the effects of barriers and countermeasures.

Camex may, at any time, change or suspend existing retaliation measures. To do so, simply submit a proposal from Gecex. A new working group may be created for this purpose. The rules are flexible. The agencies involved—Camex, Gecex, and the Interministerial Committee—may issue supplementary rules.

The decree is in force. It takes effect today.



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# Urea prices in Brazil rise to US\$30 per ton

India boosts urea prices and Brazilian producers face higher costs ahead of the 2025/26 second crop

14.07.2025 | 17:36 (UTC -3)

Valeria Campos



Urea prices have returned to their upward trend in Brazil. According to the weekly fertilizer report from StoneX, a global

financial services company, prices were boosted in international trade due to the tight global supply-demand balance and buoyant buying interest in the Indian market.

According to Market Intelligence analyst Tomás Pernías, urea prices in Brazil have increased significantly in recent days, with weekly variations of up to US\$30 per ton at national ports—a rise of over 5% compared to the previous week.

"The event that triggered this upward movement in urea prices in Brazil was the announcement of new information about an ongoing purchase tender in India.

Currently, an Indian importer is seeking urea cargoes on the international market, and during these negotiations, suppliers

demonstrated a lack of willingness to sell urea at relatively low prices, which indicates that this market is tighter than previously thought," says Pernías.

India is a country that frequently purchases large volumes of fertilizers, and its purchases often set the price for other transactions around the world.

"In light of this, the announcement of sales intentions by urea suppliers participating in the Indian bidding process has boosted prices at a delicate time: China, a major urea exporter, is currently limiting its exports of the product, helping to sustain prices in the foreign market," highlights the Market Intelligence analyst.

On the other hand, the market is still recovering from the impacts caused by the

halt in Iranian and Egyptian production, which occurred during the conflict between Israel and Iran. According to Pernías, Brazilian importers and farmers tend to increase their urea purchases throughout the second half of the year. This situation, especially for those who still need to purchase nitrogen for the 2025/26 corn harvest, could worsen trade relations at a strategic time for the domestic market.

"Brazilian farmers are already facing unattractive exchange rates in the phosphate market, which tends to reduce margins for producers facing adverse rural production costs," concludes the Market Intelligence specialist.

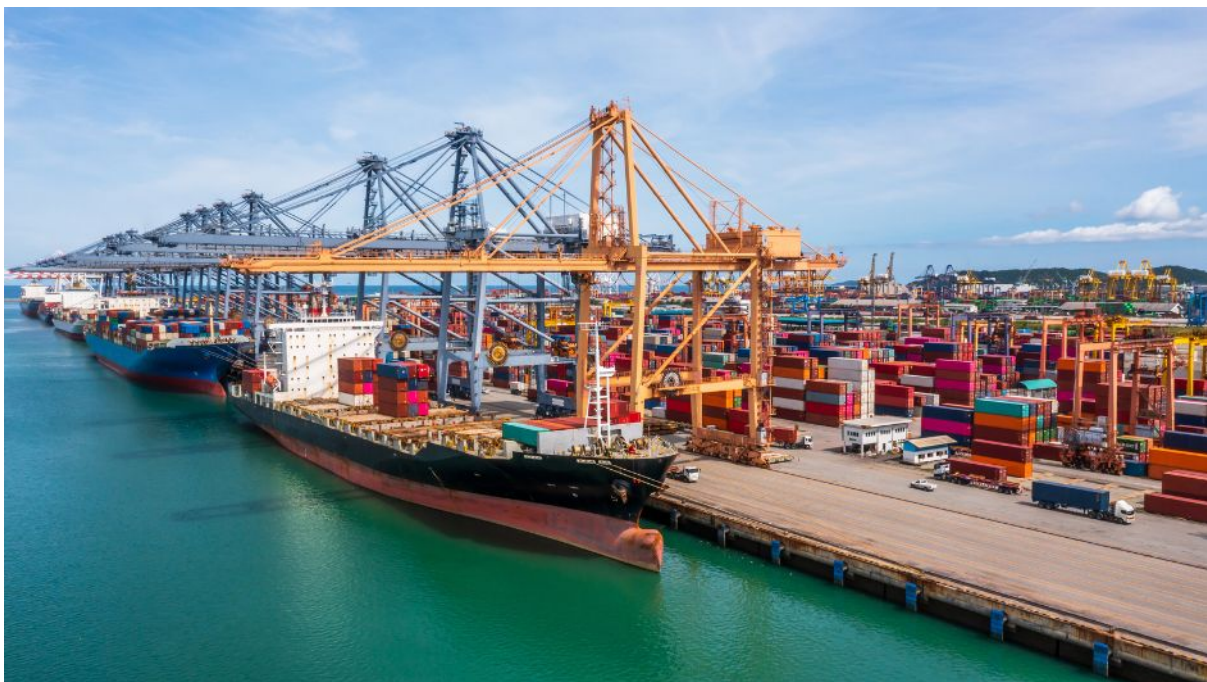
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# Brazilian agriculture exports US\$82 billion in the first half of 2025

