The buffalo in Southern South America

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ABSTRACT: The number of buffaloes in the American continent is growing at the explosive rate of 12.7 % a year, well above all other continents. Within this context the different situations of the southern part of South America are described, those countries that two hundred years ago were part of the River Plate Viceroyship and the Chile General Command, both of them part of the Spanish empire. The first steps of buffaloes in Paraguay, Bolivia and Uruguay. The expansion of buffaloes in Argentina and their recent start up in Chile. The production systems in the region are described, principally Argentina and Paraguay. The major changes and expansion of agriculture in Argentina are displacing cattle production from the North towards the Tropics, where buffalo has proven to be very superior in productivity compared to cattle production thanks to its very good adaptation to the local conditions. In Paraguay, a totally subtropical country, something very similar is happening. Paraguay has consolidated its sales of buffalo hides and beef. Argentina is well on its way to having a very efficient buffalo beef marketing competing with cattle of the highest quality. Buffalo milk production is still not mature in these countries, although there are several projects underway in Uruguay, Bolivia and Argentina.

Key words: Chile, Uruguay And Bolivia

Buffalos were brought into Chile in 2006, when a breeder, Máximo Correa, imported 9 buffalo cows and 1 buffalo male from Australia, with the cooperation of the National University of Chile, to launch a dairy project in one of his ranches close to the city of Parral, 400 kilometers south from Santiago. The project is only starting now. In Chile, both milk production and the dairy industry are well developed, which facilitates access to state-of-the-art technology for this buffalo milk project. In Uruguay, Mr Lorenzo Balerio introduced buffaloes imported from Fazenda Panorama, Porto Alegre, in 1987. They were 100 buffalo cows to be used for a forestry-breeding project in his ranch located in Rivera, in the north of the country. The purpose was to produce beef while cleaning areas planted with eucalyptus. Presently in Uruguay there are over 500 buffalo heads, and Engineer Francisco Dotti, with the assistance of the government and a local university is starting to organize a buffalo dairy project and a dairy plant. In Bolivia there are at least 3000 buffalo heads, all of them in the east of the country, a highly humid area, with rivers and high temperatures, typical of subtropical weather. The major producer is Mr. Roberto Haab Chavez, who keeps 2,000 buffaloes in his ranch El Carmen, close to Santa Cruz de la Sierra. He milks 200 dairy buffalo cows, with a
daily average of 6 liters and a milking average of 1,672 liters (maximum 2,600 liters). He has a modern milking parlor with 16 milking machines: milk and cheese are processed in modern plants that are “sanitation” and efficiency paradigms. He also fattens buffalo calves and sells the beef that he processes, with promotions that emphasize the rate of cholesterol, 30% lower than that of cattle. He produces several types of cheese, among them processed cheese and ricotta, under the trademark “Caserti,” which he sells through aggressive promotion in the market. He owns Murrah buffaloes, although most are Mediterranean, imported from Italy. According to Dr. Wyland Cripe, they are excellent quality animals, and uniform with regard to build and size. They have an Artificial Insemination program in place, whose technical director is Dr. M.V. Roger Camacho, who specialized at the University of Florida (U.S.A.) in Gainesville. He joined the company over 7 years ago.

Paraguay

There are about 8,000 buffaloes spread all over the country, mostly in small 20 to 50-mother buffalo herds. For many years they were bred in medium or large ranches, mostly unmanaged and without increasing their number. They are kept as something exotic and/or to cover the ranches’ beef needs.

Only one breeder breeds and fattens buffalos rationally and successfully: Engineer Rubén Bruyn Ramos, whose family owns the Cerro Campana Ranch, located in Caá Pucú, 180 km southeast of the city of Asunción, 8900 hectares in size, 4200 of low land, with quack grass and scrublands, and 4,700 of high land, shallow soil over granite and basalt rock, with outcrops and rock heights with scrubland. This mother rock outcrop occurs in this region in an area of approximately 100 kilometers in diameter, 150 mts. above sea level. These are natural fields, poor in protein and phosphorus, but with exceptional weather, 1,600 mm annual rainfall and high average temperatures, even in winter (with few 5 to 10° C “cold” days).

