

REPRODUCTIVE PERFORMANCE OF *Camelus dromedarius* IN THE EL-OUED REGION, ALGERIA

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ABSTRACT: A questionnaire survey and group discussions were conducted to characterize the reproductive performances of camels at their natural pastoralist management systems in El Oued region, southern east of Algeria. A total of 60 breeders were included in the study. The results about the level of education among camel herders in El Oued region revealed that the majority of older herders were illiterate 80% while 15% had primary school education. The camel management dominating in the study areas is traditional nomadic. Mature female camels were dominant (64.68%) in the camel herd. The ratio of male to female camel was 1:60.7. Mean age at first calving and calving interval were 4.66±0.07 years and 22.9±0.25 months, respectively. The mean lactation length was 11.4±0.08 months. Mean age at first mating of male and female was 4.82±0.12 years and 3.43±0.16, respectively. Reproductive performances of camels in the study area is low which could be attributed to the late age of puberty, long gestation period, poor management system, environmental factors and pathological reasons. Therefore, improvement of management systems and the use of controlled breeding techniques contribute to improve of camel.

Keywords: Camel, Breeding, Reproductive Performance, El Oued, Algeria.

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INTRODUCTION

Camels are the most capable animals in utilizing marginal areas because they can survive under harsh environmental conditions. For the people residing in the arid and semiarid areas, camels provide important sources of subsistence and income.

In Algeria, camel breeding has been considerable momentum from 2000, rising from 234,220 heads in 2000 to 315,849 head in 2010 (MARD, 2012), following the promulgation by the Ministry of Agriculture of the premium at birth, a kind of financial assistance to owners for every birth of a new calf. In El Oued, camel breeding remains a practice transmitted from generation to generation. In study area camels are raised according to the three existing farming systems such as sedentary, nomadic and transhumant. The production potential of camels differs depending on farming systems, as in other livestock species.

The reproductive performance of livestock depends on the genetic potential of the species and breed, the management of the livestock keeper and the production conditions (Kaufmann, 2005). Dromedaries had low reproductive efficiency compared to other domestic species (Hermans, 2009). The apparently low reproductive performance is a major problem for camel production improvements.

The reproductive efficiency of camel under natural conditions is low, due to short breeding season, late age of puberty and long gestation period. Full exploitation of the camel's production of milk and meat will only be possible when the reproductive performance is improved. Therefore, the objectives of this research were to characterize the reproductive performance of camels in their natural management systems in El Oued region and helping herders to improve reproductive performance of their herds.

MATERIAL AND METHODS

Study site presentation

The study site is located in the arid Grand Erg Oriental Basin (Figure 1), northeastern part of the Algerian Sahara (33°21'21" N 6°51'47" E). This region is characterized by an arid climate desert Saharan type, in winter the temperature drops below 0°C while in summer it reaches 50°C; average rainfall varies between 80 and 100 mm/year (period from October to February).

The flora in El Oued region is characterized by the speed of change, adaptation to soil and climate, the small number of species, the discontinuous nature of the plant material (Ozenda, 1977).



The main plants of the region are, Drinn (*Aristida pungens*), Alenda (*Ephedra alata*), Arta (*Calligonum comosum*), Retem (*Retama retam*), Adhide (*Euphorbia guyoniana*), Ethel (*Tamarix articulata*), Zita (*Limoniastrum guyonianum*) and Dhemran (*Traganum nudatum*), these species are widely available and highly preferred by ruminants (sheep, goats and camels) in its natural habitat.

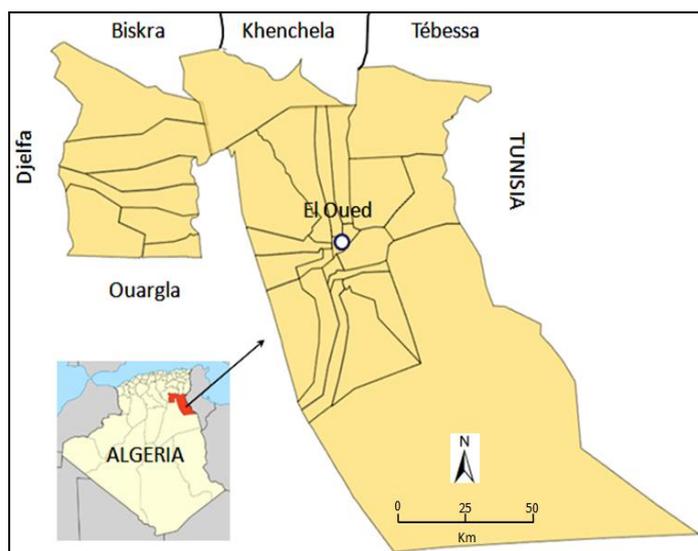


Figure 1- Geolocation of the study area

Survey methodology

The survey was conducted through a questionnaire and guided interviews with camel herders in selected regions of the camel habitat in El Oued area.