Stability, diversification of the agenda, and international recognition in health reinforce the leading role in global agriculture

14.07.2025 | 17:13 (UTC -3)

Ministry of Agriculture



Brazilian agribusiness exported US\$82 billion in the first half of 2025, remaining

virtually stable compared to the same period the previous year (-0,2%). Even with falling international prices, the sector maintained its relevance in the trade balance, accounting for 49,5% of all the country's exports during the period.

In June, exports totaled US\$14,6 billion, influenced by a scenario of falling global prices. The World Bank's food index, for example, fell 7,3% compared to June 2024. Even so, Brazil remained competitive, with a diversified food supply and a consolidated presence among the world's leading food suppliers.

Among the month's highlights are products such as cellulose (with record export volume), orange juice, soybean meal, cotton, peanut oil, eggs, gelatin, ground

black pepper, and cocoa chocolates. The variety of products reflects a strategic market expansion effort promoted by the Ministry of Agriculture and Livestock (MAPA).

## **Reliable supplier**

Another milestone of the semester was Brazil's recognition as a country free of foot-and-mouth disease without vaccination, granted by the World Organization for Animal Health (WHO). The certification was awarded in June during a ceremony in Paris, attended by President Luiz Inácio Lula da Silva and the Minister of Agriculture and Livestock, Carlos Fávaro.

This achievement is the result of decades of investment in health surveillance, cooperation between states, and partnerships with the production sector. The new health status paves the way for expanded access to higher-value markets and reinforces Brazil's image as a reliable supplier of safe, high-quality food on the international stage.

## **More destinations, more opportunities**

China remained the main destination for Brazilian agricultural exports in June, with US\$5,88 billion in purchases, equivalent to 40,3% of the month's total. The European Union (US\$1,9 billion) and the United

States (US\$1,04 billion) followed. There was also growth in shipments to Japan, Vietnam, Thailand, and Indonesia, signaling Brazil's expansion into less traditional but highly potential markets.

MAPA's strategic actions seek to promote producers of all sizes, expand markets, ensure health, and add value to national production. The performance in the first half of the year reaffirms the importance of agriculture as a driver of the Brazilian economy and a pillar of the country's presence in international trade.

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# CJ Selecta has a new CEO

With over 30 years of experience in agribusiness, Alessandro Santana dos Reis took on the role

14.07.2025 | 16:30 (UTC -3)

Wellington Torres



CJ Selecta, a leading producer of soybean derivatives and one of the largest global exporters of Soy Protein Concentrate

(SPC), announces its new CEO: Alessandro Santana dos Reis. The inauguration ceremony, held in Uberlândia, was attended by CJ executives and leaders in South Korea and authorities from the cities of Uberlândia and Araguari, Minas Gerais. The announcement marks the beginning of a new cycle of leadership and growth for the company.