Originally the ranch bred Indian breed cattle, with 20 to 30% pregnancies, which grew to 53% through temporary weaning.

In 2002 they started buffalo breeding with 169 breeding buffalo cows.

Today they own 1,500 buffalo heads in all, including 600 breeding cows, Paraguay’s main herd, totally used for beef production. Males are slaughtered not castrated at 24-28 months, without suffering hormonal changes, mainly because the meat packing plants do not make any distinction in price when they are not castrated (as is the case in Argentina). They expect to grow the number to 3,000 buffaloes in 4 years in the high lands, totally replacing cattle. And they will add another 2,000 in a second stage, when they start to use the low lands. Buffaloes are bred with 2% of sires in a continuous mounting that spontaneously occurs approximately between February 15 and June 15. Weaning takes place in December-January, at 7-10 months of age and a weight of 180 to 330 kilos. The animals are Jafarabadi or Jafarabadi crossbred with Mediterranean and/or Murrah. The 2-year old buffaloes selected for sires are excellent in their beef build (long, good hind quarter, deep) harmonious (good back line, relatively light head, etc.) with good Jafarabadi breed characterization, and they have excellent scrotal circumference for their age in buffaloes: Between 26.5 and 31 cm.

They supplement mineral in all the herds with bone meal.

The facilities are spectacular. The entrance pen and the bullpen are built with blind boar-
ding and a curved shape, although not too closed, open enough so that animals can see up the chute without seeing anything to the sides; with successive gates that prevent animals from moving backwards without requiring many workers. Animals do not bump into the sides and therefore light boards are used (*timbó* wood) 1” instead of 2” thick. The chute design is ideal for buffaloes and cattle, slightly sloped and narrow below. However, for buffaloes a complementary wood board floor is used, reinforced and with anti-sliding devices that “widen” the base and adapt the chute for these animals.

The only light buffaloes see is the one beyond the stock, since a gate with vertical iron bars is used. Animal management is excellent. Without dogs or shouts, the people stand on decks and work with long sticks.

From the very beginning pregnancies in buffalo cows have been much higher than cattle: between 70 and 87% from 2003 to 2006. Meat packing plants’ demand of fat buffaloes is excellent. They pay the same price as for cattle: US$ 1 per live kilo. They even buy the carcass whole, without any price difference. They tend to move slaughter age from 24 to 28 months to sell in winter and obtain the best prices. Slaughterhouses have agreements in place with tanneries that purchase and process the hides. Under such conditions, growth possibilities are unlimited. The slaughterhouses sell the heads and/or cuts together with the bovine cattle, without any difference, although one or more consumer niches would demand buffalo beef if sold separately. This is a price and cost-related issue that has yet to be resolved.

As for sanitation, they vaccinate against foot and mouth disease and brucellosis, deworm the buffalo calves at birth and at weaning, vaccinate against rabies and carbuncle only when there are outbreaks in the area, and bathe against lice only when animals have them (winters are mild and buffaloes continue to bathe because it is rarely cold). Young animals do not carry ticks, and urus almost never affects them. As for the horn fly, they have it but it does not bother them. Vaccination against carbuncle will be starting soon.

**Argentina**

In Argentina a true agricultural revolution has started, Thanks to a new generation of technologies the agricultural frontier has massively expanded, especially in the case of soybean. Cattle breeding has been displaced from a large part of the humid pampas (except the large depressions and the hills that were left for cattle breeding. An extraordinary cattle-breeding node is being developed in the Argentine northeast (NEA) and more recently the industry has also grown in the northwest (NOA) of the country.

As part of such scenario, the NEA holds most of the buffalo heads. Of the 85,000 existing heads, the province of Formosa has 33,000 and Corrientes has 30,000.

