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Morphostructural Growth According to the Sex and Birth Mode and Relationship Between Body Size and Body Weight of the Local Kids' at the First Five Month of Age Intunisian Arid Area

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Abstract: During 4 years, about 3378 body parts measurements were harvested for different birth mode of 149 males and 127 females of indigenous kids raised under pastoral arid conditions at some standard ages: birth, 30, 60, 90, 120 and 150 days. Data was used to establish local kid's stature growth after the birth and till 20 weeks' age. The study focused the kinetic evolution of 17 kid's body parts. The individual measurements underwent an extra and/or intra-polation to estimate performances. Statistical analysis was applied to establish the parameters and the variation of individual performances. The body length of male recorded in these age types were found to be 25.35±3.58, 31.41±3.60, 35.67±3.61, 40.20±4.86, 43.79±6.03 and46.10±6.67 cm wile that of female in these age groups were investigate to be24.82±3.00, 31.58±2.89, 35.17±3.38, 38.67±4.13, 41.51±5.08 and 43.18±6.22 cm, respectively. The mean height at withers in male in standard age groups were noted to be 30.55±3.09, 36.94±3.21, 41.34±3.75, 45.23±4.76, 48.46±5.34 and 51.16±5.57 cm while that of female in these age were recorded to be 29.84±3.19, 36.42±2.95, 39.65±3.20, 42.84±4.54, 46.30±5.34 and 48.44±6.35 cm, respectively. The mean heart girth in male in these standard ages was recorded to be 30.24±2.96, 36.79±4.19, 42.87±5.02, 47.34±5.47, 51.76±5.96 and 54.86±6.22 cm. Concerning female mean heart girth was noted to be 29.66±3.59, 36.57±3.96, 41.45±4.13, 45.93±5.15, 49.71±6.02 and 53.00±6.06 cm, respectively. Indeed the study consist body measurement of kids birth mode essentially (body length, height at withers and heart girth) of 149 born single and 127 born twins in the same standard age (birth, 30, 60, 90, 120 and 150 days). Average body length was 24.98±3.15, 31.84±3.09, 36.31±3.60, 40.59±4.51, 44.02±5.23 45.73±6.22 for single and 25.26±3.53, 31.07±3.47, 34.42±3.10, 38.21±4.36, 41.24±5.91, 43.62±6.90 for twins, respectively for the standard age. Also for height at withers was 30.86±3.01, 37.36±3.29, 41.82±3.55, 45.77±4.70, 48.49±5.76, 51.63±6.86 for single mode and 29.84±3.19, 36.42±2.95, 39.65±3.20, 42.84±4.54, 46.30±5.34, 48.44±6.35 for the twins mode, respectively for the same standard age. In addition the heart girth of the birth mode at this standard age was 30.38±2.86, 37.40±4.15, 43.75±4.41, 47.92±5.54, 52.32±5.97, 55.10±6.27 and29.50±3.65, 35.85±3.85, 40.43±4.34, 45.25±4.78, 49.06±5.71, 52.72±5.90, respectively for single and twins. Pearson correlation illustrates relationships between body parts and body weight of local kids'. This correlation during growing life was higher significant ($p<0.01$) for each sex and each age type especially after 30 days. Based on the magnitude of the correlation body length, height at withers and height girth could be selected for predicting live weight of the animals after one month of age.

Key words: Local kid, sex, birth mode, Tunisian arid area, morphostructural, growth, relationshipo

INTRODUCTION

Goats play an important role in generating employment, income capital storage and improving household nutrition. Being small in size they do not require any large management skills and can easily be handled and managed by women and children (Husain *et al*., 1995).

In Tunisia, The majority of the autochthonous natural goats' livestock has existed in the arid zone (Najari, 2005). The common goats' concentration in the marginal and difficult areas is justified either by caprine rusticity and the ability to valorize range lands sparse resources under harsh climate (Bourbouze *et al*., 1989).

The Tunisian local goat population is well-adapted to the harsh environments and the pastoral breeding mode, traditionally adopted as the main exploitation mode of the arid region restrictive resources and conditions (Ouni, 2006). The adaptation character, acquired during a long selective process has been oriented both by the environment and by nomadic herders (Bouche and Hugot, 2002).

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The local goats raised into extensive has a multipurpose functions (El Aïch *et al*., 1995; Bernus, 1981) and contributes notably to the local society consumption. This animal is an important source of cash through live sales and protein through home slaughter (Hale, 1986), especially by the production of kid's meat exploited after 5 months age (Najari *et al*., 2004).

