



2023 Annual REPORT

- Research and Development
- Technology Transfer
- Administration

Embrapa Suínos e Aves
Rodovia BR 153 - km 110
89.715-899, Concórdia, SC, Brazil
www.embrapa.br/fale-conosco/sac

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Editors
Monalisa Leal Pereira
Lucas Scherer Cardoso

Photos and Illustrations
Alexandre Matthiensen
Biopark
Canva

Jairo Backes
MoovieTwo
Jalusa Deon Kich
Lucas Scherer Cardoso
Monalisa Leal Pereira
Paulo César Baldi
Rodolfo Espinola/AgênciaAL

Technical Review
Everton Krabbe
Catia Silene Klein
Franco Muller Martins
Darci Dambrós Junior

Translation
Jean Carlos Porto Vilas Boas Souza

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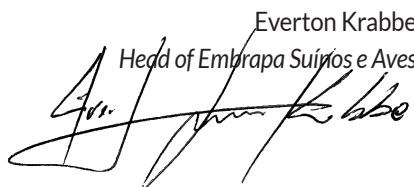
Investment in innovation to meet the demands of the productive chain

Foreword

Embrapa Swine and Poultry made significant progress in 2023. Our research staff worked diligently to overcome challenges and achieve our goals, building new partnerships and engaging in innovative projects.

As the year went by, we reaffirmed our commitment to innovation and excellence. We continued to seek new ways to deliver value to pig and poultry production and to Brazilian society, staying attentive to market demands and ever-changing needs. In the following pages, we highlight the main actions and achievements of 2023.

We hope this material is both informative and inspiring, reflecting our ongoing efforts to make a difference.

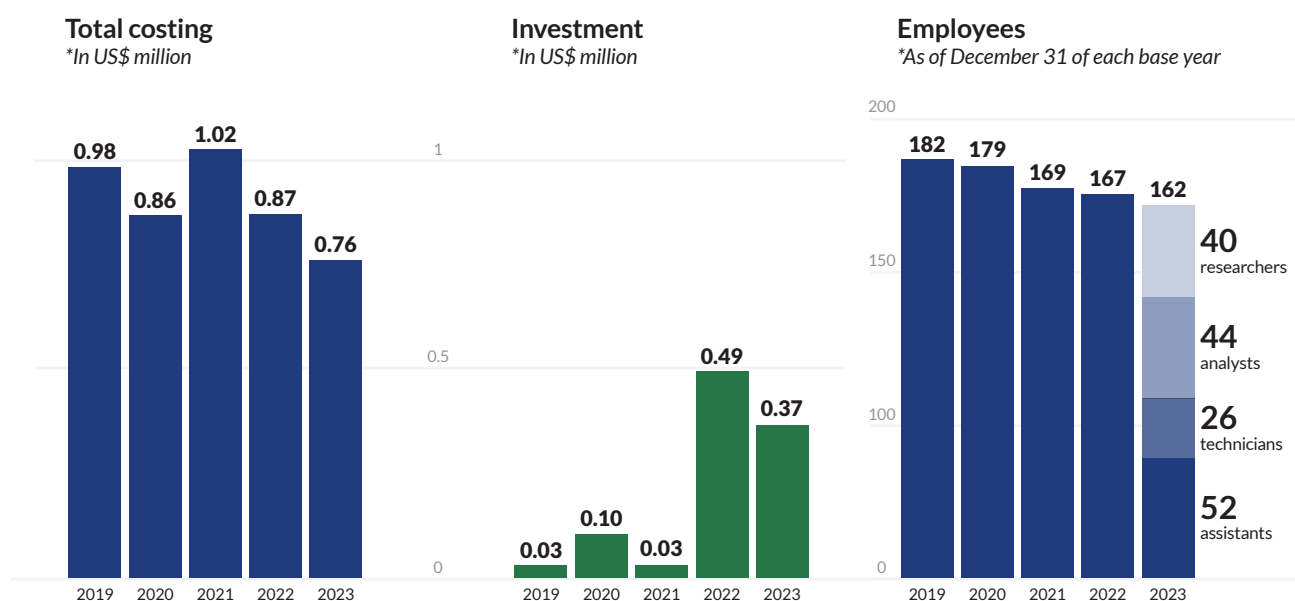

 Everton Krabbe
 Head of Embrapa Suínos e Aves

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*US\$ 1 = R\$ 5.53 (June 27, 2024)

