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Effect of Parity and Live Body Weight of She-Camel on Reproductive Performance, Calving Characteristics, and Blood Parameters during Post-Partum Period

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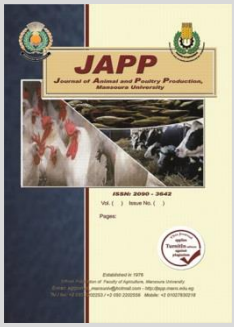

ABSTRACT

This study aimed to evaluate the effects of parity order (PO) and live body weight (LBW) on reproductive, calving and blood parameters of Maghrabi She-camels during post-partum period in Egypt. Post-partum 28 she-camels were divided according to LBW into four categories {400-430 (n=7), >430-460 (n=7), >460-500 (n=6) and >500-560 (n=8) kg}, and according to parity to 1st–2nd (n=8), 4th (n=7) and 5th-6th (n=9). Results showed that number of estrus cases/animal, post-partum 1st estrus interval (PPFEI) and cervical length increased by increasing LBW >500 kg (P≥0.05). Cervical closure time (P≥0.05) and uterine involution (P<0.05) increased by increasing LBW >430 kg. Uterine horn thickness, uterine length, cervical diameter and plasma progesterone and estrogen were not affected significantly by LBW. **E**strus cases (n)/animal, cervical closure time and uterine involution increased in multi-parous than in primi-parous (P≥0.05), while cervical length increased at 5-6 parity compared with 1-4 parity (P≥0.05). The PPFEI, uterine horn thickness, uterine length, and progesterone and estrogen concentrations showed inconsistent changes in different parities (P≥0.05). Placental weight with or without fluids and calf weight at birth were not affected by weight or parity. **C**oncentration of total proteins and their fraction as well as albumin/globulin ratio in blood plasma was not affected by weight. Glucose level reduced (P<0.05), ALP activity decreased (P≥0.05) by increasing weight. In conclusion parity and live body weight showed inconsistent trend of changes on reproductive performance, calving performance and blood biochemicals and hormonal concentrations during post-partum period of maghrabian she-camel under the Egyptian condition.

Keywords: Camel, weight, parity, reproduction, calving, blood.

INTRODUCTION

Arabian camels from severe neglected has suffered over the past ages, both nutritionally or veterinary, although its ability to bridge the food gap of meat and dairy products in poor countries. The time has come to the attention of the Arabian camels as a source of bilateral purpose alongside the rest of other livestock species. Maghrebian camels are restricted to the North African territories extending from Egypt to Morocco. They are medium in size with small but pointed hump. The Maghrebian camel generally responds to feeding and their milk gain is about 3500 grams per day (Wilson, 1984).

The sustain seniority of gestation and the postpartum mature of the upper crust shrewd seniority in the pound of animal. Quit this age, animals up two anatomical, physiological, hormonal, and metabolic changes. For the purpose of these, this is the stage of richest affair in ordering of nourish and stake of metabolic and contagious disorders (Dubuc *et al*., 2011).

Camel physiology was distinctive in abounding aspects if compared to other mammals, which advise them to survive and curl beneath desperate altitude of acrid environments and clashing comestible altitude area added breed cannot abide (Badawy *et al*., 2008). Several factors are affecting reproduction in camels. Camel parity order is one of the major factors and had marked effect on camel reproduction and milk production (Almutairi *et al*., 2010). In this respect, Mustafa *et al.* (2015) found that reproductive performance was affected by camel parity, including number of services per conception (Mostafa, 2007), gestation period length (Ahmed *et al*., 2012) and blood parameters during pre- and post-partum (Abd El-Salaam and Arafa, 2018). Beside the effect of camel parity on reproductive performance, the relationship between parity and live body weight in most of animal species is well known. However, the information on the effect of she-camel body weight on reproductive performance, calving characteristics and blood biochemicals and hormonal concentration are rare. Therefore, the present work aimed to study the effects of parity order in relation with live body weight on reproductive performance, calving performance and blood parameters of Maghrabian She-camels during post-partum period under the Egyptian conditions.

