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REPRODUCTIVE PERFORMANCE OF EGYPTIAN BUFFALOES AS AFFECTED BY DIETARY YEAST CULTURE SUPPLEMENTATION WITH OR WITHOUT PREMIX DURING SUMMER AND WINTER.

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ABSTRACT

The current study was conducted to evaluate the effects of dietary supplementation of YC (Gustor nature) with or without premix on reproductive performance of buffalo cows during summer and winter seasons. A total of 42 lactating Egyptian buffalo cows weighing 500-650 kg, aged 3-9 years and between 1-5 parities were used in this study for two seasons, winter and summer. Within each season, the experimental animals were divided into three dietary groups. Group 1, fed basal diets without supplementation and kept as control group. Group 2, fed basal diets and supplemented with 20 g yeast culture (Gustor nature)/h/d. Group 3, fed basal diets and supplemented with 20 g Gustor nature and 35 g premix/h/d. Total animals in each group were seven buffaloes. All animals were fed the tested diets one-month prepartum and 6 months postpartum. The obtained results indicated that postpartum 1st ovulation interval was longer ($P<0.05$) in summer than winter (33.7 vs. 19.7 d), however, it was not affected significantly by dietary treatment. Postpartum 1st oestrus interval was insignificantly longer in summer than winter (39.7 vs. 32.1 d) and shorter in G2 and G3 than in G1 (33.6 and 33.8 vs. 41.9 d). Postpartum service interval did not differ significantly as affected by season or dietary treatment, being 40.7 and 44.3 d in summer and winter and 45.9, 36.3 and 44.3 d in G1, G2 and G3, respectively. Service period length was 13.6 d in summer and 26.6 d in winter and 9.1, 30.6 and 20.4 d in G1, G2 and G3, respectively, but the differences were not significant. Number of services per conception was 1.4 in both seasons, and 1.5 in both G2 and G3 versus 1.3 in G1. Days open was insignificantly longer in winter (70.7 d) than in summer (54.4 d) and was not affected by dietary treatment. Buffaloes showed insignificantly shorter calving interval in summer than in winter (372.6 vs. 384.9 d), and was not affected by dietary treatment. In conclusion, feeding buffalo cows on diets supplemented with 20 g/h/d yeast culture (Gustor nature) has resulted in marked improvement in most reproductive measurements of Egyptian buffaloes only during summer in term of reducing number of services/conception and shortening days open and calving interval.

Keywords: Buffaloes, season, yeast culture, premix, reproduction.

INTRODUCTION

Season of the year has been reported to affect postpartum reproductive performance. Summer months usually are associated with lower reproductive performance than that occurred in winter ones. There were some evidences which indicated that season of calving may be more important than other factors affecting the resumption of postpartum ovarian activity in buffaloes (El-Fouly, 1983; El-Wardani, 1990&1995; and Barkawi *et al.*, 1997). The prominent fluctuations throughout the year with frequency of calving and conception occurred in association with unsuitable and suitable climatic conditions, and also in association with the feeding situation (Termeulen *et al.*, 1995). Moreover, El-Fouly (1983) reported that the delayed restoration of postpartum ovarian activity of Egyptian buffaloes could not be considered as a disease, but it is in most cases due to seasonal anoestrus.

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 and needs to be carefully evaluating. In Egypt, some studies evaluated the effect of dietary supplementation of yeast culture (YC) on productivity and reproductivity of lactating Friesian cows (Abdel-Khalek, 2003) and of lactating buffaloes (Ebrahim, 2004). Mineral bioplexes was found to stimulate the action of YC in the rumen and the availability of nutrients in the mammary gland in cows (Iwanska *et al.* (1999) and increased intensity of oestrous symptoms of buffaloes (Abdel-Khalek *et al.*, 2005).

Season effect was found to interact with other factors on reproductive traits of buffaloes. Gill and Rurki (1985) found under good management system that the hot season did not affect the service period and conception rate of buffaloes. Mahdy *et al.* (2001) found that effects due to season of calving were highly significant on postpartum first service interval, days open and calving interval of primiparous Egyptian buffaloes.

The current study was conducted to evaluate the effects of dietary supplementation of YC (Gustor nature) with or without premix on reproductive performance of buffalo cows during summer and winter seasons.

MATERIALS AND METHODS

Experimental animals and dietary groups:

Total of 42 Egyptian buffaloes was used in this study, which was carried out at El-Gemmizah Research Station, Gharbia Governorate, belonging to the Animal Production Research Institute (APRI). The experimental buffaloes 500-650 kg LBW, aged 3-9 years and between 1-5 parities. Within each season, the experimental animals were divided into three dietary groups. Group 1, fed basal diets without supplementation and kept as control group. Group 2, fed basal diets and supplemented with 20 g yeast culture (Gustor nature)/h/d. Group 3, fed basal diets and supplemented with 20 g Gustor nature and 35 g premix/h/d. Total animals in each group were seven buffaloes. All animals were fed the tested diets one-month prepartum and 6 months postpartum. Animals within each group were housed in open pens and fed in groups.

Calving period of all buffaloes used in this study lasted from June to August for summer calvers and from December to February for winter calvers. The main basal diets was formulated from corn silage, berseem hay, rice straw and concentrate feed mixture to meet recommendations APRI (2002) required for pregnant and lactating Egyptian buffaloes. The daily feed allowances average was 10.5 kg DM/ head containing 14 % CP in DM basis. The daily allowances was adjusted every 15 days according to milk yield. Fresh and clean drinking water was available at all times.

