

Chapter 17

Interaction Between Camel Farming and Environment

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ABSTRACT

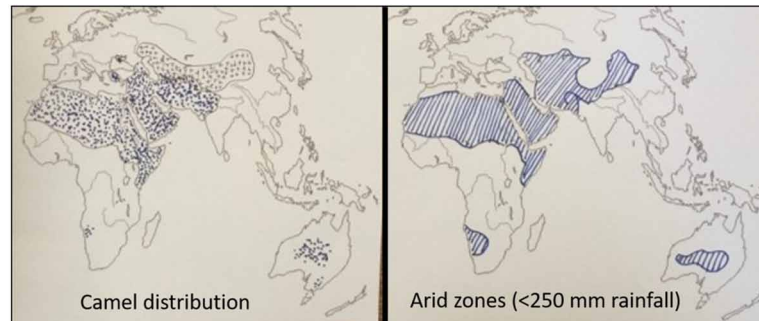
The close adaptation of camel to its desert environment could explain its weak expansion out of the arid lands of the world. This adaptation can contribute to the desertification combat, attesting to its small ecological footprint with traditional extensive farming. The camel population in the world, despite its active growth, remains marginal, and its contribution to the greenhouse gas emission is negligible. However, the current trends to the intensification of camel productions could change the impact of the species on the environment and on animal metabolism. The necessity to expect a better productivity face to the growing demand could lead to a “specialization” of the camel farms and a specific selection of the camel. Such trends require care with a possible erosion of the camel biodiversity and the consequences on the interactions between the emerging camel production system and the environment.

INTRODUCTION

According to FAO report published in 2006 (FAO, 2006), livestock was regarded as the cause of many environmental problems and responsible of some emblematic “hots-spots” in the planet, notably global climate warming, land degradation, pollution of the atmosphere and water, and loss of biodiversity. Nevertheless, the same report showed that 80 percent of the livestock sector growth is the result of industrial systems, the part of extensive livestock farming (which is still the case of camel farming) in these environmental impacts remains relatively low. However, data on camel species are lacking to accurately assess the specific effects of its farming. Among different interactions between livestock and environment (overgrazing, deforestation, gaseous emissions of livestock, animal waste management, domestic animal diversity), the camel, animal particularly adapted to desert ecosystem (Wilson, 1989) is mainly confronted to the desertification process (Faye, 2011). Obviously, its world distribution is closely linked to the arid zones of the old world (map 1). Face to the “hot-spot” of the desertification

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Figure 1. World distribution of the dromedary (λ) and Bactrian (+) camel population (left map) and of the arid lands (right map) where rainfall is less than 250 mm/year



in arid lands (Steinfeld, De Haan & Blackburn, 2003), the camel farming systems can be regarded as a problem, but also as a solution. Indeed, the interaction between livestock and environment is complex and cannot be limited to negative externalities. Because its well-known adaptation to desert environment, the camel farming, especially camel pastoralism can contribute also to the desertification combat. However, in the same time, camel farming is under the influence of new trends including intensification and “peri-urbanization” process (Faye, 2016 and 2018). Such evolutions could greatly contribute to alter the interactions between camel breeding and the environment.

These different topics are discussed in the present chapter. It will be addressed successively (i) the adaptive peculiarities of the camel in arid contexts, (ii) its contribution to desertification combat, (iii) its contribution to greenhouse gas emissions, (iv) the consequences of the intensification on camel production systems and (v) the challenges of camel biodiversity.

THE CAMEL: AN ANIMAL ADAPTED TO ARID LANDS

It is amazing to observe that most of the scientific papers regarding camel, whatever the topic, start by a phrase such as “the camel is well adapted to harsh conditions” or “camel is the ship of desert”. Obviously, large camelids are inextricably linked to the desert ecosystems. The description regarding anatomical and physiological mechanisms of adaptation of camels to the arid conditions was largely achieved for long time in scientific literature (Gauthier-Pilters, 1961). The desert being characterized by high nictemeral variation of the ambient temperature, permanent drought, rarity of water resources, and poor nutritive values of pastoral resources. The camel has developed along its evolution, a large capacity to resist to such conditions (Gebreyohanes & Assen, 2017). Among them, we could cite:

- **The resistance to the thirst** through two main mechanisms (i) decrease of the water loss by decreasing urine excretion, stopping sweating, slowing down basal metabolism, varying body temperature in relation to external temperature, and (ii) maintenance of the homeostasis by limiting variation of the vital blood parameters and by excreting efficiently the metabolic wastes (Bengoumi & Faye, 2002; Faye & Bengoumi, 2018);

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