Costing, investment and staff evolution at Embrapa Suínos e Aves 2019-2023



Embrapa Suínos e Aves' Indirect Revenue from 2019-2023

*From 2020, expenses executed are taken into account instead of the revenue reached throughout the year

	2019	2020	2021	2022	2023
Revenue	US\$	US\$	US\$	US\$	US\$
Events revenue/Technology Transfer	47,393.31	29,150.09	15,695.84	40,035.99	26,316.31
Research Support Foundations	508,276.13	281,624.77	803,055.15	431,729.48	398,231.37
Coperdia Pig and Poultry Contract Farming	329,099.82	416,041.41	597,012.12	466,726.94	327,159.93
Other partnerships	1,193,348.64	139,815.91	-	124,956.42	227,060.11
Deputy Chamber extra budget	-	90,219.17	-	90,415.91	-
Scholarships	13,200.72	26,292.95	56,166.37	73,788.43	140,707.05
Total	2,091,318.63	983,144.30	1,471,929.48	1,227,653.16	1,119,474.78



Investments

US\$ 366 thousand in improvements in 2023

Description	US\$
GENERAL IMPROVEMENTS	
Implementation of the PPCI and accessibility executive project	225,813.60
Development of several construction projects for the PAC	39,359.79
LABORATORY EQUIPMENT AND EXPERIMENTAL FIELDS	
1 bench-top lyophilizer	21,338.16
13 ultra-low temperature freezers	13,783.17
1 flame photometer	3,061.12
5 laboratory multifunctional vortex	2,701.95
1 microcentrifuge	2,211.57
Others purchases	8,927.89
COMPUTERS AND OFFICE EQUIPMENT	
34 computer desktops and monitors	27,421.34
14 security cameras	8,429.85
1 network server	4,520.80
Others purchases	8,541.70
2023 TOTAL	366,110.94

Embrapa Genetics

Market share in 2023



LEARN MORE ABOUT
THE 051 LAYING
HEN AND THE
MS115 SWINE



Laying Hen
051

2,224
million
sold birds

8.9%
of the national
market of brown-egg
laying hens



Swine
MS115

223
swines sold

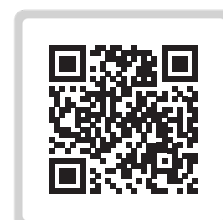
2.9%
of the national
market of
terminal males

Strategic action



Umipi's Building at Biopark in Toledo, Paraná

Umipi will be a pivotal research asset in Paraná



WATCH THE VIDEO
WITH UMIPI
TIMELINE

In 2023, Embrapa, Biopark, and Biopark Educação formed a strategic partnership by signing a technical cooperation agreement to establish the Mixed Research and Innovation Unit (Umipi Oeste Paranaense) in Toledo, a city located in the western region of Paraná state.

This partnership promises to intensify research projects in the region, boosting the development of new technologies and agricultural practices, particularly for pig, poultry, and fish production

value chains. With the implementation of Umipi, Embrapa will enhance its operations within the innovation ecosystem in western Paraná, identifying demands and fostering partnerships in technology transfer to support cooperation projects with agro-industries, cooperatives, producer associations, science and technology institutes, and governmental agencies.

The first initiative linked to Umipi is the establishment of the Reference Labo-

ratory for Water and Effluent Analysis, which began in 2023. Additionally, Umipi Oeste Paranaense will serve as a center of excellence for knowledge and technology transfer.

The synergy between Embrapa, Biopark, and Biopark Educação will facilitate local producers' access to essential information and resources to improve their performance.

Research

Research activities were intense last year. Embrapa's efforts involved actors from all sectors of the pig and poultry production value chains. Additionally, the unit delivered numerous results in support of public policies, directly impacting the improvement of the Brazilian agricultural sector. For instance, research projects provided scientific support for new regulations implemented by the Ministry of Agriculture and Livestock concerning risk-based inspection procedures in poultry slaughterhouses.

