Argentine bovine genetics market

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2017

Contents

List of tables and graphs

Tables

Graphs

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An insight of a cattle-raising country

Brief overview of Argentine cattle breeding

With a strong cattle tradition, Argentina has developed an important livestock sector, capable of meeting the growing global demand of animal proteins. Over the years, the extensive Pampas of the Southern Cone gave birth to a product well recognized as an appellation of origin in the world for its quality: the Argentine steak. For its part, the dairy sector also experienced a significant increase in productivity, modernization of the industry, achieving a primary production of milk and main products of high quality and according to international standards.

The selection work carried out since the beginning of the 19th century, combined with a system of natural production, eminently based on grass feeding, and under strict sanitary conditions originated a genetically consistent herd, capable of producing meat and milk of high quality and without affecting the ecosystem and biodiversity.

Beef and milk in Argentina are produced in natural form, with deep respect for the ecosystem and biodiversity

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Livestock farming is one of the most important activities in the Argentine Agri-food industry sector. It has played a fundamental role throughout history, in the initial territorial occupation, in the development of employment, economic growth and in the beginning of the country's insertion in the world as a food supplier. The livestock sector historically constitutes 20% of the agricultural GDP and 3% of the total GDP of Argentina (*Regúnaga, Cetrángolo and Mozeris, 2007*).

The national cattle herd is about 52 million heads (*MINAGRI, 2015*), mainly beef breeds as Angus, Hereford, Brangus and Braford. The two british breeds specially adapted to the temperate zones of the country, and those synthetic to the warm climates of Argentina.

It is important to highlight the role played by the Criollo breed in the development of Argentine livestock, considered as a founder breed and subject to a long process of natural selection.

Argentina has excellent cattle genetics, adapted to different environments resulting in the incorporation of the best blood lines and their subsequent selection

Regarding dairy breeds, Holstein and Jersey, are the main representatives of this biotype, with a clear predominance of the first one.

Holstein is the major dairy breed in Argentina

Some variables that allow to characterize Argentine livestock are presented in Table 1.

Table 1. Characterization of Argentine livestock. 2016

Stock (millions of heads)	52,6
Total slaughter (millions of heads)	11,8
Extraction rate (%)	22,4
Cattle average weight (kg)	225
Beef production (millions of heads)	2,7
Beef exports (thousands of tons)	157
Beef comsumption (Kg/head/year)	56,9
Milk production (millions of liters)	9.400
Number of dairy farms	12.000
Dairy breed heads (millions)	3,5

Source IPCVA, SENASA, INDEC and Agroindustry Ministry

Argentina can be divided into five regions according to Agroecological and productive characteristics: Pampean, Northeast (NEA), Nortwest (NOA), Central semiarid and Patagonic (Figure 1).

Figure 1. Livestock areas of Argentina. Distribution of bovine stock.

NOA: argentine northwest; NEA: argentine northeast.

Source:Agroindustry Min.

Each of these zones has a different potential, but undoubtedly the highest concentration of heads is found in the Pampean region.

Argentine dairy production is mainly distributed in the Pampean region, with a concentration in several areas in the province of Buenos Aires (Mar y Sierras, Oeste, Abasto sur and Abasto norte), Santa Fe (South and Central), Córdoba (South, Villa María , Northeast), Entre Ríos and La Pampa. Milk production in the rest of the country is of little significance (*Regúnaga, Cetrángolo and Mozeris, 2007*).

As regards to health status, Argentina is officially recognized as a BSE-free country (according to the OIE, World Organization for Animal Health, with insignificant risk of BSE) and free of foot-and-mouth disease, with and without vaccination zones (Patagonia and Calingasta valley in San Juan province)

"The best beef I ever ate was in Argentina. The meat produced there is the best tasting and the most tender in the world. I think this is due to the quality of genetics and the environment. It is absolutely superb in all methods of preparation "

Mr. Bill Bunce

Agribusiness Division Director.

Wyoming State, USA.

Source: Ayerza, M, 2003.

Key Points

✓ Favorable agroecological conditions for the production of meat and high quality milk in a natural system, in accordance with its ecosystem and biodiversity.

✓ Very good genetic base, adapted to different environments and a result of the incorporation of best blood lines and their subsequent selection.

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✓ Argentine beef has a very good international reputation as "natural beef".

✓ Good technological level in both chains. (Dairy and beef)

✓ A country free of BSE (mad cow) and all OIE "A" diseases.

✓ Industrial slaughterhouses and dairy plants with good processing and sanitary standards, able to respond to the foreign markets demand.

Source: adapted from Regúnaga, Cetrángolo y Mozeris, 2007.

