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Since 1997



THE
cotton
EVOLUTION IN BRAZIL



Argentina's soybean seed business

Introduction

Ever since 1997/98, soybean has been Argentina's main crop, and it has gained paramount strategic importance in domestic economy. Production, processing and export of soya and soybean byproducts are core activities in the Argentine economy, having shaped a highly competitive production chain in terms of technology, production, and foreign exchange generation. Sixty-seven percent of soybean oil and 91% of soybean meal are exported, there being material possibilities to substantially increase the value of exports through integrated industrial processing of soybean

seeds (Paolilli et al, 2019.)

One of the most significant components of competitive soybean cultivation in Argentina is the existence and development of a seed industry with a strong national presence, as well as excellent human and technical resources.

This report contains an updated review of the main soybean seed market features in Argentina.

Planted Area

The evolution of the three main crops planted in Argentina are shown in Figure 1. Soybean, which was grown on a little over than 30,000

hectares in 1969/70, began to exceed one million hectares in 1977/78, and since then, it has witnessed a remarkable growth. Before the introduction of biotech event GTS 40-3-2 (RR1) in 1995/96, the soybean planted area was already exceeding 6 million hectares. After placing the first soybean varieties containing this biotech event, the soybean area would increase significantly year after year until 2015/16, thus becoming the main crop in the country, which has been the case up to the present.

The maximum production peak of soybean cultivation was recorded precisely in 2015/16 with

20,562,233 hectares, but a decrease of around 1 million hectares per year would begin from then onwards. In the last reported year of the series (2019/20), soybean cultivation reached 16,882,238 hectares.

From the production viewpoint, the values do not follow the sown area linearity, as they are naturally affected by climate factors. In the last 10 years, the volume of planted soybean has been close to 50 million tons and, during 2014/15, the maximum production peak was reached when production exceeded 61 million (Paolilli et al, 2019.)

Legal Framework

In Argentina, plant varieties can be protected by a valid property title deed under Law 20.247/73 on Seeds and Phytogenetic Creations and its regulatory decree 2.183/91. Pursuant to Law 24.376/94, Argentina joined UPOV by ratifying the 1978 Act, and by the Law 24.425/94, it adhered to the TRIPs Agreement of the World Trade Organization.

The need to update the national Plant Variety Protection Law has been pointed out on several occasions and, from 2016 to 2018, eleven reform bills were submitted to the Lower House. Against this background, on November 13, 2018, the Lower House Committees on Agriculture and Livestock, General Legislation, and Budget & Finance drafted a commission opinion that was never transacted by the House representatives. All such bills have lost parliamentary status, and there-

fore, no bills are currently tabled in Congress to reform the Law 20.247 (Rapela, 2019.)

enacted, thereby creating the Simplified Agricultural Information System (SISA.) The new regulation replaced a

GM events approved in Argentina

GLYPHOSATE TOLERANCE	1996
TOLERANCE TO AMMONIUM GLUFOSINATE	2011
LEPIDOPTERAN RESISTANCE AND GLYPHOSATE TOLERANCE	2012
TOLERANCE TO IMIDAZOLINONES	2013
2.4 D TOLERANCE + GLUFOSINATE + GLYPHOSATE	2015
DROUGHT RESISTANCE + GLUFOSINATE TOLERANCE	2015
LEPIDOPTERAN RESISTANCE	2016
RES. LEPIDOPTERA + TOL. GLUFOSINATE + TOL. GLYPHOSATE	2016
GLUFOSINATE TOLERANCE + HPPD ENZYME INHIBITORS	2017
TOL. GLYPHOSATE + GLUFOSINATE + DROUGHT RESISTANCE	2018
STAINLESSAFLUTOLE, GLUFOSINATE AND GLYPHOSATE TOLERANCE	2018
TOL. GLYPHOSATE + GLUFOSINATE + DROUGHT RESISTANCE	2018
GLYPHOSATE + GLUFOSINATE TOLERANCE	2019