Gustro nature as a yeast culture was composed of malic acid salts, *Saccharomyces cerevisiae*, mould inhibitors, antisalmonella, antioxidants flavors and sweeteners. Contents per kg of premix were as following:

Di-calcium phosphate	185.0 g	**Cobalt sulphate**	287.0 mg
Potasium sulphate	54.0 g	**Iron**	50.2 mg
Manganize sulphate	24.8 g	**Pantothenic acid**	8 mg
Zinc oxide	10.0 g	**Vitamin B1**	7 mg
Sodium chlorid	100.0 g	**Vitamin B6**	3 mg
Magnesium sulphate	43.5 g	**Vitamin A**	64 IU
Sulphur	21.0 g	**Vitamin E**	64 IU

All buffalo cows were allowed to nurse their calves for the first four days postpartum (period of colostrum intake). Thereafter, they were milked in the absence of their calves' twice-daily at.6 a.m. and 5 p.m.

Oestrus detection:

During both seasons, buffaloes in all groups were visually observed for oestrus behaviour using teaser bull introduced for 3 times /day at (7:00 a.m., 11.00 a.m. and 4.00 p.m. h) and was allowed to run with females for 30 minutes on each occasion.

Reproductive parameters:

Postpartum first ovulation interval (PPFOI) was determined by subtracting four days from the time at which plasma progesterone concentration reached the level of <0.5 ng /ml that was sustained for two consecutive samples. This was based on the finding on changes in progesterone (Pg) concentration in association with oestrus and ovulation in buffaloes according to Aboul-Ela (1982), Avenell *et al.* (1985) and El-Moghazy (2003).

Time of the 1^{st} occurrence of standing postpartum oestrus was recorded as postpartum first oestrus interval (PPFEI). A fertile bull naturally served buffaloes that had been detected in standing oestrus and then postpartum first service interval (PPFSI) was recorded.

Rectal palpation was performed 60 d after service for pregnancy diagnosis. Thereafter, days open (DO), service period (SP), and number of service per conception (NSC) were recorded. Conception rate was determined as percentage of buffaloes, that were diagnosed pregnant in proportional to the total number of buffaloes served. This item was recorded for the 1^{st}, 2^{nd} and 3^{rd} service. Calving interval (CI) was computed as gestation period length plus days open.

Blood sampling:

Blood samples through postpartum period up to pregnancy were collected twice weekly immediately before feeding at 3 days interval via jugular vein from all buffalo cows for progesterone assay for monitoring ovarian activity. Progesterone concentration in blood plasma was determined twice weekly until the 1^{st} month of pregnancy. Blood samples were collected in tubes containing anticoagulant (EDTA) and were centrifuged for 15 minutes at 3000 rpm for plasma separation, which was stored at –20°C until analysis.

Progesterone assay:

Direct radioimmunoassy technique (RIA) was performed for determination of plasma progesterone concentration using antibody coated tubes kit (Diagnosis systems, laboratories Texas, USA) according to the produce outlined by the manufacture.

Statistical analysis:

The obtained results were statistically analyzed according to Snedecor and Cochran (1982). Data were analyzed using one-way analysis of variance (Harvey, 1990), utilizing SAS (1996). Chi-square was used to test the significance of the percentages values.

RESULTS AND DISCUSSION

Reproductive measurements:

Postpartum first ovulation interval (PPFOI):

Based on the estimated individual P4 concentration throughout postpartum, PPFOI of buffalo cows was shorter in winter than in summer by 14 d, although it was within 35 d postpartum during both seasons. The earlier incidence of 1st postpartum ovulation was mainly associated with higher ($P<0.05$) P4 concentration prior to onset of ovulation in winter than in summer by about 468%. Such difference was related to incidence of earlier and higher P4 spike in one animal during winter versus later and lower two P4 spikes in two animals during summer (Table 1).

This finding indicated earlier resumption of the postpartum ovarian activity in buffaloes during winter than summer, which was proved by Zeitoun and Fathelbab (1994), who found that days from calving to 1st ovulation were 43.5 and 82.5 d for buffaloes calving in winter and summer, respectively. Similar results were obtained by El-Wardani (1995) and El-Sobhy *et al.* (1987) on Egyptian buffaloes. Recently, El-Moghazy (2003) found shorter PPFOI for buffaloes during cold than hot season by about 7 d, but the difference was not significant. However, El-Fouly *et al.* (1976b); Barkawi (1984); El-Wardani (1990) and Youssef (1992) found no significant effect of season of calving on PPFOI of Egyptian buffaloes.

Effect of dietary supplementation on PPFOI and average concentration of P4 prior to postpartum 1st ovulation was not significant (Table 1), although PPFOI was shorter slightly in G2 (28.4 d) and markedly in G3 (25.4 d). As affected by season x dietary treatment interaction, PPFOI was shorter in all groups during summer than winter, being the longest in G1 during summer and the shortest in G3 during winter. It is of interest to note that average P4 concentration prior to postpartum 1st ovulation showed inconsistent trend in all dietary treatment groups during both seasons (Table 1).

In accordance with the present results, Abdel-Khalek (2003) found that PPFOI was insignificantly shorter in Friesian cows fed diet supplemented with YC than those fed unsupplemented diet. However, Ebrahim (2004) found that adding YC or YC and premix significantly decrease PPFOI of Egyptian buffaloes.

Table (1): Postpartum first ovulation interval (PPFOI) of buffalo cows as affected by season, dietary treatments and their interaction.