The bovine genetics market

Development and structure

Genetics is one of the variables of high impact in animal production, with a notable qualitative and quantitative influence on meat and milk produced.

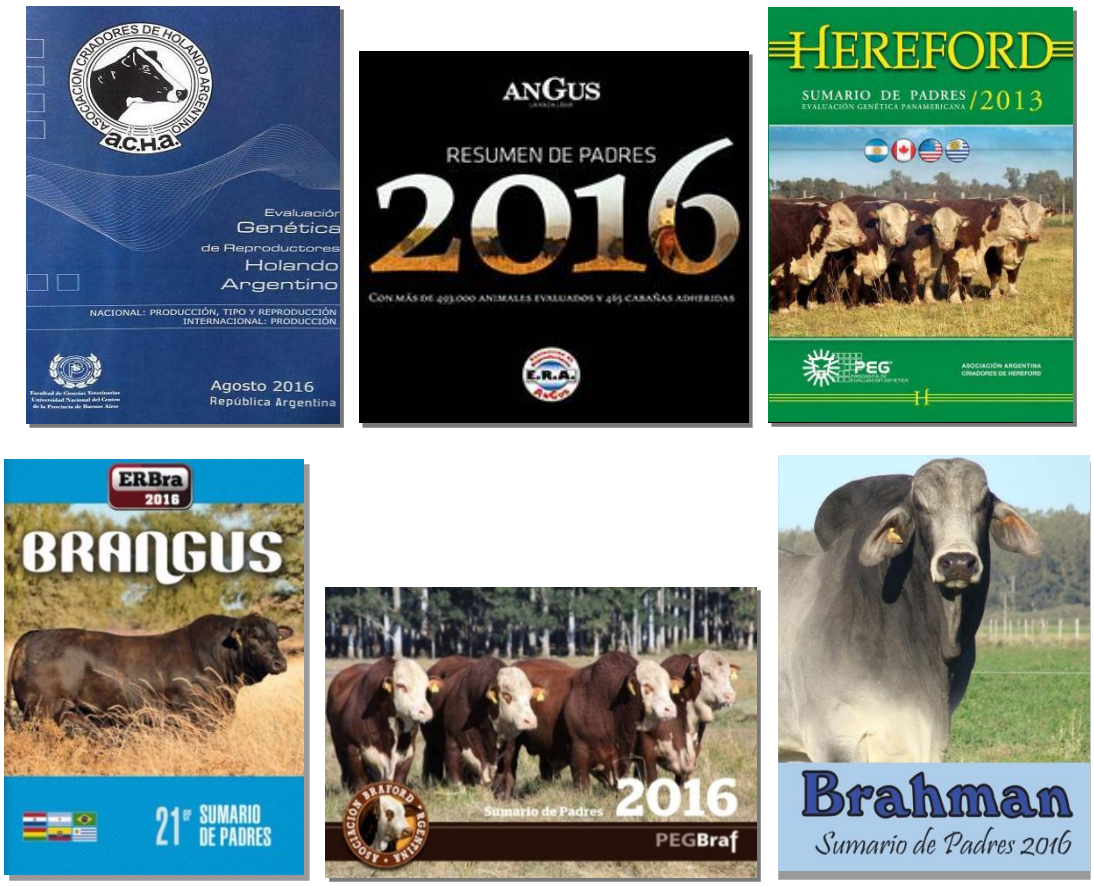
The Argentine bovine genetics market has experienced significant growth in the last decades, boosted by the development of different evaluation tools and progress in reproduction biotechnologies.

Regarding evaluation tools, the Argentine Holstein Breeders Association (ACHA) was a pioneer, providing since the decade of the '70 the predictions of genetic merit of bulls, which influenced strongly the selection criteria of applied animals (*Musi, 2008*). The first Holstein (Holando Argentino) evaluation was published in 1984, carried out by ACHA in agreement with Argentine Rural Society (*Sociedad Rural Argentina – SRA*) (Table 2). In 1998 the Blup-Animal Model was implemented in agreement with the Faculty of Veterinary Sciences of the National University of the Center of the Province of Buenos Aires (*Casanova, 2017 personal communication*).

In the 80s and 90s, Breeders Associations of the major beef cattle breeds began to conduct systematic and uninterrupted genetic evaluations that also generated accurate information on animal merit.

Table 2. Genetic Evaluation Programs for Holstein, Angus, Hereford, Brangus and Braford breeds.

