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EFFECT OF PARITY, SEX AND TYPE OF BIRTH ON MILK YIELD, KID GROWTH, BODY PHYSIOLOGICAL REACTIONS AND SOME BLOOD CONSTITUENTS OF ZARAIBI GOATS

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ABSTRACT

The present study aimed to investigate the effects of parity, type of birth and kid's sex on milk yield and kids growth of Zaraibi goats. The effects on body physiological reactions and some blood constituents have been also investigated. Thirty-six adult Zaraibi does (12 first parity, 12 second parity and 12 third parity), immediately, after kidding were used throughout the 17 weeks of lactation period. Weekly milk yield determination was performed by kid suckling technique. Blood samples were taken on day 1, 3 and 5 after kidding, then weekly (blood samples were collected) from cade doe. Blood samples were analyzed for packed cell volume (PCV), haemoglobine (Hb), serum total protein (TP), albumin (AL), total lipids (TL), glucose, cholesterol, glutamic oxaloacetic transaminase (GOT) and glutamic pyruvic transaminase (GPT). Bi-weekly pulse and respiration rats as well as rectal temperature were recorded.

The results showed,that milk yield increased as the number of parities increased. Does bearing male and triplet kids produced more milk than those bearing female and single or twin kids. At the first week after birth, third parity kids were heavier than those of the first and second ones. Male kids and single born kids were heavier and grow faster than females and twin and triplet kids. The third parity does were more physiologically stressed than does in their first and second parities. Changes in glucose, AL, GL, AL:GL ratio, TP, GOT, GPT:GOT ratio, TL and cholesterol were affected by parities, while Hb, GPT were not affected. The effect of the third parity was clear on the milk yield, kids weight, pulse rate, respiration rate, rectal temperature and heamatological parameters, than those of the first or second parity.

INTRODUCTION

Goats have served mankind earlier and longer than cattle and sheep. It is managed for the production of meat, milk and hair particularly in arid, semitropical or mountainous countries (Haenlein and Delaware, 1992). One of the well-known native Egyptian breed is zaraibi goats, called Egyptian Nubian. Effective utilization of genetic variability of such breed of goat requires reliable and systematic information about genetic and non-genetic effects on their production characteristics. Previous investigations revealed, that a wide environmental and non-environmental factors affect the productive and reproductive performance of goats. Various investigators observed significant differences in body weight traits of kids due to their age of dams, sex and year and season of birth. Mekkawy (2000) observed that body weight of zaraibi kids increased with age of dam, but this increase was

in- significant. Mourad (1993) and Mourad and Anous (1998) reported that breed, genetic and type of birth affected body weights of kids. The studies of effect of parity, type of birth and sex of kids on milk yield were insufficient. The effect of parity on milk yield is well established as one of the sources of variation in goat milk yield. Many studies indicated, that milk yield increased with increasing parity up to third to fifth and decline afterward (Prasad *et al*, 2005, Mourad, 2001; Singh and Mukherjee, 1998 and Montaldo *et al*; 1995). The effect of parity on some blood constituents which monitoring the metabolic and physiological status of the milking zaraibi goats was received little attention. Therefore, the present study aimed to investigate the effects of parity, type of birth and kid's sex of zaraibi goats on milk yield and growth of their kids. The effects of such factors on physiological body reaction and some blood constituents were also investigated.

MATERIALS AND METHODS

Animals and their management :

Thirty six adult zaraibi does aged between 3 and 5 years were used at the farm of the Animal Production Department, Faculty of Agriculture, Alexandria University. They were housed in semi-open shaded yard throughout the experimental period. The does were provided with their nutritional requirements during the study according to NRC (1987). They were fed on berseem (*Trifolium alexandrium*) plus concentrate mixture contained at least 14% crude protein and 64% TDN. Clean fresh water was available for all animals throughout the experimental period.

Milk yield :

Throughout the three studied parities, bi-weekly milk yield was determined, starting from first week of kidding till weaning time (17 weeks). Kids were kept with their dams all the time except at the day of milk yield estimation. Milk yield was estimated two times a day at 08:00 and 18:00 h using kid suckling technique (Wallace, 1948). Accordingly, the kids were weighed just before and after suckling to the nearest 50 g. The kids were allowed to suckle their dams till satisfaction. The weights of feces and urine eliminated by the kids during suckling were added to the end weight of the kids. Differences between the two weights before and after suckling were considered as the daily milk intake. After suckling, does were hand milked and the residual milk was added to the milk intake to sum up the daily milk yield. The later was multiplied by 7 to get milk yield per week. The total milk yield for each parity was calculated from birth to the weaning time. Type of birth (either single, twin or triplet), sex (male or female), kids body weight were also recorded throughout each parity. All kids were weighed at birth (birth weight), then at biweekly intervals up to sixteenth week of age.

Blood collection and analysis :

Blood samples were taken from the jugular vein at morning before feeding. on day 1, 3 and 5 immediately after kidding then blood samples were collected weekly throughout the first month of lactation. In the second month, bi-

weekly up to the 17th week of lactation. Whole blood samples were analyzed immediately after collection for packed cell volume (PCV) and haemoglubin (Hb). Serum was obtained by centrifugation of non heparinized blood at 886 xg for 20 minutes and was stored at –20°C until used. Serum was analyzed according to AOAC (1975) procedures for total protein (TP), albumin (AL), total lipids (TL), glucose, cholesterol, glutamic oxaloacetic transaminase (GOT) and glutamic pyruvic transaminas (GPT), globulin concentration was calculated as the difference between total protein and albumin.

Physiological reaction parameters :

Bi-weekly measurements of pulse rate by counting the pulses of femoral artery for one minute, respiration rate by counting the flank movements for one minute and rectal temperature by ordinary clinical thermometer with minimum excitation were carried out.

