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Title: Re-localisation of bovine genetics in the promotion of sustainable and healthy food systems: the case of the southwest of the Pampa.

Summary: The Pampean plain was gradually occupied by peoples of European origin and mestizo populations from the end of the 18th century until it was completely occupied at the end of the 19th century. It was during this same period that a more sedentary, meat-oriented cattle farming developed. In order to promote the "improvement" of cattle genetics, the Argentine Rural Society was set up in 1866 and in 1875 the first rural exhibition was organised. In 1897 he was in charge of managing the Herd-books for the Hereford breed and in 1901 for the Shorthorn breed (the "British" breed with the greatest diffusion in the Pampean herds of the time) and in 1907 for the Angus breed.

At the beginning of the 20th century, with the arrival of the beef refrigeration system and its transport by ship, the genetic selection objectives were oriented towards the search for smaller animals: the British breeds (mainly Aberdeen Angus and Hereford) triumphed [Gaignard R., 1979, p 493]. This sentence shows us two important phenomena: a) the conception of a direct relationship between the ideal biotype and the market and b) the "improving" genetics comes from the developed countries.

With the importation of genetics, knowledge is localised through use. In the first place, rural exhibitions and breeding stock auctions are the privileged places where breeders disseminate their "knowledge" and selection criteria. In general, being connected with external genetics suppliers allows a good positioning. Thus, the competitions of the Sociedad Rural, both in Palermo, as well as in the different regional and local centres, mark the trend of "*what is sought after*" in each period of history. And superior genetics are associated with notable surnames (Champredonde et al. 1999). In the second half of the 20th century and the beginning of the 21st century, the paradigm of high productivity is associated with larger animals (New Type) and

"good genetics" no longer comes from the United Kingdom but from the United States. This phenomenon was aggravated by the generalisation of artificial insemination and embryo transplantation (Vissac, 2002). In the same vein, and with regard to our continent, Leroy et al 2020 points out that "In Latin America, locally adapted criollo breeds are themselves the product of crossbreeding between several imported populations over the last few centuries, so that continuous importation and crossbreeding may be more culturally and scientifically accepted than in other regions ...".

The maladaptation of genetics to pure pastoral systems, combined with factors such as agriculturalisation and increased demands from slaughterhouses, contributed to the spread of confinement fattening systems in feed lots or on pasture with high supplementation (Litre et al., 2022). Meat production on pasture alone currently accounts for only 15 %.

The emergence of the Fen Hue grass-fed meat differentiation project in 2017 and the development of agro-ecological production systems in the region led us to rethink the management of genetics at the regional level. Re-learning selection criteria and using genetic materials adapted to extensive grazing systems became a central challenge. Achieving cattle with adequate finishing grades at early ages and without access to energy supplementation (or eventually at low levels) became the main technical challenge. To this end, a network of local actors including cattle producers, herds and insemination centres is being created, with the support of INTA.

The knowledge on which the management of genetics in an adaptation process is based is both empirical and codified. Indeed, Bouche and Bordeaux (2006) highlight the centrality of localised collective know-how (SHCL). The fact of having to mobilise both empirical and codified knowledge is one of the major challenges for all the actors involved in this type of innovation process. The complexity of this is due to the fact that it involves profound changes in the basic paradigms on which the process is based (from productivity to agro-ecological transition), with its implications at the level of the biotypes that are presented as "ideal", the heterogeneity of the actors involved and, in the case of an innovation support organisation such as INTA, the diversity of disciplines involved in its support.

At the heart of the process, learning to observe and understand what animals "tell us" implies the development of collective learning, in which different types of actors and knowledge must be articulated. Different orientations, associated with divergent interests and values, necessarily require the construction of agreements (Vallerand et al, 1994) in order to be able to innovate collectively. A central challenge is to achieve languages and representations of the real, common to all the actors involved, on which the selection mechanisms are based. The qualification of breeders may involve discourses and representations on visible adaptive mechanisms, such as the dynamics of body reserves, health status and welfare markers, reproduction achievement, responses to body growth in pure pastoral systems, beef conformation and muscle development, nutritional and technological quality of fat, etc....

Within the framework of the participation of research organisations and support for territorial innovation, many reflections on the articulation of biotechnical sciences and social sciences, research and animation activities, in order to achieve cattle populations with biotypes adapted to the region's purely pastoral production systems, have emerged.

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