A set of detailed structured questionnaires were prepared and used to collect information from a total of 60 camel herders in different sites in interview conducted over single visit. The questionnaires were pre-tested to check clarity and appropriateness of the questions, some of the information collected during interviews was supported by observation. The questionnaires were designed to obtain information on general socio-economic characteristics of herders, livestock and herd structure, Age at puberty, Mating, Gestation, Calving and Lactation.

Data collection

The data were collected using questionnaire technique designed to cover aspects of herd population, production system, age at puberty, age at first mating, ratio female one male, gestation length, age at first calving, calving interval, length of lactation and age at weaning.

The data were sorted and subjected to statistical analysis using SPSS software version 19.

RESULTS AND DISCUSSION

Socio-economic characteristics of the camel herders

Camel herders interviewed were all males, aged between 20-68 years old, the mean age was 48.7 years, herders between 41- 60 years is the highest category 55%, then category of herders over 60 years 33%, this means that there is a great reluctance of young people to this type of farming. Study revealed that the most of the camel herders were illiterate (80%), however 15% got only primary school education and 5% got secondary school education. These results agreed with those reported by Adamou, 2008. Livestock is the main activity of the herders in the study areas.

The majority of camel herders (70%) indicated that their main activity was livestock; followed by those their main activity both livestock and agriculture 21.7%; while 8.3% of the herders surveyed their income from outside livestock associated with agriculture. Outside livestock activities are divided between trade and public service (Table 1).

The results obtained showed three production systems, the nomadic 71.6%, transhumance 21.7% and the sedentary system 6.7%. These findings were within the range obtained by Adamou (2008). For the seasonal movements, it was suggested that the climate conditions and the wells of water are the main reasons for these systematic movements. Generally they move to look for rangelands as forage availability and water wells and would normally return to their permanent dwellings during the summer months (Table 1).

Camel herd composition

The camel herd population in the study area showed great variation and significant difference in number of heads. The average camel herd size was 78.6 heads. The percentage of mature female camels in this study was 48.31 %, while the percentage of mature males was 3.73 % (Table 2).

Generally the female camels contribute about 82.0% of the total herd size. The young male and female calves have almost similar percentages 6.10 and 7.72 respectively (Table 2). The percentage of aging females (4-10 years) was greater than the percentage of aging males 9.5% and 6.0% respectively. This indicated that the main reason for the maintenance and growth of the herd is the larger proportions of females in herds in the areas indicate.

She camels and female calves dominate the camel herd composition and this is in agreement with that of Darosa and Agab (2008) in Sudan, Megersa et al. (2008) in Ethiopia and Al-Dahash (2009) in Libya.

Table 1 - Camel herders socio-economic characteristics in surveyed areas

Parameters	Category	Percentages (%)
Age	(20- 40 years)	11.7 %
	(41- 60)	55.0 %
	(> 60)	33.3
Education	Illiterate	80
	Primary	15
	Secondary	5
	University	0
Income sources	Livestock	70
	Livestock and agriculture	21.7
	Livestock and others	8.3
Management system	Nomadic	71.6
	Transhumance	21.7
	Sedentary	6.7

Table 2 - Camel herd composition in surveyed areas

Age group	Sex		Total
	Male	Female	
Less than 1 year	288 6.10 %	364 7.72 %	652
1 - 4 years	283 6 %	448 9.50 %	731
4 - 10 years	106 2.25 %	772 16.37 %	878
More than 10 years	176 3.73 %	2278 48.31 %	2454
Total	853	3862	4715

Camel reproductive performances

According to the present survey, the breeding season takes place in winter, from November, intensified between December and January, and extends until spring (March); thus corresponding to the rainy season, which affects forage availability in areas of pasture quality and quantity. The mean age at puberty of camel males is 5.40 years (Table 3) comparable with the report of Simenew et al. (2013) in Ethiopia and Tura et al. (2010) in Kenya. Management of camels puberty in good nutritional and environmental conditions could help early sexual development and reproductive maturity (Abdel Rahim., 1997).