This market class represents about 75% at the overall red meat consumption in the south of Tunisia (Najari, 2003).

The goat production improvement needs to characterize the kid's growth through the study of the weight and the morphostructural evolution after birth and till slaughtering age. Knowing the kid's body parts evolution allows to apprehend herd management and to establish genetic improvement plans. On fact, relation between body parts was largely studied for several species (Lejeune *et al*., 2002) and the weight of the several species is perhaps expressed in relation to unquestionable height and length of the animal body parts (Fida Muhammed *et al*., 2006). Body parts measurements can be a useful criterion of selection especially when control does not offer the possibilities of the follow-ups individual potentialities under pastoral breeding mode (Ouni, 2006). In many cases these have been based common zoometric parameters (Herrera *et al*., 1990). Given that the majority of the genes influencing the configuration of an animal are of common action and not local, the formation of one part is found narrowly correlated with the formation of the other (Herrera *et al*., 1996). Very little work on the assessment of growth rates of local goats has been carried out in Tunisia. The present study was focused on the evaluation of growth performance kids under harsh feeding systems after birth at the first 5 month of age by establishing characters relationship during kid's growing life. The aim is to supplement the characterization of the local goat and results will help for herds' survey on range lands and the genetic scheme elaboration.

MATERIALS AND METHODS

Location and climate of the study area: The study was conducted at the experimental herd of Arid Aria Institute (Tunisia), which is located about 24 Km from Médenine in the south-east of Tunisia (33° 30N. 10°40'E). The climate in this area is very had and precarious (Ouni *et al*., 2007). Annual rainfall averages about 200 mm (Ferchichi, 1996). The dominant winds are of western. north-eastern sector and south-east from November to April (Floret and Pontanier, 1982). January is the coldest month of the year. with temperature average of 10.7°C, while August is the hottest month with a mean temperature of 27.3°C (Ouled Belgacem, 2006). The experiment was conducted in December after the kidding and continuous until the beginning of the summer.

Animal materials

Local goat: The local goat population is characterised by its small size with a height of 76 cm for the male and 60 cm

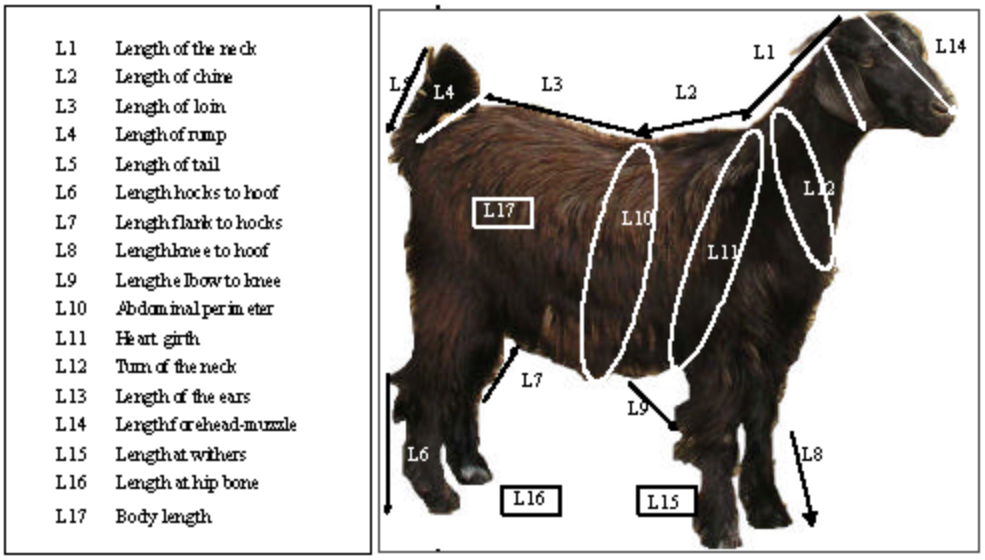

Fig. 1: Zoometrical variables studied and their reference points followed in the kids of the local goats' population

for the female (Ouni, 2006; Najari *et al*., 2007b). Characteristics of the population include the ability to walk long distances, water deprivation resistance and good kidding ability. The native goats are hairy; basically black goat coloured with spots on the head, horned and has bread and dewlap on the neck. Fertility rate is about 87% and prolificacy rate varies between 110 and 130% (Najari *et al*., 2006). Kidding season begins in October and continues till February with a concentration in November and December when 69.2% of kids are born.

