

EDITORIAL

Special issue on “Some preliminary results of the PROCAMED project (Promotion of innovations in the camel sector for a sustainable development in The Mediterranean basin)”

Bernard Faye^{1,2*}

¹FAO Consultant, Camel and Range Research Center, P. O. Box n°322 Al-Jouf- Sakaka, Saudi Arabia

²FAO/CIRAD-ES, Campus International de Baillarguet, TA C/112 A 34398 Montpellier, France

*Email: bernard.faye@cirad.fr

PROCAMED: A European project aiming the promotion of technical innovations in the camel sector (2011-2015)

The “PROCAMED Project” (acronym of “Promotion of innovations in the Camel sector for a sustainable development in the Mediterranean basin”) is started in the operational framework of the European Neighbourhood and Partnership Instrument (ENPI) of the “Mediterranean Sea Basin Programme”. The main objective of the project is to contribute to the answers for the main challenges of the camel sector in arid and semiarid lands around the Mediterranean: improvement of the productivity of the camel breeding system, improvement of the quality/value of its productions (milk, meat, leather, hair), limitation of the pastures degradation, proposition of innovations in the production system, development of the research on products innovation and promotion of durable and innovative production/market chains.

Four Research Institutes are involved in the project: CIRAD (Centre de Coopération Internationale en Recherche Agronomique pour le Développement, France), IRA (Institut des Régions Arides - Laboratoire d'élevage et de la faune sauvage, Tunisia), DRC (Desert Research Center, Egypt) and D.E.T.O. (University of Bari, Italy).

In the countries of the southern Mediterranean basin, camel livestock represents a central activity in occupation of the pastoral area of steppe and desert and the maintenance of agricultural activity of oasis systems, in the rural development desert lands (Faye, 2011), and in the control of desertification (Stiles, 1988). Furthermore, climate changes in this part of the world marked by increasing desertification of the Saharan fringes lead to a decrease in natural resources and the need for reasoned management water (Faye, 2013).

Consequently, renewed interest has emerged since a few decades in the Maghreb countries and

this for several reasons: (i) climatic reasons stressing the capacity of adaptation of camels to ecosystem constrained by water availability; (ii) economic reasons, the camel being able to respond to the needs of urbanized population more sensitive to quality of products such as camel milk or meat, (iii) social reasons, camel livestock allowing the “valorization” of the desert spaces returned otherwise to the marginality (except localized mining recovery), and (iv) political reasons, because investment in the camel sector can represent (for example, in Morocco) the proof of involvement of the central authorities towards the most marginalized populations in the country.

In the North Africa, the total camel population declined since 50 years, passing of 1 031 000 heads to 879,000 in 2011 (FAOstat, 2013), but this change varied depending on the period and the countries. Indeed, after a period of sharp decline at the beginning of the 1960s (-2.4% per year from 1961 to 1978), the population has been broadly stable until the end of the 1990s (0.4% growth between 1979 and 1998), for since a regular annual growth of 2%.

The decrease of the camel population during the period 1970-1987 is linked especially to the change in pastoral systems, the dromedary losing little by little its status of draught or pack animal face to the mechanization of agriculture and transportation. The rise in the numbers from the end of the 1980s, may therefore be associated with a change in the objectives of producers, for responding to the increased demand in camel milk and meat. Globally, camel population in North Africa continued to decrease in proportion to the world camel population world: from 8% in 1961, it represents 3.5% only in 2011, although this proportion appears stable since 1993. In 2011, date of the latest available FAO statistics, the number of camels was 315 000 head in Algeria, 237,000 in

Tunisia, 163,000 in Morocco (therefore 108,000 in the only Saharan provinces), 107,000 in Egypt and only 57,000 in Libya.

In that context, PROCAMED project is aiming to engage researches in different field:

1) Improve productivity and innovation in camel breeding systems by introducing innovations in production systems to increase the numerical productivity of camel livestock (improvement of reproductive performance), increase the production, the health status and the valorization of camel products.