MATERIALS AND METHODS

The present study was carried out in cooperation between the Department of Animal Production, Faculty of Agriculture, Mansoura University and the Center for the Study and Development of camels in Marsa Matrouh that belongs to Animal Production Research Institute,

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Agricultural Research Center (ARC), Dokki, Giza, Egypt, during the period from January to December 2015. The province is geographically located at longitude N, 27° 14′ 10″and E 31° 21 ′10″ latitude and about 7 meters above sea level.

Animals and feeding system:

Twenty–eight female Maghrabi camels were used to study.Animals were housed in open houses provided with feeders and drinkers. The female camels were fed on the following:

During milking: she-camels received 4 kg rice straw, 1 kg berseem hay and 4 kg concentrate feed mixture (CFM) containing 16 % protein.

During early pregnancy (<10 months): she-camels received 4 kg rice straw, 1 kg berssem hay and 2.5 kg CFM containing 16% protein.

During late pregnancy (>10 months): she-camel received 4 kg rice straw, 1 kg berseem hay and 1.5 kg CFM containing 16% protein.

Concentrate feed mixture consisted of 32% undecorticoted cotton seed cake , 26% wheat bran 22% yellow corn , 12% rice bran 5% line seed cake , 2% molasses , 0.5% limestone and 0.5% common salt. The chemical composition of feedstuffs of she-camel is shown in Table (1).

Milking and milk samples:

Milk yield was measured after born calves were allowed to suckle colostrum from their dams for the first seven days. Hand milking of all animals was done twice daily .

Experimental factors:

In this study, 28 female Maghrabi she-camels with live body weight from 400 to 560 kg, 1 to 6 parities and 3 to 15 years old were used. During postpartum period, all she-camels (n=28) were divided according to LBW, regardless parity, into four categories (400-430, >430-460, >460-500 and >500-560 kg), counting 7, 7, 6 and 8 animals in each category, respectively, Also, the same animals were divided according parity order, regardless LBW into three parity orders (1st–2nd, 4th and 5th-6th), counting 8, 11 and 9 animals in each order, respectively.

Table 1. Chemical composition of concentrate feed mixture (CFM), rice straw and berseem hay to she camels

Chemical composition	CFM	Rice straw	Breseem hay
DM	89.1	88.46	89.74
OM	91.55	82.24	84.62
CP	16.30	2.53	13.25
CF	11.46	29.69	28.61
EE	3.32	1.52	1.74
NFE	60.47	49.50	41.02
ASH	8.45	16.76	15.38

Experimental procedures:

Reproductive measurements:

Estrus was detected by ultrasonoghraphy examination Sonoscape A5V. In animals observed visually in heat by determining follicular diameter ≥ 10 mm on the ovaries of each animal. Then, the interval from calving to 1st post-partum estrus and number of estrus cases up to conception was calculated. Also, time required for post-partum cervical closure and uterine involution was recorded by ultrasonoghraphy examination for each animal Calving characteristics including weight of placenta with or without fluids as well as calf weight at birth were recorded.

Ultrasound equipment:

The ultrasound scanner used for the study was Sonoscape A5V (Portable Ultrasonic Diagnostic System, Sonoscape Co. Ltd., Nanshan, Shenzen, China) provided with L561V endo-rectal transducer with (4-9 megahertz) multiple frequency and built in caliper As per instructions of the manufacturer, contrasts and gains were adjusted to obtain a clear image with good resolution. The machine was placed on a movable trolley at appropriate level for easy visibility of the operator and to make controls of machine approachable to the operator during scanning. The selected observations were recorded as a frozen B Mode images and saved on hard disc memory of the instrument.

