ARTICLE

THE DEBATE SURROUNDING GM CROPS IN SOUTH AMERICA AND ITS COVERAGE IN THE NEWSPAPERS *CLARÍN* AND FOLHA DE *S. PAULO* FROM 2016 — 2018

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ABSTRACT – The cultivation and consumption of transgenic foods is a subject of global debate. Given that Argentina and Brazil are the world's largest producers of genetically modified crops after the United States, this article aims to explore the international controversy surrounding GM crops and its coverage in leading newspapers in these two countries. It aims to verify whether the press exercised its social function as an independent observer or if other interests influenced its coverage. For this, it includes a deductive content analysis of *Clarín* and *Folha de São Paulo's* coverage of GM crops from 2016 to 2018. It concludes that *Clarín's* coverage was more clearly pro-transgenic than that of *Folha de São Paulo*, which could be attributed to greater presence of pro-transgenic sources at *Clarín*, in addition to historical and economic factors that could have influenced the way these newspapers covered transgenic topics.
Key words: GM Products. *Clarín. Folha de São Paulo.* Content Analysis. Communication.

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O DEBATE SOBRE AS CULTURAS GM: reflexo nos jornais *Clarín* e *Folha de S. Paulo* (2016–2018)

RESUMO – O cultivo e consumo de alimentos transgênicos é objeto de debate global. Tendo em vista que, depois dos Estados Unidos, Argentina e Brasil serem os maiores produtores mundiais de culturas geneticamente modificadas, este artigo tem como objetivo explorar a controvérsia internacional em torno das culturas GM e seu reflexo na comunicação dos principais jornais desses dois países. O objetivo é verificar se a imprensa exerceu a função social que lhe foi atribuída ou se atuou influenciada por outros interesses. Para isso, realiza uma análise do conteúdo do tipo dedutivo da cobertura de transgênicos dos jornais *Clarín* e *Folha em S. Paulo*, no período 2016–2018. Conclui-se que a comunicação de *Clarín* foi mais claramente pró-transgênica do que a *Folha de S. Paulo*, o que pode ser atribuído a maior presença de fontes pró-transgênicas em *Clarín*, além de fatores históricos e econômicos que podem influenciar as diferentes coberturas oferecido pelos dois jornais.
Palavras-chave: Culturas GM. *Clarín. Folha de S. Paulo.* Análise do conteúdo. Comunicação.

EL DEBATE SOBRE LOS CULTIVOS TRANSGÉNICOS EN SUDAMÉRICA Y SU COBERTURA EN LOS DIARIOS *CLARÍN* Y *FOLHA DE S. PAULO* DE 2016 A 2018

RESUMEN – El cultivo y consumo de alimentos transgénicos es objeto de debate a nivel global. Teniendo en cuenta que, tras Estados Unidos, Argentina y Brasil son los mayores productores mundiales de cultivos genéticamente modificados, este artículo tiene como objetivo explorar la polémica internacional en torno a los transgénicos y su reflejo en la comunicación de diarios líderes de estos dos países. Se busca comprobar si la prensa ejerció la función social que se le atribuye o si actuó influida por otros intereses. Para ello se realiza un análisis de contenido de tipo deductivo de la cobertura sobre transgénicos de los diarios *Clarín* y *Folha de São Paulo*, durante el periodo 2016-2018. Se concluye que la comunicación de *Clarín* fue más claramente pro-transgénica que la de *Folha de São Paulo*, lo que podría atribuirse a la mayor presencia de fuentes pro-transgénicas en *Clarín*, además de factores históricos y económicos que pudieron influir en la distinta cobertura ofrecida por parte de los dos diarios.
Palabras clave: Transgénicos. *Clarín. Folha de São Paulo.* Análisis de contenido. Comunicación.

1 The discursive power of the press: the case of GMOs in Argentina and Brazil

According to Kovach and Rosenstiel, the press's social function involves defending the public interest: "The fundamental purpose of journalism is to provide citizens with the information they need to be free and self-governing" (2001, p.17). Whether or not it tries to fulfill this social function, the press transmits a conception of reality by selecting certain topics and focusing on them in a given

way, which in turn influences the reading public. It therefore ends up shaping perceptions and decision-making at the personal, social and institutional levels. The press thus has a "discursive power" that is derived and expressed in its ability to build and reinforce approaches to issues (Newell, 2009, p.52).

Aware of this influence, various social actors try to promote their worldviews and interests in media coverage. This is also true of the media itself, which is by no means immune to local contexts, editorial lines, advertising revenue, etc. According to Nisbet and Lewenstein (2002, p.362), certain actors, such as government sources, relevant economic actors and specialists, have a greater capacity to influence media coverage since what they say and do is considered news, and given that they offer press conferences and press releases that facilitate journalistic work. At the opposite extreme, there are social actors with limited prestige and financial resources, such as social movements and many NGOs. According to Pinto (2000), resorting to certain sources is one of the media's resources in terms of setting the agenda in a direction that meets sources' interests and harmonizes with those of the media itself.

