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REPRODUCTIVE PERFORMANCE OF EGYPTIAN BUFFALO HEIFERS FED DIETS SUPPLEMENTED WITH YEAST CULTURE (GASTUR NATURE):

2- LIVE BODY WEIGHTS AND AGES AT PUBERTY, FIRST SERVICE AND CONCEPTION

Aboul-Ela, H.B.*; Sh. A. Gabr; M.A. Abdel-Latif *and A. E. Abdel-Khalek. *****

* Anim. Prod. Res. Institute, Agric. Res. Center, Ministry of Agriculture

** Anim. Prod. Dept., Fac. Agric., Tanta University.

*** Anim. Prod. Dept., Fac. Agric., Mansoura University.

ABSTRACT

A total of 18 Egyptian female buffalo heifers aging 7-11 months and having 197±12.0 kg LBW were divided randomly into three similar groups balanced for LBW and age (6 animals in each). The main experimental basal diet was formulated from concentrate feed mixture (CFM), berseem hay (BH) and rice straw (RS). Buffalo heifers in the control group (G1) were fed CFM, BH and RS (control diet), while those in the 1st and 2nd treated group (G2 and G3) were fed the control diet supplemented with 20 and 30 g yeast culture (YC) per head/day, respectively. Detection of oestrous activity of heifers was performed at the 12th months of age using infertile buffalo bull. The date of onset of the 1st oestrus was recorded for each heifer and considered as indicator for achieving puberty age if concentration of progesterone was ≥1 ng/ml in blood plasma. Heifers reaching puberty (the 1st oestrus) with LBW between 340->350 kg were naturally mating. Results revealed that heifers at puberty were insignificantly heavier in G2 by about 6 kg and lighter in G3 by about 11 kg than those in the control group (G1), being 339, 345 and 328 kg for G1, G2 and G3, respectively. At 1st service, heifers in G2 and G3 were insignificantly heavier by about 8 and 7 kg than in G1, respectively (353.7, 361.5 and 360.2 kg, for G1, G2 and G3, respectively). At conception, heifers in G2 and G3 were insignificantly heavier by about 4 and 8 kg than those in G1, respectively (359.8, 363.5 and 371.3 kg, respectively). All heifers in G3 (100%) were conceived at 350-400 kg LBW and 84% of heifers in G2 and 67% in G1 were conceived at the same LBW category. Puberty age was insignificantly earlier by about 31 days in G2 and significantly (P>0.05) earlier by about 75 days in G3 than in G1 (529.2, 498.5 and 454.7 days for G1, G2 and G3, respectively). At 1st service, average age was insignificantly earlier by about 29 and 55 days in G2 and G3 than in G1, respectively (549.0, 520.2 and 495.7 days for G1, G2 and G3, respectively). Average age at conception was significantly (P>0.05) earlier by about 9.5% in G3 than G1 and was insignificantly earlier by about 6.5% in G2 than in G1 (560.2, 523.7 and 506.8 days for G1, G2 and G3, respectively.

On the basis of the foregoing results the present study indicated the beneficial effects of yeast culture (Gustor nature) during pre-pubertal ages on reducing age of buffalo heifers at puberty, 1st service and conception in particular for diets supplemented with 30 g/head/day.

Keywords: Buffalo heifers, weight, age, puberty, 1st service, conception.

INTRODUCTION

Improving the reproduction of local buffaloes is important to attain considerable increase in milk production. It can be achieved by starting their

productive live as early as possible through early puberty, mating, conception and calving.

In Egyptian buffaloes, significant impacts of yeast culture (Gustore nature) supplementation were reported on live body weight and gain of heifer calves (Farage, 2004) and lactating buffalo cows (Ibrahim, 2004).

Dietary energy level is the limited factor affecting average daily gain, age at puberty, first service and conception in buffalo heifers (Shahin, 2004 a and b and El-Ashry *et al.*, 2001) and ewe lambs (El-Gohary, 2004).

The relationship between nutrition and reproduction in ruminants is complex and often quite variable. However, nutrient supply is a component of the management system that is under the control of the farmer needs to be carefully evaluated (Boland, 2002). Reducing age at puberty and 1st conception could help in decreasing costs, gaining fertile services and obtaining longer productive lives (El-Ashry *et al.*, 2004).