Item	n	Length of PPFOI (day)	Calving to 1st postpartum ovulation			
			Average P4 (ng/ml)	No. of P4 spikes	No. of animals showed P4 spikes	P4 (ng/ml) during spikes
Effect of season:						
Summer (S)	21	33.7±2.80^{a}	0.16±0.03^{b}	2	2	1.4±0.41
Winter (W)	21	19.7±4.31^{b}	0.91±0.25^{a}	1	1	2.0±0.0
Effect of dietary treatment:						
G1	14	29.6±3.69	0.26±0.08	-	-	-
G2	14	28.4±2.67	0.17±0.04	2	2	1.4±0.41
G3	14	25.4±4.76	0.32±0.07	1	1	1.8±0.0
Interaction between season and dietary treatment:						
G1 x S	7	36.4±4.21	0.15±0.04	-	-	-
G2 x S	7	32.4±2.71	0.09±0.03	1	1	1.0±0.0
G3 x S	7	32.2±7.37	0.23±0.07	1	1	1.8±0.0
G1 x W	7	21.0±2.86	1.02±0.61	-	-	-
G2 x W	7	21.7±2.40	0.77±0.18	1	1	2.0±0.0
G3 x W	7	17.0±1.68	0.94±0.39	-	-	-

a,b : Means in the same column with different superscript are significantly different (P ≤0.05). G1: Control, G2: fed YC diet and G3: fed YC and premix.

Generally, the differences in PPFOI may be related to wide variations in animal's age (Mohamed and El-Sheikh, 1983), feeding system (El-Keraby *et al.*, 1981), individuals, milk production, suckling, parity, nutritional level, and managerial system (El-Moghazy, 2003). The delay in resuming ovarian cyclicity was found to be the main reason for the long calving interval (Perera, 1981 and Aboul-Ela *et al.*, 1987).

Postpartum first oestrus interval (PPFEI):

As for PPFOI, also PPFEI of buffalo cows was shorter in winter than in summer by about 8 days, but the difference was not significant (Table 2). Such effect is similar to that reported by several authors on Egyptian buffaloes in cold and hot season (El-Fouly *et al.*, 1977; Barkawi, 1984 and El-Wardani, 1995). Also, Zeitoun and Fathelbab (1994) found that days from calving to 1st oestrus were 74.0; and 114.0 d for buffaloes calving in winter and summer, respectively. In good agreement with the present results, El-Moghazy (2003) reported that the differences in PPFEI of buffaloes in hot and cold seasons were not significant.

Dietary supplementation of YC (G2) or YC and premix (G3) markedly decreased PPFEI as compared to the control diet (G1); however, the difference was not significant (Table 2). Similar results were reported in Friesian cows fed YC diet (Abdel-Khalek, 2003) and Egyptian buffaloes fed diets supplemented with YC or YC and mineral mixture (Ebrahim, 2004). It is worthy noting that the beneficial effect of dietary supplementation on PPFEI of buffalo cows was more pronounced in winter than in summer (Table 2).

Table (2): Average postpartum first oestrous (PPFEI) and service (PPFSI) intervals of buffalo cows as affected by season, dietary treatments and their interaction.

Item	n	Postpartum 1st oestrous interval (PPFEI, day)	Postpartum 1st service interval (PPFSI, day)
Effect of season:			
Summer (S)	21	39.7 ± 2.01	40.7 ± 2.02
Winter (W)	21	32.1 ± 4.31	44.3 ± 3.70
Effect of dietary treatment:			
G1	14	41.9 ± 4.97	45.9 ± 4.13 ^{a}
G2	14	33.6 ± 2.65	36.3 ± 2.40 ^{b}
G3	14	33.8 ± 3.54	44.3 ± 3.53 ^{a}
Interaction between season and dietary treatment:			
G1 x S	7	38.6 ± 2.91	39.4 ± 2.92
G2 x S	7	34.1 ± 2.56	35.1 ± 2.56
G3 x S	7	46.4 ± 3.55	47.4 ± 3.55
G1 x W	7	45.3 ± 9.75	52.4 ± 7.17
G2 x W	7	31.3 ± 4.74	42.0 ± 5.77
G3 x W	7	19.9 ± 3.74	38.6 ± 5.89

a,b : Means in the same column with different superscript are significantly different (P ≤0.05). G1: Control, G2: fed YC diet and G3: fed YC and premix.

Postpartum first service interval (PPFSI):

In an opposite situation to PPFOI and PPFEI, PPFSI was shorter in summer than in winter by about 4 d, but the difference was not significant (Table 2). Such finding was mainly related to that most buffalo cows calving in winter came in the 1st oestrus at shorter PPFEI than date of postpartum 1st service, so they were served at the following oestrus. However in summer, most buffalo cows came in the 1st oestrus at suitable date of postpartum 1st service. Several investigators studied the trend of differences in PPFSI of Egyptian buffaloes as affected by season, being not significant (Mahdy *et al.*, 2001 and El-Moghazy, 2003). Meanwhile, other authors found that PPFSI was almost longer during hot than cold season (El-Fouly *et al.*, 1977 and El-Wardani, 1995).

Effect of dietary supplementation on PPFSI was significant, reflecting shorter PPFSI in G2 than in both G1 and G3. Similar to the effect of dietary supplementation of YC, Ebrahim (2004) found insignificant effect on PPFSI of Egyptian buffaloes fed YC and mineral mixture during summer. However, Abdel-Khalek (2003) found insignificant effect of YC supplementation on PPFSI of Friesian cows.