Statistical analysis :

Data were analyzed using SAS, 2004; ver.8.0 using the mixed procedure and the least squares means option. The following model was used for the milk trait analysis. statistical model underlying this analysis was :

$$Y_{ijkim} = \mu + p_i + T_j + S_k + a(pls)_{ijkl} + W_m + e_{ijklm}$$

Where:

Y_{ijkim} is the records of milk yield weekly.

μ is the overall mean.

P is the fixed effect of parity, $_i$ = 1,2,3 for parities .

T is the fixed effect of litter size, $_j$ = 1,2,3 for single, twin and triplet.

S is the fixed effect of sex kids, $_k$ = 1,2 for male and female.

a(pls) random effect of animal $_l$, nested within parity $_i$, litter size $_j$ and sex of kids $_k$

W fixed effect of week throughout the lactation period .

e_{ijklm} is the random error.

The model used for physiological reaction and blood parameters was:

$$Y_{ijkl} = \mu + P_i + a(p)_j + W_k + e_{ijklm}$$

Where:

Y_{ijklmn} is the records of milk yield weekly.

μ is the overall mean.

P is the fixed effect of parity, $_i$ = 1,2,3 for parities .

a (p) random effect of animal $_j$, nested within parity.

W fixed effect of week throughout the lactation period .

e_{ijklm} is the random error.

Numbers of animals were considered in the model as a repeated factor associated with the weeks.

RESULTS AND DISCUSSION

1- Effect of parity, sex and type of birth on milk yield:

The overall mean of weekly milk yield was increased from the first parity up to the third one (Table 1). However, all values were in the range obtained by Abdelsalam *et al.* (2000). The present results the average milk yield of the first three parities were steadily decreased from the first week of lactation up to the seventeenth week (Fig. 1). The weekly decline in milk secreting ability was more pronounced throughout the first parity. The difference in average milk yield between the first and second parities was estimated by 31.0%, while it was 74.65 and 33.33% between the first and the third parities, respectively. The increase in milking ability as parities progressed was also reported by Zoa-Mboe *et al.* (1997), All *et al.* (1983), Biocheard and Lee (1992) and Gokhale *et al.* (1997). The increase in milk yield as parity advanced may be explained by the increase in mammary size and number of secretory cells and its ability to secret milk.

The average daily milk yield was significantly ($P<0.01$) higher for goats kidding males than those kidding females (Table 1). It was found that, does kidding males gave more milk per week than does kidding females by about 10.4%. This may be due to that the male kids suckled more times than female kids in order to obtain their nutritional needs which stimulate the udder to give more milk. The results disagree with that reported by Gokhale *et al.* (1997), who observed that kid sex was of no effect on the milk yield of sirohi goat.

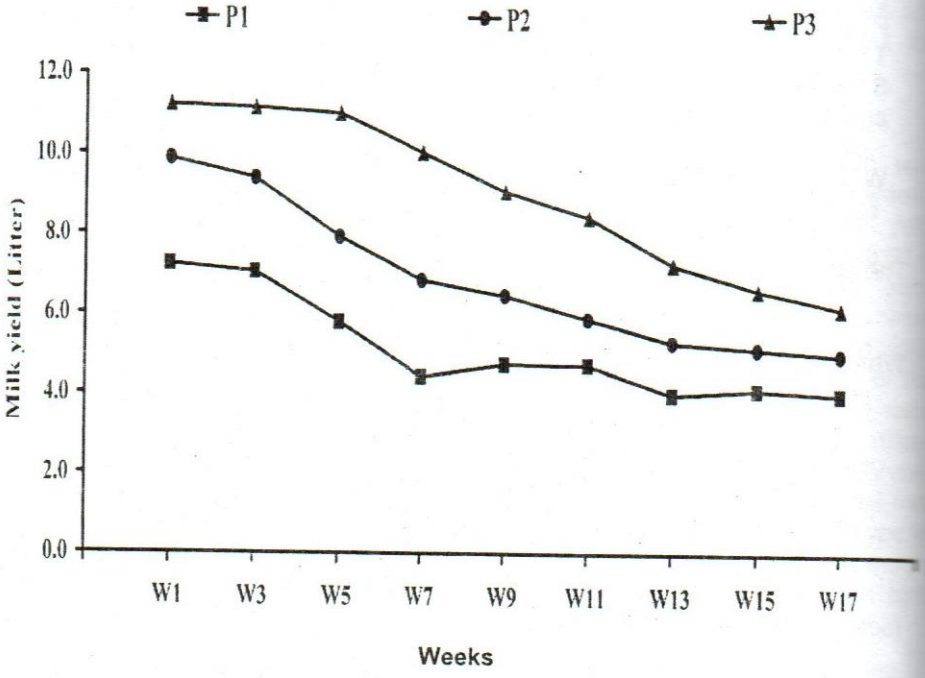

Fig. 1. Variations in milk yield of the three parties throughout different weeks of lactation