Evaluation Program	Breed	Start year	Number of proven bulls in 2016	Number of farms	Total number of animals
Holando Argentino	Holstein	1984	7994	2487	1.035.735
ERA	Angus	1989	7140	465	493.762
PEG	Hereford	1991	1764	112	234.179
ErBra	Brangus	1990	1400	337	384.330
PEG Braf	Braford	2006	1106	164	280.643
Genbrah	Brahman	2010	252	32	22.293



The availability of genetics evaluation programs meant for producers a key tool for the genetic progress in their herds.

The availability of EPDs for different economic characters meant for producers a key tool for the genetic progress in their herds. Likewise, the new technologies that are being implemented in the last decade, such as genomics, represents an ideal complement, allowing farmers to produce faster genetic progress in their herds, increasing the accuracy of the breeding value estimation *(Montaldo et al., 2012*).

On the other hand, the remarkable advance in different reproduction biotechnologies has had a huge impact in the adoption of enhancing breeding genetics, generating a true globalization of it. Biotechnologies not only increased significantly the accuracy of the assessments, but also helped to remove geographical barriers given by distance and, in some cases by health matters, in addition to the advantages of genetic transport in the form of semen or embryos.

The growing use of fixed-time Artificial Insemination (FTAI) programs in breeding herds had a great impact in the adoption of enhancing breeding genetics.

In this sense, Argentina worked intensively in joint public and private sectors, searching for markets interested in their genetics. Through the project entitled "Support for the opening processes and International Trade Integration "of the IDB-MIF (Inter-American Development Multilateral Investment Fund), a comprehensive and easily accessible with detailed and updated information on “Non Tariff Barriers” (NTBs) for Argentine exports of bovine genetics (breeding stock, semen and embryos) to enter International markets. (Marcantonio, 2009).

The Argentine public and private sectors work together to open international markets.

The Argentine market for genetic superior animals is represented by a universe that is integrated of “cabañas”. It is called "cabaña" to the farm dedicated to produce pedigree animals with outstanding genealogical and productive background. The activity of the “cabaña” contributed predominantly to the improvement and development of Argentine livestock (*Ayerza, 2003*). These farms are members of the respective breed Association, which pedigree animals are registered in the Argentine Rural Society. In this market, the animals can be divided into Pure Pedigree (PP) and Pure Controlled or Registered (PC or PR). The commercial trade for PP is quite small and limited to animals of great value. PCs or PRs (endorsed by the respective breed Association) represents a much larger volume (*Etcheverry, 2009*).

The number of registered animals by breed in the 2015/2016 period and also accumulated is shown in Table 3.

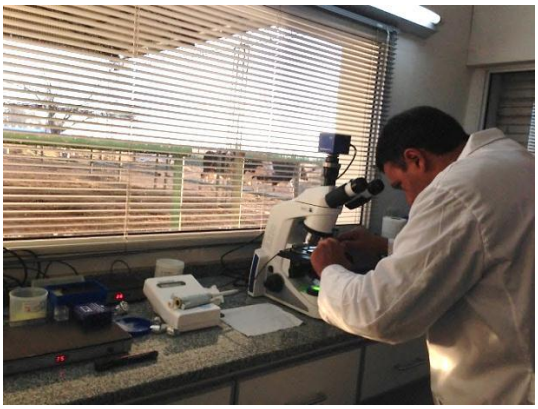
Table 3. Animals registered from 7/1/2015 to 6/30/2016 and accumulated since herd book opening

Breed	Herd book opening year	Imported		Domestic		Total	Accumulated as of 6/30/2016		Total
		M	F	M	F		M	H	
Angus	1889	27	1	9.628	9.568	19.224	830.297	825.556	1.655.853
Braford	1989	1	0	140	280	421	104.843	113.548	218.391
Brahman	1941	4	0	73	117	194	21.399	26.923	48.322
Brangus	1982	3	1	1.111	1.304	2.419	161.180	204.866	366.046
Bov. Criollo	1969	0	0	19	23	42	100.895	101.875	202.770
Hereford	1888	0	0	79	86	165	68.295	76.252	144.547
P. Hereford	1920	0	0	2.343	2.163	4.506	189.986	212.011	401.997
Holstein	1920	221	18	1.806	2.704	4.749	262.256	333.323	595.579
Jersey	1914	29	1	116	440	586	4.627	9.985	14.612
Limangus	1994	0	0	95	158	253	1.020	3.369	4.389
Limousin	1941	2	0	158	214	374	4.417	9.779	14.196
PardoSuizo	1922	0	0	0	11	11	5.725	7.847	13.572
Santa Gertrudis	1968	0	0	18	25	43	13.166	19.929	33.095
Shorthorn	1888	0	0	151	186	337	522.973	512.447	1.035.420
Simmental	1922	0	0	32	25	57	12.366	13.676	26.042
Otras		20	3	131	186	340	46.871	54.236	101.107
Total		**307**	**24**	**15.900**	**17.490**	**33.721**	**2.350.316**	**2.525.622**	**4.875.938**

M= males; F:= Females Source*: SRA, 2016*

The bovine frozen semen industry in Argentina is represented by around 20 Semen Collection and Processing Centers (CCPS) and semen banks, whose activity is officially regulated (Arg. law 20.425, decreet 4678/73). The most important CCPS are gathered in the Argentine Chamber of Biotechnology of Reproduction and Artificial Insemination (CABIA).