Blood samples:

Concentration of total protein in serum was estimated by the Biuret method using Bovine serum albumin (BSA) as the method described by Henry (1974). Albumin concentration in serum was estimated by bromocresol green according to Doumas *et al.* (1981). Globulin concentration was obtained by subtracting the value of albumin from the corresponding value of total protein of the same samples. Albumin/globulin ratio was calculated. Concentration of glucose in serum was determined by enzymatic colorimetric method using kits received from Diomond Diagnostics, Egypt according to Trinder (1969). ALP was determined according to Rec. GSCC (1972).

Serum progesterone was estimated by Radioimmunoassay (RIA) using Coat –A count 1^{125} progesterone kit (Diagnostic product corporation, Los Angeles, USA) according to Haynes *et al*. (1980) and Kubasik *et al.* (1984). The quantitative measurement of Estradiol in serum was done by RIA using coat- A count 1^{125} Estradiol 17-β kit (Diagnostic product corporation, Los Angeles, USA) according to Xing *et al*. (1983).

Statistical analysis:

The obtained data were statistically analyzed by SAS (2002) using the following model: $Y_{ij} = \mu + V_i + e_{ij}$ Where, μ is the overall mean, V_i the fixed effect of LBW category (1…..4) or parity order (1……3) on different parameters studied and e_{ij} = random error. The significant differences were subjected to Duncan's Multiple Range Test (Duncan, 1955) and set at $P<0.05$.

RESULTS AND DISCUSSION

1. Reproductive parameters:

1. Effect of LBW of she-camel

Results showed that number of estrus cases/animal, post-partum 1st estrus interval and cervical length tended to increase only by increasing she-camel weight more than 500 kg, but the differences were not significant. Time for cervical closure and uterine involution increased by increasing LBW of she-camels more than 430 kg up to 560 kg, but the differences were significant ($P<0.05$) only for uterine involution. However, thickness of uterine horns, uterine length, cervical diameter, and concentration of plasma progesterone and estrogen were not affected significantly by LBW of she-camels (Table 2).

Table 2. Effect of live body weight of she-camels on their reproductive performance and hormones.

Parameter	Live body weight category (kg) of she-camel			
	400-430	>430-460	>460-500	>500-560
Number of estrus cases/animal	2.20±0.374	2.29±0.359	2.00±0.166	2.86±0.670
Postpartum 1st estrus interval, d	20.00±3.847	22.00±4.509	22.56±2.819	36.00±8.621
Time for cervical closure, d	9.21±2.083	13.85±2.32	13.56±1.740	15.29±2.523
Uterine involution, d	16.60±2.976[b]	20.29±3.120[a]	20.33±2.415[a]	21.57±3.442[a]
Average thickness of horns (cm)	3.76±0.06	3.42±0.106	3.46±0.123	3.41±0.168
Uterine length (cm)	5.17±0.306	4.54±0.368	5.67±0.810	4.75±0.415
Cervical length (cm)	4.56±0.522	4.14±0.375	4.24±0.307	5.08±0.225
Cervical diameter (cm)	2.56±0.128	2.25±0.064	2.40±0.139	2.50±0.111
Progesterone (ng/dl)	1.31±0.005	1.58±0.178	1.41±0.100	1.28±0. 28
Estradaiol 17β (pg/dl)	75.51±0.912	74.89±2.266	75.16±2.602	80.75±1.505

Means denoted with different superscripts (a, b) indicate significant differences at P<0.05 in the same row.

Interval from parturition to first acceptance of the male is variable in the dromedary and should not be used as a criteria to evaluate ovarian activity and postpartum fertility. Accidental mating as early as 2 days after parturition have been observed. Normal conception cannot be expected until the uterus is completely involuted and ovarian function is restored. The time from parturition to the establishment of these conditions is not known with precision. However, pregnancies have been obtained in several females as early as 45 days postpartum. Others have reported no conception in females mated 12 and 40 days after parturition and suggest that low conception rate is to be expected if breeding occurs before 50 days postpartum because uterine mucosa has not yet returned to its normal status before this stage (EL-Wishy, 1987; Ahmed, 1990; Elias, 1990; Yagil, 2006).