With over 30 years of experience in agribusiness, nearly 18 of which dedicated to the company, the executive takes over the organization with a strategic plan until 2027. "This moment represents much more than a formal appointment," he declares, stating that this new stage symbolizes a renewed commitment to the values, history, and, above all, the future of CJ Selecta.

An economist by training, Alessandro has built a solid career in agribusiness, logistics, finance, supply chain, and purchasing and sales. His trajectory is marked by consistency, strategic vision, and leadership focused on building high-performance teams.

Under his leadership, CJ Selecta focuses on three core pillars: financial stability, infrastructure investment, sustainability, and employee appreciation. "Stability will be our focus. We will pursue efficiency, profitability, and cash generation responsibly," he states.

Among the projects under study are biomass, biogas, biofertilizers and biodiesel initiatives, expanding the company's commitment to sustainable

practices and industrial innovation.

Alessandro also emphasizes that his management will be guided by ethics, transparency, and humanization.

"Leadership is more than achieving financial results. It's creating a healthy environment where people feel valued, safe, and motivated to give their best," he emphasizes, also recognizing the work and achievements of his predecessor, Guilherme Tancredi, who dedicated nearly 23 years to the company. "He guided this company with integrity, strategic vision, and empathy, leaving a legacy of commitment that inspires us all," he adds.

With over 70 years of history, CJ Selecta has established itself as a pioneer in the production of soy products for various

segments, working with raw materials from both GMO and non-GMO sources.

Alessandro's appointment as CEO reinforces the company's commitment to excellence, innovation, and positive global impact.

"I learned that the future is not something we wait passively for — the future is built in the present, with actions, courage, and responsibility," concludes the new CEO.

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# Satis announces new Chief Business Officer

Jair Unfried takes on the role with a focus on marketing, sales, and innovation, strengthening the company's corporate governance.

14.07.2025 | 16:14 (UTC -3)

Tiago Ritter, Cultivar Magazine edition



Satis, a Minas Gerais-based plant nutrition and physiology company, announced the arrival of Jair Unfried (pictured) as its new

business director. The change is part of the company's corporate governance strengthening process, focused on improving management and sustaining the brand's strategic growth.

With over 15 years of experience in the seed industry, Unfried will focus on marketing, sales, manufacturing, and innovation. An agronomist from the State University of Western Paraná, he holds a PhD in Genetics and Plant Breeding from Esalq/USP, a postdoctoral degree from the University of Illinois (USA), and executive training from FGV and Fundação Dom Cabral.

Throughout his career, he worked for companies such as Syngenta, GDM Seeds (Don Mario Group), Tropical Melhoramento & Genética (TMG), and

Fundação Mato Grosso, contributing to the consolidation of soybean genetics in Brazil and abroad. In addition to his technical training, he stands out for his experience in the United States and extensive experience in markets such as Latin America, Canada, Europe, Asia, and South Africa.