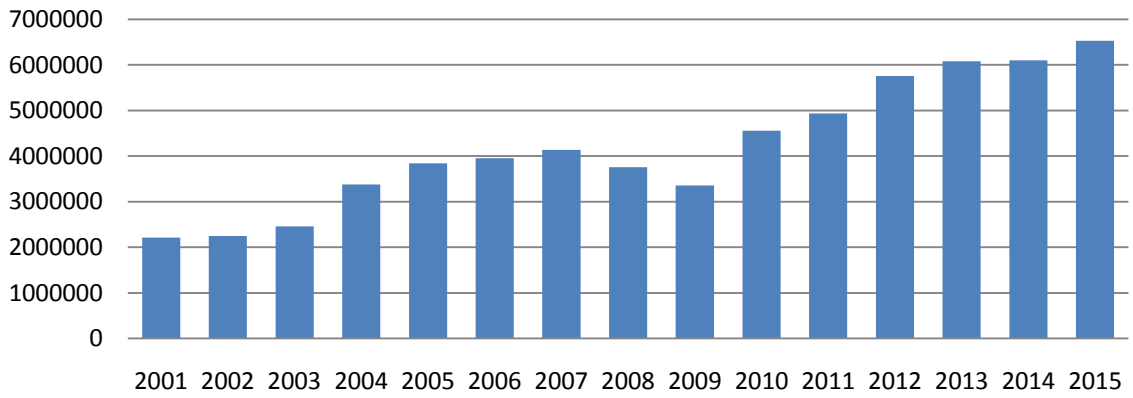
With regard to the industry linked to bovine embryos, around 15 companies and embryo transfer (ET) groups work in this field, and are associated under the Argentine Society of Embryo Technologies (SATE).



The activity of semen collection and processing centers (CCPS) is governed by Law 20.425 / 73.

Statistics on the Argentine bovine semen market are based on information provided by CABIA partners, who represent 80% of the market (Etcheverry, 2013). In 2015, 6.5 million semen doses (47% of beef breeds and 53% of dairy breeds) (CABIA) were sold. This showed a significant growth in the last 15 years (Graph 1).

Graph 1. Evolution of semen doses marketed within Argentina: 2001-2015



Source: CABIA

The bovine semen marketed in Argentina during 2015, by breed, is shown in Table 4.

Table 4. Semen doses marketed by breed. Year 2015

Breed	Doses	%
Angus	1.358.701	20,8
Braford	549.171	8,4
Brahman	34.969	0,5
Brangus	743.859	11,4
Limangus	43.498	0,7
Polled Hereford	271.026	4,1
Other beef breeds	66.120	1,0
Total beef breeds	**3.067.344**	**46,9**
Holstein	3.308.781	50,7
Jersey	121.147	1,8
Other dairy breeds	28.930	0,5
Total dairy breeds	**3.458.858**	**53,0**
Total	**6.526.202**	**100**

Source: CABIA

The market share of dairy breeds has remained stable over the last ten years, being Holstein the major breed. As regards beef breeds there has been a significant growth of the synthetic group (mainly Brangus and Braford), almost doubling the share in the total percentage in the last ten years (11.5% to 19.7%). This can be explained to a large expansion of the agricultural frontier and the displacement of bovine cattle to zones where the synthetic breeds have a better adaptation. However, the British breeds, particularly Angus, continue to be the most important in total marketing.

For several years, the industry has adopted the technology of semen sexing, in 2015 reaching 262,000 doses of sexed semen marketed, especially from dairy bulls.

The Argentine embryo market produces about 30,000 transferable embryos per year, 85% of which are produced under “in vivo” conditions (IETS). These are mainly beef embryos.