The preliminary studies on the histology of the uterus in the postpartum period are in accordance with the obtained results of uterine involution. Many authors showed that uterine conditions are compatible with embryo survival and pregnancy as early as 26 days postpartum. In addition, some camelidae uteri have been able to obtain normal fertilization rates and collection of viable embryos in females bred 3 weeks after induction of abortion at 3 to 10 months of pregnancy (Evans and Powys, 1979; Yagil, 2006). According to the present duration of uterine involution, which was earlier than that reported by the later authors, being significantly shorter (16.6 d) with camel having 400-430 kg than those being heavier more than 430 kg. Results of Mostafa (2007) showed that overall mean of the interval from parturition to uterine horn symmetry was 38.50-39.75 days in camels. Generally, the obtained postpartum uterine involution in term of uterine horn symmetry ranged between 25 and 40 days as reported by some investigators on dromedary camels (Sharma and Vyas, 1971; Sahani, 2001). This information must keep in mind when she-camels were mated during breeding season. In agreement with the present results, the involution of uterus in dromedary camels is reported to be complete as early as 21.0 days (Musa and Makawi, 1985). In the dromedary, the involution of the uterus is completed as early as 20 days (Yagil and Etzion, 1984; Musa and Makawi, 1985; Chriqui, 1988). Under agro-climatic condition, it was found that uterine involution was completed 40.0 ± 2.0 days postpartum (Sharma and Vyas, 1972) or averaged 25.3 days (Vyas and Sahani, 2000).

In addition, there is an effect of feeding level or suckling period on uterine involution but, this effect may be related to postpartum profile of progesterone and estradiol (Silva *et al*., 2009). In our study, despite the significant differences in uterine involution, progesterone and estradiol levels were not affected by LBW category, which may suggest relationship between LBW and uterine weight of she-camels. Uterine involution is rapid in the female camelidae due to the microcotyledonary and diffuse nature of the placentation in these species, which does not cause a great loss of uterine tissue (Musa and Makawi, 1985; Chriqui, 1988). The major decrease in size is observed during the first l0 to 15 days postpartum. Some authors have reported, however, that size of the uterus does not return to normal until 31 to 54 days postpartum (Yagil and Etzion, 1984; Qureshi, 1986).

The insignificant differences in progesterone and estradiol levels in all LBW categories may be attributed to that some anovulatory follicles can go on to become luteinized and produce significant levels of progesterone. Some dromedary females with anovulatory follicles can have plasma progesterone levels similar to those seen in the presence of a corpus luteum (Adams *et al*., 1991a; Noseir *et al*., 2006). These structures take 9.3 days to regress, on the average, but can last from 4 to 21.9 days. The corpus luteum (CL) develops within a few days after ovulation, reaches a plateau, and then regresses if no conceptus is present in the uterus. The life-span of the corpus luteum and its activity are best studied through analysis of its progesterone secretion (Adam *et al*., 1989; Adams *et al*., 1991b).

2. Effect of she-camel parity:

Results showed that number of estrus cases/animal, time for cervical closure and uterine involution showed a tendency of increase in multi-parous than in primi-parous she-camels, while only cervical length increased at later parities (5-6 parity) as compared to 1,2,4 parities, but the differences were not significant. However, post-partum 1st estrus interval, average thickness of horns, uterine length, and concentration of plasma progesterone and estrogen showed inconsistent trend of insignificant changes in different parities (Table 3).