The pronounced effect of dietary supplementation on PPFSI as compared to the control diet was observed in G2 during summer and in G2 and G3 during winter, being the shortest in G3 during winter (Table 2). This indicated the beneficial effects on PPFSI of buffalo cows fed diets supplemented with YC during winter and YC plus premix during winter.

Service period (SP) and number of services per conception (NS/C):

Effect of season on average SP and NS/C was not significant, although SP length was shorter in summer than in winter and NS/C was similar in both seasons (Table 3). In agreement with the present results, El-Fouly *et al.* (1977) found no significant effect of season of calving on

SP and NS/C of Egyptian buffaloes. Some authors observed that NS/C was slightly influenced by the calving season (El-Shafie *et al.*, 1983 and El-Menoufy *et al.*, 1984). However, others reported that conception in hot months required more NS/C (1.7–2.5) than cold months (1.4–1.7).

As affected by dietary treatment, the differences in SP and NS/C between G1, G2 and G3 were not significant (Table 3). The obtained results agreed with those reported by Abdel-Khalek (2003) on Friesian cows fed YC diet and Ebrahim (2004) on Egyptian buffaloes fed YC or YC and mineral mixture, who found insignificant effect of dietary treatments on SP and NS/C.

It is of interest to note that all control buffalo cows (G1) in winter season were conceived after the 1st service. However, both dietary supplementations appeared marked effect on NS/C and SP compared with the control diet only in summer (Table 3).

Table (3): Service period (SP, day) and number of service per conception (NS/C) of buffalo cows as affected by season, dietary treatments and their interaction.

Item	n	Service period (day)	Number of service per conception	Frequency distribution (%) of animals required:		
				One service	Two services	Three services
Effect of season:						
Summer(S)	21	13.6±4.6	1.36±0.11	61.9	38.1	-
Winter (W)	19	26.6±10.4	1.42±0.18	68.4	26.3	5.3
Effect of dietary treatment:						
G1	14	9.1±4.27	1.29±0.13	71.4	28.6	-
G2	13	30.6±11.6	1.42±0.14	53.8	46.2	-
G3	13	20.4±11.4	1.42±0.24	69.2	23.1	7.7
Interaction between season and dietary treatment:						
G1 x S	7	18.3±7.1	1.57±0.20	42.9	57.1	-
G2 x S	7	8.1±5.3	1.17±0.18	71.4	28.1	-
G3 x S	7	14.3±3.5	1.17±0.18	71.4	28.1	-
G1 x W	7	0.0±0.00	1.00±0.00	100.0	00.0	-
G2 x W	6	56.8±20.3	1.67±0.21	33.3	66.4	-
G3 x W	6	7.5±22.0	1.67±0.49	66.6	17.6	16.7

G1: Control, G2: fed YC diet and G3: fed YC and premix.

The negative effect of dietary treatments on SP and NS/C during winter season may be related to increased milk production of buffaloes in G2 and G3 as compared to G1 (unshown data). Aboul-Ela *et al.* (2001) reported positive correlations between SP and NS/C, and milk production. In addition, Grings *et al.* (1990) reported that one of the possible disadvantages of the increase in milk production was the decrease in reproductive efficiency due to the high nutrients demand placed on the cow. Moreover, season effect was found to interact with other factors on reproductive traits of buffaloes. Gill and Rurki (1985) found under good management system that the hot season did not affect SP and NS/C of buffaloes.

It is of interest to note that the wide differences between length of SP and NS/C were mainly attributed to incidence of prolonged oestrous cycles, silent ovulation, persistent CL or early embryonic mortality in some animals (unshown data).

Days open (DO):

Effect of season on DO of buffaloes was not significant, although number of DO was lower in summer than winter by about 15 d (Table 4). The lower DO in summer was mainly associated with shortening SP rather than PPFSI of buffalo cows in summer than winter and was attributed to that 71.5% of buffaloes were conceived within two months postpartum in summer versus 57.9% in winter (Table 4).

Similar trend was reported by El-Moghazy (2003). However, several investigators indicated that DO was almost higher in hot than cold season (El-Fouly *et al.*, 1977; El-Menoufy *et al.*, 1984 and El-Wardani, 1995).

The effect of dietary supplementation and their interaction on average DO was not significant. As affected by dietary treatments during both seasons, buffaloes in G2 fed YC in summer showed the shortest DO, whereas all buffaloes in this group were conceived within two months postpartum and showed the shortest PPFSI, SP and NS/C. Similar effect was obtained on Friesian cows (Abdel-Khalek, 2003), who found that feeding animals on YC diets led to marked reduction in DO, but the difference between supplemented and the control group was significant. In this respect, Sastry *et al.* (1981) reported that better feeding and management during summer could reduce DO.

Table (4): Least square means and frequency distribution (%) of days open (DO) of buffalo cows as affected by season, dietary treatments and their interaction.

Item	n	Days open	Frequency distribution (%)	
			Within 60 d	>60 -120 d
Effect of season:				
Summer (S)	21	54.4±5.1	71.5	28.5
Winter (W)	21	70.7±9.4	57.9	42.1
Effect of dietary treatment:				
G1	14	55.1±5.08	64.3	35.7
G2	13	67.3±10.73	61.5	38.5
G3	13	64.6±11.37	69.2	30.8
Interaction between season and dietary treatment:				
G1 x S	7	57.7±7.62	57.1	42.9
G2 x S	7	40.8±2.94	85.7	14.3
G3 x S	7	50.0±6.26	71.4	28.6
G1 x W	7	52.4±7.17	71.4	28.6
G2 x W	6	94.5±17.36	33.3	66.7
G3 x W	6	68.2±20.98	66.7	33.3

G1: Control, G2: fed YC diet and G3: fed YC and premix.