Table 1. Effect of parity, sex and type of birth on milk yield of Zaraibi goats

Week of lactation	Parity (P)			Sex (S)		Type of birth (T)			Significance		
	P1	P2	P3	Male	Female	Sin.	Tw.	Tr.	P	S	T
W1	7.23±0.33^{c}	9.88±0.38^{b}	11.21±0.38^{a}	9.57±0.31^{a}	9.31±0.28^{a}	8.12±0.26^{c}	9.16±0.41^{b}	11.04±0.68^{a}	**	NS	**
W3	7.04±0.33^{c}	9.39±0.38^{b}	11.14±0.38^{a}	9.49±0.30^{a}	8.89±0.28^{a}	7.79±0.26^{b}	9.30±0.41^{a}	10.48±0.68^{a}	**	NS	**
W5	5.78±0.33^{c}	7.92±0.37^{b}	11.00±0.36^{a}	8.03±0.10^{a}	7.04±0.28^{b}	5.91±0.25^{c}	6.94±0.40^{b}	9.75±0.67^{a}	**	**	**
W7	4.42±0.37^{c}	6.84±0.43^{b}	10.04±0.41^{a}	7.67±0.34^{a}	6.53±0.32^{b}	5.92±0.29^{b}	7.07±0.46^{a}	8.31±0.77^{a}	**	**	**
W9	4.74±0.31^{c}	6.45±0.25^{b}	9.07±0.35^{a}	7.20±0.28^{a}	6.30±0.27^{b}	5.60±0.24^{b}	6.90±0.38^{a}	7.76±0.64^{a}	**	**	**
W11	4.72±0.29^{c}	5.87±0.30^{b}	8.43±0.33^{a}	6.76±0.27^{a}	5.92±0.25^{b}	5.37±0.23^{b}	6.69±0.36^{a}	6.95±0.60^{a}	**	**	**
W13	3.98±0.31^{c}	5.28±0.34^{b}	7.24±0.35^{a}	5.70±0.28^{a}	5.30±0.27^{a}	5.17±0.24^{a}	5.88±0.38^{a}	5.45±0.64^{a}	**	NS	NS
W15	4.11±0.23^{c}	5.13±0.26^{b}	6.61±0.23^{a}	5.44±0.22^{a}	5.13±0.20^{a}	4.75±0.18^{b}	4.54±0.29^{b}	6.56±0.48^{a}	**	NS	**
W17	4.00±0.22^{c}	4.99±0.25^{b}	6.15±0.26^{a}	5.12±0.20^{a}	4.98±0.19^{a}	4.42±0.27^{b}	4.80±0.17^{b}	5.93±0.45^{a}	**	NS	**

**(P<0.01)

$^{a-c}$ Values within weeks bearing different superscript differ significantly (P<0.05).

In the present study, the average daily milk yield of dams was significantly ($P<0.01$) affected by the type of birth (Table 1). Does rearing triplet kids produce significantly ($P<0.01$) more milk than those rearing twin or single kids by about 16.6 and 31.9%, respectively (Table 1). This finding is in agreement with that of Houria and Omar (1990), Wyatt *et al.* (1997) and spedding (1966) who reported that does, cows and ewes rearing twin kids, calves and lambs produced more milk comparing with those rearing singles. This could be due to that triplet kids seem to suckle more frequent and consequently produced more milk than those with twins or single kids. Houria and Omar (1990) also observed that twin kids suckled more times than single kids in the first day of birth. Moreover, Peart (1967) added that, after about six weeks of age, single lambs did not always consume all the milk available by their dams. The results of Neber *et al.* (1995) indicated that twin kids unlike singles were able to suckle all their dam's milk. The suckling process is a natural neuroendocrine stimulant, especially for the hyperphysical non-genetic factors. Thus, as the frequency of suckling increases, it is expected that such stimulant become more effective. In the present study, the average of daily milk yield of does reached their peak three weeks after kidding, persisted for another two weeks, then declined gradually till the end of lactation period (Fig. 1). The results were in agreement with the results of Browning *et al.* (1995) working on alpine goats.

2- Effect of parity, sex and type of birth on body weight change

Parity had a significant ($P<0.01$) effect on litter size only at birth (Table 2). Kids of the third parity were heavier than that of the first and second parities. However, the effect was not significant between the first and the third parities. The results were in agreement with that reported by Ambruster and Peters (1993), Hoque *et al.* (2002) and Chowdhury *et al.* (2002). They found that parity had a significant effect on litter size at birth. The effect of parity on body weight change after birth up to weaning weight was not significant (Table 2). Garcia *et al.* (1985) and Jum *et al.* (2001) reported that, litter size at weaning was significantly ($P<0.01$) influenced by parity, while Awemu *et al.* (1999) showed that parity had highly significant effect on litter size at weaning of red sokoto does.

The effect of sex on body weight changes of kids was significant ($P<0.01$) only up to the eleventh week of lactation (Table 2). It was clear that male kids were heavier and grew faster than female ones. These results are similar to that obtained by Sidwell *et al.* (1964), Chawla and Bhatnagor (1984) and Mourad and Anous (1998) in goats.

The effect of type of birth on body weight gain, as shown in Table (2) was significant ($P<0.01$). It was found that single born kids were of heavier ($P<0.01$) body weight and higher average daily gain than those of twin and triplet kids. The results were in agreement with Mourad (1993), Mourad and Anous (1998).

3- Effect of parity on does physiological reaction

Variation of respiration rate, rectal temperature and pulse rate of does during different parities are shown in Fig. (2). It was found that does during the third parity were higher ($P<0.01$) in rectal temperature, respiration rate and pulse rate than those during the first or the second parities all the way up to the seventeenth week of lactation (Fig. 2)..

Table 2. Effect of parity, sex and type of birth on body weight changes of Zaraibi goats

