February 21, 2026

N º 67

Cultivar Semanal ®

Natural synergist overcomes resistance

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Early domestication selected for wheat varieties that were more competitive for light and space.

Research indicates that larger, more upright leaves boosted competitive advantage.

20.02.2026 | 14:52 (UTC -3)

Cultivar Magazine

Photo: Joseani Antunes

Early wheat cultivation favored plants with a greater ability to compete for light and space. This selection occurred unintentionally during domestication. This conclusion is part of a study led by researchers at the University of Sheffield.

Researchers compared three independent domestication events: einkorn wheat, emmer wheat, and Timopheev wheat. The domesticated lineages showed greater biomass under competition than their wild relatives. The difference increased as the density of neighboring plants grew.

Domesticated forms

Experiments showed that domesticated forms maintained vegetative growth even under shade. The competitive advantage was concentrated in leaves and stems, not in inflorescences. The interaction occurred mainly during the vegetative phase.

Simulations using a functional-structural model of plants confirmed the experimental results. The leaf insertion angle exerted the greatest influence. More erect leaves allowed domesticated plants to outcompete their neighbors and capture more light.

Greater potential leaf biomass and apical dominance also contributed in some groups. In Emmer and Einkorn wheat, larger leaves enhanced light capture. In Timopheev wheat, a combination of

greater leaf biomass and changes in internodes increased the relative height of the plants.

Initial stages

The authors indicate that competitiveness increased in the early stages of domestication, at least 8 to 9 years ago. This process occurred before the complete establishment of the natural no-threshing trait.

In an intraspecific experiment with emmer wheat, researchers compared wild forms, ancient landraces, durum landraces, and modern cultivars. The early landraces exhibited greater competitiveness. Modern breeding has reduced this trait, although

current cultivars still outperform wild forms.

The study links the recent reduction in competitiveness to breeding programs focused on high planting densities. Modern programs have selected plants with smaller leaves and shorter stems. The goal was to concentrate resources on grain production and limit internal competition.

Further information can be found at doi.org/10.1016/j.cub.2026.01.061

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Olive-derived compound restores pyrethroid effectiveness.

SYN-A increases mortality in resistant Psylliodes chrysocephala populations from 20% to 75%.

20.02.2026 | 08:18 (UTC -3)

Cultivar Magazine

Photo: AJC1 from UK, CC BY-SA 2

Researchers at Rothamsted Research have demonstrated that the natural synergist SYN-A restores the effectiveness of lambda-cyhalothrin against resistant populations of *Psylliodes chrysocephala*In trials, the mixture increased insect mortality from 20% to 75% and reduced plant damage by at least 50% compared to the insecticide alone.

The team evaluated the compound extracted from unsaturated fatty acids in olive oil. SYN-A inhibits cytochrome P450 enzymes and esterases. These metabolic systems degrade pyrethroids in resistant insects. The compound was patented in 2017 (WO2017/005728). Its stated function is precisely to improve the effectiveness of conventional pesticides.

In laboratory bioassays, the combination of SYN-A with lambda-cyhalothrin The insect mortality rate tripled compared to the insecticide alone. Applying 20% ??of the field dose of lambda-cyhalothrin, combined with the synergist, delivered 2,2 times greater control than the full dose without the additive. The results indicate the possibility of reducing the insecticide load by up to 80% without loss of efficiency.

In the trial, plants treated with SYN-A plus lambda-cyhalothrin showed a lower proportion of attacked plants and fewer perforations per leaf. The mixture halved the number of damages compared to the insecticide alone.

Effects on parasitoids

The study also evaluated effects on the parasitoid. *Microctonus brassicae*, natural enemy of *Psylliodes chrysocephala*SYN-A also inhibited metabolic enzymes of the parasitoid. In bioassays, the combination of SYN-A with lambda-cyhalothrin caused 100% mortality of the parasitoid, even at the reduced dose of the insecticide.

The authors highlight the need for application strategies that reduce the risk to non-target organisms. The study recommends adjusting the application timing and conducting further field-scale evaluations.

The team advocates for the integration of SYN-A into integrated pest management programs. The use of this synergist could extend the lifespan of pyrethroids in the

face of a shortage of new active ingredients. The researchers caution that validation through larger-scale trials is necessary before widespread recommendation.

More information at doi.org/10.1002/ps.70496

About SYN-A

According to the patent description, the invention relates to synergists for insecticides, fungicides, and herbicides. The term synergist refers to inhibitors of enzymes that metabolize pesticides and therefore confer resistance to them. The invention is especially useful for insecticides. In particular, the invention relates to the use of inhibitors of P450 and

esterase class enzymes to increase the effectiveness of pesticides, especially pyrethroid and neonicotinoid-based insecticides. Synergists also increase the effectiveness of fungicides and herbicides.

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United States opens public consultation on Bayer's MON 94637 soybeans

The assessment includes a request for unregulated status for an event involving insecticidal proteins against lepidopterans.

18.02.2026 | 07:35 (UTC -3)

Cultivar Magazine

The U.S. Animal and Plant Health Inspection Service (APHIS) has received a request from Bayer Crop Science to grant unregulated status to MON 94637 soybeans, genetically engineered for lepidopteran control. The agency has opened a public consultation and made the petition and preliminary plant pest risk assessment available for comments until April 20, 2026.

Soybeans with the transgenic event MON 94637 It expresses two insecticidal proteins, cry1A.2 and cry1B.2. Both are present in Intacta 5+ soyThe technology aims to protect the crop against damage caused by target lepidopteran pests. The company argues that the event does not pose a plant pest risk and, therefore, should not remain under the regulation

provided for in 7 CFR Part 340.

Aphis has prepared a preliminary plant pest risk assessment. The document compares the risk of MON 94637 with that of the conventional soybean from which it was derived. The analysis concludes that the event does not increase the risk of plant pests compared to the unmodified variety.

The legislation allows any interested party to file a petition to determine that an organism obtained through genetic engineering should no longer be classified as a regulated product. APHIS publishes a notice in the Federal Register and grants 60 days for public comments.

After the deadline, the agency will analyze the comments and other available

information. Then, it will respond to the company with approval or rejection of the request.

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Ants protect aphids and reduce parasitism in bell peppers.

The exclusion of Tapinoma ibericum increases the number of Aphis gossypii mummies by 22,2%.

17.02.2026 | 16:13 (UTC -3)

Cultivar Magazine

Photo: Clemson University, USDA

The presence of the ant *Tapinoma ibericum* reduces the success of the parasitoid *Aphidius colemani* in control of *Aphis gossypii* In greenhouse-grown bell peppers in southeastern Spain, the exclusion of ants increased the number of mummies per plant by 22,2% and decreased the number of aphid colonies. Fruit weight did not vary between treatments.

This study evaluated the impact of the mutualistic interaction between ants and aphids on biological control in four experimental greenhouses in Almería. The region has the largest area of ??protected horticulture in Europe. Pepper cultivation occupies approximately 12.500 hectares, with annual production exceeding 893 tons.

The researchers conducted an ant exclusion experiment over two consecutive growing seasons, in 2018 and 2019. Each greenhouse received 16 pepper plants infested with ants. *Aphis gossypii*Half of the plants remained accessible to the ants. The other half was isolated with physical barriers at the bases of the pots.

Parasitoid released

After the aphids were established, the authors released the parasitoid. *Aphidius colemani* at a dose of 30 mummies per greenhouse. The team monitored the abundance of aphids, the number of colonies, the quantity of mummies, and the presence of spontaneous natural enemies weekly for four weeks.

The total abundance of aphids did not show a consistent pattern between years. In 2018, plants without ants showed a trend of lower numbers of individuals. In 2019, the opposite occurred. In the data set, the presence of ants did not consistently alter the total density of the insect.

Number of colonies

The number of colonies, however, provided a clear answer. Plants with access to *Tapinoma ibericum* They showed an average of 38,8 colonies per plant. Plants without ants registered 30,2 colonies. The spatial aggregation of aphids increased in the presence of ants.

The most consistent effect was observed in parasitism. Plants without ants showed an average of 65,9 mummies per plant. Plants with ants recorded 38 mummies. The statistical model indicated a 22,2% increase in the abundance of mummies when ants were excluded.