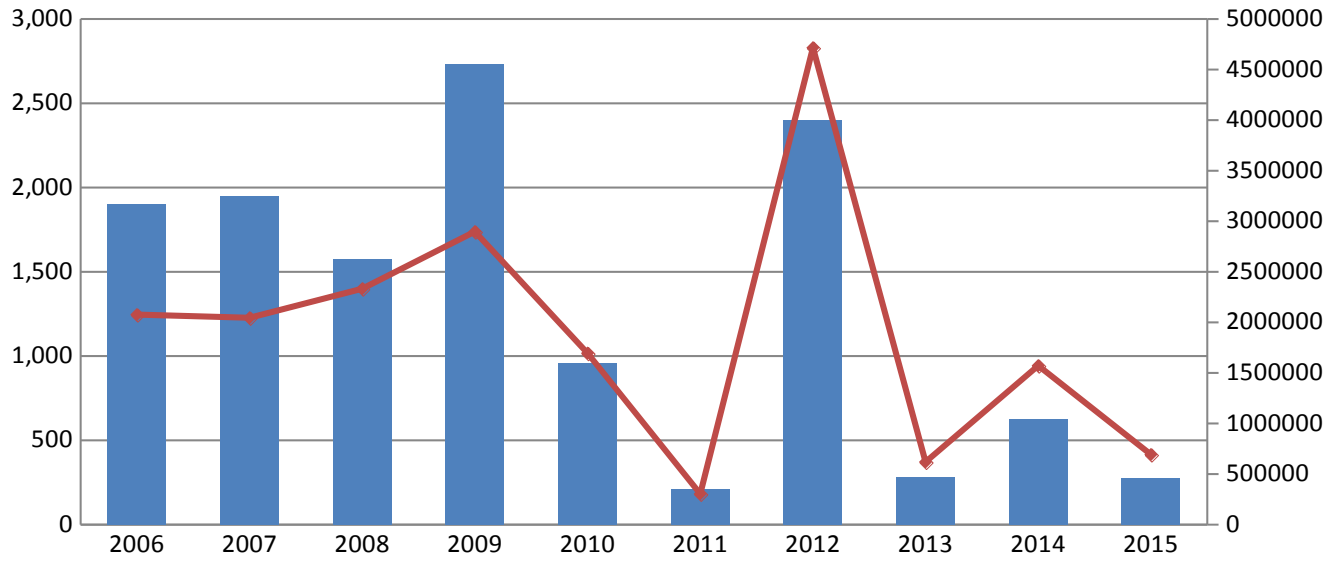
The groups of professional people and companies dedicated to the production of embryos are members of SATE.

Outside borders genetics

The availability of bovine genetics outward boundary is provided through the sale of live cattle, semen and embryos.

Exports of live cattle have been quite limited in recent years (Graph 2). Paraguay, Brazil, Uruguay, Bolivia, Venezuela and Colombia are the main destinations.

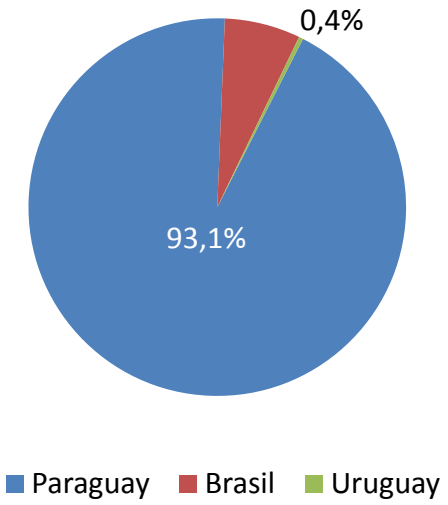
Graph 2. Evolution of the exports of bovine cattle for reproduction purposes 2006-2015



Source: Argentine customs

Exports of breeding stock during the year 2015 can be seen in Graph 3. Shipments to Paraguay were mainly Brangus (220 heads) and Braford (38 heads). Eighteen Angus heads were exported to Brazil and only one Brangus (Argentine Customs information) to Brazil.