Week of lactation	Parity (P)			Sex (S)		Type of birth (T)			Significance		
	P1	P2	P3	Male	Female	Sin.	Tw.	Tr.	P	S	T
W1	2.26±0.06^{ab}	2.17±0.05^{b}	2.35±0.05^{a}	2.41±0.04^{a}	2.10±0.04^{b}	2.82±0.05^{a}	2.12±0.05^{b}	1.83±0.06^{c}	**	**	**
W3	3.10±0.07^{a}	3.02±0.07^{a}	3.00±0.06^{a}	3.21±0.05^{a}	2.87±0.06^{b}	3.71±0.06^{a}	2.91±0.07^{b}	2.50±0.8^{c}	**	**	**
W5	3.95±0.10^{a}	3.97±0.10^{a}	3.92±0.08^{a}	4.14±0.07^{a}	3.75±0.08^{b}	4.77±0.08^{a}	3.76±0.09^{b}	3.30±0.11^{c}	NS	**	**
W7	4.88±0.11^{a}	4.63±0.11^{a}	4.63±0.10^{a}	4.92±0.08^{a}	4.51±0.09^{b}	5.67±0.09^{a}	4.42±0.11^{b}	4.04±0.13^{c}	NS	**	**
W9	5.55±0.14^{a}	5.49±0.14^{a}	5.55±0.13^{a}	5.75±0.11^{a}	5.31±0.11^{b}	6.63±0.12^{a}	5.27±0.13^{b}	4.69±0.16^{c}	NS	**	**
W11	6.41±0.14^{a}	6.45±0.16^{a}	6.56±0.16^{a}	6.66±0.12^{a}	6.29±0.13^{b}	7.68±0.13^{a}	6.13±0.15^{b}	5.60±0.19^{c}	NS	**	**
W13	7.67±0.20^{a}	7.37±0.20^{a}	7.55±0.18^{a}	7.73±0.15^{a}	7.33±0.16^{a}	8.83±0.17^{a}	7.21±0.19^{b}	6.55±0.23^{c}	NS	**	**
W15	8.51±0.23^{a}	8.37±0.22^{a}	8.38±0.20^{a}	8.64±0.17^{a}	8.17±0.18^{a}	9.84±0.19^{a}	8.02±0.21^{b}	7.37±0.26^{b}	NS	**	**
W17	9.54±0.25^{a}	9.30±0.25^{a}	9.17±0.22^{a}	9.51±0.19^{a}	9.17±0.20^{a}	10.86±0.21^{a}	8.88±0.24^{b}	8.27±0.29^{b}	NS	NS	**

**(P<0.01)

a-c Values within weeks bearing different superscript differ significantly (P<0.05).

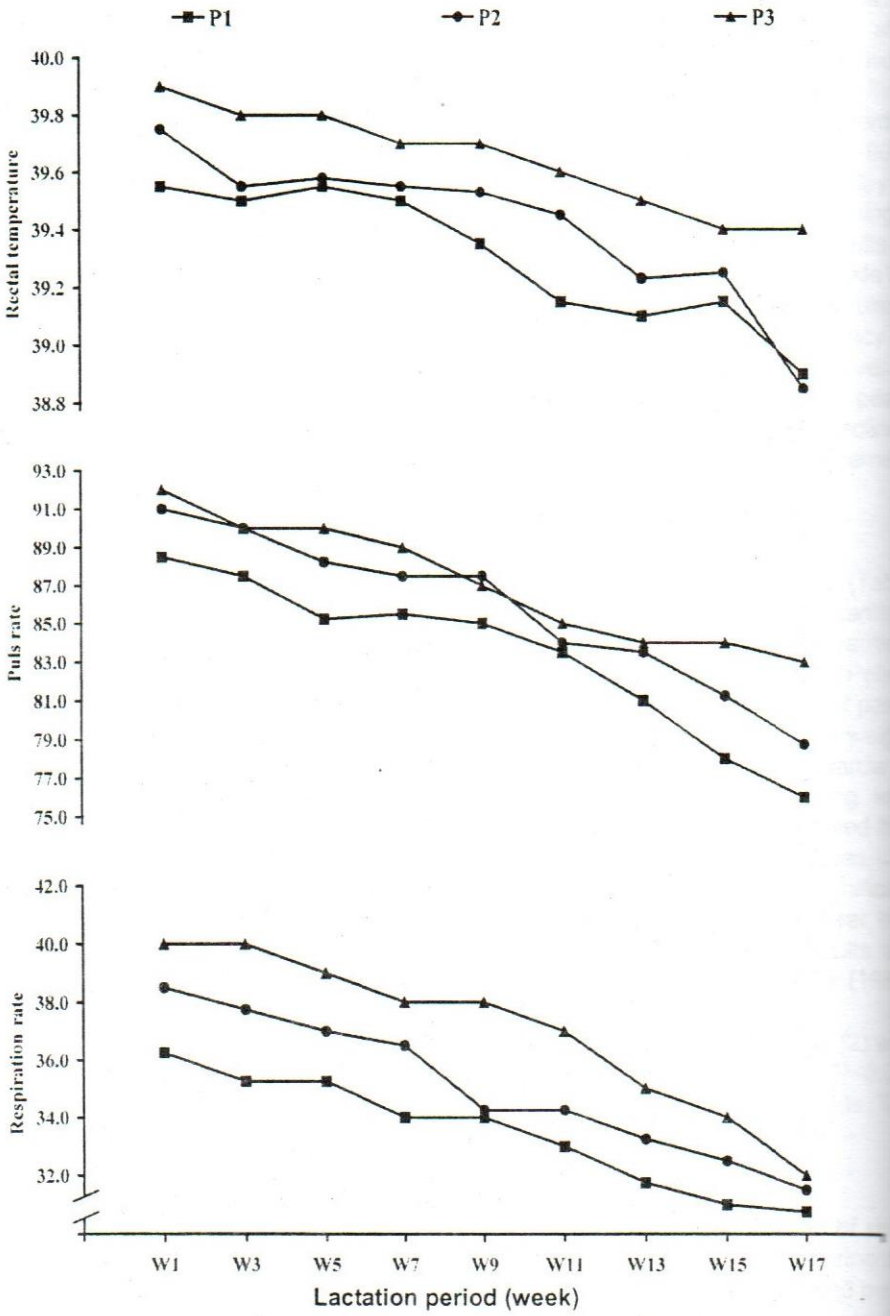

Fig. 2. Effect of parity on rectal temperature (RT), pulse rate (PR) and respiration rate (RR) throughout different weeks of lactation