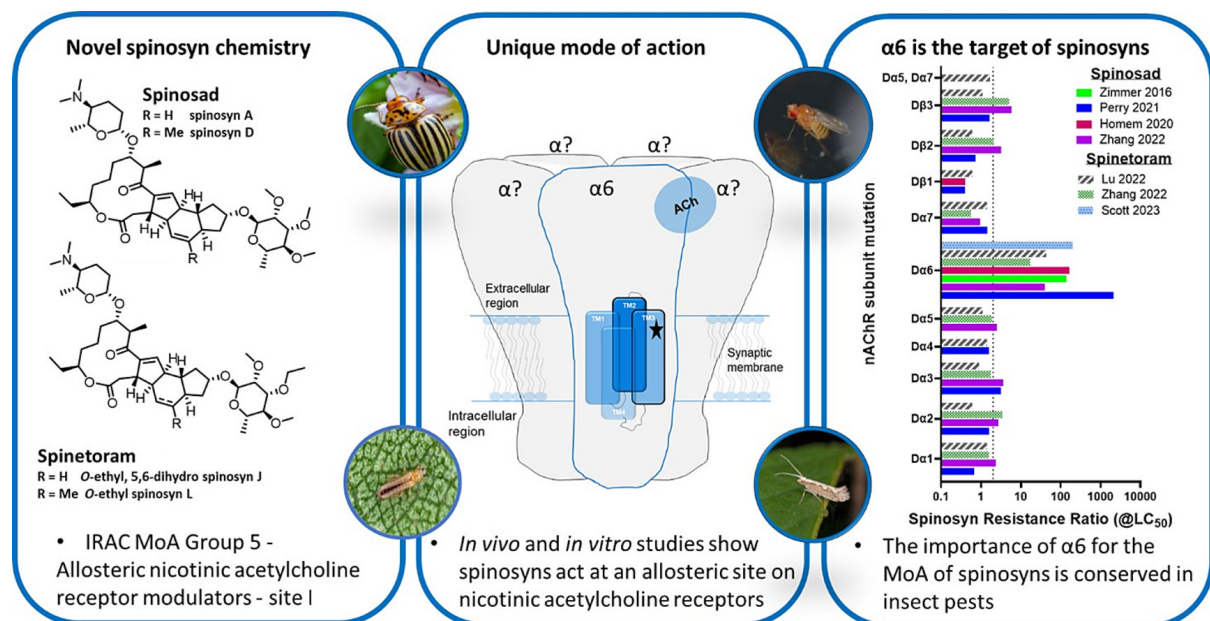
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# Review analyzes 25 years of studies on spinosyns

Study details how these insecticides modulate neural channels and maintain their effectiveness

14.07.2025 | 15:28 (UTC -3)

Cultivar Magazine



Since their introduction in 1997, spinosyn insecticides have transformed agricultural pest control. Spinosad and spinetoram act

on the nervous system of insects. Both belong to Group 5 of the Insecticide Resistance Action Committee (IRAC) classification, characterized as allosteric modulators of the nicotinic acetylcholine receptor (nAChR), acting specifically at the so-called "Site I."

A recently published scientific review by Corteva scientists summarizes 25 years of research on the molecules' mode of action. It also highlights findings on their effectiveness and the emergence of resistance.

## **Origin and application of spinosyns**

Spinosyns are products obtained from the fermentation of the microorganism *Saccharopolyspora spinosa*, originally isolated from soil samples in the Virgin Islands.

The semi-synthetic chemical modification of two of these molecules—spinosyns J and L—led to the development of spinetoram, which is more potent and stable under ultraviolet light. Spinosad and spinetoram have a broad spectrum of action against chewing insects of the orders Coleoptera, Diptera, Lepidoptera, and Thysanoptera.

Today, they are used in more than 250 agricultural crops across 130 countries. Their global acceptance is also due to their environmental profile and low toxicity to

mammals, characteristics that earned both compounds Green Chemistry awards from the U.S. Environmental Protection Agency.

## **Neurophysiological effects and symptomatology**

The action of spinosyns on insects begins with neural excitation, resulting in involuntary muscle contractions, leg extension, wing flapping, and loss of motor coordination. The compounds cause paralysis, even in decapitated insects, as demonstrated in *American Periplaneta*.