The cultivation of GMOs is a controversial, multidimensional topic at the international level since, as discussed below, it touches on political, economic, scientific, environmental, ethical and social issues. Argentina and Brazil stand out as the countries with the highest levels of GM crop cultivation in both South America and globally; during the period studied in this article (2016–2018), Brazil ranked second in the world and Argentina third, both trailing the United States (ISAAA, 2016, 2017, 2018).

In the 1990s, Argentina was one of six countries that pioneered the cultivation of GMOs and, for 13 years, it was the world's second highest producer until Brazil replaced it in 2009. Starting in the 1990s and until 2005 when the Biosafety Law was approved, which authorized transgenics (Bianconi, 2009, p.30), illegal plantations and the illegal entry of Argentine transgenics caused conflict in Brazil. In the Argentine economy, agriculture plays a larger role than it does in Brazil — according to data from the CIA World Factbook, in 2017, agriculture represented 10.8% of Argentina's GDP, while in Brazil it represented 6.6%. In both countries, transgenics are overwhelmingly used in soybean cultivation, followed by corn and then by cotton, albeit in a much smaller proportion.

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Given the relevance of GM crops in these two countries, this article aims to explore the role the Argentine and Brazilian press had therein during the period 2016–2018. It further aims to answer the following research question: in this case, did the press fulfill the social function that Kovach and Rosentiel ascribe to it, or did a discursive power guided by other interests prevail?

Reviewing previous content related to this research establishes the backdrop for the press's modus operandi. Analysis of the Latin American press found a mostly positive coverage of scientific issues and little coverage of controversies related to scientific issues (Massarani & Buys, 2007). Campos Motta's (2013) analysis of the portrayal of agrobiotechnology in the Argentine, Brazilian and Mexican press concluded that the debate in Argentina focuses more on GM soy and the use of pesticides linked to it (glyphosate), while the Brazilian press addresses the problem of the legal framework and the coexistence of GM and non-GM crops.

According to Lapegna (2007), in Argentina, rural supplements of the newspapers *Clarín* and *La Nación* support the expansion of the agriculture model driven by transgenic soybeans. This author criticizes the connection between *Clarín* and the Argentine Association of Direct Sowing Producers (AAPRESID), an association that brings together transgenic producers and seeks to promote related crops. He points out that *Clarín*'s rural supplement is one of the main channels of information and opinion-forming in the agrarian field, and that its editorials highlight the benefits of the new agrarian model and criticize those who point to the problems it generates.

Lapegna also points out that, since 2003, AAPRESID has organized the annual FeriAGro event with advertising support from the *Clarín* group. This fair brings together agricultural producers and companies in the sector and, in 2005, the companies BASF, Bayer Crop Science, Syngenta and Monsanto sponsored it. In 2008, *Clarín* and *La Nación* supported the mobilization of agricultural producers against the increase in withholdings on soybeans (Lapegna 2019). Thus, Lapegna denounced the link between the media, pressure groups and agricultural producers at the transnational, national and regional levels.

A similar complaint is found in the work of Maradeo & Damiani (2019) on the power of lobbies. Likewise, Newell (2009) states that biotech companies and agrochemical producers' access to sponsor advertising in key media in Argentina (*Clarín* and *La Nación*) plays a

crucial role in generating and maintaining support for biotechnology in these newspapers, and in limiting space for critical voices. In addition, it is worth mentioning the fact that *Clarín* and *La Nación* have sponsored the ExpoAgro fair since 2006. Journalistic processes that determine who is considered a valid expert contribute to reinforcing a beneficial business approach to biotechnology in the Argentine press. Morin's (2009) analysis of the Argentine press, which he prepared between 2000 and 2004, reaches similar conclusions, namely *Clarín* and *La Nación* are clearly involved in promoting biotechnology, and they follow the same arguments used by large multinationals and agricultural entrepreneurs. In his research on GM soy and the media in Argentina, Leguizamón (2014) reaches similar conclusions.

Previous studies on the coverage of genetic issues in the Brazilian press reveal a mostly favorable position (Massarani et al., 2003). Research into the coverage of transgenics in the São Paulo press concluded that the press there built agendas favorable to transgenics, both in informative texts and in opinion pieces, privileging pro-transgenic sources and economic interests over environmental ones (Rothberg & Berbel, 2010). Another investigation into coverage of transgenics in the newspapers *O Globo* and *Folha de S. Paulo* concluded that these newspapers offered more information focused on political background than on dramatic elements (Brossard et al., 2013). A recent article criticizes the prevalence of agribusiness sources when covering transgenics in *Folha de S. Paulo* (de Oliveira Vicentini, 2019). According to these previous studies, in the cases of both the Argentine and Brazilian press, coverage of transgenics has been largely positive to date, and has prioritized the economic interests involved.