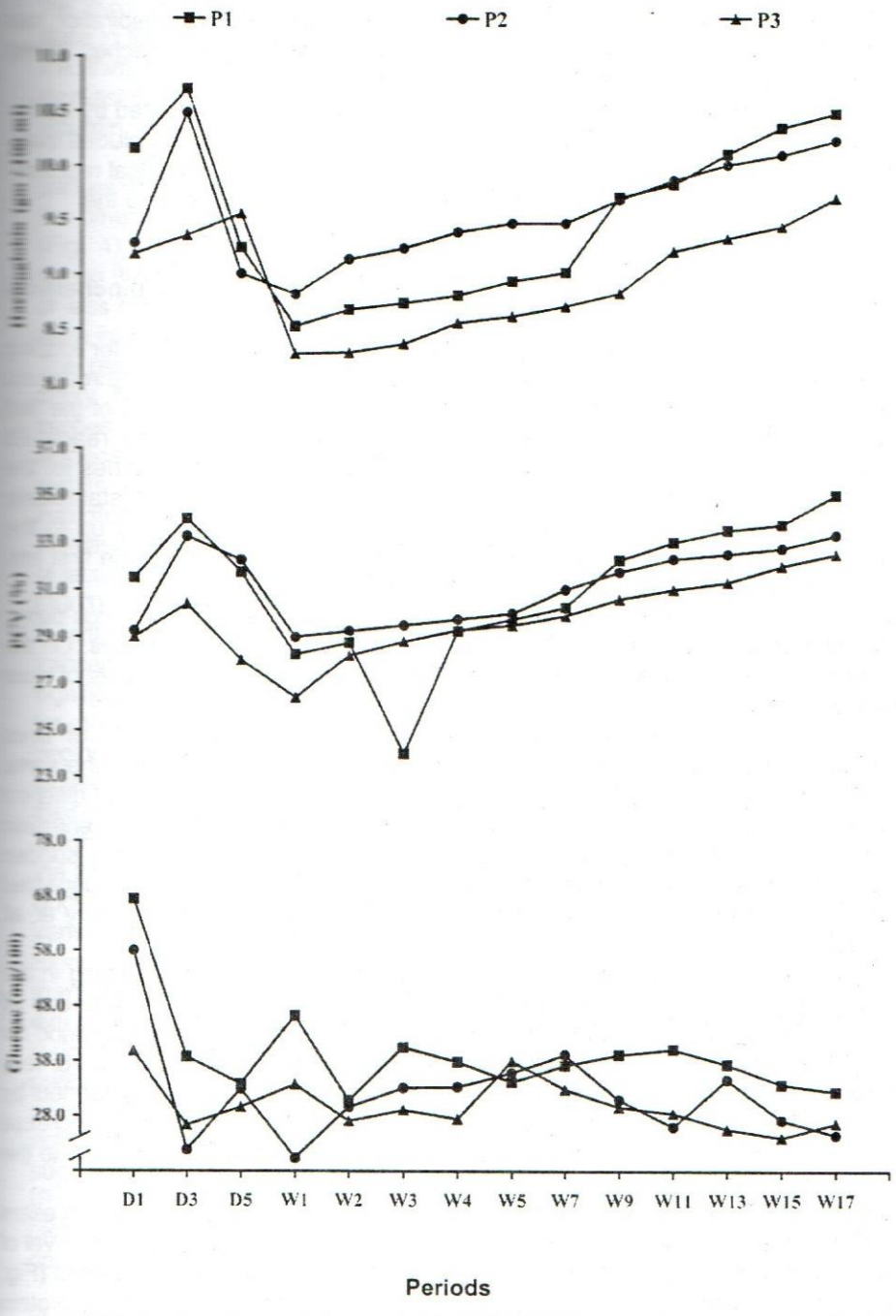

Fig. 3. Effect of parity on haemoglobin (Hb), PCV and glucose on the day 1, 3 and 5, immediately after kidding and throughout different weeks of lactation

These results suggested that does were thermally stressed as parity progressed and the effect was more pronounced on the third parity (Fig. 2). The results were also revealed that, does rectal temperature, respiration rate and pulse rate in the three parties decline progressively and reached lowest value at the seventeen week after kidding.

The present study was in agreement with the results reported by Latif (1973) working on ewes. From the present results it could be concluded that, does during the third parity had the highest level of the physiological reaction and that may explained by the increase in metabolic activity due to the increase in milk yield during this parity

4- Effect of parity on some blood haemoatological and biochemical parameters

The results indicated that PCV% of does immediately after kidding have low values in the three parities. Values were then increased throughout the first three days after birth then decreased to a level at the end of the first week (Fig. 3). Does PCV% were then increased gradually to reach its highest level during the seventeenth week of lactation (Fig. 3). Values for the three parities throughout the different periods of lactation were statistically insignificant. At the same time, was found that from the third day up to the end of the first week, values were significantly ($P<0.01$) high for the first and second parities as compared to the third one.

Hassan *et al.* (1982) reported that blood PCV% of does was high during the first parity, but it decreased during the second and the third parities. On the other hand, Ghobashy (1990) reported that differences between parities of does were not significant.

From the present results blood haemoglobin (Hb) content of does throughout different lactation periods at the three parities have nearly the same trend as PCV% values (Fig. 3). Differences between values throughout different periods for the three parities were insignificant. The decline in Hb concentration after kidding and through the first week of lactation may be due to the sudden decrease in blood iron concentration with the increase in milk yield as suggested by Neber *et al.* (1995). Similar findings were also reported by El-Nouty *et al.* (1988).

Blood glucose level was high for does immediately after kidding in the three parities under study then sharply decreased through the third day of lactation (Fig. 3). Blood glucose level throughout the rest of lactation period for the three parities showed no different trend, although values were more or less the same. The present results were contradictory with the result reported by Ghobashy (1990) who stated that there were a tendency for glucose to increase with advanced parity in Friesian cows. Differences in values may be due to the differences between breed and/or species.