Technology Transfer

The prospecting of partnerships and project demands was crucial for improving collaborations with the pig and poultry production value chains. The Inova Program selected 22 proposals from entrepreneurs in 2023, which are currently in the structuring phase to be executed as innovation projects. Furthermore, the unit's involvement in the Ater+Digital platform included creating technical content (texts, audios, and videos) aimed at technicians and small-scale pig farmers.

Administration

Making Administration play a role as a strategic link for carrying out research and transferring technologies was the motto of 2023. The aim was to modernize processes, ensure the sustainable evolution of the Unit, and strive for transparency, participatory management, and quality of life for all employees and collaborators. Administration also focused on identifying challenges and investment needs related to Embrapa's PAC implementation, launched in 2023 to renovate the physical structure of its units.

Year of Tributes

The year 2023 brought significant tributes to Embrapa Swine and Poultry. In September, in celebration of Embrapa's 50th anniversary and Embrapa Swine and Poultry's 48th anniversary, the Legislative Assembly of Santa Catarina (ALESC) held a formal decentralized meeting in Concórdia.

During the meeting, ALESC also paid tribute to companies and institutions with a history of partnership and support for the work that Embrapa develops in favor of poultry and pig production in Brazil. It was also a moment of recognition for people who have marked the Unit's tra-

jectory, whether through research that impacted production chains or through involvement in projects and activities that shaped our history. The honorees represented work teams and colleagues.

Outstanding Leadership Award

On October 25th, Embrapa Swine and Poultry paid tribute to two important figures in Brazilian pig and poultry production. The 2023 Outstanding Leadership Poultry and Swine Award was presented during the Inova Program – Poultry and Swine Production of Tomorrow, which took place at Embrapa Swine and Poultry's headquarters in Concórdia.

The awardees for 2023 were Rogério Jacob Kerber, executive director of the Rio Grande do Sul Pig Products Industries Union (SIPS), in the pig production sector, and Inácio Afonso Kroetz, executive director of the Poultry Products Industries Union of the State of Paraná (Sindiavipar), in the poultry production sector.

City Council

Another tribute for Embrapa's 50th anniversary was held at the Concórdia City Council. The ceremony took place during the ordinary meeting of the legislative house on November 16th.