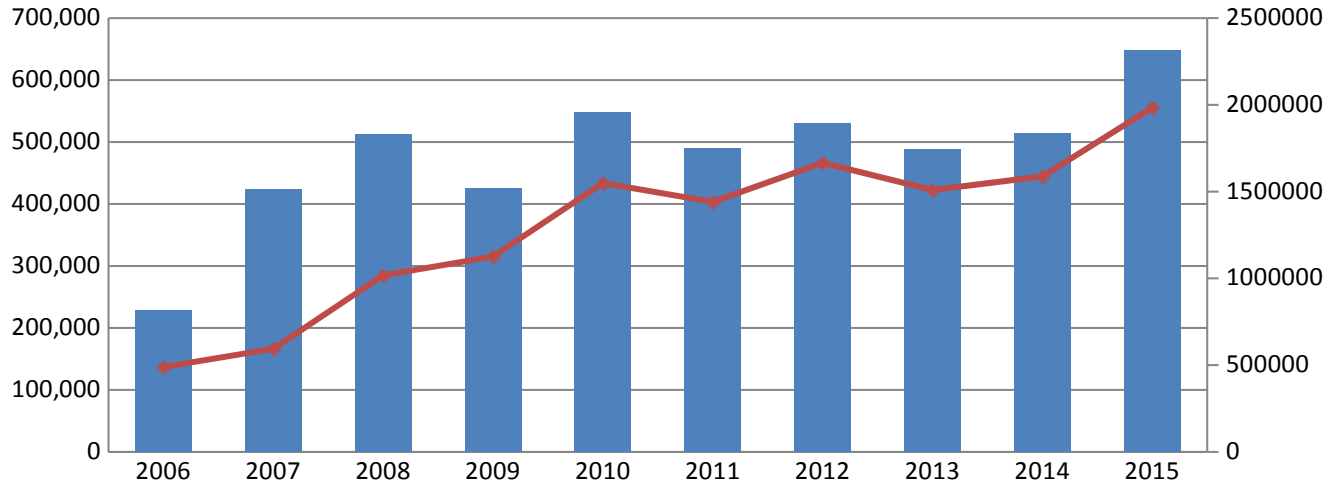
Graph 3. Destination of the exports of bovine cattle for reproduction purposes – 2015



Source: Argentine customs

As regards frozen semen, in the last ten years there has been an increase in the number of exported doses as well as the FOB value of these transactions (Graph 4).

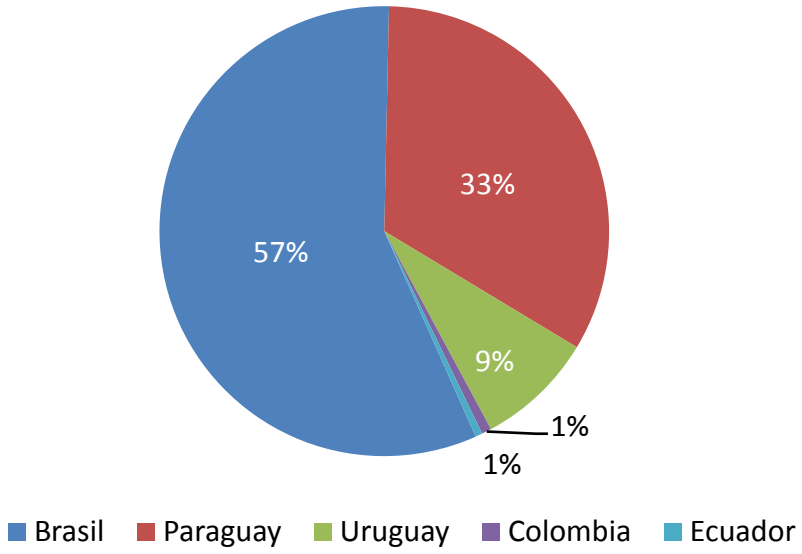
Graph 4. Evolution of the exports of bovine semen doses from Argentina – 2006 - 2015



Source: Argentine customs

According to data from the Argentine Chamber of Biotechnology of Reproduction and Artificial Insemination (CABIA), in 2015, there were 620,000 semen straws exported, reaching a value of US $ 2 million. The main countries involved were Brazil (57%), Paraguay (33%) and Uruguay (8.5%) (CABIA) (Graph 5).

Graph 5. Destination of the semen doses exported in 2015



Source: CABIA

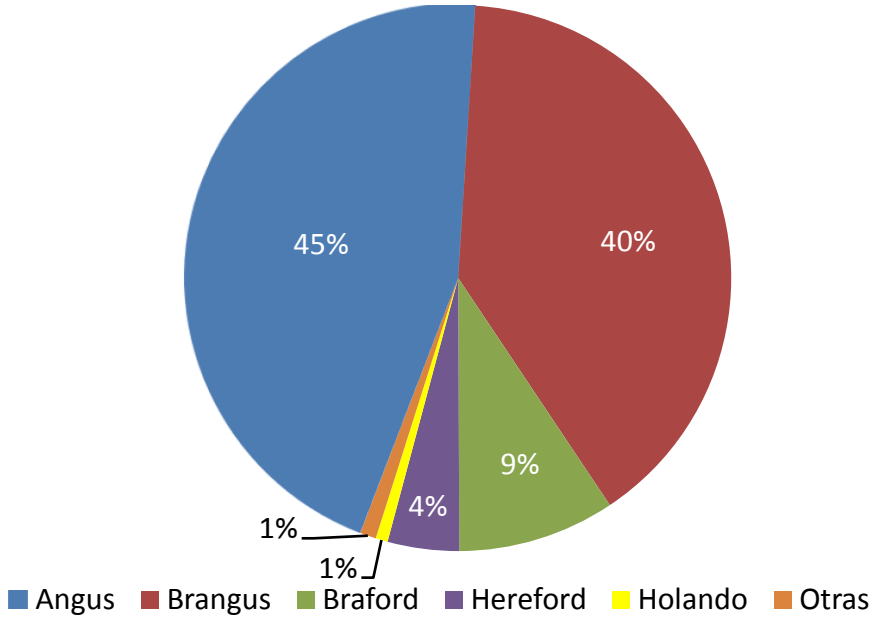
The distribution of semen doses exported by breed is shown in Table 5 and Graph 6.