2 Legislation and international debate on GMOs

According to the Food and Agriculture Organization of the United Nations (FAO), genetically modified organisms (GMOs) are "any living organism that possesses a new combination of genetic material that has been obtained through the application of modern biotechnology" (FAO, 2001, Introduction para. 1). Similarly, in the European Union, a GMO is defined as "the organism, with the exception of human beings, whose genetic material has been modified in a way that does not occur naturally in mating or natural recombination" (Official Journal of the European Communities, 2001, p.4).

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GMO foods are part of GMOs. The first commercial launch of a transgenic food occurred in the United States in 1994 with a tomato variety. A year later, the commercialization of transgenic products began among countries. Currently, the main GM crops marketed globally are soybeans, corn, cotton, and rapeseed. Most of these products are not consumed directly, but rather are used in animal feed, as sugar substitutes, as vegetable oil or in fibers (Moseley, 2017, para. 16).

International legislation on transgenics occurs at different levels. It includes, on the one hand, the International Convention on Biodiversity and the Cartagena Protocol (Argentina has not ratified the latter). On the other hand, there are transnational agreements that originate with the World Trade Organization to eliminate non-tariff barriers to the export of raw materials. Finally, the national biosafety laws that apply in each country must be taken into account (Berger & Carrizo, 2016, pp.135–137).

The 1992 Convention on Biological Diversity (CBD) established basic principles for the responsible use of biotechnology, highlighting the precautionary principle, which maintains that when a new technology is suspected of causing harm (to the environment, biological diversity or human health), scientific uncertainty about its scope and severity should not limit precautionary measures, among which include the right of countries to oppose the importation of transgenic products or the declaration of a moratorium (Berger & Carrizo, 2016, p. 136).

The precautionary principle serves as the basis for the Cartagena Protocol's international agreement on biosafety. This protocol, which began in 1996 and ended in 2000 in Montreal with the signing of a new agreement that entered into force in 2003, is complementary to the CBD. The Cartagena Protocol aims to regulate the use of GMOs to guarantee the protection of health and the environment, as well as to regulate the transboundary movement of GMOs. The precautionary principle authorizes the imposition of restrictions on imports of transgenics in the signatory countries.

The cultivation and consumption of transgenic foods is the subject of international debate. Having completed a literature review, this research identifies five interrelated issues or themes that commonly arise in the debate between advocates and critics of transgenics. The pro-transgenic and anti-transgenic arguments associated with each of these five topics, which will later guide this

article's content analysis, are enumerated below in order of highest to lowest frequency.

2.1 Economics: how multinational biotechnology companies and farmers affect and are affected by transgenics

The controversy over transgenics mainly focuses on the economic interests and repercussions that they wield. GMO advocates argue that GMOs lead to higher productivity, which translates into better economic prospects and higher income for farmers. This increase in productivity is additionally attributed to the "reduction of production costs derived from the use of pesticides or herbicides, from the hiring of labor, and the use of machinery and equipment" (Rodríguez, 2016, p.13).

Critics of transgenics focus, above all, on the corporate interests behind them. Large biotech corporations that apply GMO technology, mainly Monsanto (bought by Bayer in 2016), Syngenta, BASF, Dow and Dupont, bear the brunt of this criticism. The controversy over these companies revolves around their efforts to develop contractual systems that allow them to maintain a legal monopoly that protects their technological developments and secures profits, regardless of the protection offered by the industrial property legislation of the country in question (Martínez Cañellas, 2012, p.5).

The associated contracts prohibit farmers from conserving seeds and oblige them to buy products required for production, which belong to the biotechnology company (Martínez Cañellas, 2012, pp.4-5). Pesticides and herbicides, together with seeds, make up the technology package. A monopoly emerges when supplying transgenic seeds that have been modified to be resistant to the pesticides that are meant to protect those same seeds. Because GM seeds have patented genes, farmers must pay the company royalties every time they plant; otherwise, the company can sue them. This design carries with it significant social impact since it prohibits farmers from engaging in traditional practices like storing a part of their harvest to plant or exchange (Desentis, 2017, p.14).

Another problem with intellectual property rights lies in cross-pollination of transgenic to non-transgenic crops, which may be accidental and yet can "give rise to owners claiming rights to the patent, to the corresponding intellectual property rights bodies

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recognizing such rights, or to exacting liability for said contamination" (Lapeña, 2007, p.78). Another problem refers to transgenic technology possibly leading to the concentration of land ownership and an increase in monocultures (Castro, 2016; Vara, 2004).

Biotechnology activities also have economic and social repercussions for the poorest farmers. In addition to the dependency they create, they imply a "decrease in the workforce and farmland, and an increase in emigration" (Rodríguez, 2016, p.17).