The current study aimed at evaluating the effects of dietary supplementation of yeast culture (Gustor nature) throughout pre-pubertal ages, on age, weight and ovarian activity of buffalo heifers at puberty, 1st service and conception.

MATERIALS AND METHODS

The present study was carried out at El-Gemmizah Research Station, Gharbia Governorate, belonging to Animal Production Research Institute, Agricultural Research Center, Ministry of Agriculture, in cooperation with Department of Animal Production, Faculty of Agriculture, Mansoura University, during the period from July 2003 to October 2004.

Experimental animals:

A total of 18 Egyptian female buffalo heifers aging 7-11 months and having 197±12.0 kg LBW were divided randomly into three similar groups balanced for LBW and age (6 animals in each). All experimental heifers were housed individually under semi-open shed, partially roofed with asbestos.

Feeding system and experimental groups:

The main experimental basal diet was formulated from concentrate feed mixture (CFM), berseem hay (BH) and rice straw (RS). The experimental diets were prepared according to the requirements of Animal Production Research Institute for growing Egyptian buffaloes based on live body weight. The daily allowances were adjusted every two weeks according to LBW. Amounts of feedstuffs required for feeding heifers at different LBW classes were the same for all experimental groups. Dry matter content (%) and calculated chemical composition of experimental diets (on DM basis) are presented in table (1).

Heifers in the control group (G1) were fed CFM, BH and RS (control diet), while those in the 1st and 2nd treated groups (G2 and G3) were fed the control diet supplemented with 20 and 30 g/h/d, respectively, from yeast culture (YC) namely Gusto nature.

The yeast culture was added and mixed with CFM of the diet, immediately before feeding. Heifers in all groups were fed the experimental diets at the beginning of the experiment up to conception of each animal. Diets were fed to all groups twice a day at 8 a.m. and 2 p.m.

Table (1): Dry matter content (%) and calculated chemical composition of experimental diets (on DM basis).

Diet	DM%	Chemical composition on DM basis (%)						Feeding values	
		OM	CP	CF	EE	NFE	Ash	TDN%	DCP%
G1	80.29	88.58	14.00	21.43	2.70	50.45	11.42	61.21	7.90
G2	78.72	89.73	14.62	21.41	2.85	50.85	10.27	66.50	10.35
G3	84.56	89.96	15.00	23.00	2.25	49.71	10.04	65.36	10.97

Fresh water was available all daytime. Mineral blocks were freely available throughout the experimental period.

Yeast culture (gustor nature) used in this study was imported from Barcelona, Spain allotted by Egyptic Company. It was contained malic acid salts, *Saccharomyces cerevisiae*, mould inhibitors, antisalmonella, antioxidants flavors and sweeteners.

Experimental procedures:

Heifers were weighed at puberty, 1st service and conception. Starting at the 12th months of age, infertile buffalo bull as a teaser was introduced 3 times (8 a.m., 12 a.m. and 2 a.m.) to animals of each group to detect oestrous activity. The date of onset of the first oestrous behaviour was recorded for each animal and considered as indicator for achieving puberty if concentration of Progesterone (Pg) was ≥1 ng/ml in blood plasma. Puberty was defined as the 1st day that progesterone determined in blood samples collected at weekly intervals exceeded 1 ng/ml (Jones *et al.*, 1991 and Simpson *et al.*, 1991). Heifers reaching puberty (the 1st oestrus) with LBW between 340->350 kg were naturally mating. Age and live body weight at the first, second oestrus and conception was recorded.

Statistical analysis:

Data were statistically analyzed according to Snedecor and Cochran (1982). The significant differences among treatment groups were tested using Duncan's Multiple Range Test Duncan (1955).

RESULTS AND DISCUSION

Live body weight at puberty:

The effect of dietary treatment on LBW of heifers at puberty was not significant, although heifers in G2 and G3 were heavier by about 6 kg and those in G3 were lighter by about 11 kg than the control heifers (Table 2).