Data collection: About 276 experimental kids' were used in the present study. Data is carried out, during four years. For each periodical control, 17 linear measurements are retained. The kids' were controlled one every tow week. These various parameters of the general morphology of kids are inspired by a morphometric study of Habe and Szabara (2000).

Performances used in this study, 17 measurements body parts of kid's followed (Fig. 1), estimated by intra or extra-polation at standard ages (Birth, 1 month, 2 months, 3 months, 4 months and 5 months).

Each kid records included goats' parents and kid identification, type of birth, date of birth, sex, kid's weight measured with the corresponding dates of controls. These performances have been analyzed by statistical package (SAS, 1999).

RESULTS AND DISCUSSION

The results of 17 body parts of local kids at the five first months of age, separately by kid's sex and birth mode were presented in Table 1and 2. This information allows the establishment of morphometric knowledge of certain body parts of the local goat and the variation of these parameters according to the age.

Measurements of the new born kids: Table 1and 2 illustrates well the average of the measurements and the variation merge of growth for each sex and birth mode of Tunisian local kid's harvested just after birth. The average measurements at birth for height at withers were 30.55±3.09 cm for male compared to 30.20 ±3.18 for female. also for body length was 25.35±3.58 and 24.82±3.00, respectively for male and female.

Table 1: Trait description, average and standard deviation of indigenous sex kids body parts at first 5 month of age

SEX	Body parts	Birth	30 days	60 days	90 days	120 days	150 days
Male	L1	13.00±1.66	16.63±1.47	18.96±1.79	20.76±2.49	22.17±3.00	23.02±2.91
	L2	11.92±1.65	15.20±1.50	17.10±1.71	18.74±2.26	19.83±2.30	20.86±2.50
	L3	7.80±1.31	10.48±1.02	12.03±1.42	13.14±1.36	14.44±2.12	15.29±1.76
	L4	6.87±1.39	9.06±1.12	10.13±1.18	11.04±1.40	12.19±2.08	12.43±2.60
	L5	6.70±1.45	7.88±1.00	8.52±1.10	9.03±1.19	9.34±1.48	9.65±1.79
	L6	15.41±4.29	16.94±1.33	18.63±1.49	20.22±2.22	21.12±2.77	22.18±2.36
	L7	14.95±1.45	18.02±1.42	19.75±1.65	21.20±2.23	22.11±2.79	23.21±2.43
	L8	12.33±1.57	14.78±1.72	16.92±1.94	18.37±2.25	19.28±2.66	20.78±3.12
	L9	13.26±1.56	15.74±1.75	17.93±1.92	19.30±2.26	20.29±2.66	21.58±2.69
	L10	31.55±2.95	37.38±4.36	45.69±4.99	50.74±5.77	56.59±6.93	61.08±7.20
	L11	30.24±2.96	36.79±4.19	42.87±5.02	47.34±5.47	51.76±5.96	54.86±6.22
	L12	18.92±2.84	22.49±2.44	25.72±3.77	27.27±4.17	28.65±4.77	29.98±5.53
	L13	10.05±1.13	11.60±0.94	12.52±1.09	13.27±1.48	13.95±1.88	14.60±2.18
	L14	12.69±1.37	14.81±1.27	16.43±1.36	17.88±1.86	19.09±2.52	20.26±2.69
	L15	30.55±3.09	36.94±3.21	41.34±3.75	45.23±4.76	48.46±5.34	51.16±5.57
	L16	31.43±3.05	37.82±3.07	42.54±3.77	46.52±4.91	49.52±4.57	51.85±5.69
	L17	25.35±3.58	31.41±3.60	35.67±3.61	40.20±4.86	43.79±6.03	46.10±6.67
Female	L1	12.65±1.42	16.66±1.30	18.63±1.84	20.00±2.07	20.94±2.31	21.85±3.33
	L2	11.77±1.53	15.43±1.29	16.81±1.45	18.23±1.85	18.94±2.00	19.75±2.78
	L3	7.84±1.38	10.56±1.01	11.74±1.15	12.71±1.43	13.94±1.86	15.07±2.64
	L4	6.61±1.32	9.12±1.04	10.01±1.20	10.60±1.28	11.53±1.72	11.97±1.78
	L5	6.54±1.28	7.91±1.06	8.19±1.01	8.64±1.22	8.95±1.41	9.27±1.79
	L6	14.89±4.07	17.14±1.32	18.42±1.47	19.44±1.83	20.21±2.36	21.17±2.83
	L7	14.71±1.44	18.26±1.38	19.49±1.51	20.34±1.91	21.10±2.45	22.39±3.15
	L8	12.10±1.67	14.96±1.73	16.63±1.86	17.73±2.10	18.61±3.25	20.42±3.34
	L9	12.97±1.63	15.95±1.8	17.62±1.87	18.71±2.11	19.45±2.72	21.41±3.30
	L10	30.89±3.40	37.30±4.03	43.78±4.53	49.65±5.25	54.89±6.88	59.65±7.61
	L11	29.66± 3.59	36.57± 3.96	41.45±4.13	45.93±5.15	49.71±6.02	53.00±6.06
	L12	18.14±2.90	22.55±2.51	23.96±3.07	25.17±3.35	26.20±4.51	27.76±4.84
	L13	10.09±1.09	11.73±0.95	12.40±0.91	13.13±0.99	13.55±1.29	14.08±1.68
	L14	12.63±1.35	14.99±1.06	15.91±1.11	17.05±1.48	17.65±2.02	18.66±2.58
	L15	30.20 ±3.18	36.91±3.13	40.21±3.22	43.48±4.78	46.33±5.84	48.99±7.88
	L16	31.18 ±2.96	37.58±2.68	41.20±3.19	44.65±4.19	46.96±5.38	50.15±7.75
	L17	24.82±3.00	31.58±2.89	35.17±3.38	38.67±4.13	41.51±5.08	43.18± 6.22