2.2 Productivity: GMOs' impact on agricultural productivity and their role in solving world hunger

Proponents of transgenics argue that they improve agricultural productivity, achieving more food with less soil use thanks to their resistance to insects, pests and severe climates (Rodríguez, 2016, p.18; Zhang et al., 2016; Ge et al., 2016). Other promising traits include tolerance to drought, salinity, greater efficiency in the use of nitrogen, resistance to fungi and biofortification (Godfray et al., 2010, p.815). Proponents consider GM crops' enhanced productivity a great achievement in the effort to reduce world hunger, repeating the argument that, according to the FAO, global food production must double by 2050 to satisfy the demands of a growing population. They also recall that the use of GM crops has reduced the price of food (Martinelli et al., 2016; Taheripour et al., 2016), and that climate change will make much of the world's arable land more difficult to grow on.

For their part, GMO critics claim that "the GM crops most widely grown currently are controlled by corporate interests and that their costs tend to exclude the truly poor" since, in this scheme, buying new seeds every year or every three years is required, which most poor families cannot afford (Moseley, 2017, para. 18). For GMO critics, the solution to world hunger lies, first, in improving access to food for the poorest and, second, in agroecological techniques that modernize traditional practices. For the former, simply increasing production is inadequate since the true solution to the problem of hunger involves "a structural approach that tackles the problems of inequality and gives the most impoverished populations access to the resources necessary to exercise food sovereignty" (Moseley, 2017, párr. 2). In other words, distribution is the most important factor here, and should be approached from political and economic perspectives

rather than from the vantage point of agricultural innovation (Arcieri, 2016, p.556). For the latter, agroecological techniques have trouble finding funding because they do not yield the same profits as transgenics for large companies (Moseley, 2017, para. 23).

2.3 The environment and the impact of transgenics

Advocates of transgenics argue that their cultivation helps reduce the use of herbicides and pesticides (Calvo, s.f., para. 1) thanks to their resistance to diseases and pests. This represents an environmental benefit and implies less human exposure to toxic substances. GMOs also save water and reduce CO_2 consumption (ISAAA, 2016, 2017); without them, land use and CO_2 emissions would significantly increase (Taheripour et al., 2016). Transgenic crops allow for less land use based on higher productivity, i.e., greater amounts of food are obtained per hectare when compared to traditional crops, thus avoiding further deforestation and the consequent loss of productivity (ISAAA, 2016, p.1; ISAAA, 2017, p.1). Finally, a possible increase in fruits and vegetables' shelf life could decrease the waste associated with their transportation and storage.

Critics argue about the consequences of crops resistant to insects with a high tolerance to herbicides. On the one hand, they point to the increasing observation that, although Bt crops (transgenic crops resistant to insects) can reduce the use of pesticides, they do not solve the problem of pests that have developed resistance to pesticides (Tabashnik et al., 2013). Furthermore, Bt crops do not just harm the target pest; they can also be detrimental to other populations like butterflies (Emani, 2014) and beneficial insects that are pollinators, biological control agents, seed dispersers and food for other species (Bravo, 2014, p.64). On the other hand, although GM herbicide-tolerant crops were supposed to contribute to less herbicide use, the emergence of resistant weeds (especially to glyphosate) over the years has led to increased use of glyphosate and other herbicides (Bonny, 2016, p.31; Vara et al., 2012).

GMOs contribute to biodiversity loss, deforestation and displacement of local varieties. Concern for biodiversity is greater in megadiverse countries (Comisión Nacional para el Conocimiento y Uso de la Biodiversidad, 2020, para. 1) where much agricultural biodiversity originates. The phenomenon of "outcrossing" presents

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an additional risk when genes from herbicide tolerant crops escape to other cultivated and wild plants (Chapman & Burke, 2006, p.435), which can further threaten biodiversity, as well as food safety and security. This happened in the United States of America, for example, when traces of a type of corn that was only approved for animal feed appeared in corn products approved for human consumption (World Health Organization-WHO, 2002, p.3).

2.4 Health and the impact of transgenics

Proponents of transgenics argue that transgenic foods are innocuous based on results from tests that all transgenic products must pass before being approved (Martín López, 2016, p.20). These tests include security controls that guarantee their harmlessness to human health, which then allows for their cultivation and/or commercialization. Concerns about the adverse effects of transgenics on health are seen as unfounded because no related evidence has emerged since the commercialization of transgenic crops began in 1995 (Davis, 2016, p.268).

GMO advocates focus, rather, on the potential benefits that genetic engineering and transgenics can have. They point to the elimination of genes associated with certain allergies, the improvement of wheat or rice's nutritional value, the production of healthier foods (for example, eliminating trans-saturated fats or caffeine), and the development of drugs and vaccines that reduce the risk of adverse reactions (Desentis, 2017, p.73). Furthermore, they especially highlight the potential for nutritional improvement (Glass & Franzo, 2017, p.46) and decreased toxic compounds and allergens in food through transgenics. Some examples include golden rice, wheat with a lower allergenic capacity, thus helping reduce the incidence of celiac disease (Higher Council for Scientific Research-CSIC & Institute of Sustainable Agriculture-IAS, s.f., para. 1), and cassava (a staple food in some African regions) with lower levels of cyanide in its roots (EFE-El Mundo, 2008, para. 1).