In accordance with the present trend of increase in uterine involution by advancing camel parity, the previous results in the literature showed earlier uterine involution of camels was observed in primiparous than in multiparous camels (Vyas and Sahani, 2000). Primi-parous females have a significantly more rapid involution than pluri-parous animals (Ahmed, 1990). Some authors indicated that the cervix remains open during the first 20 days of the postpartum period (Musa and Makawi, 1985; Qureshi, 1986; Elias, 1990). In our study this period was shorter in different parity orders.

Table 3. Effect of she-camel parity on their reproductive performance and hormones.

Parameter	Parity of she-camel		
	First and second	Fourth	Fifth and sixth
Number of estrus cases/mating per animal	2.23±0.280	2.43±0.297	2.38±0.532
Postpartum 1st estrus interval, d	25.23±4.679	23.14±4.289	27.38±5.467
Time for cervical closure, d	11.85±1.712	14.14±2.404	14.88±1.694
Uterine involution, d	18.31±2.254	20.71±3.219	22.00±2.236
Average thickness of horns (cm)	3.60± 0.820	3.42± 0.171	3.38±0.112
Uterine length (cm)	5.16± 0.427	4.80± 0.543	5.32±0.664
Cervical length (cm)	4.35± 0.268	4.12± 0.357	5.01±0.276
Cervical diameter (cm)	2.51± 0.820	2.30±0.160	2.362±0.082
Progesterone (ng/dl)	1.36±0.730	1.44±0.144	1.42±0.112
Estradaiol 17β (pg/dl)	77.81±1.151	75.58±1.317	75.36±3.439

All differences are not significant at P≥0.05.

The parity showed insignificant effect on the number of estrus cases. Some investigators reported that the parity showed insignificant effect on the number of services conception (estrus cases), the service intervals. The number of services per conception was lower in the first parity, and the higher number was obtained in the second parity then the third parity in camels (Hermas *et al*. 1990, Arther 1992; El-Azab *et al*., 1997). These results are in agreement with Mostafa (2007), who concluded that, the number of services per conception was higher in the third parity then decreased in the second parity. Furthermore, Hussein (2010) concluded that number of services per conception was significantly lower in the 2nd and the 4th parity cows. In contrast, Hammoud *et al*. (2010) mentioned that no significant effect of camel parity on number of services per conception.

Concerning the effect of parity on post-partum progesterone level, Mostafa (2007) found in significant differences in progesterone and estradiol 17β levels during pre- or up to 4 months post-partum in all parity groups, but progesterone level was higher in the last month pre-partum than in the 1st month post-postpartum. The findings of this study confirmed the concluded that P4 level rise with the advance of gestation revealed a sharp rise in the last month of gestation and then diminished gradually from day 2 until achieving a physiological level at day 40 delivery (Kelanemer *et al*., 2015).

Generally, Hammoud *et al.* (2010) reported that the effect of parity on reproductive performance may be due to the changes in managerial systems and environmental conditions among parities. The low reproductive performances could be attributed to late of age 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 (Mayouf *el al.*, 2014).

2. Calving characteristics:

1. Effect of LBW of she-camels:

As affected by LBW of she-camels, placental weight with or without fluids was not affected, but weight of calves at birth had positive relationship with LBW of their dams, being the heaviest for she-camels having higher LBW (from >500-560 kg), but the differences were not significant (Table 4).

In agreement with the obtained results, some investigators reported that the parity showed marked effect on birth weight of camel calves (El-Azab *et al*., 1997; Mostafa, 2007). At birth, LBW of camel calves was higher in medium parity (4-6 parity) than in the early parity and later parity (Abd El-Salaam and Arafa, 2018). There is an effect of the nutritional status of she-camels at late pregnancy on milk production and LBW of calves at birth. Improving LBW of calves by advancing camel parity may be attributed to increasing milk yield with appropriate chemical composition of fat, protein and lactose for calf camel as well as forage availability and supplementary diets (Al-Saiady *et al*. (2012).

Table 4. Effect of live body weight of she-camels on their calving characteristics.