Total protein was affected significantly ($P<0.01$) by parity. The present results revealed that, the does in second parity have almost the highest level of total protein followed by those in the third parity allover the lactation period (Fig. 4). Results were indicated that, at the first day one of kidding blood total protein of does for different parities was low then increased thereafter up to the end of lactation period (Fig. 4). These results are in disagree with Neber *et al.* (1995) in

Baladi goat but in agreement with the results of Ghobashy (1990) who found that total protein started at low level at the first parity and slightly increased up to the third parity. Albumin concentration was significantly (P<0.01) high for the does in the first parity as compared to those of the second and third parities till the third week of lactation (Fig. 4). Values for the three parities were then increased throughout the first three weeks after kidding and the levels of albumin were these more or less the same.

Differences between the level of albumin for does in second and third parities were insignificant throughout the different weeks of lactation (Fig. 4). On the other hand, globulin has taken the same variational trend as total protein (Fig. 4). Albumin to globulin ratio started high at early lactation, especially, during the first parity, then decreased up to the third week of lactation and more or less constant the end of lactation in the three parities (Fig. 4). These results were in agreement with the findings of Shaffer *et al.* (1981).

The results also indicated that transaminase activity of GOT was affected by parity. The level of GOT was significantly (P<0.01) high during the first and third parities as compared to that during the second parity (Fig. 5). Value was in significant between the first and third parities allover the lactation period. These results were in disagreement with that reported with Ghobashy (1990), who indicated that GOT enzyme tended to decreased as the number of parities increased. GOT has high level early in lactation then decreased towards the end of lactation (Fig. 5). The present results agree with the results of Maharem *et al.* (2003) who found that the GOT level was high during the beginning of lactation in sheep and decreased thereafter. The concentration of glutamic pyrovic transaminase (GPT) was not affected by parity (Fig. 5), although, the level was significantly (P<0.01) low at the first day of the third parity as compared to values for other parities. Variations in GOT: GPT ratio were significantly different at the beginning of lactation and up to the second week (Fig. 5). During the rest of lactation period GOT : GPT ratio was only significant between the first and the third parity but variations in the three parities throughout lactation period was insignificant (Fig. 5). It should be pointed out that several factors may influence the level of transaminase activities such as lactation, feeding and management. Such factors should be taken into consideration when discussed the level of transaminase variation with parities.

Blood chlosterol levels were significantly (P<0.01) different between parities from the fifth day up to the seventeenth week of lactation (Fig. 6). The differences between the second and the third parities along lactation period was insignificant but both were significantly (P<0.01) higher than that of the first parity. This may explained by the high milk yield in the second and the third parities. High milk yield during the third parity was related to the increased activity of thyroid gland and this may lead to a high blood cholesterol level as suggested by Ghobashy (1990). Total lipids concentration was significantly (P<0.01) affected by parity. It was found that the concentration of total lipid were high in the third parity only up to the thirteenth week of lactation period as compared to the first and second parities.

The level of total lipids was observed to decrease from the ninth week of lactation period (Fig. 6) which was accompanied with the low milk yield.