Solemn session of the Legislative Assembly of Santa Catarina



2023 Outstanding Leadership award (poultry production)



2023 Outstanding Leadership award (pig production)



Tribute at the Concórdia City Council

Publications reinforce technological results

54 articles published in scientific journals

18 articles and 12 abstracts in conference proceedings

13 articles published in specialized magazines

11 technical reports edited

8 technical-scientific book chapters published

6 Embrapa's Documents Series published

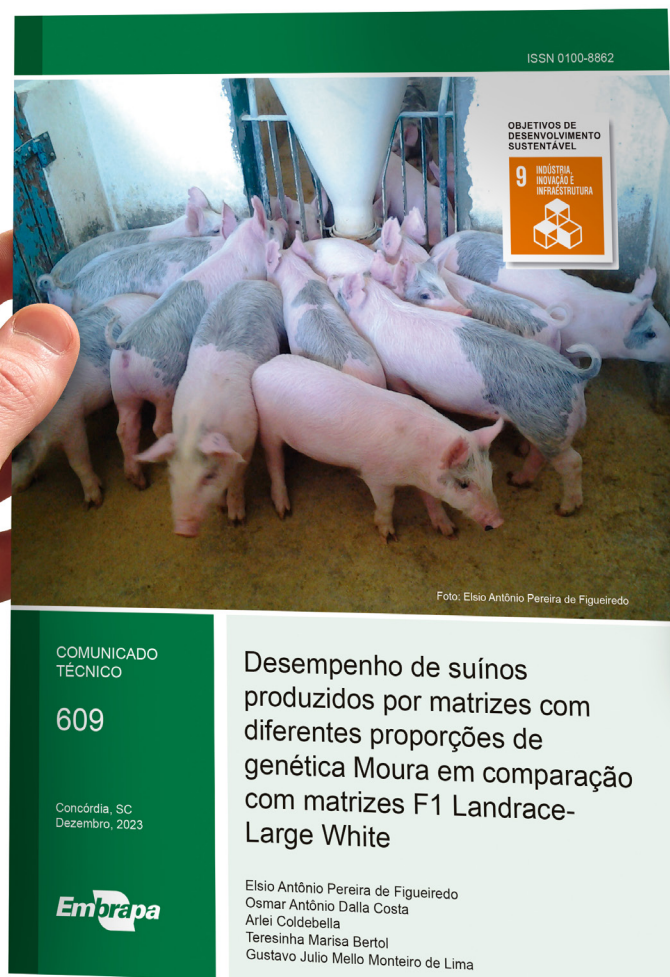
5 books edited or organized

2 brochures, leaflets or booklets published

1 research & development bulletin



CHECK ALL
EMBRAPA
SUÍNOS E AVES
PUBLICATIONS



Caracterização da avicultura no Brasil a partir do Censo Agropecuário 2017 do IBGE



POULTRY FARMING



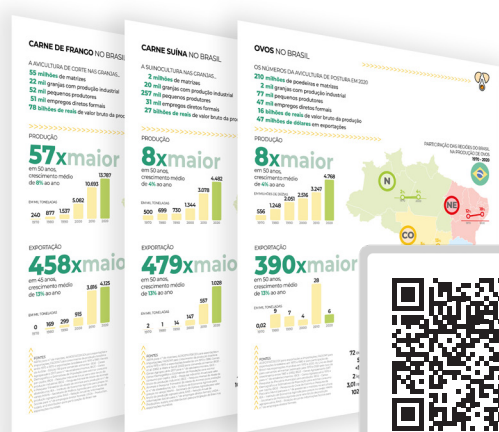
PIG FARMING



Characterization of Poultry and Swine Production

Embrapa Swine and Poultry has released two publications that provide dimensioning and characterization of two significant agricultural activities in Brazil: pig production and poultry production.

These publications address activities across Brazil and its five major regions based on the 2017 Agricultural Census conducted by the Brazilian Institute of Geography and Statistics (IBGE). The information is also available in the Embrapa Research Data Repository (Redape).



➔ Production Evolution

Three infographics available on the CIAS website provide information on the evolution of the chicken and pig production chains, as well as egg production, over the past 50 years.

Highlights



➔ Technical Criteria

Embrapa has published a document that compiles criteria, recommendations, and technologies for managing waste and disposing of dead animals that have not been slaughtered on pig farms.



Continuous action to benefit pig and poultry production

89 ongoing research projects in 2023

The Embrapa Swine and Poultry research team led 61 projects in 2023, including 14 new ones, and participated in the execution of an additional 28 projects in partnership with other Embrapa Units. Of the 89 projects active in 2023, 25 finished at the end of the year.

The Unit's deliveries accounted for 80 results, including some technological and pre-technological assets and innovation support.

The main deliveries were in the biological collection (17) and database (15), in addition to technical-scientific methodology (6), agricultural process (6), industrial process (5), agricultural product/input (5), biotechnology-based asset (4), software (3), prospective studies (3), machine and/or agricultural implementation (2), socioeconomic or impact assessment studies (2), institutional arrangement (1), and computerized procedure (1).

Other notable deliveries were contributions to public policies (5) and the training and updating of multiplier agents (5).



Swine flu

Embrapa developed a vaccine that provides rigorous immunization of pigs potentially, reflecting the diversity of the influenza virus circulating in Brazil. Another difference is that it was built on a nanovaccine platform.



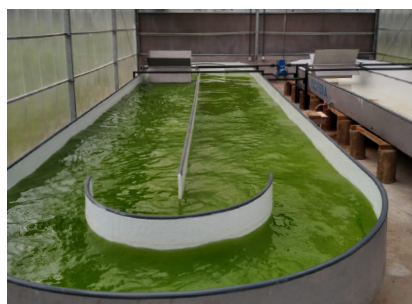
Antimicrobials

In 2023, fieldwork carried out on 116 pig farms evaluated agricultural practices and antimicrobials usage, in addition to collecting biological samples. The objective of this action is to support PAN-BR Agro with economic and environmental studies of practices that impact antimicrobials usage in pig production.



Senecavirus

Embrapa Swine and Poultry developed an inactivated vaccine from an isolate representative of the genetic diversity of Senecavirus A. Tests indicated a robust protective response in pigs with two doses.