The authors interpret the result as evidence of direct interference by ants on the oviposition of the parasitoid. The presence of *Tapinoma ibericum* makes access difficult *Aphidius colemani* to the colonies. Aggressive behavior reduces the success of parasitism.

natural enemies

The community of natural enemies also changed according to the treatment. The exclusion of ants increased the abundance of *Chrysoperla carnea* sl, *Scymnus* sp. It is *Nesidiocoris tenuis*These organisms showed a lower number of individuals on plants with ants.

The predator *Aphidoletes aphidimyza* The study showed an inverse pattern. Its abundance increased in plants with ant access. Spiders and hoverflies did not show a significant difference between treatments.

The data indicate the presence of *Tapinoma ibericum* reorganizes the assembly of natural enemies. In plants with ants, biological control occurred with greater participation of *Aphidoletes*

*aphidimyza*In plants without ants, the diversity of predators increased.

Productivity showed no statistically significant difference. In 2019, the fruits of plants with ants registered an average fresh weight of 59,6 grams. Plants without ants registered 50,9 grams. Dry weight also did not vary significantly.

The study concludes that *Tapinoma ibericum* promotes spatial aggregation of *Aphis gossypii* and reduces parasitism by *Aphidius colemani*The interaction did not result in a decrease in performance under the evaluated conditions. The authors suggest that the combination of *Aphidoletes aphidimyza* Using Aphidius colemani can increase the efficiency of control in areas with the presence of

mutualistic ants.

Further information at doi.org/10.1111/1744-7917.70249

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UPL's Board of Directors approves corporate reorganization.

The operation unifies businesses into a new listed company and maintains UPL as a diversified group.

20.02.2026 | 10:24 (UTC -3)

Cultivar Magazine

The Board of Directors of UPL has approved a reorganization scheme that unifies its Indian and international

businesses under UPL Global Sustainable Agri Solutions Limited. The new company will list shares on Indian stock exchanges upon completion of the process.

The operation involves three stages. The first stage incorporates UPL Sustainable Agri Solutions Limited into UPL Limited. The second stage transfers the crop protection business in India to UPL Global. The third stage incorporates UPL Crop Protection Holdings Limited, based in the Cayman Islands, into UPL Global.

With the reorganization, the group now has two listed companies. UPL Limited maintains its operations as a diversified platform in agriculture and specialty chemicals. UPL Global focuses on the crop protection portfolio on a global scale.

The spun-off business in India recorded revenue of INR 24.120 billion for the fiscal year ended March 31, 2025. This represents 31,15% of the combined revenue of UPL Limited and UPL SAS for that period.

UPL Limited reported revenues of INR 53.313 million in the same fiscal year. UPL SAS achieved INR 24.120 million. UPL Crop Protection Holdings Limited totaled USD 4.187 million.

The reorganization does not involve any cash payment. UPL Limited will issue 1.000 ordinary shares at INR 2 each for every 48 shares of UPL SAS. UPL Global will issue 1.000 shares at INR 2 each for every 213 shares of UPL Cayman.

In the spin-off, UPL Global will issue one INR 2 share for each INR 2 share of UPL Limited held by eligible shareholders.

Following completion, the promoters' stake in UPL Global will fall from 100% to 71,56%. The market will hold 28,44%. In UPL Limited, the promoters' share will decrease from 33,51% to 33,09% after the initial incorporation.

The group projects completing the transaction within 12 to 15 months, subject to regulatory and corporate approvals. The process depends on approval from SEBI, CCI, RBI, stock exchanges, the National Corporate Law Tribunal of India, and other relevant authorities.

According to the company, the consolidation creates the second-largest

listed company in the world focused exclusively on crop protection. The new structure seeks to broaden management focus, raise funds independently, and generate efficiency in research, manufacturing, and market access.

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São Paulo establishes plan to eradicate amaranth.

Resolution defines mandatory prevention, control, and prohibition measures to contain Amaranthus palmeri.

20.02.2026 | 10:00 (UTC -3)

Photo: Felipe Nunes / Defense

The Government of São Paulo instituted the State Plan for the Prevention, Control

and Eradication of giant amaranth (*Amaranthus palmeri*The measure came into effect today with the publication of Resolution SAA No. 07/2026 in the Official Gazette. The objective involves protecting production chains and preserving the competitiveness of São Paulo's agricultural sector.

The Department of Agriculture and Supply confirmed an outbreak of the weed on February 3, 2026, on a property in the municipality of Mirassol, in the São José do Rio Preto region. The Agricultural Defense agency initiated the area's closure, elimination of the outbreak, and expanded monitoring after its detection.

Resolution No. 07, of February 19, 2026, establishes the plan and sets forth

mandatory measures for prevention, control, and eradication. The State Directorate of Agricultural Defense coordinates its execution through the Department of Plant Health Defense.

The plan defines standardized protocols. Actions include continuous phytosanitary surveillance, inspection, traceability, integrated management, closure of infested areas, immediate elimination of outbreaks, and control of the movement of agricultural machinery and implements.

The text organizes the action into three axes. The prevention axis encompasses active and passive surveillance, inspection of productive and non-agricultural areas, and control of machinery traffic. The control axis determines integrated

management and the application of chemical, mechanical, and cultural measures. The eradication axis provides for the immediate elimination of outbreaks, controlled destruction of plants, and the closure of areas when necessary.

The regulation assigns responsibility to owners, tenants, or occupants for compliance with phytosanitary measures. Non-compliance authorizes direct enforcement by the Agricultural Defense agency, with reimbursement of expenses and application of penalties provided for by law.

According to the Secretary of Agriculture, Geraldo Melo Filho, the formalization of the plan consolidates the state's rapid response to a pest with a high potential for

economic and productive impact. He affirms that the Secretariat is mobilizing its structure in partnership with producers, municipalities, and institutions to prevent its spread throughout the state of São Paulo.

Giant amaranth exhibits high invasive potential, a high capacity for dissemination, and proven resistance to herbicides. Its confirmed occurrence in the state of São Paulo poses a risk to strategic production chains.

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Agricultural Market - Feb. 20, 2026

Soybean acreage expands in the US, and Chicago reacts with losses in Brazil.

20.02.2026 | 09:52 (UTC -3)

Vlamir Brandalizze - @brandalizzeconsulting

The Outlook Forum indicated an increase in soybean acreage in the United States and a significant reduction in corn acreage.

The market reacted in Chicago. Soybeans gained support. Corn remained stable. In Brazil, weather-related losses could reduce the harvest and negate some of the American gains.

American producers are expected to plant 34,37 million hectares of soybeans in the new crop season. In the previous cycle, the area totaled 32,84 million hectares. The increase exceeds 1,5 million hectares.

The decision reflects expectations of increased Chinese purchases. The projection considers an additional import of 5 million tons by China. The new area could generate a volume close to that amount.

The cost of corn weighed heavily in the decision. Producers report difficulty in

purchasing urea. Russia and China lead the global supply. Geopolitical conflicts are putting pressure on oil and raising costs. Corn requires more inputs. Part of the area has shifted to soybeans.

For corn, the Outlook indicated 38,038 million hectares planted. In the previous cycle, planting reached 39,9 million hectares. The reduction is close to 2 million hectares. The smaller area could remove up to 25 million tons from the potential supply. Global consumption exceeds 1,3 billion tons. The latest USDA data indicated production of 1,297 billion tons.

In Chicago, soybeans found support. The March contract lost $11,40. The July contract surpassed $11,60. The

environment improved despite the expansion of planted area in the US.

Brazil is facing climate problems. The USDA projected 180 million tons of rainfall. Analysts are already considering a volume closer to 175 million tons. Excessive rain is affecting Goiás, Bahia, and Mato Grosso do Sul. Rio Grande do Sul is registering losses.

The national harvest exceeds 25%. Mato Grosso surpasses 55%. Paraná surpasses 30%. Bahia approaches 20%.

The marketing of the new crop has reached approximately 35%. During the same period last year, the rate ranged between 42% and 44%. The historical average is 41%.

Exports are accelerating. In the first two weeks of February, Brazil shipped 2,69 million tons of soybeans. February of last year totaled 6,42 million tons. The current estimate exceeds 10 million tons for the month.

The accumulated total for January and February reached 4,56 million tons. This volume surpasses the previous record of 4,15 million tons. Soybean meal totaled 2,9 million tons. The soybean complex totaled 7,83 million tons.

In Brazil, the second corn crop (safrinha) has reached 35% planting. At the same time last year, the figure was 44%.

For wheat, the USDA reduced the estimated planted area in the US from 18,32 to 18,2 million hectares. The harsh

winter is supporting prices in Chicago.