Table 5. Semen doses exported in 2015 by breed

Breed	Doses
Angus	283.152
Brangus	248.442
Braford	58.395
Polled Hereford	26.527
Other beef breeds	5.923
Total beef breeds	**622.439**
Holstein	4.500
Other dairy breeds	0
Total dairy breeds	**4.500**
Total	**626.939**

Source: CABIA

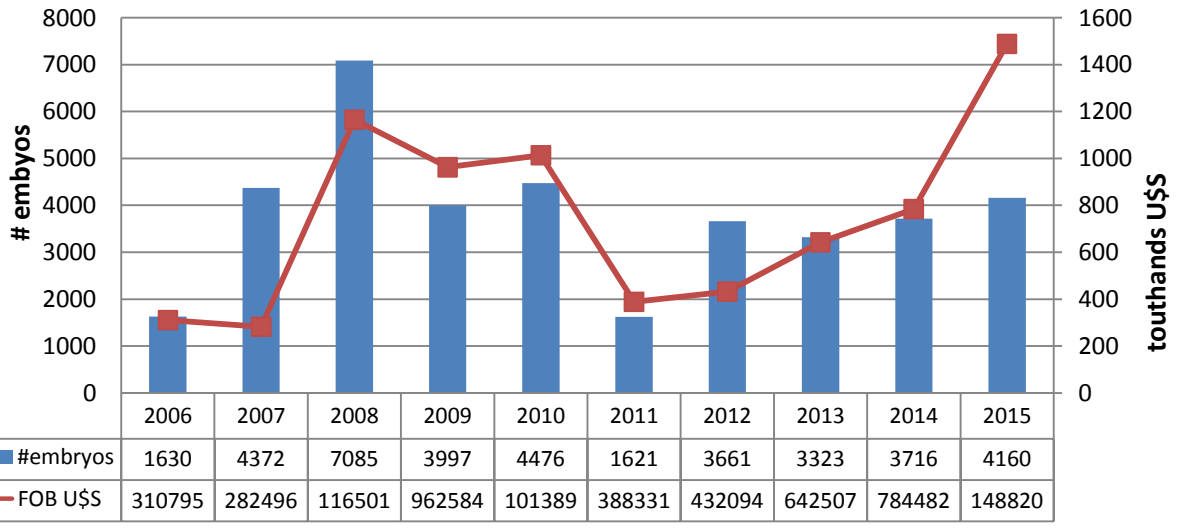
Graph 6. Distribution of semen doses exported in 2015 by breed



Source: CABIA

Regarding the export of embryos, in 2015, there were 4,160 units sold for a total value of US $ 1.5 million. Graph 7 shows the evolution of the exports of bovine embryos in the last 10 years.

Graph 7. Evolution of bovine embryos exported from Argentina - 2006-2015

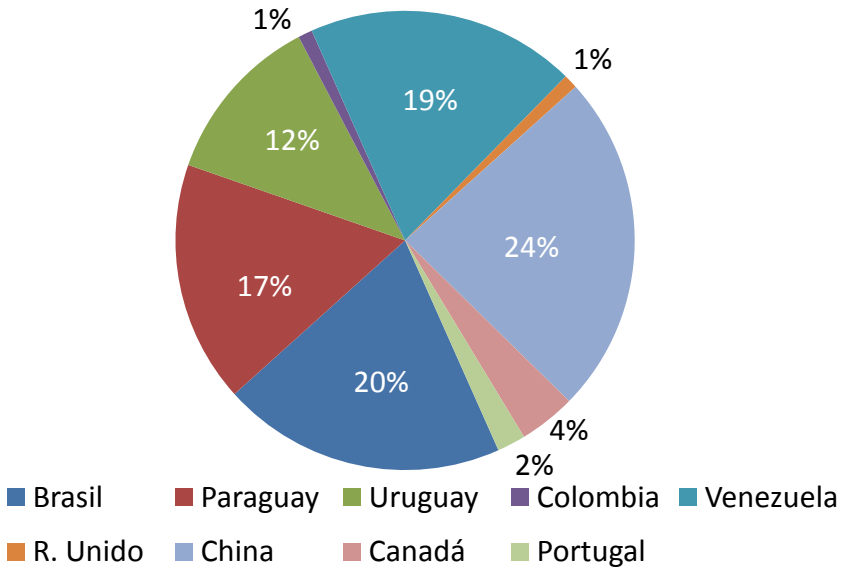


	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
#embryos	1630	4372	7085	3997	4476	1621	3661	3323	3716	4160
FOB U$S	310795	282496	116501	962584	101389	388331	432094	642507	784482	148820

Source: Argentine customs

Graph 8 shows the destinations for the exports of embryos in 2015.