Unlike traditional insecticides, spinosyns induce symptoms that keep individuals on

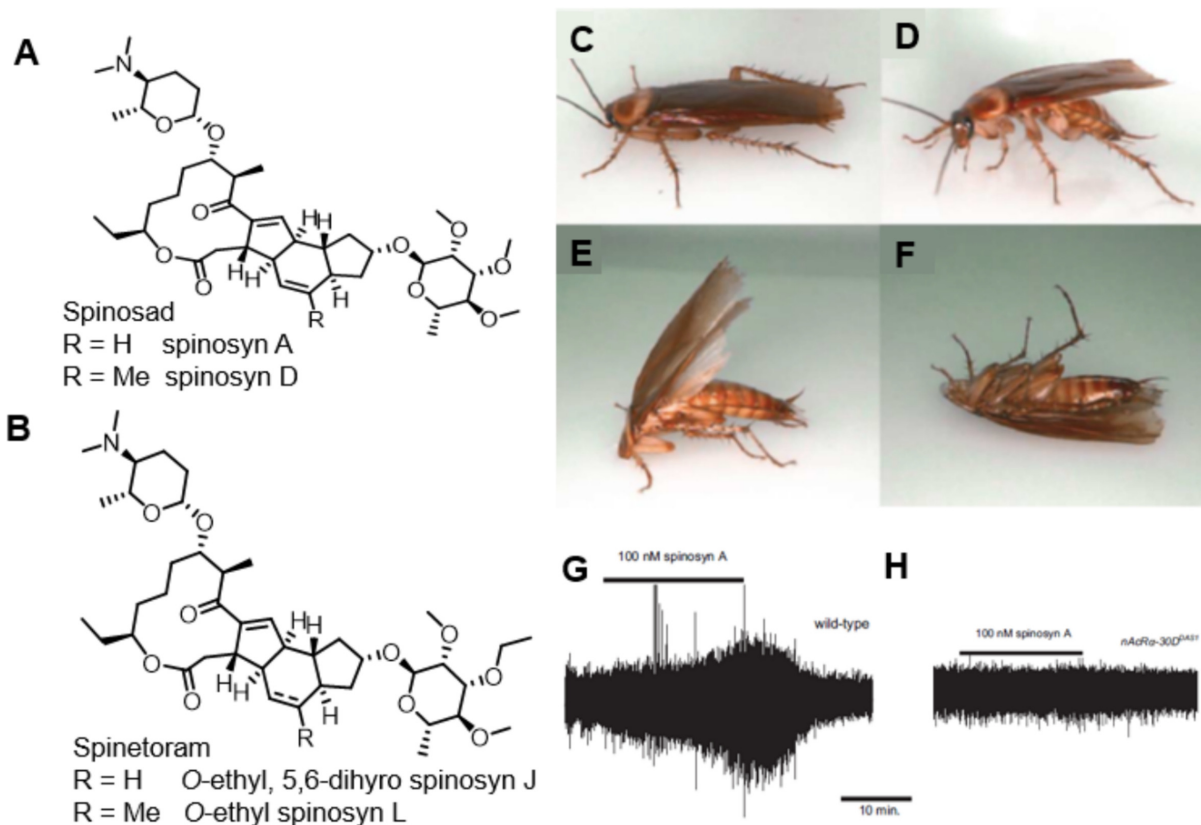
the leaves. This is relevant for integrated pest management programs, as it affects the dynamics of exposure to natural predators.

## **Molecular target: the alpha-6 subtype of the nAChR receptor**

nAChRs are pentameric acetylcholine-activated ion channels. Spinosyns act as allosteric modulators of a specific combination of these receptors containing the alpha-6 subunit. This subunit has been shown to be highly conserved among different insect orders. Studies of loss-of-function (LOF) mutations in the alpha-6 subunit in *Drosophila melanogaster*

revealed resistance greater than 100 times to spinosad, an effect replicated in other species such as *Plutella xylostella* e *Frankliniella occidentalis*.

The most common mutation in the field is the G275E substitution, located in the third transmembrane helix of the receptor. This modification confers resistance greater than 350-fold in populations of *F. occidentalis* and was validated via gene editing with CRISPR/Cas9.