For rice, Brazilian production may fall below 11 million tons. The previous harvest reached 12,8 million tons. Exports are increasing at the start of the year.

Bean prices are rising in major markets. Premium carioca beans are exceeding R$305 per sack in several regions. Producers indicate the potential for further price increases.

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

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Trump issues executive order to secure elemental phosphorus and glyphosate.

The text highlights the risk to the defense industrial base and food supply in case of interruption of these inputs.

20.02.2026 | 07:20 (UTC -3)

Cultivar Magazine

President Donald Trump signed an executive order—equivalent to a decree in Brazil—to protect domestic production of elemental phosphorus and glyphosate-based herbicides. The measure seeks to safeguard critical supply chains for defense and food production in the United States.

The government believes that any disruption in the supply of these inputs exposes the defense industrial base and the food system to external risks. The text identifies only one domestic producer of elemental phosphorus and glyphosate-based herbicides. Current production does not cover the country's annual demand.

More than 6 million kilograms of elemental phosphorus enter the country through

imports each year. A reduction or halt in domestic production could compromise national security, including food security.

Elemental phosphorus is an integral part of defense supply chains. The raw material is used in the manufacture of smoke devices, lighting, and incendiary devices. It is also a component of semiconductors used in radar, solar cells, sensors, and optoelectronics. The material is gaining ground in lithium-ion batteries found in weapons systems.

Elemental phosphorus also acts as a precursor in the production of glyphosate-based herbicides. These products are the leading crop protection tools used in agriculture in the United States. Farmers use glyphosate to produce food and feed

efficiently and at a lower cost.

The government states that there is no direct chemical alternative to glyphosate. Lack of access could reduce agricultural productivity and put pressure on the food system. The text cites the risk of economic losses for producers due to restrictions on this input.

The order delegates to the Secretary of Agriculture the authority to enforce contracts and determine the allocation of materials, services, and facilities related to the two inputs. The Secretary must consult with the Secretary of War. The text authorizes the issuance of rules and regulations to implement the measure.

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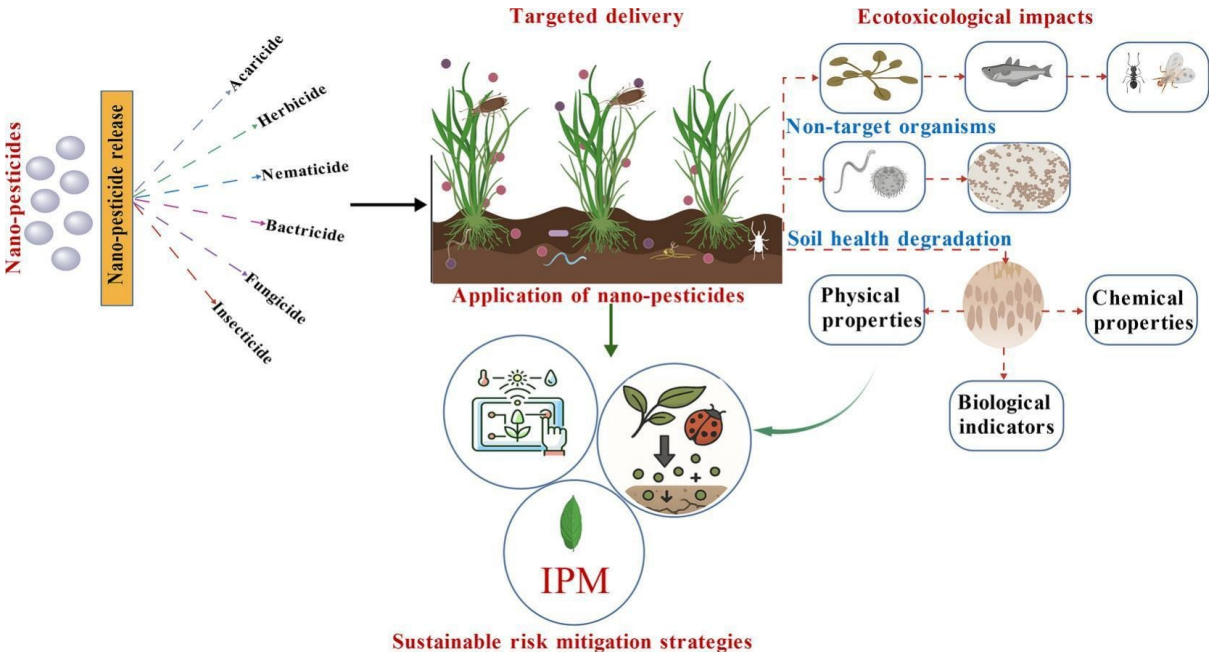
Nanopesticides increase efficiency in the field.

International review points to persistence, bioaccumulation, and ecotoxicological impacts.

19.02.2026 | 15:38 (UTC -3)

Cultivar Magazine



Nanopesticides increase the efficiency of pest control, reduce application doses, and prolong the release of active ingredients. At the same time, they are accumulating

evidence of environmental persistence, bioaccumulation, and ecotoxicological effects on non-target organisms.

A study by Chinese and Indian scientists analyzes the environmental fate, transformation mechanisms, and impacts on soil, plants, aquatic organisms, and soil fauna. It also discusses mitigation strategies and methodological limitations in current assessments.

Nanopesticides incorporate nanomaterials between 1 and 100 nanometers. Formulations utilize polymeric, lipid, metallic, and carbon-based nanocarriers. These systems increase the solubility, stability, and bioavailability of hydrophobic compounds. They allow for controlled release and response to stimuli such as

pH, light, and enzymatic activity.

Superior performance

The review highlights that superior performance stems from the high surface area to volume ratio. This characteristic intensifies electrostatic interactions with insect cuticles, leaf surfaces, and roots. Many formulations penetrate through stomata or via the root system and promote systemic translocation.

The same property that increases efficiency alters environmental behavior. Nanoparticles exhibit high mobility in soil-water matrices. They interact with dissolved organic matter. They cross biological barriers more easily than

conventional formulations.

Persistence depends on solubility, dissolution rate, aggregation, and interaction with organic matter. Metal oxides such as ZnO and CuO release ions and undergo chemical transformations. SiO2 and carbon-based nanomaterials maintain greater structural stability.

Dissolution and aggregation

pH modulates dissolution and aggregation. In acidic soils, ZnO releases Zn2+ more rapidly. In soils close to neutrality, ions recombine and form more stable mineral complexes. Organic matter can stabilize or destabilize particles, alter reactivity, and

modify bioavailability.

Bioaccumulation processes

Bioaccumulation processes occur at different trophic levels. Soil organisms accumulate nanoparticles through ingestion or dermal contact. Studies report oxidative stress, suppression of antioxidant enzymes, and reduced growth and reproduction. There is evidence of trophic transfer to predators and insectivorous birds.

In aquatic systems, particles reach bodies of water through runoff and leaching. Interaction with sediments and organic matter dissolves or aggregates particles. In

fish and invertebrates, oxidative stress, metabolic changes, and cellular damage are observed.

In soil, microorganisms respond with changes in composition and functional activity. Reductions in microbial respiration and biomass occur after exposure to silver nanoparticles. Enzymes linked to carbon, nitrogen, and phosphorus cycling show dose-dependent inhibition.

Arbuscular mycorrhizal fungi experience reduced spore germination and root colonization. This effect compromises nutrient absorption and plant resilience. The soil loses functional stability when symbiotic networks weaken.

Pollinators are also exposed. Residues adhere to floral surfaces. Insects ingest contaminated nectar and pollen. Reports indicate behavioral changes, oxidative stress, and alterations in gene expression associated with the immune response.

Responses in plants

Plants exhibit species- and dose-dependent responses. ZnO can inhibit root elongation by interfering with hormonal pathways. Copper nanoparticles accumulate in leaves and reduce photosynthetic efficiency. Some effects appear only after repeated exposures.

The review points out that many trials focus on short-term acute toxicity.

Experiments last days or weeks. Nanopesticides, however, release active ingredients over a prolonged period. Brief trials do not capture seasonal bioaccumulation or chronic multigenerational effects.

The authors advocate for specific protocols for nanomaterials. They suggest integrating omics tools and predictive modeling to estimate multi-crop exposure. They also propose green formulations and agroecological practices that reduce persistence and off-target effects.