Graph 8. Destination of bovine embryos exports from Argentina. 2015



Source: Argentine customs

Importations

With regard to the importation of breeding stock, it has been practically none since the early 2000s. This was because of BSE outbreaks in Canada and the United States, where most breeding stock came from. Thereafter, a scarce entry of imports came from Mercosur countries. In 2015, two Brafords and 1 Brahman heads came from Paraguay (Argentine customs info).

According to data from Argentine Customs of 2015 for bovine semen imports, 63% of the total - beef and dairy - comes from the United States, 22% from Canada and the rest from New Zealand and France. Imported doses were 2,898,036, of which 87% were from dairy breeds and 13% from beef breeds (*Taurus, 2016*).

The 2015 imports of bovine embryos were 614 units for a total of U $ S 479,300, which came from Australia (311), Canada (161) and the United States (142) (Argentine Customs).

Situation for Argentine bovine genetics markets

The current situation of the market for Argentine bovine genetics in relation to the existence of health protocols that allow importation from other countries can be seen in Table 6.

Table 6. Situation of foreign markets for Argentine bovine genetics. 2016

Country	Live cattle / breeding	Semen	Embryos
Angola	O	O	O
Saudi Arabia	O	-	-
Algeria	-	O	O
Azerbaijan	O	O	-
Bolivia	O	O	O
Brazil	O	O	O
Canada	-	-	O
Chile	-	N	N
China	-	O	O
Colombia	O	O	-
Ecuador	-	O	O
Egypt	O	O	O
Morocco	N	N	N
Pakistán	-	N	N
Paraguay	O	O	O
Peru	O	-	O
European Union (28 countries)	-	-	O
Uruguay	O	O	O
Venezuela	N	N	N

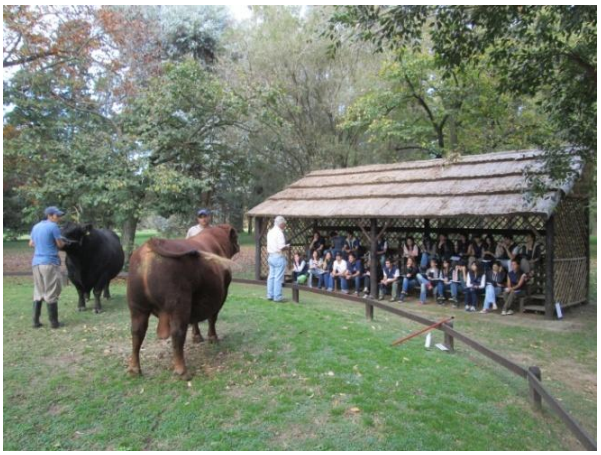
O: Open N: Negotiating

Source: SENASA (DNSA-DNC-CRI).

Technology transfer

In recent decades, Argentina has played a leading role in the transfer of technologies linked to bovine genetics and reproduction, both in countries of the region as well as in other continents.

From governmental and non-governmental organizations, training of professionals and technicians is carried out through courses, workshops and symposia, in Argentina and in third countries. Technical tours are also organized, so that visitors can get to know production systems, livestock farms involved in the production of genetics (live cattle, semen and embryos) and the industrial connections of beef and dairy production chains.



In conclusion,

Why choose Argentine bovine genetics?

- ✓ Argentina has a worldwide recognition for excellence as a cattle-raising country
- ✓ Argentina has a strict sanitary control and complies with the international standards of the OIE
- ✓ Argentina has an excellent offer of superior bovine genetics.
- ✓ Argentina has technology and know-how comparable to the world's leading countries
- ✓ Argentina breeds cattle in a natural and environmentally friendly process
- ✓ Argentina has the capacity to meet the international clients demand with the best bovine genetics.

Acknoledgement:
Special thanks to Ing. P. A. Mariano Etcheverry, Executive Director of CABIA and recognized specialist in the bovine genetics market, for his generous collaboration and critical review of this material.

Foro Argentino de Genética Bovina

www.forodegeneticabovina.com

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