For their part, critics provide various arguments regarding the dangers that transgenics can pose to human health. They highlight that the aforementioned controls, which are carried out on animals, only demonstrate the safety of products in the short term.

To start, they claim that transgenics can increase pathogens' resistance to antibiotics in terms of the transfer of antibiotic resistant

marker genes. The first generations of transgenic foods were created using said genes, which upon transfer to the environment can impact soil bacteria. GM food with antibiotic resistant marker genes may also impact bacteria in the intestinal tract, which could then develop resistance to antibiotics and create a public health problem. However, since 2000, the FAO and WHO recommend not using marker genes resistant to antibiotics in the development of new transgenics, and researchers have managed to eliminate these markers once the plant has been transformed (FAO, 2004, p.69).

Another problem pertains to allergenicity. Cases of allergic reactions to certain GM foods have been reported, forcing companies to withdraw them from the market, for example, GMO Starlink corn, Flavr Sarv tomato and NewLeaf potato (Milner, 2013). There is also concern over the possible development of new allergic reactions to proteins without a history of allergenic effects since genetic engineering introduces genes from bacteria, viruses, insects, etc. that are not part of human nutrition (Ecologistas en Acción, 2005, p.14).

Lastly, transgenics have been accused of causing an increase in disease due to their constant need for agrochemicals, which are said to cause an "increase in diseases such as cancer, congenital malformations, spontaneous abortions, thyroid disorders and diabetes in populations surrounding transgenic crops" (Rodríguez, 2016, p.23). The case of the herbicide glyphosate stands out; the expansion of GM soy with resistance to glyphosate had serious effects on the health of the population living near these crops, for example the Ituzaingó Anexo neighborhood in the Argentine province of Córdoba. There, in 2012, after years of protests, a group of women called the *Madres del Barrio* sued genetically modified soy producers in the area based on the area's high number of documented cases of cancer and autoimmune diseases.

2.5 Labeling transgenic foods

GMO advocates believe that, since there is no difference between GMO and non-GMO ingredients, labeling should not be required. Some argue that labeling GM products could be counterproductive given that most consumers have a false belief that GMOs are harmful to the environment (Christiansen et al., 2019, pp.282–284), and many also consider them dangerous to human

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health. In this sense, it is worth keeping in mind that "the industry's refusal to label GM foods lowers the public's confidence" (Desentis, 2017, p.72).

Opponents of transgenics defend the consumer's "right to know" and believe that all products that contain ingredients from transgenic crops should be labeled as such (Messer et al., 2017, p.408).

In general, in the most permissive countries, such as the United States or Canada, the labeling of transgenics is not mandatory because they believe that products obtained through genetic engineering are equivalent to products obtained by other methods of genetic selection in terms of nutritional properties and security (Messer et al., 2017). For its part, the European Union (where only GM 810 maize is grown) stands out for its application of strict legislation. There, any product that contains 0.9% or more of GMOs must be labeled to indicate the presence of GMOs. In the cases of Argentina and Brazil, Argentina does not require food labeling for GMOs, while Brazil began to require it in 2003.

3 Methodology

This research examines the Argentine and Brazilian press, which are the top two countries in Latin American in terms of the production of transgenic crops. The newspapers *Clarín* (Argentina) and *Folha de S. Paulo* (Brazil) were selected for analysis because they are the most widely read written press with a digital version in each country (*Laprensa.news*, s.f.; *DPA*, 2018; Schipani, 2019). The methodology consisted of content analysis of pieces published in the digital version of these newspapers over a period of three years (2016–2018). A deductive approach was applied—themes and arguments were predefined with a literature review as variables for analysis and their frequency was examined.

First, an exploratory analysis of the presence of GM crops/food in the newspapers analyzed (visibility) was performed. For this, pieces that contained the terms "transgenic", "GMO" or "genetically modified organism" were selected. These keyword searches yielded 65 pieces in *Clarín* and 89 pieces in *Folha de S. Paulo*. After a first reading, pieces that did not actually refer to GM crops/food were removed. Thus, *Clarín*'s sample was reduced to 51 pieces and *Folha de S. Paulo*'s to 44 pieces. The reduction of *Folha de S. Paulo*

articles was so significant because pieces on the use of transgenic mosquitoes to combat the spread of Zika (a disease that was on the rise in Brazil during the study period), and other diseases such as dengue and chikungunya, had to be eliminated. Pieces on genetic editing in humans and animals, which was often international news, were removed from both newspapers.

Secondly, general coverage in each piece, in terms of a positive, negative or neutral tone, was examined with respect to transgenics. Third, pieces that were classified as either positive or negative were analyzed for the presence of the aforementioned themes and arguments for and against transgenics identified in the literature review. It is important not to confuse tone with the themes and arguments — a piece that contains "pro" tone arguments can have different themes, as well as some "anti" tone arguments. Thus, the identification of themes and arguments adds depth to the initial analysis.