Calving interval:

As affected by the shorter PPFSI and SP and subsequently lower DO, calving interval (CI) was shorter for buffalo cows in summer than winter (372.6 vs. 384.9 d), but the difference was not significant (Table 5). This was associated with higher distribution of summer calvers (76.2%) having CI of less than 380 d versus 58% in winter. The opposite was found for calvers having CI more than 410 d (Table 5).

In agreement with the obtained results, El-Moghazy (2003) found that the effect of season of calving on CI length of Egyptian buffaloes under field conditions was statistically not significant. However, buffaloes calving during hot season showed shorter CI than that during cold season by about 6 days (424 vs. 418 d). Also in Egyptian buffaloes under experimental conditions, Mahdy *et al.* (2001) found that summer calvers had shorter CI than winter calvers (526.3 vs. 545.2 days), but the difference was significant (P<0.001). Moreover, Ayesh (1992) and Ibrahim (1998) obtained similar results.

The longer CI in cold than hot season calvers presented herein was almost associated with longer DO caused mainly by longer SP and higher NS/C. The existing mild weather is favorable for milk production (Mahdy *et al.*, 2001).

In contrast, some authors found that CI was longer for buffaloes calving in hot than in cold season (El-Menoufy *et al.*,1984; Aboul-Ela, 1988 and El-Wardani, 1995).

Table (5): Least square means (day) and frequency distribution (%) of calving interval (CI) of buffalo cows as affected by season, dietary treatments and their interaction.

Item	n	Calving interval (day)	Frequency distribution (%)			
			≤350 d	351-380 d	381-410 d	>410 d
Effect of season:						
Summer (S)	21	372.6±5.3	19.0	57.2	14.3	9.5
Winter (W)	21	384.9±8.6	5.3	52.7	21.0	21.0
Effect of dietary treatment:						
G1	14	377.3±7.5	14.3	50.0	21.4	14.3
G2	13	374.8±9.1	15.4	61.5	7.7	15.4
G3	13	383.4±9.6	7.7	53.8	23.1	15.4
Interaction between season and dietary treatment:						
G1 x S	7	382.9±9.0	14.3	42.8	28.6	14.3
G2 x S	7	357.3±4.4	28.6	71.4	-	-
G3 x S	7	377.6±11.1	14.3	57.1	14.3	14.3
G1 x W	7	371.7±12.4	14.3	57.1	14.3	14.3
G2 x W	6	395.2±15.6	00.0	50.0	16.7	33.3
G3 x W	6	390.2±18.0	00.0	50.0	33.3	16.7

G1: Control, G2: fed YC diet and G3: fed YC and premix.

As affected by dietary supplementation, nearly similar CI was recorded in all dietary treatment groups, regardless season of calving, ranging between 374.8 d in G2 and 383.4 d in G3 (Table 5). Similarly Abdel-Khalek (2003) found insignificant reduction in CI of Friesian cows fed YC diet.

It is of interest to observe that, only feeding buffalo cows on YC diet (G2) during summer decreased CI to 357.3 d as compared to 382.9 d in the control group (G1) (Table 5). However, reverse situation was found during winter as affected by longer lactation period and higher milk yield (unpublished data). Yet, Interaction between season and dietary supplementation of YC in G2 during both seasons indicated longer CI in winter (395.2 d) compared to the summer (357.3 d), also as affected by longer lactation period and higher milk yield.

In agreement with the present results, Ebrahim (2004) found that CI decreased from 373.2 to 358.0 and 364.7 d for buffaloes fed YC alone or YC and mineral mixure diets during summer, respectively. Moreover, Sastry *et al.* (1981) added that better feeding and management during summer could reduce the CI from 514 day to 427 days.

In Egyptian buffaloes, CI ranged from 471 to 585 d (Metry *et al.*, 1994; Mahdy *et al.*, 2001 and El-Moghazy, 2003). Youssef (1992) attributed the variation of CI in Egyptian buffaloes to delay of resumption of ovarian activity (31.6%), delay of time at which she-buffalo displays its first heat (10.3%), longer service period (57.2%), and gestation length (0.9%). In addition, management practices, in particular level and type of feeding during postpartum period are largely responsible for a long CI as indicated in the present study. Buffalo breeders aim at achieving CI of 13 months.

Conception rate (%):

The effect of season of calving on conception rate (CR) of buffalo cows was significant (P<0.05) within two and three months postpartum, being higher in summer than winter. Final values of CR were 100% in summer as compared to 90.5% in winter. All summer calvers were conceived within two months postpartum versus 71.4% for winter calvers (Table 6).

This trend disagreed findings of El-Moghazy (2003) in Egyptian buffaloes and Shukla *et al.* (1970) in Indian Surti buffaloes, who observed no significant differences in conception rate during summer or autumn months. In addition, Tomar (1966) found no significant effect of season of insemination on conception rate of Indian Murrah buffaloes. Season of service was found to affect CR in buffaloes.

Low percentage of CR was reported during hot months (22-28%) compared to high percentage (71–72%) during cold months (El-Fouly *et al.*, 1976a and El-Shafie *et al.*, 1983).

Variation in conception rate was found among dietary treatment groups, regardless season, being significantly (P<0.05) higher in the control buffaloes (G1) than those in G2 and G3 within 60 days postpartum. All control buffaloes were conceived within three months postpartum; however, the final CR was 92.9% in both G2 and G3 during 120 days postpartum (Table 6). This was mainly independent on the low reproductive performance of buffaloes in G2 and G3 fed the dietary treatments as affected by increased milk yield.