Table 2: Trait description, average and standard deviation of indigenous birth mode kids body parts at first 5 month of age

Birth mode	Body parts	Birth	30 days	60 days	90 days	120 days	150 days
Single	L1	12.98±162	16.71±1.37	19.22±1.69	20.89±2.11	22.00±2.72	22.77±2.89
	L2	11.83±1.53	15.50±1.37	17.39±1.59	18.89±2.07	19.66±2.36	20.65±2.57
	L3	7.99±1.34	10.72±0.98	12.28±1.26	13.20±1.35	14.64±1.99	15.24±1.88
	L4	6.89±1.44	9.27±1.10	10.40±1.11	11.16±1.32	12.30±1.72	12.65±1.89
	L5	6.67±1.26	8.02±1.00	8.56±1.10	9.14±1.22	9.35±1.46	9.50±1.70
	L6	15.47±4.56	17.33±1.10	18.93±1.26	20.30±2.12	21.14±2.71	21.96±2.60
	L7	14.92±1.44	18.42±1.18	20.06±1.44	21.21±2.19	22.06±2.80	23.12±2.69
	L8	12.31±1.58	15.19±1.68	17.24±1.67	18.54±2.13	19.16±2.77	20.82±2.92
	L9	13.19±1.60	16.14±1.77	18.24±1.65	19.50±2.15	20.18±2.77	21.73±2.88
	L10	31.74±2.85	38.19±4.21	46.54±4.46	51.63±5.39	57.60±6.87	61.61±6.93
	L11	30.38±2.86	37.40±4.15	43.75±4.41	47.92±5.54	52.32±5.97	55.10±6.27
	L12	19.22±2.89	22.92±2.48	25.52±3.34	26.82±4.06	28.51±5.27	30.06±4.87
	L13	10.07±1.04	11.76±0.90	12.60±0.95	13.33±1.16	13.90±1.51	14.44±2.12
	L14	12.67±1.34	15.03±1.03	16.55±1.32	17.93±1.76	18.98±2.36	20.10±2.63
	L15	30.86±3.01	37.36±3.29	41.82±3.55	45.77±4.70	48.49±5.76	51.63±6.86
	L16	31.69±2.78	38.16±2.86	42.97±3.51	47.03±4.85	49.45±4.95	52.50±7.05
	L17	24.98±3.15	31.84± 3.09	36.31±3.60	40.59±4.51	44.02±5.23	45.73±6.22
Twins	L1	12.67±1.48	16.56±1.42	18.33±1.85	19.85±2.46	21.14±2.75	22.15±3.43
	L2	11.87±1.67	15.07±1.42	16.47±1.46	18.05±2.04	19.14±2.00	19.99±2.79
	L3	7.61±1.32	10.28±1.00	11.45±1.23	12.64±1.41	13.71±1.93	15.13±2.55
	L4	6.58±1.24	8.87±1.03	9.69±1.17	10.47±1.32	11.39±2.09	11.72±2.56
	L5	6.57±1.50	7.75±1.04	8.14±0.99	8.51± 1.12	8.95±1.44	9.45±1.92
	L6	14.81±3.70	16.67±1.47	18.06±1.59	19.35±1.93	20.19±2.44	21.41±2.66
	L7	14.75±1.46	17.78±1.57	19.13±1.62	20.33±1.97	21.16±2.46	22.50±2.91
	L8	12.12±1.67	14.48±1.70	16.25±2.03	17.54±2.17	18.75±3.17	20.37±3.54
	L9	13.05±1.59	15.47±1.72	17.25±2.04	18.48±2.15	19.58±2.63	21.23±3.08
	L10	30.68±3.44	36.35±3.99	42.78±4.55	48.61±5.31	53.70±6.46	59.03±7.74
	L11	29.50±3.65	35.85±3.85	40.43±4.34	45.25±4.78	49.06±5.71	52.72±5.90
	L12	17.79±2.71	22.04±2.37	24.20±3.71	25.71±3.74	26.37±3.90	27.67±5.58
	L13	10.06±1.19	11.54±0.99	12.31±1.06	13.05±1.39	13.60±1.78	14.27±1.81
	L14	12.66±1.39	14.73±1.32	15.78±1.08	16.99±1.58	17.77±2.31	18.85±2.75
	L15	29.84±3.19	36.42±2.95	39.65±3.20	42.84±4.54	46.30±5.34	48.44±6.35
	L16	30.86±3.20	37.18±2.86	40.70±3.25	44.05±3.92	47.03±5.00	49.39±6.00
	L17	25.26±3.53	31.07±3.47	34.42±3.10	38.21±4.36	41.24±5.91	43.62±6.90