To quantify the themes and arguments identified based on the literature review, the sentences contained in each piece under analysis were examined in search of claims for or against transgenics. The claims found were classified into one of the five identified themes. When an argument was repeated multiple times in the same piece, it was only counted once in order to avoid over representing any one theme. Finally, the sources of the arguments for and against transgenics were identified. A list of the analyzed sample and detailed analysis can be found in https://osf.io/6muv5/

4 Results

4.1 Visibility

The sample size was as follows:

Table 1 – Number of pieces

# PIECES	**2016**	**2017**	**2018**	**TOTAL**
CLARÍN	15	4	32	51
FOLHA	22	13	9	44

Source: author's elaboration

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The pieces analyzed from both newspapers mainly referred to national issues, although they both included certain types of international news, such as the publication of the American Academy of Sciences' report on transgenics, the 100 Nobel Prize letter against Greenpeace's anti-GMO campaign, and the announcement of the merger between Bayer and Monsanto (2016). Thus, in terms of visibility (number of pieces on GM crops/food), both newspapers gave the matter similar coverage. The search did not discriminate between information and opinion pieces (whether editorials, columns or blog articles). The breakdown thereof is as follows:

Table 2 – Number of information pieces

INFORMATION	**2016**	**2017**	**2018**	**TOTAL**
CLARÍN	11	3	21	35
FOLHA	13	5	6	24

Source: author's elaboration

Table 3 – Number of opinion pieces

OPINION	**2016**	**2017**	**2018**	**TOTAL**
CLARÍN	4	1	11	16
FOLHA	9	8	3	20

Source: author's elaboration

For *Clarín*, opinion pieces represented 31% of the analyzed sample, while for *Folha de S. Paulo* they were 45% (percentages have been rounded to the nearest figure to avoid decimals). In *Clarín*, the vast majority of pieces (90%), whether information or opinion, appeared in the Rural section, where biotechnology and agribusiness topics are discussed. The remaining pieces appeared in the Economy and World sections. In *Folha de S. Paulo,* the Opinion (with 14 pieces) and Market (with 12 pieces) sections published more than half of the sample, while the rest were distributed among the Science (5), Social Entrepreneur (3), Environment (2), São Paulo (2), *Ilustríssima* (2), Power (1), Balance and Health (1), Restaurants (1) and Folha Seminars (1) sections.

4.2 Tone

This study's measurement of tone came out as follows:

Table 4 – Pieces with a pro-transgenics tone

PRO	**2016**	**2017**	**2018**	**TOTAL**
CLARÍN	12	3	26	41
FOLHA	9	7	1	17

Source: author's elaboration

Table 5 – Pieces with an anti-transgenic tone

ANTI	**2016**	**2017**	**2018**	**TOTAL**
CLARÍN	1	0	2	3
FOLHA	6	4	5	15

Source: author's elaboration

Table 6 – Pieces with a neutral tone

NEUTRAL	**2016**	**2017**	**2018**	**TOTAL**
CLARÍN	2	1	4	7
FOLHA	7	2	3	12

Source: author's elaboration

Given that there was a higher percentage of opinion pieces in the *Folha de S. Paulo* sample than in the *Clarín* sample (41% vs. 31%), the *Clarín* sample might be expected to have a greater number of neutral tone pieces (which is more common in information pieces). But this was not the case: neutral tone pieces only represented 14% of the total *Clarín* sample, while in *Folha de S. Paulo* they represented 27%. Furthermore, the *Folha de S. Paulo* sample offers a better balance between the three tone variables analyzed (pro, anti and neutral), while *Clarín*'s sample very clearly displays a pro-transgenic tone. This is due in part to the fact that the debate on transgenics in Brazil focused more on mosquitoes than on agriculture during the period analyzed. In addition, *Clarín*'s information pieces came largely from the newspaper's section on agriculture and biotechnology, which includes many statements from large agricultural entrepreneurs and biotechnology professionals who, in general, are in favor of transgenics.

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4.3 Themes

Finally, regarding themes and arguments, the *Clarín* sample stood out for following the same frequency order as the one identified in the literature review, namely it most frequently focused on the economic issue, followed by a focus on productivity and then, in almost equal measure, on the environment. Focus on the topic of health was noticeably smaller than that of the first three topics, while the issue of labeling was simply not addressed. Pro-transgenic arguments represent the overwhelmingly majority.

Table 7 – Themes and arguments in *Clarín*

THEMES	POSTURE	# ARGUMENTS	TOTAL ARGUMENTS
Economics	PRO	25	26
	ANTI	1	
Productivity	PRO	22	22
	ANTI	0	
Environment	PRO	16	17
	ANTI	1	
Health	PRO	7	9
	ANTI	2	
Labeling	PRO	0	0
	ANTI	0	

Source: author's elaboration

The *Folha de S. Paulo* sample offers a balance in terms of tone, although a pro-transgenic tone somewhat predominates (pro17; anti15; neutral 12). For themes and arguments, pro-transgenic arguments in terms of economics predominate, as was the case in *Clarín*. However, the rest of the topics contained greater balance (there were 32 total pro-transgenic arguments, compared to 27 anti-transgenic ones), with anti-transgenic arguments more prevalent in relation to the environment, health and labeling.