Despite this scenario, some progress has been made in relation to law enforcement. In 2018, Joint General Resolution 4248 of the Ministry of Agro-Industry, the National Agri-Food Health and Quality Service (SENASA), the National Seed Institute (INASE), and the General Administration of Public Revenues (AFIP) was

series of prior resolutions, making it compulsory for all farmers to declare information related to sowing, including the location of seed lots, planted areas and plant varieties used. Since farmers were required to submit a declaration of seed use within the scope of SISA, INASE officials have had access to information on almost

the entire planted area, segregated by plant variety declared by seed lot, which has allowed them to have a real “roadmap” of what is being sown in the country and, based on such information, to determine the origin of the seed used. According to INASE Resolution 35/96, any farmer producing and using his own seed must have developed the current seed from a legally purchased seed. By requiring information on seed sales from

an varieties.

As a result of implementing these advanced steps, the complementarity of Resolutions 4248 and 218 will enable INASE to determine whether farmers’ declarations are truthful, or otherwise impose the relevant administrative penalties if any inconsistency is verified. Upon finding out any irregularity, plant breeders will have access to the files so that they can defend their infringed

seed processing times, since there has been a significant reduction in benchmark varieties.

Commercial Seed Production and Use

According to the statistical data surveyed by the Argentine Plant Breeders Association (ArPOV), an entity that brings together breeders of plant varieties, the certified soybean seed market totaled 246 billion tons of seed sold to farmers, which only covers 21% of total planted area.

Certified seeds are delivered to farmers through a major network of seed multipliers and stores. According to INASE information, for the 2019 crop season, 414 seed multipliers registered seed lots before the government seed agency, having produced a total number of 170 plant varieties. Such production is marketed through multipliers themselves, vendors and stores. According to ArPOV surveys, this network consists of 845 participants, who cover the whole production area and have an important regional presence in the area where seeds are used.

The rest is planted with grower seed or illegal seed (uncertified seed marketing, grower seed produced outside farmer’s holding, farm-saved seed without certified legal origin, etc.)

As the legal framework is outdated, and proper legal tools are missing, enforcement of plant variety ownership rights has histori-

Some data from the seed business

CULTIVATED AREA	17 million ha
BREEDERS	+10
CULTIVARS IN USE	+50
OGM	+10
TUS	21%
CULTIVAR PROTECTION	UPOV 1978

the commercial chain, INASE may identify inconsistencies in the declaration of seed use, and penalize those who are using plant varieties without due support as to the legal origin of such seed.

Additionally, and following a joint project between INASE and seed companies, the government seed agency issued Resolution 218/18, approving a list of 56 SNP-type DNA markers to verify and identify soybe-

property rights in civil court proceedings.

Besides this, INASE issued Resolution 296/19, approving a list of 4004 SNP-type DNA markers to identify soybean varieties in order to ensure compliance with the seed differentiation requirement set forth in Law 20,247 on Seeds and Phytogenetic Creations. This is already fully operational, thus enabling plant breeders to shorten their property title

cally been low (Bergadá et al, 2016). However, pursuant to the latest regulations, farmers must declare seed use through SISA, as described above. For the 2019 crop season, based on the tax statements filed by 58,448 farmers, SISA surveyed the use of 719 soybean varieties, including the use of certified seed and farm-saved seed (INASE, 2020.)

Part of the area sown with farm-saved seed is subject to a royalty payment to the breeder based on private contracts between breeders and producers, as well as to acceptance of conditions relating to the use of soybean varieties proposed by genetics suppliers when a variety is released. In the case of biotech events, user licence contracts are signed between users and technology companies, and the use of technology is controlled by a sampling system at delivery points, coordinated under a framework agreement between soybean seed trading entities and INASE.

Likewise, we underscore the importance of the ambitious project carried out between INASE and the private sector, which has enabled mapping a set of molecular markers for all soybean varieties, thus allowing

- to use these selected molecular markers in order to accompany the differentiation process in the registration of new materials, and

- to achieve varietal identification from a set of pre-defined markets.