The analysis focuses on terrestrial agroecosystems and metallic and polymeric formulations. It does not delve deeply into human toxicology or socioeconomic impacts. The work gathers

evidence from 2009 to 2025 and organizes data based on PRISMA criteria.

The results indicate that nano-pesticides can reduce the total chemical load applied. They also indicate that nanoscale properties introduce new routes of exposure and environmental transformation. Large-scale adoption requires an integrated assessment of productivity and ecosystem protection.

More information at doi.org/10.1016/j.pestbp.2026.107026

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Bayer launches Newgold and expands its seed offering.

A multi-crop brand is targeting low-carbon crops and promising a new source of income for US producers.

19.02.2026 | 15:15 (UTC -3)

Cultivar Magazine, based on information from Bayer in the United States.

Photo: Howard F Schwartz, Colorado State University

Bayer announced today in St. Louis the launch of Newgold, a multi-crop seed brand focused on low-carbon crops in the United States. The company aims to connect producers to the biofuel market, focusing on sustainable aviation fuel and renewable diesel, and expand profitability opportunities in the field.

The brand is part of the Biofuel Crops by Bayer platform. The offering includes seeds, agronomic support, and market access in a single strategy. According to Chad Bilby, innovation and commercial leader for biofuel crops, the initiative connects seed innovation, agronomic performance, and marketing channels to generate scale and trust.

Newgold prioritizes low-carbon oilseeds, such as camelina and winter canola. These crops can be planted as a second crop, integrated into rotations, or used in underutilized areas. Bayer is betting on generating additional revenue without competing with food production.

The company argues that the energy transition requires scale and execution in the field. With the new brand, it seeks to structure an agricultural system that connects producers, fuel industries, and markets.

Newgold seeds were developed with a focus on economic viability per hectare. The company suggests three usage strategies: intercropping, inclusion in crop rotation for income diversification, and use

in marginal areas.

Bayer is also expanding investments in new crops and integrated supply chains. The goal involves strengthening agriculture's role in decarbonizing transportation and supplying raw materials for renewable fuels with lower greenhouse gas emissions compared to fossil fuels.

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Promip announces new commercial director.

Carlos Eduardo Zamataro will be tasked with expanding the company's presence in different segments in Brazil and Latin America.

19.02.2026 | 14:00 (UTC -3)

Cultivar Magazine, based on information from Janete Galbiati

Promip, a Brazilian company specializing in biological control, announced the arrival of **Carlos Eduardo Zamataro** (pictured) for the position of commercial director.

With over 35 years of experience in agribusiness, the executive assumes the role with the mission of integrating the company's commercial strategy, expanding its reach to major clients and distribution channels, and sustaining the growth plan in an increasingly innovation- and biotechnology-driven environment.

According to the company's CEO, Marcelo Poletti, the new director will play a strategic role in consolidating the company's planning, working in conjunction with the executive board and the finance area. Priorities include advancing biological solutions, especially baculovirus-based inputs—a technology aimed at controlling caterpillars that affect crops such as soybeans and corn.

In recent years, Promip has intensified its industrial and technological expansion. The company announced the opening of its second biofactory and set a goal to triple its production capacity, reaching 200 tons annually. This move was reinforced by an investment round in January 2025, when it received an investment of R$ 20 million from Angra Partners.

According to the company, new products are in the launch phase, and reorganizing market access will be one of the new director's areas of focus.

Zamataro built his career in the areas of commercial strategy, business development, and market planning, with experience in companies in the bio-inputs and agrochemicals sector such as

Agrivalle, Syngenta Crop Protection, Adama (formerly Milenia Agrociências), and Ourofino Agrociência.

In a statement, the executive said that the strategy will be to strengthen long-term partnerships in Brazil and abroad, focusing on developing channels and generating value for distributors and producers.

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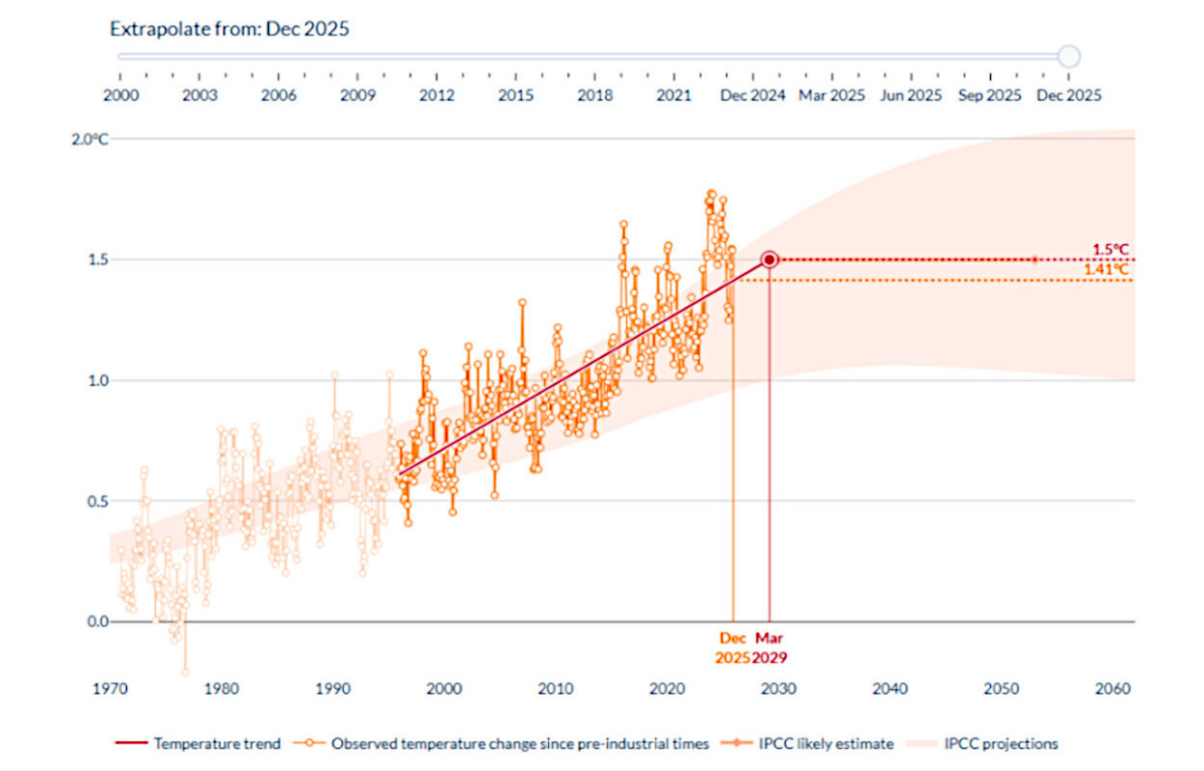
Planet records third hottest year in 2025

Copernicus report indicates an average global temperature of 14,97°C, record highs at the poles, warming oceans, and an increase in extreme weather events.

19.02.2026 | 13:47 (UTC -3)

Cultivar Magazine



The year 2025 ended as the third warmest ever recorded on the planet. The global average temperature reached 14,97°C.

This value was 0,59°C above the 1991-2020 average and 1,47°C above pre-industrial levels. The data is from the Global Climate Highlights 2025 report by the Copernicus Climate Change Service (C3S).

The ranking places 2025 behind only 2024 and 2023. The last 11 years, from 2015 to 2025, occupy the top 11 positions among the hottest in the historical series. The average temperature for the three-year period 2023–2025 exceeded 1,5°C above pre-industrial levels for the first time, although 2025 alone did not surpass that limit.

Air temperatures were above average across 91% of the planet's surface. Almost half of the Earth recorded conditions much

warmer than usual. January 2025 entered the record as the hottest January ever recorded.

At the poles, the deviations were striking. Antarctica recorded an annual anomaly of +1,06°C, the largest in the series. The Arctic recorded +1,37°C, the second highest value ever measured. In Europe, the average temperature reached 10,41°C. This figure exceeded the 1991–2020 average by 1,17°C and secured third place among the warmest years on the continent.

Sea surface

Sea surface temperatures also remained elevated. The annual average outside the

polar regions reached 20,73°C. This value was 0,38°C above the 1991-2020 average and ranked third in the historical ranking. The report indicates 2025 as the warmest La Niña year ever recorded for both air and ocean temperatures.

Sea ice levels remained near historic lows. In the Arctic, monthly extent reached record lows between December 2024 and March 2025. In March, the annual maximum marked the lowest level in 47 years of satellite monitoring. In Antarctica, coverage fell rapidly, reaching the fourth lowest annual minimum in February. The combination resulted in the lowest global sea ice extent ever recorded for a single month since the late 1970s.