Parameter	Live body weight category (kg) of she-camel			
	400-430	>430-460	>460-500	>500-560
Weight placenta without fluids, kg	3.80 ±0.114	3.57 ±0.101	3.70 ±0.066	3.66 ±0.139
Weight placenta with fluids (kg)	11.46 ±0.220	11.24 ±0.128	11.28 ±0.215	11.06 ±0.186
Weight of born calves (kg)	28.1 ±1.04	28.8 6±1.16	30.71 ±1.23	30.81 ±1.51

All differences are not significant at P≥0.05.

2. Effect of she-camel parity:

Also placental weight with or without fluids and calf weight at birth was not affected significantly by camel parity (Table 5).

Table 5. Effect of parity of she-camels on their calving characteristics.

Parameter	Parity of she-camel		
	First and second	Fourth	Fifth and sixth
Weight placenta without fluids, kg	3.65±0.760	3.69±0.129	3.71±0.780
Weight placenta with fluids (kg)	11.28±0.150	11.53±0.110	10.94±0.166
Weight of born calves (kg)	30.31±0.82	31.00±1.93	30.144±0.77

All differences are not significant at P≥0.05.

3. Blood parameters:

1. Effect of LBW of she-camels:

Results in Table (6) revealed that concentration of total proteins and their fraction as well as albumin/globulin ratio in blood plasma was not affected by weight of she-camels. On the other hand, concentration of plasma glucose showed marked and significant (P<0.05) reduction, while and plasma ALP activity slightly decreased by increasing she-camel weight.

Table 6. Effect of live body weight of she-camel on blood biochemical, (ALP enzyme activity in blood plasma.

Blood parameter	Live body weight category (kg) of she-camel			
	400-430	>430-460	>460-500	>500-560
Total proteins (g/dl)	7.392±0.336	7.447±0.317	7.291 ± 0.165	7.487±0.162
Albumin (g/dl)	3.528±0.195	3.805±0.219	3.633 ± 0.146	3.678±0.171
Globulin (g/dl)	3.864±0.504	3.641±0.336	3.657 ± 0. 251	3.808±0.192
Albumin/globulin ratio	1.02±0.205	1.11±0.144	1.05± 0.111	0.99±0. 820
Glucose (mg/dl)	64.27±2.874[a]	49.18±2.848[b]	48.55±1.900[b]	49.21±2.790[b]
ALP (U/L)	71.57±0.834	71.38±0.719	70.46±1. 73	68.99±1.504

Means denoted with different superscripts (a, b) indicate significant differences at P<0.05 in the same row.
ALP: Alkaline phosphatase

The results of this study are in line with the findings that the effect of age had no significant effect on serum total proteins concentration in calves and their dams (Sarwar *et al*., 1992). However, the present data concerning concentration of plasma total proteins in camels contrasted the statement of Roubies *et al*. (2006), who indicated that mean concentration of total proteins was influenced by age, being lower in ewe lambs than in older ewes. Also in cattle, Mamun *et al*. (2013) demonstrated that total proteins concentrations decreased by increasing age. Proteins are complex nitrogen compounds that contain many organic compounds found in all animal and plant cells. Where they form a major part of the life protoplasm. In addition, all enzymes and many hormones are functional proteins that regulate chemical and biological reactions (Yadav *et al*., 2006). In addition, the results obtained in the present study are in other direction with the results of Roubies *et al*. (2006), who confirmed that the concentration of albumin is affected by age. Concentration of albumin in the small lambs less than the older ewes, and Roubies *et al*. (2006), who found that the concentration of blood globulin was higher in older ewes than in lambs.

2. Effect of she-camel parity:

Results in Table (7) revealed significant (P<0.05) decrease in plasma total proteins and globulin concentration in camels at later parities (5-6 parity) as compared to those with moderate or early parities. However, plasma glucose concentration decreased by advancing camel parity, but the differences were not significant.

Table 7. Effect of she-camel parity on blood biochemical, (ALP enzyme activity in blood plasma.