The averages of this variable according to the birth mode at birth are 30.86±3.01; 24.98±3.15 and 29.84±3.19; 25.26±3.53, respectively for single and twins. The male and the single the largest birth body size.

Results confirm anterior works of (Najari, 2005) indicated that the kids of the local population born with a small stature, indeed the height at wither does not exceed 31 cm for two sex. Such kids' stature at birth remains largely related to the adult size and to the genetic animal group (Ouni, 2006).

McGregor, 1985 indicate that one of the major influences on growth of goats is the mature size of the parents. Generally the progeny of large breeds grow faster than the progeny of small breeds. In fact, Jalouali (2000); Gaddour *et al*. (2007a) announce that the weight of kid represents between 7 and 9% of that of the goat breed.

Measurements of the kids after birth according to the sex and birth mode: Table 1 illustrates the descriptive statistics of 17 morphometrical variables of local goats studied in the experimental herd. This statistic descriptive of different morphometrical parameters, means and standard derivations of the principle variables of morphostructural evaluation, body length, height at withers and heart girth are given in standard age of each sex in Table 1. The means of all the traits increased with the increase of the age.

There was a gradual size gain of all the measurements for each kid's sex at the first five month. At this age the average of height at withers was 51.16±5.57 cm for male and 48.99±7.88 cm for female, also the average of body length was 46.10±6.67 cm; 43.18±6.22, respectively for male and female. All the values obtained for linear body measurements were higher in the male than the female for all standard age studied (1, 30, 60, 90, 120 and 150 days). L11, L15 and L17 are the important parameters of body size, all showed progressive increases throughout the first 5 month of life.

All the means for birth traits of the male were greater than those of the female of all the morphometric variables. The same notice indicate by Zhang *et al*. (2007). This difference of animal growth explained by the difference of genetic potentiality for each sex (Ouni, 2006).

At 150 days, the kid took a stature of an animal very close to his/her parents from point of view stature. It has been shown previously that quick growth for early

reproduction depends on nutrition and management, where feed represents about 75% of overall production costs (Morand-Fehr *et al*., 1982).

Muhammed *et al*. (1996) mentioned that this variation in body size is one of the criteria used in the classifying breeds of goats. Also, measurements of various body conformations are a value in judging quantitative characteristics of meats and helpful in developing suitable selection criteria. The birth weight of a kid depends primarily on the conformation and size of the adults of the breed to which it belongs (Morand-Fehr, 1981).

Mean values of almost all somatic measurements considered are quite similar to those observed in some Mediterranean breed (Herrera *et al*., 1996) and tend to increase gradually during the first five growing life differently for each sex.The results confirm that the local goat is of small size (Ouni, 2006; Najari, 2005; Ouni *et al*., 2006) the height at withers east does not exceed 60 cm for the adult female goat and 73 cm for adult male bucks (Chriha and Ghadri, 2001).