Extreme events

Extreme events marked the year. Intense rains caused floods in the United States, China, and South Korea. Melting glaciers generated floods in Pakistan and India. Preliminary data indicate 103 tropical storms worldwide in 2025. Of these, 50 reached tropical cyclone strength and 20 evolved into major cyclones.

Heat waves have hit Asia, North America, Africa, and Europe. Prolonged droughts and extreme heat have exacerbated wildfires in Europe and North America. According to the Copernicus Atmosphere Monitoring Service, Europe recorded the highest annual volume of emissions from wildfires in the last two decades.

The report indicates warming of approximately 1,4°C above pre-industrial levels by the end of 2025. The document reinforces the reduction of the margin to the 1,5°C limit foreseen in the Paris Agreement. Copernicus advocates continuous monitoring to guide data-driven decisions.

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John Deere earns US$656 million in the first fiscal quarter of 2026.

Revenue grows 13%; company raises annual forecast to up to US$5 billion.

19.02.2026 | 10:18 (UTC -3)

Cultivar Magazine, based on information from Jen Hartmann

Deere & Company reported net income of $656 million in the first fiscal quarter of 2026. This represents a 25% decrease

compared to the same period in 2025. Net income and total revenues totaled $9,611 billion, a 13% increase year-over-year.

Diluted earnings per share reached US$2,42. In the same quarter of the previous year, the indicator was US$3,19.

Net sales reached US$8,001 billion. In the first quarter of 2025, the company's revenue was US$6,809 billion.

The company raised its net profit forecast for fiscal year 2026. The estimate ranges from US$4,5 billion to US$5,0 billion.

In the Precision Agriculture and Production segment, revenue totaled US$3,163 billion, representing a 3% increase. Operating profit fell 59% to US$139 million. Higher tariffs, an unfavorable sales mix, and increased warranty expenses

pressured the result.

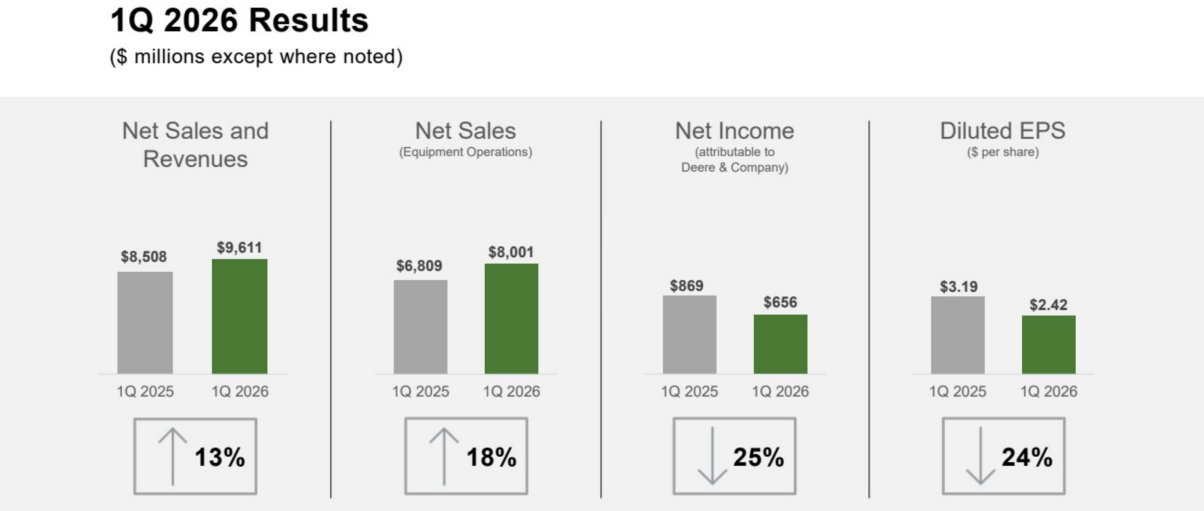
In Small Farming and Gardening, revenue reached US$2,168 billion, a 24% increase. Operating profit grew 58% to US$196 million. Higher shipment volumes and price realization boosted performance, despite the impact of tariffs.

The Construction and Forestry segment recorded revenue of US$2,670 billion. Growth reached 34%. Operating profit increased by 111%, totaling US$137 million. The company attributed the result to higher volumes and gains in production efficiency.

The Financial Services division reported net income of US$244 million, a 6% increase. Favorable financing spreads and lower provisions for credit losses

contributed to the result.

By 2026, the company projects a 15% to 20% decline in the large agricultural machinery market in the United States and Canada. In small-scale agriculture and gardening in the region, expectations range from stability to a 5% increase. In South America, the company forecasts a decline of approximately 5% in tractors and harvesters.



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Study maps resistance to Fusarium wilt in wild bananas.

Region on chromosome 5 of Calcutta 4 may accelerate improvement against the Subtropical 4 race.

19.02.2026 | 09:09 (UTC -3)

Cultivar Magazine

Photo: Elizabeth Aitken

Australian scientists have identified the genomic region that confers resistance to Fusarium wilt Subtropical Race 4 (STR4) in a wild banana. The discovery strengthens breeding programs and expands strategies against the disease that threatens the global supply of the fruit.

The research located the QTL associated with resistance on the short arm of chromosome 5 of the diploid variety Calcutta 4, of the subspecies Musa acuminata ssp. burmannica.

Fusarium wilt, caused by *Fusarium oxysporum* f.sp. *cubense*This compromises Cavendish coffee plantations worldwide. The Tropical Race 4 (TR4) is advancing in producing regions. STR4 is causing losses in subtropical areas.

The team conducted crosses between the resistant 'Calcutta 4' and the susceptible 'Ma848'. After inoculation with STR4 isolates, the researchers compared the DNA of resistant and susceptible plants. Sequencing and analysis of segregating bulks indicated a significant QTL between 5 and 10 Mb of chromosome 5. No other QTLs with the same level of confidence emerged.

The data indicated a greater contribution of haplotype 2 of 'Calcutta 4' in the resistant group. Mutations with a possible functional impact in the candidate region were also detected.

The project took five years. Each generation required at least 12 months of cultivation before inoculation and

evaluation.

Calcutta 4 does not meet the market standards for fresh produce. The fruit is not palatable for consumption. The team plans to develop molecular markers to track the resistance allele in the early stages of breeding. This strategy could reduce costs, accelerate selection, and support the release of commercial cultivars with genetic resistance to the disease.

Further information can be found at doi.org/10.1093/hr/uhag001

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Nutrien releases 2025 results

Company reports $2,3 billion in profit for the year.

19.02.2026 | 08:17 (UTC -3)

Cultivar Magazine, based on information from Simon Scott

Financial highlights

"2025 was a defining year for our company, with exceptional performance across all our operating segments and a reduction in cost and capital expenditures that surpassed our targets. Alongside delivering structural free cash flow growth, we took decisive actions to optimize our portfolio, strengthen our balance sheet and increase cash returns to shareholders,"

Ken Seitz, President and CEO

2025 Results	
Net Earnings	$2,297M
Adjusted EBITDA[1]	$6,046M
Retail Adjusted EBITDA	$1,736M
Potash Adjusted EBITDA	$2,254M
Nitrogen Adjusted EBITDA	$2,147M
Phosphate Adjusted EBITDA	$382M

2025 Highlights

- **13%** increase in adjusted EBITDA compared to 2024
- **Record** upstream fertilizer sales volumes
- **>5%** annualized growth in Retail adjusted EBITDA since 2018

Nutrien ended 2025 with a net profit of US$2,3 billion, a 228% increase compared to 2024. Adjusted EBITDA totaled US$6,05 billion, a 13% increase. In the fourth quarter, net profit reached US$580 million, with adjusted EBITDA of US$1,28

billion.

The result reflected higher average fertilizer prices, record volumes in the upstream segment, and a greater contribution from retail. The company also reduced operating expenses and invested capital above internal targets.

Free cash flow has gained momentum. Since the fourth quarter of 2024, the company has raised approximately US$900 million through asset sales. The company repurchased 2% of its shares in 2025 at a cost of US$551 million and approved a 1% increase in its quarterly dividend to US$0,55 per share.