Table (6): Cumulative conception rate of buffalo cows as affected by season, dietary treatments and their interaction.

Item	n	Cumulative conception rate (%) during postpartum			NP%
		60 d	>60 - 90 d	>90-120 d	
Effect of season:					
Summer (S)	21	80.9[a]	100[a]	-	0.0
Winter (W)	21	52.4[b]	71.4[b]	90.5	9.5
Effect of dietary treatment:					
G1	14	85.7[a]	100[a]	-	0.0
G2	14	64.3[b]	71.4[b]	92.9	7.1
G3	14	64.3[b]	85.7[ab]	92.9	7.1
Interaction between season and dietary treatment:					
G1 x S	7	71.4	100	-	0.0
G2 x S	7	100	-	-	0.0
G3 x S	7	71.4	100	-	0.0
G1 x W	7	100	-	-	0.0
G2 x W	7	28.6	42.9	85.7	14.3
G3 x W	7	57.1	71.4	85.7	14.3

a,b : Means for each classification having different superscripts within the same column are significantly different at P<0.05. NP: non-pregnant.
G1: Control, G2: fed YC diet and G3: fed YC and premix.

During summer season, it was found that all calvers in G2 were conceived earlier (within 60 d postpartum) compared with those in G1 and G3, after that the final CR was 100% in both groups G1 and G3 during 90 days postpartum. However in winter calvers, only control buffaloes (100%) were conceived within 60 days postpartum as compared to 28.6% and 57.1% in G2 and G3, respectively; while, the final CR was 85.7% of those in G2 and G3 during 120 days postpartum (Table 6). Similar results were reported by Ebrahim (2004) on Egyptian buffaloes and by Abdel-Khalek (2003) on Friesian cows fed YC diets. Furthermore, Season effect was found to interact with other factors on reproductive traits of buffaloes. Gill and Rurki (1985) found under good management system that the hot season did not affect the service period and CR of buffaloes.

Based on the foregoing results, feeding buffalo cows on diets supplemented with 20 g/h/d yeast culture (Gustor nature) has resulted in marked improvement in most reproductive measurements of Egyptian buffaloes only during summer in term of reducing number of services/conception and shortening days open and calving interval.

REFERENCES

Abdel-Khalek, A.E. (2003). Productive and reproductive performance of primiparous and multiparous Friesian cows fed rations supplemented with yeast culture (Yea-Sacc1026). Egyptian J. Nutrition and feeds 6 (special Issue): 1095-1105.

Abdel-Khalek, A.E.; Osman, Kh. T.; Ayek, M.Y. and Ebrahim, S.A. (2005). Influence of feeding diets containing yeast culture alone or with premix on reproductive performance of lactating Egyptian buffaloes. J. Agric. Sci. Mansoura Univ., 30 (1): 115-128.

Aboul-Ela, M.B. (1982). Changes in the interavaginal electerical resistance in relation to oestrus and ovulation in the buffalo seminar on reproduction and meat reproduction. Abstract of paper presented, at Tanuku, Andhra Pradesh, India on 15th, 16th and 17th January.

Aboul-Ela, M.B. (1988). Reproductive patterns and management in the buffalo. International Symposium on the Constraints and Possibilities of Ruminant Production in the dry subtropics. Cairo, Egypt, 5-7 Nov. pp. 174-179.

Aboul-Ela, M.B.; Khattab, R.M.; El-Keraby, F.E.; Shafie, M.M. and Bedier, L.H. (1987). Patterns of ovarian and oestrus activity and induction of cyclic activity during the post-partum period in Egyptian buffaloes. Proceeding of the 3rd research co-ordination meeting on optimizing grazing animal productivity in the Mediterranean and North African Regions with the Aid of Nuclear Techniques. Rabat, Morocco, March 23-27, pp. 236-254.

Aboul-Ela, M.B.; Mostafa, M.A. and Shalaby, N.A. (2001). Association between productive and reproductive performance in Holstein Friesian herds in Hungary. J. Agric. Sci. Mansoura Univ., 26: 207-216.

Avenell, J.A.; Saepudin, Y. and Fletcher, I.C. (1985). Concentration of LH, estradoil-17β and progesterone in the peripheral plasma of swamp buffalo cows (*Bubalus bubalis*) around time of oestrus. J. Reprod, Fert. 74: 419-424.

Ayesh, H. (1992). Some reproductive aspects of female buffaloes fed on dry feeds Ph. D. Thesis, Fac. Agric., Ain Shams Univ., Egypt.

Barkawi, A.H. (1984). Pre-partum and post-partum hormonal pattern and reproductive activity in Egyptian buffaloes. Ph. D. Thesis, Fac. pf Agric., Cairo Univ., Egypt.

Barkawi, A.H.; El-Wardani, M.A. and Khattab, R.M. (1997). Post Partum oestrous behaviour and related phenomena of Egyptian buffaloes in relation to season of calving. Proc., 5th World Buffalo Congress, Caserta, Italy, October, 13-16: 710-715.

Ebrahim, S.A. (2004). Physio-Nutritional studies on Egyptian buffaloes. Ph. D. Thesis, Fac. Agric., Mansoura Univ., Egypt.

El-Fouly, M.A. (1983). Some reproductive aspects of the Egyptian buffalo cows. Buffalo Bull., 2: 3-4.

El-Fouly, M.A. ; Afifi, Y. and Kirrella, A.K. (1977). Service period length in a herd of experimental buffaloes. Egyptian J. Anim. Prod., 17: 63-73.