Growth performance was evaluated in terms of birth size. For each sex it was observed that, of all the morphometric variables, shoulder point width showed the greatest variability, which agrees with Herrera *et al*. (1996) who confirms the different nutritional state of the animals. Thus, small size can be considered as an adaptation criterion towards harsh breeding conditions (LeGal Planchenault, 1993). This adaptation strategy of the animal in these areas enables him to reduce nutritional requirements and to modulate the stresses effects. Also, small animals have particular walk ability, necessary to survive on poor ground pastoral (Ouni, 2006).

Table 2 summarises the average measurements obtained for all the traits studied on the kids' birth mode during the first five month of growing life, all the values obtained at the standard age of the morphostructural single kids were higher than the twins for all body part studied. body measurement of kids birth mode essentially (body length, height at withers and heart girth) of 149 born single and 127 born twins in the same standard age (birth, 30, 60, 90, 120 and 150 days). Average body length was24.98±3.15, 31.84±3.09, 36.31±3.60, 40.59±4.51, 44.02±5.23 45.73±6.22 for single and 25.26±3.53, 31.07±3.47, 34.42±3.10, 38.21±4.36, 41.24±5.91, 43.62±6.90 for twins, respectively for the standard age. Also for height at withers was 30.86±3.01, 37.36±3.29, 41.82±3.55, 45.77±4.70, 48.49±5.76, 51.63±6.86 for single mode and 29.84±3.19, 36.42±2.95, 39.65±3.20, 42.84±4.54, 46.30±5.34, 48.44±6.35 for the twins mode, respectively for the same standard age. In addition the heart girth of the birth mode at this standard age was 30.38±2.86, 37.40±4.15, 43.75±4.41, 47.92±5.54, 52.32±5.97, 55.10±6.27 and 29.50±3.65, 35.85±3.85, 40.43±4.34, 45.25±4.78, 49.06±5.71, 52.72±5.90, respectively for single and twins. It can conclude that the goat which gave at birth twins produced more of milk than that which gave at birth only one kid. Chalah (1997) shows that these differences in quantity explain by the difference in the intensity of the udder stimulation. However concerning the quantity, they are the simple one which has profit than the twins. Ben Hammouda (1985) showed the existence of a chronological difference between the maximum of the growth rate reached by the simple one and that which is reached by the twins. Sight the strong correlation which exists between daily average gain and the dairy production. Wenzhong *et al*. (2005) indicate also that kids born and raised as single were lower compared to those from multiple births. Indeed, the male and the single have the heaviest birth weight and the largest birth body size. The small size of the indigenous goat is observed for several caprine breeds and populations raised in hot zones of the world. The Importance variability of the kids' performances kids was signaled by Najari *et al*. (2007a; Najari, 2005).

Statistical relationship of kid's body parts: Table 3 illustrate the relationship of body parts and body weight, it was a higher significant correlation ($p<0.01$) between all studied variables. Pearson correlation between Body weight and the important linear measurements of body size (Body length, height-at -withers and heart girth) are 0.922, 0.893 and 0.909, repectively. These Highly significant linear relationships between body weight and body size at the first five month of age are in agreement with (Constantinou, 1989). This results show the degree of relationship and morphological similarity within local goat population and which may or may not be indicators of the mechanism growth of kid's (Ouni *et al*., 2006). From kidding until weaning they body size was significantly ($p<0.01$) correlated with weight till weaning between all studied variables. The marked difference of Pearson correlations for the somatic measurements (Table 3), indicate the existence of unobservable factors controlling the dependence structure of observed variables. (Macciotta *et al*., 2002). Indeed, the correlation between zoometric parameters (Herrera *et al*., 1990; Herrera *et al*., 1996) given that the majority of the genes influencing the configuration of an animal (Macciotta *et al*., 2002).

Table 4 reports the correlation between some body size parameters and body weight at standard age studied. Weight values consistently had a higher correlation significant ($p<0.01$) for all age types and for each sex. At standard this age (birth, 30, 60, 90, 120 and 150) body weight vwas correlated with body length (0.215, 0.613,