In the potash segment, adjusted EBITDA reached US$2,25 billion for the year, up 22%. Total sales reached 14,25 million

tons, the highest volume ever recorded. The average price rose to US$252 per ton in 2025.

In nitrogen, adjusted EBITDA reached US$2,15 billion, a 14% increase. Ammonia production grew with a four percentage point improvement in the operating rate of plants in North America. Total nitrogen sales reached 10,9 million tons.

In the phosphate segment, adjusted EBITDA was US$382 million for the year. The segment faced higher sulfur costs and lower volume in the first quarter.

For 2026, the company projects potassium sales between 14,1 million and 14,8 million tons. For nitrogen, the estimate ranges from 9,2 million to 9,7 million tons. Adjusted retail EBITDA is expected to

reach between US$1,75 billion and US$1,95 billion.

The company forecasts global potassium shipments of between 74 million and 77 million tons in 2026, driven by tight fundamentals and low inventories in markets such as China and Brazil.

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Syngenta expands agreement and brings botanical biofungicide to new markets.

Quillibrium strengthens the management of fungal diseases in fruits and vegetables in the Americas.

19.02.2026 | 08:07 (UTC -3)

Cultivar Magazine, based on information from Syngenta

Syngenta has expanded its exclusive agreement with Botanical Solution Inc. (BSI) and will distribute the botanical biofungicide Quillibrium in the United States, Canada, and Mexico. The product is derived from the Chilean tree. *Quillaja saponaria*, has been serving producers in Chile and Peru since 2021.

Quillibrium uses extract from the bark of Quillaja saponaria, rich in saponins with antifungal action. BSI produces the active ingredient ABM-01 through in vitro plant tissue culture. This technology ensures a continuous supply without cutting down trees and preserves biodiversity.

The biofungicide acts both preventively and curatively. It inhibits spore germination. It controls mycelial growth. It

also activates the plant's natural defenses through acquired systemic resistance.

Since 2021, Syngenta and BSI have been working with producers in Chile and Peru on crops such as grapes, tomatoes, and cherries. The product controls diseases caused by... *Botrytis cinerea*, *Erysiphe necator*, *alternaria alternata* and complexes associated with sour rot in grapevines. Field trials in both countries and in Mexico indicated increased yield and improved fruit quality.

In Chile, the biofungicide was marketed under the name BotriStop. With the expansion of the agreement, Syngenta will now distribute Quillibrium for crop protection, lawns, ornamentals, and post-harvest applications in North America. The

company states that the solution contributes to Integrated Pest Management programs by combining biologicals and conventional pesticides.

The product meets maximum residue limits required by export markets, such as the European Union and East Asian countries. According to the companies, the biologicals market could exceed US$20 billion by 2030.

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Embrapa launches white grape cultivar for the Southern Region.

The new cultivar has a yield potential of up to 30 tons per hectare and is easy to manage.

18.02.2026 | 14:52 (UTC -3)

Viviane Zanella, Cultivar Magazine edition

Photo: Patricia Ritschel

Embrapa Uva e Vinho presents this Thursday (February 19th), at a field day held in Alto Feliz (RS), the new seedless

white grape cultivar BRS Pérola. The result of more than 18 years of research, the variety emerges as an alternative for the production of fine table grapes in the Southern Region, with the potential for high productivity and easy management.

Trials conducted in the Serra Gaúcha and Santa Catarina regions, in partnership with Epagri, indicate a productive potential of up to 30 tons per hectare under cultivation with plastic covering. This new option expands the portfolio of grapes for fresh consumption in the region, alongside the BRS Vitória, BRS Isis, and BRS Melodia cultivars.

Growing demand for table grapes

Photo: Viviane Zanella

According to researcher João Maia, from Embrapa Uva e Vinho, there is room for expansion of the production of fine table grapes in the South of the country, both for sale on farms and in small establishments. He says that the growth of rural tourism and wine tourism has stimulated investments in the "pick and pay" system, adding value through direct sales to consumers.

Furthermore, producers are seeking to diversify their portfolio to meet the needs of different consumer profiles. The berries of the BRS Pérola variety have characteristics similar to those of the traditional Thompson Seedless — a benchmark in the seedless white grape market in the São Francisco Valley — such as elongated shape, crunchy texture, and neutral flavor, with a balance between sugars and acidity.

Researcher Patrícia Ritschel (pictured), one of the coordinators of the Grapes of Brazil program, points out that the bunches of the new cultivar have low compactness, which facilitates thinning and reduces the demand for labor, a relevant factor for the competitiveness of table grape viticulture

in the region.

On-site approval

Currently undergoing commercial validation, the cultivar is already demonstrating acceptance among producers. Grape grower Jair Freiberger, in his third year of producing BRS Pérola, believes the variety offers important advantages, such as the bright yellow color of the berries, their crispness, and elongated shape – attributes valued by consumers.

According to Adeliano Cargin, head of Embrapa Grape and Wine, the new cultivar has the potential to add value to regional production and strengthen table

grape viticulture in the Serra Gaúcha region, reinforcing the role of public research in the development of Brazilian agriculture.

agronomic characteristics

Photo: Patricia Ritschel

BRS Pérola is the result of genetic crossing carried out in 2004 and underwent a series of tests until the

recommended production system for the Southern Region was defined. The cultivar is not suitable for the Brazilian Semi-arid region.

In the Serra Gaúcha region, the berries reach approximately 18 millimeters in length after the application of gibberellic acid. They have an elongated ellipsoid shape, a medium-thick skin, colorless pulp, and a moderately firm texture. They contain rudimentary traces of small seeds.

Under cultivation with plastic covering, the cycle from sprouting to harvest is approximately 170 days, with maturation in February, characterizing it as a medium-cycle cultivar for the Southern Region.

Growing recommendations

The technical recommendation is for cultivation in a trellis system, with a spacing of 2,50 meters between rows and 2,00 meters between plants, on the Paulsen 1103 rootstock and with the use of plastic covering — considered fundamental to ensure the quality of table grapes in the region's climate. The recommendation is to adopt mixed pruning, as detailed in the cultivar's Technical Circular.

Seedling sales

The BRS Pérola variety will initially be marketed by the licensed nurseries Viecelli Viveiros, in Videira (SC), and MP Mudas, in Vacaria (RS), which are already receiving orders for seedling production in

2026.

Other nurserymen can acquire basic material by reserving it at the Canoinhas Experimental Station (SC), between April and June, with delivery scheduled for July to August. Embrapa advises interested producers to reserve seedlings at least one year in advance, as production is made to order.

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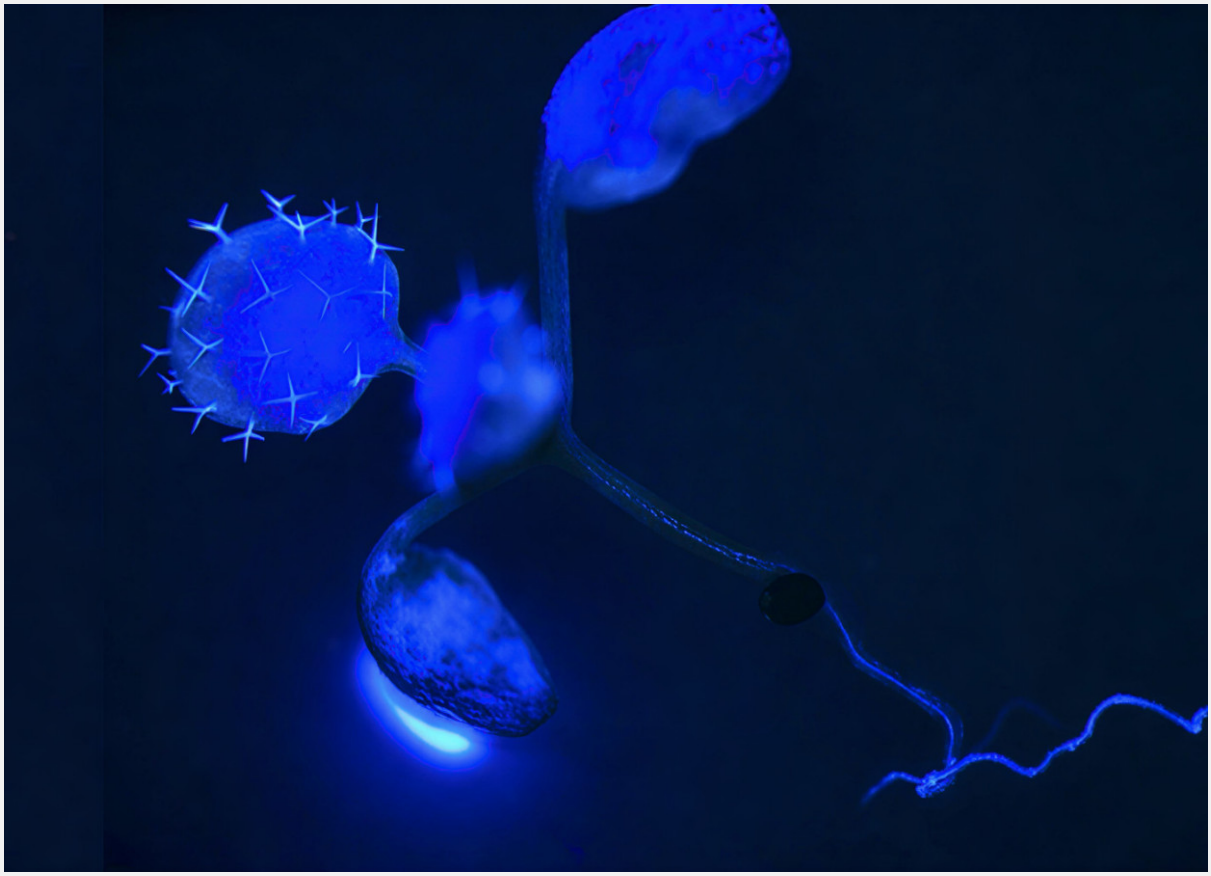
Circadian clock adjusts proton gradient and resets carbon partitioning.