El-Fouly, M.A.; Kotby, E.A. and El-Sobhy, H.E. (1976a). The functional reproductive peak in egyptian buffalo cows is related to day length and ambient temperature. Archivo Vetrinario Italiano, 27: 123-129.

El-Fouly, M.A.; Kotby, E.A. and El-Sobhy, H.E. (1976b). Effect of suckling on uterine and cervical involution in postpartum Egyptian buffaloes. Ind. J. Anim. Sci., 46: 221-227.

El-Keraby, F.; Aboul-Ela, M.B. and Bedier, L.H. (1981). The effect of diet on post partum reproductive traits in buffaloes. Agric. Res. Rev. 59: 1-13.

El-Menoufy, A.A.; El-Tayeb ; Ayoub, M.M. ; Yousef, H.I. and Abdou, M.S.S. (1984). Breeding performance in buffaloes and Friesian cows in Egypt. Egyptian J. Anim. Prod., 24: 193-206.

El-Moghazy, M.M. (2003). Physiological studies on the postpartum reproductive performance in buffaloes. Ph. D. Thesis, Fac. Agric., Mansoura Univ., Egypt.

El-Shafie, M.M.; Borady, A. M.A.; Mourad, H.M. and Khattab, R.M. (1983). Physiological and seasonal factors affecting reproductive performance of Egyptian buffalo heifers. Egyptian J. Anim. Prod., 23: 1-14.

El-Sobhy, H.E.; Khalil, F.A.; Abdelaal, A. E. and El-Fouly, M.A. (1987). Use of progesterone levels in peripheral blood for studying reproductive patterns of Egyptian buffaloes. Proceeding of the Final Research Coordination Meeting on Optimizing Grazing Animal Productivity in the Mediterranean and North African Regions with the Aid of Nuclear Technique, Rabat, Morocco March 23-27, pp: 231-233.

El-Wardani, M.A. (1990). Heat detection in Egyptian buffaloes with particular reference to post-partum period. M. Sc. Thesis, fac. Agric., Cairo Univ., Egypt.

El-Wardani, M.A. (1995). Reproductive efficiency of buffalo cows in relation to managerial practices. Ph. D. Thesis, Fac. Agric., Cairo Univ., Egypt.

Gill, R.S.S. and Rurki, G.S. (1985). Effect of season of calving on the reproductive behaviour of water buffalo. First World Buffalo Congress, Cairo, Egypt, Dec. 27-31 Vol. III ppp. : 604-613.

Grings, E.E.; D.M. DeAvila, Eggert and J.J. Reeves (1990). Conception rate, growth, and lactation of dairy heifers treated with recombinant somatotropin. J. Dairy Sci., 73:73-77.

Harvey, W.R. (1990). User's Guide for LSMLMW. Mixed model leastsquares and maximum likelihood computer program, PC-2 version, Ohio State University, Columbus, U. S. A. (Memeograph).

Ibrahim, S.A. (1998). Analysis of non-genetic factors affecting calving interval and post-partum traits in Egyptian buffaloes. Egyptian J. Anim. Prod. Vol. 35, Suppl. Issue, Dec. 597-607.

Iwanska, S.; Strusinska, D.; Zalewski, W. and Opalka, A. (1999). The effect of Saccharomyces cerevisiae 1026 used alone or with vitamin mineral premix on milk yield and milk composition in dairy cows. Acta Vet. Hung. 47 (1): 41-52.

Mahdy, A.E.; El-Shafie, O.M. and El-Rigalaty, H.A. (2001). Relative importance of some factors affecting performance traits in a herd of Egyptian buffaloes. Alex. J. Agric., 46: 1-18.

Metry, G.H.; Wilk, J.C.; McDowell, R.W. and El-Rigalaty, H.A. (1994). Factors affecting the performance of Egyptian buffaloes. J. Anim. Agric. Sci. Moshtohor, 32: 775-785.

Mohamed, A.A. and El-Sheikh, A.S. (1983). Post partum ovulation in a herd of Egyptian buffaloes. Indian J. Anim. Sci., 53: 485-487.

Perera, B.M.A.O. (1981). The use of hormone measurement for studying reproductive patterns of buffaloes in Sir Lanka. The 2nd Coordination Meeting of the Regional Cooperative Agreement on the Use of Nuclear Techniques to Improve Domestic Buffalo Production in Asia, Bangkok, Thailand, March 2-6 Part I, pp. 149-158.

SAS (1996): SAS User's Guide: Statistics, SAS Institute, Cary, NC.

Sastry, N.S.R.; Juneja, I.J.; Yadav, R.S.; Gupta, L.R.; Thomas, C.K. and Tripathi, S. (1981). Effect of provision during summer of extra shelter and sprinkling water on young buffalo heifers on their inter productive and reproductive functions. Indian Vet. J. 58: 753-754.

Shukla, K.P.; Mithuji, G.F. and Buch, N.C. (1970). Breeding performance of Surti buffaloes during summer months. Ind. J. Anim. Sci., 40: 551.

Snedecor, G. W. and W. G. Cochran (1982). Statistical Methods. 7th Ed. Iowa Univ. Press, Ames. Iowa, USA.

Termeulen, U.; Bode, E. and Nothelle, G. (1995). The fertility of the water buffaloe. Berl Munch Tierarztl Wochenschr. Dec., 108(12): 457-61 Related Articles, Books.

Tomar, N.S. (1966). Effect of the season of insemination on conception rates in Hariana cows and Murrah buffaloes. Ind. J. Dairy Sci., 19: 14-17.