Parameter	Parity of she-camels		
	First and second	Fourth	Fifth and sixth
Total proteins (g/dl)	7.570±0.168[a]	7.455±0.250[a]	7.063±0.157[b]
Albumin (g/dl)	3.732±0.100	3.637±0.265	3.593±0.143
Globulin (g/dl)	3.838±0.190[a]	3.818±0.440[a]	3.470±0.171[b]
Albumin/globulin ratio	1.016±0.780	1.088±0.200	1.058±0.741
Glucose (mg/dl)	55.60 ±2.760	51.668±3.367	48.806±3.323
Alkaline phosphatase (U/L)	70.33±1. 810	71.674±0.654	69.806±0.687

Means denoted with different superscripts (a, b) indicate significant differences at P<0.05 in the same row.

In agreement with the trend of the present results, concentration of plasma of albumin concentration was lower at the 1st-4th parity than at the 6th parity in ewes (Anwar *et al*. (2012). On the other hand, results of total proteins in camel disagreed with those reported on different species. In this respect, Anwar *et al*. (2012) found that the concentration of total proteins increased at the 6th parity as compared to those at the 1st, 2nd and 3rd parities in ewes. The highest level of blood globulin in camel blood was recorded at later parities (>6 parities), while, the lowest level was recorded at the early parities (1-3 parities), and the middle level at medium parities (4-6 parities) in camel (Abd El-Salaam and Arafa, 2018) and in ewes (Anwar *et al*., 2012).

The variation in plasma total proteins concentration might ability represent an adaptive reaction to higher need of water mobilization and protein by blood to mammary glands for milk synthesis (Anwar *et al*., 2012). Generally, total proteins and albumin markers of hepatic function and decline in their concentration may suggest imply fat infiltration into the liver (Bobe *et al*., 2004). Conceivable changes in liver function may deleterious affect the metabolism of these animals, and may adversely impact milk production or reproduction (Djokovic *et al*., 2013). Blood glucose is known as metabolic profile test, along these lines, it has discernable incentive in pregnancy toxemia, retarted growth, weight reduction, production and reproduction (Ramin *et al*., 2007). Blood glucose gives off an impression of being an essential metabolic consider influencing regenerative action in farm animals (Ali and Majid 2006). Glucose and amino acids are the real fuel supply of the creating fetus in ruminants. Additionally glucose and amino acids are likewise required by mammary organs for lactose and milk protein synthesis (Yotov,*et al*.,2013). The assembled amino acids in liver cells are used amid gluconeogenesis, which is the primal source of energy for the embryo (Faramarzian,*et al*.,2016). Results of glucose concentration in plasma of she-camels are in accordance with Abd El-Salaam and Arafa (2018), who found insignificant effect of camel parity on glucose concentration in blood during first and fourth parities, but in sheep, Anwar *et al*. (2012) demonstrated that, the concentration of glucose was affected by number of parity, where it was higher at the 6th parity than at the previous parities.

In the present study, effect of LBW and parity orded on reproductive performance, calving characteristics and blood parameters of she-camels during post-partum period indicated nearly similarity of both effects. Abd El-Salaam and Arafa (2018) indicated that body weight of she-camels differed with different parities of she-camels. Overall means of LBW was significantly (P<0.05) higher between early, medium and late parities, whereas the heaviest weights were associated with the later parities, while the early parities were recorded with the lightest weights.