Table 8 – Themes and arguments in *Folha de S. Paulo*

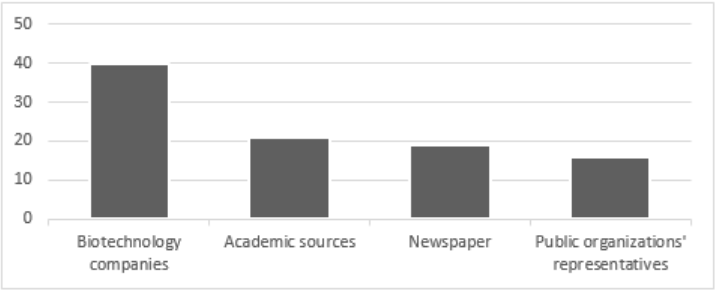
THEMES	POSTURE	# ARGUMENTS	TOTAL ARGUMENTS
Economics	PRO	14	19
	ANTI	5	
Productivity	PRO	5	8
	ANTI	3	
Environment	PRO	5	13
	ANTI	8	
Health	PRO	7	15
	ANTI	8	
Labeling	PRO	1	4
	ANTI	3	

Source: author's elaboration

4.4 Sources

Identifying the sources behind arguments documented as pro or anti-transgenic facilitates the interpretation of these results. In the case of *Clarín*, as mentioned, pro-transgenic sources were clearly the majority. In fact, anti-GMO sources were limited to one representative from an agrarian federation, an American academic report, and a handful of critical professionals (a lawyer, two researchers, and two nutritionists). Most pro-transgenic sources were identified in statements from representatives of biotech companies (41%), followed by academic sources (21%), the newspaper itself with editorials, columns and editorial staff (19%) and, finally, from representatives of public organizations (16%).

Graphic 1 – Pro-transgenics statements in *Clarín*



Source: author's elaboration

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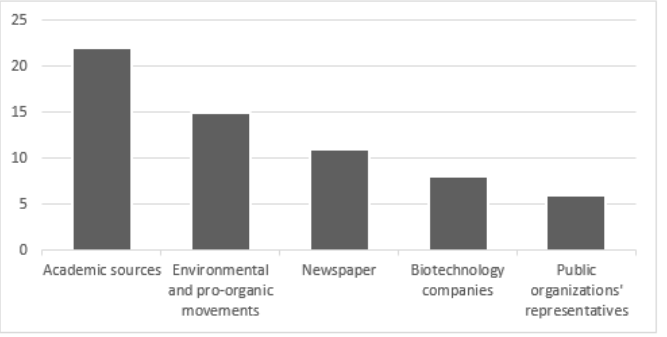
Folha de S. Paulo presents a greater balance of sources, as seen in the following graphic:

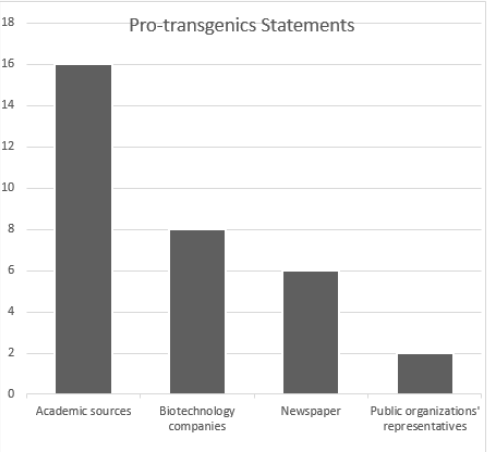
Graphic 2 – Statements in *Folha de S. Paulo*



Source: author's elaboration

Furthermore, it is worth noting that certain types of sources are more prevalent in pro-transgenic statements (academic sources (48%), biotech companies (24%)), while others are more prevalent in anti-transgenic statements (environmental and pro-organic movements (48%)). The newspaper itself as a source has a similar presence in pro-transgenic (18%) and anti-transgenic (16%) arguments, demonstrating some balance.