Youssef, H.A.H. (1992). Some reproductive aspects of female buffaloes fed on dry feeds. Ph. D. Thesis, Fac. Agric. Ain Shams Univ., Egypt.

Zeitoun, M.M. and Fathelbab, A.Z. (1994). Seasonal ovarian function in Egyptian water buffalo as measured by a simple progesterone enzyme immunoassay in whole milk. Alex. J. Agric. Res., 39 (3).

J. Agric. Sci. Mansoura Univ., 31 (11), November, 2006

الأداء التناسلى للجاموس المصرى تحت تأثير التغذية على مزرعة الخميرة (جاستور) مع أو بدون مخلوط الأملاح المعدنية والفيتامينات خلال موسمى الصيف والشتاء.

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كان الهدف من هذا البحث هو دراسة تأثير إضافة مزرعة الخميرة (جاستور) مع أو بدون مخلوط الأملاح المعدنية والفيتامينات على الأداء التناسلى للجاموس المصرى خلال موسمى الصيف والشتاء. ولذلك استخدم فى هذه الدراسة عدد ٤٢ جاموسة تراوح وزنها بين ٥٠٠-٦٥٠ كجم، وعمرها بين ٤-٦ سنوات وكان عدد مرات الولادة ١-٥ ولادات خلال موسمى الشتاء والصيف. قسمت حيوانات التجربة إلى ثلاث مجموعات غذائية داخل كل موسم، غذيت على عليقه أساسية تحتوى على عليقه مركزة، سيلاج ذرة، دريس برسيم، قش الأرز. المجموعة الأولى غذيت على العليقه الأساسية بدون إضافات (مجموعة مقارنة)، المجموعة الثانية غذيت على العليقه الأساسية مع إضافة مزرعة الخميرة (٢٠ جم جاستور/ رأس / يوم)، بينما المجموعة الثالثة غذيت على العليقه الأساسية مع إضافة مزرعة الخميرة مع مخلوط الأملاح المعدنية والفيتامينات (٢٠ جم جاستور / رأس / يوم + ٣٥ جم مخلوط الأملاح المعدنية والفيتامينات / رأس / يوم). كل الحيوانات غذيت على العليقه التجريبية لمدة شهر واحد قبل الولادة و٦ أشهر بعد الولادة. تم أخذ القياسات التناسلية المختلفة وعينات الدم لتقدير مستوى هرمون البروجستيرون خلال فترة ما بعد الولادة. ولقد أظهرت النتائج بعد الولادة أن طول الفترة من الولادة حتى أول تبويض كانت أطول معنوياً ($P<0.05$) في موسم الصيف عن الشتاء (٣٣,٧ مقابل ١٩,٧ يوم)، وعموماً لم يتأثر طول الفترة من الولادة حتى أول تبويض معنوياً بالمعاملة الغذائية. طول الفترة من الولادة حتى أول شياع كانت أطول في موسم الصيف عن الشتاء (٣٩,٧مقابل ٣٢,١ يوم) وكانت أقصرفي المجموعة الثانية والثالثة عن الأولى (٣٣,٦ ٣٣,٨ مقابل ٤١,٩ يوم). طول الفترة من الولادة حتى أول تلقيح لم يختلف معنوياً بتأثير الموسم أو المعاملة الغذائية حيث كانت ٤٠,٧ و ٤٤,٣ يوم في موسم الصيف والشتاء وكانت ٤٥,٩ ، ٣٦,٣ و ٤٤,٣ يوم في المجموعة الأولى والثانية والثالثة، على التوالي. طول فترة التلقيح كان ١٣,٦ يوم فى موسم الصيف و ٢٦,٦ يوم في الشتاء وكانت ٩,١، ٣٠,٦ و ٢٠,٤ يوم في المجموعة الأولى والثانية والثالثة، على التوالي، و كانت الاختلافات غير معنوية. كان متوسط عدد التلقيحات اللازمة للإخصاب ١,٤ في كلا من الصيف والشتاء، و١,٥ في كلا من المجموعتين الثانية والثالثة مقابل ١,٣ في المجموعة الأولى. فترة الأيام المفتوحة كانت أطول في موسم الشتاء (٧٠,٧ يوم) عن موسم الصيف (٥٤,٤ يوم) ولم يتأثر معنوياً بالمعاملات الغذائية. كانت الاختلافات فى طول الفترة بين ولادتين غير معنوية وكانت أقصر فى موسم الصيف عن الشتاء (٣٧٢,٦ مقابل ٣٨٤,٩ يوم)، ولم تتأثر معنوياً بالمعاملات الغذائية. كان تأثير التفاعل بين الموسم والمعاملات الغذائية فى حالة التغذية على العليقه الأساسية مع إضافة ٢٠جم / للرأس / يوم من بيئة الخميرة (جاستور) أدى إلى تحسين ملحوظ أكثر فى الأداء التناسلى للجاموس المصرى أثناء موسم الصيف فقط بتقليل عدد التلقيحات اللازمة للحمل وقصر طول فترة الأيام المفتوحة وقصر طول الفترة بين ولادتين.

الخلاصة: يتضح من النتائج السابقة أن تغذية الجاموس على علائق مضاف إليها ٢٠جم/رأس/اليوم من بيئة الخميرة (جاستور) أدى إلى تحسن ملحوظ فى أغلب القياسات والخصائص التناسلية للجاموس المصرى فقط أثناء موسم الصيف من حيث تقليل عدد التلقيحات اللازمة للحمل وتقليل فترة الأيام المفتوحة والفترة بين ولادتين.