It is worthy note that 83.4% of heifers in G3 (5/6 animals) reached puberty at lightweights (250-350 kg) versus 50% of heifers in G2 and 67% in G1 at the same LBW category. However, 50% of heifers in G2 (3/6 animals)

reached puberty at heavy weights (350-400 kg) compared with 16.7% of animals in G3 (1/6 animals) and 33.3% in G1 (2/6 animals).

Table (2): Means and standard errors of LBW at puberty and its frequency distribution of heifers in different groups.

Item	Experimental group		
	G 1	G 2	G3
Weight at puberty (kg)	339±12.5	345±12.5	328±8.4
Frequency distribution (%):			
250 – 300	16.7	16.7	16.7
300 – 350	50.0	33.3	66.7
350 – 400	33.3	50	16.7

This may indicate incidence of puberty of most heifers in G1 and G3 at lighter LBW (300-350 kg) than that of heifers in G2 (350-400 kg), being the lightest in heifers of G3 (Table 2).

The obtained weights at puberty are within the range reported by Barkawi *et al.* (1988), who found that the 1st ovulation occurred at a range from 256 to 390 kg in buffalo heifers. However, the present LBW at puberty in this study was higher than the range reported by El-Ashry (1993) (231- 309 kg and Ali *et al.* (1979) (310.3±7.8 kg) for female buffaloes. These differences may be attributed that weight at puberty combined with incidence of puberty, which could vary considerably due to interacting factors such as season of birth, breed, nutrition level and climatic factors (Metry, 1996).

Similar trend to that obtained in the present study was reported by Shahin (2004 a) on the same flock of buffaloes in the station. The author found that weight at puberty did not differ significantly among groups fed 120, 100 and 80% TDN diets, being lower than that obtained in this study (307.4, 301.8, and 292.8 kg, respectively).

In comparing the present LBW with those reported by Shahin (2004 a) at puberty, it was found that level of the dietary energy is the limited factor affecting LBW at puberty. Marston *et al.* (1995) found that puberty weight of cow heifers was similar for those fed supplemental soybean meal, low energy and dry lot diets, being 290, 296, and 297 kg, respectively, and heaviest (325 kg) for heifers fed high-energy diet ($P<0.01$). Dietary feed intake is important factor to determine LBW at puberty in cow heifers. Hall *et al.* (1995) fed cow heifers on different feeding types. They found that high-gain diet heifers were heavier ($P<0.01$) at **puberty** than moderate-gain diet heifers.

In cow heifers, average live body weight (kg) at **puberty** (first ovulation) of Hereford x Friesian heifers was 308 kg (**Moran *et al.*, 1990**). However, when age at puberty was determined by measuring progesterone in blood samples taken 2–3 times a week, LBW at puberty 337±30 kg (**Honaramooz, *et al.*, 1998**).

Live body weight at 1st service:

Data in table (3) show the effect of dietary treatment of LBW on heifers at 1st service was also not significant, but there was a tendency of heavier weights in G2 and G3 by about 8.0 and 7.0 kg than that of the control

group. Although heifers in G2 tended to be lighter than those in G2 and G1 at puberty, LBW at 1st service was heavier in G2 and G3 than in G1 by about 6 kg, however the differences were not significant.

This trend of differences in LBW at 1st service was associated with the highest distribution of heifers at 350-400 kg, being 83% (5/6 animals) in G3 as compared to about 67% in G2 and G1 and the lowest distribution of heifers at 250-300 kg (1/6 animals) in G1 (Table 3).

This clarified that heifers in G2 and G3 required more weights than those in G1 to service for the first time. As applied in the fieldwork of the station, heifers did not service before reaching 350 kg LBW. So, LBW of heifers did not differ significantly in G2 and G3 than G1. However, heifers in G2 and G3 were with slightly higher LBW and body confirmation than G1 heifers at the first service.

Table (3): Means and standard errors of LBW at 1st service and its frequency distribution of heifers in different groups.

Item	Experimental group		
	G1	G2	G3
Weight at 1st service (kg)	353.7±14.2	361.5±6.1	360.2±5.0
Frequency distribution (%):			
250 – 300	16.7	-	-
300 – 350	16.7	33.3	16.7
350 - 400	66.7	66.7	83.3

In agreement with the present tendency of heavier weight of animals fed YC supplemented diets in G1 and G2 at 1st service, Shahin (2004 b) found that heifers fed 120% TDN level were insignificantly heavier at 1st service than those fed 100 and 80% TDN levels, being 371.1, 365.2 and 356 kg, respectively as compared to 360.2, 361.5 and 353.7 kg presented in this study for G2, G1 and the control group (G1), respectively. This trend of differences may indicate the higher energy level of YC supplemented diets than the control diet.