The buffalo production systems that we will describe are located in both provinces, mostly in open low fields, with humid subtropical climate, north of 31° south latitude, with 1000-2500 mm. annual rainfall, located in the Parana River basin, where cattle breeding is not very efficient. In the region, buffaloes occupy not only the low lands but also the high fields, since under extensive conditions this allows for 20% additional calving compared to cattle, and 70-100% additional weight gain, which results in slaughtering animals one year earlier. It should also be highlighted that the buffalo cow productive life doubles that of cows. Buffalo breeding systems are principally extensive, in natural grass with humid subtropical climate, mainly in the NEA. Calving rate varies from 80 to 98% (much higher than
To estimate loads, one buffalo cow requirements equal those of 1.3 cows, since its live weight is 150 kilos more. Production per hectare/year ranges from 40 to 60 kilos, whereas cattle’s does not exceed 40 kilos. The daily weight gain is remarkable: 700 gram/day pre-weaning and 500 gram/day post-weaning (70 to 100% higher than cattle under equal conditions). This allows for slaughtering at 27-30 months, with a live weight of 500 – 550 kilos and a yield of 50 to 55 %. The beef is lean, with excellent color and tenderness.

The reposition of females is done, always in low-quality natural grass, when they reach 2/3 of their adult size (350 kilos) and 2 years of age (vs. 2 to 3 years in cattle), controlling the gynecological status by touch. Buffalo cows are discarded at 18-22 years of age, and buffalo bulls at 6-7 years (to prevent fights). Buffaloes need to be well treated and to have more contact with humans than cows. This is the reason to have one man every 350 heads (in cattle the ratio is 700-1000/1) and trained staff. As for calving, buffalo calves practically manage by themselves (cattle calves require much more labor, they are less resistant). The annual veterinary scheme is similar to cattle: vaccination against hoof and mouth disease, brucellosis, carbuncle, blackleg and gaseous gangrene (in buffalo calves), etc. Some differences exist in parasitosis. With respect to ectoparasites, no tick control is required although in wintertime lice should be controlled, and the control repeated at 30 days. As for endoparasites, *neoscaris vitulorum* sp should be controlled in buffalo calves 30 days after birth, and repeat every 45 days until 6 months of age when they acquire lifelong immunity.

The ranches whose production systems we will describe are located in the provinces of Corrientes and Formosa, in the NEA. Following the order of the presentation, Imará Ranch, owned by Marco Zava, is a middle-size facility – small for the region, located in the west of Corrientes, on the border of the Batel - Iberá tideland system located in the center of the province.

Santa Rosa Ranch, owned by Salentein Argentina B.V., is one of the largest fields of the province of Corrientes, located in the southwest, on the coast and the deltas of the Parana River, and the marshes and levees of the Corrientes River. Most of the Santa Rosa buffalo fattening activities take place in a different facility, Estancia Nueva Ranch, located in the lowlands in the south of Entre Ríos province.

And finally Guazú Cuá Ranch, owned by Compañía General de Hacienda S.A., a large ranch with open fields, levees, streams and ponds, located in the center-east of Formosa, in the region of the Montelindo stream.

Imará Ranch involves 1,511 hectares of different soils: sandy soils with Yatay Palm groves (dates), and corridors of medium-height woods; clayey soils with systematized lagoons and eucalyptus forests; and finally floodable lowlands of *Estero Batel* populated by tight reedbeds and very few levees (small high-lands). Eight hundred hectares are fully usable; about 500 cattle heads (Pure Registered Bradford) are kept there, and about 120 buffalo heads (Pure Pedigree Mediterranean). Calving takes place in the open lands, while beef production and fattening are accomplished in the hills, where in wintertime there is more protection against low temperatures, and humidity is retained in case of scarce rainfall.