Table 3: Pearson correlations between the zoometrics variables and weight

	POIDS	L1	L2	L3	L4	L5	L6	L7	L8
POIDS	0.844(**)	0.846(**)	0.831(**)	0.800(**)	0.621(**)	0.832(**)	0.874(**)	0.812(**)	
L1	o. 844(**)		0.920(**)	0.790(**)	0.794(**)	0.506(**)	0.816(**)	0.876(**)	0.874(**)
L2	o. 846(**)	0.920(**)		0.803(**)	0.764(**)	0.543(**)	0.815(**)	0.876(**)	0.837(**)
L3	o. 831(**)	0.790(**)	0.803(**)		0.832(**)	0.565(**)	0.743(**)	0.785(**)	0.733(**)
L4	o. 800(**)	0.794(**)	0.764(**)	0.832(**)		0.482(**)	0.731(**)	0.768(**)	0.758(**)
L5	o. 621(**)	0.506(**)	0.543(**)	0.565(**)	0.482(**)		0.547(**)	0.568(**)	0.471(**)
L6	o. 832(**)	0.816(**)	0.815(**)	0.743(**)	0.731(**)	0.547(**)		.924(**)	0.841(**)
L7	0.874(**)	0.876(**)	0.876(**)	0.785(**)	0.768(**)	0.568(**)	0.924(**)		0.907(**)
L8	0.812(**)	0.874(**)	0.837(**)	0.733(**)	0.758(**)	0.471(**)	0.841(**)	0.907(**)	
L9	0.811(**)	0.876(**)	0.837(**)	0.734(**)	0.762(**)	0.483(**)	0.840(**)	0.905(**)	0.985(**)
L10	0.927(**)	0.837(**)	0.849(**)	0.836(**)	0.779(**)	0.577(**)	0.807(**)	0.854(**)	0.802(**)
L11	0.922(**)	0.835(**)	0.841(**)	0.822(**)	0.782(**)	0.580(**)	0.811(**)	0.866(**)	0.795(**)
L12	0.795(**)	0.689(**)	0.709(**)	0.686(**)	0.652(**)	0.560(**)	0.710(**)	0.752(**)	0.658(**)
L13	0.775(**)	0.761(**)	0.773(**)	0.741(**)	0.672(**)	0.534(**)	0.717(**)	0.764(**)	0.718(**)
L14	0.885(**)	0.831(**)	0.849(**)	0.794(**)	0.747(**)	0.571(**)	0.800(**)	0.857(**)	0.773(**)
L15	0.893(**)	0.836(**)	0.841(**)	0.826(**)	0.771(**)	0.583(**)	0.794(**)	0.841(**)	0.779(**)
L16	0.905(**)	0.849(**)	0.852(**)	0.838(**)	0.780(**)	0.594(**)	0.805(**)	0.850(**)	0.793(**)
L17	0.909(**)	0.850(**)	0.864(**)	0.833(**)	0.783(**)	0.600(**)	0.816(**)	0.865(**)	0.797(**)

Table 3: Continued

	POIDS	L9	L10	L11	L12	L13	L14	L15	L16	L17
POIDS	0.844(**)	0.811(**)	0.927(**)	0.922(**)	0.795(**)	0.775(**)	0.885(**)	0.893(**)	0.905(**)	0.909(**)
L1	0. 844(**)	0.876(**)	0.837(**)	0.835(**)	0.689(**)	0.761(**)	0.831(**)	0.836(**)	0.849(**)	0.850(**)
L2	0. 846(**)	0.837(**)	0.849(**)	0.841(**)	0.709(**)	0.773(**)	0.849(**)	0.841(**)	0.852(**)	0.864(**)
L3	0. 831(**)	0.734(**)	0.836(**)	0.822(**)	0.686(**)	0.741(**)	0.794(**)	0.826(**)	0.838(**)	0.833(**)
L4	0. 800(**)	0.762(**)	0.779(**)	0.782(**)	0.652(**)	0.672(**)	0.747(**)	0.771(**)	0.780(**)	0.783(**)
L5	0. 621(**)	0.483(**)	0.577(**)	0.580(**)	0.560(**)	0.534(**)	0.571(**)	0.583(**)	0.594(**)	0.600(**)
L6	0. 832(**)	0.840(**)	0.807(**)	0.811(**)	0.710(**)	0.717(**)	0.800(**)	0.794(**)	0.805(**)	0.816(**)
L7	0.874(**)	0.905(**)	0.854(**)	0.866(**)	0.752(**)	0.764(**)	0.857(**)	0.841(**)	0.850(**)	.865(**)
L8	0.812(**)	0.985(**)	0.802(**)	0.795(**)	0.658(**)	0.718(**)	0.773(**)	0.779(**)	0.793(**)	0.797(**)
L9	0.811(**)		0.800(**)	0.790(**)	0.655(**)	0.720(**)	0.774(**)	0.775(**)	0.791(**)	0.796(**)
L10	0.927(**)	0.800(**)		0.944(**)	0.756(**)	0.792(**)	0.879(**)	0.893(**)	0.905(**)	0.887(**)
L11	0.922(**)	0.790(**)	0.944(**)		0.785(**)	0.774(**)	0.878(**)	0.883(**)	0.889(**)	0.871(**)
L12	0.795(**)	0.655(**)	0.756(**)	0.785(**)		0.640(**)	0.747(**)	0.743(**)	0.748(**)	0.748(**)
L13	0.775(**)	0.720(**)	0.792(**)	0.774(**)	0.640(**)		0.749(**)	0.778(**)	0.788(**)	0.788(**)
L14	0.885(**)	0.774(**)	0.879(**)	0.878(**)	0.747(**)	0.749(**)		0.852(**)	0.863(**)	0.864(**)
L15	0.893(**)	0.775(**)	0.893(**)	0.883(**)	0.743(**)	0.778(**)	0.852(**)		0.979(**)	0.877(**)
L16	0.905(**)	0.791(**)	0.905(**)	0.889(**)	0.748(**)	0.788(**)	0.863(**)	0.979(**)		0.886(**)
L17	0.909(**)	0.796(**)	0.887(**)	0.871(**)	0.748(**)	0.788(**)	0.864(**)	0.877(**)	0.886(**)	