Live body weight at conception:

Data in table (4) revealed that heifers in G2 and G3 were heavier by about 4.0 and 8.0 kg than that of the control heifers, respectively, but the differences among experimental groups were not significant. Shahin (2004 b) reported heavier heifers at conception, being significantly (P>0.05) higher for heifers fed 120% TDN diet (404.3 kg) than those fed 80% TDN diet (379.8 kg), but did not differ significantly from those fed 100% TDN level (390.5 kg).

It is of interest to note that the heaviest heifers in G3 was attributed to that all heifers in G3 (100%) conceived between 350-400 kg LBW. However, about 84% of heifers in G2 and 67% in G1 conceived at the same LBW category (Table 4).

The present weights at 1st conception are in agreement with a range reported by Ibrahim(1989), being 324-389 kg. However, El-Ashry *et al.* (2004) recorded lighter LBW (364.67 kg) at conception due to feeding buffalo heifers

diets containing 10 g of YC (Lacto-Sacc)/head 3 consecutive days/weekly than the control (363.33 kg).

Table (4): Means and standard errors of LBW at conception and its frequency distribution of heifers in different groups.

Item	Experimental group		
	G 1	G 2	G3
Weight at conception (kg)	359.8±10.6	363.5±5.3	371.3±2.9
Frequency distribution (%):			
300 – 350	33.3	16.7	-
350 – 400	66.7	83.3	100

Changes in LBW at puberty, 1st service and conception:

The trend of change in LBW of heifers from puberty to 1st service and then to conception differed among the experimental groups. At puberty, heifers were heavier in G2 and lower in G3 than in G1, while at 1st service; heifers were heavier in G2 and G3 than in G1. Yet, heifers in G3 were conceived at heavier LBW than G2 and G1, respectively (Fig. 1).

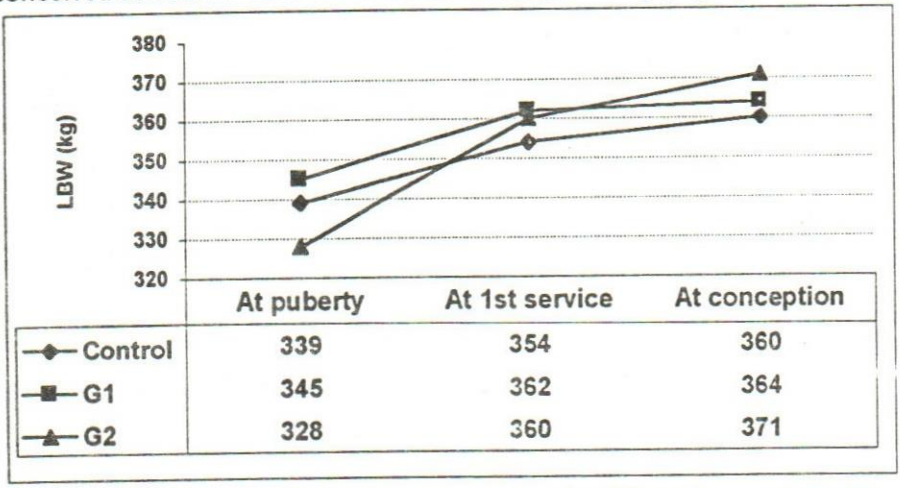


Fig. (1): Change in LBW of buffalo heifers in different experimental groups at puberty, 1st service and conception.

In spit of the presence of lighter heifers in G3 than in both G2 and G1, the marked increase in LBW of heifers in G3 as compared to G2 and G1 at 1st service was mainly related to incidence of early puberty in G3 at lighter weights, where service was not suitable at light LBW.

However, the pronounced increase in LBW of heifers in G3 as compared to G2 and G1 at conception was mainly related to that 50% of animals did not conceived at the 1st service and at the 2nd service their LBW increased as compared to the other groups, where 5/6 animals in G2 and 4/6 animals in the G1 conceived from the 1st service.