As stated, the latter tool facili-

Protected soybean cultivars per year

2001	4	2011	26
2002	9	2012	44
2003	13	2013	54
2004	29	2014	28
2005	28	2015	52
2006	34	2016	29
2007	24	2017	18
2008	42	2018	41
2009	29	2019	15
2010	40	2020	10

tates verification of the variety used in order to check the legal use of seed, based on farmers' declarations of seed use submitted to SISA.

Number of Public and Private Plant Breeders

A total number of 34 plant breeders are currently registered with the INASE National Register of Cultivars, with 569 valid property title deeds. (Table 1)

Maintaining the historical trend, with 383 varieties (67% of the total number), the greatest number of valid property title deeds are registered by Argentine companies, and 186

varieties (33% of the total number) are registered by international companies.

The participation of breeders in the public sector is negligible. Only 16 varieties (3% of the total amount) are registered by Argentine government institutions, the National Institute for Agricultural Technology (INTA) standing out as the government institution with most registrations (9 in total). On the contrary, the participation of breeders in the private sector is an overwhelming majority with 553 registered varieties (97% of the total number), the participation of Asociados Don

Mario/GDM company standing out with 211 registered varieties (37% of the total number.)

A total of 1058 varieties appear in the list of plant varieties to be marketed in Argentina. This shows that 53% of such varieties are supported by a valid property title deed. The difference between both figures is explained by the fact that some varieties ceased to be marketed due to seed obsolescence or by decision of seed companies or institutions themselves.

A number ranging between 20 and 50 soybean varieties, with an average of nearly 40, are supported by a valid property title deed in Argentina. (Table 2)

New domestic plant varieties, coming from national and/or international companies, are still the main varieties that are supported by a valid property title deed, which account for 90% of the total registered amount. (Figure 2)

If we compare the current number of applicants and IP-protected soybean varieties with what happened in 2004 y 2005 (Rapela, 2006), we can notice some differences. Back then, a total number of 16/17 breeders made up the spectrum of companies and institutions offering soybean seeds, and only 3 of them were international companies. At that time, the companies Nidera and Asociados Don Mario led the supply at a considerable distance from the rest, both together accounting for 80% of the total amount.

However, there are other factors that have remained absolutely unchanged, the most important of which is that the supply of soybean varieties is still mainly provided by domestic companies.

Approved Biotech Events

A total number of 16 biotech events have been approved for soybean in Argentina from 1996 to the present (Table 3.)

However, when we examine the 569 varieties filed with the INASE National Register of Cultivars, only 2 of such events appear on record (Table 4.)

Biotech event 40-3-2, commonly known as “RR1” (Roundup Ready Soybean), is clearly the most widespread of all, and only 22 varieties (4% of the total number) supported by a valid property title deed are conventional (non-biotech) crops. (Figure 3)

Within the list of approved events described in Table 3, it is worth mentioning those developed by INDEAR SA, which are the result of cooperation among multiple public and private R&D initiatives in Argentina. The most outstanding initiative has been the creation of the HB4 event derived from a gene extracted from sunflower conferring drought and salinity tolerance to plant species, which is unique in the world due to its technical features and state of development. This initiative was a joint effort between Argentina’s Science and Technology Council CONICET and the National University of El Litoral.

It should be mentioned that soybean varieties containing event DAS-44406-6 (Enlist), with tolerance to 2,4-D, glyphosate and glufosinate-ammonium, are in the process of being approved.

CONCLUSIONS

Argentina’s soybean seed market is supplied by a wide range of varieties developed mainly by private seed companies, and to a lesser extent by public institutions. It should be noted that this seed supply is strongly supported by national research, which is highly competitive in terms of quality and performance. In turn, research carried out by these companies and institutions goes hand in hand with biotech developments from both international companies and national public research associated with companies. This favorable technological and productive scenario has not been accompanied by appropriate legislation in order to grant effective IP protection to soybean varieties. However, the recent application of new enforcement mechanisms combining traditional control and genomics technology has led to a gradual improvement in the low rate of certified seed use.