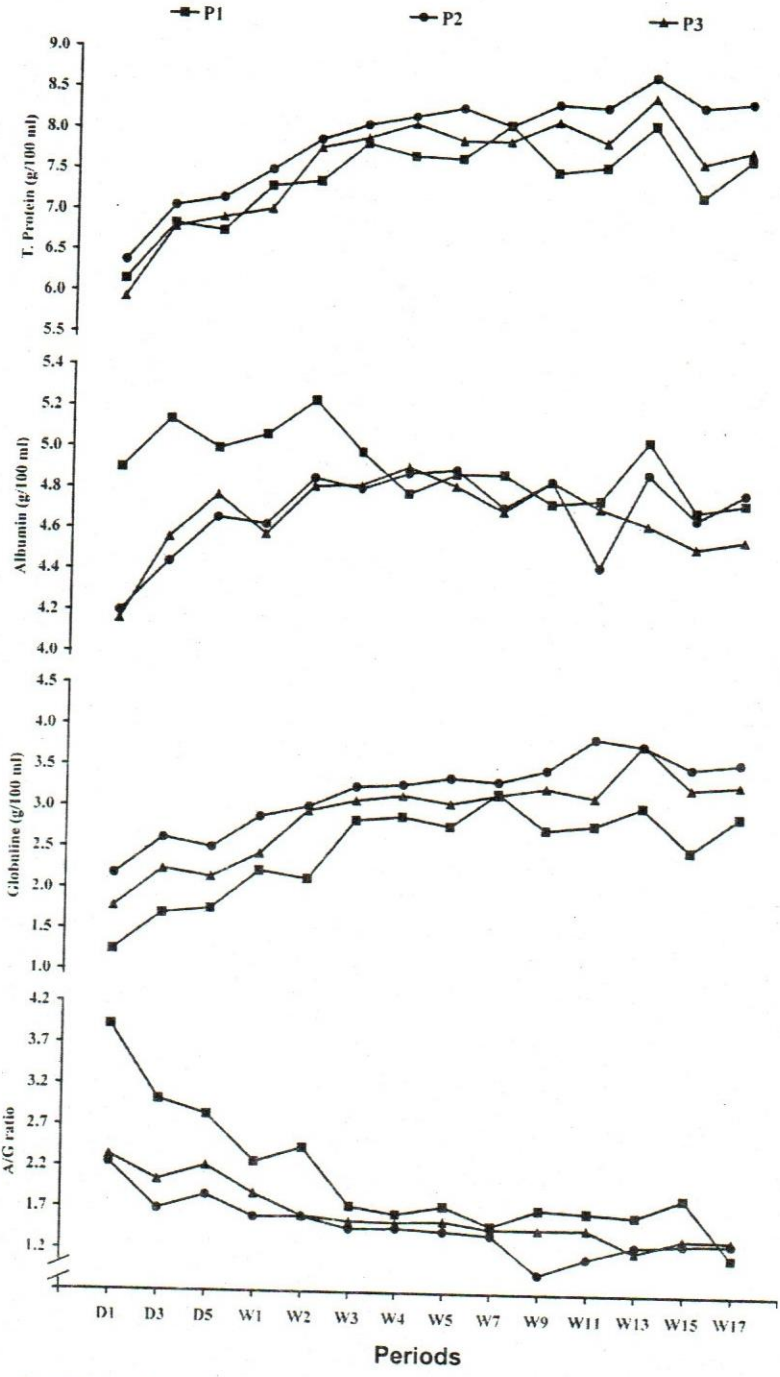

Fig. 4. Effect of parity on total protein (TP), Albumin (AL), globulin (GL) and AL: GL ratio on the day 1, 3 and 5. immediately after kidding and throughout different weeks of lactation

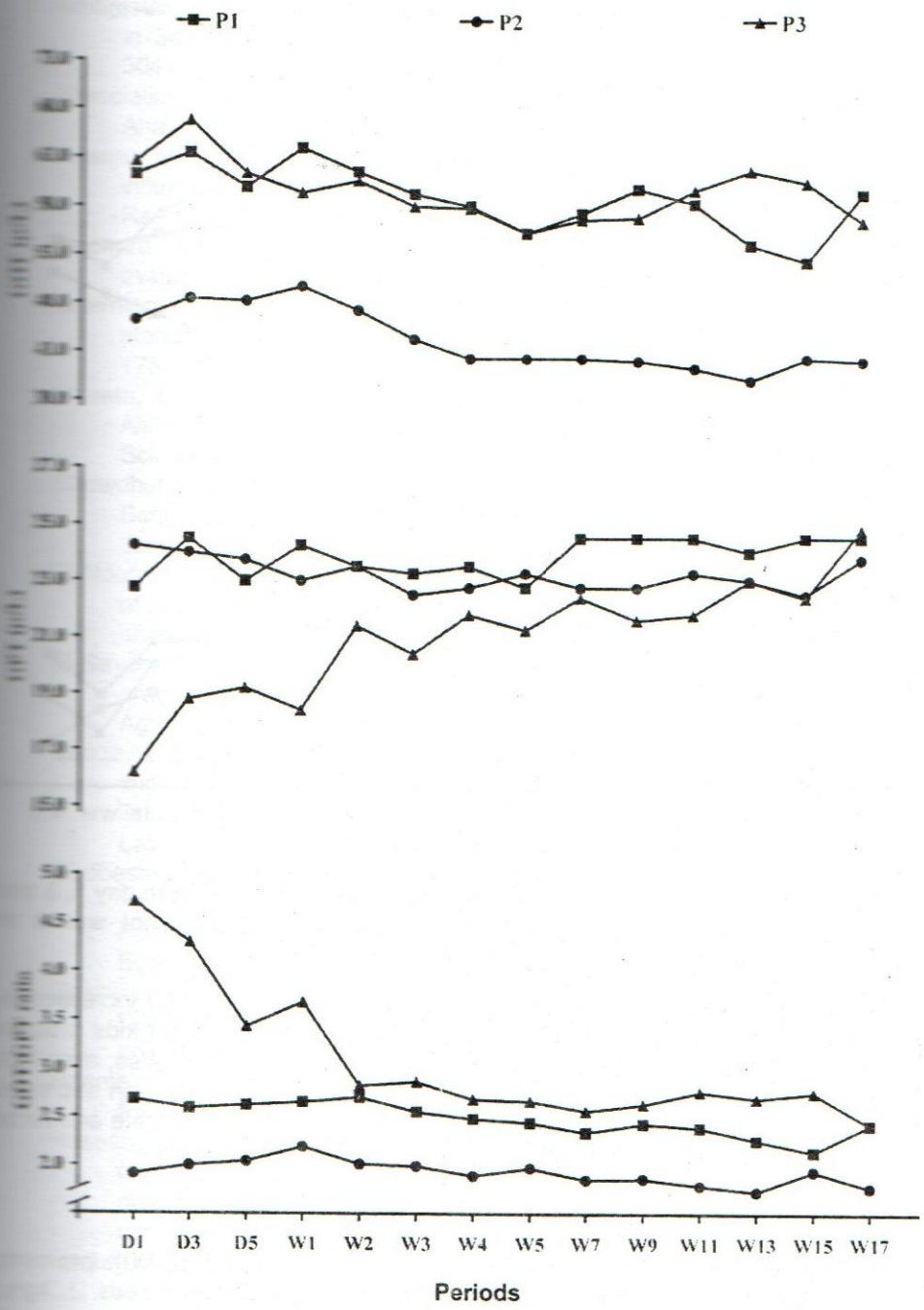

Fig. 5. Effect of parity on GOT, GPT, GOT: GPT ratio on the day 1, 3 and 5, immediately after kidding and throughout different weeks of lactation