Generally, heifers in G2 and G3 were lighter at puberty, and heavier at 1st service and conception as compared to those in the G1.

Age at puberty:

The effect of dietary treatment on age of heifers at puberty was significant. Puberty age was significantly (P>0.05) earlier by about 74 days in heifers of G3 than G1 and was insignificantly earlier by about 31 days in heifers of G2 than G1. However, considerable differences in puberty age were found between G2 and G3 (about 44 days), but did not reach the level of significance (P≤0.05, Table 5).

It is worthy noting that the earliest puberty age of heifers in G3 was associated with 50% of heifers (3/6 animals) in G3 showed the 1st oestruos activity within 400-450 days as compared to one out of six animal in G2 (17%), while none of G1 heifers showed oestrous activity earlier than 450 days. This means that all heifers in G3 showed oestrous activity within 400-550 days versus 83 and 67% in G2 and G1, respectively (Table 5).

These results indicated beneficial effects of YC supplementation on puberty age of heifers, being higher for 30 than 20 g YC supplementation.

Table (5): Means and standard errors of age at puberty (day) and its frequency distribution of heifers in different groups.

Item	Experimental group		
	G 1	G 2	G3
Age at puberty (day)	529.2±17.05[b]	498.5±23.82[ab]	454.7±18.98[a]
Frequency distribution (%):			
400 – 450	-	16.7	50
450 – 500	33.3	16.7	33.3
500 – 550	33.3	50.0	16.7
550 – 600	33.3	16.7	-

a and b: Means denoted within the same row with different superscripts are significantly different at P>0.05.

In agreement with the present trends, El-Ashry *et al.* (2004) recorded marked reduction in age at puberty by about 40 days in buffalo heifers fed diets containing 10 g of YC (Lacto-Sacc)/head 3 consecutive days/weekly as compared to the control. Such trend was mainly related to the higher average daily gain (ADG) of supplemented than the control heifers. The strong relationship between ADG and age at puberty of buffalo heifers was proved by Shahin (2004 a), who found that ADG of heifers attained the earliest puberty was significantly (P>0.01) higher (700 g/d) than those attained the moderate and latest puberty (657 and 515 g/d, respectively). Selection for weaning weight and final weight did not have a detrimental effect on age at puberty in heifers (Wolfe *et al.* 1990).

In Egyptian buffalo heifers, Shahin (2004 b) found that age at puberty was 433 days. However, in cow heifers, mean age at puberty (1st ovulation) for Hereford x Friesian heifers was 352 days (Moran *et al.*, 1990). However, age at puberty in cow heifers, as determined by measuring progesterone in blood samples taken 2–3 times a week, was 54.8±1.9 wk (Honaramooz, *et al.*, 1998).

Age at puberty was affected by dietary factors in buffalo heifers, (Shahin, 2004 b), cow heifers (Hall *et al.*, 1994) and lambs (El-Gohary, 2004). As affected by dietary energy level, Shahin (2004 a) found that age at puberty of buffalo heifers was significantly (P<0.05) earlier in animals fed 120% TDN (424 days) than the control (433 days). Also in cow heifers, Hall *et al.* (1994) recorded that heifers fed high energy level were younger (P<0.001) at puberty than those fed moderate level.

On the basis of these findings, the earlier age at puberty (significantly in G3 and insignificantly in G2 as compared to G1) may be attributed to different impacts of YC supplementation on dietary energy intake of buffalo heifers, being higher with the high than low level of Gustor (30 than 20 g/h/d).

In cow heifers fed to achieve either moderate (0.6 kg/d) or high ADG (1.0 kg/d) to determine body weight at puberty. High-gain diet heifers were younger, (P<0.01) at puberty than moderate-gain diet heifers (Hall *et al.*, 1995). Buskirk *et al.* (1995) found that post-weaning gain of heifers receiving low and high diets was 0.43 and 0.62 kg/d, respectively. These treatments resulted in a range of post-weaning gain from 0.07 to 1.17 kg/d. Puberty age was earlier in heifers fed high diets.