Structures, symptoms and physiological effects of spinosyn. **(A)** Structure of the major (spinosyn A) and minor (spinosyn D) components of spinosad. **(B)** Structure of the major (spinosyn J) and minor (spinosyn L) components of spinosad. Cockroach responses to spinosyns **(C)** without injection, **(D)** leg extension and chest elevation, **(E)** persistent symptoms in decapitated cockroach, **(F)** paralyzed, prostrate and still trembling cockroach - Source: [doi.org/10.1016/j.pestbp.2025.106575](https://doi.org/10.1016/j.pestbp.2025.106575)

# Functional expression and technical challenges

To study the interactions of spinosyns with alpha-6 receptors, scientists employed

heterologous expression systems using oocytes from *Xenopus laevis*. Receptor functionality required the coexpression of auxiliary proteins such as RIC3, UNC-50, and TMX-3. Even with these chaperones, response levels remain inconsistent, suggesting the existence of unknown cofactors.

The functional expression of  $\alpha$ ;fa-6 receptors in species such as *Rhipicephalus microplus* (bovine tick) and *Apis mellifera* was obtained without the need for exogenous chaperones.

Interestingly, *R. microplus* receptors exhibit a strong response to acetylcholine, with a modulatory action of spinosyns. And fast-desensitizing depolarization currents, contrasting with the persistent effects in

*Drosophila* spp.

## Specificity and absence of cross-resistance

Studies with nAChR mutants in *D. melanogaster* indicate that only the  $\alpha 6$  subunit is directly involved in the action of spinosyns. Mutations in subunits such as alpha-1, beta-1, or alpha-7 do not confer resistance. Not even the simultaneous deletion of the alpha-5 and alpha-7 subunits, which share structural similarity with  $\alpha 6$ , alters the efficacy of spinosad.

Comparisons between different resistance mechanisms—point mutations such as G275E and LOF mutations—reveal similar effects in terms of resistance, which

reinforces the functional importance of the  $\alpha 6$  subunit as a single target.

## Gene editing studies in agricultural pests

Besides *D. melanogaster*, gene editing studies have confirmed the essential function of alpha-6 in several agricultural pests. Knockouts of this subunit in *Helicoverpa armigera*, *Spodoptera exigua*, *Aedes aegypti* e *P. xylostella* conferred resistance between 320 and 1760 times greater. G275E mutations introduced into *S. exigua* replicated the resistance pattern.

Em *F. occidentalis*, experiments with simulated laboratory populations showed that the alpha-6 knockout allele disappears

rapidly due to fitness costs, while the G275E allele persists. The loss of alpha-6 function, in addition to causing resistance, also affects visual functions in insects, interfering with synapses in the optical system.

## **Mode of action**

The uniqueness of spinosyns is evident by the absence of cross-resistance with other insecticides that also act on nAChRs, such as neonicotinoids (group 4A), sulfoximines (4C), mesoionics (4E), and peptides such as  $\delta$ -Hexatoxin-Hv1a (group 32).

Radioligands confirmed that the binding site of spinosyns is distinct, with no overlap with other compounds.

Although an initial study suggested a secondary interaction with GABA receptors, subsequent analyses refuted this hypothesis. The resistance observed in the field and the molecular binding results demonstrate that spinosyns' action is concentrated exclusively on nAChR receptors with functional  $\alpha 6$ .

Recent research using intracellular calcium ionometers (GCaMP) and fluorescent proteins suggests that spinosad exposure induces selective degradation of the  $\alpha 6$  subunit, interfering with neuronal signaling balance. Although the exact mechanism remains unclear, these findings indicate that the impact of spinosyns goes beyond allosteric modulation.

Expanded use of genomic tools and improved heterologous expression systems may reveal new details about the effects of spinosyn binding to the alpha-6 receptor, including possible conformational interactions and implications for the channel's pentameric assembly. Obtaining the crystallographic structure of the alpha-6 subunit would be a crucial step toward understanding these interactions with atomic precision.

Further information at  
[doi.org/10.1016/j.pestbp.2025.106575](https://doi.org/10.1016/j.pestbp.2025.106575)

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