Study shows that CCA1 modulates pH in the phloem and epidermis.

18.02.2026 | 14:47 (UTC -3)

Cultivar Magazine



The circadian clock component CCA1 controls electrochemical proton gradients in specific cell types and resets the growth balance between shoot and root in *Arabidopsis*The mechanism involves opposite regulation of apoplastic pH in the hypocotyl epidermis and phloem companion cells. This modulation alters sucrose loading, transport rate in the phloem, and carbon allocation, explain Spanish and Japanese researchers.

Seedlings with CCA1 overexpression exhibited long hypocotyls and short roots under constant light. The double mutant cca1 lhy showed the opposite phenotype. The differences appeared in early developmental stages. The hypocotyl-to-root length ratio increased in CCA1-ox

plants and decreased in the mutant. The pattern was not repeated in mutants of other clock components, indicating a specific function of CCA1.

Transcriptional networks

RNA-seq analyses revealed distinct transcriptional networks in shoots and roots. In shoots, CCA1 induced genes linked to auxin signaling, such as PIF4, and activated pathways associated with cell elongation. Chromatin immunoprecipitation assays confirmed direct binding of CCA1 to the PIF4 promoter in shoots. In roots, the factor did not extensively activate auxin genes. The

differential set included genes for carbohydrate metabolism and metabolite transport.

Among the targets repressed by CCA1, the sucrose transporter SUC2 stood out. Overexpression reduced SUC2 expression in shoots and roots. The cca1 lhy mutant increased gene levels. ChIP assays confirmed CCA1 binding to the SUC2 promoter. CCA1-ox plants accumulated more starch in photosynthetic tissues and showed lower sucrose content in roots. The addition of exogenous sucrose to the culture medium increased the root length of CCA1-ox, indicating a limitation of endogenous supply.

The study also identified direct repression of the H+-ATPase AHA3 by CCA1. This

protein acts in phloem companion cells and sustains the proton gradient necessary for sucrose/H+ symport. AHA3 expression decreased in CCA1-ox and increased in CCA1 lhy. ChIP assays confirmed the interaction of CCA1 with the AHA3 promoter. This reduction compromised the electrochemical gradient and increased the apoplastic pH in the phloem.

Alkalinization of the apoplast

Membrane-anchored pH sensor images showed apoplast alkalinization in CCA1-ox companion cells. The pattern occurred in hypocotyls and roots. The transport rate of

esculin, a fluorescent analog of sucrose, decreased in CCA1-ox roots and increased in CCA1-lhy. Overexpression of AHA3 in the CCA1-ox background restored phloem pH, normalized transport rate, and recovered root growth.

In the hypocotyl epidermis, the effect was reversed. CCA1 reduced the apoplastic pH and favored acidification associated with cell elongation. The pattern oscillated throughout the daily cycle and showed a phase almost opposite to that observed in the phloem. The cca1 lhy mutant showed an increase in pH in the epidermis. The data set supports specific cellular regulation of the proton gradient.

Mathematical modeling integrated sucrose dynamics in the aerial part, phloem loading

rate, and root growth. Simulations indicated an approximate 50% reduction in sucrose loading rate in CCA1-ox and an increase in CCA1 lhy. This result explains the imbalance between source and sink organs.

Researchers propose that CCA1 functions as a circadian rheostat. This factor adjusts proton gradients according to cell type. The epidermis acidifies and expands the hypocotyl. The phloem alkalizes, reduces sucrose export, and limits root elongation. This mechanism connects the biological clock, carbon partitioning, and the temporal coordination of plant growth.

More information at doi.org/10.1016/j.cell.2025.12.056

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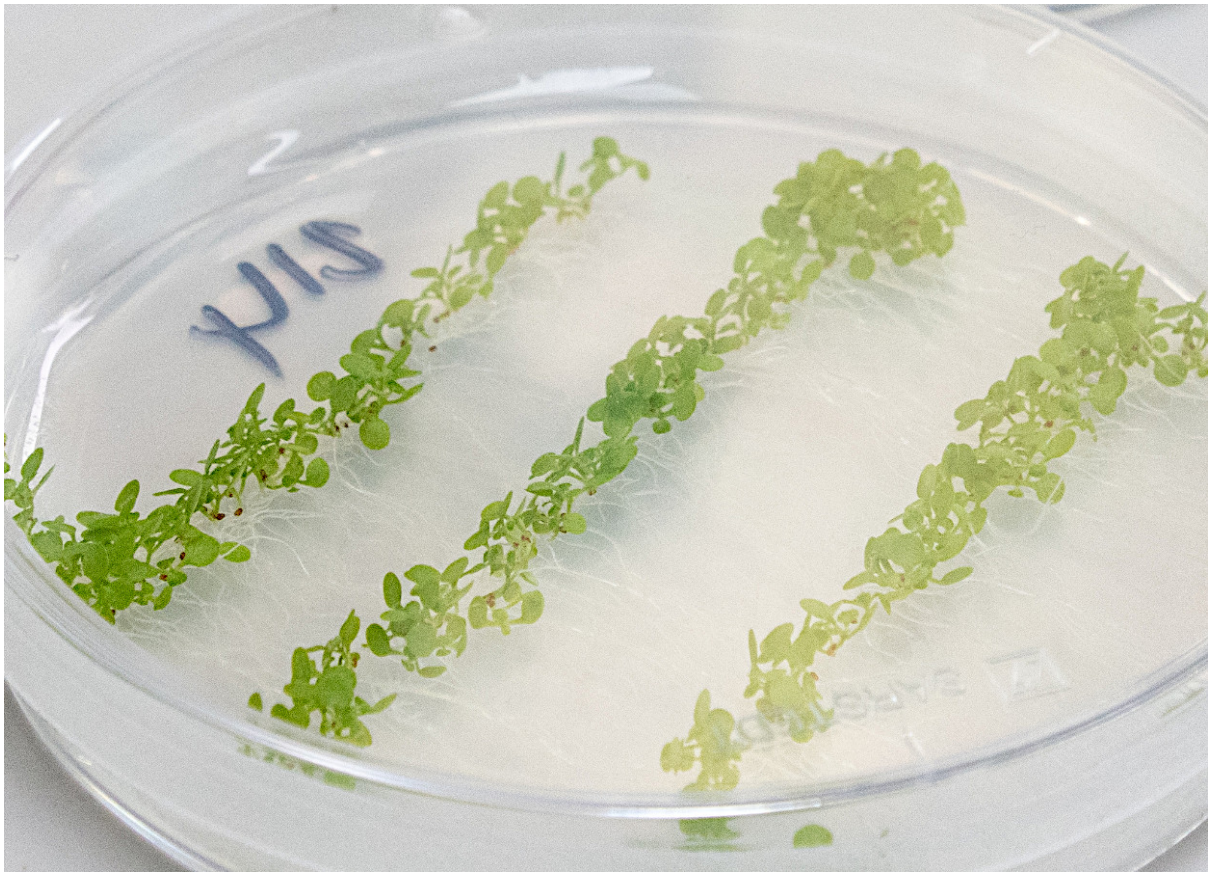
Foliar spraying with dsRNA reaches roots and expands biopesticides.