In general, the present puberty age in all groups ranged between 15 and 17 months. This was indicated by the histological studies by Aboul-Omran (1998) on the development of the histological structure of the ovaries of Egyptian buffaloes from birth to maturity.

Age at 1st service:

The effect of dietary treatment on age of heifers at 1st service was not significant. Average age at 1st service was earlier by about 55 days in heifers of G3 than G1 and was earlier by about 29 days in heifers of G2 than G1. However, considerable differences in puberty age were found between G2 and G3 (about 24 days). The differences among groups were not significant (Table 6).

Table (6): Means and standard errors of age at 1st service and its frequency distribution of heifers in different groups.

Item	Experimental group		
	G 1	G 2	G3
Age at 1st service (day)	549.0±22.48	520.2±17.09	495.7±14.94
Frequency distribution (%):			
450 - 500	16.7	33.3	50.0
500 - 550	50.0	33.3	50.0
550 - 600	16.7	33.3	-
600 - 650	16.7	-	-

Inspit the insignificantly differences in age at 1st service between heifers groups, the effect of dietary treatment was more pronounced on frequency distribution of age at 1st service. All heifers in G3 were served for the 1st time between 450 and 550 days. The corresponding distributions of heifers in G2 and G1 were 67% in each, however; only one heifer in the control group (17%) was served for the 1st time between 600 and 650 days (Table 6).

Shahin (2004 b) found that age at 1st service was significantly (P>0.05) earlier in buffalo heifers fed 120% TDN (516.4 days) and 100% TDN (529.1 days) than those fed 80% TDN level (581.3 days). Average age reported by this author is nearly similar for buffalo heifers fed 120% TDN and heifers in G1, and lower age was obtained in this study for heifers in G2, which may indicate the beneficial effects of YC supplementation on age at 1st service of buffalo heifers, being the earliest in G2 heifers supplemented with 30 g YC.

Age at conception:

The effect of dietary treatment on age of heifers at 1st service was not significant. Average age at conception was significantly (P>0.05) earlier by about 9.5% in G3 than G1 and was insignificantly earlier by about 6.5% in G2 than G1. However, conception age insignificantly decreased by about 3.2% in G2 as compared to G3 (Table 7).

Also, the effect of dietary treatment was marked on frequency distribution of age at conception. All heifers in G3 conceived between 450 and 550 days versus 67% in heifers of G2 and G1. While, 33% of heifers in G2 and G1 required 600 and 700 days, respectively, to conceive (Table 7).

Table (7): Means and standard errors of age at conception and its frequency distribution of heifers in different groups.

Item	Experimental group		
	G 1	G 2	G3
Age at conception (day)	560.2±20.72^{b}	523.7±15.34^{ab}	506.8±10.03^{a}
Frequency distribution (%):			
450 - 500	-	33.3	50
500 - 550	66.7	33.3	50
550 - 600	16.7	33.3	-
600 - 650	-	-	-
650 - 700	16.7	-	-

a and b: Means denoted within the same row with different superscripts are significantly different at P>0.05.

It is of interest to note that the frequency distributions of heifers in G2 and G3 were similar at between 450-500, 500-550 and 550-600 days of age, which may indicate that higher conception rates from the first service in G2 and G3.

In accordance with the present results, El-Ashry *et al.* (2004) found that age at conception significantly (P<0.05) decreased from 25.07 months in the control buffalo heifers to 20.37 months in those fed diets containing 10 g of YC (Lacto-Sacc)/head 3 consecutive days/weekly. Also, Shahin (2004 a) found that age at conception of buffalo heifers significantly (P<0.05) decreased from 568.8 to 536.1 days for animals fed 120% TDN as compared to the control (100% TDN).

Age at conception obtained in this study is lower than those reported by Barkawi *et al.* (1988) and Mourad (1997) for Egyptian buffaloes. The present ages at 1st conception in all groups (16.8-18.6 months) could suggested that age at the first calving may be ranged between 27 and 29 months of age. Available reports revealed that age at 1st calving in Egyptian

buffaloes ranged from 30.46 months (Elwan, 1991) to 39.89 months (Osman, 1997). These results indicated the earlier age at conception in heifers of G3 and G2, being the earliest in G3 heifers supplemented with 30 g YC (about 27months).