It is interesting to highlight the evolution of buffalo calving rates and daily weight gain in pure Mediterranean pedigree heads at Imará:
CALVING
1995: 9 Buffalo calves / 14 breeding cows = 64.29 %
1996: 9/12 = 75 %
1997: 9/10 = 90 %
1998: 12/14 = 86 %
1999: 13/15 = 86.67 %
2000: 13/15 = 86.67 %
2001: 18/18 = 100 %
2002: 19/20 = 95 %
2003: 24/24 = 100 %
2004: 42/43 = 97.67 %
2005: 41/47 = 87.73 % (drought)
2006: 47/55 = 85.45 % (drought)

Example: Calving 2004: 753 gr./day pre-weaning and 604 gr./day post-weaning, on natural field. With the Bradford Registered herd, calving in general is 70 %, 160 kilos on weaning at 7 months of age. In this case breeding cows should be replaced at 10%/year rate while their longevity is 10 years.

Santa Rosa Ranch is 45,200 hectares in size, that include 14,000 hectares of hills and high marshes, used for cattle beef production, and 30,000 hectares of lowlands (floodable islands) for buffalo beef production. The ranch used an extensive production system, managed by 18 persons, to cover all the activities. Buffaloes are herded from the islands twice a year, one in October-November (spring) and the other in April-May (autumn). On such occasions the tasks related to sanitation and others are carried out (touch, weaning, castration, count, vaccination, separating fat and discarded heads, etc.). Supervising tours and rounding up are done all year round. When islands are wet, reed makes an excellent feed. In case of drought it is worse: they feed on straw grass (Panicum prionitis). Natural service calving rates range from 78 to 82 %, but with 12% loss of calves between calving and weaning since buffalo calves are born in fields covered with water. Their pure registered herd includes 200 Mediterranean buffalo cows, which they inseminate, achieving 75% pregnancy rate with two inseminations. In the 30,000 island hectares the load is 0.24 buffalo heads/hectare, and the total stock by October 2005 was 8,173 adult heads (3.7 hectare/head), including 3,781 breeding cows. After calving in 2007, the weaned calves were near 2,700. Another 3,000 heads are in Estancia Nueva Ranch, in the south of the province of Entre Rios. This is the largest number of fattening animals. There are also castrated bulls that are finished in Santa Rosa and slaughtered at 30 months and 508 kilos live weight.

| Year of birth | Bulls | Cows | BULL WEIGHT 2 YEARS |
|---------------|-------|------|---------------------|
| 2001          |       |      | 561.13 (25 months)  |
| 2002          |       |      | 527.86 (25 months)  |
| 2003          |       |      | 482.65 (24 months)  |
| 2004 (8.5 months) | 231.32 | 232.94 | 513.43 (24 months) |
| 2005 (7.5 months) | 209.08 | 207.46 |
Santa Rosa sells 500 fat animals a year (16 kg beef/hectare in island fields) and in Estancia Nueva they receive 650 bulls a year for fattening; this number will grow to 1500/year. In Entre Rios lowlands are better, animals are finished faster and they are 200 km. away from slaughterhouses (much closer).

Guazú Cuá Ranch comprises 28,600 hectares, with open fields, lakes, streams and levees, and is located in the center-east of Formosa, in Paraje Montelindo, that takes its name from the stream that runs close to the field. It has 4,000 hectares of no use camps, and other 5,000 hectares boarding a lake that remaine under water when it rains very much. In the levees and hills cleared from forests subtropical pasture is planted and grown, e.g. Tanzania grass, used for buffalo castrated males’ final finishing, and Rhodes grass, that toghether with the Dicantium pastures are used for breeding weaned calves. This is the only large ranch in the country that devotes solely to buffalo breeding, and includes breeding, weaned calves breeding and fattening, with general herds and pure registered Murrah smaller herds. This is the most important breeding facility for Murrah buffaloes.