A study from the University of Queensland confirms the systemic mobility of double-stranded RNA via the apoplast.

18.02.2026 | 09:40 (UTC -3)

Cultivar Magazine



Plant samples for experiments in the UQ laboratory - Photo: Megan Pope

Foliar sprays with double-stranded RNA reach roots, flowers, and new tissues and maintain activity against pathogens. Research from the University of Queensland has demonstrated that dsRNA applied to leaves travels through the plant, reaches the root system, and silences genes of infecting fungi. The work also refutes the hypothesis that dsRNA enters plant cells directly.

The team led by Chris Brosnan of the Queensland Alliance for Agriculture and Food Innovation applied dsRNA to leaves and detected the material in distant tissues. The dsRNA appeared in the vasculature, at the apex, in young leaves, in flowers, in siliques, and in roots. The molecule remained intact in new tissues formed after application.

Experiments showed that dsRNA moves through the apoplast, not the symplast. Blocking plasmodesmata did not prevent movement. The team isolated apoplastic fluid in roots and young leaves and identified mobile dsRNA in these compartments.

Model species

The study evaluated model species and crops as *Arabidopsis*, canola and tomato. In all of them, foliar spraying resulted in the detection of dsRNA in distant tissues.

Researchers tested the functionality of mobile dsRNA against soil fungi. Plants treated with dsRNA targeting the GFP gene showed a reduction of approximately

50% in the expression of the transgene in *Fusarium oxysporum* e *Verticillium dahliae* that infected the roots.

The data indicate that dsRNA transferred from the plant to the fungus and activated the pathogen's RNAi machinery. Mutant plants deficient in siRNA production maintained the silencing effect in *Botrytis cinerea*The result indicates that the fungus is predominantly processed after transfer.

siRNA enrichment

The team used the TraPR technique to purify functional siRNAs loaded into AGO complexes. The analysis revealed enrichment of 21- and 22-nucleotide siRNAs derived from the applied dsRNA.

dsRNA regulates genes or activates RNA interference in pests and pathogens, including fungi. When the target organism absorbs the molecule, essential genes are silenced. The technology is emerging as an alternative to synthetic chemical strategies.

According to Donald Gardiner, the results alter the understanding of the stability, uptake, and movement of dsRNA. Currently, there are no effective sprayable products for subsurface targets. Mobility to the roots opens up opportunities for controlling organisms that are difficult to reach.

The team aims to identify root organisms that are highly susceptible to dsRNA. One of the potential targets includes

nematodes, which affect grains, cotton, and vegetables.

More information at doi.org/10.1093/nar/gkaf1452

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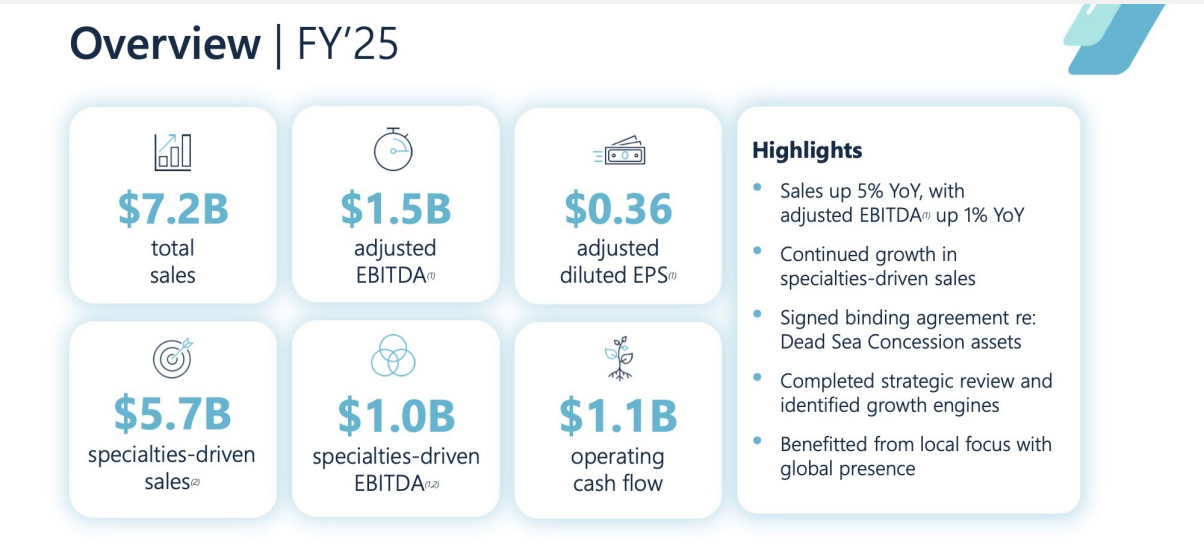
ICL increases sales by 5% in 2025.

Potassium price rises 22% in the 4th quarter; company reviews portfolio.

18.02.2026 | 07:15 (UTC -3)

Cultivar Magazine, based on information from Peggy Reilly Tharp



ICL reported sales of US$7,153 billion in 2025, a 5% increase over 2024. Adjusted EBITDA reached US$1,488 billion, and adjusted earnings per share totaled US$0,36. The company projects adjusted EBITDA between US$1,4 billion and

US$1,6 billion in 2026.

In the fourth quarter, revenue reached US$1,701 billion, a 6% increase year-over-year. Adjusted EBITDA totaled US$380 million, a 10% increase. Adjusted diluted earnings per share were US$0,09.

Operating profit for the quarter showed a negative result of US$16 million. The company recorded adjustments of US$239 million. These figures include US$122 million related to the implementation of the new strategy. The company terminated LFP battery materials projects in St. Louis and Spain. The company also recorded a provision of US$80 million following a court decision regarding water extraction fees in the Dead Sea.

In the Potassium segment, quarterly revenue totaled US$473 million. The CIF price per ton reached US$348 in the fourth quarter. This represents a 22% increase compared to the previous year. The segment's EBITDA reached US$150 million.

Potassium production in the fourth quarter reached 1,222 million tons. Sales totaled 1,200 million tons. Adverse weather conditions at the end of the year affected shipments at the port of Ashdod and reduced volumes in the United States and Europe.

In December, ICL signed contracts with Chinese clients to supply 750 tons of potassium in 2026. The agreement includes an option for an additional 330

tons. The agreed price was US$348 per ton.

The Phosphate Solutions segment recorded sales of US$518 million in the fourth quarter. EBITDA reached US$121 million. The company reported a drop in commodity phosphate prices during the period. Higher sulfur costs pressured margins.

In January 2026, the company acquired 49,9% of Bartek Ingredients. The company operates in food-grade malic and fumaric acids. The operation is part of a strategy to expand its presence in food specialties.

The Growing Solutions segment recorded sales of US$467 million in the fourth quarter. EBITDA totaled US$60 million. Brazil drove the result with higher prices.

Europe also increased sales with improved product mix and pricing.

Operating cash flow reached US$1,056 billion in 2025. The company distributed approximately US$224 million in dividends during the year. The company announced a quarterly dividend of US$0,0465 per share, payable on March 25, 2026.

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John Deere acquires assets from Finnish company Risutec Oy.

The business reinforces its forestry strategy and expands its offering for reforestation operations.

17.02.2026 | 15:55 (UTC -3)

Cultivar Magazine, based on information from Kara Ferry

John Deere announced the acquisition of intellectual property and assets related to tree planting equipment from Risutec Oy, a

manufacturer based in Finland. This transaction expands the company's forestry strategy and strengthens its offering of solutions focused on reforestation and sustainable forest management.

According to the company, the portfolio of planters allows for configuration according to the client's operational conditions. The equipment accepts integration with optional precision forestry software, focusing on productivity and data analysis for forest management.

Mary Pat Tubb, vice president of global forestry at John Deere, highlighted the incorporation of the technical knowledge and experience of the Risutec team. The executive stated that mechanized solutions

reduce reliance on manual planting. This decreases the workforce's exposure to extreme weather, uneven terrain, and wildlife hazards. The technology also increases operational productivity.

The line of planters will be sold and serviced through select John Deere and Waratah dealers in the global forestry equipment market.

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