2) Promote innovations in camel product value chains with particular attention to the development and insertion of innovations in the networks of actors relying on local and national development (assessment of the incomes for smallholders due to camel activities, analysis of the camel products value chain).

3) Determine economic and environmental impacts of introduced innovations for a sustainable management of camel breeding territories (primary resources, local and regional economy, ecosystem services).

The dissemination of the results of PROCAMED project is an important objective also. It involves the dissemination to all the actors of the project: (i) to the stakeholders of the camel sector who are the primary beneficiaries, (ii) to policymakers and technical services to facilitate the promotion of innovation at the national and/or regional levels, (iii) to consumers by promoting innovative products on the market and therefore raise the general public, (iv) to partners and the European Union, (v) to the scientific community, (vi) to developers and institutions of innovation and technological development.

Therefore, the present special issue published by Emirates Journal of Food and Agriculture responds to one of this objective. In this present issue, 10 papers are selected. They cover the range of expected results. It involves different disciplines (reproduction, animal husbandry, food science, veterinary sciences) and contributes to the advancement of knowledge regarding camel breeding and production.

The first paper is focused on the “role, distribution and perspective of camel breeding in the third millennium economies” (Faye, 2015). All the camel scientists have to convince the decision makers in the camel countries, that dromedary is not an “animal of the past”. The development of the camel breeding within modern farming system is an important challenge. The contribution of all stakeholders in camel sector to the modernization

of the camel production is the warranty of sustainable entrance of camel into the modernity. But, to succeed, the scientists have to answer to many constraints. One of these constraints is the low reproductive performances of the camel. The fact is known: long gestation (13 months), late puberty (5 years), low fertility rate (less than 50% yearly), high young mortality (up to 20%). It is why the deepening knowledge on physiology of reproduction and on the use of biotechnologies of reproduction is a primary step proposed by the paper “distinctive features of female reproductive physiology and artificial insemination in the dromedary camel species” (Monaco et al., 2015). Some progress is expected also thanks to a better understanding of the semen properties and a better handling for developing artificial insemination for example as stated in the paper regarding “recent advances in dromedary camel reproduction” based on the Egyptian field experience (Bahrawy et al., 2015). To explore the reproductive traits, the physiological studies could bring useful knowledge able to support any improvement of the camel productivity. In that sense, the paper “effects of dietary supplementation and parity of dam on plasma concentrations of Insulin-like growth factor (IGF)-I and IGF-binding protein-3 during postpartum period in dromedary camels” (Hammadi et al., 2015) contributes to understand the effect of diet and age on metabolic factors intervening in production and reproduction efficiency. However, the improvement of performances could be supported also by a better management of the stallions and not necessary only by using new biotechnologies. The paper “male camel behavior and breeding management strategies: how to handle a camel bull during the breeding season?” is especially based on ethology study and shows that it is possible to improve the male performances just by a better handling (Paladino et al., 2015).

The genetic improvement of camel is an important challenge because the selection pressure in this species is still very low. A wide field of research is open to advance in this field including the control of performances up the gene exploration. Within PROCAMED project, several studies are on-going on this aspect. An important step is the characterization of the natural biodiversity in the camel population as it is suggested in the paper “assessing genetic diversity of three Tunisian dromedary camels (*Camelus dromedarius*) subpopulations using microsatellite markers” (Nouairia et al., 2015). But, the genetic studies could be also focused on small portion of the genome, for example myostatin gene which is

informative for exploring the ability of camel to meat production. The paper “sequence and polymorphism analysis of the camel (*Camelus dromedarius*) myostatin gene” (Muzzachi et al., 2015) expect to answer to this question.

Camels are used in North Africa mainly for meat purpose, but milk interest is increasing as the expected “medicinal virtues” of camel milk are more and more a commercial argument. Two papers deal with camel milk in this special issue. The first one is interested by the colostrum and its antibacterial activities. This paper entitled “camel colostrum: Nutritional composition and improvement of the antimicrobial activity after enzymatic hydrolysis” (Jrad et al., 2015) shows how the camel colostrum plays a significant role in the host defense system. In the second study, the role of exopolysaccharide-producing starter (EPS), a crucial textural agent of dairy products is explored in fermented milk. This study entitled “effects of exopolysaccharide-producing starter cultures on physicochemical, rheological and sensory properties of fermented camel’s milk” (Ibrahim et al., 2015) contributes to the technical innovation in the camel milk sector which is one of main objective of the project.