Biomass

Embrapa's researchers worked on the study of aquatic biomass for use as raw material in the production of biofuels, generation of biogas in biomass coding, production and isolation of bioactive molecules, and in supplementation in animal nutrition.



LEARN ABOUT
ALL PROJECTS
DEVELOPED BY
EMBRAPA SUÍNOS
E AVES

Alignment

Researchs fit pig and poultry production demands

Innovation challenges

Embrapa Swine and Poultry dedicate to research projects aligned with the main needs of production value chains, with the pivotal objective of promoting pig and poultry production sustainability. The research team works strategically, in close collaboration with pig and poultry crucial stakeholders, in search of innovative and effective solutions, as well as providing crucial support to public policies.

Thematic research groups

Embrapa Swine and Poultry arranges its research process through five Thematic Research Groups (NTs), which focus on production value chains development. NTs work aligned and interact each other constantly. The main actions played by the thematic research groups in 2023 are described below.



NTPA Poultry Production Thematic Group

- » Comparison between conventional poultry housing facilities and automated poultry housing facilities with complete climate control
- » Characterization of small-scale commercial poultry farming and farms regularization
- » Virtual community to encourage cooperation for technological innovation through public and private institutions interactions
- » Portable NIR detection of biogenic amines

NTSA Poultry Health Thematic Group

- » Studies focused on new strains of infectious chicken bronchitis that impacted public policies, with the introduction of a new live vaccine
- » Review and modernization of the Federal Inspection System for poultry slaughterhouses
- » Virus sequence analyzes and viral vaccine development
- » Biosafety of biological and GMO containment areas

Partnership broadens CIAS scope

Pig production costs in the independent market of Goiás, Mato Grosso, and Minas Gerais became part of the scope of services of CIAS (Poultry and Pig Intelligence Center of Embrapa Swine and Poultry) in 2023. Partners of this new service are Brazilian Association of Pig Breeders (ABCS), Association of Pig Breeders of Mato Grosso (Acrismat), Association of Pig Farmers of Goiás (AGS), National Supply Company (Conab), and Mato Grosso Institute of Agricultural Economics (Imea).



CIAS website is available at embrapa.br/suinos-e-aves/cias

NTPS

Pig Production Thematic Group

- » Bacterial contamination effect on pig semen
- » Raw materials evaluation for pigs precision nutrition and winter cereals in pig feed
- » Estimates of genetic parameters for mesentery torsion syndrome in pigs
- » Automated pig feeding systems
- » Animal welfare in pig farming

NTSS

Pig Health Thematic Group

- » Population studies of wild boars in areas of Santa Catarina and the border of Rio Grande do Sul with Uruguay
- » Carcass losses reduction in pig slaughter: diagnostics and loss mitigation
- » Good sanitary practices protocol to prevent bacterial contamination in pig semen production plants
- » Antimicrobial resistance in the swine production environment

NTMA

Environment Thematic Group

- » Integrated GHG repository for treating pig manure and applying organic fertilizers
- » Water reuse in animal protein slaughter and processing
- » Remineralizer associated with poultry litter and its agricultural usage
- » Fluid fertilizer with humic substances from poultry litter
- » Waste distribution and composition traceability study
- » High rate digester for animal production waste

Embrapa selects 22 innovation proposals for pigs and poultry

Proponents selected to build innovation projects in partnership with Embrapa were announced during the event “Inova 2023 – Poultry and Swine Production of Tomorrow”, which had as its main focus debating the main innovation trends for food poultry, pig, and eggs production. Between in-person and online participants, the event brought together more than 160 professionals.



Selected proponents

Inova 2023 brought a proposal to promote open innovation projects distributed in four stages. The first of these was the submission to the public notice aimed at meeting innovation demands. In the second phase, of the 40 proposals registered, 22 were selected to move forward.

Projects building

With the proponents selected, another phase began, in November, with the formation of teams to build innovation projects. This stage ended in April 2024, when proposals were presented to funding sources.

Financing sources

Among the sources of financing are Embrapa itself, which may allocate annual resources to Inova innovation projects, and private institutions interested in promoting pig and poultry production in Brazil.

PROGRAMA Inova



VISIT THE SPECIAL
WEBSITE FOR THE
INOVA PROGRAM



Trends

In addition to innovation projects, the Inova Program will also deliver a study on innovation trends for pig and poultry production based on what was discussed during the event.