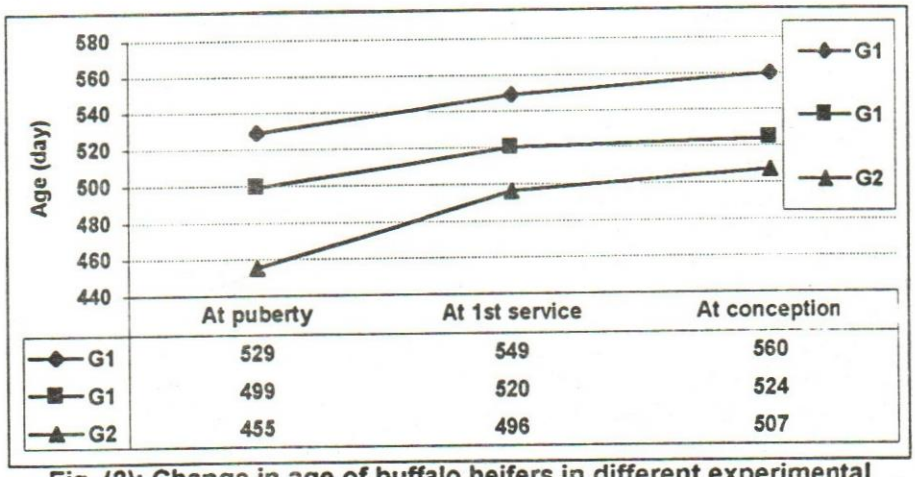
Change in age at puberty, 1st service and conception:

Average age at puberty, 1st service and conception indicated that average interval from puberty to 1st service were longer for heifers in G3 (41 days) than in G2 and G1 (21 and 20 days, respectively). The long interval of G3 was mainly attributed to incidence of early puberty at lighter weights (less than 340 kg) as compared to heifers in G2 and G1 in which most heifers showed their 1st oestrous activity at weights >340 kg. It is known that heifers must be served for the 1st time after being >340 kg as a routine work in the station (Fig. 1).

On the other hand, average interval from 1st service to conception was longer in G3 and G1 (11 days) than in G2 (4 days). This was associated with conceiving 5 out of 6 animals (83%) in G2 from the 1st service versus 3/6 in G2 (50%) and 4/6 in the control group (67%).

Shahin (2004 a) found that the interval from puberty to conception was significantly (P>0.01) shorter in 120 and 100% TDN than that in 80% TDN (91.5 and 95.9 vs. 123.3 days). Generally, these trends of differences in ages were associated with the differences in age at puberty, 1st service and conception as illustrated in figure (2).

Shahin (2004 b) found that buffalo heifers fed 120% TDN were heavier at 1st service and conception than those fed 100 and 80% TDN level, although insignificantly at 1st service, being 371.1, 365.2 and 356.3 kg, respectively and significantly (P>0.05) at conception, being 404.3, 390.5 and 379.8 kg, respectively.



	At puberty	At 1st service	At conception
G1	529	549	560
G1	499	520	524
G2	455	496	507

Fig. (2): Change in age of buffalo heifers in different experimental groups at puberty, 1st service and conception.

Also, ADG of early puberty heifers was significantly (P>0.05) higher from 1st service to conception (0.71 kg) than those attainting puberty at moderate (0.64 kg) or late puberty (0.54 kg).

On the basis of the foregoing results the present study indicated the beneficial effects of yeast culture (Gustor nature) during pre-pubertal ages on reducing age of buffalo heifers at puberty, 1st service and conception in particular for diets supplemented with 30 g/head/day.