The health aspect is not forgotten and in the paper “effects of two anthelmintics on gastrointestinal infestation by parasitic worms in camels” (Seddik et al., 2015), the authors follow the kinetics of parasitic eggs elimination after two anthelmintic treatments: sub-cutaneous injection of Ivermectine and Albendazole by oral route.

These 10 papers are just a small part of the data already published by the partners of PROCAMED project in different national and international papers or in national and international conferences, but by gathering these papers in one special issue, they participate to show the wide diversity of the studies and of the approaches. There are few multidisciplinary researches in camel sciences. PROCAMED project is an important opportunity for camel scientists from different disciplines to share their experiences. The authors thank the European Union, ENPI-CBC-MED programme for their financial support. All the present papers have been published under the only responsibility of the partners of the project and cannot engage the funding structure.

References cited

El-Bahrawy, K. A., M. A. Khalifa and S. A. Rateb. 2015. Recent advances in dromedary camel

reproduction: An Egyptian field experience. Emir. J. Food Agric. 27(4):350-354.

FAOstat, 2013. <http://www.faostat.org>

Faye, B. 2011. Combating desertification: the added value of the camel farming. Annal. Arid Zone 50(3&4):1-11.

Faye, B. 2013. Camel farming sustainability: The challenges of the camel farming system in the XXIth century. J. Sust. Dev. 6(12):74-82

Faye, B. 2015. Role, distribution and perspective of camel breeding in the third millennium economies. Emir. J. Food Agric. 27(4):318-327.

Hammadi, M., M. Chniter, T. Khorchani, R. Renaville. 2015. Effects of dietary supplementation and parity of dam on plasma concentrations of Insulin-like growth factor (IGF)-I and IGF-binding protein-3 during post-partum period in dromedary camels. Emir. J. Food Agric. 27(4):355-361.

Ibrahim, A. H. 2015. Effects of exopolysaccharide-producing starter cultures on physicochemical, rheological and sensory properties of fermented camel’s milk. Emir. J. Food Agric. 27(4):374-383.

Monaco, D., B. Padalino and G. M. Lacalandra. 2015. Distinctive features of female reproductive physiology and artificial insemination in the dromedary camel species. Emir. J. Food Agric. 27(4):328-337.

Muzzachi, S., A. Oulmouden, Y. Cherifi, H. Yahyaoui, M. A. Zayed, P. Burger, G. M. Lacalandra, B. Faye and E. Ciani. 2015. Sequence and polymorphism analysis of the camel (*Camelus dromedarius*) myostatin gene. Emir. J. Food Agric. 27(4):367-373.

Nouairia, G., S. Kdidi, R. Ben Salah, H. Hammadi, T. Khorchani and M. H. Yahyaoui. 2015. Assessing genetic diversity of three Tunisian dromedary camel (*Camelus dromedarius*) subpopulations using microsatellite markers. Emir. J. Food Agric. 27(4):362-366.

Padalino, B., D. Monaco and G. M. Lacalandra. 2015. Male camel behavior and breeding management strategies: how to handle a camel bull during the breeding season? Emir. J. Food Agric. 27(4):338-349.

Seddik, M. M., B. T. Olfa, Z. Najet, S. Imed and K. Touhami. 2015. Effects of two anthelmintics

on gastrointestinal infestation by parasitic worms in camels. Emir. J. Food Agric. 27(4):390-395.

Stiles, N. 1988. Le dromadaire contre l'avancée du désert. La Recherche 201:948-952.

Zeineb, J., O. Nadia, A, Isabelle, K. Touhami, D. Pascal and H. El-Hatmi. 2015. Camel colostrum: Nutritional composition and improvement of the antimicrobial activity after enzymatic hydrolysis. Emir. J. Food Agric. 27(4):384-389.