The results revealed that the mean ages at first mating, of male and female were 4.82 and 3.43 years, respectively (Table 3). For male camels can be provided the first mating from 3 years of age but full maturity is reached only at the age of 5 years (Kaufmann, 2005). Female camels reach puberty at two years of age but are not usually mated until three years Umaru and Bello (2013).

Table 3 - Summary of the descriptive analysis of some camel reproduction variables as reported by respondent herders in El Oued (n = 60)

Variables	Mean	SEM	Min	Max	
Age at puberty (years)	Male	5.40	0.22	4	6
	Female	3.8	0.26	3	6
Mating (years)	Male age at first mating	4.82	0.12	4	6
	Female age at first mating	3.43	0.16	3	5
	Ratio female / one male during mating season	60.7	2.38	50	70
Gestation	Time taken to detect gestation traditionally (days)	12.6	0.42	10	15
	Gestation length (months)	12.2	0.04	12	13
Calving	Age at first calving (years)	4.66	0.07	4	5
	Calving interval (months)	22.9	0.25	12	24
	Number of calves in a lifetime	7.56	0.08	5	10
Lactation (months)	Length of lactation	11.4	0.08	8	12
	Age at weaning	8.8	0.16	6	12

SEM: standard error of mean. Min: minimum. Max: maximum



The male to female ratio in the study area was 60.7. There are considerable differences in the ideal proportion of males to females during the breeding season. Estimates vary from as little as 1 male with 5-7 females (Watson, 1969), with an average level of 1:10-30 (Simenew et al., 2013) to as high as 1:50-80 (Abdussamad et al., 2011).

Survey reported a mean gestation length of 12.2 months. The gestation period of the dromedary is often quoted as about 1 year, with a range of 355–389 days being given by Burgemeister (1975). The herders interviewed responded that they can detect pregnant camels in an average of 12.6 days. They mentioned, a pregnant female will show it by lifting and curving her tail when a male camel advances toward her this sign was reported by Elmi (1989).

In the present study the mean age at first calving was found to be 4.66 years (table 3). The mean calving interval is 22.19 ± 0.25 months. The mean number of calves in a lifetime is 7.56 ± 0.08 . Generally, some females continue to breed until 25 years old, and it is often reported that they produce 8 - 10 calves during a lifetime. The mean age at first calving in this study agrees with that reported by Abdussamad et al. (2011). However, our finding shows lower than the 5 years reported by Megersa et al. (2008), Tura et al. (2010). On the contrary, age at first calving is much higher than the report of Moslah and Megdiche (1989), which was 4 years in Tunisia.

These results really show that the management system clearly affects the age at which camels can reach their first service and gives their first calves. This difference may be due to supplementation for young camels and calves, leading to early maturity and younger age at first calving. The mean age at first calving and calving interval in the current study were less than those reported by Kaufmann (2005), but it is higher than that found by Abbas et al. (2000), in intensive camel husbandry systems in Saudi Arabia. The difference between mean age at first calving and calving interval could be explained by the method of husbandry management.

Lactation length is 12 month in most of the cases but factors affecting lactation length include season of the year and demand for milk for more prolonged time. Lactation length can be prolonged when there is good feed availability and if demand for milk by the owners is increasing. In this study, lactation length is in close agreement with the previous findings of Keskes et al. (2013).

Weaning is at 8-18 months, depending on the browse situation, the milk production of the female, and the growth of the calf. In traditional pastoral systems, the camel calf is weaned at any time between 3 and 18 months, with an average of 12 months, Mukasa-Mugerwa (1981). The average age at weaning reported in the current study is less than the range given by Abdussamad et al. 2011, but fell within the range given by Mukasa-Mugerwa (1981).

The methods used to prevent the young camel from taking milk from his mother; the udder is covered with cloths (Chmelle) which are held in place by ropes passed over the back of the mother.

CONCLUSION

Camels play an important role to the livelihood and survival of nomadic pastoralists in the study areas. The low reproductive performances could be attributed to late age of puberty, long gestation length, and poor management of herders, environmental factor and other physiological and pathological reasons. Proper husbandry and health services can play significant roles in the long term improvement of camel production and productivity of the region. In order to improve the productivity of camels in the study area, development interventions should take into consideration the socio-economic characteristics of camel herders and the prevailing problems in the area.

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