In conclusion parity and live body weight showed inconsistent trend of changes on reproductive performance, calving performance and blood biochemicals and hormonal concentrations during post-partum period of maghrabian she-camel under the Egyptian condition

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تأثيرالموسم ووزن الجسم الحي لإناث الجمال على الاداء التناسلي وخصائص الولادة و قياسات الدم أثناء فترة ما بعد الولادة

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تهدف الدراسة لتقييم تأثير ترتيب عدد المواسم والوزن الحى للحيوان على الاداء التناسلى، وخصائص الولادة وقياسات الدم لاناث الجمال المغربية اثناء فترة ما بعد الولادة تحت الظروف المصرية. استخدم فى تلك الدراسة عدد ثمانية وعشرون من اناث الجمال المغربية. تم تقسيم جميع الحيوانات (٢٨ انثى) على حسب وزن الجسم الحى وبغض النظر عن عدد المواسم الى أربع مجموعات ٤٠٠ – ٤٣٠كجم عدد ٧، أكبر من ٤٣٠- ٤٦٠ كجم عدد ٧، أكبر من ٤٦٠-٥٠٠ كجم عدد ٦ و أكبر من ٥٠٠-٥٦٠كجم عدد ٨. كذلك قسمت تلك الحيوانات على أساس ترتيب عدد المواسم بغض النظر عن وزن الجسم الحى إلى ثلاث مواسم (الموسم الأول :الموسم الثانى، الموسم الرابع ، الموسم الخامس : الموسم السادس) وتحتوى على ٨،١١، ٩ حيوانات بكل موسم على الترتيب. تم ملاحظة وتسجيل الأداء التناسلى وخصائص الولادة وتم أخذ عينات الدم. وقد أوضحت النتائج أن عدد حالات الشياع/حيوان، طول ومدة أول شياع بعد الولادة، طول عنق الرحم أظهرت زيادة بزيادة الوزن الحى للجسم فيما فوق ٥٠٠ كجم وكانت الإختلافات غير معنوية. زاد زمن وفترة غلق عنق الرحم وعودة الرحم إلى وضعه الطبيعى بزيادة الوزن الحى للجسم فيما فوق ٤٣٠كجم إلى أكثر من ٥٠٠كجم وكانت الاختلافات معنوية بالنسبة لعودة الرحم. بينما سمك قرنى الرحم، وطول الرحم، وقطر عنق الرحم وتركيز البروجستيرون والاستروجين لم تتاثر معنويا بوزن الجسم الحى. اظهرت عدد حالات الشياع/حيوان، الزمن اللازم لغلق عنق الرحم وعودة الرحم ميلا الى الزيادة فى الحيوانات متعددة الولادة عنها فى الحيوانات التى ولدت مرة واحدة، بينما زاد طول الرحم فقط فى المواسم المتقدمة (٥-٦ موسم) بالمقارنة بالمواسم من الاول الى الرابع وكانت الاختلافات غير معنوية. على الرغم من ان زمن الشياع الأول ما بعد الولادة، متوسط سمك قرنى الرحم، طول الرحم و تركيز البروجستيرون والإستروجين أظهرت إتجاهات متعارضة للتغيرات غير المعنوية للمواسم المختلفة. بالنظر الى تأثير وزن الجسم الحى لإناث الجمال، وزن المشيمة مع أو بدون السوائل الجنينية كلها لم تتأثر بوزن الجسم الحى أو الموسم. لم يتأثر تركيز بروتينات الدم الكلية ومشتقاتها وكذلك نسبة الألبومين / الجلوبيولين بوزن الجسم للحيوانات. من ناحية أخرى أظهر تركيز الجلوكوز في البلازما إنخفاضًا ملحوظًا ومعنويا، بينما نشاط إنزيم الكبد (ALP) انخفض بشكل ملحوظ بزيادة وزن الجسم الحى للحيوان. نستخلص من النتائج السابقة أن تأثير عدد المواسم ووزن الجسم الحى أظهر إتجاهاً غير محدد على الاداء التناسلى وخصائص الولادة وكل من قياسات الدم البيوكيميائية وتركيز الهرمونات أثناء فترة ما بعد الولادة للنوق المغربية تحت الظروف المصرية.

الكلمات الاسترشادية: الجمال، وزن الجسم الحى، المواسم،التناسل، الولادة والدم.