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الكفاءة التناسلية لعجلات الجاموس المصري المغذى على علائق مضاف اليها مزرعة الخميرة (جاستور ناتشر):

١- وزن الجسم والعمر عند البلوغ، أول تلقيح والإخصاب

حسن بيومي أبو العلا*، شريف عبد الونيس جبر**، مجدي عبد الرحمن عبد اللطيف* و عبد الخالق السيد عبد الخالق***

* معهد بحوث الإنتاج الحيواني – مركز البحوث الزراعية – وزارة الزراعة
** قسم الإنتاج الحيواني – كلية الزراعة – جامعة طنطا
*** قسم الإنتاج الحيواني – كلية الزراعة – جامعة المنصورة

أجري هذا البحث في محطة بحوث الإنتاج الحيواني بالجميزة — محافظة الغربية التابعة لمعهد بحوث الإنتاج الحيواني — مركز البحوث الزراعية — وزارة الزراعة بالتعاون مع قسم الإنتاج الحيواني كلية الزراعة جامعة المنصورة خلال الفترة من يوليو ٢٠٠٣ حتى أكتوبر ٢٠٠٤. استخدم في هذه الدراسة ١٨ عجلة جاموسي أعمارها ٧-١١ شهر ومتوسط أوزانها ١٩٧ كجم قسمت إلي ثلاث مجموعات متماثلة علي حسب وزن الجسم الحي والعمر. غذيت كل الحيوانات علي العلف المركز، دريس البرسيم وقش الأرز علي حسب توصيات معهد بحوث الإنتاج الحيواني وكانت المجموعات التجريبية كالآتي:

١- المجموعة الأولى: غذيت علي علف مركز، دريس البرسيم وقش الأرز (المجموعة الضابطة).
٢- المجموعة الثانية: غذيت علي عليقة المجموعة الضابطة مع إضافة مزرعة الخميرة (٢٠ جم مركب الجاستور التجاري/رأس/يوم).
٣- المجموعة الثالثة: غذيت علي عليقة المجموعة الضابطة مع زيادة مزرعة الخميرة الى ٣٠ جم مركب الجاستور التجاري/رأس/ يوم).

واستمرت التغذية علي العلائق التجريبية حتى حدوث الإخصاب حيث تم وزن الحيوانات وتحديد العمر عند البلوغ، أول تلقيح والإخصاب وقد أظهرت الدراسة النتائج التالية:

١- زاد وزن العجلات عند البلوغ في المجموعة الثانية بحوالي ٦ كجم وفي المجموعة الثالثة بحوالي ١١ كجم عنه في المجوعة الضابطة (٣٤٥ ، ٣٢٨ و ٣٣٩ كجم، علي التوالي)، ولم تكن الفروق معنوية.
٢- زاد وزن العجلات عند أول تلقيح بحوالي ٨ و ٧ كجم في المجموعة الثانية والثالثة عنه في المجموعة الضابطة، علي التوالي (٣٦١,٥ ، ٣٦٠,٢ و ٣٥٣,٧ كجم علي التوالي)، ولم تكن الفروق معنوية.
٣- زاد وزن عجلات المجموعة الثانية والثالثة عند الإخصاب بحوالي ٤ و ٨ كجم عنه في عجلات المجموعة الضابطة، علي التوالي (٣٦٣,٥ ، ٣٧١,٣ و ٣٥٩,٨ كجم، علي التوالي) ، ولم تكن الفروق معنوية
٤- كان عمر البلوغ الجنسي مبكر بدرجة غير معنوية بحوالي ٣١ يوم في المجموعة الثانية ومبكر معنويا بحوالي ٧٥ يوم في المجموعة الثالثة عنة فى المجموعة الضابطة (٥٢٩،٤٩٩ و٤٥٤ يوم، على التوالي).
٥- كان العمر عند أول تلقيح مبكر بدرجة غير معنوية بحوالي ٢٩ و٥٣ يوم في المجموعة الثانية والثالثة عن المجموعة الضابطة (٥٤٩، ٥٢٠ و٤٩٦ يوم، على التوالي) .
٦- كان العمر عند الإخصاب مبكرا بدرجة غير معنوية بحوالي ٦,٥ % في المجموعة الثانية و مبكر معنويا بحوالي ٩,٥ % في المجموعة الثالثة عن المجموعة الضابطة (٥٦٠، ٥٢٤ و٥٠٧ يوم، على التوالي).

وتوصى الدراسة بإضافة مزرعة الخميرة إلي علائق عجلات الجاموس المصري قبل البلوغ حيث أنها تبكر عمر البلوغ الجنسي وتقلل العمر عند أول تلقيح وعند الإخصاب خصوصا مستوى الإضافة ٣٠ جم/رأس/يوم