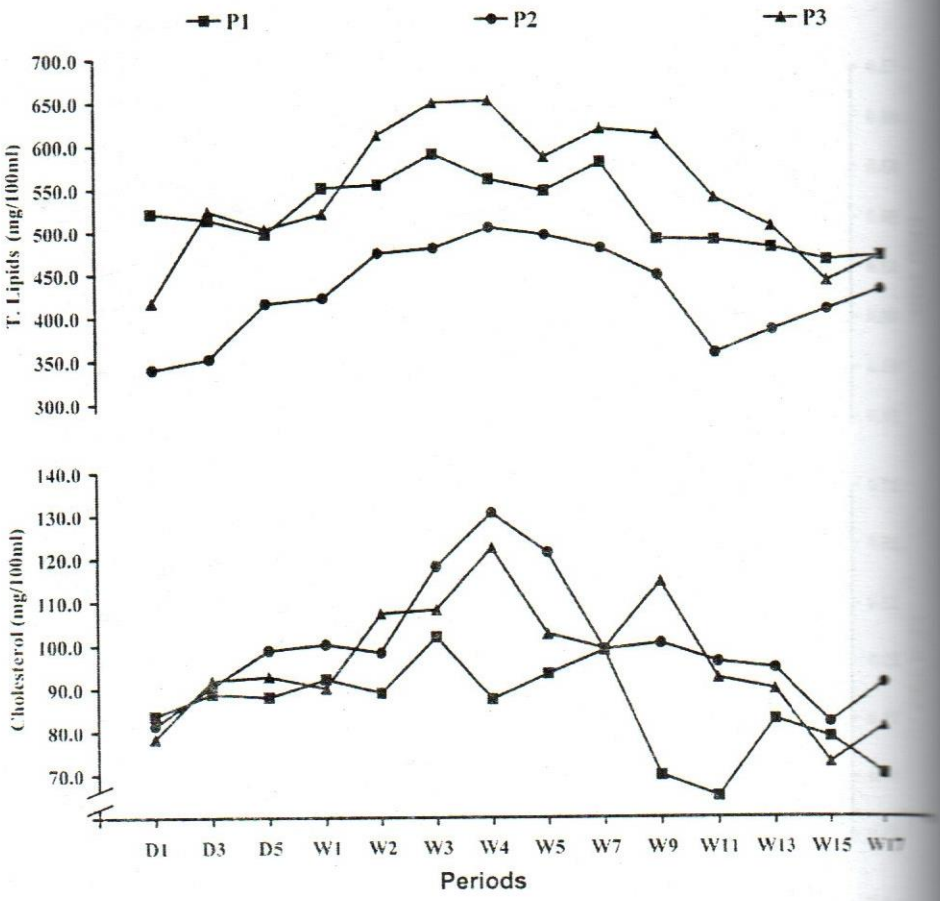

Fig. 6. Effect of parity on total lipids and cholesterol on the day 1, 3 and 5, immediately after kidding and throughout different weeks of lactation

From the present study it would appear that milk yield increases as the number of parities increase. Does bearing male or triplet kids produce more milk than those bearing female or single and twin kids. Also, male kids or single born kids were heavier and grow faster than females, twin and triplet kids. The present results indicated that pulse rate, respiration rate and rectal temperature were increases as the number of parities increase.

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تأثير موسم الحليب وجنس وحجم الخلفه على إنتاج اللبن ونمو الجداء ومقاييس الجسم الفسيولوجية وبعض مكونات الدم في الماعز الزرايبي

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أجري هذا البحث على الماعز الزرايبي وذلك لدراسة تاثير كل من موسم الحليب وجنس وحجم الخلفه على إنتاج اللبن ونمو الجداء ومقاييس الجسم الفسيولوجية (معدل النبض، معدل التنفس، درجة حرارة المستقيم) وبعض مكونات الدم المختلفة.

استخدمت في هذه الدراسة ستة وثلاثون أنثى ماعز زرايبي بالغة عمرها من ٣-٥ سنة بعد الولادة مباشرة خلال موسم الحليب (١٧ أسبوع) وكانت هذه الحيوانات مقسمة على ثلاثة مواسم حليب في كل موسم ١٢ أنثى.

وقد تم تقدير كمية اللبن أسبوعيا وذلك بطريقة الفرق في الوزن – أيضا تم أخذ عينات الدم بعد الولادة مباشرة في اليوم الأول – الثالث – الخامس ثم بعد ذلك تم أخذ عينات الدم أسبوعيا في الشهر الأول ثم كل أسبوعين حتى نهاية التجربة في الأسبوع السابع عشر. وقد تم تقدير معايير الدم الآتية:

قيمة الهيموتوكريت، الهيموجلوبين، البروتين الكلي، الألبيومين، الجلوبيولين والنسبة بين الألبيومين والجلوبيولين، الدهون الكلية، الجلوكوز، الكوليسترول، وكذلك إنزيمات الكبد الـ GOT والـ GPT والنسبة بينهما كذلك تم تقدير معدل النبض ومعدل التنفس ودرجة حرارة المستقيم كل أسبوعين وقد أوضحت النتائج مايلي :

١- كان هناك تأثير معنوي لموسم الحليب على إنتاج اللبن حيث ازداد إنتاج اللبن بتقدم موسم الحليب.

٢- كانت الأمهات التي تلد جداء ذكور أو توائم تعطي كمية لبن أعلى من الأمهات التي كانت تلد جداء أنثى أو مفرد.

٣- كان هناك تأثير معنوي لموسم الحليب على نمو الجداء حيث كانت الجداء المولودة في موسم الحليب الثالث أثقل وزنا من الجداء المولودة في كل من موسم الحليب الأول والثاني وذلك يرجع لزيادة كمية إنتاج اللبن في موسم الحليب الثالث عن الأول والثاني.

٤- كانت الجداء المولودة مفرد أو ذكور أسرع في معدل النمو عن الجداء المولودة توائم أو المولودة إناث.

٥- كانت الأمهات في موسم الحليب الثالث كان هناك عبء فسيولوجي أعلى على الأمهات عنه على الأمهات في الموسم الأول والثاني.

٦- كان هناك تأثير معنوي لموسم الحليب على كل من الجلوكوز، الألبيومين، الجلوبيولين، نسبة الألبيومين إلى الجلوبيولين، البروتين الكلي، وإنزيم الكبد الـ GOT، نسبة الـ GOT إلى الـ GPT، الدهون الكلية والكوليسترول.

٧- كان هناك تأثير غير معنوي لموسم الحليب على كل من نسبة الهيموجلوبيولين وإنزيم الكبد الـ GPT.