The program

The Inova 2023 Program was promoted by Embrapa Swine and Poultry and co-executed by Concórdia City Hall, INCTECH Technological Incubator, Pollem Scientific and Technological Park, and Biopark and Biopark Educação. It was supported by Fapesc, Fapeg and CREA-SC.

Sponsors

As Silver sponsors, the Inova Program had SIPs, Icasa, and MSD Animal Health. Sindicarne/Acav, Kemin, and DSM Nutrition Products were Sponsorship Bronze. The partner media were Avicultura Blog, O Presente Rural, Avicultura Industrial, Suinocultura Industrial, AviNews, NutriNews, and SuinoBrasil.

Information and content available to all audiences



9 technical and institutional events

» Coopavel, Itaipu Show Rural, Expo Agro CotriCampo, Seara Fair, South Brazilian Poultry Production Symposium, South Brazilian Pig Production Symposium, South Brazilian Biogas Forum, AveSui, and PorkExpo



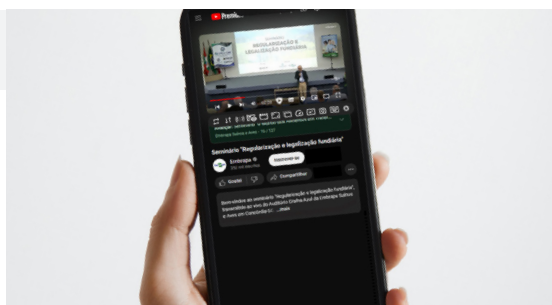
1,422 mentions in the media

» 199 demands of journalists
» 41 news sent to media
» 1 Prosa Rural (Embrapa's radio program)



57 hours of content

» 12 live broadcastings (31 hours)
» 120 videos produced (26 hours of scientific communication, news and interviews)



1,699 services

» 597 via the official customer service (SAC via Embrapa website)
» 381 by phone
» 649 by WhatsApp
» 72 by e-mail





Science Field Day at Embrapa



e-Campo online education

- » 1 course released
- » 9 training courses started
- » 6,626 subscribers



Capacitation

- » 92 events
- » 4,973 training hours
- » US\$ 9,000 in investments



Embrapateca

- » Embrapa's Selection: Inova Program
- » Science today: scientific and media articles
- » Shelf highlights: 4 publications



Science Field Day

- » In person at Embrapa
- » 5 knowledge stations
- » 465 students from Santa Catarina state



Winter cereals in animal feed - Two Harvest Program

- » Articulation meetings in Porto Alegre-RS, Cascavel-PR and Florianópolis-SC
- » Seminar: Embrapa and Senar-RS partnership
- » Webinar: partnership with Nutron and Cargill



Scientific Initiation Journey (Jinc)

- » 34 scientific articles applied
- » 13 poster presentations
- » 19 oral presentations



Awards

- » AgTech Day: 2 awards
- » XXV Brazilian Congress of Animal Reproduction: Scientific highlight
- » XX Abraves National Congress: Best presentation



Apps

- » New versions of Granucalc, Conforcalc, DiagSui, Custo Fácil, and SGAS software



Webinar on winter cereals in animal nutrition



**The revolution of the
future starts now**



Production Performance 2023



14.83 million
tons of meat

2nd in production | ▲2.1% (2022»2023)

1st in exports | ▲6.6% (2022»2023)



5.16 million
tons of meat

4th in production | ▲3.5% (2022»2023)

4th in exports | ▲9.8% (2022»2023)



52.45 billion
units

5th in production | ▲0.7% (2022»2023)

13th in exports | ▲168.2% (2022»2023)



0.13 million
tons of meat


3rd in production | ▼17.9% (2022»2023)

3rd in exports | ▲18.6% (2022»2023)

**Sources: ABPA and FAO (for Brazil's position in egg exports and for the production and export of turkey meat, relative to 2022). The Brazilian position in each production sector considers the European Union as a single country.*



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INTELLIGENCE
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Rodovia BR 153 - km 110 +55 49 3441 0400 
Caixa Postal 321 | 89.715-899 embrapa.br/suinos-e-aves
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