** Correlation is significant at the 0.01 level

Table 4: Coefficients of correlation between body weight (kg) and linear body measurements (cm) at standard age

Age (days)	Sex	L17	L15	L11
1	M	0.278(**)	0.161(*)	0.310(**)
	F	0.077	0.250(**)	0.351(**)
	M and F	0.215(**)	0.206(**)	0.335(**)
30	M	0.591(**)	0.439(**)	0.659(**)
	F	0.655(**)	0.393(**)	0.787(**)
	M and F	0.613(**)	0.418(**)	0.715(**)
60	M	0.591(**)	0.439(**)	0.659(**)
	F	0.671(**)	0.548(**)	0.687(**)
	M and F	0.732(**)	0.607(**)	0.757(**)
90	M	0.774(**)	0.568(**)	0.783(**)
	F	0.748(**)	0.518(**)	0.722(**)
	M and F	0.771(**)	0.559(**)	0.762(**)
120	M	0.674(**)	0.581(**)	0.786(**)
	F	0.748(**)	0.518(**)	0.722(**)
	M and F	0.636(**)	0.515(**)	0.689(**)
150	M	0.471(**)	0.615(**)	0.634(**)
	F	0.397(**)	0.428(**)	0.327(**)
	M and F	0.464(**)	0.516(**)	0.525(**)

** Correlation is significant at the 0.01 level (2-tailed), orrelation is significant at the 0.05 level (2-tailed), M: Male; F: Female

0.732, 0.771, 0.636 and 0.464), height at withers (0.206, 0.418, 0.607, 0.559, 0.516 and 0.515) and height girth (0.335, 0.715, 0.757, 0.762, 0.689 and 0.525), respectively.

High and positive correlations among birth traits indicated a strong relationship of L17, L15, L11 and weight during growing life for each sex essentially after one month age but the higher correlation for the male goats is most of the cases indicate that on the basis dimension of the various body lengths and body weight could be predicted more accurately in the male than in their female, this is a same result indicate by Hassen *et al.* (1992) and Fida Muhammad *et al.* (2006). It was concluded that non-genetic factors are more responsible for relationships between body weight and body size than genetic factors (Zhang *et al.*, 2007).

The body size variables (Body length and heart girth) could be used as a reliable guide for estimating

weight for each sex essentially after one month of age, these findings are i n agreement vwith those reported by Mohammed *et al.* (1996) and Hassan and Cirma, 1992).

CONCLUSION

The study indicated that male and single born kids of local goats in a traditionally managed in the arid area of Tunisia grew quickly before weaning than the female and twins' birth mode. Analysis of kids' body parts after birth contributes of characterization of local goat population and their kid's performances in Tunisian arid zone. Also the local goat small body size related to the population adaptation capacity and requirement to survive and produce under harsh environment of arid area.

Morphostructural parameters differ with kid's sex, birth mode during growing age. Indeed male kid's body becomes progressively apparent to bucks; the sexual life began early and since 5 months age.

Further more, body size at standard age strongly correlated with body weight during growing life especially after 30 days, this correlation depending to body part, sex and age. Based on the magnitude of this correlation body length, height at withers and height girth could be selected for predicting live weight of the animals especially after one month of age and essentially for the male.

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