There are 11,000 heads in 24,600 usable hectares: 0.45 head/usable hectare and 0.38 head/total hectare. Of that total, 4,800 are breeding cows (buffalo cows and heifers 1st. service): 4,842/19,000=0.25 breeding cow/hectare. The buffalo herd pregnancy rate ussually is 83%. Some years arrive to 87% (one should remember that for cattle, pregnancy rate in the area reaches at best 60 %, but very often below 60%). The weaning rate achieved is 3,500 buffalo calves per year, that have a weight of 170 to 220 kilos, weaned at 7-8 months of age. The purebred herds include 198 pure pedigree breeding Murrah buffalo cows, distributed in 3 herds, each one with a buffalo bull, and 600 Murrah pure registered breeding buffalo cows. The mountin of the herds have a buffalo bull ratio that has a variation from 1.5% to 2.5%; it increasis toghether with the size of the herd. A lot of 22 month-old P.P. Murrah buffalo heifers selected for replacement in the herds weighed in average 350 kilos. They were fattened in natural field, which used to be a tidal (reedbed) and was improved by the buffaloes. Buffalo castrated males are finished in 600 hectares of Tanzania grass rotations and slaughtered at 24 - 26 months, weighing 400-450 kilos. From weaning to slaughtering this animals have a daily weight gain of 0,583 kilos. Every year 1,200 fattened buffalo castrated males are sold and slaughtered and 1,000 buffalo heifers are sold for mothers, and also 50 P.P. buffalo bulls (chosen from 100 as minimum). The female reposition is of 250 per year.

This represents the following amounts of estimated beef production per hectare:

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\begin{align*}
1,300 \text{fattened buffalo castrated males} \times 400 \text{ kilos} & = 520,000 \text{ kilos} \\
1,300 \text{buffalo heifers} \times 380 \text{ kilos} & = 494,000 \text{ kilos} \\
\text{Total production} & = 1,014,000 \text{ kilos} \\
1,014,000 \text{ kilos produced} / 24,600 \text{ usable hectares} & = 41 \text{ Kg./Hectare}
\end{align*}
\]

A production that doubles the 15 to 20 cattle kilos produced in the area.

In Argentina buffalo and cattle beef are generally not differentiated. Ours is a mass meat market, huge, where beef is a commodity: the highest consumption worldwide: 65 kilo beef/ inhabitant/year. There are more cattle heads than human beings: 55 million vs. 38 million.

Recently buffalo products started to be sold in specialized market niches: five-star restaurants in the city of Buenos Aires (always the most highly-valued cuts). It is also being sold
in butcher stores in Formosa and Corrientes cities. Foreign markets are being evaluated and identified: Europe and Chile.

Buffalo milk production and processing at industrial level are not yet significant in Argentina. However, the future is promising in the short and medium term.

Buffalo dairy farms exist in Corrientes, Buenos Aires, Formosa, Misiones and Tucumán, some of them with industrial processing plants.

However, only one dairy farm, “La Salamandra”, located in Luján, 70 km from the city of Buenos Aires, has kept an official production record for years: 2,159 liters in 267 days, with 7.63% of milk fat and 4.52% protein. Its owner is Javier González Fraga and Miguel Magrane manages the plant. Buffalo calves are removed from their mothers at 3 days, after receiving colostrum, and are transferred to artificial feeding, where they get part of the milk from the buffalo cows, to which concentrate supplement is gradually added. At 90 days, after a gradual adaptation, they are transferred to beef production where they are fed concentrate and go to pasture and/or natural field. Early service with 15-month buffalo heifers is achieved with good feeding during beef production. Dairy cows are basically fed pasture, in plains and good quality natural field, together with corn ensilage and rolls of hay. Also, concentrate is added during milking, in variable amounts, according to each buffalo cow’s individual production. There is a 120-cow herd, where 70 are being milked. The milking parlor has 12 units per side. There are 350 heads in 80 hectares. There are major market niches for cheese, due to the influence of the Italian culture in the population, especially city-dwellers. And this demand is not served. Asociación de Criadores de Holando Argentino (ACHA) and Asociación Argentina de Criadores de Búfalos (AACB) entered into an agreement on December 20, 2005, whereby Buffalo Milk Control is being regulated, as well as the implementation of the Genealogical Milking Registry of Buffalo Breeds as part of the current ACHA regulations and coinciding with the AACB Genealogic Registry Rules.