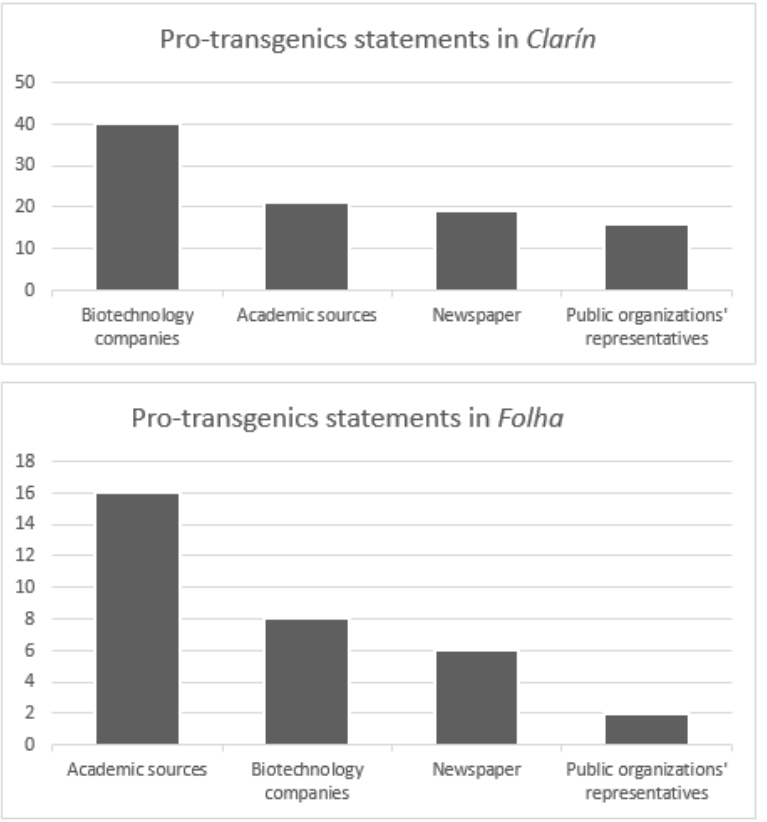
Graphic 3 – Pro-transgenics and anti-transgenics statements in *Folha de S. Paulo*



Source: author's elaboration

The final comparison herein relates to the distribution of pro-transgenic sources in *Clarín* and *Folha de S. Paulo*. Both newspapers relied on the same major sources, although *Clarín* relied more on biotech companies (41%) followed by academic sources (21%) and, inversely, *Folha de S. Paulo* relied more on academic sources (48%) followed by biotech companies (24%). Both newspapers served as the source of an argument at similar rates, with 19% for *Clarín* and 18% for *Folha de S. Paulo*. Finally, *Clarín* more frequently included public officials as a source (16%) as compared to *Folha de S. Paulo* (6%).

Graphic 4 – Pro-transgenics statements in *Clarín* and *Folha de S. Paulo*



Source: author's elaboration

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5 Conclusions

This content analysis leads to the conclusion that *Clarín* and *Folha de S. Paulo* covered news related to transgenics differently. This difference is due, first of all, to the fact that, during the study period, coverage of transgenics in Brazil focused much more on the creation and release of transgenic mosquitoes in order to combat diseases. Second, regarding pieces on transgenic crops and foods, although the tone was predominantly pro-transgenic in both newspapers, in *Folha de S. Paulo* there was greater balance, including more pieces with an anti-transgenic or neutral tone (even though its sample had more opinion pieces). Finally, when analyzing the themes and arguments present in the sample, *Folha de S. Paulo* demonstrated a greater balance of themes and arguments and *Clarín* predominantly published pro-transgenic arguments. For this analysis, the arguments identified in *Clarín* primarily came from large agricultural entrepreneurs and biotechnology professionals who, in general, are in favor of transgenics. For its part, *Folha de S. Paulo* included more diversity of topics (more emphasis was placed on health and labeling issues) and more critical perspectives were offered regarding transgenics.

What could be behind the difference between these two newspapers? Regarding Argentina, a 2009 research report that is critical of transgenics stated:

> Given the advertising revenue generated from seed and pesticide ads, the press has in general become a channel that has tried to 'show' the benefits of GMOs, while hiding or minimizing their impact on the agrarian structure and on the environment (Souza, 2009, p.22).

This argument is added to the aforementioned investigations, which denounce the collusion between the newspapers *La Nación* and *Clarín* and the interests of biotech companies and powerful agricultural entrepreneurs. Souza's statement still seems to hold true in light of this analysis.

The empirical research carried out in this article shows that *Clarín* gave much more visibility to pro-transgenic sources with an economic interest. This did not happen in *Folha de S. Paulo*, where the highest percentage of pro-transgenic sources came from

the academic field, which lacks an evident economic interest. In this regard, the relative weight of agriculture in Argentina and the fact that its government has authorized transgenics for a longer period should be considered. In the case of Brazil, despite having surpassed Argentina in terms of production of transgenic crops, initial authorization thereof was slower (almost a decade later than in Argentina) and accompanied by controversy. In addition, it is worth recalling that, since 2003, Brazil has required labeling of transgenic products, while Argentina enforces no such requirement. These factors may influence the more balanced and diverse coverage of sources in *Folha de S. Paulo*.

Finally, based on this case study, the Brazilian newspaper fulfilled the social function of journalism somewhat better by covering the issue of GM crops in a less biased way. This refutes previous research that argued that the Brazilian press, and *Folha de S. Paulo* in particular, exhibits a pro-transgenic leaning. On the contrary, by comparing it with *Clarín*'s coverage, this analysis is in line with previous research that concludes that the Argentine press, and *Clarín* in particular, subordinates the social function of journalism to its own economic and ideological interests.

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